INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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50X1-HUM

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SUBJECT	Album of Electrical Circuit Diagrams of the Soviet IL-28 Aircraft	DATE DISTR.	26 May 1961
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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

1. Czech English-language document entitled A[illegible] Electrical Circuit Diagrams of the Aeroplane IL-28

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2. The document was published in Prague in 1958. It consists of 306 pages of text, tabular data, and circuit diagrams.

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STATE	X	ARMY	X	NAVY	X	AIR	X	NSA	X	FBI		OCR	X	NIC	X

(Note: W[illegible] Field distribution by "#")

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ALBUM
OF ELECTRICAL CIRCUIT DIAGRAMS
OF THE AEROPLANE
IL - 28

Prague 1958

ALBUM

OF ELECTRICAL CIRCUIT DIAGRAMS

OF THE AEROPLANE

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The album of the electrical and radio circuit diagrams of the aeroplane is a short handbook of the main systems of the aeroplane, and detail materiel about the electrical circuits of all the systems of the aeroplane; it is designated to be used by the personel of the aeroplane, which is acquainted with the aeroplane and its technical description.

The simple circuits are represented so, that they can be understood without any explaining text. The complicated circuits are explained by short notes.

To every circuit diagram a list of elements, systems and parts is added, giving the number of pieces, the reference symbols and numbers of drawings; this should make the exploitation of the aircraft easier.

All the feeders are, for easier understanding, represented on principal and assembly drawings.

For full representation of all the equipment the Album contains general principal and assembly diagrams of all the electrical equipment, the radio equipment and the radio location equipment, separately. Besides, the album contains specifications of all connectors and conductors of the electrical equipment.

According to the military requirements the Album is divided into three parts:

Part 1 - main diagrams of the aeroplane.

Part 2 - electrical circuit diagrams of the equipment and the radio and radio location system.

Part 3 - main electrical circuit diagrams without specifications.

The third part contains all assembly and principal diagrams of the electrical equipment with references to the corresponding numbers of the second part, which contains the specifications. So it is possible to have the main electrical feeders in one album, which makes its use easier.

INTRODUCTION

The electrical equipment of the aeroplane operates from the d. c. power net with a voltage of 24 - 28 V. The electrical equipment operates on one phase, with one pole connected to the frame of the aeroplane. Two generators of type ГСР-9000 and two board accumulator batteries 12-А- 30 connected in parallel to the board net, are the sources of electrical energy of the aeroplane.

When the aeroplane stands by on the aerodrome, the energy to the board net is supplied from aerodrome sources through the connecting clamps of the aerodrome supply. The energy from the power sources is led to the bus bars of the distribution systems. The power consuming elements are connected to the bus bars, and are protected by means of fuses. The types of fuses used are given in table 1. The control elements of the electrical equipment of the aircraft are placed on separate distribution systems, placed in the navigator's, pilot's and gunner's cabins.

In places, where the power net has to be connected because of constructional or exploitational reasons, the conductors are provided with plug- or screw-connectors.

The position numbers and the indeces of the systems on the different diagrams correspond to the general circuit diagrams and to the specifiacations of the aeroplane.

Conductor БПВ7 and БПВЛ3 is used for the board net.

The cross sections of the used conductors are given in table 2.

The ends of the conductors of the board net are dressed according to the examples given in table 3.

The conductors of the board net are marked with letters and digits. The letters are taken from the name of the power sources or power consuming systems and their purpose.

A sign, consisting of letters, corresponds to every power consuming element or system, and is completed by a number.

The index of the signs is printed on chlorvinyl tubes, which are put on the ends of the conductors, at the same time insulating the conductor ends in the places of connections.

The letter-number signs enable quick orientation in the wiring of the electrical equipment.

The letter indeces of the signs are explained in table 4.

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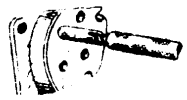
Used types of dressing of conductor ends

Table No. 3

	Bressed with solder for plug sockets		Dressed with tubular end-piece, under a screw
	Ring dressing		Soldered cable-eye
	Dressed with solder, under a screw		Pressed cable-eye

Used protecting devices
Table 1.

Name	Type	No. of pieces	Name	Type	No. of pieces
Melting fuse	ТП-200	5	Mains limit switch	АЗС-5	56
	ТП-400	2		АЗС-10	16
Inertia switch	ИП-5	2		АЗС-15	[illegible]
	ИП-15	2			
	ИП-30	2		АЗС-20	4
	ИП-50	2		АЗС-30	3
Melting fuse	ПВ-1	4		АЗС-40	1
	ПВ-2	5		АЗС-50	2

Used conductors

Table 2.

Cond. type	БПВЛ														[illegible]					
Cross section	[illegible]	0.5°	[illegible]	1.5°	1.95°	3°	[illegible]	6.0°	13°	21°	25°	35°	50°	70°	0.5°	0.88°	[illegible]	[illegible]	[illegible]	mm²
Length of conductor in plane	135	242	9286	1183	606	1990	51	112	143	11	7	54	18	134	[illegible]	[illegible]	15	[illegible]	[illegible]	m

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Name of group of the electrical equipment	No.	Name of power consuming element or system	Letter index
1	2	3	4
Power sources of the board net	1	Generators	Г
	2	Amperemeters	АГ
	3	Accu. battery	А
	4	Accu. A-meter	ВА
	5	Aerodrome supply source clamps	АЗР
	6	Relay for disconnecting the accu. bat. РТ-40	УА
Supply of dynamotors of the a. c. supply sources	7	Dynamotors МА-250, МА-500	ПТ ИНЕ
Engine control mechanizm circuits	8	Engine starter	ЗП
	9	Starters	ПЗП
	10	Pressure indicator	СЗП
	11	Pumps	ПП
	12	Pumps	ПОМ
	13	Fuel distribution cock	КРП
Trim tab and take off boost rockets control	14	Aileron trim tab	ТЭ
	15	Rudder trim tab	ТЭП
	16	Take off rockets	СРД
Electrical instrument supply	17	Oil manometers	[illegible]
	18	Oil thermometers	[illegible]
	19	Fuel manometers	[illegible]
	20	Fuel meter	[illegible]
	21	Automatic pilot	[illegible]
	22	Heating of auto-pilot	[illegible]
	23	АГМК-3	[illegible]
	24	Navigation indicator	[illegible]
	25	Artificial horizon	[illegible]
	26	Panel position indicator	[illegible]
	27	Outer air thermometer	[illegible]
	28	Clock heaters	[illegible]
	29	Voltmeters	[illegible]
Indication and heating instrument supply	30	Indicator of [illegible] pressure [illegible] /[illegible] and [illegible] cabin/	[illegible]
	31	Altitude [illegible]	[illegible]
	32	[illegible]	[illegible]
	33	[illegible]	[illegible]

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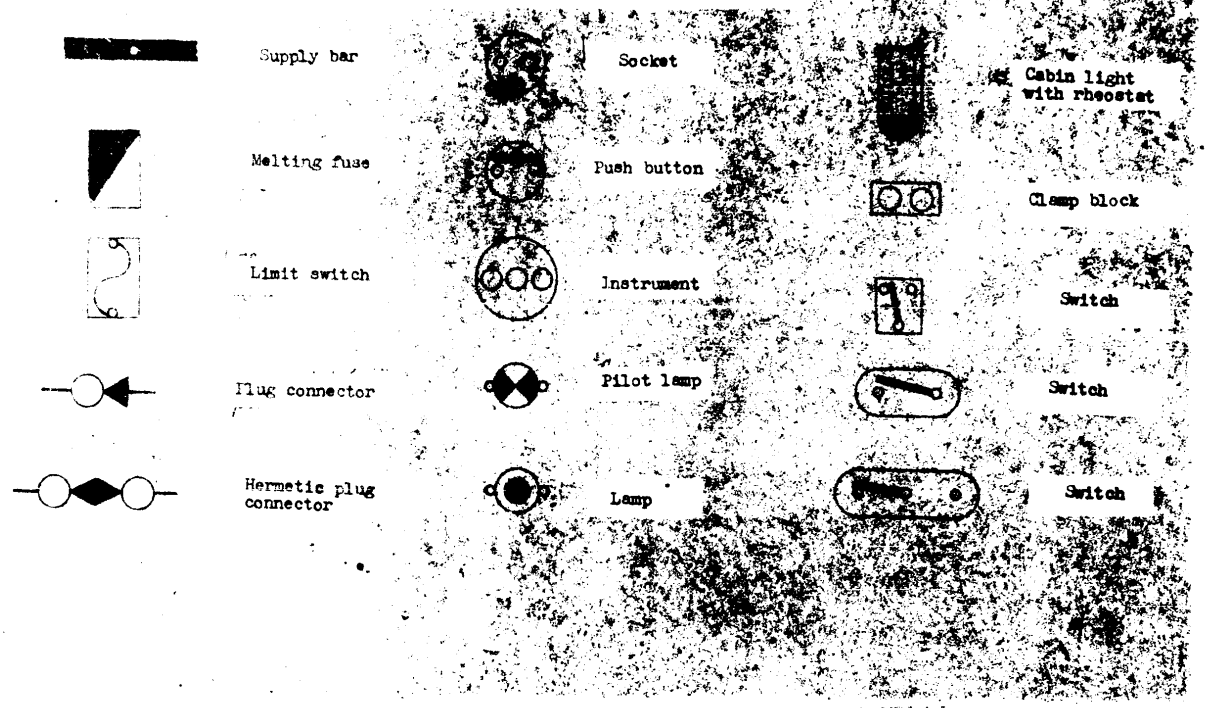
1	2	3	4
		Altitude indicator /gunner's cabin/	CKC
Illuminating and indicating equipment	35	Pilot's cabin illum.	OП
	36	Navig.'s cabin illum.	OШ
	37	Navig.'s compass illum.	OKШ
	38	Gunner's cabin illumin.	OC
	39	Tail compartment illum.	OX
	40	Portable-lamp socket	PЛУ
	41	Position lights	AHO
	42	Formation lights	CO
	43	Landing lights	Ø
	44	Signal rockets	CP
	45	Parachute rockets	ПР
	46	Landing gear indication	CШ
	47	Three-colour indication	TC
Heating system	48	Wing heating	OБK
	49	Cabin air temperature control	PT
	50	Cabin air thermometer	TBK
	51	Pilot's clothes heater	OOП
	52	Navig.'s cabin heater	OOШ
	53	Gunner's clothes heater	OOC
Fire-fighting equipment	54	Engine fire fighting equipment	[illegible]
	55	Fire alarm	[illegible]
	56	Fire cocks	[illegible]
Radio equipment power supply	57	Station "Syren-2"	[illegible]
	58	Liason radiostation	[illegible]
	59	Command radio station	[illegible]
	60	Radio compass	[illegible]
	61	Altimeter for small altitudes	[illegible]
	62	Altimeter for high altitudes	[illegible]
	63	Intercom. equipment	[illegible]
Arms	64	Control of bomb [illegible]	[illegible]
	65	Releasing of bomb [illegible]	[illegible]
	66	Emergency release [illegible] bombs	[illegible]
	67	[illegible]	[illegible]
	68	[illegible]	[illegible]
	69	[illegible]	[illegible]

1	2		3
Arms	70	Opening indication	СЛ
	71	Firing of front guns	СП
	72	Fire control of front guns	УО
	73	Photo gun /front/	С, ФП
	74	Photo gun operation indication /front/	СГ
	75	Recharging of guns /front/	ПГС
	76	Aiming system illumin. /front/	ПИР
	77	Photo gun operation indication /tail/	ГС
	78	Re-loading of guns /tail/	ПЛ,ПА
	79	Aiming set of tail mounting	АСП
	80	Illumination of turret	ОС
	81	Supply of tail mounting supply	ПА
	82	Power supply of the drive of the tail mounting	КФ
	83	A. c. net	И
	84	Potentiometer of horizontal aiming	ХПГ
	85	Potentiometer of vertical aiming	ПВ
	86	Pump power supply	ГС
	87	Starting box of pumps	ПК
Photo equipment	88	Photo equipment power supply	АФА
Instruments with independent supply	89	Tachometers	ТТ
	90	Exhaust gas thermometers	ТГ

Main used symbols:



DISTRIBUTION SYSTEMS AND BO

The distribution of electrical energy and the control of the electrical equipment is achieved by means of distribution systems and boards /desks/, placed in the cabins, the engine gondolas and in the fuselage.

The general circuit diagram and the location of the distribution systems and boards is given in fig. 1, the names are given in the specifications under the corresponding numbers.

The distribution systems serve to distribute the electrical energy among the separate power consuming elements. The main elements of the distribution systems are the bus bars, to which the various power consuming elements are connected through fuses. The distributing systems also serve to divide the net conductors into branches.

On the boards /desks/ are concentrated the control elements of the electrical equipment - the switches, buttons, rheostats etc. and the instruments, pilot lamps for checking the function of the electrical equipment.

The distributing systems and boards are provided with connectors, which secure easy disassembling.

In the following part are assembly diagrams of the distributing systems and boards with the specifications of the parts and instrumnets, which they contain.

The instruments and parts are denoted by a number followed by a letter /e.g. 70 , 120a, etc./. The given reference symbols are kept throughout the Album.

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DIAGRAM
of the Location of the Distribution Boards.
/To fig. 1/

No.	Name	No. of pieces	Location
1	2	3	4
10	Left navigator's board	1	Navig. cabin, left board, between ribs No. 1 and 4
20	Right navigator's board	1	Navig. cabin, right board, between ribs No. 1 and 4
25	Landlight control board	1	Pilot's cabin, right board, between ribs No. 8 and 9
30	Take off rocket control board	1	Pilot's cabin, left board, between ribs No. 8 and 9
35	Left pilot's desk	1	Pilot's cabin, left board, between ribs No. 8 and 11
40	Central distribution board /navigator/	1	Nav. cabin, right board, between ribs No. 4 and 6
41	Accumulator blocking relay	1	Fuselage, between ribs No. 37 and 38
50	Trim tab control board	1	Pilot's cabin, left board, between ribs No. 8 and 9
60	Right pilot's board	1	Pilot's cabin, right board, between ribs No. 8 and 11
65	Voltage regulator box	1	Fuselage, between ribs No. 10 and 11.
70	Pilot's instrument board	1	Pilot's cabin, rib No. [illegible]
80	Gunner's right board	1	Gunner's cabin, right board, between ribs No. 42 and [illegible]
90	Navig. instrument board	1	Navig. cabin, left board, between ribs No. 3 and [illegible]
100	Pilot lamp board /with 1206,0101,0201/	1	Gunner's cabin, right [illegible] rib No. 45
110	Gunner's left board	1	Gunner's cabin, left [illegible] between ribs No. 42 [illegible]
120	Three-colour indication board	1	Gunner's cabin, [illegible] rib No. 45
150	Left central distribution system	1	Fuselage, left [illegible] between ribs No. [illegible]
160	Right central distribution system	1	Fuselage, right [illegible] between ribs [illegible]
170	Tail central distribution system	1	Fuselage [illegible] rib No. [illegible]
290	Box of fuel pumping indication relay	1	Navig. [illegible] between [illegible]
528	Indication board	1	Fuselage [illegible]
	Reverse current relay box	2	[illegible]

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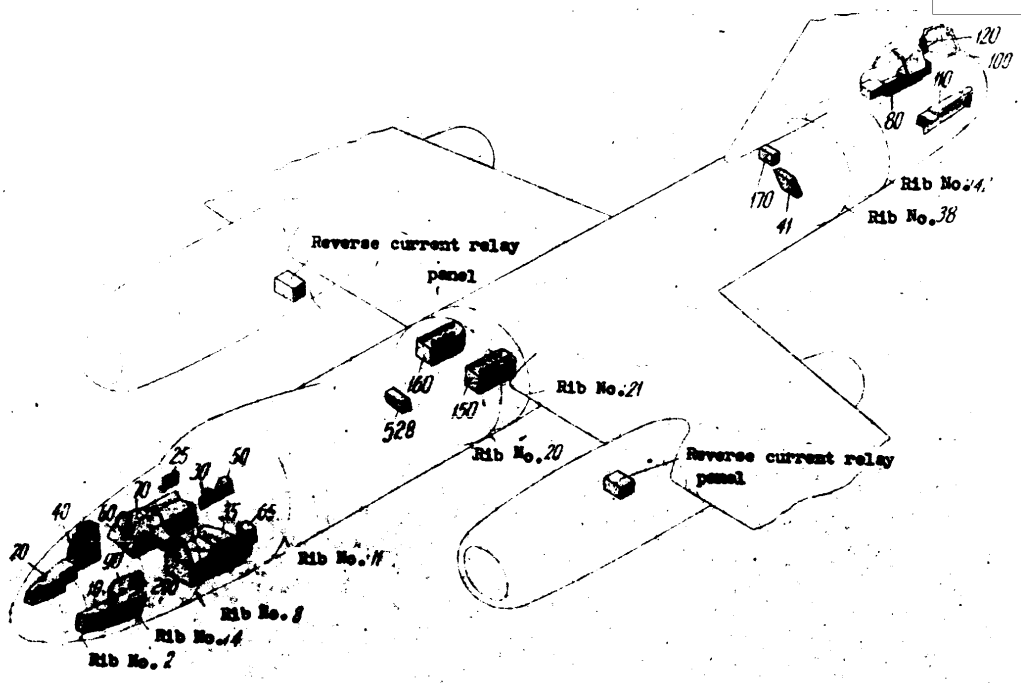

Fig. 1. Diagram of location of electrical distributing devices and panels.

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ASSEMBLY DIAGRAM OF THE NAVIGAT
/To fig. 4,5/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
2		Coordination knob	1	AM-5	Left navig. desk
10		Left navigator's desk	1	Made by manufacturer	Nav. cabin, left board, between ribs 1 and 4
	в	Pilot lamp of releasing the bombs from the left front case	1	СЛЦ-51	Left nav. board
	д	Pilot lamp of releasing the bombs from the right front case	1	СЛЦ-51	-"-
	з	Pilot lamp of releasing the bombs from the beam holder	1	СЛЦ-51	- " -
	г	Pilot lamp of releasing the bombs from the left back case	1	СЛЦ-51	- " -
	ц	Pilot lamp of releasing the bombs from the right back case	1	СЛЦ-51	- " -
	м	Main switch of the bomb releasing net	1	2В-45 from 3201, 1101, 1701	- " -
	ж1	Switch of indication of closed cases /with 3201,1701,1101/	1	В-45	- " -
	э	Rear case switch	1	В-45	- " -
	и	Front case switch	1	В-45	- " -
	к	Switch "Explode-No explosion"	1	2В-45 from 3201, 1101, 1701	- " -
	л	Bomb emergency release switch	1	Кнп-45	- " -
	н	Electrical releasing device	1	ЭСВР-45 (To 3101, 1101, 1701) ЭСВР-45М (To 3201, 1101, 1701)	
	н	Tube checking switch	1	ПВ-12А	
	п	Emergency control switch of openings	1	ПВ-[illegible]	
	р	Tactical control switch of openings	1	[illegible]	

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1	2	3	4	5	6
	е	Pilot lamp "Bombing net on"	1	СЛЦ-51	- " -
	т	Pilot lamp "Explosion"	1	СЛЦ-51	- " -
	у	Pilot lamp "ЭСАР on"	1	СЛЦ-51	- " -
	ж	Pilot lamp "Openings closed"	1	СЛЦ-51	- " -
	ц	Pilot lamp "Openings open"	1	СЛЦ-51	- " -
	ш	Pilot lamp of altitude indicator	1	СЛЦ-51	- " -
	щ	Intermediate relay /with 6201...4820/	1	РП-2	- " -
	ъ	Intermediate relay /with 6201...4820/	1	МВ-1	- " -
24		Socket for connecting the course stabilizer of the autopilot	1	АП-5	- " -
534		Movable bomb releasing button	1	КСВ-49	- " -
1	А	Navigator's left desk connector	1	ШР-8Н9НШ1	- " -
	В	Dtto	1	ШР48П26НШ2	- " -
	В	"	1	75 К	- " -
	Г	"	1	ШР55П31НГ3	- " -

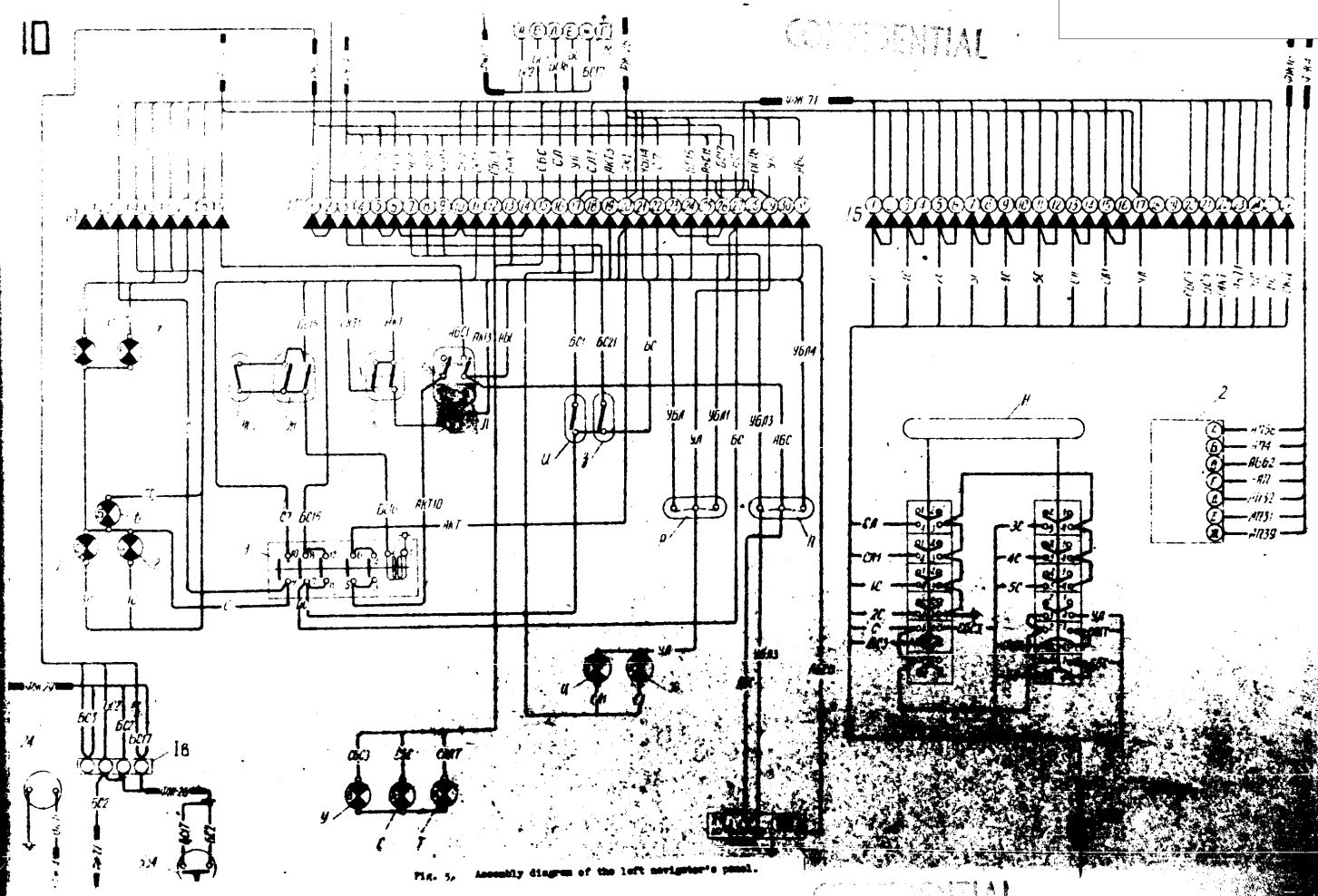

Fig. 5. Assembly diagram of the left navigator's panel.

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ASSEMBLY DIAGRAM OF NAVIGATOR'S RIGHT

/Fig. 8/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
20		Right navig. desk	1	Made by manufacturer	Navig. cabin, right board between ribs No. 1 and 4
	а	Releasing button of upper signal rockets	1	ПУСП-28	Right nav. desk
	б	Releasing button of central signal rockets	1	ПУСП-28	- " -
	в	Releasing button of lower signal rockets	1	ПУСП-28	- " -
	е	The perspective photo-camera opening control switch.	1	ПП-45	- " -
	ж	Lamp for indication of open photo well	1	СЛЦ-51	- " -
	с	Navigator's three colour indication button, red	1	5КС	- " -
	и	Nav. three colour ind. button, white	1	5КС	- " -
	к	Nav. three colour ind. button, green	1	5КС	- " -
	л	Socket of panor. camera control instrument	1	48К	- " -
	м	Panor. camera control instrument	1	Camera equipm.	- " -
	н	Perspective camera control instrument	1	- " -	- " -
	о	Socket of perp. camera control instrument	1	48К	- " -
	п	Perspective camera control instrument connector	1	[illegible] (0301, 0701)	- " -
	р	Panor. camera control instr. connector	1	[illegible] (0301, 0701)	- " -
	с	Socket of illum. of sight АС-52	1	47К	- " -
	т	Socket for connection of АБА with УСП /with 1705, 0001, 0001/	1	48К	- " -
	у	Rheostat of the illumin. of the aiming set of the navig. /with 5801, 3201, 4101/	1	РУ80-48	- " -

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1	2	3	4	5	6
20	A	Navig. right desk connector	1	WP48H16HW2	- " -
	B	Dtto	1	74K	- " -

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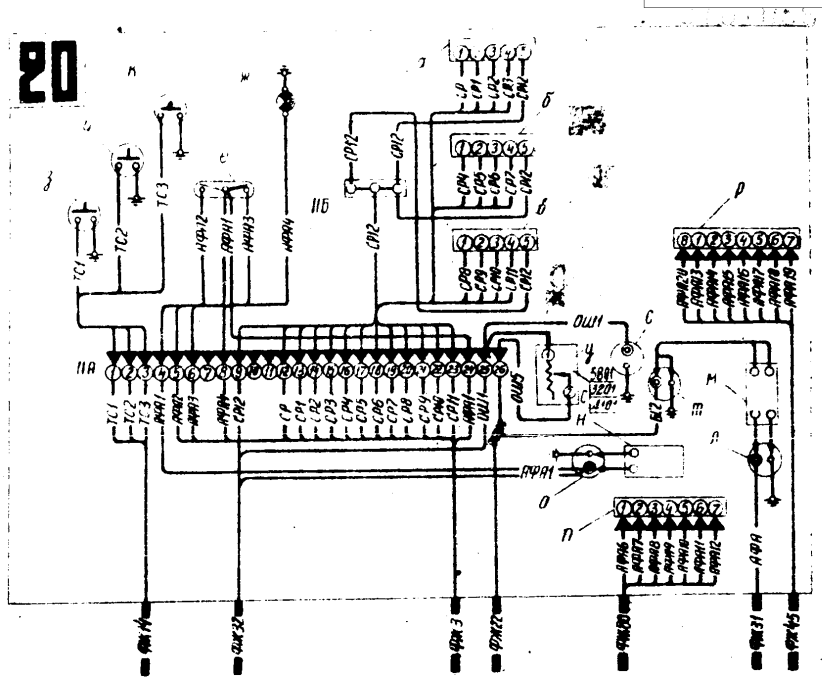

Fig. 8. Assembly diagram of right navigator's panel.

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SCHEMATIC DIAGRAM OF THE LAND-LIGHT CONTROL SC

/Fig. 11/

No. of pos.	Ind. of ligt.	Name	No. of pie-ces	Type of element	Location
1	2	3	4	5	6
25		Land light control board	1	Made by manufacturer	Pilot's cabin, right board, bet. r. 8 and 9
	a	Red button of the three colour indicat.	1	[illegible] KC	Spot-light contr. board
	d	White button of the three colour indicat.	1	[illegible] KC	- " -
	e	Green button of the three colour indicat.	1	[illegible] KC	- " -
	n	Left light control switch	1	ПП-[illegible],5	- " -
	л	Otto, right light	1	ПП-[illegible]	- " -
	c	Compass КИ-11 illum. rheostat	1	РИК-[illegible]	- " -
	м	Pilot's airdrome set illumination	1	ПКН	- " -
	в	Pilot's airdrome set illum. socket	1	47 K	- " -
	н	Landlight switch	1	[illegible] (from 5660, 3501, 4001)	- " -

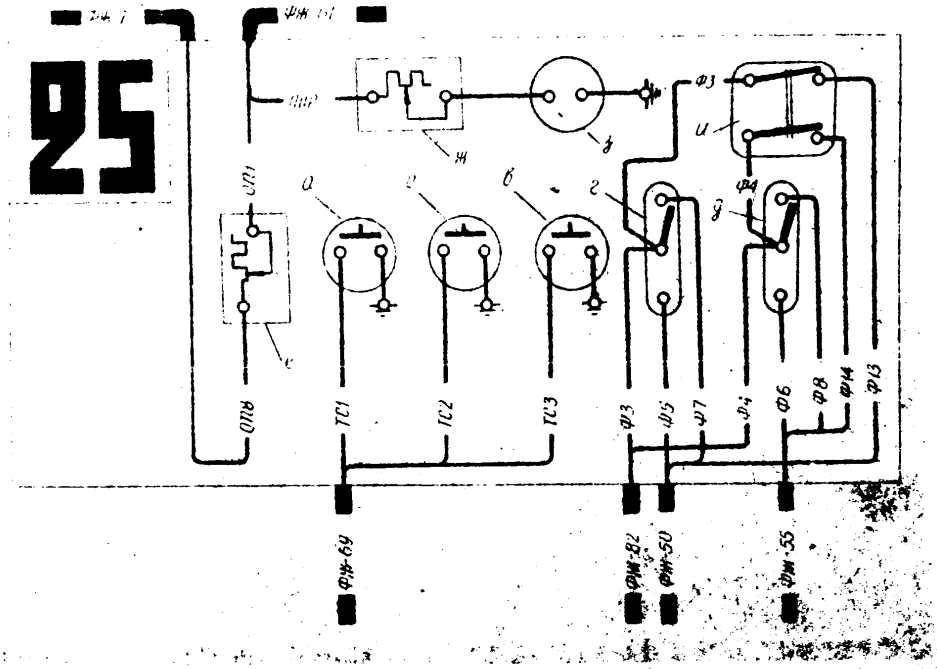
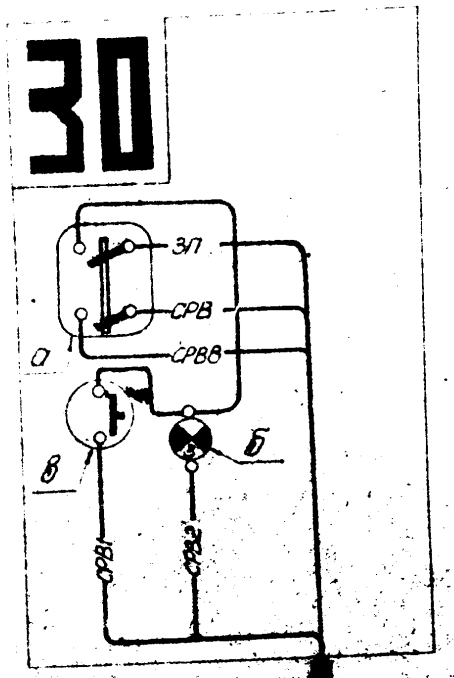


Fig. 11. Assembly diagram of landing light control panel.

ASSEMBLY DIAGRAM OF THE TAKE OFF BOOST ROCKET BOARD.

/Fig. 12/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
30		Take off rocket control board	1	Made by manufact.	Pilot's cabin, left board, between ribs No. 8 and 9
	a	Take off rocket control device switch	1	2B-45	Take off rocket control board
	б	Take off rocket release indication lamp	1	СЛЦ-51	-"-
	в	Take off rocket release button	1	5 KC	-"-



To connector V

Fig. 12. Assembly diagram of take off boost rocket panel.

ASSEMBLY DIAGRAM OF THE PILOT'S LEFT

/Fig. 14/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin left board, between ribs No. 8 and 11
	a	Indication lamp of release of bombs from left front case	1	CJIЦ-51	Left pil. desk
	б	Indication lamp of release of bombs from right front case	1	CJIЦ-51	- " -
	в	Indication lamp of release of bombs from beam holder	1	CJIЦ-51	- " -
	г	Indication lamp of release of bombs from left rear case	1	CJIЦ-51	- " -
	д	Indication lamp of release of bombs from right rear case	1	CJIЦ-51	- " -
	е	Indication lamp "Explosion"	1	CJIЦ-51	- " -
	ж	Ind. lamp "Bays shut"	1	CJIЦ-51	- " -
	з	Ind. lamp "Bays open"	1	CJIЦ-51	- " -
	к	Switch "Explosion - No explosion"	1	2B-45/[illegible] 1703,0700,0401/	- " -
		Emergency release switch	1	2B-45	- " -
		Emergency hole shutting button	1	5KC	- " -
	с	Temperature indication of left wing de-icing device	1	TWP-8	- " -
	п	Engine starting switch	1	[illegible]-45	- " -
	р	Accumulator and aerodrome supply socket switch	1	[illegible] 1[illegible] [illegible]	- " -
	с	Left motor starting button	1	[illegible]	- " -
	т	Right engine starting button	1	[illegible]	- " -
	у	Switch "Ground-air" of the left engine	1	[illegible]	- " -

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1	2	3	4	5	6
35	ф	Switch "Ground-air" of the right engine	1	ПН-45	Pilot's right desk
	х	Left engine starting aggregate switch	1	В-45	- " -
	п	Right engine starting aggregate switch	1	В-45	- " -
	ш	Indication lamp of switching of the left engine selector valve	1	СЛЦ-51	- " -
	щ	Indication lamp of switching off the right engine selector valve	1	СЛЦ-51	- " -
	э	Left engine selector valve switch	1	В-45	- " -
	ю	Right engine selector valve switch	1	В-45	- " -
	я	Engine starter fuse	1	В-45	- " -
	$а_1$	Fuel pumping switch	1	ЗИКН -45	- " -
	$е_1$	Indication lamp of the fuel pump of the front group of tanks	1	СЛЦ-51	- " -
	$п_1$	Rheostat of the fuel pump of the front group of tanks	1	РБП-45А	- " -
	$ж_1$	Indication lamp of the fuel pump of the rear group of tanks	1	СЛЦ-51	- " -
	$э_1$	Rheostat of the fuel pump of the rear group of tanks	1	РБН-45А	- " -
	$х_1$	Amperemeter switching relay	1	РТ-40	- " -
	$з_1$	Amperemeter switching relay	1	РТ-40	- " -
	$п_1$	Button switch of the accoustic land.gear warning, on the engine throttle lever	1	ВКР-140А	- " -
	$к_1$	"On" indication lamp of the mechanism of air pumping of the left engine /with 1705,0301, 0401/	1	СЛЦ-51	- " -
	$л_1$	Dtto, right engine	1	СЛЦ-51	- " -
	$н_1$	Left engine air pump control switch /with 1705,0301,0401/	1	ПН-45	- " -
	$м_1$	Chassis acoustic signallisation siren	1	С-1	- " -
	$р_1$	Fuel distribution cock switch	1	ПН-45	- " -
	$в_1$	Right wing control aggregate device switch	1	ПН-45	- " -

1	2	3	4	5	6
35	$с_1$	Left wing de-icing device switch	1	ПП-45	- " -
	$т_1$	Right engine air pump control switch	1	ПП-45	- " -
	$у_1$	Command radio station РСИУ-3М switch	1	2В-45	- " -
	$э_1$	Right wing de-icing device temperature indication	1	ТЦТ-9	- " -
	$к_1$	Stabilizer and fin de-icing device temperature indication	1	ТЦТ-9	- " -
	$ф$	Switch of cabin heating on ground	1	ПП-45	- " -
	А	Pilot's left desk connector	1	ШР60П45НШ2	- " -
	Б	Dtto	1	ШР55П31НШ3	- " -
	В	Dtto	1	ШР48П20НШ1	- " -
	Г	Dtto	1	ШР40П15НШ2	- " -
	Д	Dtto	1	ШР33П12НШ1	- " -
	Е	Dtto	1	ШР48П26НШ2	- " -
	Ж	Dtto	1	75-К	- " -

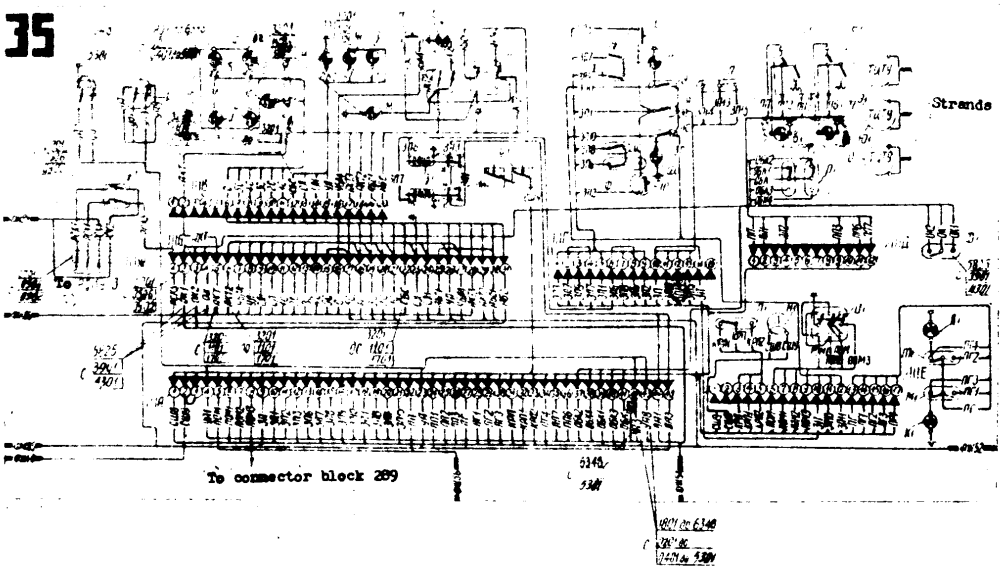

Fig. 14. Assembly diagram of left pilot's panel.

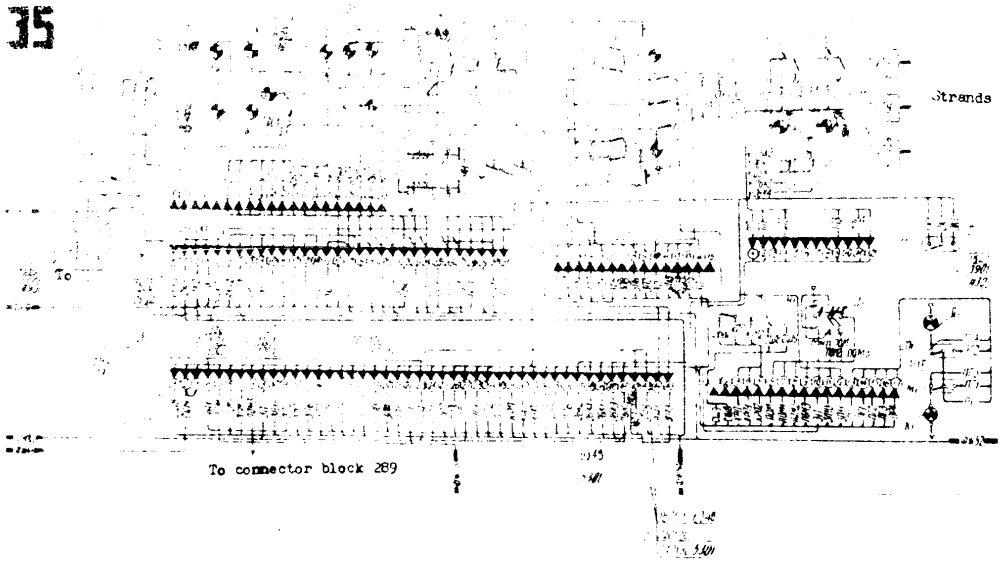

Fig. 14. Assembly diagram of left # pilot's panel.

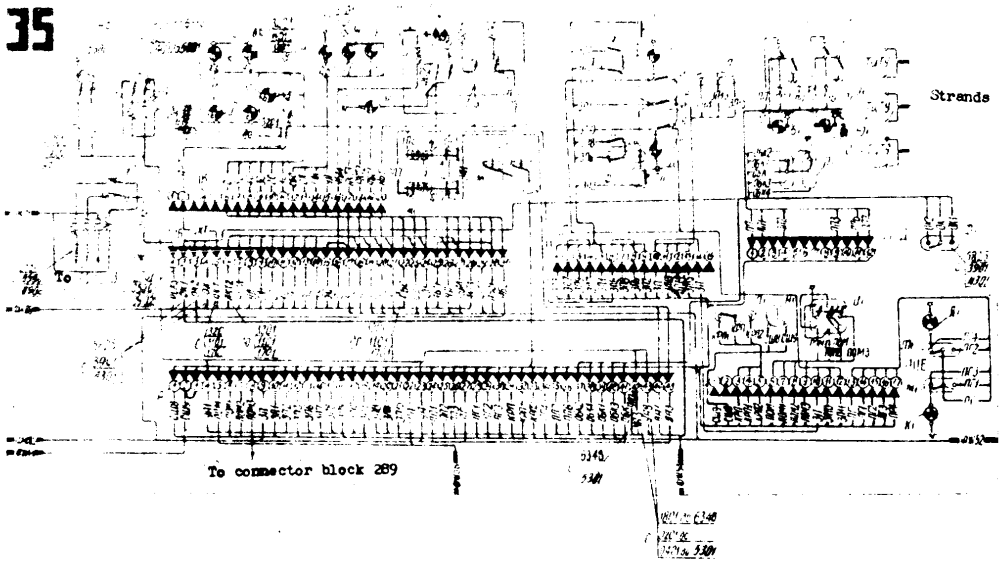

Fig. 14. Assembly diagram of left pilot's panel.

ENGINE [illegible] CONTROL DISTRIBUTION BOARD.

/Fig. 16/

No. of pos.	Ins. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Central distribution board	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 and 6 CDB of navig.
	а	Accumulator amperemeter	1	A-46	- " -
	д	Accumulator switch	1	B-46	- " -
	в	Left generator switch	1	2B-45	- " -
	г	Left generator amperemeter	1	A-46	- " -
	ж	Voltage regulation variable resistance of left generator	1	[illegible]-25A /from 2801, 0801,1301/	- " -
	ж	Volt meter switch	1	ННН-45	- " -
	ж	Voltmeter	1	B-46	- " -
	з	Voltage regulation variable resistor of right generator	1	ЗС-25А /from 2801, 0801,1301/	- " -
	к	Right generator amperemeter	1	A-46	- " -
	к	Right generator switch	1	2B-45	- " -
	л	A. c. voltmeter	1	3B-46	- " -
	м	A. c. voltmeter switch	1	2НН-46	- " -
	к	МА-250 voltage regulation resistor	1	РП-25-300 /from 2802, 0701,1401/	- " -
	п	Navigator's clock heating switch	1	B-45	- " -
	с	Dynamotor switch	1	ЗННН-45	- " -
	т	МА-500 voltage regulation resistor	1	РП-25-500 /from 2802, 0701,1401/	- " -
	у	УØ lamp rheostat on navig. board /with 1901,0101,0501/	1	РУØ0-48	- " -
	ф	Voltmeter switch /with 3001,0801,1501/	1	ПН-45	- " -
	х	УØ armature on the navig. board /with 1801, 0101,0301/	1	АРУØ0 -45	- " -
	п	Navig. ventilator switch	1	[illegible]-45	- " -
	ц	CDB bar	1	Made by manufacturer	- " -
	и	A. c. bar	1	- " -	- " -
	зп	Net protecting limit switch, engine starting and take off rockets	1	АЗС-20 /from 3616, 3216,3910/	- " -

1	2	3	4	5	6
40	CPB	Net limit switch, take off rocket limition	1	A30-15	Crew cabin, between ribs
	#3	Net limit switch, left landing light control		A36-5	No.4 and 6, right board
	#4	Net limit switch, right spot-light control	1	A30-5	- " -
	3046	Net limit switch, pumps, starting coils, starting solenoids	1	A30-30	- " -
	PT1	Net limit switch, cabin air temperature regul.	1	A30-5	- " -
	PT2	Net limit switch, cabin air temperature regulation, thermometer	1	A30-5	- " -
	MHE	Net limit switch, dynamotor MA-250	1	A30-30	- " -
	APK3	Net limit switch, automatic radio compass supply	1	A30-15	- " -
	PP	Net limit switch, automatic radio compass supply	1	A30-5	- " -
	CUY	Net limit switch, intercommunication equipment	1	A30-5	- " -
	PCK5	Net limit switch, command radio station supply	1	A30-5	- " -
	RCM	Net limit switch, IFS	1	A30-15 /from 1201, 0101,0101/	- " -
	CW	Net limit switch, undercarriage indicator	1	A30-5	- " -
	AHO	Net limit switch, position lights	1	A30-5	- " -
	CO	Net limit switch, formation lights	1	A30-5	- " -
	ABC	Net limit switch, emergency comb releasing	1	A30-10 /3101,0901,1401/.	- " -
	C15	Net limit switch, bomb releasing /with 1206, 0101,0101/		A30-20	- " -
	Y	Net limit switch, hole control /with 3101,0901, 1401/	1	A30-10	- " -
	AKT	Net limit switch, control of "Explosion-No explosion/	1	A30-5	- " -
	AM	Net limit switch, autopilot	1	A30-10	- " -
	BOJ	Net limit switch, navigator's voltmeter	1	A36-5	- " -
	AH1	Net limit switch, autopilot	1	A30-10	- " -

1	2	3	4	5	6
40	САП	Net limit switch, auto-pilot heating	1	АЗС-10	СДВ
	АØА	Net limit switch, plane camera	1	АЗС-5 /from 4201, 2101, 2801/	- " -
	ПГ	Net limit switch, air pumping mechanisms	1	АЗС-10	- " -
	АØА1	Net limit switch, perspective camera	1	АЗС-5 /from 4201, 2101, 2801/	- " -
	ГАК	Net limit switch, gyro-magnetic compass	1	АЗС-10	- " -
	ПК	Net limit switch, navigation indicator	1	АЗС-5	- " -
	ТНВ	Net limit switch, outer air thermometers, navig. and pilot's clock heating	1	АЗС-5	- " -
	РНА	Net limit switch, fuselage illumination	1	АЗС-5	- " -
	ОШ	Net limit switch, navigator's cabin illum.	1	АЗС-5	- " -
	ОШ1	-- " --	1	АЗС-5	- " -
	СЛШ 100П	Net limit switch, navig. hole control	1	АЗС-10	- " -
	100Ш	Net limit switch, navigator's and pilot's clothing heating	1	АЗС-50	- " -
	ОП	Pilot's cabin net limit switch	1	АЗС-5	- " -
	ОП1	— " —	1	АЗС-5	- " -
	ОН#	Net limit switch, heating /3101,0901,1401/	1	АЗС-5	- " -
	ОВН1	Net limit switch, heating /3101,0901,1401/	1	АЗС-5	- " -
	СКП	Net limit switch, clock, altitude indic., dangerous pressure indicator	1	АЗС-5	- " -
	КРП	Net limit switch, fuel distribution cock	1	АЗС-10 /from 5618, 3216,3910/	- " -
	СЕК	Net limit switch, de-icing mechanism valve control	1	АЗС-5	- " -
	ПВ	Net limit switch, wave-guide pump	1	АЗС-5	- " -
	ВВ	Net limit switch, wave-guide heating /from 3601,1509,2201/	1	АЗС-10	- " -
	МНВ	Net limit switch, dynamotors МА-500	1	АЗС-40	
	УШ	Net limit switch, indicator of board position and of position of wheel of front undercarriage leg	1	АЗС-5	

1	2	3	4	5	6
40	C7	Net limit switch, cab release indication /from 3201,1101,1701/	1	A3C-5	СПВ
	CP12	Net limit switch, signalling rocket firing /from 3460,3001,3801/	1	A3C-5	- " -
	OK	Net limit switch, cabin heating on ground /from 5825,3901,4501/	1	A3C-5	- " -
	B&H	Net limit switch, navigator's and pilot's ventilators /from 5601/	1	A3C-5	- " -
	APK	Fuse, automatic radio compass	1	ПВ-2	- " -
	PB6	Fuse, altimeter, high altitudes	1	ПВ-2	- " -
	PCH2	Fuse, command radio station	1	ПВ-2	- " -
	ВСЛ7	Fuse /from 2601,0507, 1401/	1	ПВ-2	- " -
	И1	Fuse, rear mounting control	1	ПВ-2	- " -
1Y	A	CDB connector	1	ШРВ0П46Н12	- " -
	Б	Dtto	1	ШРS5М31Н13	- " -
	B	Dtto	1	ШР48П9НШ1	- " -
	Г	A.c. board connector	1	ШР32П14НШ5	A.c. board
	Д	Dtto	1	ШР32П14НШ3	- " -

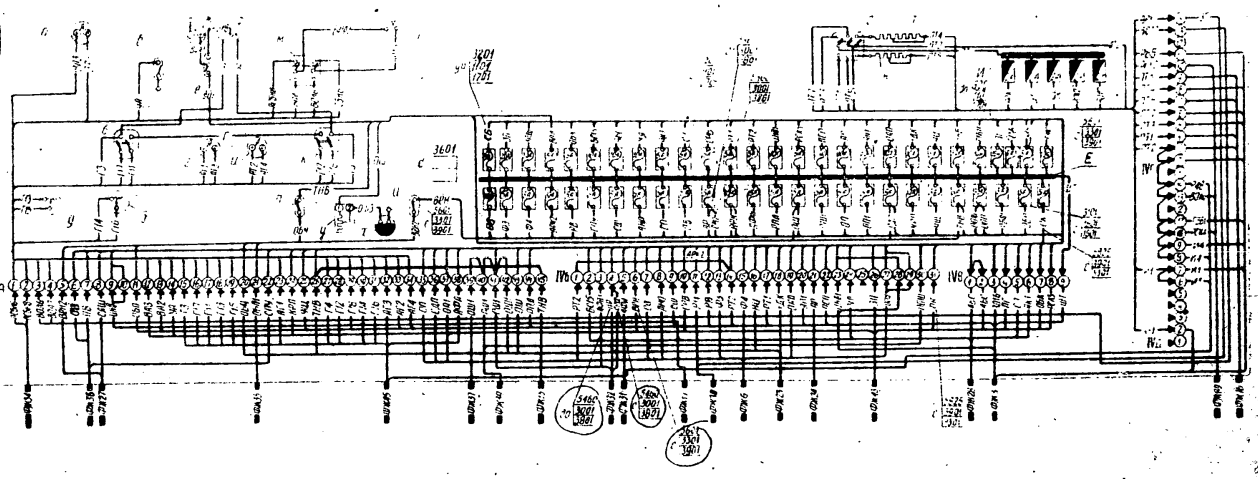

Fig. 16. Assembly diagram of the central distribution panel.

ASSEMBLY DIAGRAM OF THE ACCUMULATOR RELAY BLOCK.
/Fig. 19, valid up to 6348, 5301/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
41		Accumulator relay block	1	Made by manufacturer	Fuselage, between ribs No. 37 and 38
		Accumulator battery switching contactor	1	K-800Д	Accu. relay block
		Aerodrome supply switching contactor	1	K-200Д	- " -
		Accumulator battery switching contactor	1	K-200Д	- " -
		Aerodrome supply switching contactor	1	K-200Д	- " -
		Accumulator battery relay	1	PT-40	- " -
		Amperemeter board	1	A-46	- " -
		5 selenium element block	1	Made by manufacturer	- " -
		4 selenium valve /from 2511, 0901,0301/	X		
		Voltmeter	1	BC-25-6	- " -
DA1		Voltmeter fuse /from 1401,0201,0401/	1	ИП-15	- " -
DA2		-- " --	1	ИП-15	- " -
C4Б		Fuse, responder inertia switch /from 3101, 0901,1401/	1	ИП-5	- " -
ЭУП		Rudder indicator fuse / 5861,3802,4916/	1	ИП-5	- " -

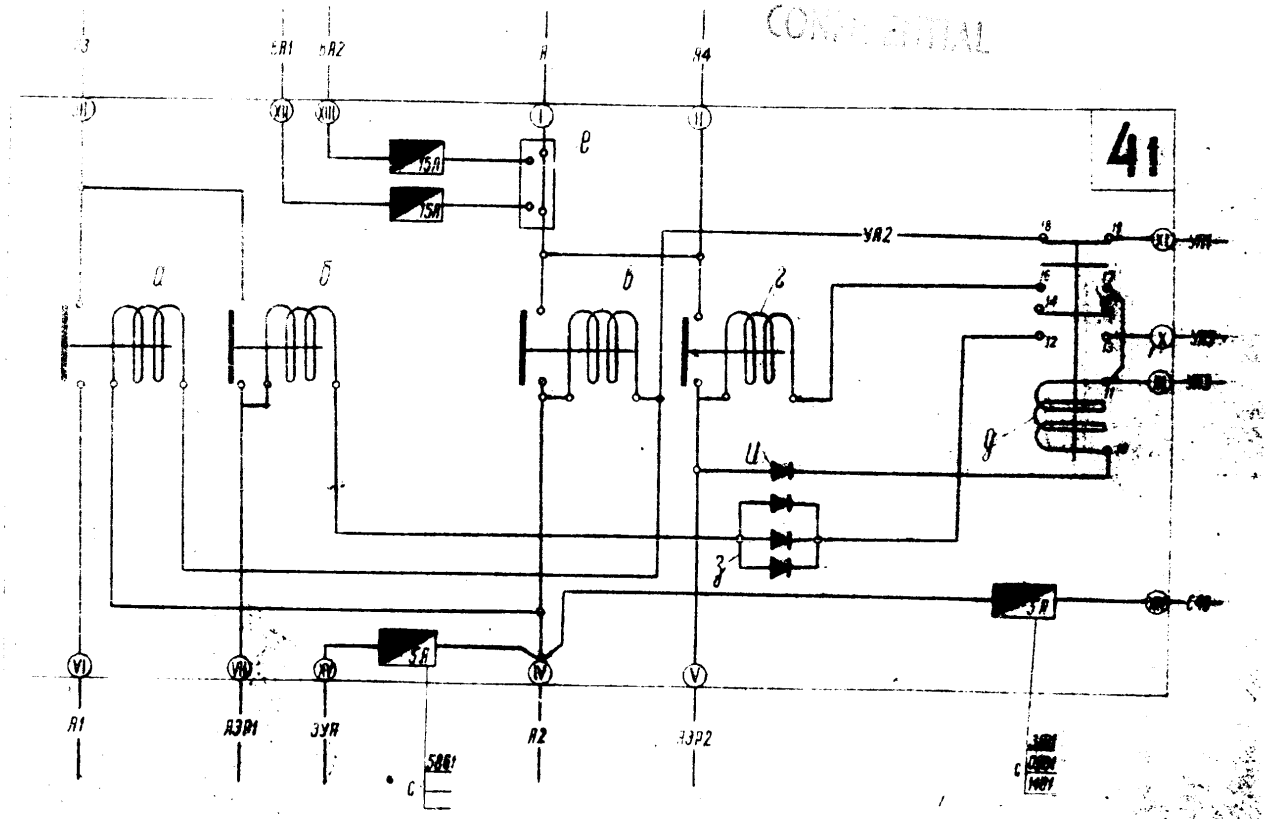

Fig. 19. Assembly diagram of accumulator relay block.

ASSEMBLY DIAGRAM OF THE TRIMMER

/To fig. 20/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
50		Trim tab control board	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 and 9
	а	Trim tab control switch	1	ПН-45	Trimmer control board
	д	Neutral position of aileron trim tab indication lamp	1	СЛН-51	- " -
	в	Rudder trim tab switch	1	ПН-46	- " -
	г	Rudder trim tab neutral position indication lamp	1	СЛН-51	- " -
	Д	Liason radio station switch	1	2ПП-45	- " -
	Е	Ventilator switch in pilot's cabin	1	В-45	- " -

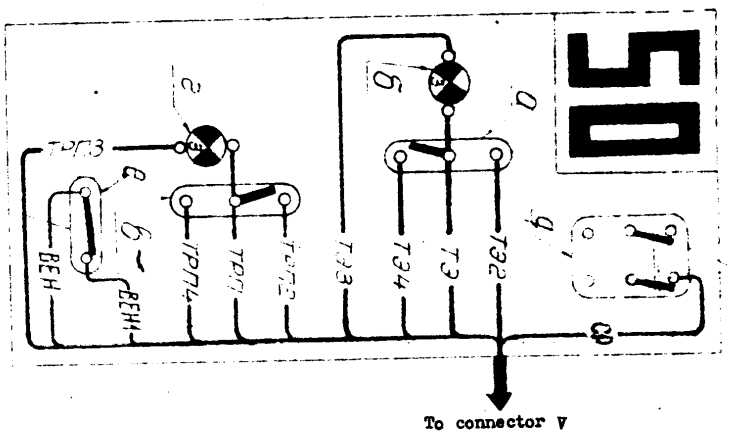

Fig. 20. Assembly diagram of trimtab control panel.

PILOT'S RIGHT DESK ASSEMBLY DIAGRA[illegible]

(Fig. 22)

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
8		Auto-pilot heating	1	B-45	Pilot's right desk
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 and 11
	д	Cabin air temperature indicator	1	TГ3-48	Pilot's right desk
	в	AHO switch	1	B-45	- " -
	г	Rheostat of YØO armature of right pilot's desk	1	PYØO-48	- " -
	ж	Upper lamps switch	1	B-45	- " -
	е	Connecting block	1	75K	- " -
	ж	Button switch of bottom lamps	1	ПZНПН-45	- " -
	к	Rheostat of YØO armature on pilot's steering column	1	PYØO-48	- " -
	л	Rheostat of YØO armature of pilot's left desk	1	PYØO-48	- " -
	м	Rheostat of YØO armature of the right part of the instrument board	1	PYØO-48	- " -
	н	Cabin air temperature regulator	1	PTBK-45	- " -
	п	Rheostat of YØO of the left part of the pilot's instrument board	1	PYØO-48	- " -
	р	Pilot's clock heating switch	1	B-45	- " -
	с	Switch of indication bell of dangerous pressure	1	B-45	- " -
	т	Dangerous pressure indication lamp	1	CЦ-51	- " -
	ф	Altitude indicator	1	BC-46	- " -
	ц	Dangerous pressure indicator	1	CONX-50	- " -
	ч	Rudder indicator switch	1	B-45	- " -
	ш	Pilot's right desk bar	1	Made by manufacturer	- " -
	щ	Min. limit switch, fuel pumping-set	1	A[illegible]-20	- " -
	ы	Max. limit switch, of fuel pump of front [illegible] tanks	1	A[illegible]-20	- " -
	ь	Dangerous pressure [illegible] bell	1	[illegible]	- " -

1	2	3	4	5	6
60	ПН1	Net limit switch, fuel pump of rear group of tanks	1	АЗС-20	Pilot's right dock
	НК	Net limit switch, mecha-nism of fire cock control of left engine	1	АЗС-10* /from 5618, 3216, 3910/	- " -
	НК1	Net limit switch, right engine fire cock control mechanism	1	АЗС-10* /from 5618, 3216, 3910/	- " -
	ТЭ	Net limit switch, aile-ron trimtab control mechanism	1	АЗС-5	- "/-
	ТРП	Net limit switch, rudder trimtab control mech.	1	АЗС-5	- " -
	ММ	Net limit switch, oil manometers	1	АЗС-5	- " -
	МТ	Net limit switch, fuel manometers	1	АЗС-5	- " -
	ТМ	Net limit switch, oil thermometers	1	АЗС-5	- " -
	ТОП	Net limit switch, fuel meters	1	АЗС-5	- " -
	ВОЛ5	Net limit switch, pilot's voltmeter	1	АЗС-5	- " -
	ПТ	Net limit switch, starting fuel manometer /to 2704/	1	АЗС-5	- " -
	АТК	Net limit switch, arti-ficial horizon	1	АЗС-5	- " -
	ППО	Net limit switch, the ex-tinguish gas system control	1	АЗС-5	- " -
	СЧ	Net limit switch, responder	1	АЗС-10	- " -
	СП	Net limit switch, front guns firing	1	АЗС-5 /to 5861, 5902, 4816/	- " -
	СПЛР СП10	Net limit switch, front gun firing	[illegible]	[illegible]	- " -
	СП СП10	Net limit switch, front gun firing	[illegible]	АЗС-5 /from 5861, [illegible]/	- " -
	ПЛ64	Net limit switch, front gun fire control	[illegible]	[illegible]	- " -
	ПП05	Net limit switch, fire-fighting system control	[illegible]	[illegible]	[illegible]

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1	2	3	4	5	6
60	СР	Net limit switch, liason radio station power supply /from 2901/	1	АЗС-5	Right desk of pilot
	СПК	Net limit switch, gyro-compass	1	АЗС-5	- " -
Ул	А	Pilot's right desk connector	1	ШР60П47НШ2	- " -
	Б	Dtto	1	ШР28П7НШ7	- " -
	Г	Dtto	1	ШР55Ф31НТ3	- " -
	Д	Dtto	1	ШР48П26НШ3	- " -

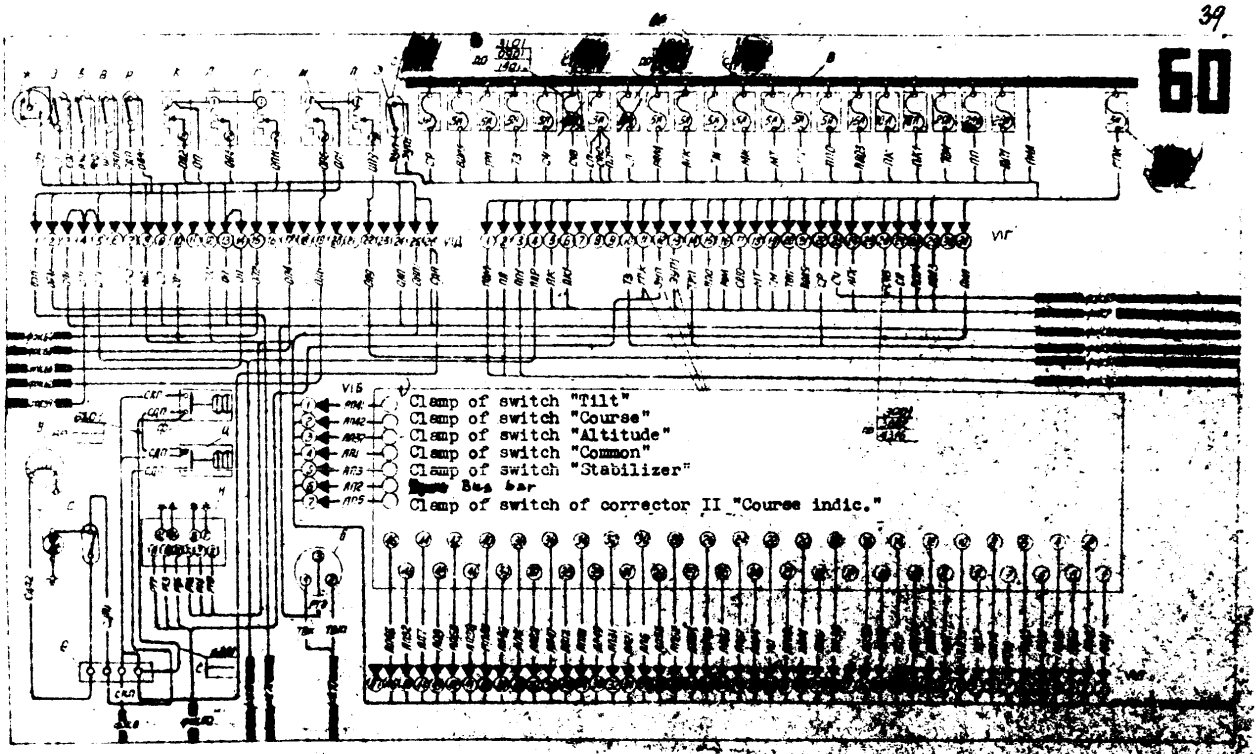

Fig. 22. Assembly diagram of pilot's right panel.

VOLTAGE REGULATOR BOX ASSEMBLY DIAGRAM

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
65		Voltage regulator box	1	Made by manufacturer	Fuselage, between ribs No. 11 and 10
	a	Transformer	1	T-1P	Regul. box
	б	Capacitor	1	KSM-31	- " -
	в	Transformer	1	T-16	- " -
	г	Voltage regulator	1	P-25-A	- " -
	д	Capacitor	1	KHM-31	- " -
	е	Voltage regulator	1	P-25A	- " -
	ж	Connecting block	1	73K	- " -

65

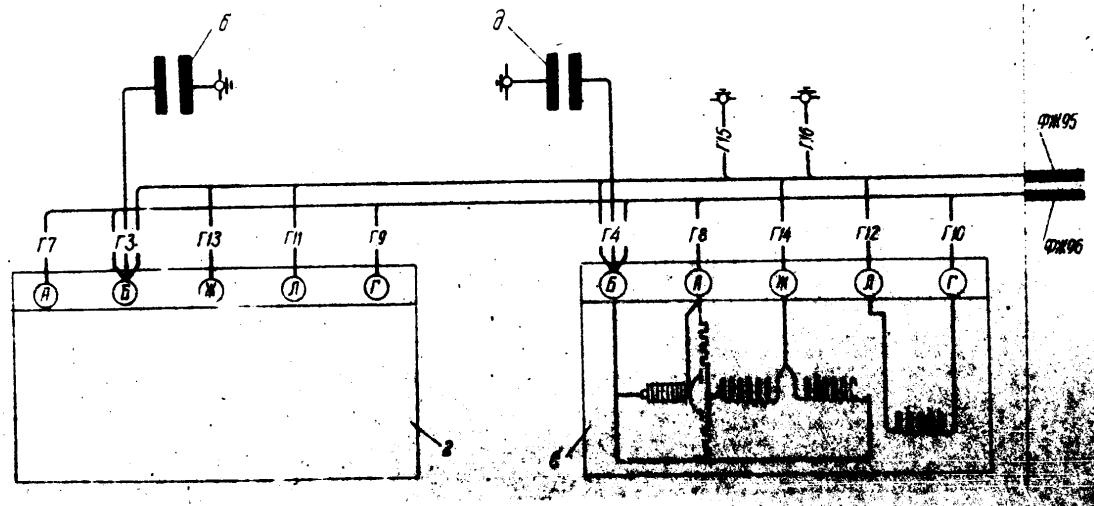

Рис. 20а. [illegible]

ASSEMBLY DIAGRAM OF PILOT'S INSTRUMENT BOARD.
/Fig. 26/

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
1		Auto-pilot course indicator	1	АП-5	Pilot's intrument board
70		Instrument board of the pilot	1	Made by manufacturer	Pilot's cabin, on rib No. 8
	а	Nose gear ~~front leg~~ position indic.	1	УШ-48	Pilot's instrument board
	б	Radio left-right indicator	1	РПК-48	- " -
	в	Electrical rudder indicator	1	ЭУП-46	- " -
	г	Aileron position indic.	1	ЭУП-47	- " -
	е	Indication lamp of position of landing gear /left/	1	СЛЦ-51	- " -
	ж	Indication lamp of position of landing gear /left/	1	СЛЦ-51	- " -
	з	Nose gear ~~front leg~~ position indicating lamp	1	СЛЦ-51	- " -
	и	Under-carriage front leg position indicating lamp	1	СЛЦ-51	- " -
	к	Under-carriage right leg position indicating lamp	1	СЛЦ-51	- " -
	л	Under-carriage right leg position indicating lamp	1	СЛЦ-51	- " -
	м	Under-carriage indication switch	1	ПП-45	- " -
	н	Left engine tachometer indicator	1	ТЭ-15 /from 2509, 0406, 0705/	- " -
	п	Right engine tachometer indicator	1	ТЭ-15 /with 0406, 2509, 0705/	- " -
	р	Left engine exhaust gas temperature indic.	1	ТВГ-11 /from 5811, 5812, 4316/	- " -
	с	Right engine exhaust gas temperature indic.	1	ТВГ-11 /from 5811, 5812, 4316/	- " -

1	2	3	4	5	6
70	т	Left engine three pointer instrument	1	УК3-3 from 3МИ-3Р	Pilot's instrument board
	у	Right engine three pointer indicator	1	УК3-3 from 3МИ-3Р	- " -
	ф	Indication lamp of the rest of the fuel in the front group of tanks	1	СЛЦ-51	- " -
	х	Indication lamp of the rest of the fuel in the rear group of tanks	1	СЛЦ-51	- " -
	ц	2-pointer fuel meter indicator	1	СТЗС-1147	- " -
	ч	Switching button of fire ext. gas of the 2-nd group of tanks	1	БКС	- " -
	ш	Voltmeter	1	В-46	- " -
	щ	Right engine starting fuel manometer /from 2705, 0606, 1001/	1	-"-	- " -
	ю	Artificial horizon switch /to 0604/	1	В-45	- " -
	я	Artificial horizon indicator	1	АГБ-1 АГК-48 to 6131, 4519, 4991	- " -
	a_1	Pilot's three colour indication lamp /red/	1	СЛЦ-51	- " -
	$б_1$	Pilot's three colour indication lamp /white/	1	СЛЦ-51	- " -
	$в_1$	Pilot's three colour indication lamp /green/	1	СЛЦ-51	- " -
	$г_1$	Pilot's clock	1	АВРМ	- " -
	$д_1$	Pilot's remote compass indicator	1	From АРМК-3	- " -
	$е_1$	Altitude indication lamp	1	СЛЦ-51	- " -
	$ж_1$	Indicator of critical rest of fuel in front group of tanks	1	СТЗС-1147	- " -
	$з_1$	Indicator of critical rest of fuel in rear group of tanks	1	Dtto	- " -
	$и_1$	Outer air temperature indicator	1	ТУЗ-48	- " -
	$к_1$	Fuel pressure indicating lamp, left engine	1	СЛЦ-51	- " -
	$л_1$	Dtto, right engine	1	СЛЦ-51	- " -
	$м_1$	Left engine fire-alarm lamp	1	СЛЦ-51	- " -
	$н_1$	Dtto, right engine	1	СЛЦ-51	- " -
	$п_1$	Fire ext. gas from 1-st gr. lower into left meter switching button	1	БКС	- " -

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1	2	3	4	5	6
70	Ф	Fire ext. gas from 1-st cylinder into right engine switching button	1	5KC	Pilot's instrument board
	c_1	Dtto, from 2-nd cylinder into left engine	1	5KC	" "
	π_1	Dtto, into right engine	1	5KC	" "
	γ_1	Left engine fire cock switch	1	ПП-45	" "
	ϕ_1	Dtto, right engine	1	ПП-45	" "
	x_1	Fire ext. gas into 1-st tank group switch	1	B-45	" "
	$ц_1$	Fuel pump operation indicating lamp	1	СЛЦ-51	" "
	$ч_1$	Button switch for fire ext. gas into 2-nd zone of rear group of tanks	1	5KC	" "
	$ш_1$	АМК-3 checking button	1	5KC	" "
	$щ_1$	Pilot's compass illum. lamp	1	From АМ-11	" "
600		Left front gun re-loading button	1	204KC	" "
652		Right front gun firing button	1	B-45	" "
656		Photo-gun operation indicating lamp	1	СЛЦ-51	" "
658		Right front gun cartridge counter	1	ЖСБ-1	" "
681		Right front gun reloading button	1	204KC	" "
670		Left front gun firing switch	1	B-45	" "
698		Left front gun cartridge counter	1	ЖСБ-1	" "
УН	В	Pilot's instrument board connector	1	ШР31П4НШ5 to 2001 ШРМ6К4НШ2 from 2001	" "
	Г	Dtto	1	ШРС0П4ЗНШ2	" "
	Д	Dtto	1	ШРМ0П4ЧНШ2	" "
	Е	Dtto	1	ШРЧ0П26НШ2	" "
	Ж	Dtto	1	ШРЧ0П26НШ2	" "

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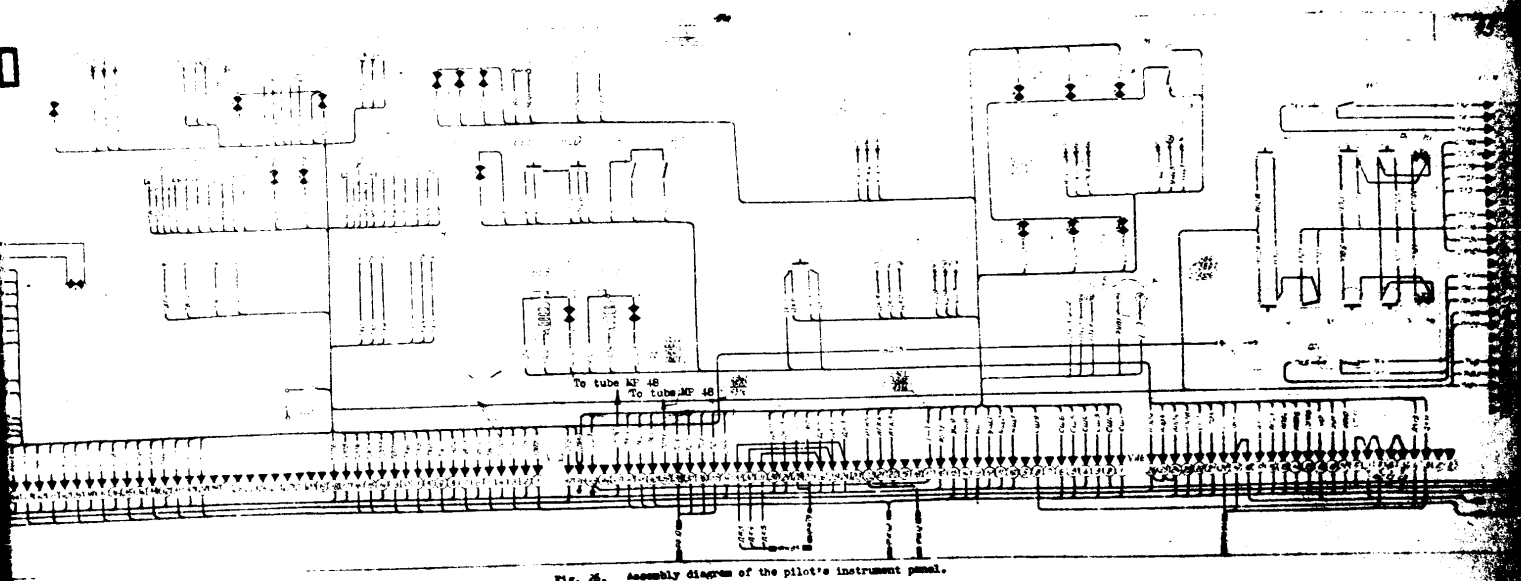

Fig. 26. Assembly diagram of the pilot's instrument panel.

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GUNNER'S RIGHT DESK ASSEMBLY DIAGRAM
/Fig. 29/

No. of pos.	Index of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
80		Gunner's right desk	1	Made by manufacturer	Gunner's cabin, right board, between ribs No. 42 and 45
	а	Rheostat of heating of gunner's clothing	1	РСЭ-45	Gunner's right board
	б	Gunner's clock heating switch	1	В-45	- " -
	х/ в	Illumination УФО fitting switch, right gunner's desk	1	РКФО-48	- " -
	г	Jointing block	1	78 К	- " -
	д	Voltmeter switch	1	2ПП-45	- " -
	ж	Left rear gun firing contactor	1	К-50А	- " -
	з	Dtto, right gun	1	К-50А	- " -
	и	Aiming set voltage checking socket	1	48К	- " -
	к	Voltage regulator box	1	РКЛ-6	- " -
	л	Distributing box	1	From АСП-3П	- " -
	м	2-nd amplifier МУ-К6-51 operation checking switch	1	ППН-45	- " -
	о	System checking switch	1	В-45	- " -
	п	Pumping motors switching contactor	1	К-50А	- " -
	с	Fuse box	1	From МУ-К6	- " -
	т	Electromagnetic limiter /from 3401, 2901, 3704/	1	From АСП-3П	- " -
	у	Altitude mechanism	1	- " -	- " -
	ф	Speed mechanism	1	- " -	- " -
	х	Aiming head	1	- " -	- " -
	ц	Calculator	1	- " -	- " -
	ш	First amplifier МУ-К6-51 checking switch	1	В-45	- " -
	щ	Second amplifier МУ-К6-51 checking switch	1	В-45	- " -
	э	Transition block	1	From АСП-8	- " -
	я	Gunner's right desk bar	1	Made by manufacturer	- " -
	ООС	Net limit switch, gunner's cabin heating	1	АЗС-10	- " -
	РСБ	Net limit switch, liason radio station power supply	1	АЗС-50	- " -

x/ УФО - fluorescent lamp

1	2	3	4	5	6
CO	ВСЛ4	Net limit switch, gunner's voltmeter	1	A3C-5	Gunner's right board
	TC	Net limit switch, three colour indic.	1	A3C-5	- " -
	OC	Net limit switch, gunner's cabin illum.	1	A3C-5	- " -
	СДС	Net limit switch, gunner's clock heating, altitude indication, dangerous pressure indication	1	A3C-5	- " -
	YO	Net limit switch, rear gun firing	1	A3C-5	- " -
	ACH'	Net limit switch, aiming set and rear compartment illumin. /from 2601,0506,0805/	1	A3C-5	- " -
	ACH1	Net limit switch, aiming set /up to 2601, 0506, 0805/	1	A3C-5	- " -
	CH	Net limit switch, rear gun firing control /from 2601, 0506, 0805/	1	A3C-5	- " -
	CH12	Net limit switch, gun firing control /up to 2601, 0506, 0805/	1	A3C-5	- " -
	HO	Net limit switch, pumping motors and rear gun recharging	1	A3C-5	- " -
	ПУ7	Net limit switch, photo-gun, recharging automat, rear mounting	1	A3C-10	- " -
	ВЕН4	Net limit switch, gunner's cabin ventilator	1	A3C-5	- " -
KY		Gunner's right desk connector	1	ШР48П26НШ2	- " -
	A	Dtto	1	ШР32П12НШ1	- " -
YШ		Dtto	1	ШР40П31НШ1	- " -

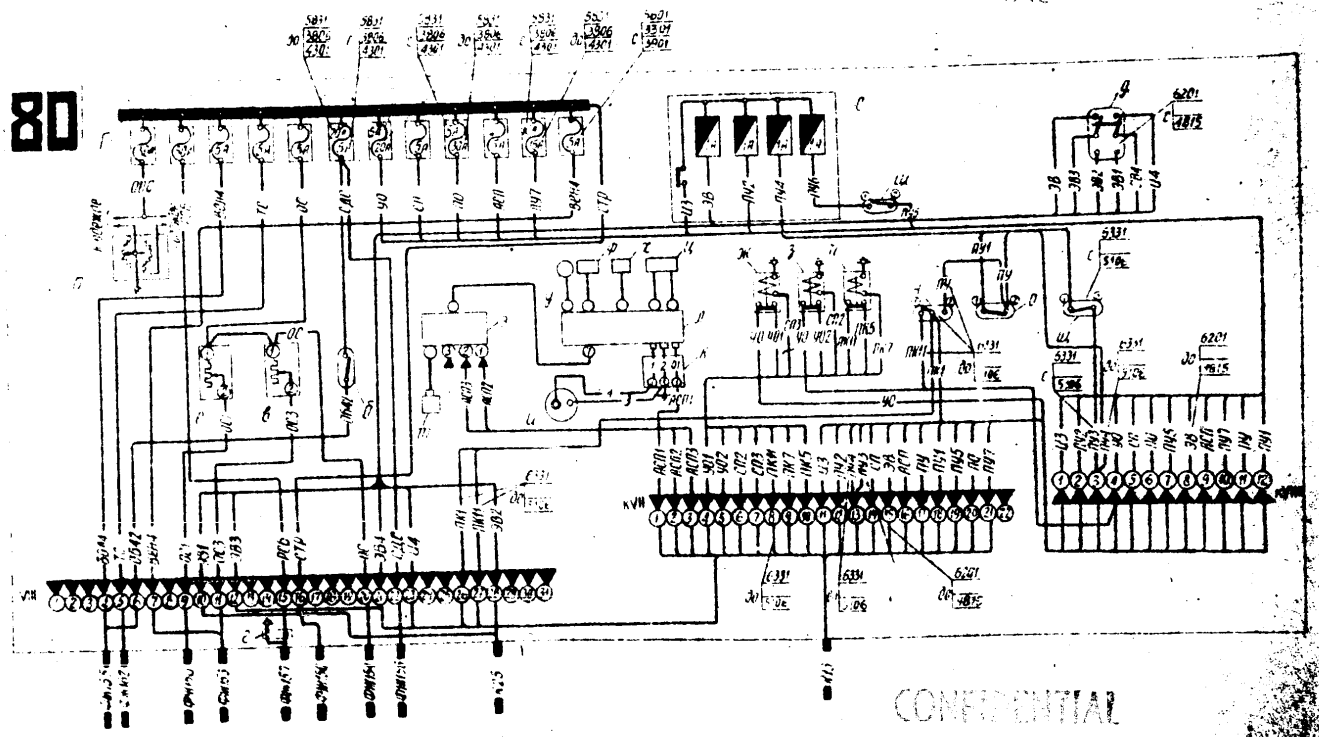

Fig. 29. Assembly diagram of gunner's right panel.

NAVIGATOR'S INSTRUMENT BOARD ASSEMBLY DIA

/Fig. 31/

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No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2-	3	4	5	6
90		Navig. instrument board	1	Made by manufacturer	Navig. cab. left board between rib No. 3 and 4
	а	Three colour indication lamp /red/	1	СЛЦ-51	Navig. instr. board
	б	Three colour indication lamp /white/	1	СЛЦ-51	- " -
	в	Three colur indication lamp /green/	1	СЛЦ-51	- " -
	г	Indicator /coordinate calculator/	1	НМ-506	- " -
	д	Checking button АГМК-8	1	5КС	- " -
	е	Navigator's clock	1	АЧКО	- " -
	ж	Outer air temperature indicator	1	ТУ-48	- " -
	з	Compass illumination lamp rheostat	1	РИК-48	- " -
	и	Navig. left desk illum. lamp rheostat	1	РУФО-48	- " -
	к	Instr. board illumin. lamp rheostat	1	РУФО-48	- " -
	л	Switch	1	ВВ-45	- " -
	м	Aiming set illumination lamp rheostat	1	РУФО-48	- " -
	о	Fuel pump "On" indication lamp	1	СЛЦ-51	- " -
	п	Course automat	1	НМ-506	- " -
	с	Wind indicator	1	НМ-506	- " -
	т	Navig. instr. board connector	1	[illegible]	- " -

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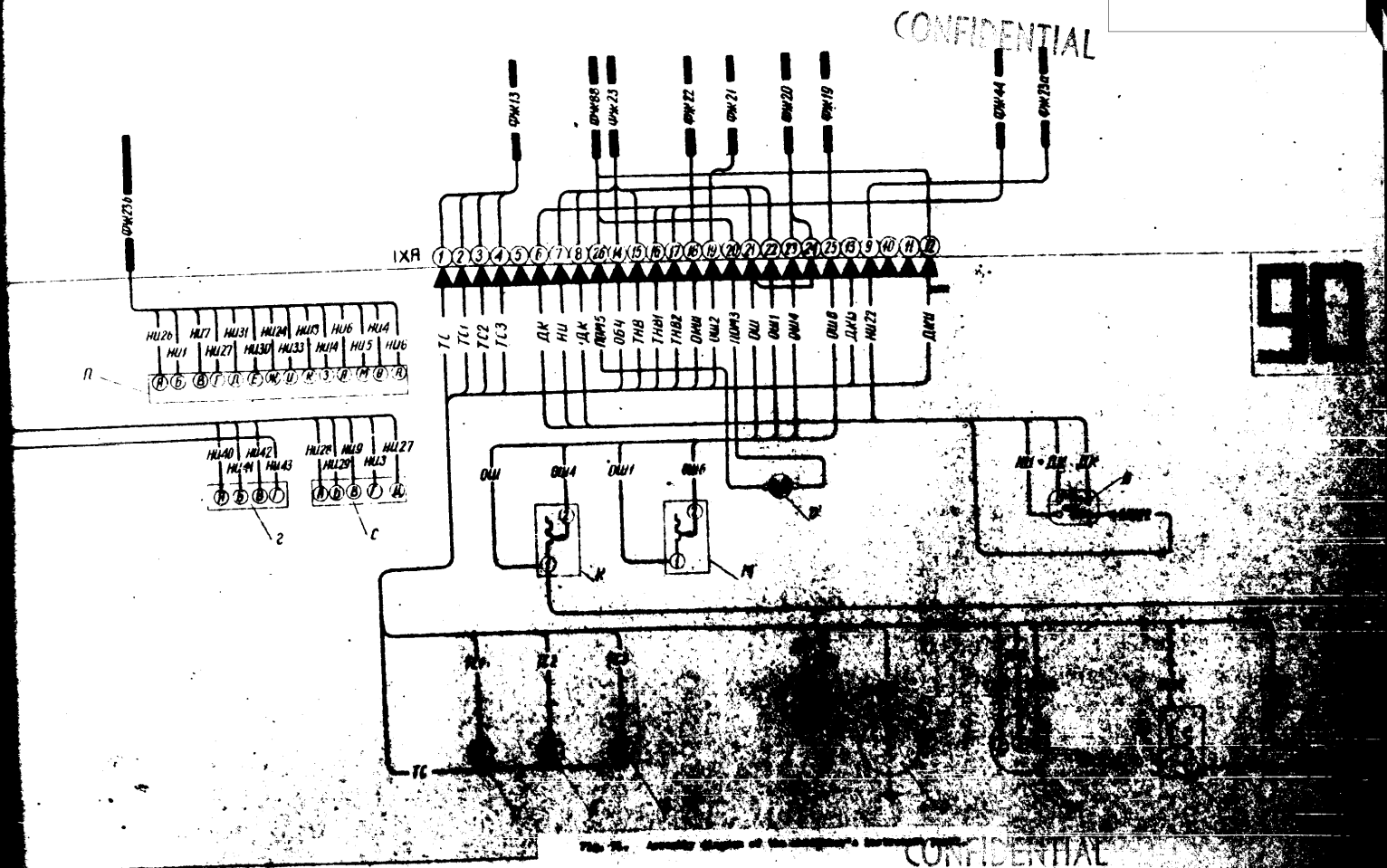

INDICATION LAMP PANEL ASSEMBLY DIAGRAM.

No. of pos.	Ind. of syst.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
100		Indication lamp panel	1	Made by manufacturer	Gunner's cabin right wall rib No. 43
	a	Indic. lamp of altitude indicator /with inscription "Включи кислород"-Switch on oxygen/	1	СМ-51	Indic. lamp panel
	б	Dangerous pressure indic. lamp	1	СМ-51	- " -
180	a	Cabin lamp connection block	1	75К	Gunner's cabin left wall rib No. 43

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No. of pos.	Ex. Ins.	Name	No. Equip. of Instrument	Location
1	2	3	4	5
116		Compass, [illegible]	1	[illegible]
		Tachometer	1	[illegible]
		Altitude indicator	1	[illegible]
		Dangerous temperature indicator	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]
		[illegible]	1	[illegible]

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THREE COLOUR INDICATION ASSEMBLY DIAGRAM.
/Fig. 52/

No. of pos.	No. of ind.	Name	No. of element	Type of pie-ces	Designation
1	2	3	4	5	6
120		Gunner's three colour indication board	1	Made by manufacturer	Gunner's c[illegible] right [illegible] rib No. [illegible] Three [illegible] indic. [illegible]
	a	Gunner's three colour indication lamp /green/	1	CM51	
	d	Ditto /red/	1	CM51	
	b	Ditto /white/	1	CM51	
	r	Green button of gunner's three colour indic.	1	5KC	
	n	Red button of gunner's three colour indic.	1	5KC	
	c	White button of gunner's three colour indic.	1	5KC	

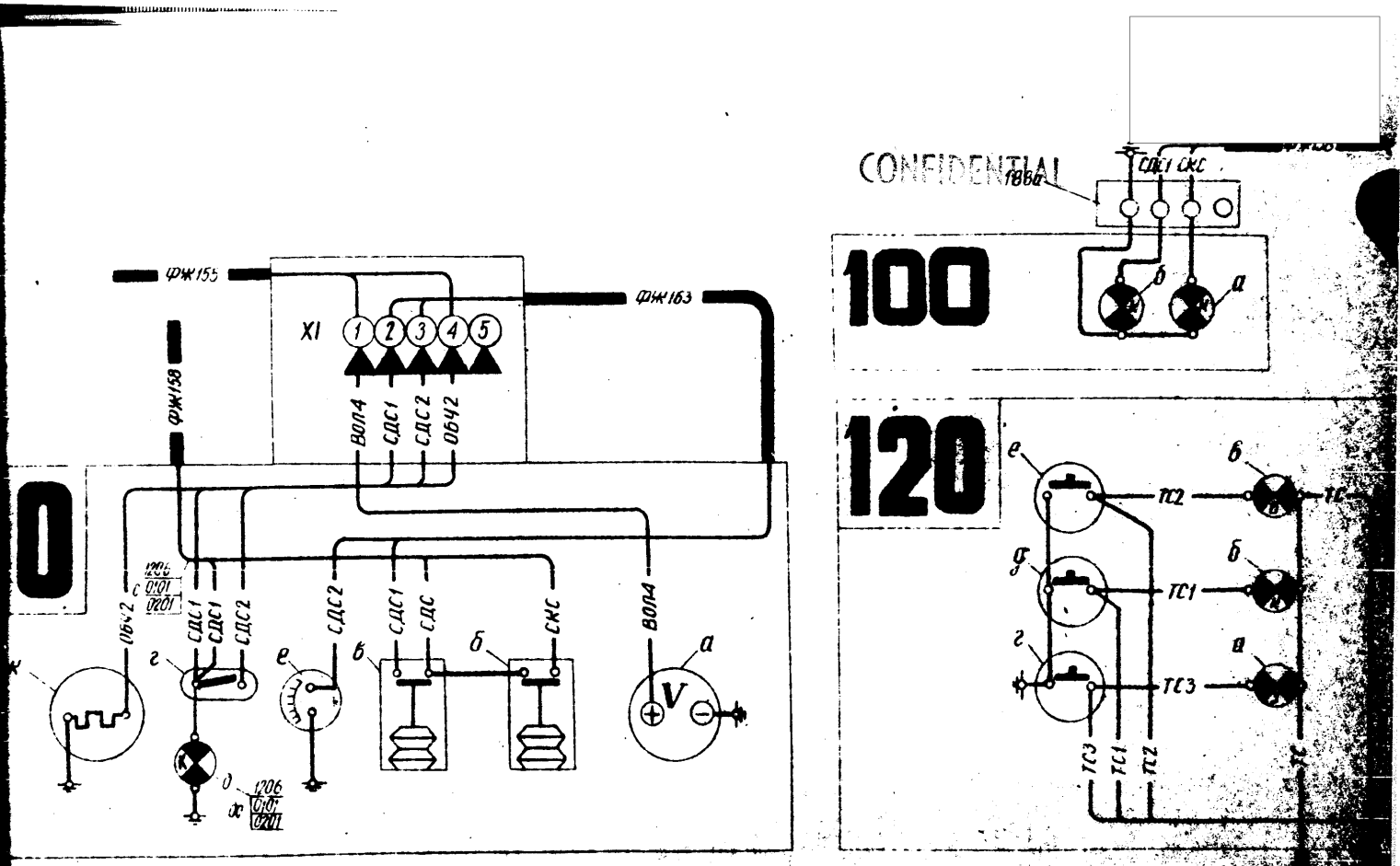

Fig. 32. Assembly diagram of the [illegible] panel and of the three-color [illegible] panel.

ASSEMBLY DIAGRAM OF THE LEFT CENTRAL DISTRIBUTION SYSTEM
/Fig. 15/

No. of pos.	No. of ind.	Name	No. of pieces	Type or element	Length
1	2	3	4	5	6
150		Left central distribution system	1	Made by manufacturer	[illegible]
	A	Left CDS bar	1	Ditto	Left CDS [illegible]
	Г1	Left generator fuse	1	ВГ-400	[illegible]
	Ф15	Left spot-light fuse	1	ПП-90 /[illegible] 100Д,180Д/	[illegible]
	ЛОК	Supply net of dynamotor МА-1500К fuse /120Д, [illegible],020Д/	1	ПП-200	[illegible]
XI	A	Left CDS connector	1	[illegible]	[illegible]
	Б	Ditto	1	[illegible]	[illegible]
	Д	Ditto	1	[illegible]	[illegible]
	Е	Ditto	1	[illegible]	[illegible]
	Ж	Ditto	1	[illegible]	[illegible]
	З	Ditto	1	[illegible]	[illegible]
	Л	Ditto	1	[illegible]	[illegible]
	К	Ditto	1	[illegible]	[illegible]
	Л	Ditto	1	[illegible]	[illegible]
	М	Ditto	1	[illegible]	[illegible]
	Н	Ditto	1	[illegible]	[illegible]

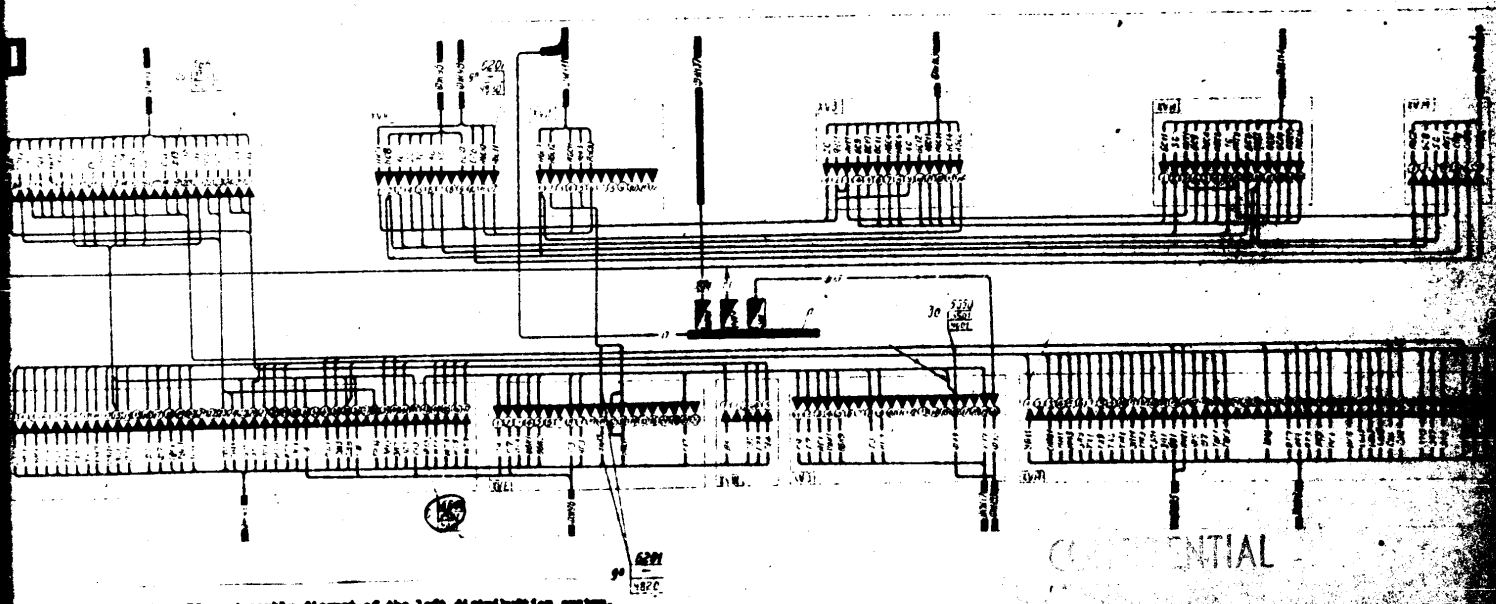

Fig. 55. Assembly diagram of the left distribution system.

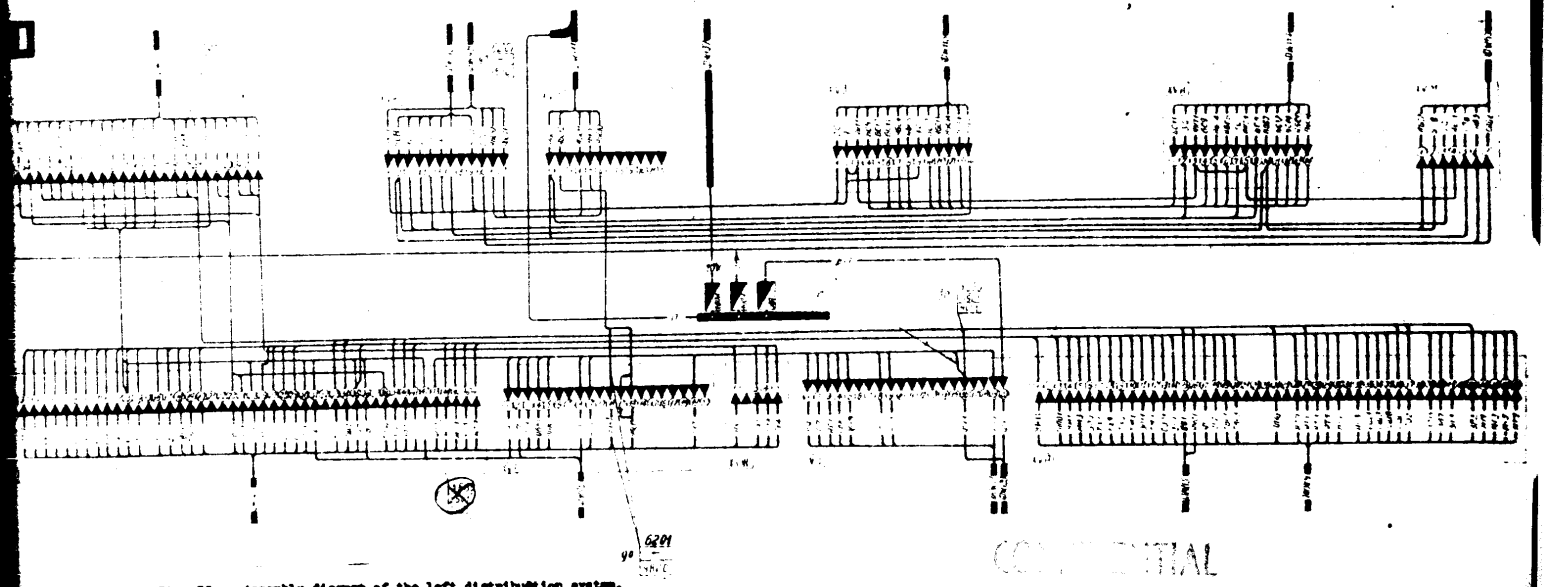

Fig. 35. Assembly diagram of the left distribution system.

ASSEMBLY DIAGRAM OF THE RIGHT CENTRA

/Pic. 38/

No. of Pos.	No. of ind.	Name	No. of elements	Type of piece	[illegible]
1	2	3	4	5	6
160		Right central distribution system	1	Made by manufacturer	Fuselage right [illegible] between p[illegible] No. 20 [illegible] Right CD[illegible]
	5	Right CDS [illegible]	1	- " -	-
	5 16	Right [illegible] light fuse /[illegible] 1000, 1600/	1	ПП-30	-
	72	Right generator fuse	1	ТП-400	-
	[illegible]	Pilot's [illegible] feeder bar fuse	1	ТП-200	-
	[illegible]	Navigator's central distribution board fuse	1	ТП-200	-
[illegible]	A	Right CDS connector	1	[illegible]	-
	[illegible]	Dtto	1	[illegible]	-
	B	Dtto	1	[illegible]	-
	[illegible]	Dtto	1	[illegible]	-
	E	Dtto	1	[illegible]	-
	Ж	Dtto	1	[illegible]	-
	З	Dtto	1	[illegible]	-
	И	Dtto	1	[illegible]	-
	К	Dtto	1	[illegible]	-

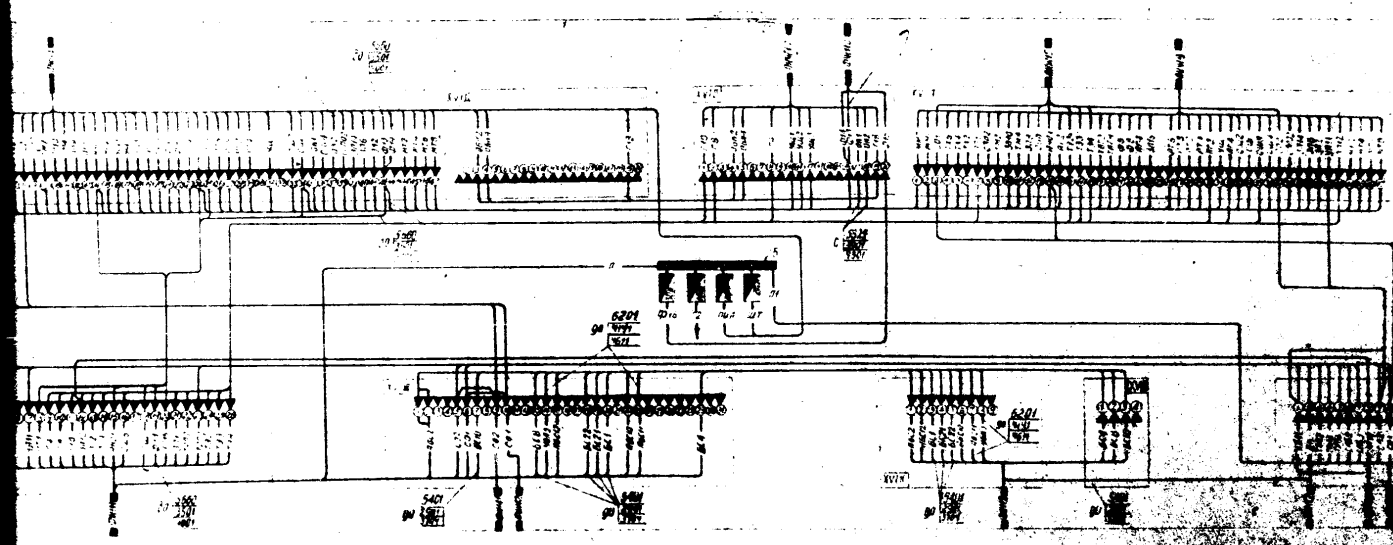

Fig. 30. Assembly diagram of the right distribution system.

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ASSEMBLY DIAGRAM OF THE REVERSE CURRENT RELAY B

/Fig. 41/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
		Right box of reverse current relay	1	Made by manufacturer	Right engine gondola, No. 2
72		Right generator capacitor	1	KBM-31	Rev. cur. relay
74		Right generator amperemeter shunt	1	A-46	- " -
		Differential-current relay of right generator /from 2805,0706,0401/		AMP-400	- " -
		Left box of reverse current relay	1	Made by manufacturer	Left engine gondola, No. 2
67		Left generator capacitor	1	KBM-31	Reverse relay
71		Left generator A-meter shunt	1	A-46	- " -
	AΓ1	Inertia net protecting switch, left gen. A-meter	1	MA-5	Left gen.
	AΓ3	Dtto, left generator A-meter	1	MA-5	
	Γ3	Dtto, voltmeter for checking the left generator voltage	1	MA-15	
	AΓ2	Dtto, right generator A-meter	1	MA-5	Right gen.
	AΓ4	Dtto	1	MA-5	
	Γ4	Dtto, voltmeter for checking the right generator voltage /from 2805, 0706, [illegible]/	1	MA-15	
	AΓ1	Net limit switch, [illegible] generator A-meter	1	[illegible]	
	AΓ3	Net limit switch, [illegible]		[illegible]	
	Γ3	[illegible]			
	AΓ4	[illegible]			
	Γ4	[illegible]			

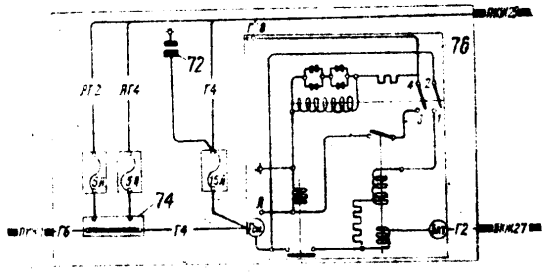
ASSEMBLY DIAGRAM OF THE REAR CENTRAL DISTRIBUTING SYSTEM.
/Fig. 42/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
170		Rear central distribution system	1	Made by manufacturer	Fuselage, right board, rib No. 38
		Bar of rear CDS	1	- " -	Rear CDS
	СТР	Gunner's right desk feeder conductor bar fuse	1	ИМ-50	- " -
	АМ1	Dynamotor МА-250 supply net fuse /from 1201/	1	ИМ-50	- " -
	ГС	ШМ-К6 driving motor supply net fuse	1	ТМ-200	- " -
	ГС1	ШМ-К6 driving motor supply net fuse /to 6331....5106/	1	ТМ-200	- " -

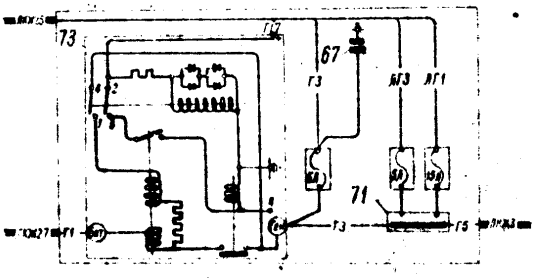
Fig. 41. Assembly diagram of the reverse current relay boxes.

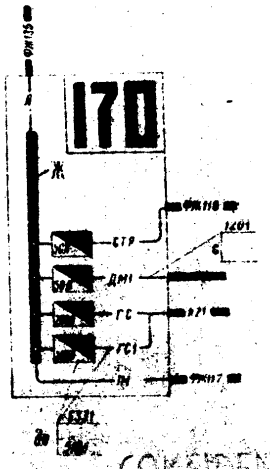
Fig. 42. Assembly diagram of the rear central distribution system.

Right reverse current relay box



Left reverse current relay box.





INDICATION RELAY BOX DIAGRAM.
/Fig. 43/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
290		Box of fuel pump indication relay box	1	Made by manufacturer	Navig. cabin, between ribs No. 3 and 4
	a	Fuel pump operation indicating relay	1	PM-12	Relay box 290
	2	Capacitor	1	K9-1A	- " -

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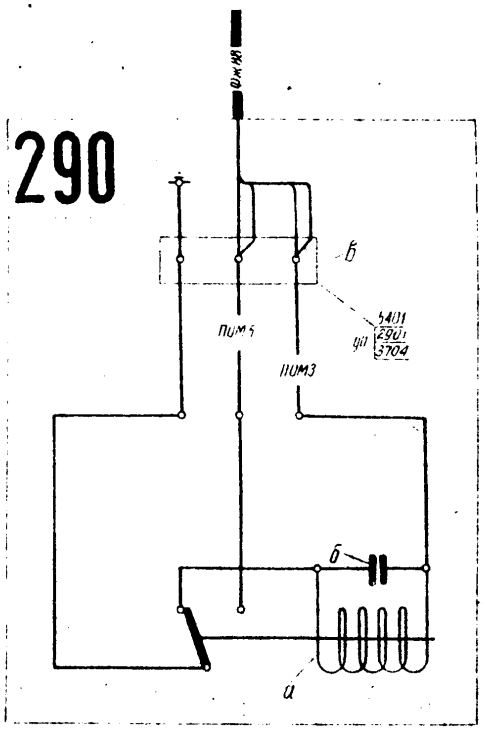

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Fig. 43. Circuit diagram of indication relay

INDICATION PANEL DIAGRAM.
/Fig. 44/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6.
328		Indication panel	1	Made by manufacturer	Fuselage, rib No 18
	а	Indication lamp of illumin. with inscription "Опасно выключи сеть" "-Danger switch off net"	4	СЛЦ-51	Indic. panel
	б	Illumination and bomb suspension indication	1	В-45	- " -
	в	Pilot lamp "Бомбосеть включено" "-Bombing net on /to 6201,4141,4416/	1	СЛЦ-51	- " -
XXIII		Indication panel connector	1	ШР28МС7НШ7	Fuselage, rib No. 18

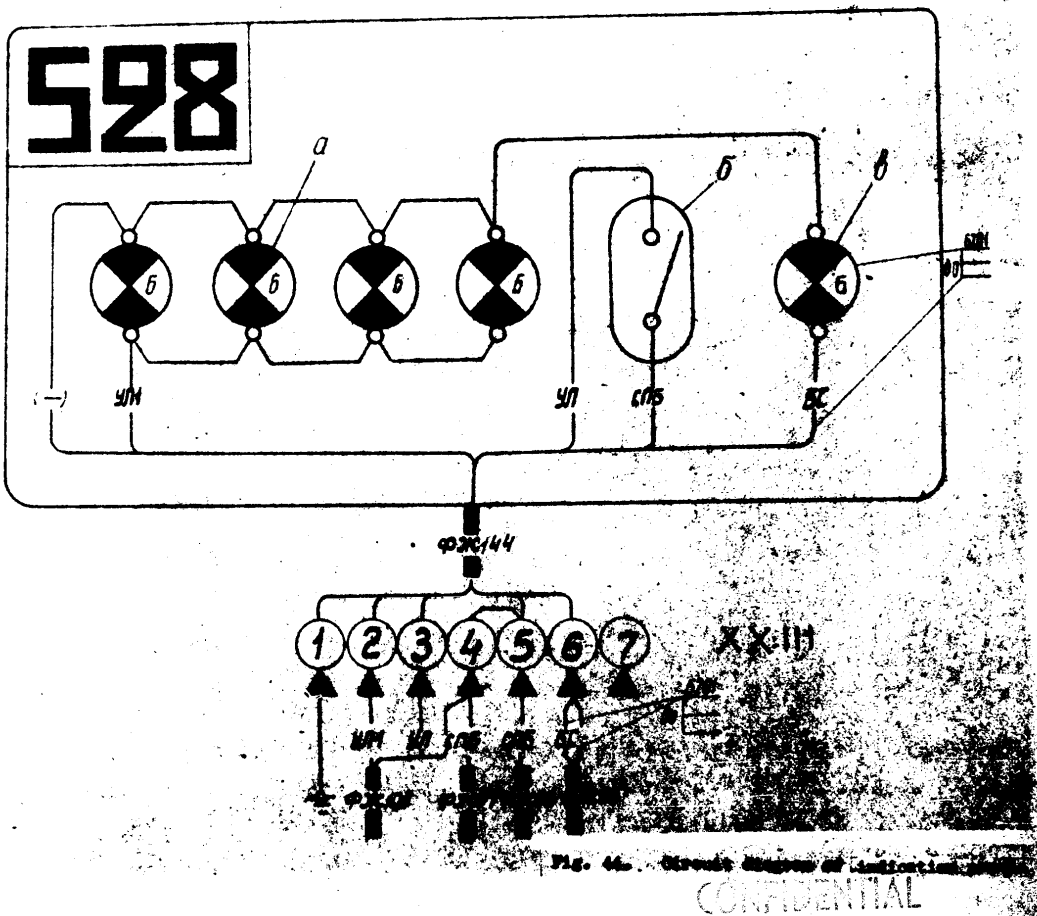

Fig. 44. Circuit diagram of indicator panel

CONNECTORS OF THE ELECTRICAL NET OF THE AEROPLANE.

In the places of constructional and functional connections of the electrical net of the aeroplane there are plug- and screw connectors. In the aeroplane hermetic and unhermetic connectors are used.

The location of the connectors is shown in fig. 45, where the hatched rectangles denote the position of the hermetic connectors, unhatched - hermetic.

The roman number denotes a group of connectors located in one place, or a single connector. In the first case every connector is, besides the roman number, denoted by a letter sign /e.g. A, B etc./. The given reference signs of the connectors are kept throughout all the electrical circuit diagrams.

The circuit diagrams, included in the following part, of the connectors with the numbers of clamps and with marked conductors, make the use of the electrical net considerably easier.

Electrical connectors, which form part of complete units, are not shown in the circuit diagrams, and are not included in the specifications.

In the following part the connectors of the benches and desks, given in the preceding part, are not given.

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SPECIFICATION OF THE CONNECTORS OF THE ELECTRICAL NET-OF THE AEROPLANE.

/Figs. 45? 46,47,48,49,50,51,52,53,54,55,56,57,58/

No. of posit.	Ind. of unit	Name	No. of pieces	Type	Location
1	2	3	4	5	6
1	А	Connector of left desk of navigator	1 ШР48П9НШ1	Left navig. d[illegible]	
	Б	Dtto	1 ШР48П26НШ2	Dtto	
	В	Dtto	1 75К	Dtto	
	Г	Dtto	1 ШР55П31НГ3	Dtto	
II	А	Navig. right desk connector	1 ШР48П26НШ2	Navig. right d[illegible]	
	Б	Dtto	1 74К	Dtto	
III	А	Pilot's left desk connector	1 ШР60П45НШ2	Pilot's left d[illegible]	
	Б	Dtto	1 ШР55П31НШ1	Dtto	
	В	Dtto	1 ШР48П20НШ1	Dtto	
	Г	Dtto	1 ШР40П15НШ2	Dtto	
	Д	Dtto	1 ШР32П13НШ1	Dtto	
	Е	Dtto	1 ШР48П26НШ2	Dtto	
	Ж	Dtto	1 75К	Dtto	
IV	А	Central distribution board connec.	1 ШР60П45НГ2	Cen[illegible]	
	Б	Dtto	1 ШР55П31НГ3	Dtto	
	В	Dtto	1 ШР48П9НШ1	Dtto	
	Г	Aft. electro-board connector	1 ШР[illegible]	[illegible]	
	Д	Dtto	1 ШР[illegible]	Dtto	
V		Firing and starting rocket control	1 [illegible] to [illegible]	Pilot's [illegible] left [illegible]	
VI	А	Pilot's right desk connector	1 [illegible]	Pilot's [illegible]	
	Б	Dtto	1 [illegible]	[illegible]	
	В	Dtto	1 [illegible]	[illegible]	
	Г	Dtto	1 [illegible]	[illegible]	
VII	А	Pilot's [illegible]	1 [illegible]	[illegible]	
	Б	[illegible]	[illegible]	[illegible]	
	В	[illegible]	[illegible]	[illegible]	
	Г	[illegible]	[illegible]	[illegible]	
	Д	[illegible]	[illegible]	[illegible]	
	Е	[illegible]	[illegible]	[illegible]	
	Ж	[illegible]	[illegible]	[illegible]	
	З	[illegible]	[illegible]	[illegible]	
	И	[illegible]	[illegible]	[illegible]	

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1	2	3	4	5	6
VIII		Radio-operator's desk connector /right/	1	ШР60П31НШ1	Radio-oper. right desk
IX	А	Navig. instr. brd. connector	1	ШР44П26НШ1	Navigator's instr. board
XI	Ф	Radio-operator's left desk connect.	1	ШР30П5НГ7	Radio-oper. left connector
XII	Б	Pilot's cabin hermetic connector	1	ШРГ-23	Floor of pilot's cabin
	В	Dtto	1	ШРГ-23	Dtto
	Г	Dtto	1	ШРГ-23	Dtto
	Д	Dtto	1	ШРГ-23	Dtto
	Е	Dtto	1	ШРГ-23	Dtto
	Ж	Dtto	1	ШРГ-23	Dtto
	З	Dtto	1	ШРГ-23	Dtto
	И	Hermetic board connector of pilot's cabin	1	Made by manufacturer	Dtto
	К	Dtto	1	Dtto	Dtto
	Л	Pilot's cabin hermetic connector	1	ШРГ-23	Dtto
	М	Dtto	1	ШР-Г23	Dtto
	Н	Dtto	1	ШР-Г23	Dtto
	О	Pilot's cabin hermetic screw connector	1	Made by manufacturer	Dtto
	П	Pilot's cabin hermetic connector	1	ШРГ-23	Dtto
	Р	Dtto	1	ШРГ-23	Dtto
	С	Dtto	1	ШРГ-23	Dtto
	Т	Dtto	1	ШРГ-23	Dtto
	Ф	Dtto	1	ШРГ-23	Dtto
	Ч	Dtto	1	ШРГ-23	Dtto
XXIII		Hermetic connector of tank	1	ШРГ-23	Near [illegible]
XIII		Left engine [illegible]	1	[illegible]	[illegible]
XIV		Right engine [illegible]	1	[illegible]	[illegible]
XV	А	Left CDS [illegible]	1	[illegible]	[illegible]
	Б	Dtto	1	[illegible]	[illegible]
	Д	Dtto	1	[illegible]	[illegible]
	Е	Dtto	1	[illegible]	[illegible]
	Ж	Dtto	1	[illegible]	[illegible]
	З	Dtto	1	[illegible]	[illegible]
	И	Dtto	1	[illegible]	[illegible]
	К	Dtto	1	[illegible]	[illegible]
	Л	Dtto	1	[illegible]	[illegible]
	М	Dtto	1	[illegible]	[illegible]
	Н	Dtto	1	[illegible]	[illegible]
	О	Dtto	1	[illegible]	[illegible]
	П	Dtto	1	[illegible]	[illegible]
	Р	Dtto	1	[illegible]	[illegible]
	С	Dtto	1	[illegible]	[illegible]
	Т	Dtto	1	[illegible]	[illegible]
	Ф	Dtto	1	[illegible]	[illegible]
	Ч	Dtto	1	[illegible]	[illegible]
XVI		[illegible]	1	[illegible]	[illegible]
		[illegible]	1	[illegible]	[illegible]

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1	2	3	4	5	6
XVI	В	Right CDS connect.	1	ШР10П5Ж1М	Right CDS
	Д	Dtto	1	ШР4П10НМ1	Dtto
	Е	Dtto	1	ШР60П43НМ2	Dtto
	Ж	Dtto	1	ШР60П39НМ1	Dtto
	З	Dtto	1	ШР4П26НМ2	Dtto
	И	Dtto	1	ШР40П6НМ3	Dtto
XVII	А	Rear compartment connector /to 2101, 0301, 0601/	1	ШР40П4НМ2	Fuselage, right rib No. 58
XVIII		Front lamp connect.	1	73K	Left board, rib
XIX		Starting net screw connector	1	Made by manufacturer	Fuselage, left board, rib No.
XX		Dtto	1	Dtto	Fuselage, right board, rib No.
XXI		Formation lamp and signal lamp connector	1	ШР10ПК33Г6	Fuselage, rib No. 52
XXII	Б	Rear cabin hermetic connector	1	ШРГ-23	Fuselage, right board, rib
	В	Dtto	1	Made by manufacturer	Dtto
	Г	Dtto	1	ШРГ-23	Dtto
	Д	Dtto	1	ШРГ-23	Dtto
	Е	Board connector	1	Made by manufacturer	Dtto
	Ж	Dtto	1	Dtto	Dtto
	И	Dtto	1	Dtto	Dtto
	К	Dtto	1	Dtto	Dtto
	Л	Connecting block	1	73K	Dtto
XXIII		Indication board connector	1	ШР13ПС1НМ1	Fuselage
XXV		Pilot's steering column connector	1	ШР21ПК1НМ1	Pilot's column
XXVI		Heating element connector	1	[illegible]	Right
XXXI	Д	Beam [illegible]	1	[illegible]	[illegible]
XXXIII	А	Left [illegible] connector	1	[illegible]	[illegible]
XXXIV		[illegible]	1	[illegible]	
XXXII	Б	Left [illegible]	1	[illegible]	

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1	2	3	4	5	6
XXXVIII	A	Right engine head connector	1	[illegible]	Right engine head [illegible] left board, [illegible] Wire No. [illegible]
	B	Right engine head screw connector	1	Made by manufacturer	[illegible]
	C	Date	1	Date	Date [illegible]
1	D	Navigator's cabin connector	1	[illegible]	Service [illegible] left board [illegible] No. [illegible]
2	E	Date	1	[illegible]	[illegible]

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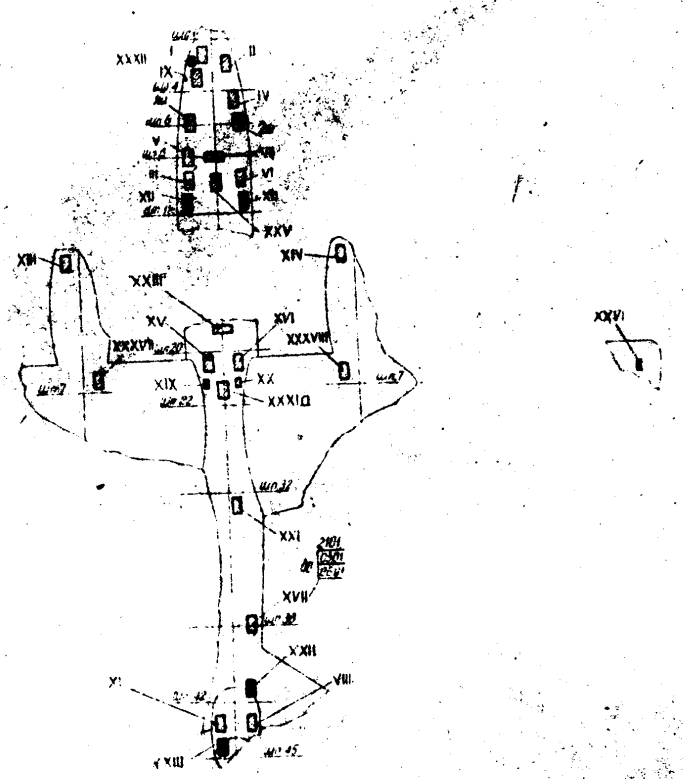

Fig. 45. Diagram of the plug connectors of the power net of the aeroplane / [illegible] = rib; e.g. /[illegible] = rib no. [illegible]/.

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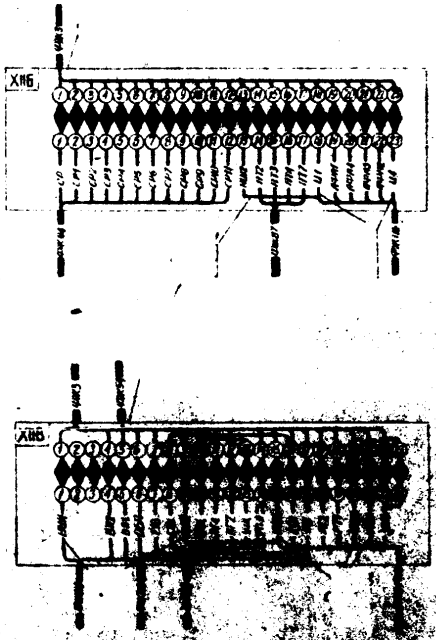

Fig. 46. Diagram of the [illegible]

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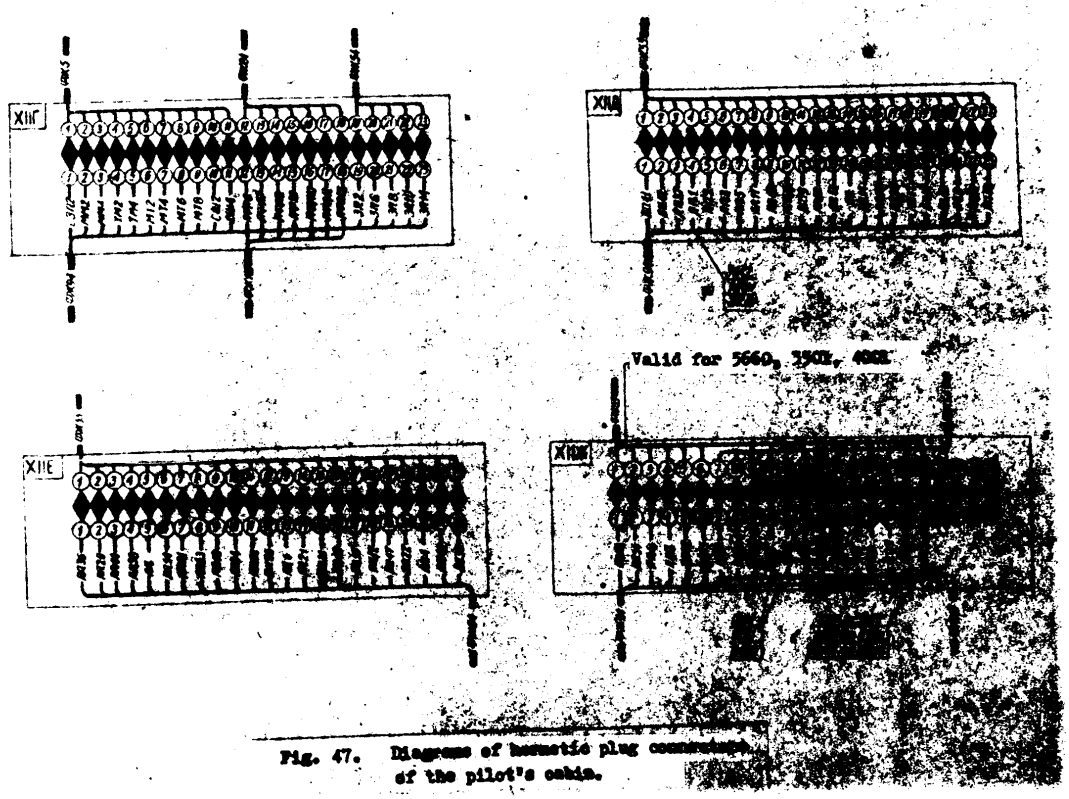

Fig. 47. Diagrams of hermetic plug connectors of the pilot's cabin.

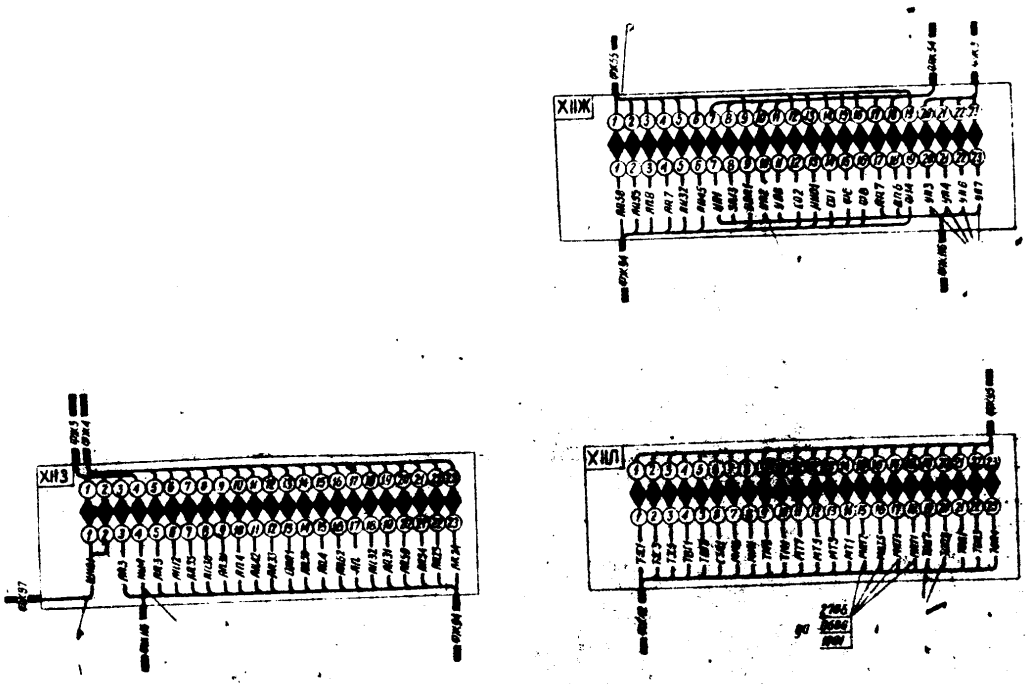

Fig. 48. Diagram of the hermetic plug connectors of the pilot's cabin.

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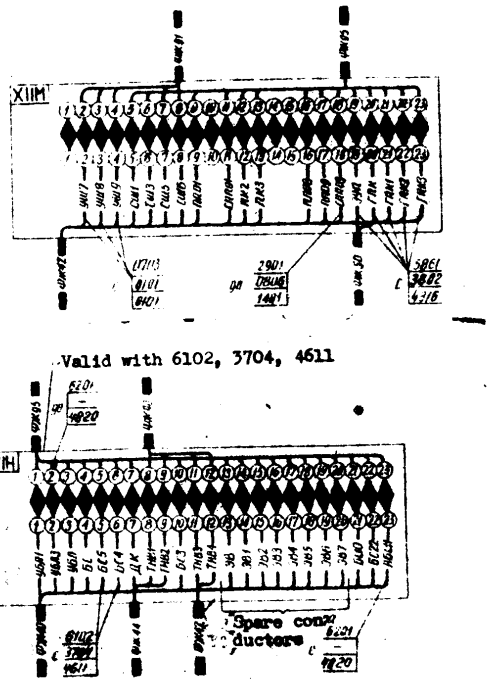


Fig. 49. Diagram of the hermetic plug connectors of the pilot's cabin.

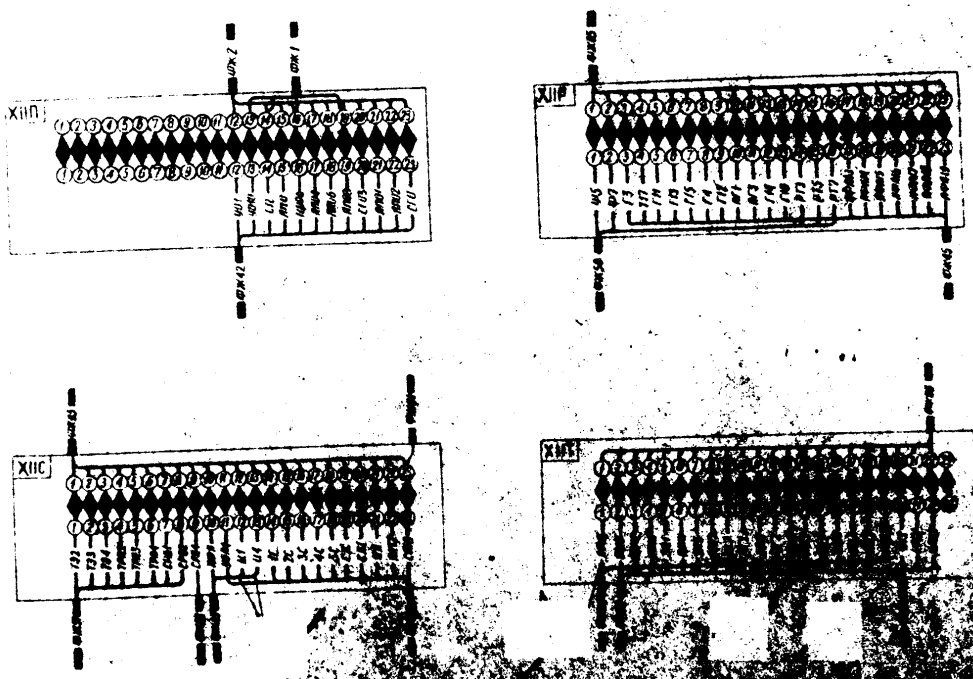


Fig. 30. Diagram of the hermetic plug connection of [illegible] pilot's [illegible]

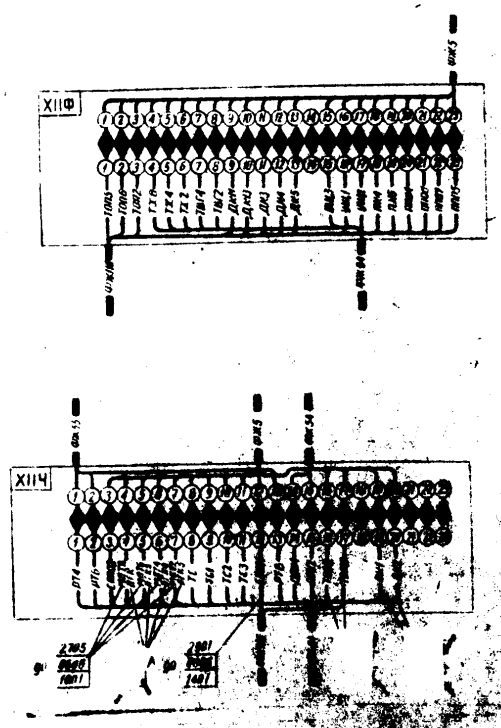


Fig. 51. Diagram of the hermetic [illegible] of the pilot's cabin, the tail [illegible]

 M

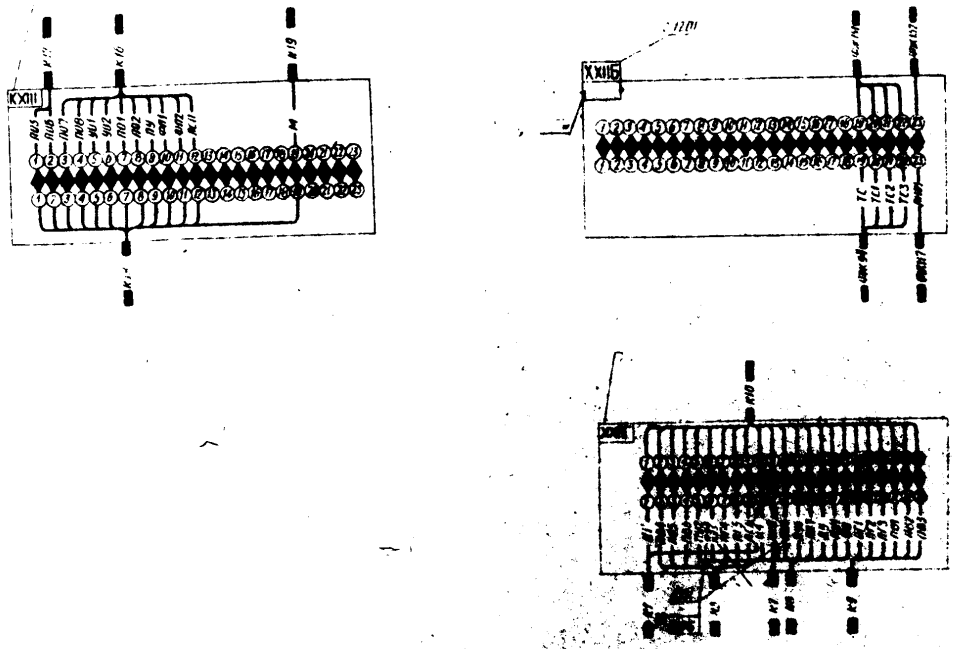
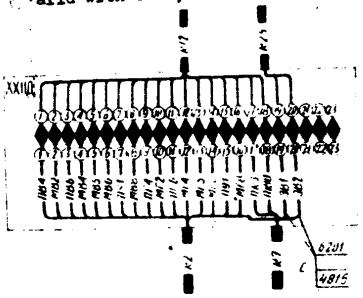
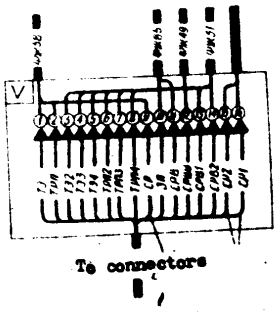


Fig. 52. Diagram of the hermetic plug connectors of the tail cabin and the turret.

Valid with 2601, 0506, 0805





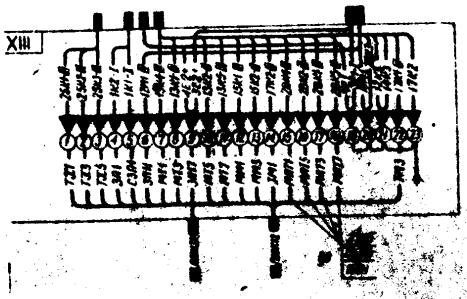
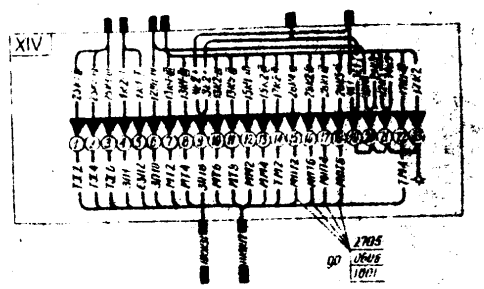


Fig. 53. Diagrams of plug sockets of the tail cabin, the twin-tub [illegible] control panels, the take off boost rocket control panel [illegible] and the left engine.



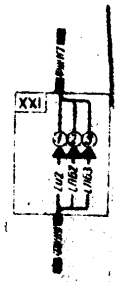


Fig. 54. Diagrams of pins [illegible] tail [illegible] of the [illegible]

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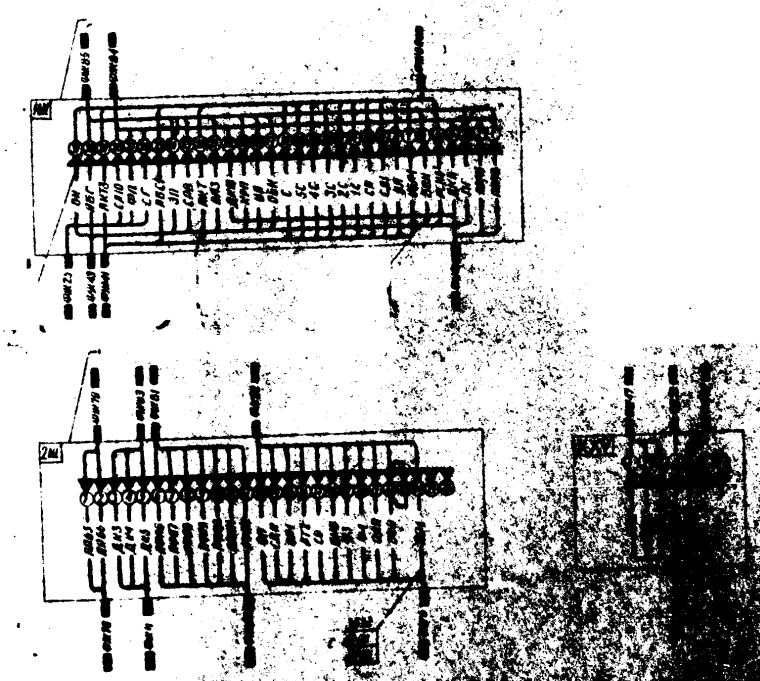

Fig. 72. [illegible]

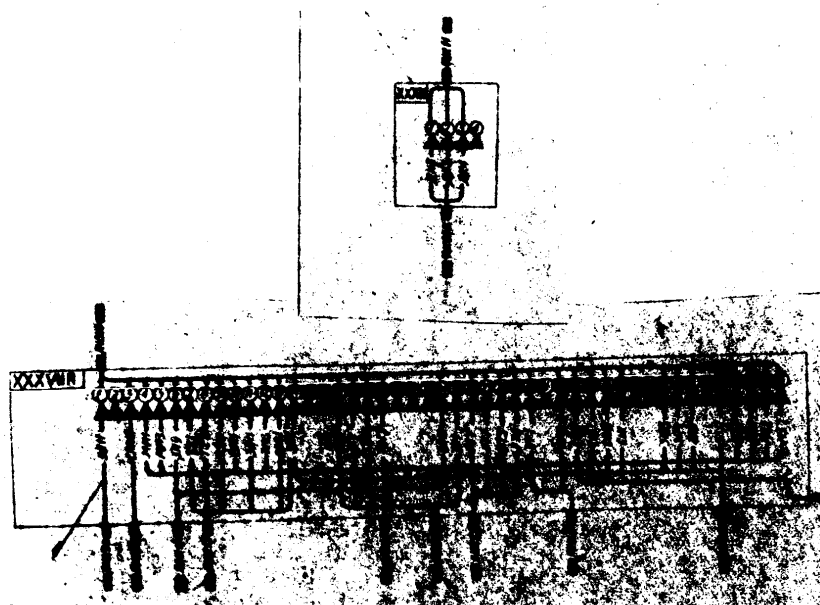

Fig 56. Diagrams of the plug connectors of the [illegible] and the left nacelle.

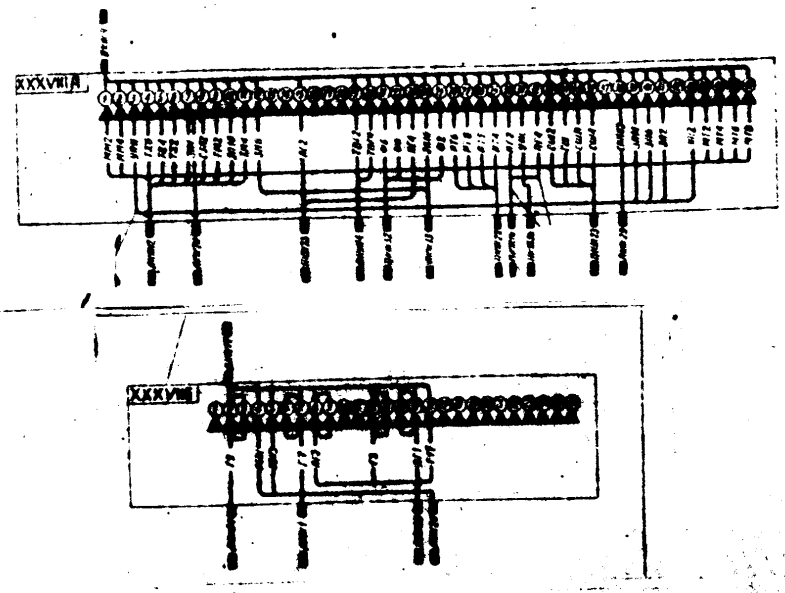

Fig. 71. Diagram of the plug connectors of the left and right modules.

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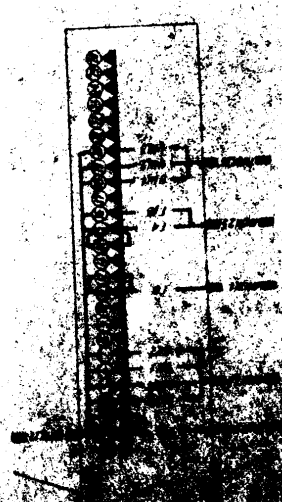

DISTRIBUTION OF [illegible]

The electrical [illegible]
raters 57 and 58 and the [illegible]
43 to the distributing [illegible] the [illegible]
F, E and [illegible] located in the [illegible]
The distrib[illegible] are [illegible]
and form a single supply system.
The power [illegible] units are [illegible]
distributing bars through protecting [illegible]
fuses.

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DISTRIBUTION OF ELECTRIC ENERGY ALONG BARS

No. of pos.	No. of ind.	Name	No. of elements in a	Type of [illegible]
1	2	3	4	5
40		Central distributing board of navig.	1	Made by manufacturer
	B	Central distributing board bar	1	Ditto
57		Left generator	1	PCP-9000
58		Right generator	1	PCP-9000
60		Pilot's right desk	1	Made by manufacturer
	B	Pilot's right desk bar	1	Ditto
73		Left generator differential-current relay	1	KRP-400
76		Right generator differential-current relay	1	KRP-400
80		Gunner's right desk	1	Made by manufacturer
	B	Gunner's right desk bar	[illegible]	[illegible]
130		[illegible]	[illegible]	[illegible]

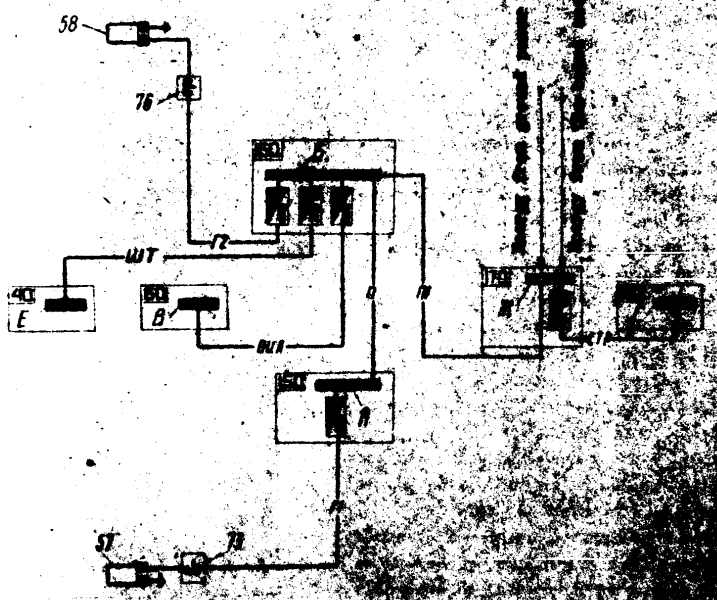

Fig. 39. [illegible]

ELECTRIC ENERGY SOURCES OF AEROPLANE.

Generator circuit

The electric net of the aeroplane includes the supply of the power consuming elements with alternating and direct current.

Two generators ГСР-9000 /57, 58/ serve as sources of direct current as well as two accumulator batteries 12-A-30 /42, 43/, and as the ground power sources, which are being connected through the aerodrome supply sockets /44, 45/.

The generators and the accumulators are connected in parallel to the board net.

The generators are switched on and off by means of the switches 40B and 40k.

The differential-current relay РМР-400 /73/ automatically connects the generators to the board net when the voltage on the generator clamps is [illegible] sufficient, and disconnects them when the voltage drops.

Equalisation of the voltage of the generators and its stabilization on the value of 28,5 V is [illegible] by means of carbon regulators /65 , 65a/. The voltage is adjusted to 28,5 V by means of rheostats /40c, [illegible]

The accumulator battery is switched on by means of switch 40ж , placed in the navigator's cabin.

In case of emergency the accumulator battery and the aerodrome supply can be switched off by means of the switch 33p on the pilot's left desk.

When the board net is supplied from ground sources, the board accumulators are automatically connected by contactors. For supplying the board net clamp [illegible] of the aerodrome supply is used [illegible] tion "Sarych" "Starting".

When the engines are being started [illegible] drome supply [illegible] are [illegible]

The [illegible] accumulator's [illegible] for starting the engines /[illegible]

GENERATOR CIRCUITS.
/Figs. [illegible], [illegible], 63, 64a, 65a/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navigator's central distribution board	1	Made by manufacturer	Navig. [illegible] right [illegible] between [illegible] No. 4 [illegible]
	6	Left generator switch	1	2B-45	Navig. [illegible]
	r	Left generator A-meter	1	A-46	[illegible]
	[illegible]	Left generator voltage regulation rheostat	1	BO-25A	[illegible]
	e	Voltmeter switch	1	MNH-45	[illegible]
	[illegible]	Voltmeter	1	B-46	[illegible]
	3	Right generator voltage regulation rheostat	1	BO-25A	[illegible]
	[illegible]	Right generator A-meter	1	A-46	[illegible]
	k	Right generator switch	1	2B-45	[illegible]
	[illegible]	Push-button switch of V-meter /with 300L, 080L, 150L/	1	MB-45	[illegible]
	E	Navig. electro-board bar	1	Made by manufacturer	[illegible]
	BO[illegible]	Set limit switch, navig. V-meter	1	[illegible]	[illegible]
57		Left generator	[illegible]	[illegible]	[illegible]
58		Right generator	[illegible]	[illegible]	[illegible]
59		Resistance [illegible]	[illegible]	[illegible]	[illegible]
		Voltmeter [illegible]	[illegible]	[illegible]	[illegible]
62		[illegible]	[illegible]	[illegible]	[illegible]
		Voltmeter [illegible]	[illegible]	[illegible]	[illegible]
65		[illegible]	[illegible]	[illegible]	[illegible]

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1	2	3	4	5	
65	e	Right generator voltage regulator	1	P-25A	Voltage reg. box
	k	Jointing block	1	73-K	- " -
67		Capacitor	1	KBM-31	Reverse current relay
71		Left generator A-meter shunt	1	A-46	- " -
72		Right generator capacit.	1	KBM-31	-" -
73		Left generator reverse current relay	1	ДМР-400	Left [illegible] rib No. 2
74		Right generator A-meter shunt	1	A-46	Reverse current relay
76		Right generator reverse current relay	1	ДМР-400	Right [illegible] rib No. 2
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs 20 & 21.
	A	Left CDS bar	1	Dtto	Left CDS
	П1	Left generator fuse	1	ТП-400	In left CDS
160		Right CDS	1	Made by manufacturer	Fuselage, [illegible] board, between ribs 20 & 21.
		Right CDS bar	1	Dtto	Right CDS
160	П2	Right generator fuse	1	ТП-400	Fuselage [illegible] board, between ribs 20 [illegible]
IV	A	CDB connector	1	[illegible]	CDB
XII	P	Pilot's cabin hermetic connector	1	[illegible]-23	Pilot's [illegible] floor
	B	Dtto	1	[illegible]-23	[illegible]
XV	Б	Left CDS connector	1	[illegible]	[illegible]
	Д	Dtto	1	[illegible]	Dtto
	E	Dtto	1	[illegible]	Dtto
	H	Dtto	1	[illegible]	Dtto
XVI	A	Right CDS connector	1	[illegible]	Right CDS
	Б	Dtto	1	[illegible]	[illegible]
	Д	Dtto	1	[illegible]	[illegible]
	E	Dtto	1	[illegible]	[illegible]
	З	Dtto	1	[illegible]	[illegible]
XXXVII	Б	Left [illegible] connector	1	[illegible]	[illegible]
	В	Left [illegible]	[illegible]	[illegible]	[illegible]
XXXVIII	Д	[illegible]	[illegible]	[illegible]	[illegible]

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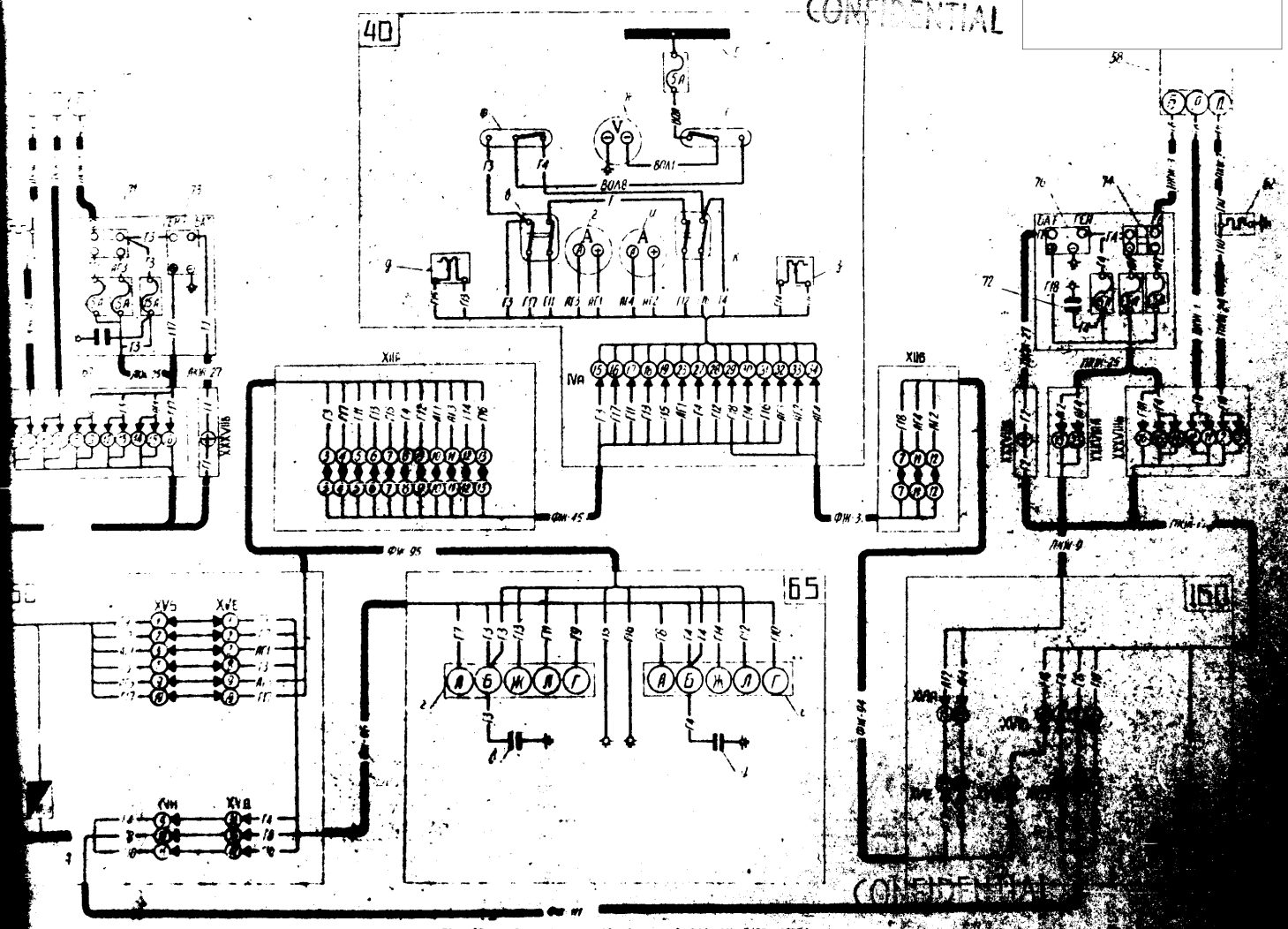

Fig. 65a. Generator assembly diagram /valid with 6400, 3002/.

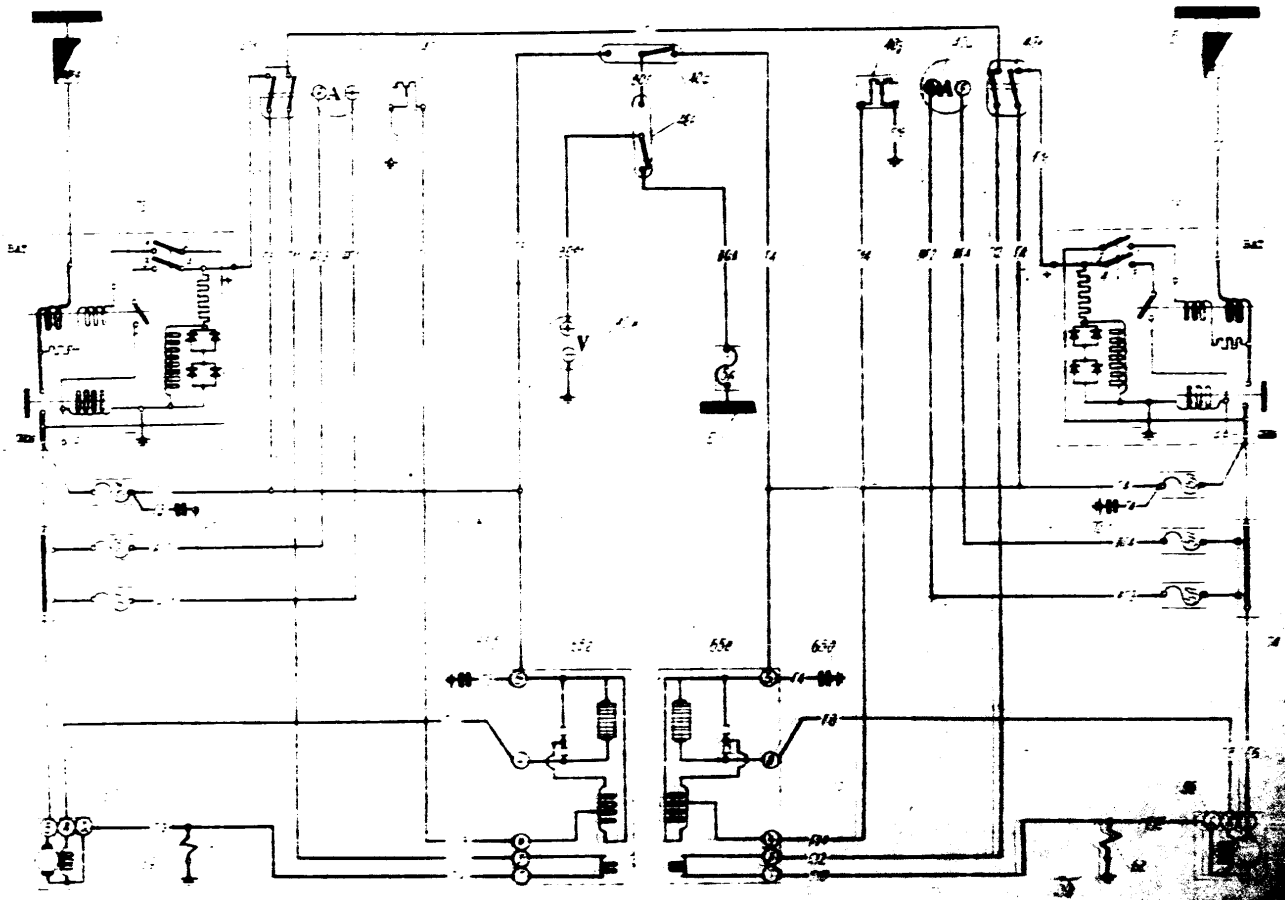

Fig. 6a. Principal circuit diagram of the generator

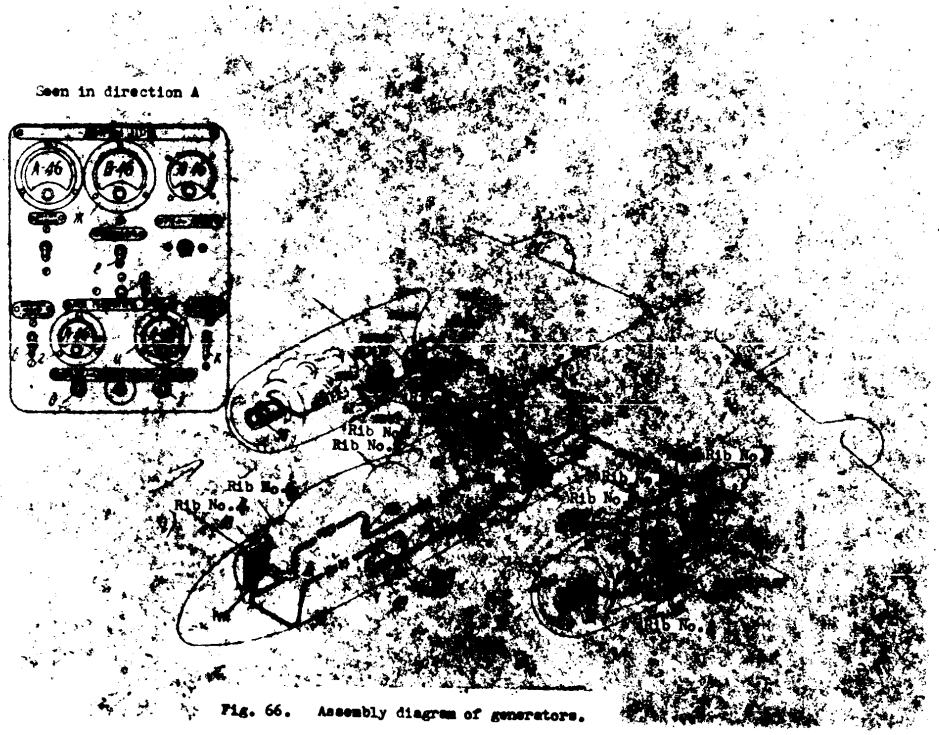

Fig. 66. Assembly diagram of generators.

1	2	3	4	5	6
XXXVIII					
	Б	Right nacelle connector	1	[illegible]	Right [illegible] left [illegible] between [illegible] No. 6 [illegible]
	В	Right nacelle screw connector	1	Made by manufacturer	—
	АГ1	Net limit switch, left generator A-meter	1	АЗС-5	Left [illegible]
	АГ3	Dtto	1	АЗС-5	—
	Г3	Net limit switch, left generator V-meter	1	АЗС-15	—
	АГ2	Net limit switch, right generator A-meter	1	АЗС-5	Right [illegible]
	АГ4	Dtto	1	АЗС-5	—
	Г4	Net limit switch, right generator V-meter	1	АЗС-15	—

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CIRCUIT OF ACCUMULATOR BATTERIES AND TH

/Fig. 68, 69, to 6348....5301/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
31	-	24-48 V switching contactor	1	KП-1	Fuselage, between ribs 37 & 38
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board between ribs No. 8 & 11
	*1	A-meter switching relay	1	PT-40	Pilot's left desk
	p	Accumulator switch /[illegible] 1801,0201,0401/	1	2B-45	- " -
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 5
	a	Accumulator A-meter	1	A-46	
	3	Accumulator switch	1	B-45	
41		Accumulator blocking relay	1	Made by manufacturer	Fuselage, between ribs No. [illegible]
	BA1	Accumulator A-meter fuse /from 1901,0201,0401/	1	ИП-15	
	BA2	Dtto /from 1801,0201,0401/	1	ИП-15	
42		Right accumulator	1	12-A-10	Fuselage, between ribs [illegible]
43		Left accumulator	1	12-A-10	
44		Starting clamp	1	Made by manufacturer	
45		Aerodrome supply clamp	1	[illegible]	
170		Near CDB	1	[illegible]	
	*	Near CDB	1	[illegible]	
XII	A	Pilot's left desk	1	[illegible]	
		[illegible]			
XI	A	[illegible]			
	B	Pilot's [illegible]			
		Connector			
	3	[illegible]			
I	*	Navig. cabin [illegible]			

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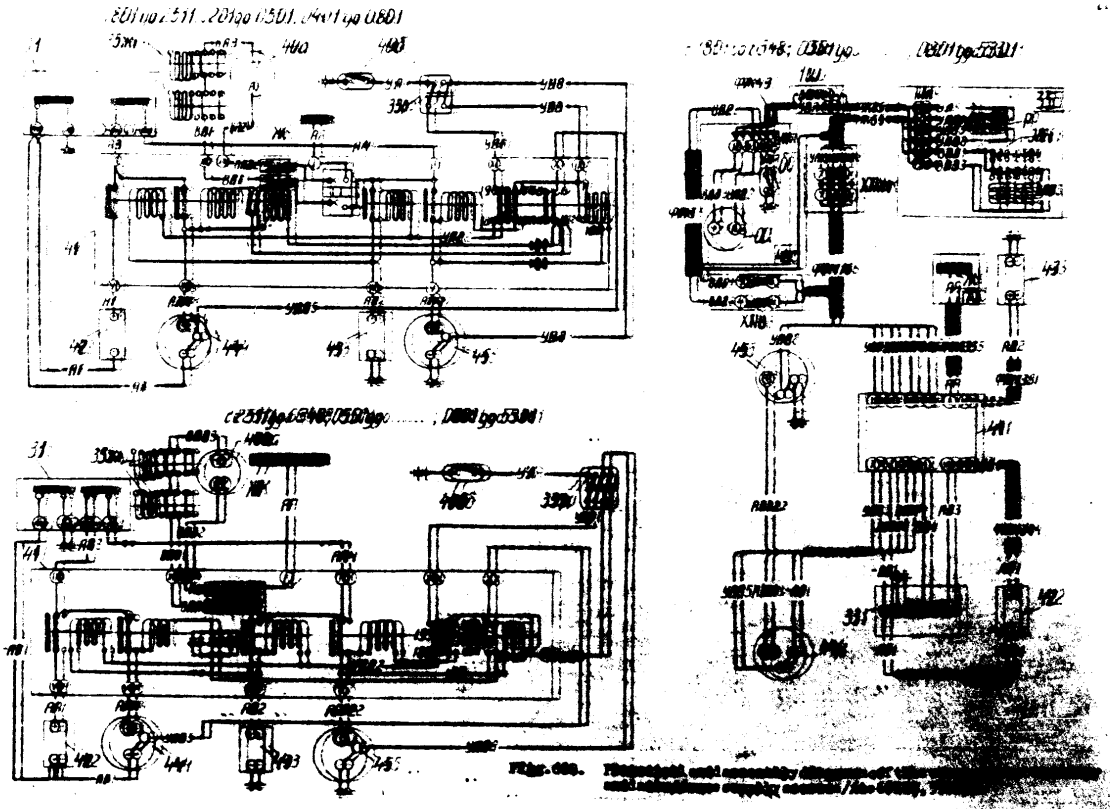

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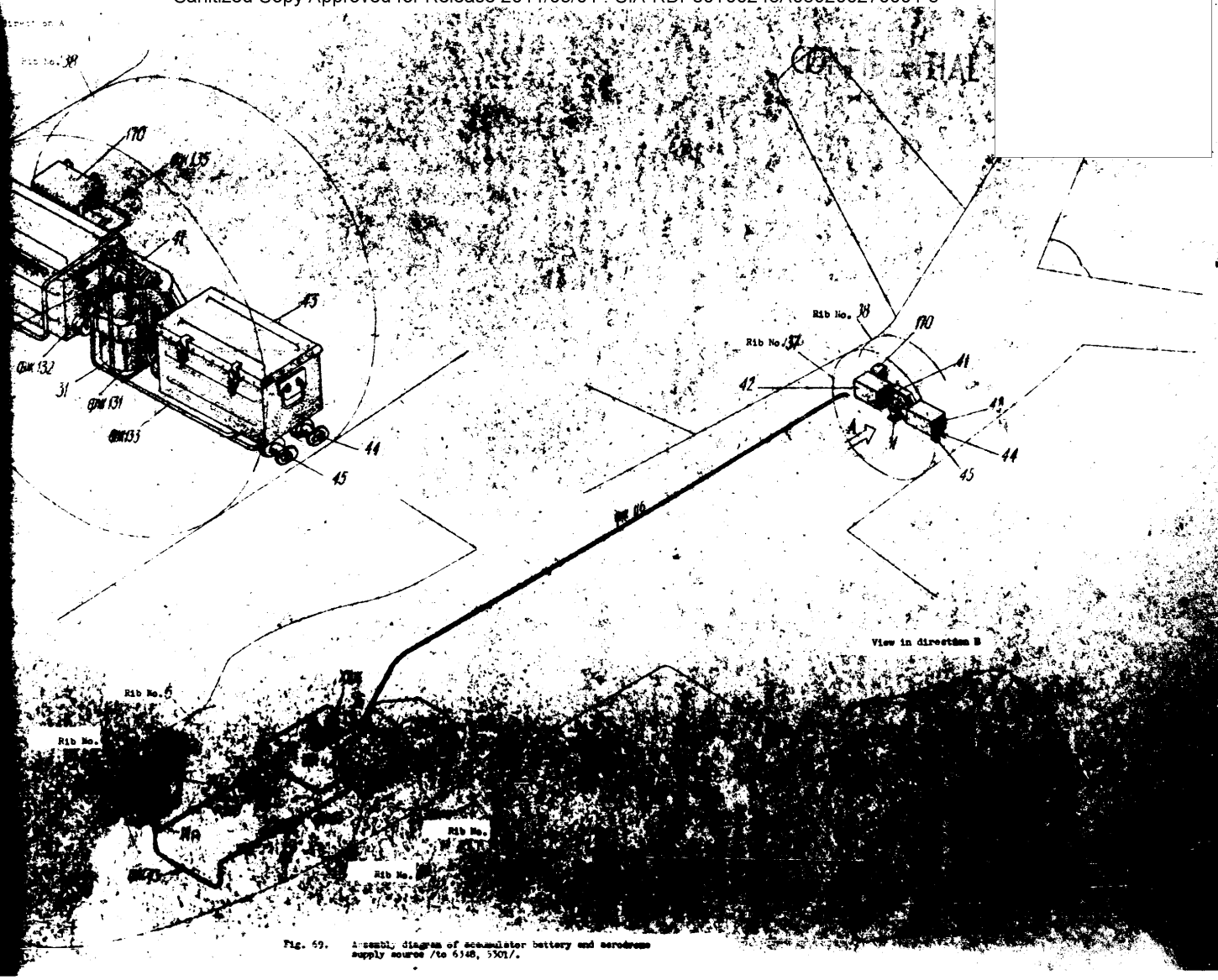

Fig. 49. Assembly diagram of accumulator battery and aerodrome supply source /to 6348, 5301/.

[redacted]

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CIRCUIT OF ACCUMULATOR BATTERIES AND A[illegible]

/Figs. 70, 71, [illegible] 65148..[illegible]/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
31		24-28 V switching contactor	1	KM-1	[illegible]
35		Pilot's left desk	1	Made by manufacturer	Pilot's [illegible] left [illegible] between [illegible] No. 8 & [illegible]
	1	Ammeter switching relay	1	PP-40	Pilot's [illegible] desk
	2	Accumulator switch	1	2B-45	—"—
40		Instigator's CBB	1	Made by manufacturer	Mtg. [illegible] between [illegible] No. 4 & 6 right [illegible]
	3	Accumulator Ammeter	1	A-56	Mtg. [illegible]
	4	Accumulator switch	1	2B-45	—"—
41	5	Accu. switching relay	1	PRA-200A	[illegible] No. [illegible]
	6	Ditto	1	PRA-200A	—"—
	8	Ditto	1	Ditto	—"—
	7	Ditto	1	Ditto	—"—
	A	Instrument fuse block	1	Made by manufacturer	[illegible]
41	e	Ammeter shunt	1	A-45	[illegible]
	RA1	Accu. Ammeter fuse	1	[illegible]	[illegible]
	RA2	Ditto	1	[illegible]	[illegible]
42		Right accumulator	[illegible]	[illegible]	[illegible]
43		Left [illegible]	[illegible]	[illegible]	[illegible]
44		S[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

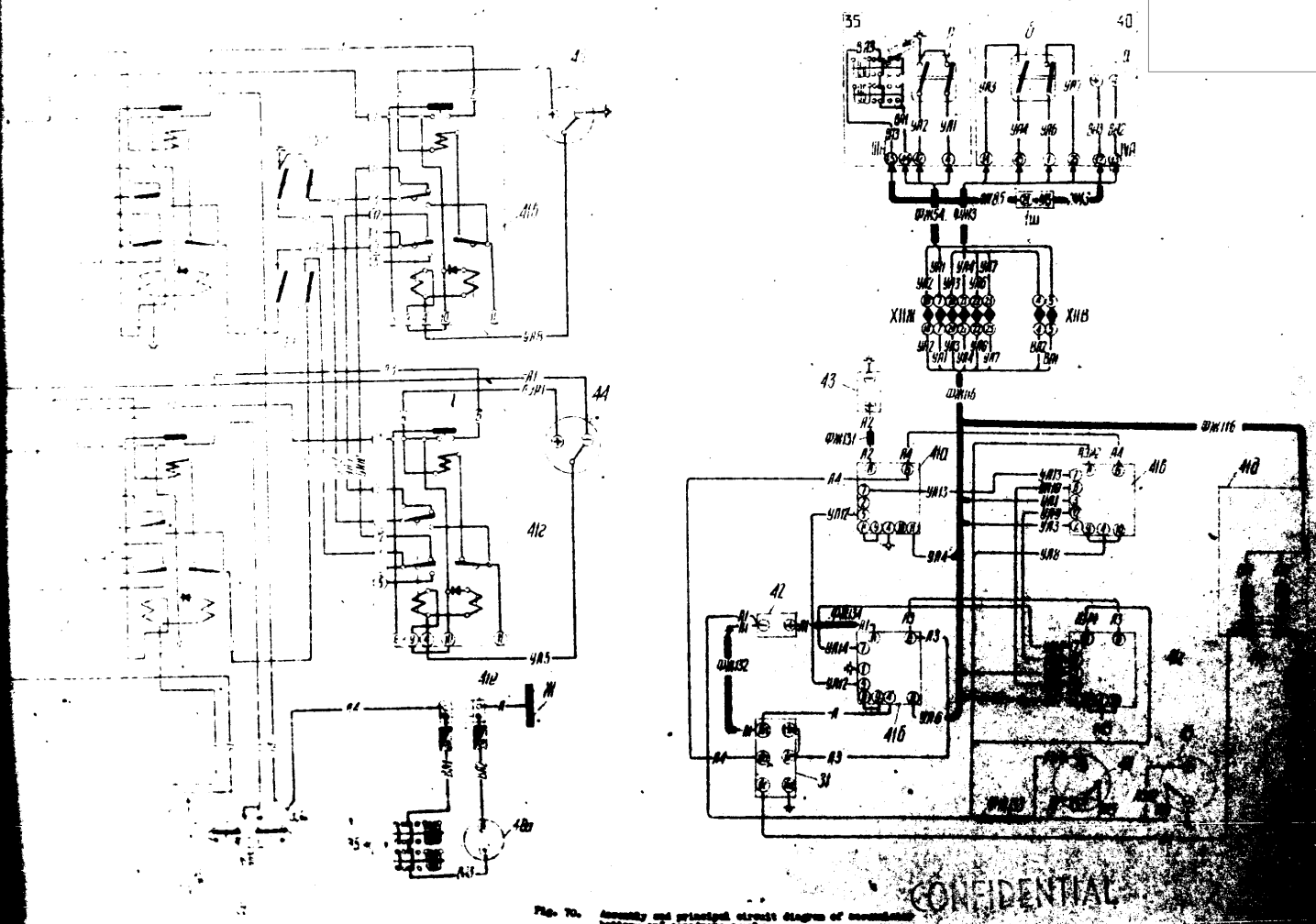

Fig. 70. Assembly and principal circuit diagram of [illegible] battery and electronic unit.

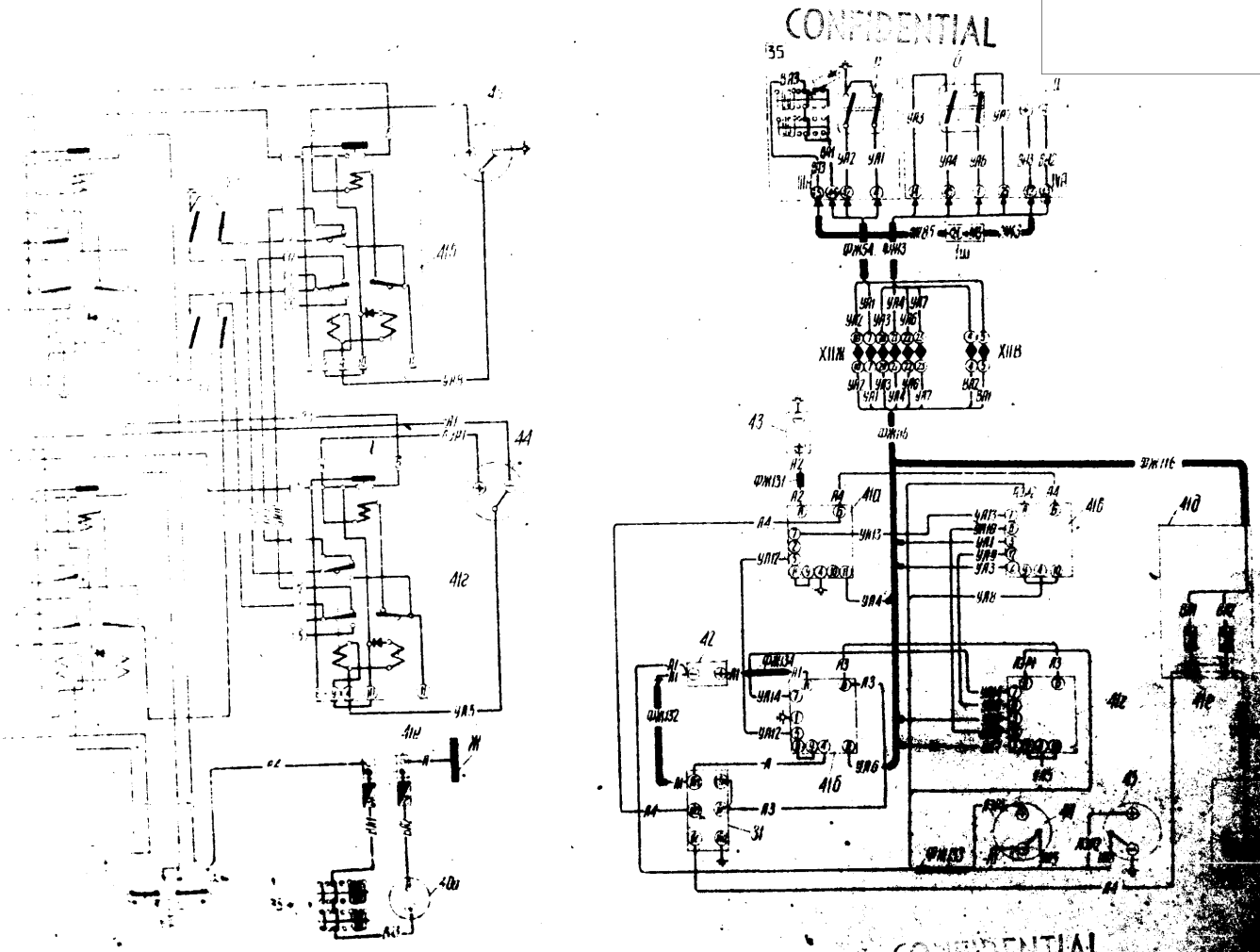

Fig. 70. Assembly and principal circuit diagram of accumulator battery and electric supply.

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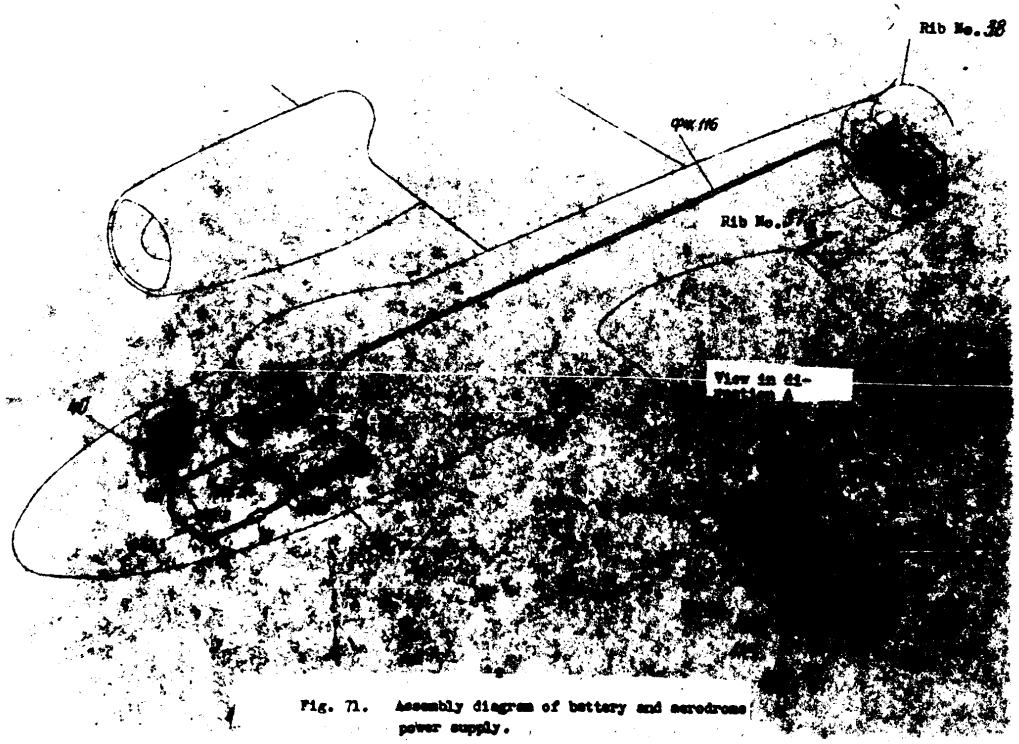

Fig. 71. Assembly diagram of battery and aerodrome power supply.

POWER SUPPLY OF THE CONVERTERS - A. C. SUPPLY

The a. c. aeroplane net is supplied from dynamotors MA-500 /75/ and MA-250 /81/.

The dynamotors are converting the d. c. of the board net into a. c. with voltage 115 V and frequency 400 c/s.

Current from the dynamotor MA-500 is supplied to the radio compass, the command radio station, the radio altimeter of large altitudes and the rear mounting [illegible].

The dynamotor MA-250 is a spare generator, and is switched on in case of a defect of the dynamotor MA-500.

The dynamotor MA-500 and MA-250 output voltage is regulated by means of rheostats /40T, 40M/.

The dynamotors, which are included in the units of the electrical instruments and the radio sets are not mentioned in the following part.

No. of pos.	No. of ind.	Name		
1	2	3	4	5
40		Navigator's CMB	1	
	H	MA-250 voltage regulating resistor	1	
	c	Dynamotor switch	1	
	T	MA-500 voltage regulating resistor	1	
	E	CMB bar	1	
	M	A, c, bar	1	
	MHB	Net limit switch, dynamotor charge	1	
	MHB-1	Dtg, MA-500		
75		Dynamotor		
42				

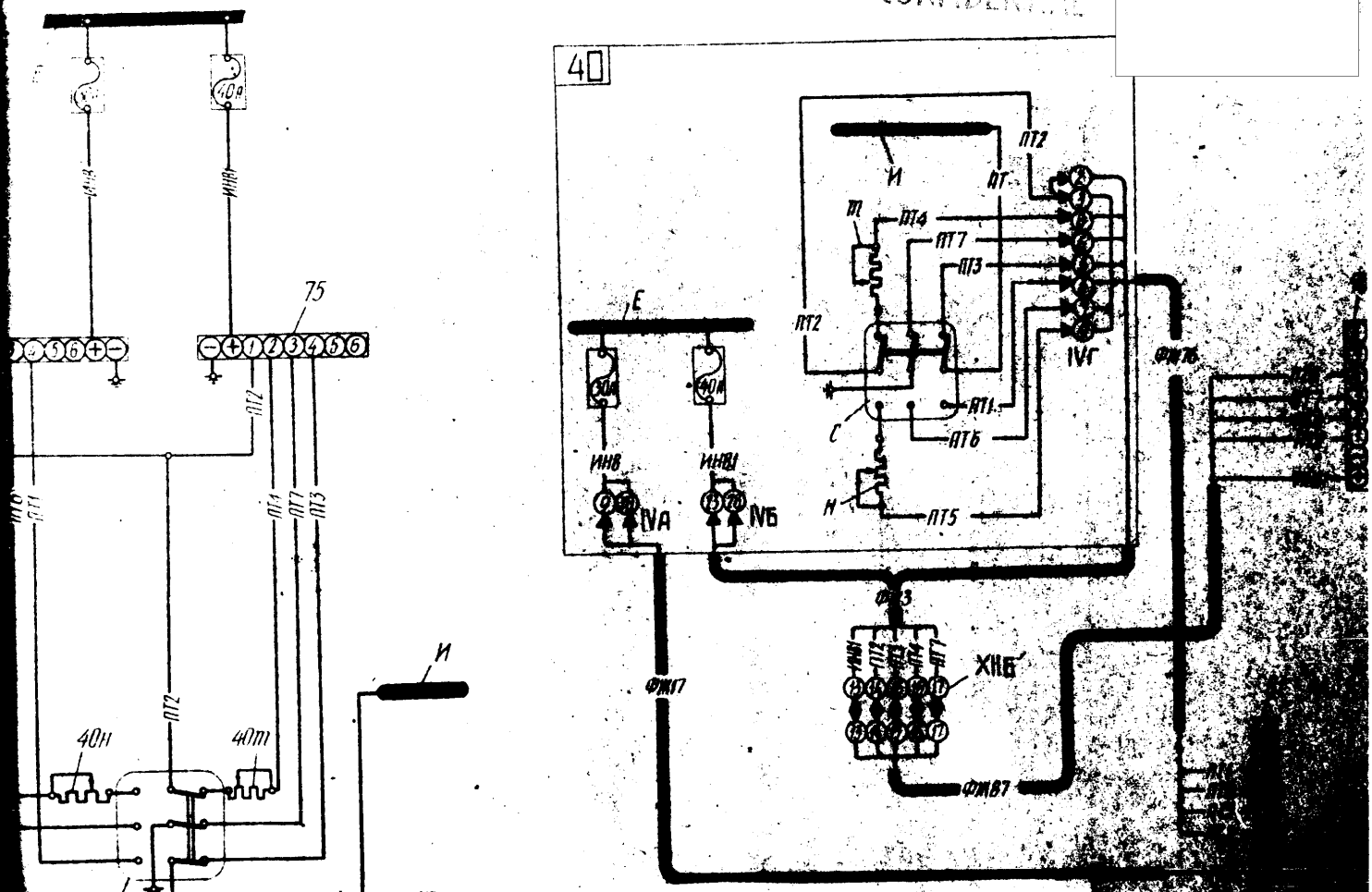

Fig. 75. Principal and assembly circuit diagram of the dynamotor MA-250 and MA-500 power supply.

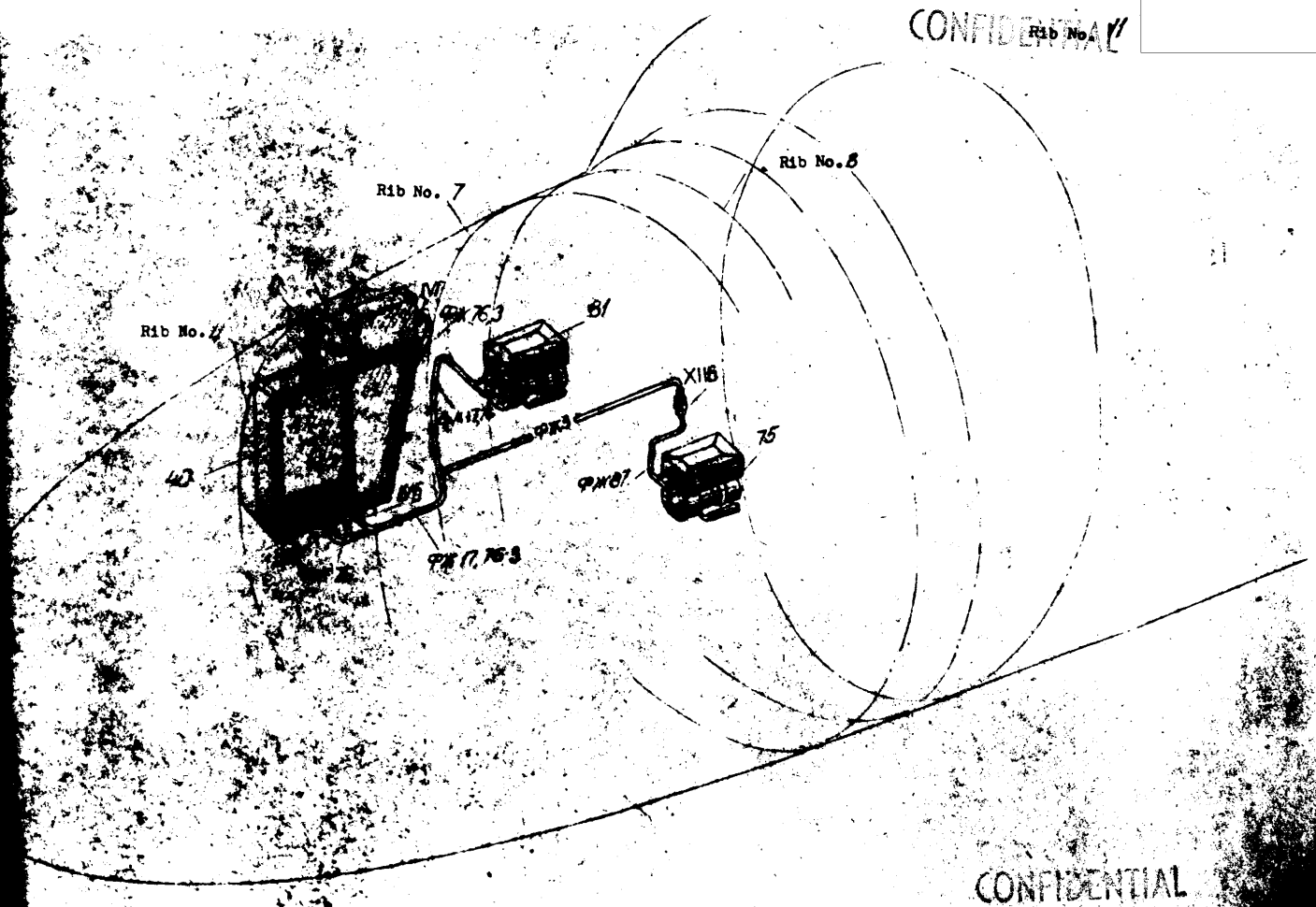

Fig. 76. Assembly diagram of the dynamotor MA-250 and MA-500 power supply.

CONTROL OF THE AGGREGATES OF THE POWER SYSTEM.

The engines are started, by means of the board batteries or the aerodrome power source through the aerodrome power source clamps 44, 45.

The starting controls are placed on the pilot's left desk.

When starting, it is necessary:

- to switch on the starting switch 35я ;
- to connect the starting pump switches 35х, 35ц;
- to put the switches "Земля - Воздух " - Ground-Air, 35у, 35ї into position " Земля "-Ground;
- to put the switch 35п into position "Левый " - Left or " Правый " - Right, according to which engine is being started.

By pushing the knob for starting the left engine 33с /or 33Т for the right one/ the current is connected to the starting panel /3Е/.

The starting panel divides the starting into three cycles, usually 30 to 35 seconds long.

First cycle. - 1 - 2,5 seconds. After the button 1 has been pressed, the relay in the starting panel operates, and connects the aggregates /starting pump, starting coils, the flooding cocks/, and simultanously switches on the accumulator battery (connecting it) through the loading resistor to the starter.

The starter begins slowly to rotate.

Second cycle. - 4 - 6,5 seconds. The second relay operates. This relay shunts the leading resistor, and the full accumulator battery voltage /24 V/ is connected to the starter. The starter begins to rotate considerably quicker.

Third cycle. - The starting panel connects the switching contactor /3I/. The contactor operates and [illegible] the accumulator batteries from parallel [illegible] to [illegible] connection. Consequently the voltage [illegible] The starter, being supplied by 48 V, [illegible] revolutions, in a time of 20 - [illegible] started.

The ground power source supplies the system in the same way as the board batteries, i. e. in the beginning /I and II cycle/ in parallel and in the III cycle in series.

Therefore it is necessary for the starting of the engines to have two independent power sources, connected separately to each of the clamps.

The fuel pumps serve to create a pressure /0,8 - 1,0 kp/cm^2/ in the fuel system between the tanks and the high pressure fuel system.

The fuel pump serves for pumping the fuel from one group of tanks into the other.

The fuel distribution cock serves to determine the sequence, in which the tanks are emptied. The control elements of the pumps and the cock are placed on the left pilot's desk. The left pilot's desk also carries the ~~[illegible]~~ lamps indicating the operation of the fuel pumps.

The air outlet mechanism /anti-pumping system/ serves to separate the ~~[illegible]~~ hot air from the compressor to prevent the pumping of the engines /see bulletin No. 47-3/.

ENGINE STARTING CIRCUITS

/Fig. 77, 78, 79, 80, 81/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
31		24-48 V switching contactor	1	КП-1	Between ribs No. 37 & 38 of fuselage
32		Right engine starting panel	1	ПС-2-48	Right ~~nacelle gondola~~, left board, between ribs 3 & 5
33		Left engine starting panel	1	Dtto	Left ~~nacelle gondola~~, left board, between ribs No. 3 & 5
34		Right engine starter	1	СТ-2-48В	Right engine
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin right board, between ribs No. 8 & 11
	$Ат_1$	A-meter switching relay	1	РТ-40	Pilot's left desk
	$З_1$	Dtto	1	РТ-40	- " -
	т	Engine starting switch	1	ТПН-45	- " -
	р	Accu. and ground source switch	1	ЗВ-45	- " -
	с	Left engine starting button	1	5-КС	- " -
	Т	Right engine starting button	1	5-КС	- " -
	у	Switch "Воздух - Земля" of left engine	1	ПП-45	- " -
	ф	Switch "Воздух - Земля" of right engine	1	ПП-45	- " -
	х	Left engine starting aggregate switch	1	В-45	- " -
	ц	Right engine starting aggregate switch	1	В-45	- " -
	ш	Left engine selector cock switching indication lamp	1	СЛЦ-51	Pilot's left desk
	щ	Dtto, right engine	1	СЛЦ-51	- " -
	э	Left engine selector cock switch	1	В-45 /to 6603/	- " -
		Dtto		АЗС-2	- " -
	ю	Dtto, right engine	1	В-45 /to 6603/	- " -
				АЗС-2	- " -
	я	Engine starting main switch	1	В-45	- " -

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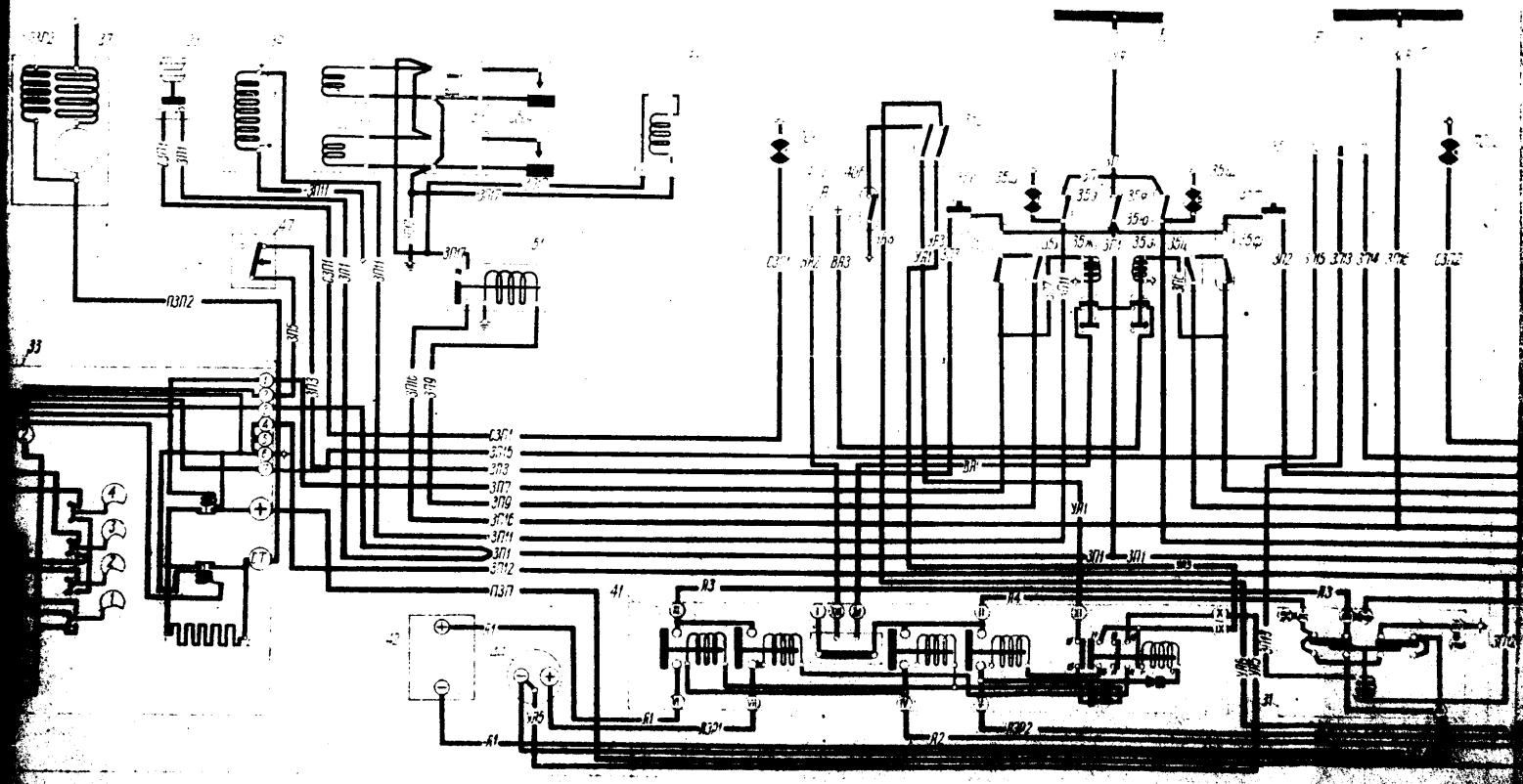
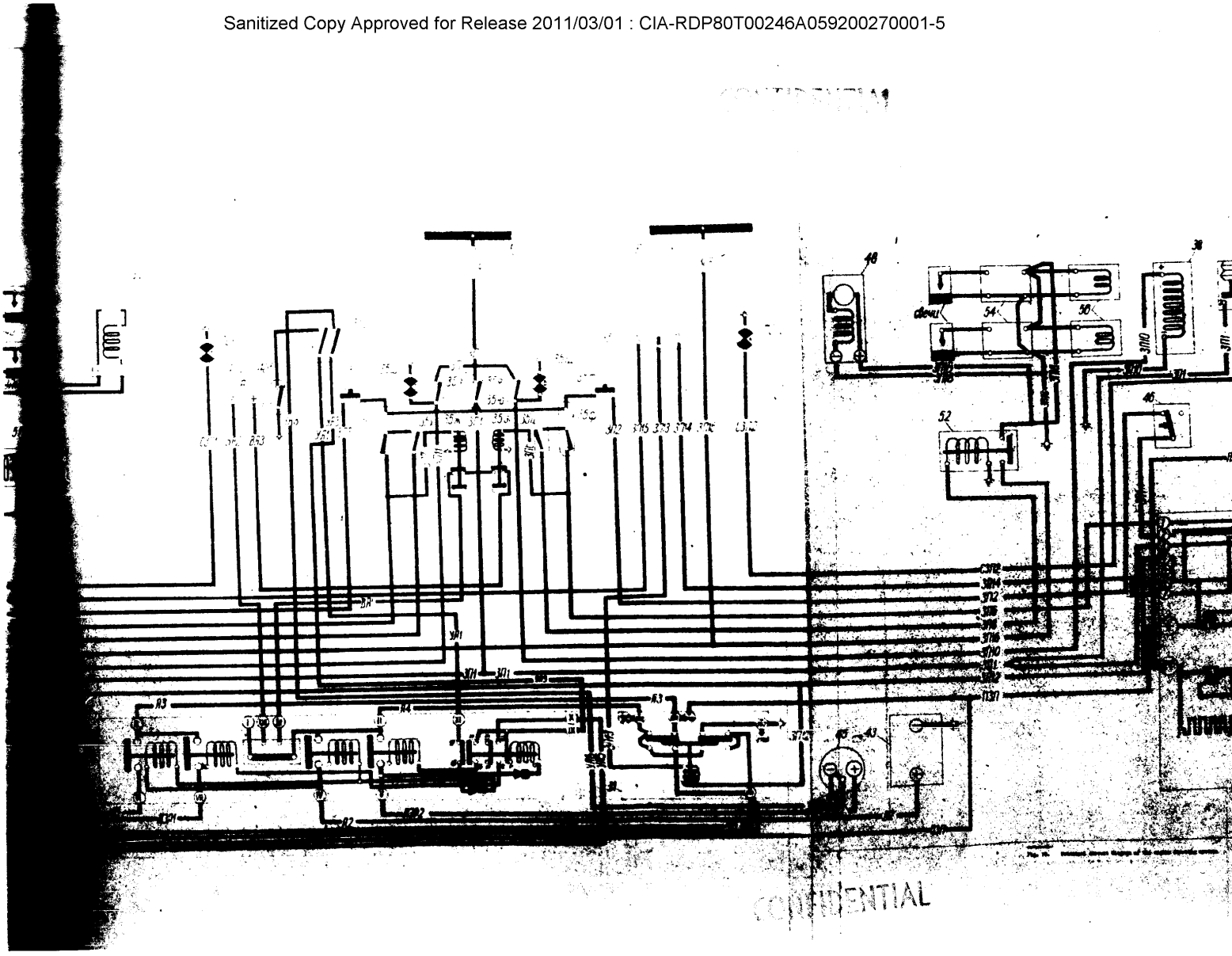
1	2	3	4	5	6
37		Left engine starter	1	СГ-2-48В	Left engine
38		Selector cock of right engine	1	ЭВ-46	Right engine
39		Selector cock of left engine	1	ЭВ-46	Left engine
40		Navigator's CDB	1	Made by manufacturer	Nav. cabin, right board, between ribs No. 4 & 6
	3П	Net limit switch, engine starting and starting rocket firing	1	АЗС-20	CDB, navig.
	3П16	Starting pump fuse	1	АЗС-30	- " -
	Е	CDB ber, navig.	1	Made by manufacturer	- " -
40	э	Accumulator A-meter	1	А-46	- " -
	ж	Accumulator switch	1	В-45 /to 6348/	- " -
41	э	Accumulator blocking relay /to 6348..5301/	1	Made by manufacturer	Fuselage, between ribs No. 37 and 38
	ж				
	а	Accumulator switching contactor	1	К-200А	Accu. blocking relay
	б	Aerodrome source switching relay	1	-"-	- " -
	в	Accumulator switching	1	-"-	- " -
	г	Aerodrome source switching contactor	1	- " -	- " -
	д	Accumulator battery switching relay	1	-"-	- " -
41	а	Accumulator switching relay /from 6348..5301/	1	РПА-200-А	- " -
	б	Dtto	1	РПА-200-А	- " -
	г	Dtto	1	РПА-200-А	- " -
	д	Distribution box of instrument fuses /from 6348..5301/	1	Made by manufacturer	- " -
	е	A-meter shunt	1	А-46	Instr. fuse box /from 6348 ...5301/
42		Right accumulator	1	12-А-30	Fuselage, between ribs No. 37 & [illegible]
43		Left accumulator	1	12-А-30	- " -
44		Starting clamp	1	Made by manufacturer	- " -
45		Aerodrome source clamp /starting/	1	Dtto	
46		Push-button switch of small gas, right engine	1	[illegible]	
47		Dtto, left engine	1	Dtto	
48		Starting pump, right engine	1	ПНВ-45	Right [illegible]
49		Starting pump, left engine	1	ПНВ-45	Left engine

1	2	3	4		
51		Left engine starting pump switching contactor	1	K-50A	Left nacelle [redacted], left board, rib 3
52		Dtto, right engine	1	K-50A	Dtto, right nacelle
53		Left engine starting coil	1	KP-1	Left engine
54		Right engine starting coil	1	KP-1	Right engine
55		Left engine starting solenoids	1	ЭП-45	Left engine
56		Right engine starting solenoids	1	ЭП-45	Right engine
70		Pilot' instrument board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	K_1	Left engine fuel pressure indication lamp	1	СЛЦ-51	Pilot's instr. board
	$Л_1$	Right engine fuel pressure ind. lamp	1	СЛЦ-51	- " -
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs No. 20 & 21
160		Right CDS	1	Dtto	Fuselage, right board, between ribs 20 & 21
236		Fuel pessure indicator	1	СД-3	Right engine
237		Dtto	1	СД-3	Left engine
59		Resistor in left engine minus	1	PC-2	Left nacelle [redacted], right board, rib 2
62		Resistor in right engine minus	1	PC-2	Right nacelle [redacted], left board, rib 2
III	A	Left desk connector of pilot	1	ШР60П45НШ2	Pilot's left desk
	Г	Dtto	1	ШР40П15НШ2	- " -
	E	Dtto	1	ШР48П28НШ2	- " -
IV	A	Navig. electro-panel connector	1	ШР60П45НР2	Nav. CDB
	Б	Dtto	1	ШРSSП31НГ3	- " -
	B	Dtto	1	ШР40П9НШ1	- " -
VII	B	Pilot's instr. board connector	1	ШР40П16НШ2 /from 2001/	Pilot's instr. board
XII	Г	Pilot's instr, board connector	1	ШР60П47НШ2	Pilot's instr. board
XII	B	Front cabin hermetic connector	1	ШРГ[illegible]23	Pilot's [illegible]

1	2	3	4	5	6
XII	Ж	Front cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
	Л	Dtto	1	ШРГ-23	- " -
	Т	Dtto	1	ШРГ-23	- " -
XIII		Left engine connector	1	ШР-23С	Left engine
XIV		Right engine connector	1	ШР-23С	Right engine
XV	А	Left CDS connector	1	ШР60П47НГ2	Left CDS
	Д	Dtto	1	Dtto	- " -
	Н	Dtto	1	ШР48П26НШ2	- " -
	Г	Dtto	1	Made by manufacturer	- " -
XVI	А	Right CDS connector	1	ШР60П47НГ2	Right CDS
	Е	Dtto	1	Dtto	- " -
	Б	Dtto	1	ШР48П26НШ2	- " -
	И	Dtto	1	ШР40П16НГ3	- " -
	Г	Dtto	1	Made by manufacturer	- " -
XIX		Starting net screw connector	1	Made by manufacturer	Fuselage, left board, rib 20
XX		Dtto	1	Dtto	- " -
XXXVII					
	А	Left nacelle ~~gondola~~ connector	1	ШР60П47НШ2	Left nacelle ~~gondola~~
	Г	Dtto	1	Made by manufacturer	- " -
XXXVIII					
	А	Right nacelle ~~gondola~~ connector	1	ШР60П47НШ2	Right nacelle ~~gondola~~, between rib [illegible]
	Г	Dtto	1	Made by manufacturer	- " -





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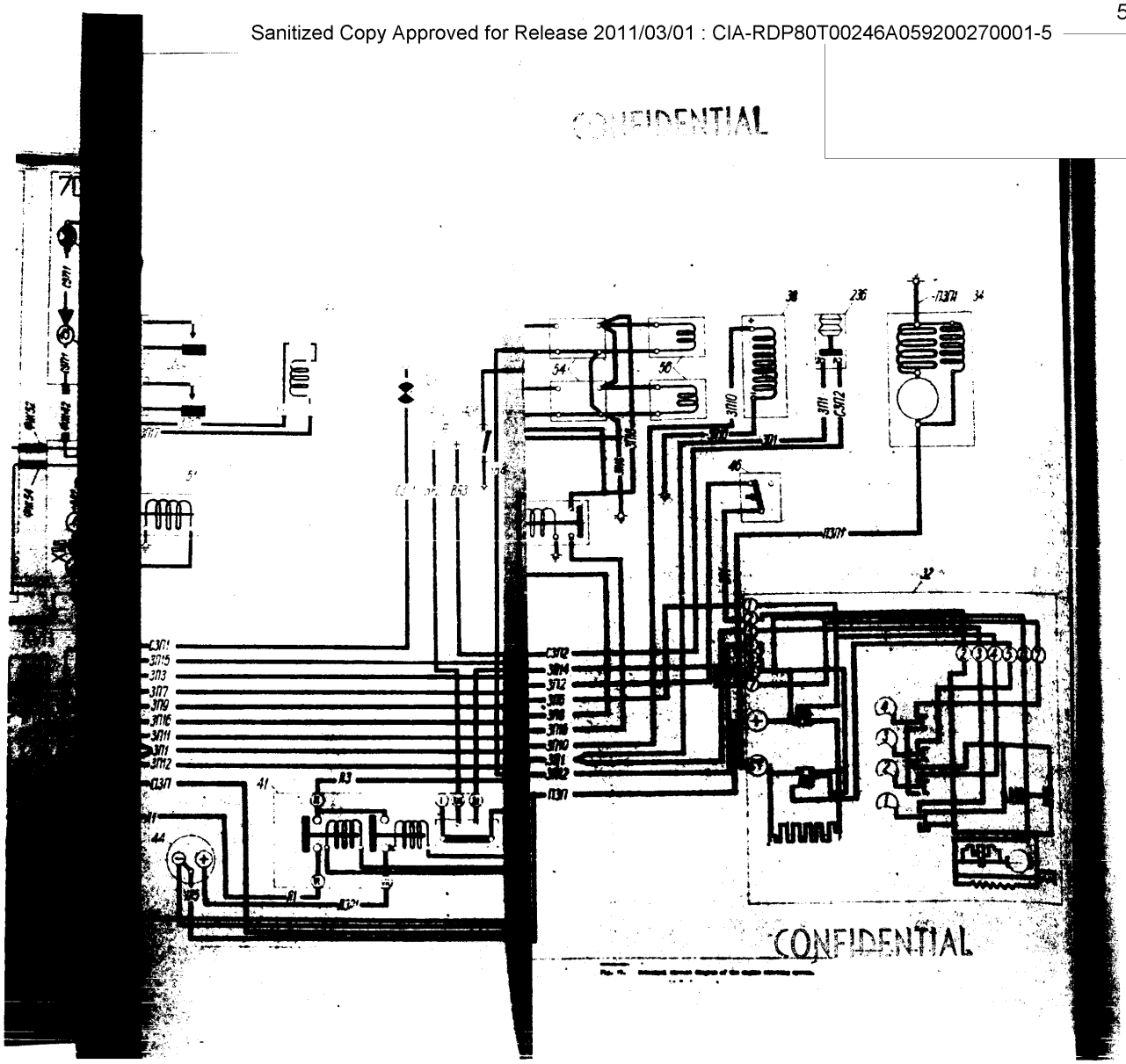
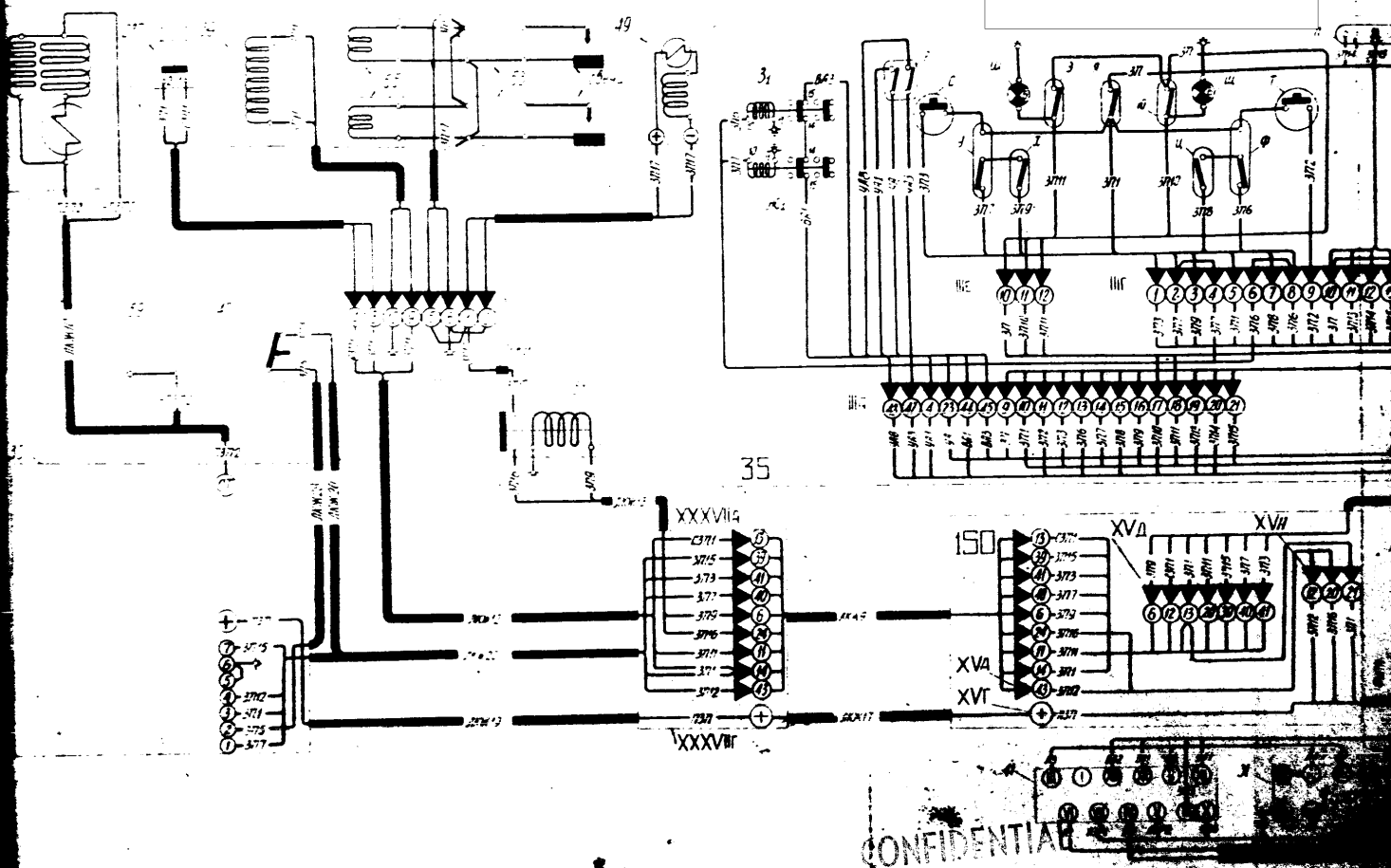
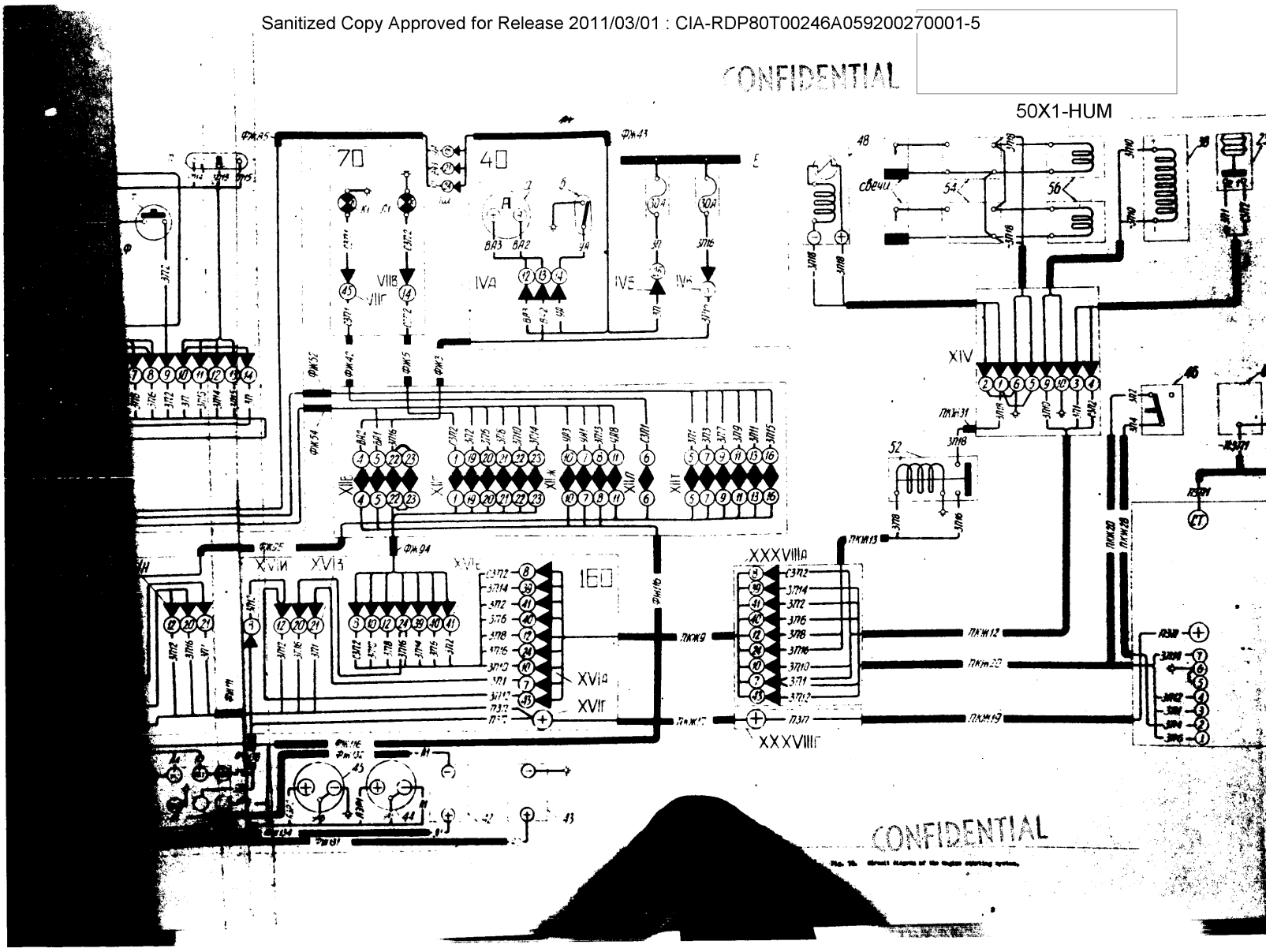






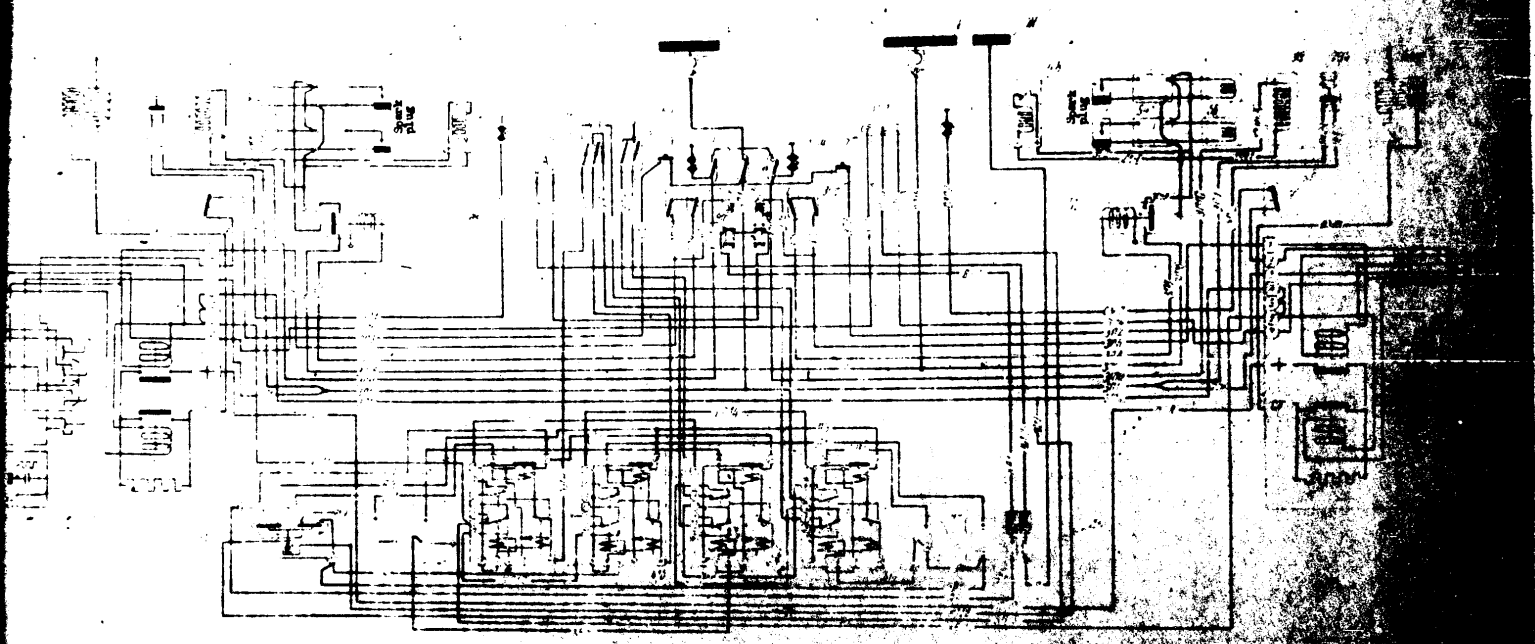


Fig. 75. Principal circuit diagram of the engine starting system.

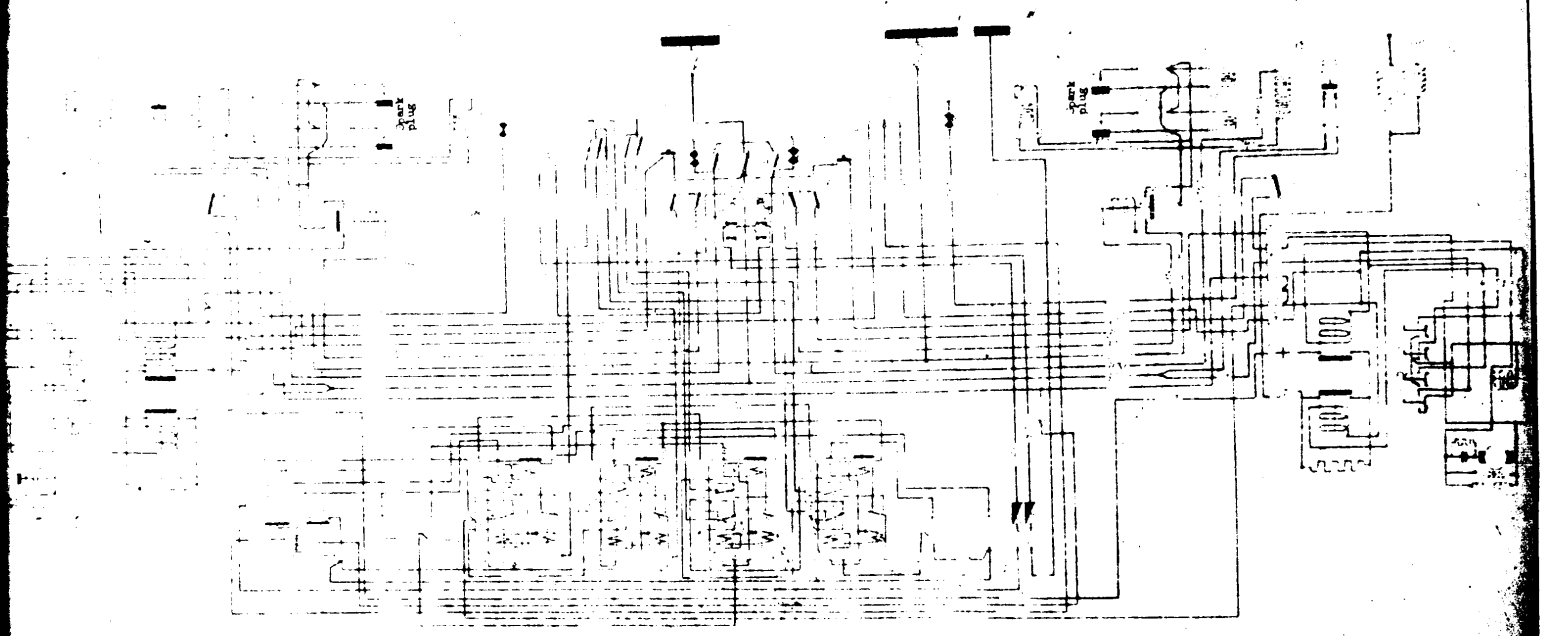


Fig. 79. Principal circuit diagram of the engine starting system.

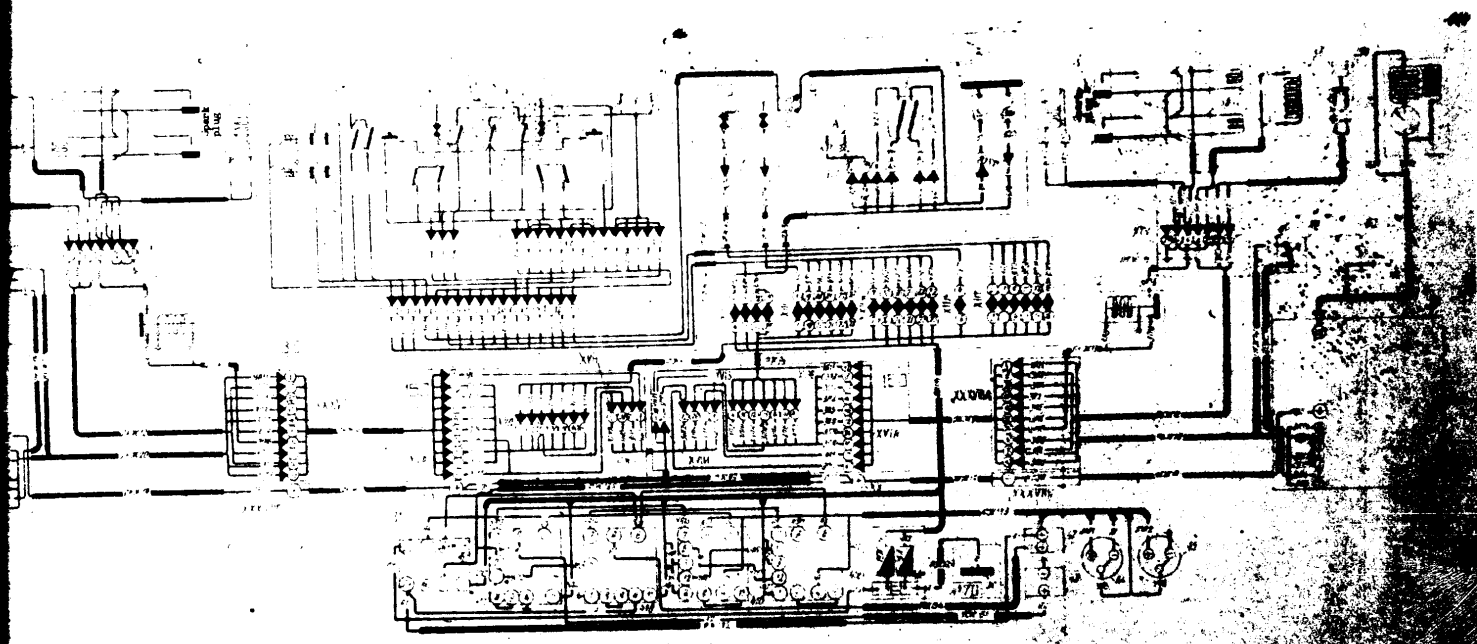


Fig. 80. Assembly diagram of the engine starting system.

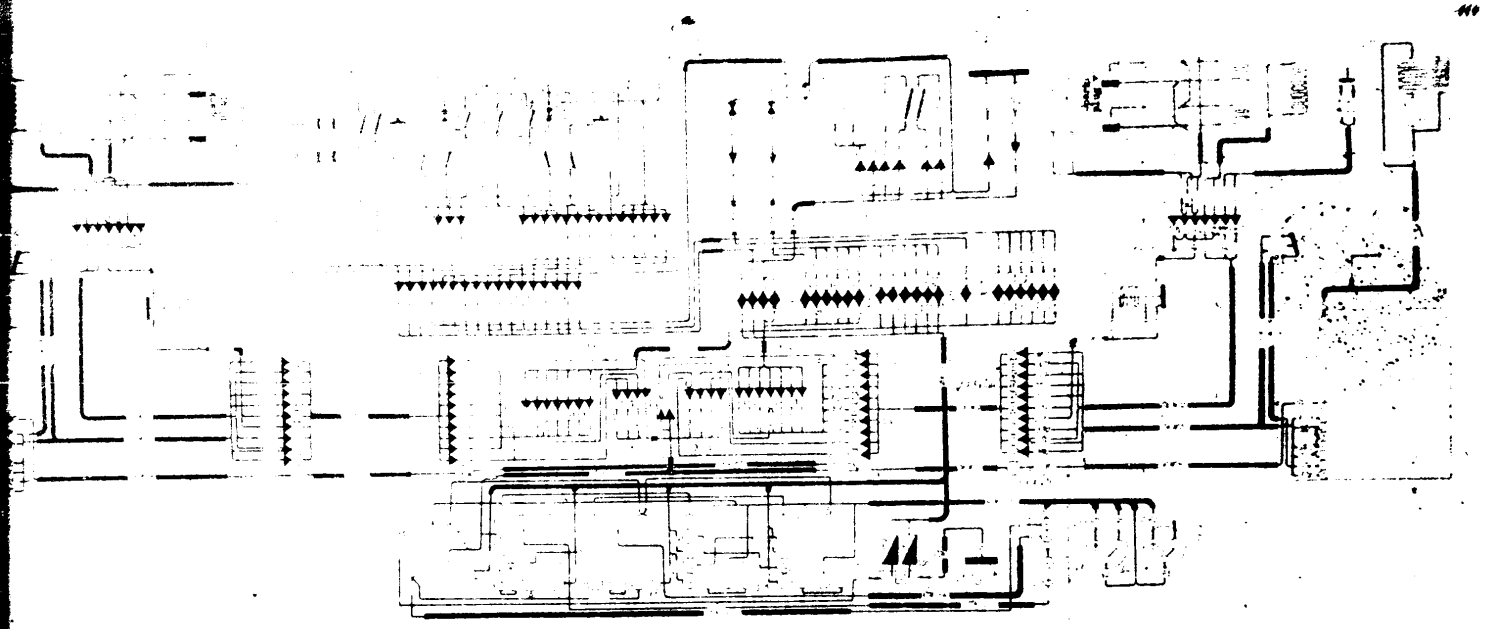
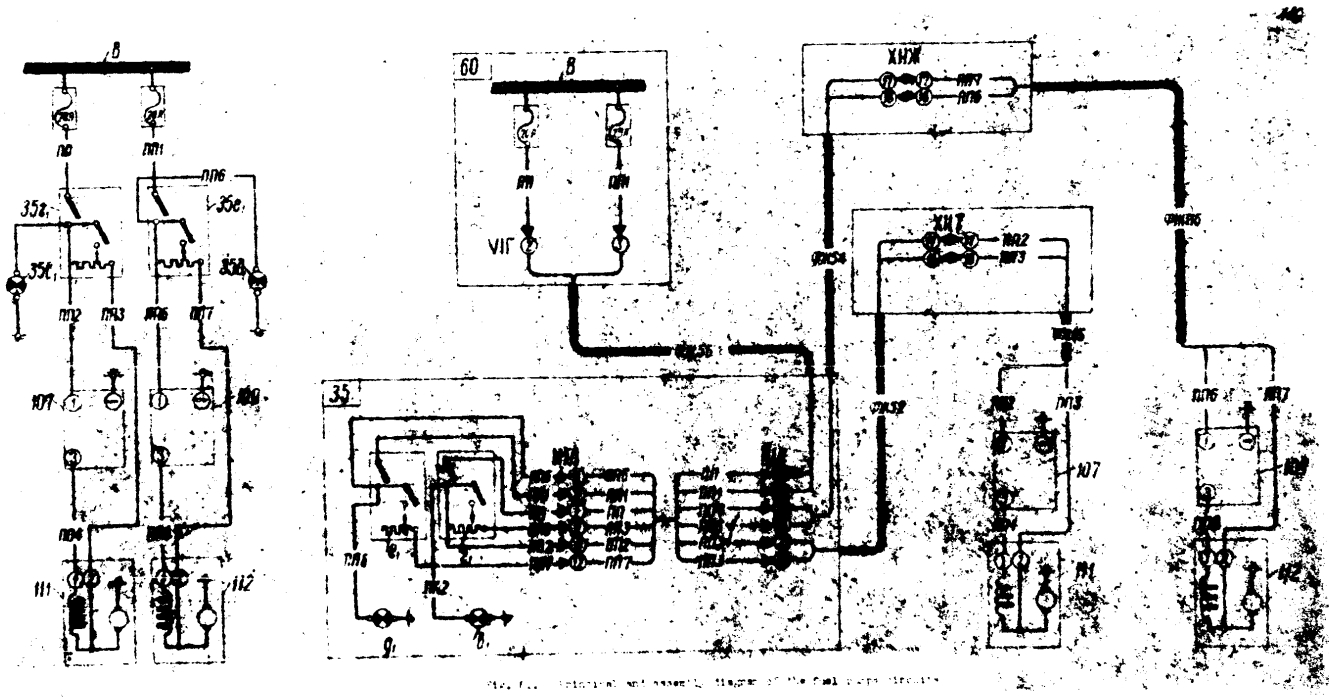


Fig. 80. Assembly diagram of the engine starting system.

CIRCUIT OF THE FUEL PUMPS

/Fig. 82, 83/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 12
	b_1	Fuel pump operation indicating lamp, front group of tanks	1	CMH-51	Pilot's left desk
	r_1	Fuel pump rheostat, front group of tanks	1	PBH-45A	- " -
	f_1	Fuel pump operation indicating lamp, rear group of tanks	1	CMH-51	- " -
	e_1	Fuel pump rheostat, rear group of tanks	1	PBH-45A	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, [illegible] ribs [illegible]
	nn	Net limit switch, front group of tanks pump	1	A30-20	Pilot's [illegible] desk
	nn1	Net limit switch, fuel pump of rear froup of tanks	1	A30-20	- " -
	B	Pilot's right desk bar	1	Made by manufacturer	Pilot's [illegible] desk
107		Front group of tanks fuel pump filter	1	[illegible]T-14 /to 5815/ [illegible]-14A /from 5815/	2-nd floor
109		Rear group of tanks fuel pump filter	1	[illegible]-14A /from 5815/	4-th floor
112		Rear group of tanks fuel pump	1	[illegible]	4-th floor
III	A	Pilot's left desk connector	1	[illegible]	Pilot's [illegible] desk
	[illegible]	Dtto	1	[illegible]	- " -
VI	[illegible]	Pilot's right desk connector	1	[illegible]	Pilot's [illegible] desk
XII	[illegible]	Pilot's cabin hermetic connector	1	[illegible]-23	Pilot's [illegible] floor
	T	Dtto	1	[illegible]-23	- " -
111		Front group of tanks fuel pump	1	[illegible]	2-nd floor



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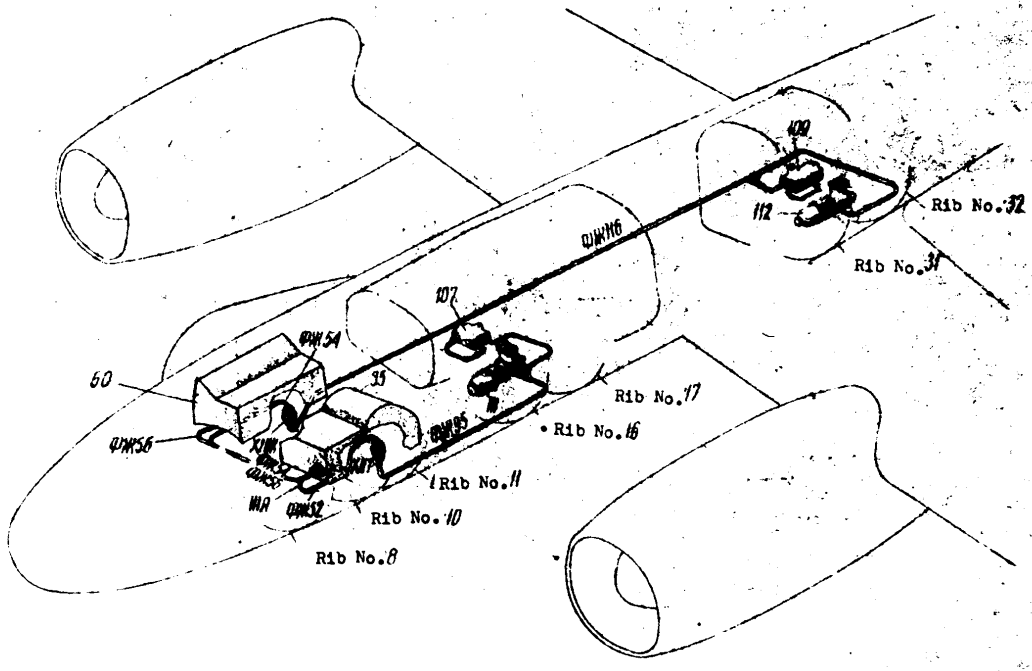

Fig. 83. Assembly diagram of the fuel pumps

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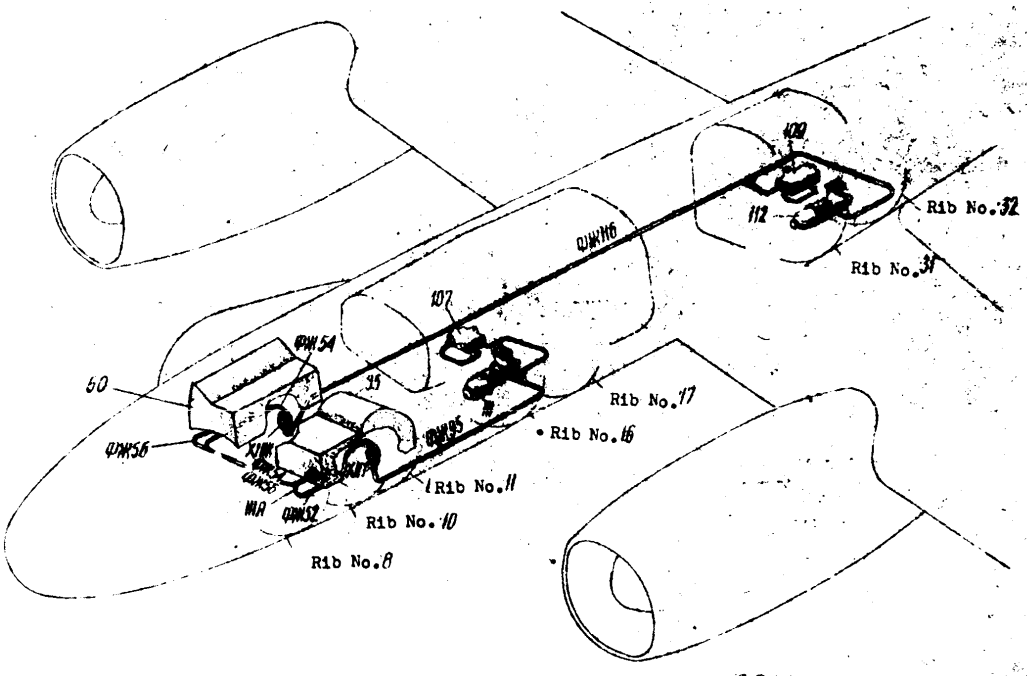

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Fig. 83. Assembly diagram of the fuel pumps

CIRCUIT OF THE FUEL PUMP.
/Fig. 84/

No. of pos. in t.	No. of	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
39		Pilot's left desk	1	Made by manufacturer	Pilot's cabin left board, between ribs No. 8 & 11
	[illegible]	Fuel pump switch	1	ЭПН-45	Pilot's left desk
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
	Б	Pilot's right desk bar	1	Otto	Pilot's right desk
	ПОК	Net limit switch	1	АЗС-20	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	$Ц_1$	Fuel pump operation indicating lamp	1	СЛЦ-51	Pilot's instr. board
90		Navig. instr. board.	1	Made by manufacturer	Navig. cabin, left board, between ribs No. 3 & 4
	о	Fuel pump operation indicating lamp	1	СЛЦ-51	Navig. instr. board
98		Fuel pump filter	1	ФТ-14 /to 5815/ ФТ-14А /from 5815/	Fuselage, rib No. 21
99		Fuel pump	1	БП К-4И	Fuselage, rib No. 22
289		Connecting block	1	74-К	Pilot's cabin, left board, rib No. 7
290		Fuel pump operation indicating relay box	1	Made by manufacturer	Navig. cabin, left board, between ribs No. 3 & 4
	а	Fuel pump operation indicating relay	1	РМ-12	- " -
	б	Capacitor	1	К31А	- " -

1	2	3	4	5
III	A	Pilot's left desk connector	1 ШР60П45НШ2	Pilot's left desk
	B	ditto	1 ШР48П26НШ2	- " -
VI	B	Pilot's right desk connector	1 ШР55П31НП3	Pilot's right desk
VII	B	Pilot's instrument board connector	1 ШР40П16НШ5	Pilot's instr. board
IX	A	Navigator's instrument board connector	1 ШР48П26НШ2	Navig. instr. board
XII	[illegible]	Pilot's cabin hermetic connector	1 ШГП-23	Pilot's cabin floor
1	Ш	Navigator's cabin connector	1 ШР55П31НП3	Navig. cabin, left board, rib No. 6

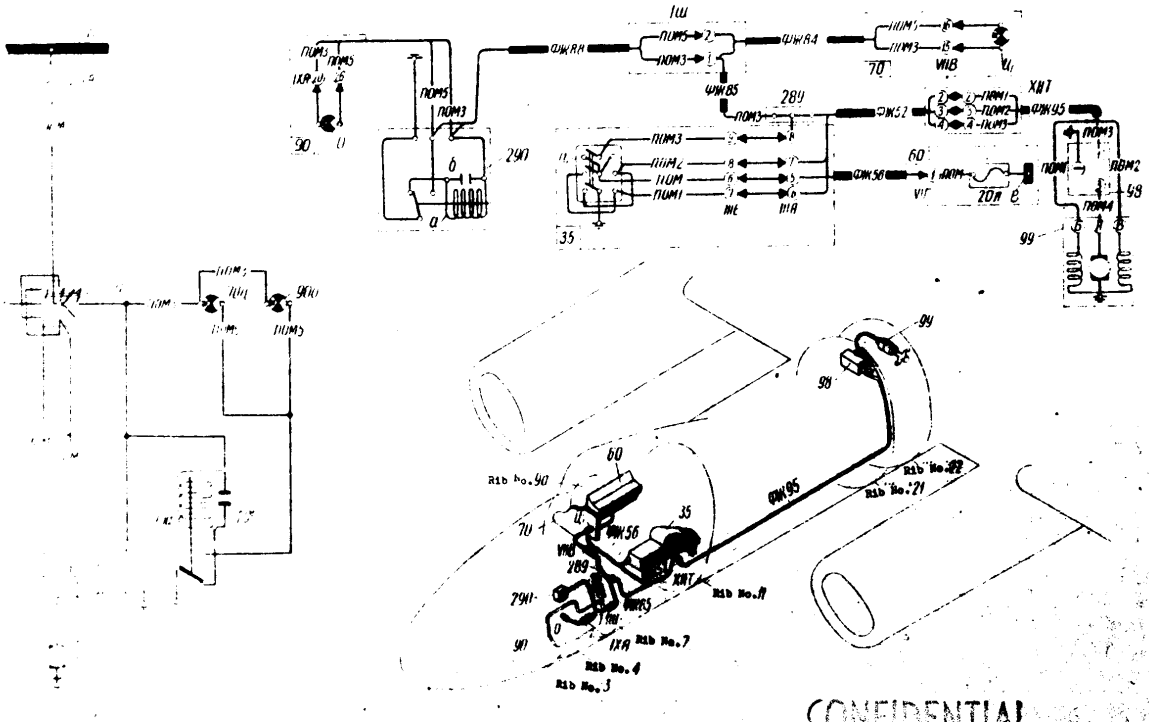

Fig. 84. Diagram of the fuel pump.

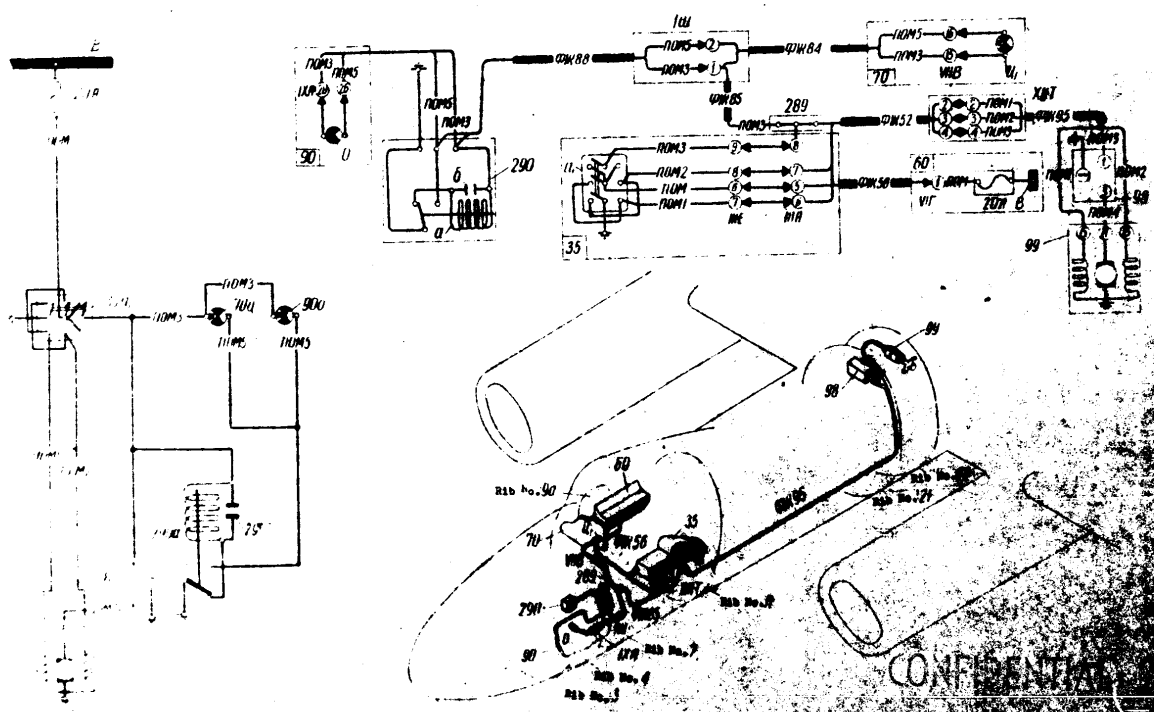

Fig. 84. Diagram of the fuel panel.

DIAGRAM OF THE FUEL DISTRIBUTION CO

/Fig. 85, 86/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's left board between ribs No. 8 & 11
	П1	Fuel cock switch	1	ПП-45	Pilot's left desk
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin right board No. 146
	КРП	Net limit switch, fuel cock	1	АЗС-10[x]	Navig. cabin
	Е	CDB bar	1	Made by manufacturer	
235		Fuel cock control mechanism	1	МГ-1М	Fuselage board ribs 23
I	Ш	Navig. cabin connector	1	ШРС5П31НП3	Navig. left board No.
III	А	Pilot's left desk connector	1	ШРС60П45НШ2	Pilot's desk
	Е	Dtto	1	ШР40П26НШ2	
IV	А	CDS connector	1	ШР60П45НП2	CDS
XII	Т	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's

[x] to 3618, 3216, 3[illegible]

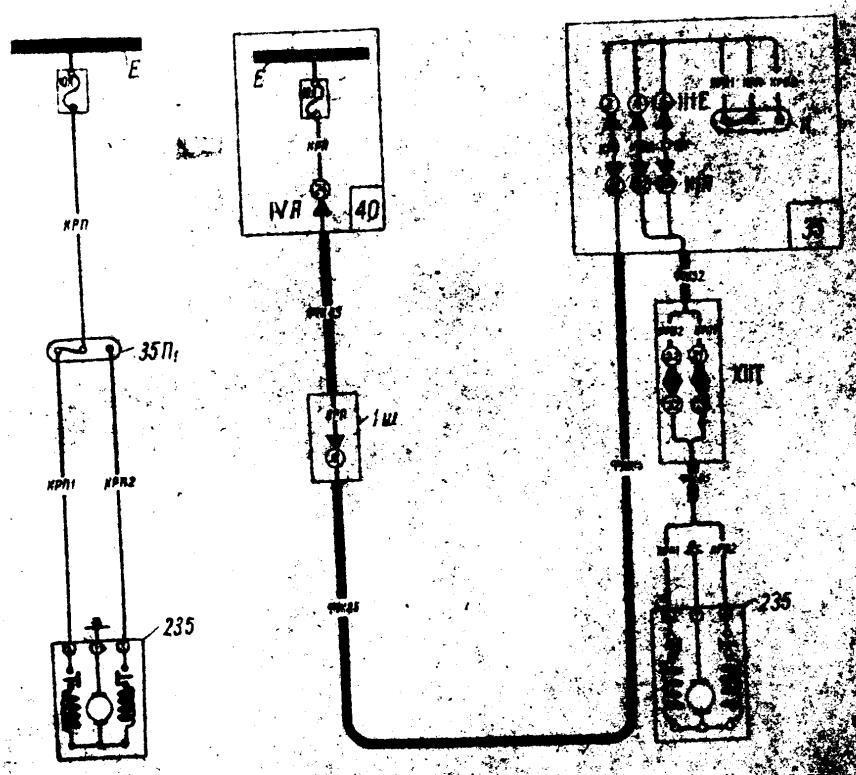

Fig. 85. Principal and assembly diagram of the fuel distribution cock.

Fig. 6. Assembly frame [illegible] distribution cone.

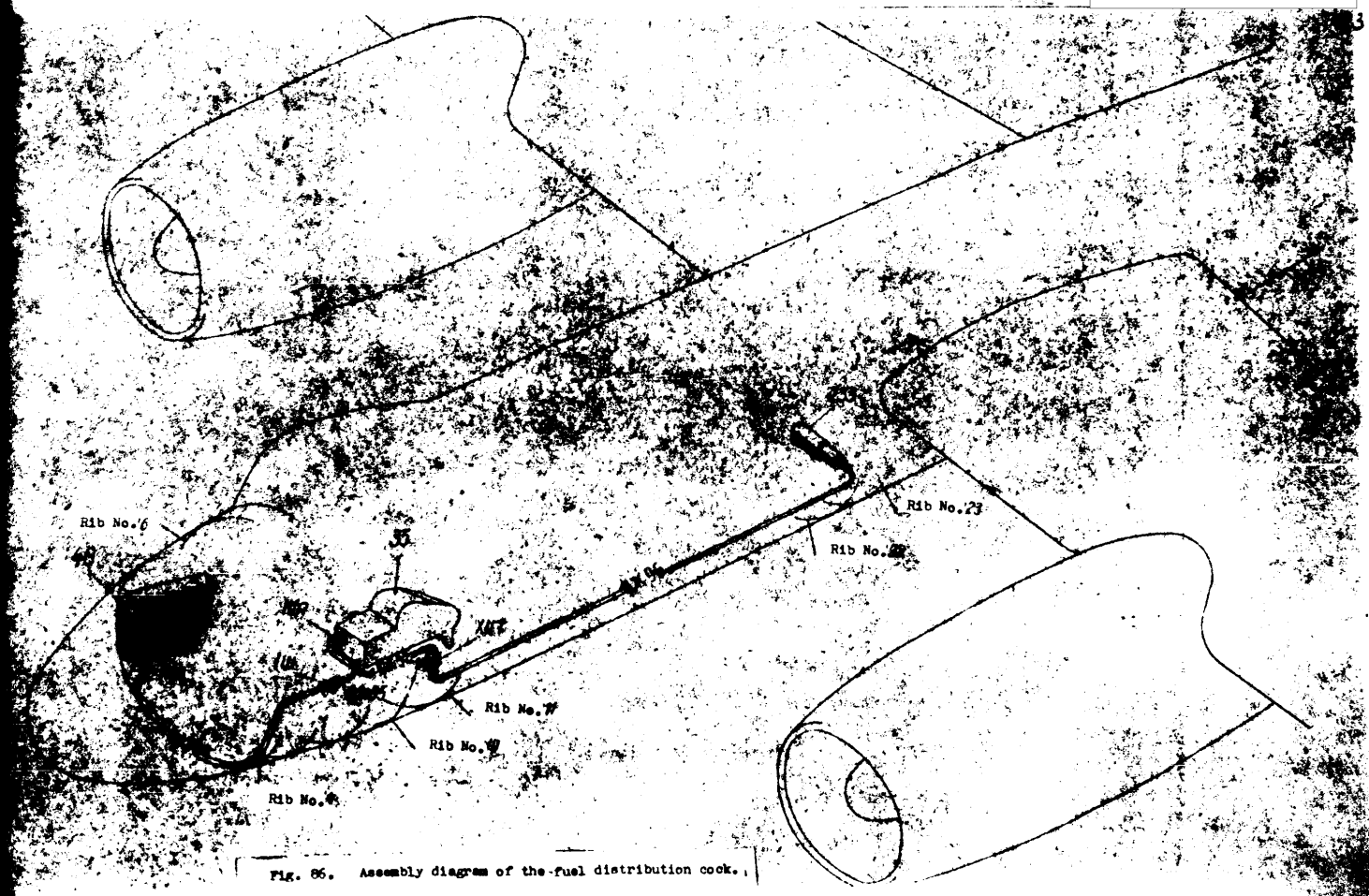

Fig. 86. Assembly diagram of the fuel distribution cock.

DIAGRAM OF THE MECHANISMS OF THE VALV

THE AIR DUCT.

/From 1705, 0301, 0401/
/Fig. 87/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	L
1	2	3	4	5	
35		Pilot's left desk	1	Made by manufacturer	Pilot's left between No. 8 Pilot's desk
	K_1	Left engine air duct "On" indicating lamp	1	CJ4-51	
	J_1	Dtto, right engine	1	CJ4-51	
	M_1	Left engine air duct control switch	1	ПП-45	
	T_1	Dtto, right engine	1	ПП-45	
40		Navigator's CDB	1	Made by manufacturer	Navig. right between No. 4 Navig.
	E	Navigator's CDB bar	1	Dtto	
	ПР	Net limit switch	1	A30-10	
150		Left CDS	1	Made by manufacturer	fu[illegible] & [illegible]
160		Right CDS	1	Dtto	[illegible]
279		Left engine air duct mechanism	1	МГ-114	
280		Dtto, right engine	1	МГ-114	
III	A	Pilot's left desk connector	[illegible]	[illegible]	
	E	Dtto	[illegible]	[illegible]	
IV	B	[illegible]	[illegible]	[illegible]	
XII	T	[illegible]	[illegible]	[illegible]	
XV	A	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

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1	2	3	4	5
XXXVIII	A	Right ~~nacelle~~ ~~[illegible]~~ connector	1 ШРС6П14НШ2	Right [illegible]
1	Ш	Navig. cabin connector	1 ШРС5П31НР3	Navig. [illegible]

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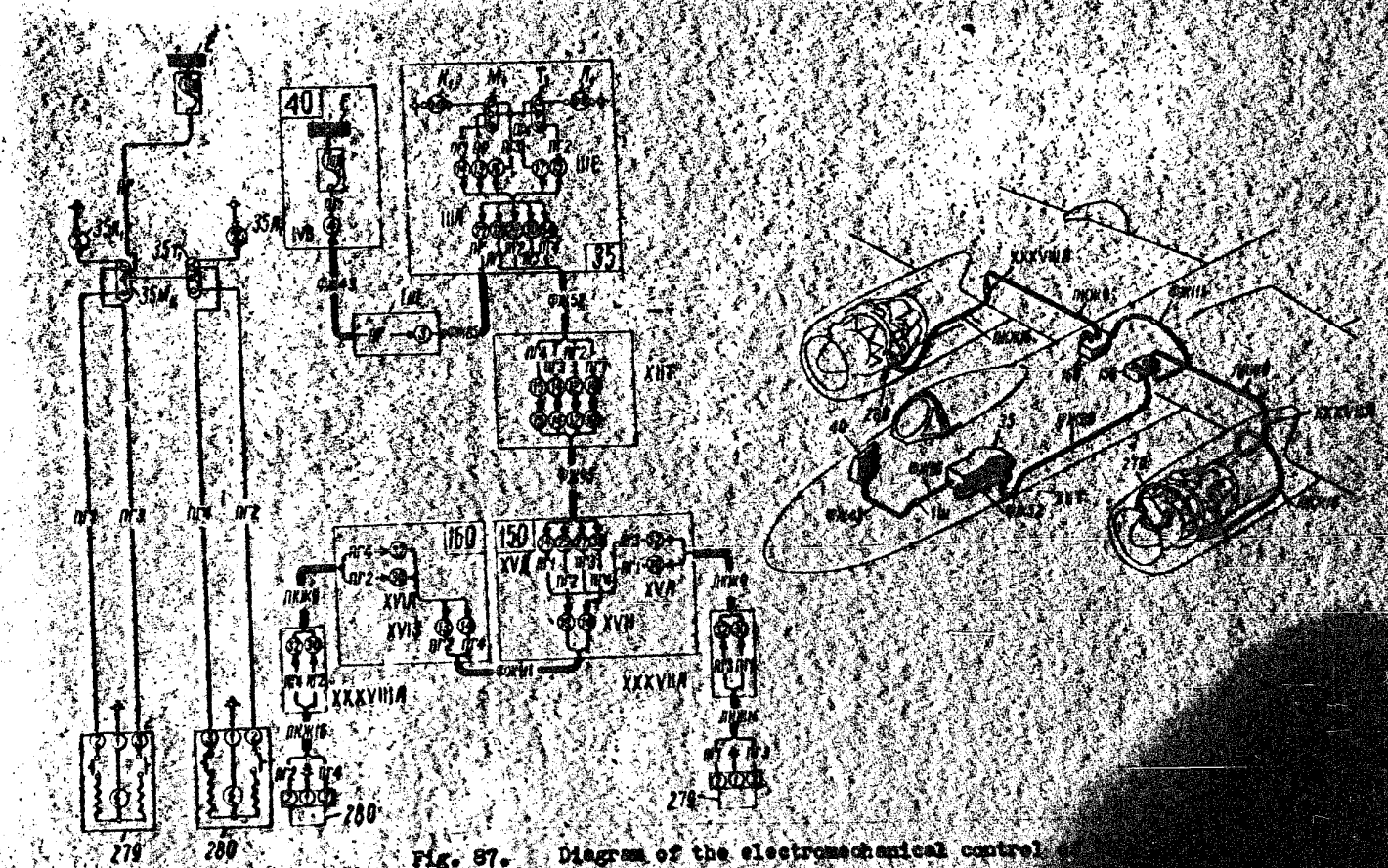

Fig. 87. Diagram of the electromechanical control of valves.

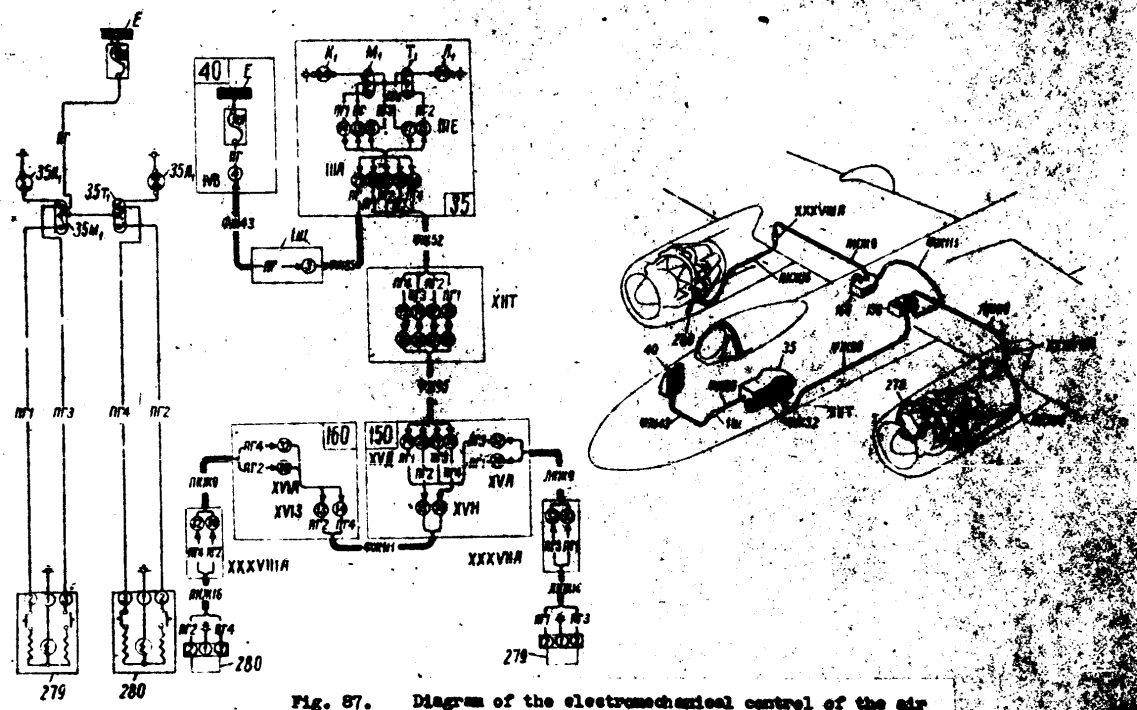

Fig. 87. Diagram of the electromechanical control of the air valves.

TRIM TAB AND TAKE OFF BOOST ROCKET CONTROL.

1. Trim tab control.

The electric trim tab control is applied on the right aileron /fig. 88, 89/ and on the rudder /fig.90, 91/.

In both cases electro mechanisms YT-2M are used.

The trim tab are controlled by means of switches /30a, 30b/ placed on the trim tab control board in the pilots cabin.

The neutral position of the trim tabs is indicated by the lamps 60ℓ, 60r, placed on the trim tab control board.

2. Take off /boost/ rocket control.

The electric system consists of two lines - the ignition line and the firing line /fig.92, 93/.

The system is connected to the power net by means of switch 30a.

The ignition of the rockets is achieved by means of the push button 224.

The rockets are fired by pressing the button 30. The current is led to the solenoids 35, 86 of the locks of the rocket holders. After the solenoids in element "A", fig. 93, have operated, the button switches 83, 84, which lead the current to the pyro-cartridges 79, 82, are closed.

Rocket holder indication is achieved by means of lamp 30ℓ on the take off rocket control board.

The lamp shines when the holders contain the rockets and the switch 30a is in position "On".

AILERON TRIMTAB CONTROL DIAGRAM

/Fig. 88, 89/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
50		Trimtab control board	1	Made by manufacturer	Pilot's left board between 8 & 9
	a	Aileron trimtab control switch	1	MH-45	Trimtab board
	2	Aileron trimtab neutral indicating lamp	1	SM-51	
60		Pilot's left desk	1	Made by manufacturer	Pilot's right board No. 6
	B	Pilot's right desk bar	1	Dtto	Pilot's desk
	T3	Net limit switch, aileron trimtab control mechanism	1	A30-5	
115		Aileron trimtab control mechanism	1	TT-2	Aileron right
150		Left CDS	1	Made by manufacturer	Fuselage bottom ribs
160		Right CDS	1	Dtto	Fuselage bottom ribs
V		Takeoff rocket and trimtab control board connector	1	[redacted] /to 6331 ...5310/ [redacted] /from 6331 ...5310/	
VI	Г	Pilot's right desk connector	1	[redacted]	Pilot's
XII	C	Pilot's cabin hermetic connector	1	[redacted]	
XV	Ж	Left CDS connector	1	[redacted]	
	H	Dtto	1	[redacted]	
XVI	A	Right CDS connector	1	[redacted]	
	3	Dtto	1	[redacted]	

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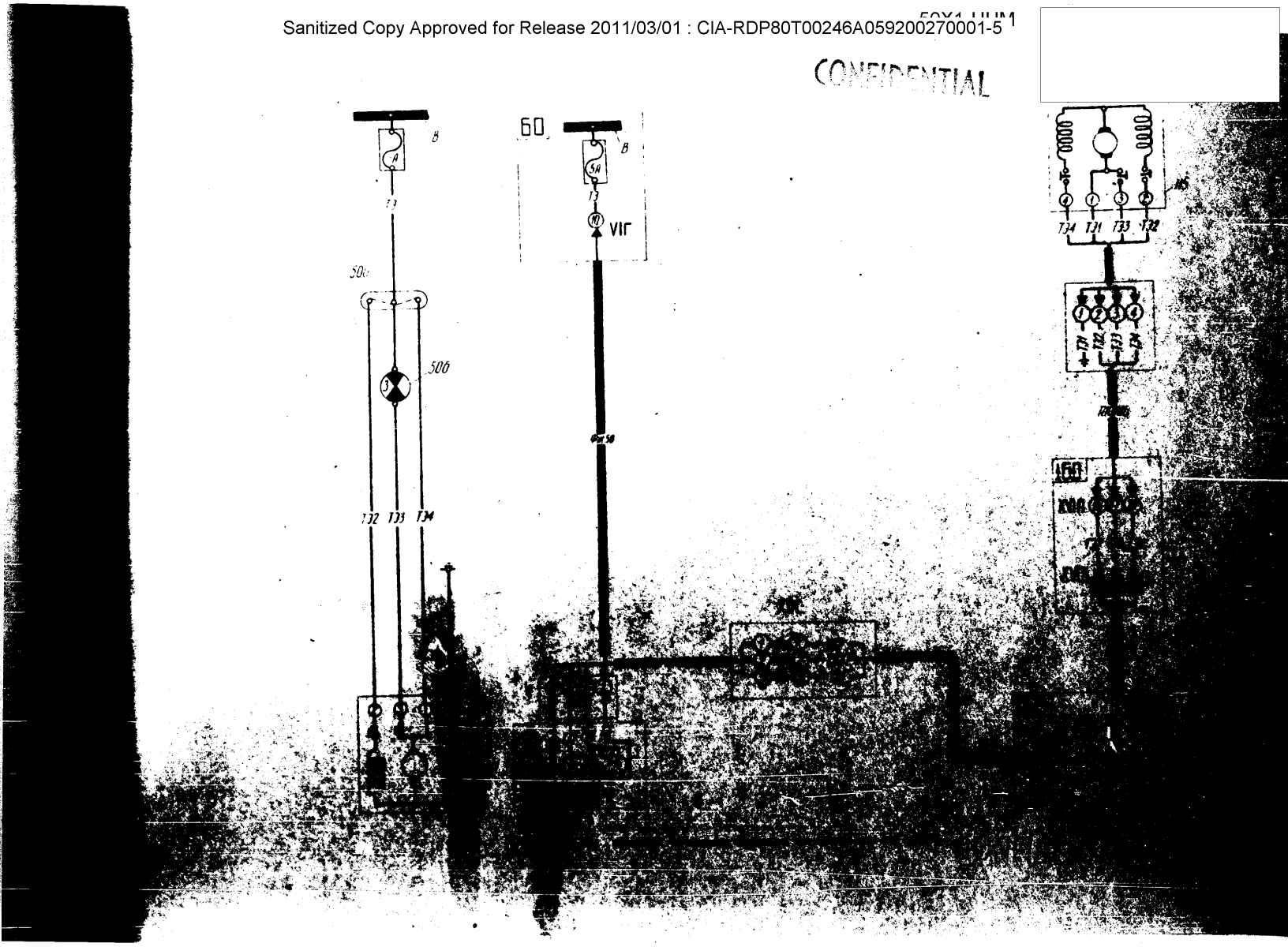

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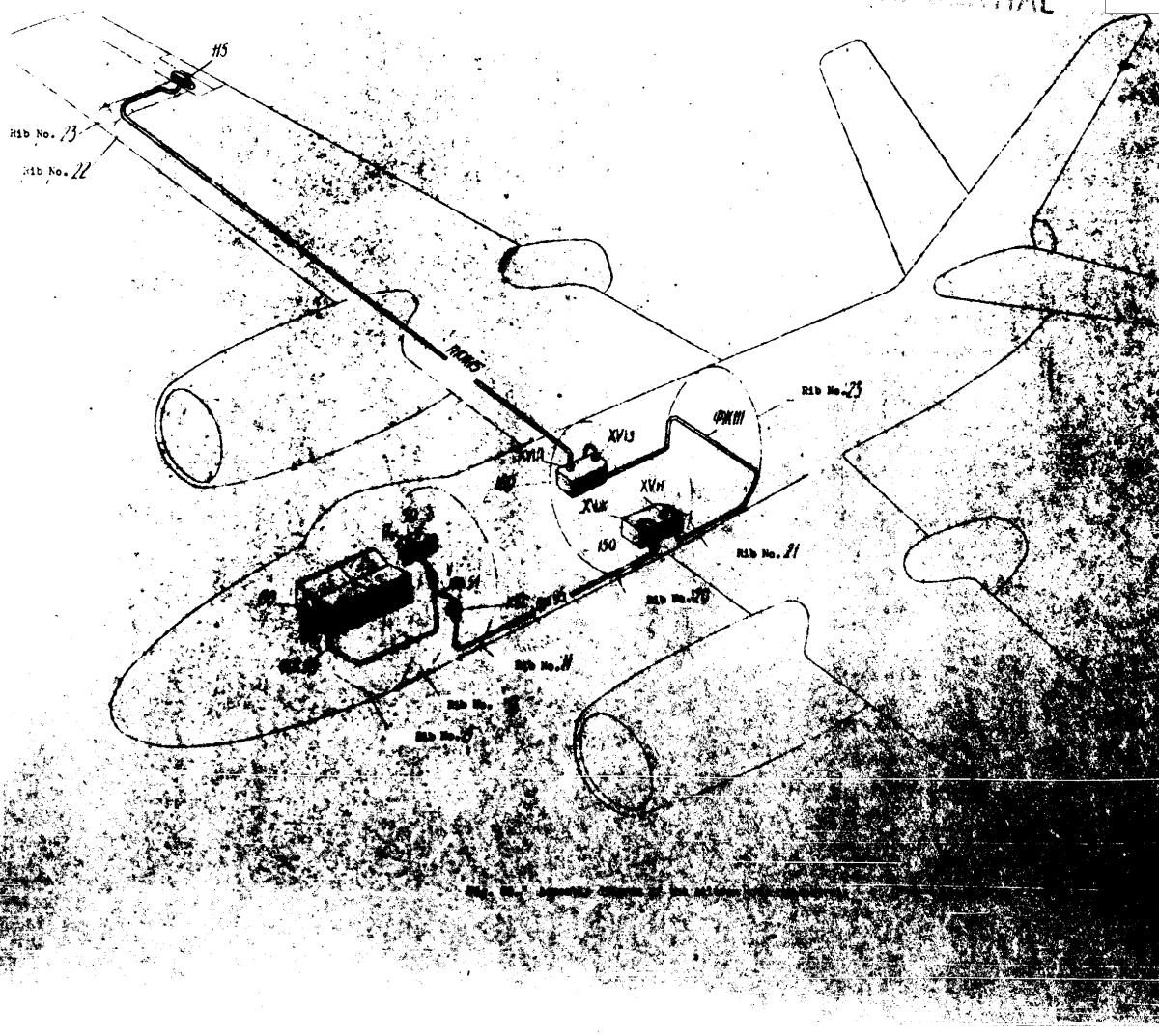

DIAGRAM OF RUDDER TRIMTAB CONTROL.

/Fig. 90, 91/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
50		Trimtab control board	1	Made by manufacturer	Pilot's cabin, left board, between [illegible] No. 8 & [illegible] Trimtab board
	Б	Rudder trimtab control switch	1	ПН-45	
	Г	Rudder trimtab neutral position indication lamp	1	СМ4-51	
60		Pilot's right desk	1	Made by manufacturer	Pilot's [illegible] right [illegible] between [illegible] No. 8 [illegible] Pilot's [illegible] desk
	В	Pilot's right desk bar	1	Dtto	
	ТРП	Net limit switch, rudder trimtab control mechanism	1	АЗС-5	
128		Rudder trimtab control mechanism	1	ТТ-2	[illegible]
	а	Rudder trimtab control mechanism connecting block	1	УЗК	
150		Left CDS	1	[illegible]	
160		Right CDS	1	[illegible]	
V		[illegible]			
VI	Г	[illegible]			
VII	Б	[illegible]			
XV	Д	[illegible]			
	Н	Dtto			
XVI	З	Right [illegible]			
	Ж	Dtto			

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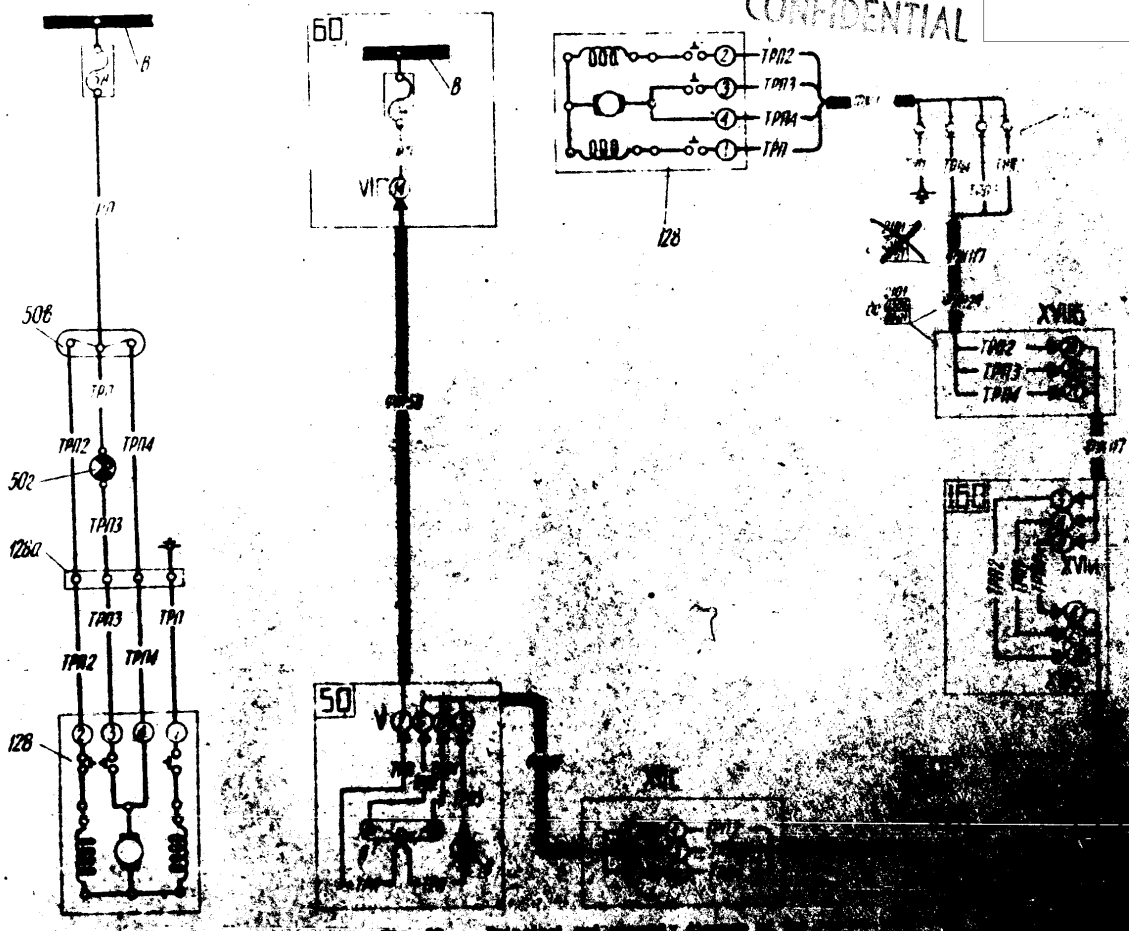

Fig. 90.

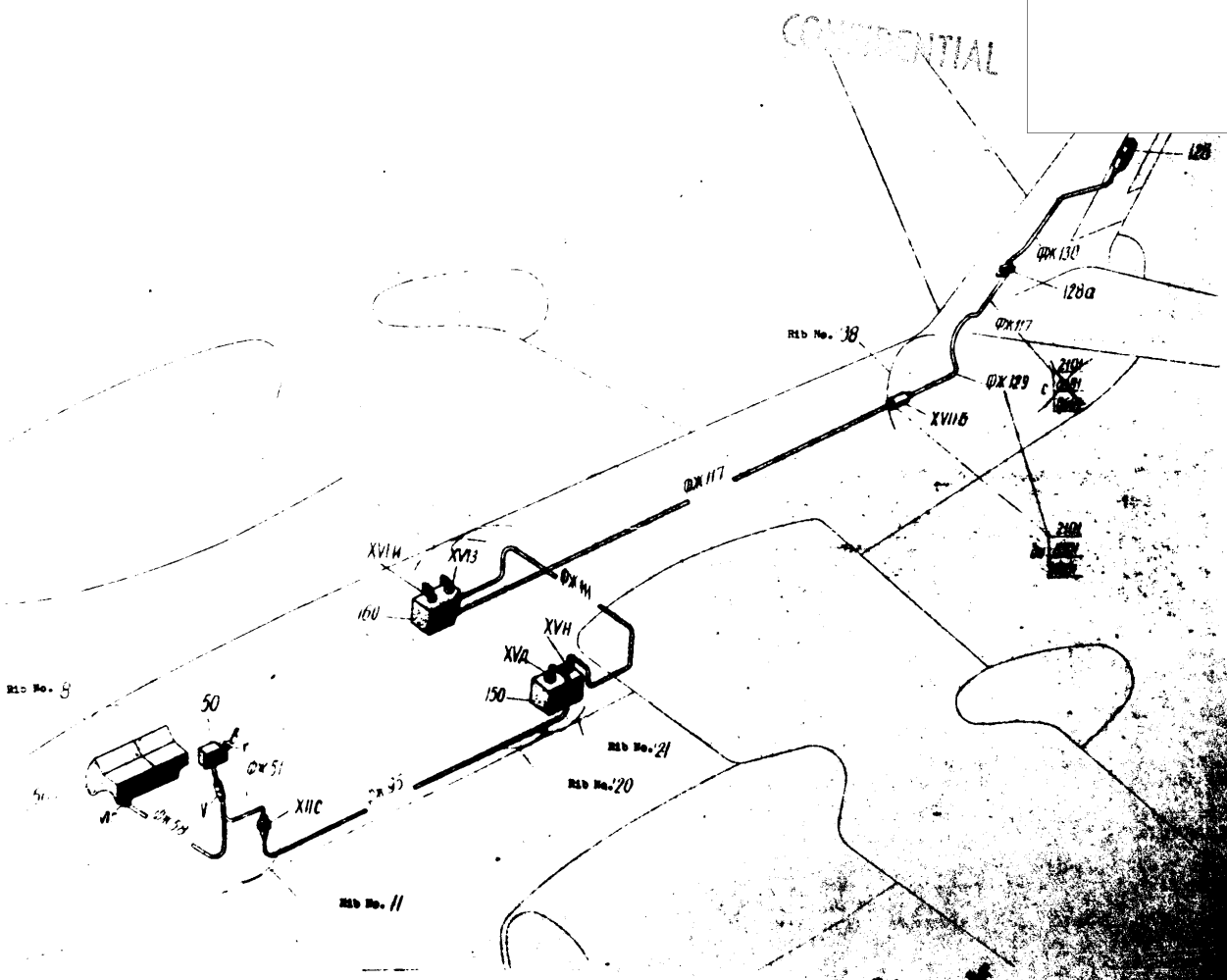

Fig. 91. Assembly diagram of the rudder trimtab control.

TAKE OFF ROCKET CIRCUIT DIAGRAM.

/Figs. 92, 93/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
30		Take off rocket control board	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 9
	a	Switch of take off rocket control	1	2B-45	Take off rocket control board
	b	Take off rocket release indicating lamp	1	CM-51	- " -
	B	Take off rocket release button	1	5KC	- " -
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navigator's CDB bar	1	Dtto	Navig. CDB
	3П	Net limit switch, engine starting and take off rocket releasing	1	A3C-20	- " -
	ОРБ	Net limit switch, take off rocket ignition	1	A3C-15	- " -
77		Left signalling rocket releasing contact	1	Made by manufacturer	[illegible]
78		Dtto, right rocket	1	Dtto	[illegible]
79		Left take off rocket lock pyro-cartridge	1	[illegible]	[illegible]
	a	Left take off rocket pyro-cartridge lock socket	1	48K	[illegible]
82		Pyro-cartridge of left lock of right take off rocket	1	[illegible]	[illegible]
	a	Right starting rocket, pyro-cartridge lock socket	1	48K	[illegible]
83		Button switch of left take off rocket releasing, fuse	1	[illegible]	[illegible]
84		Dtto, right take off rocket	1	[illegible]	[illegible]

1	2	3	4	5	6
85		Solenoid of limit switch of left take off rocket releasing	1	From unit Д3 -40	Left take off rocket
86		Dtto, right take off rocket	1	Dtto	Dtto, right take off rocket
87		Left take off rocket ignition socket	1	Dtto	Left take off rocket
88		Dtto, right take off rocket	1	Dtto	Right take off rocket
89		Left take off rocket ignition	1	ПП-9	Left take off rocket
92		Right take off rocket ignition	1	ПП-9	Right take off rocket
224		Take off rocket ignition button	1	204 КС	Steering column
I	Ш	Navigator's cabin connector	1	ШРSSП31НГ3	Navig. cabin, left board, rib No.8
IX	Б	CDB connector	1	ШРSSП31НГ3	CDB
		Trim tab control board and take off rocket control board	1	ШР40П16НШ2	Pilot's cabin, left board, between ribs No. 8 & 9
XII	С	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
XXV		Pilot's steering column connector	1	ШР28ПК7НШ7	Pilot's steering column

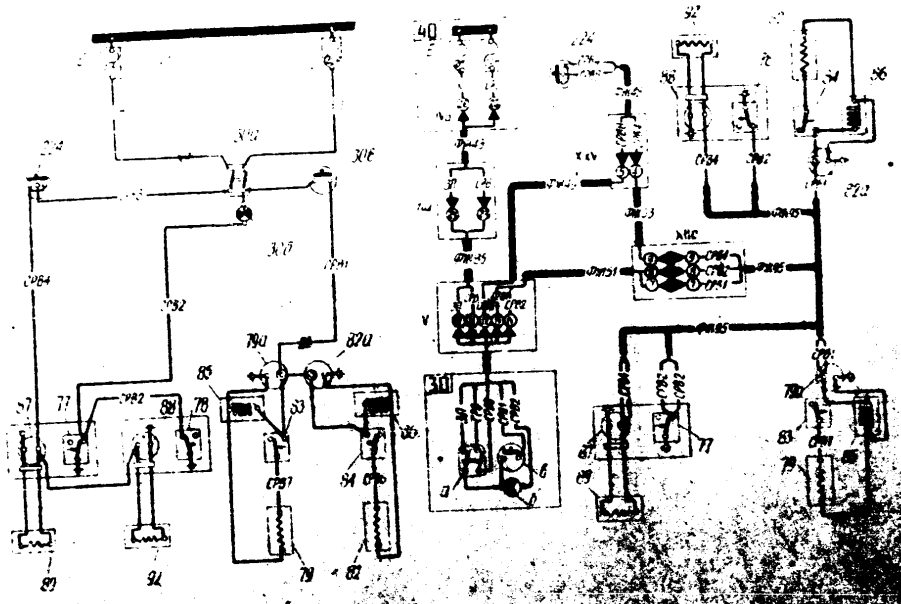

Fig. 92. Principal and assembly diagram of the [illegible] control.

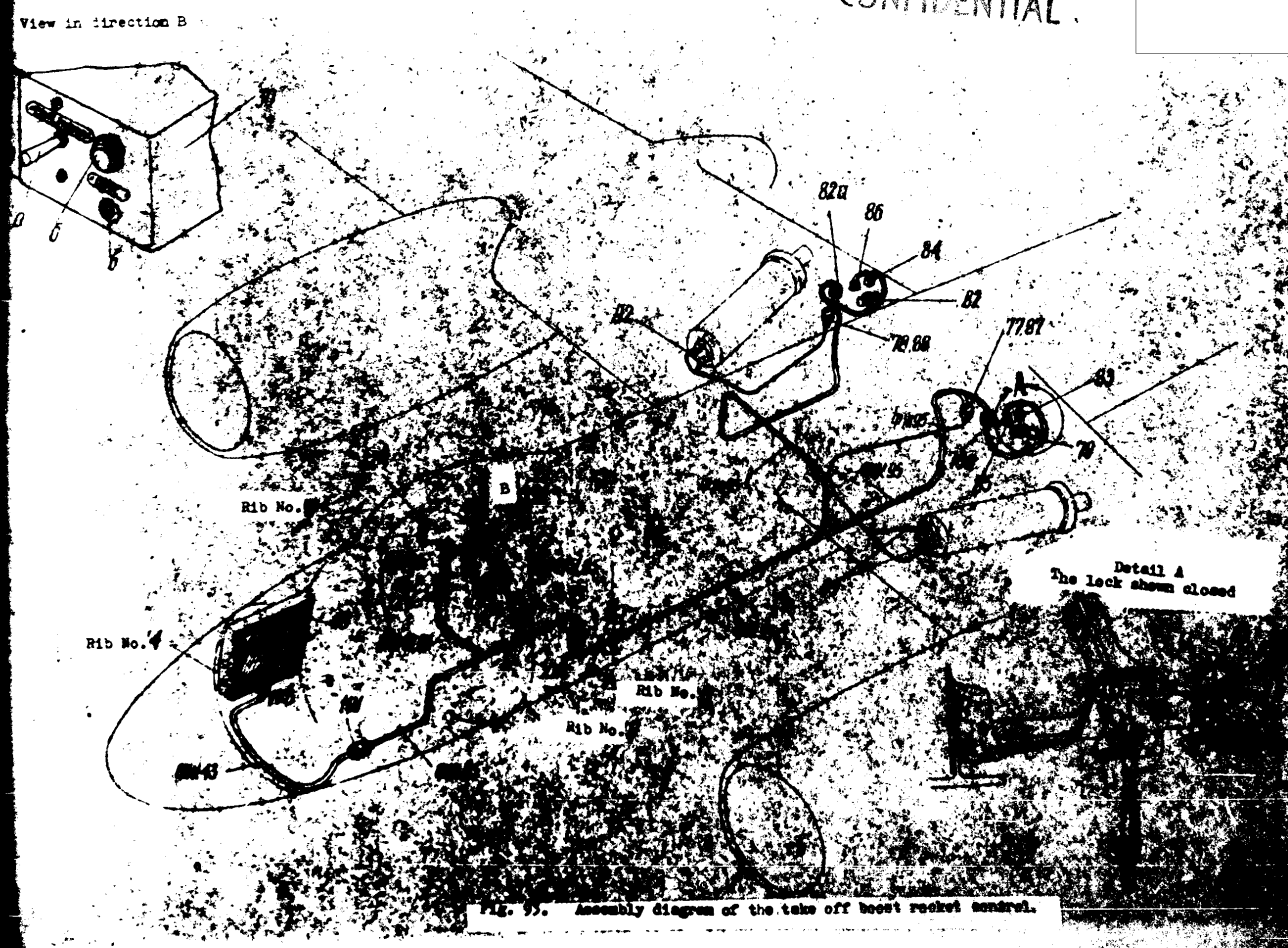

Fig. 99. Assembly diagram of the take off boost rocket sandwich.

POWER SUPPLY [illegible] ELECTRICAL INSTRU[illegible]

The electrical instruments, supplied by [illegible]

1. Checking instruments of the power system:
   - the oil manometer /fig. 94 - 96/
   - the fuel manometer /fig. 94 - 96/
   - the oil thermometers /fig. 94 - 96/
   - the starting fuel manometer /fig. 97, 98/ /[illegible] 0606, 1001/
   - the fuel meters /fig. 99 - 104/
2. Navigation instruments:
   - the auto-pilot /fig. 105 - 107/
   - the electrical remote gyromagnetic compass [illegible]
   - the navigation indicator /fig. 11[illegible] - 117/
   - the artificial horizon /fig. 118/
3. Checking instruments:
   - the aileron position indicator /fig. 119, 1[illegible]
   - the front under-carriage leg position indicator [illegible] 120/
   - the outer air thermometer /fig. 121, 122/
   - the pilot's voltmeter /fig. 123/
   - the a. c. voltmeter /fig. 124/
   - the navigator's voltmeter /fig. 60 - [illegible]
   - the gunner's voltmeter /fig. 2[illegible] - [illegible]
   - the ampermeters /fig. [illegible] - [illegible]/
   - the cabin air thermometer [illegible] 164 - [illegible]

CIRCUIT OF THE OIL MANOMETERS AND THERMO[illegible]
OF THE FUEL THERMOMETERS.
/Fig. 94, 95, 96/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between Pilot's No. 8 & 11
	B	Pilot's right desk bar	1	Dtto	Pilot's right desk
	MM	Net limit switch, oil manometers	1	A3C-5	- " -
	TM	Net limit switch, oil thermometers	1	A3C-5	- " -
	MT	Net limit switch, fuel menometers	1	A3C-5	- " -
76		Pilot's instrument board	1	Made by manufacturer	Pilot's cabin, rib No. [illegible]
		Left engine three colour indication	1	YK-3 from Pilot's unit ЗИМ-3Р	[illegible] ment No. [illegible]
	y	Right engine three colour indication	1	Dtto	- " -
144		Sensel of right engine oil manometer	1	M-10 from Right unit M-3Р	
145		Sensel of left engine oil manometer	1	Dtto	Left [illegible]
146		Sensel of right engine fuel manometer	1	M-100 from unit [illegible]	Right [illegible]
148		Sensel of right engine oil thermometer	1	[illegible]	[illegible]
149		Sensel of left engine oil thermometer	1	[illegible]	[illegible]
150		Left CDS	1	Made by manufacturer	[illegible]
151		Sensel of left engine fuel manometer	1	[illegible]	[illegible]

1	2	3		
160		Right CDS	1 Made by manufacturer	Fuselage, right board, between ribs 20 & 2[illegible]
VI	Г	Pilot's right desk connector	1 WP55П31НГ3	Pilot's right desk
VII	Б	Pilot's instrument ~~stock~~ board connector	1 WP32П44НШ5 /to 2001, 0301, 0501/ WP40П46НШ2 /from 2001, 0301, 0501/	Pilot's instrument board
	Г	Dtto	1 WP60П47НШ2	- " -
XII	Г	Pilot's cabin hermetic connector	1 WPГ-23	Pilot's cabin floor
	Д	Dtto	1 WPГ-23	- " -
XIII		Left engine connector	1 WP -23C	Left engine
XIV		Right engine connector	1 WP -23C	Right engine
XV	A	Left CDS connector	1 WP60П47НГ2	Left CDS
	Д	Dtto	1 WP60П47НГ2	- " -
XVI	A	Right CDS connector	1 WP60П47НГ2	Right CDS
	E	Dtto	1 WP60П47НГС	- " -
XXXVII	A	Left nacelle ~~generator~~ connector	1 WP60П47НШ2	Left nacelle ~~generator~~, right board, between ribs No. 6 & 7
XXXVIII	A	Right nacelle ~~generator~~ connector	1 WP60П47НШ2	Dtto, right nacelle ~~generator~~

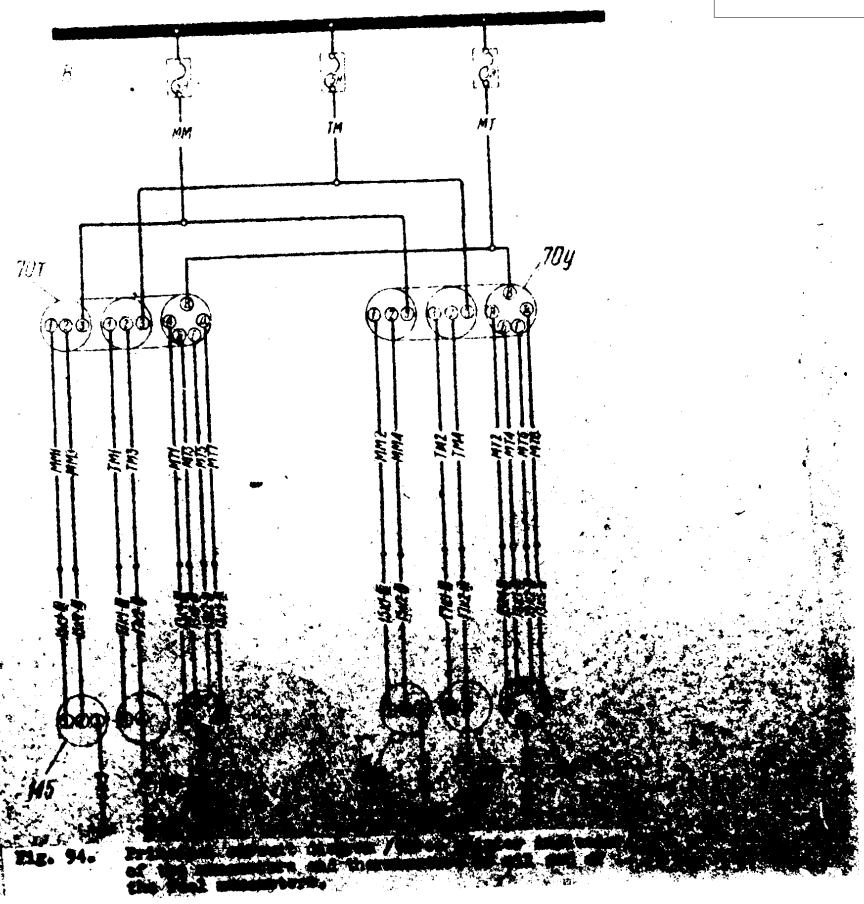

Fig. 94.

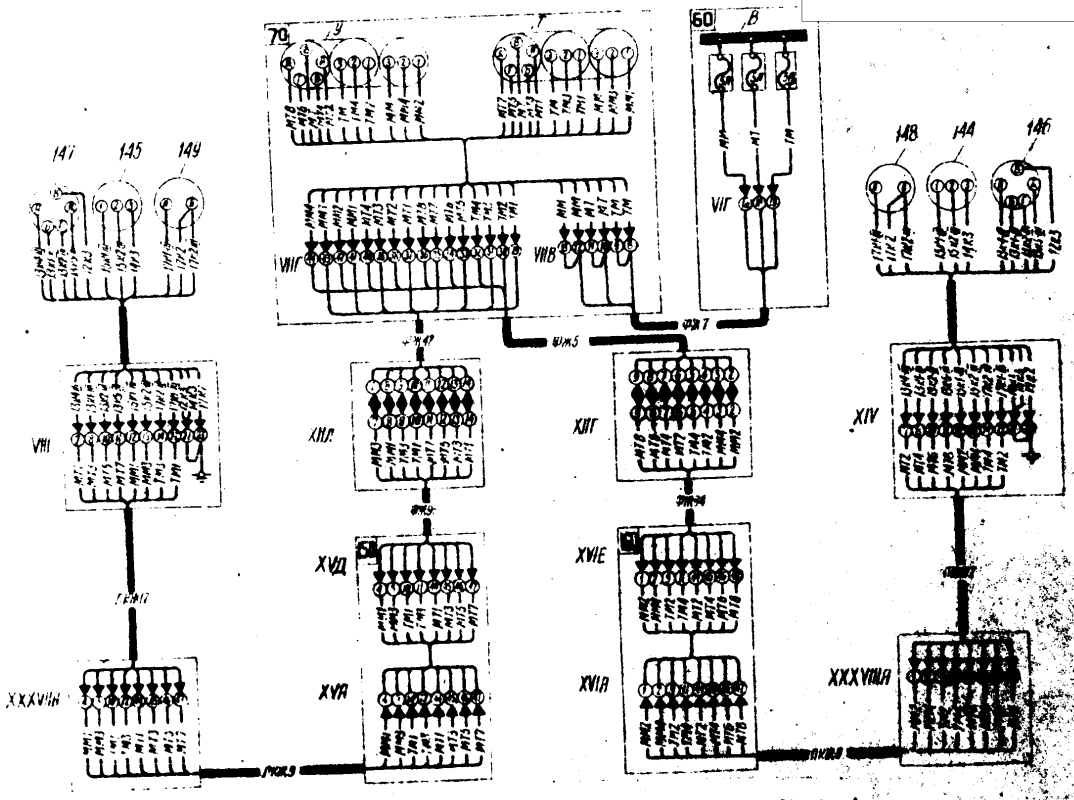

Fig. 95. Assembly diagram /of the three pointer indicator/ of the oil manometers and thermometers and of the fuel manometers.

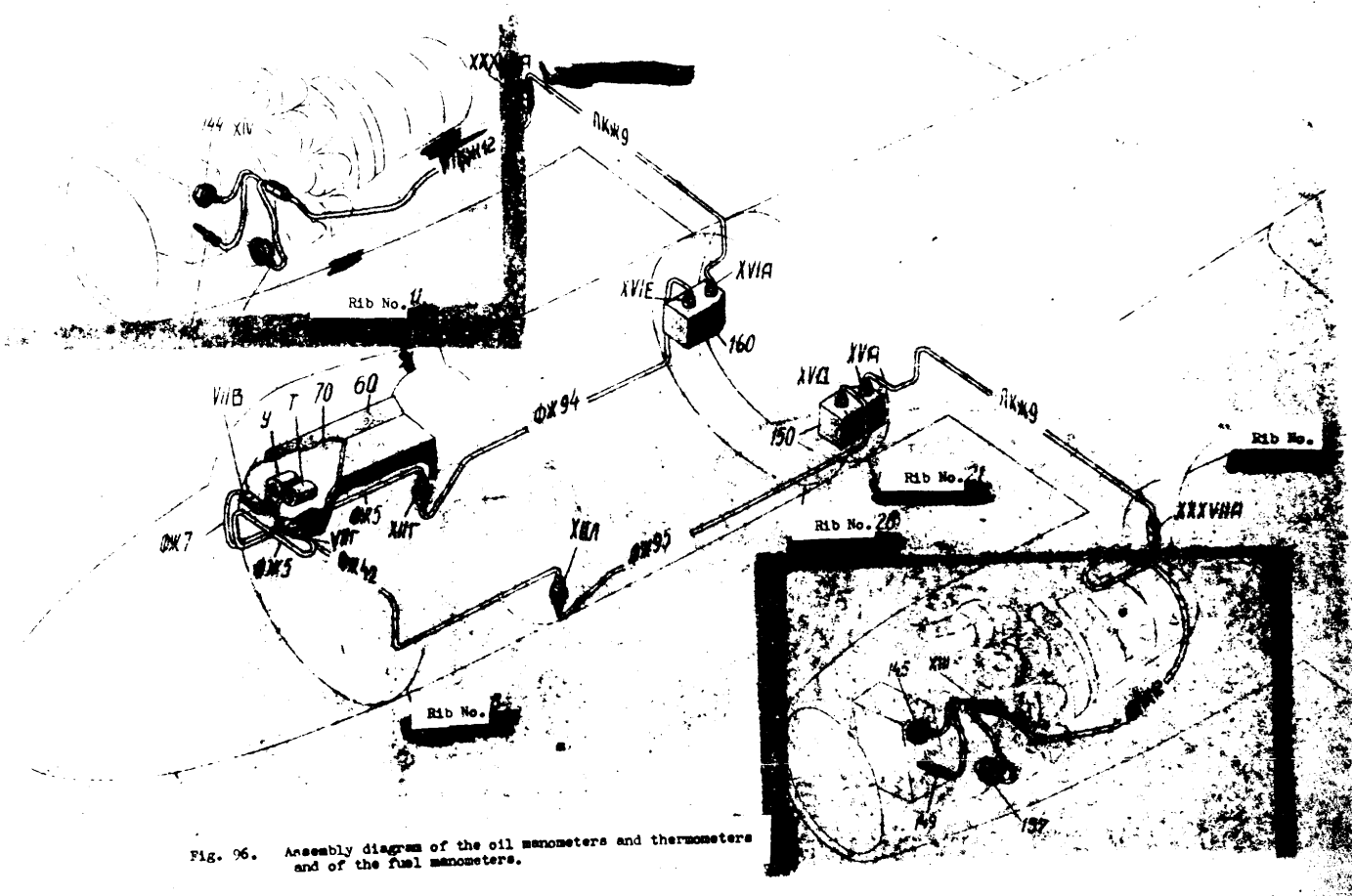

Fig. 96. Assembly diagram of the oil manometers and thermometers and of the fuel manometers.

DIAGRAM OF FUEL METER.

/Fig. 103, 104/

No. of pos. in	No. of	Name	No. of pieces	Type of element	Location
1		2	3	4	5
		Pilot's pilot desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
	2	Pilot's pilot desk bar	1	Dttp	Pilot's right desk
	NON	Red light switch, Fuel meter	1	ЛЗС-5	- " -
10		Pilot's instrument board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	Ф	Fuel rest indication lamp of front group of tanks	1	СЛМ-51	Pilot's instr. desk board
	X	Dtto, rear group of tanks	1	СЛМ-51 СТЭС-1147-1	- " -
	Ц	Fuel meter indicator /2 pointers/		/from 3801, 1801, 2502/ 1 СТЭС-1147	- " -
	Ж1	Critical rest of fuel indicator of front group of tanks		/from 3801, 1801, 2502/	- " -
	Ц1	Dtto, rear group of tanks		Dtto	- " -
155		Fuel meter sensel in 2-nd tank /top/	1	Fuel meter unit	Tank 2
156		Dtto, 4-th tank	1	Dtto	Tank 4
261		Supplementary sensel of front group of tanks fuel meter /from 2001, 0301, 0501/	1	Dtto	Tank 2
282		Dtto, rear group of tanks /from 2001, 0301, 1501/	1	Dtto	Tank 4
385		Sensel of fuel meter of 1-st tank /top/ /from 3801, 1801, 2502/	1	Dtto	Tank 1

1	2	3	4	5	6
[illegible]		Sensel. of fuel meter of [illegible]-th tank /top/	1	From fuel meter unit	Tank No. 5
VI	[illegible]	Pilot's right desk [illegible]	1	ШР 5[illegible]НГ3	Pilot's right desk
VII	[illegible]	Pilot's instr. board [illegible]	1	ШР3[illegible]НШ5 /to 2001, 0301, 0501/ ШР40П46НШ2 /Floor 2001, 0301, 0501/ 1 ШР60П47НШ2	Pilot's instr. board
	[illegible]	Ditto			- " -
XII	4	Pilot's [illegible] magnetic [illegible]	1	ШРГ-23	Pilot's cabin floor
	[illegible]	Ditto	1	ШРГ-23	- " -
	4	Ditto	1	ШРГ-23	- " -

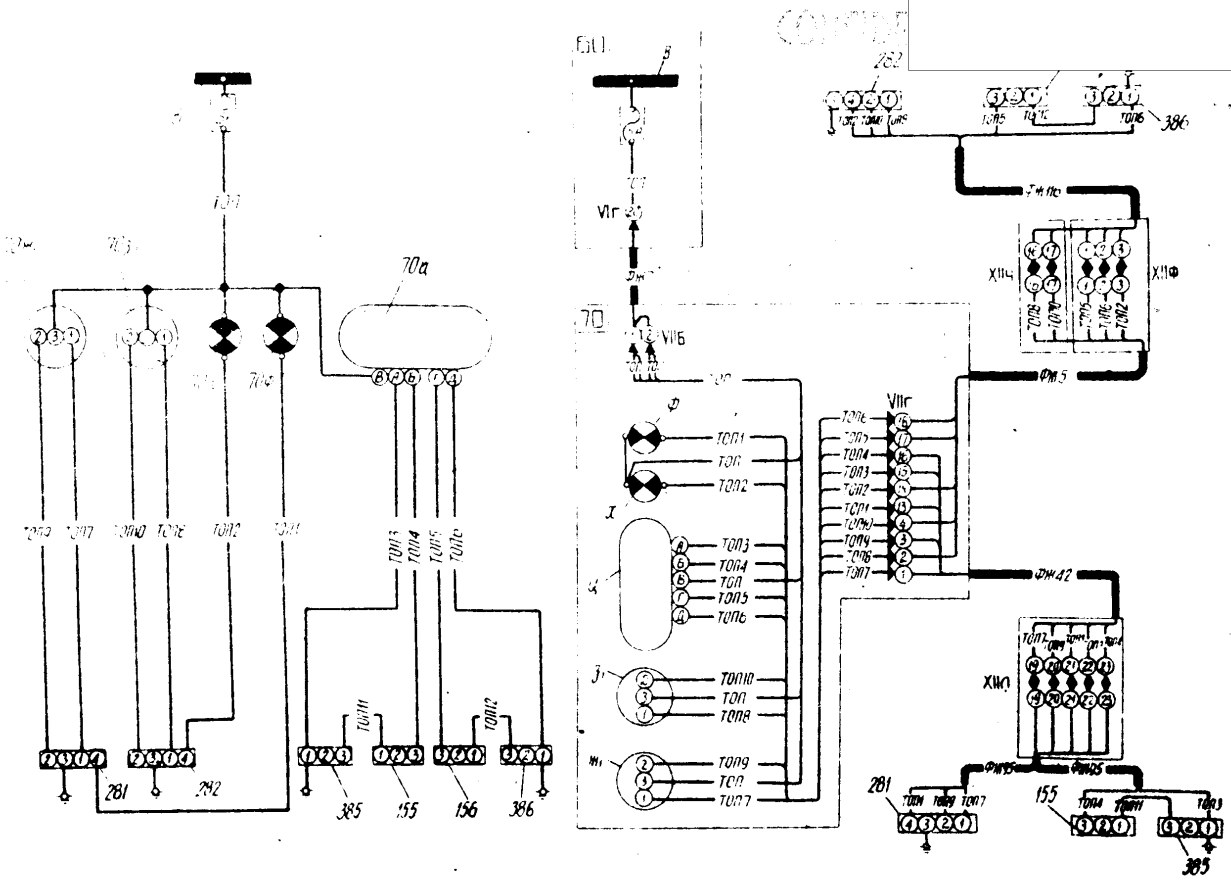

Fig. 103. Principal and assembly diagram of the fuel meters СТЭС-1147.

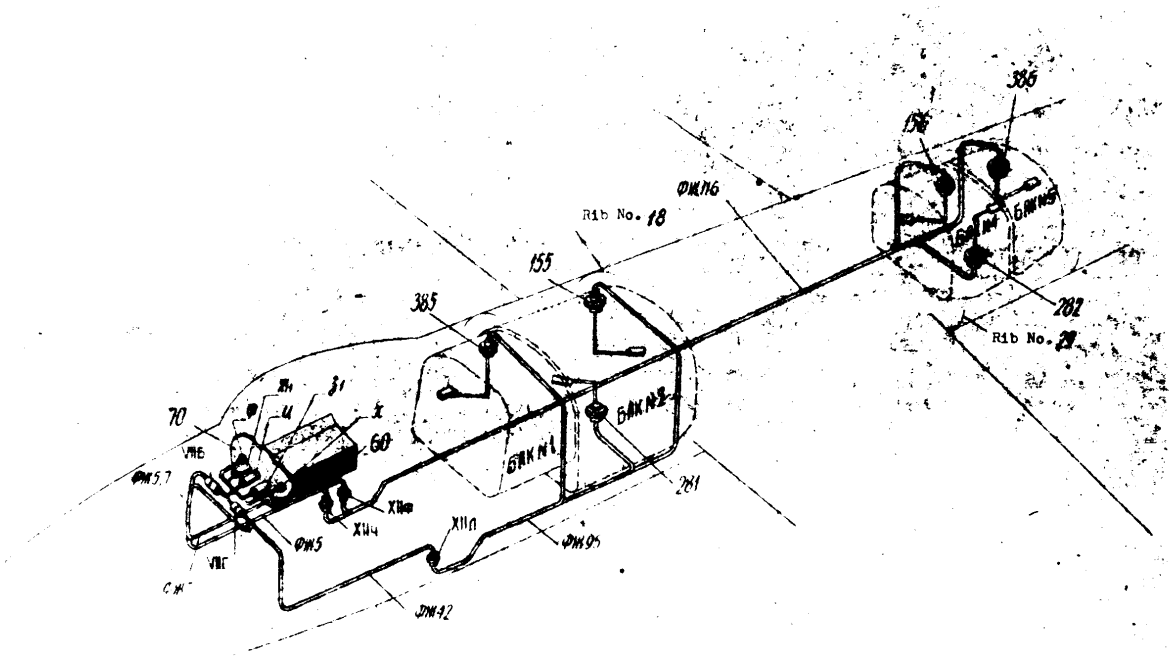

Fig. 104. Assembly diagram of the fuel meter СТЭС-1147.

CIRCUIT OF AUTOMATIC PILOT.

/Fig. 106a, 107/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
1		Course indicator of AP	1	АП-5	Pilot's instr. board
2		Procedure turn knob	1	АП-5	Navig. left desk
3		Control desk of AP	1	АП-5	Pilot's right desk
	a	Filter	1	Ф-14а	Fuselage, rib No. 7
5		Amplifier of AP	1	АП-5	Fuselage, right board, between ribs 19 & 20
6		Jointing box of AP	1	АП-5	Fuselage, right board, between ribs 21 & 22
	a	Dynamotor	1	АП-52	X
7		Dynamotors of AP	1	ПО-45 from unit АП-5	Fuselage, right board, rib 18
8		Switch of AP heater	1	В-45	Pilot's right desk
9		Course stabilizer of AP	1	АП-5	Navig. cabin front part
10		Navigator's left desk	1	Made by manufacturer	Navig. cabin left board between ribs No. 1 & 2
11		Heating cover of course stabilizer	1	АП-5	Navig. from
12		Bank and climb stabilizer	1	АП-5	Fuselage, between ribs
13		Bank and climb stabilizer heating socket	1	From unit АП-5	
14		Bank and climb stabilizer heating cover	1	АП-5	

1	2	3	4	5	6
16		Socket for connecting the heating of the rudder servo	1	From unit АП-5	Fuselage, right board, rib 39
17		Heating cover of the rudder servo	1	АП-5	- " - , left board
18		Elevator servo	1	АП-5	- " -
19		Socket for connection of heating of elevator servo of AP	1	From unit АП-5	- " -
21		Aileron servo.	1	АП-5	Fuselage, right board, between ribs 27 & 28
22		Heating cover of aileron servo	1	АП-5	- " -
23		Socket for connection of heating cover of aileron servo	1	From unit АП-5	- " -
24		Socket for connection of course stabilizer of AP	1	Dtto	Navig. left desk
26		Heating cover of elevator	1	АП-5	Fuselage, left board
27		Rudder servo	1	АП-5	Fuselage, right board, rib No. 39
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	Е	Navigator's CDB bar	1	Dtto	Navig. CDB
	АП	AP net limit switch	1	АЗС-10	- " -
	АП1	Dtto	1	АЗС-10	- " -
	САП	Net limit switch, AP heating	1	АЗС-10	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
70		Pilot's instrument board	1	Dtto	Pilot's cabin, rib No. 8
2V	Ш	Navig. cabin connector	1	[illegible]	Navig. cabin, right board, rib No. 6
1V	Б	Navigator's CDB connector	1	[illegible]	CDB
VI	А	Pilot's right desk connector	1	[illegible]	Pilot's right desk
	Б	Dtto	1	[illegible]	- " -
	Д	Dtto	1	[illegible]	- " -

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1	2	3	4	5	6
VII	Д	Pilot's instr. board connector	1	ШРБ0П47-НШ2	Pilot's instr. board
XII	А	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
	Д	Dtto	1	ШРГ-23	- " -
	Е	Dtto	1	ШРГ-23	- " -
	М	Dtto	1	ШРГ-23	- " -

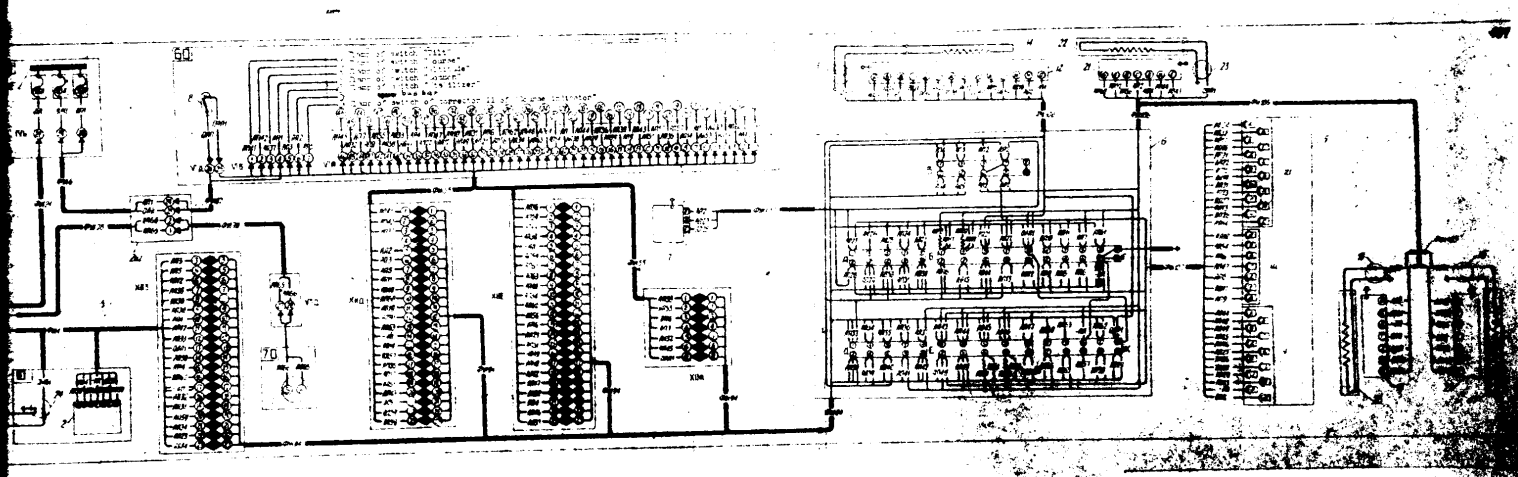

Fig. 1.4. Assembly diagram of the measurement of the automatic pilot.

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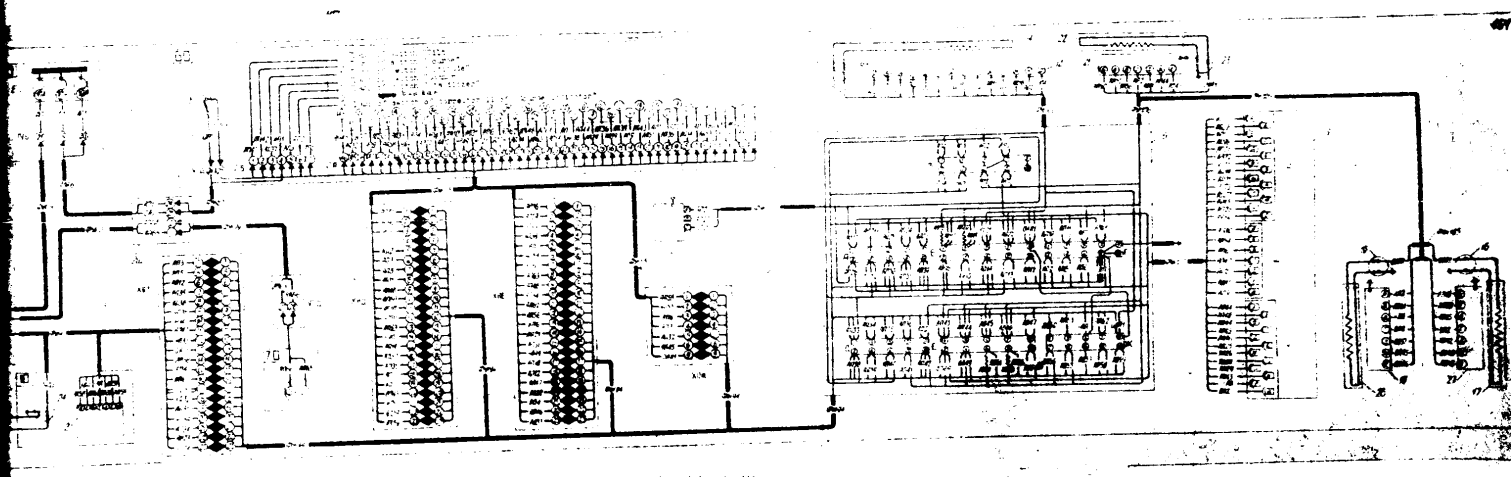
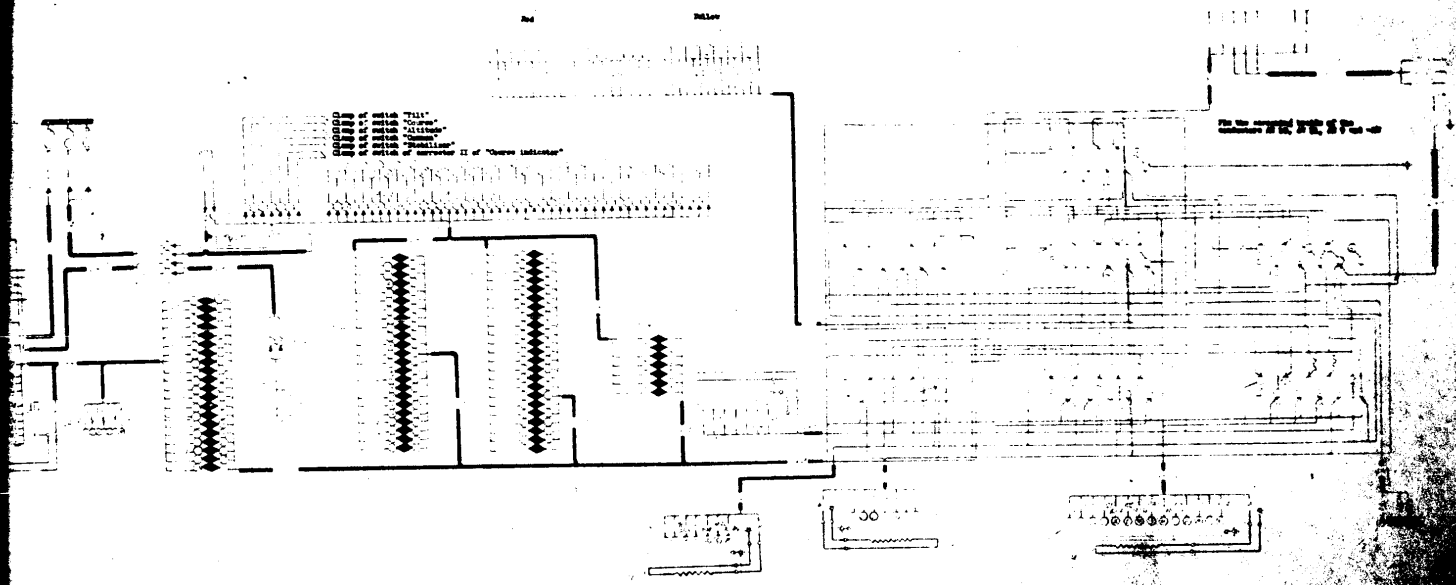


Fig. 1.1. Schematic diagram of the operation of the automatic plant.



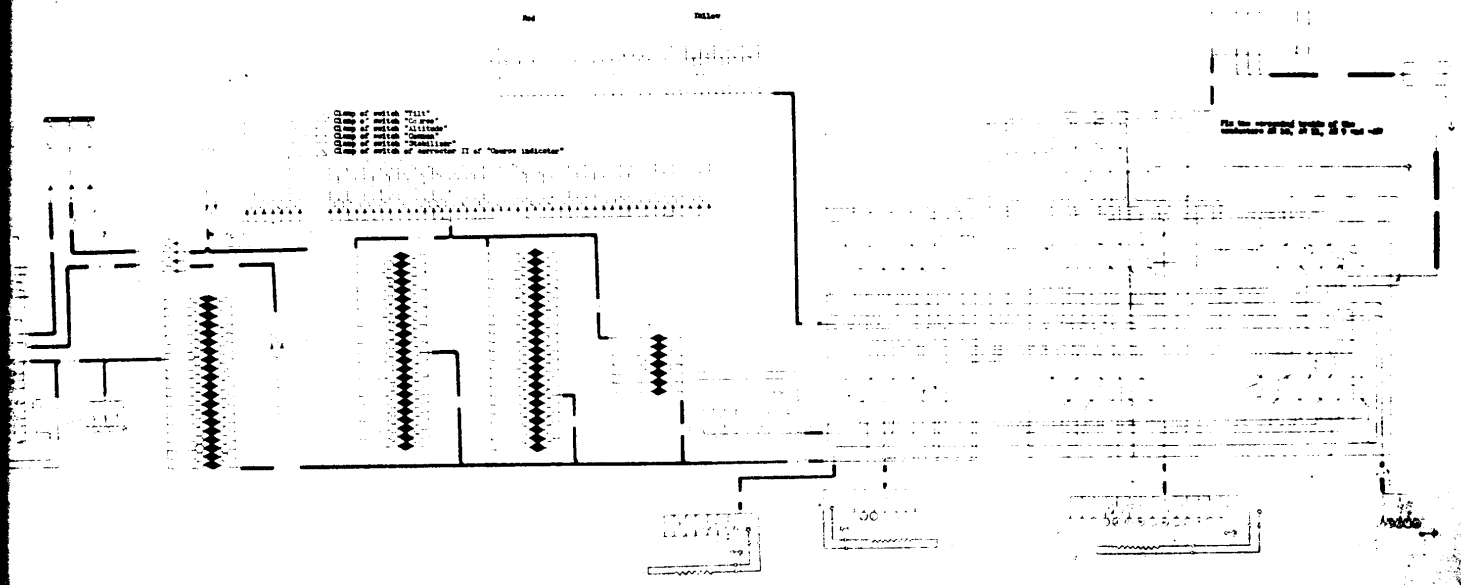


Fig. 1064. Assembly diagram of the connections of the automatic pilot.

[redacted]

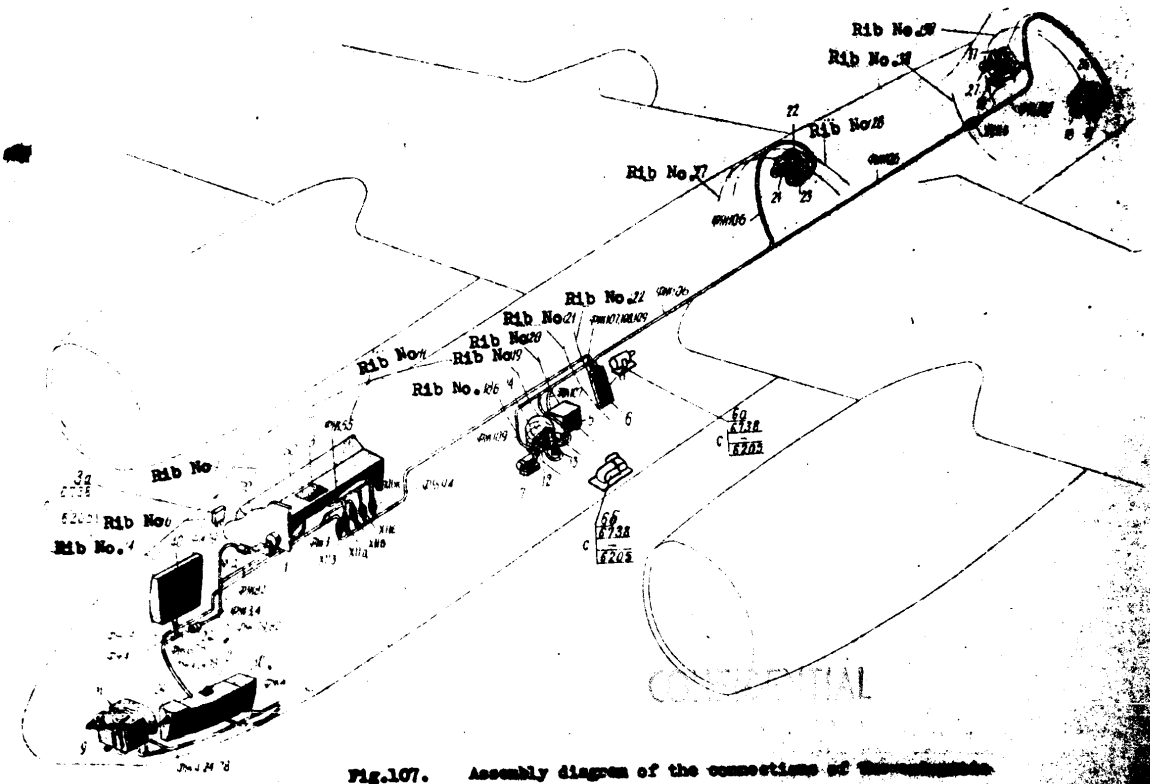


Fig.107. Assembly diagram of the connections of [redacted] pilot.

VI

CIRCUIT DIAGRAM OF THE REMOTE GYROMAGN
AND OF THE NAVIGATION INDICATOR.
/Fig. 114, 115, 116, 117/

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No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between nibs No. 4 & 6
	НИ	Net limit switch, navig. indicator	1	A3C-5	CDB
	ДК	Net limit switch, remote gyromagnetic compass	1	A3C-10	CDB
70		Pilot's instr. board	1	Made by manufacturer	Pilot's [illegible] rib No. [illegible]
	Э1	Pilot's indicator ПК-1	1	From unit ПГМК-3	Pilot's [illegible] board
	Ш1	Adjusting button of gyroflux gate compass	1	5KC	[illegible]
90		Navig. instr. board	1	Made by manufacturer	Navig. instr. board No. [illegible]
	Л	Gyroflux gate compass switch	1	2B-45	Navig. board
	Ш	Adjusting button	1	5KC	
	С	Wind sensing element	1	HM-50Б	
	Э	Coordinate indicator	1	HM-50Б	
	П	Course data unit	1	[illegible]	
150		Left CDS	1	[illegible]	
160		Right CDS	1	[illegible]	
170		Gyroflux gate compass sensing element	1	[illegible]	
180		Junction box	1	[illegible]	

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1	2	3	4	5
189		Amplifier	1 From unit ДГМК-3	[illegible] between rib 39 & [illegible]
190		Dynamotor	1 ПАГ-1	— "
191		Gyro-aggregate	1 ДГМК-3	— "
IV	Б	CDS connector	1 ШР55П31НГ3	CDS [illegible]
VII	А	Navig. instr. board connector	1 ШР60П9НШ2	Filter [illegible] board
	Е	Navig. instr. board connector	1 ШР48П26ШН2	— "
IX	А	Navig. instr. board connector	1 ШР48П26НШ2	Navig. [illegible] board
XII	Н	Pilot's cabin hermetic connector	1 ШРГ-23	Pilot's [illegible] flood[illegible]
	Ф	Dtto	1 ШРГ-23	— "
XV	М	Left CDS connector	1 ШР20П53Г40	Left [illegible]
	Н	Dtto	1 ШР48П26НШ2	— "
XVI	В	Right CDS connector	1 ШР20П53Г40	Right [illegible]
	З	Dtto	1 ШР48П26НШ2	— "
	Ш	Dtto	1 ШР40П6НГ3	— "
1	Ш	Navig. cabin connector	1 ШР55П31НГ3	Navig. [illegible] left [illegible] rib No. [illegible]
2	Ш	Dtto	1 ШР48П26НШ2	Dtto, [illegible] board [illegible]
320		Distribution box /from 6001 to 6501/	1 НМ-506	Navig. [illegible] rib No. [illegible]
		Speed automat /from 6001 to 6501/	1 НМ-506	Facing [illegible] panel [illegible] board [illegible]
	Ь	Navigation indicator filter /from 6001 to 6501/	1 СФ-2	
	Ь	Dtto	1 СФ-4	Navig. [illegible] board [illegible]
330		Distribution box /from 6501/	1 НМ-506	[illegible]
331		Navigation indicator filter /from 6501/	1 СФ-4	[illegible]
333		Speed automat /from 6501/	1 [illegible]	[illegible]
332		Filter /from 6501/	[illegible]	[illegible]

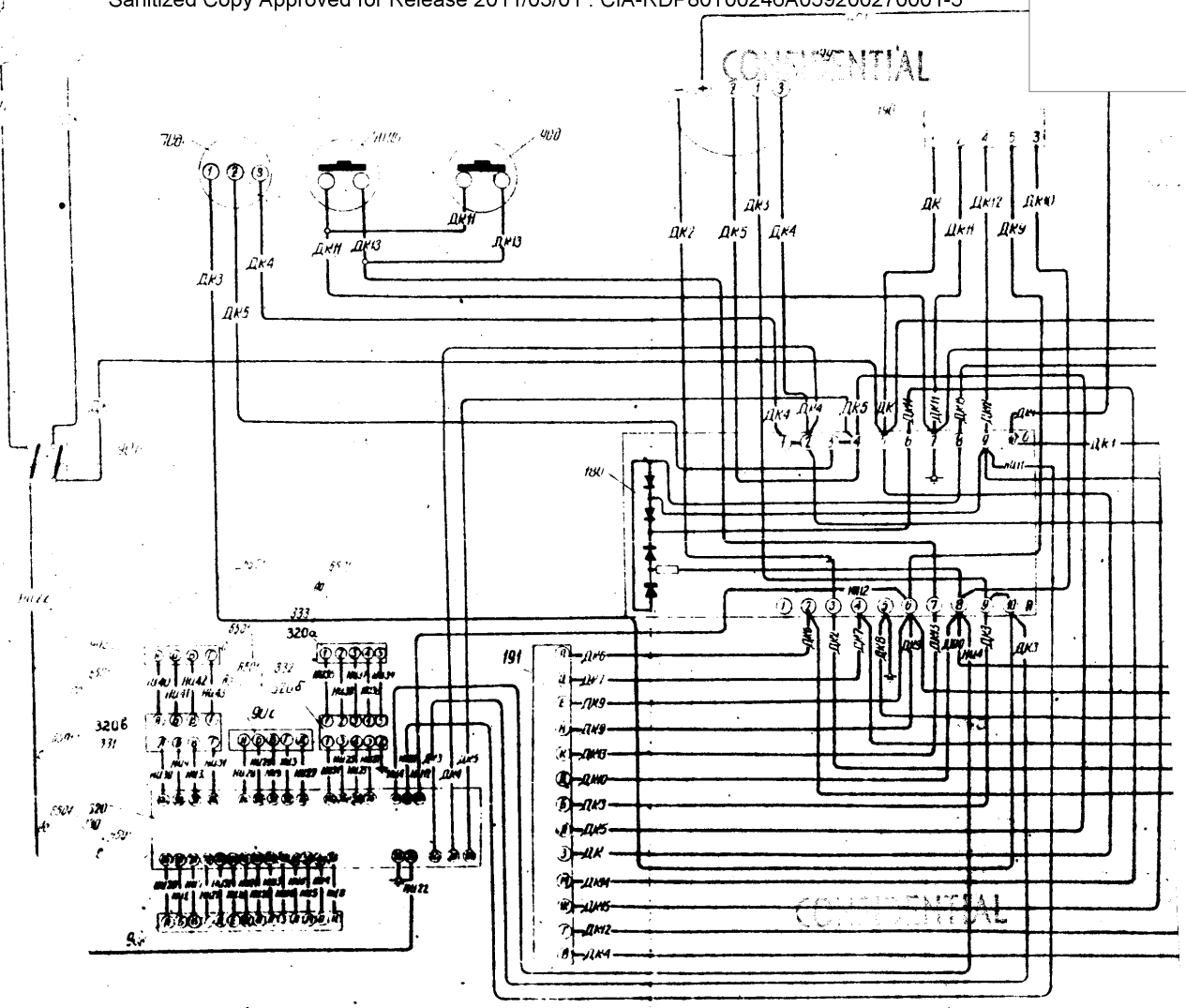

Fig. 114. Principal circuit diagram of the connections of the gyroline gate compass and navigation indicator.

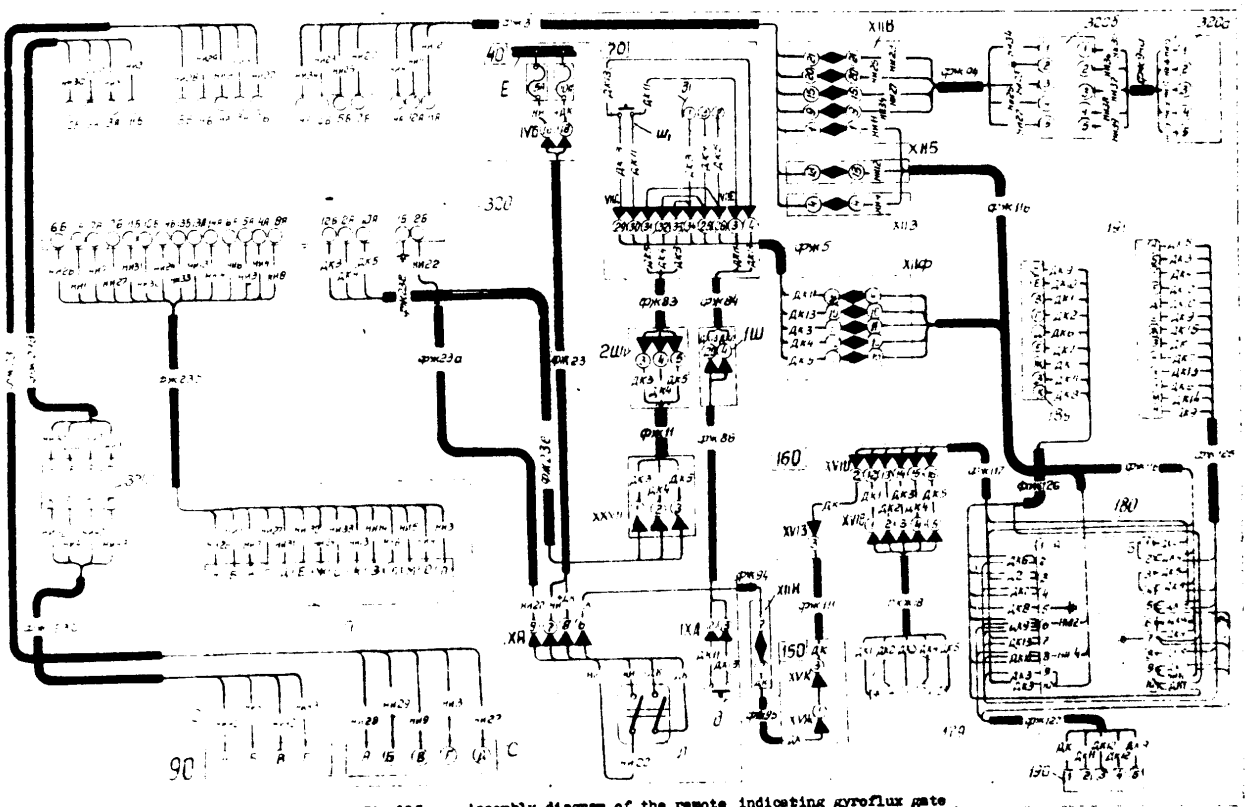

Fig.115. Assembly diagram of the remote indicating gyroflux gate compass and navigation indicator.

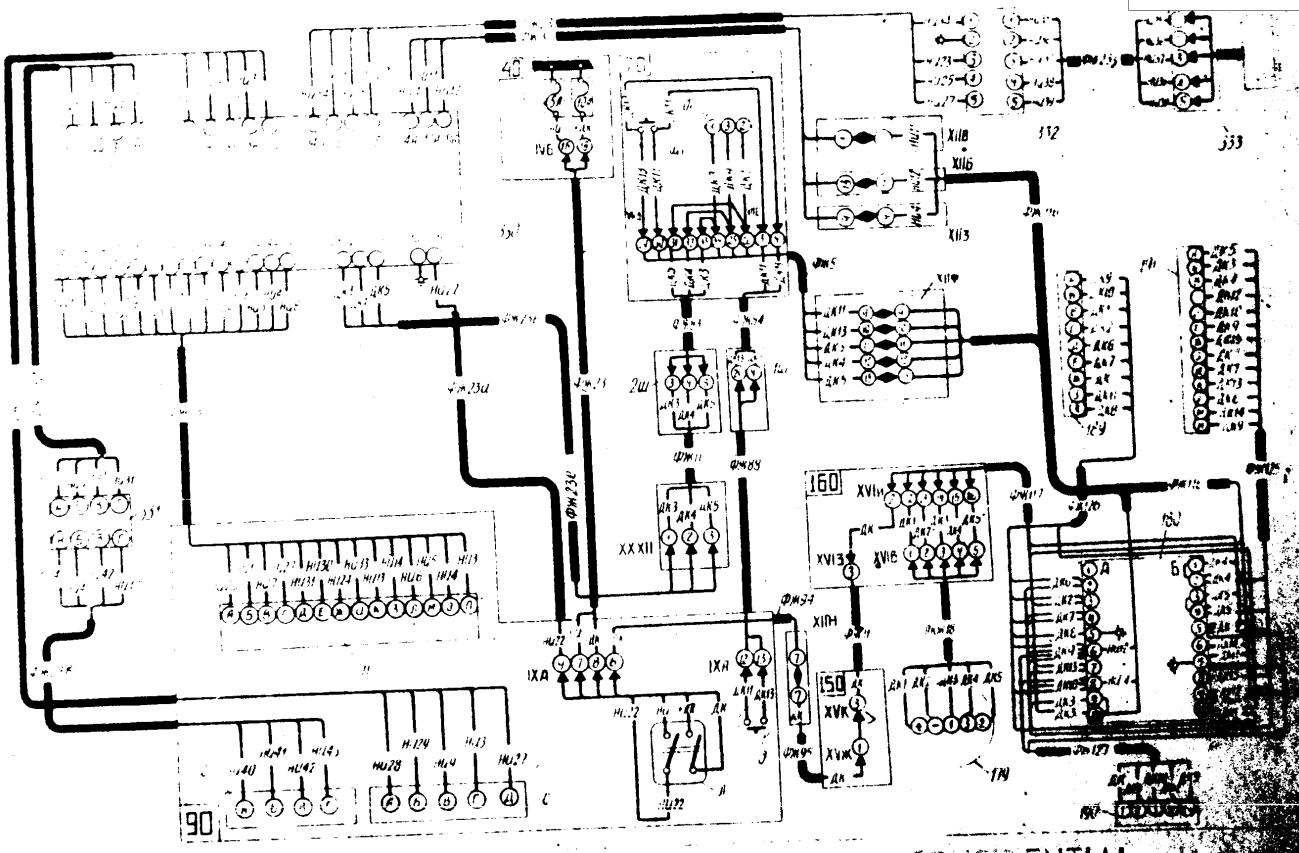

Fig. 116. Assembly diagram of the electrical remote indicating gyroflux gate compass and navigation indicator.

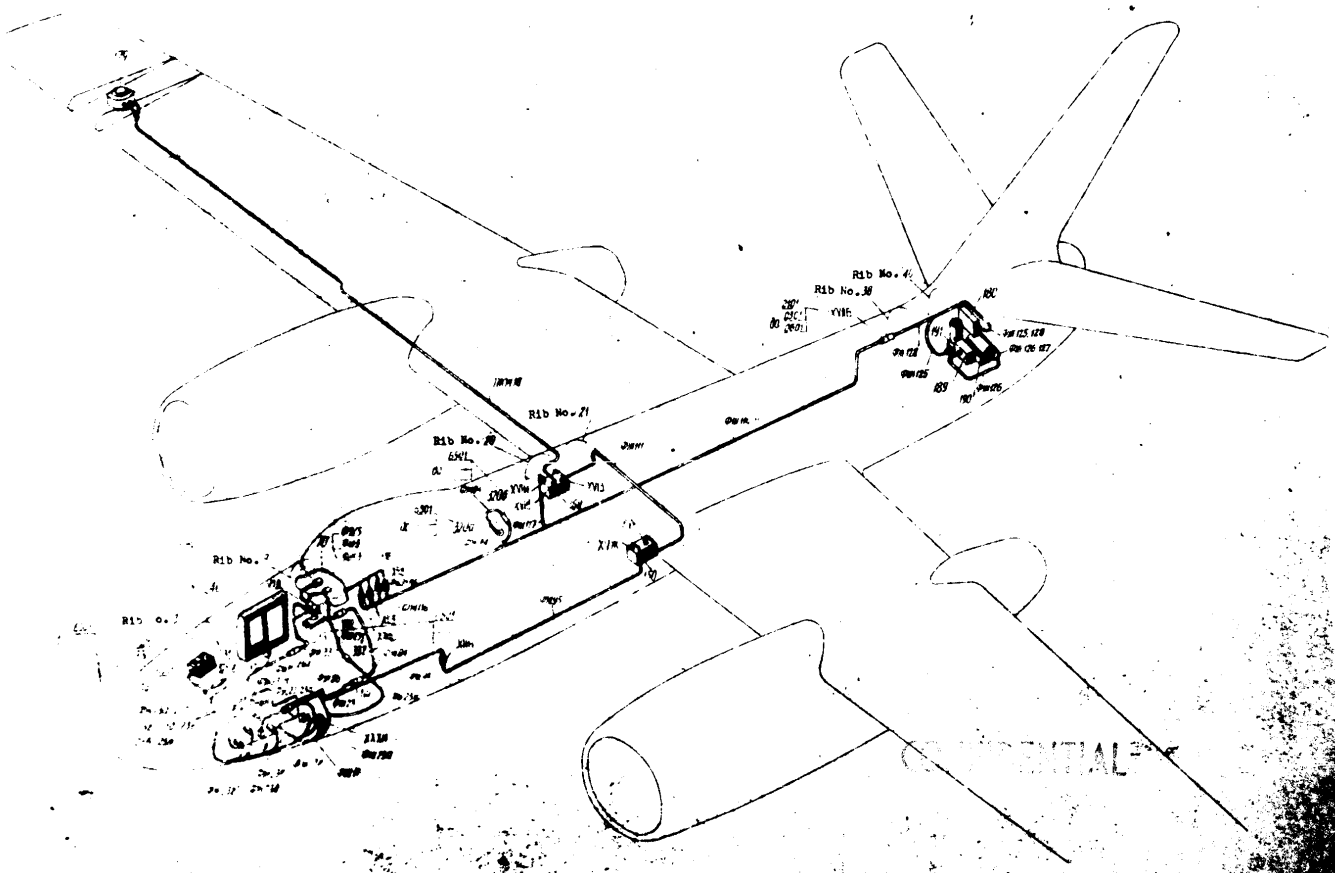

Fig. 117. Assembly diagram of the electrical remote indicating gyro flux gate compass and navigation indicator.

DRAWING DIAGRAM OF THE ARTIFICIAL HORIZ

/Pg. 118/

No. of pos.	No. of ind.	Name	No. of pie-ces	Type of element	Location
1	2	3	4	5	6
60		Pilot's right desk	1	Made by manufac-turer	Pilot's cabin, right board, between ribs No. 8 & 11
	B	Pilot's right desk bar	1	Otto	Pilot's right desk
	АПК	AP not limit switch	1	АЗС-5	- " -
70		Pilot's instrument board	1	Made by manufac-turer	Pilot's cabin, rib No. 8
	А	Artificial horizon indicator	1	АГК-47 /to 6131, 4319, 4901/ АГБ-1 /from 6131, 4319, 4901/	Pilot's instr. board
239		Artificial horizon supply dynamotor	1	ПАР-19	Pilot's cabin, right board, between ribs No. 7 & 8
VI	Г	Pilot's right desk connector	1	ШРС5П31НГ3	Pilot's right desk
VII	Д	Pilot's instr. board connector	1	ШР60П47НШ2	Pilot's instr. board

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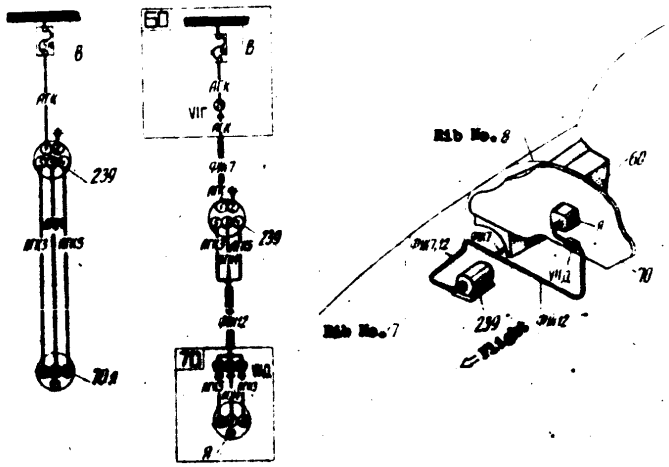

Fig.230. Circuit diagram of the [illegible]

CIRCUIT OF WING FLAP AND NOSE GEAR POSIT
INDICATION / fig. 119, 1[illegible]

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		CDB of navigator	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bar	1	Dtto	Navig. CDB
	YW	Set limit switch, board position and nose gear position indicator	1	A3C-5	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	a	Nose gear warning light	1	YW-48	Pilot's instr. board
	r	Wing flap position indicator	1	YЗП-47	- " -
116		Nose gear position sensing element	1	YЗП-47	Nose gear
119		Wing flap position sensing element	1	YЗП-47	Right nacelle, between ribs No. 16 & 17
160		Right CDS	1	Made by manufacturer	Fuselage right board, between ribs 20 & 21
IV	A	CDB connector	1	ШРС0П45МГ1	CDB
VII	A	Pilot's instr. board connector	1	ШРС0П47ВШ1	Pilot's instr. board
XII	B	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin flap
	M	Dtto	1	ШРГ-23	
	Ж	Dtto	1	ШРГ-23	
XVI	A	Right CDS connector	1	ШРС0П47МГ1	Right [illegible]
	Б	Dtto	1	ШРМ[illegible]	
	В	Dtto	1	ШРС[illegible]МГ1	
XXXVIII	A	Right nacelle connector	1	ШРС0П4[illegible]	Right [illegible]
	Б	Dtto	1	[illegible]	[illegible]

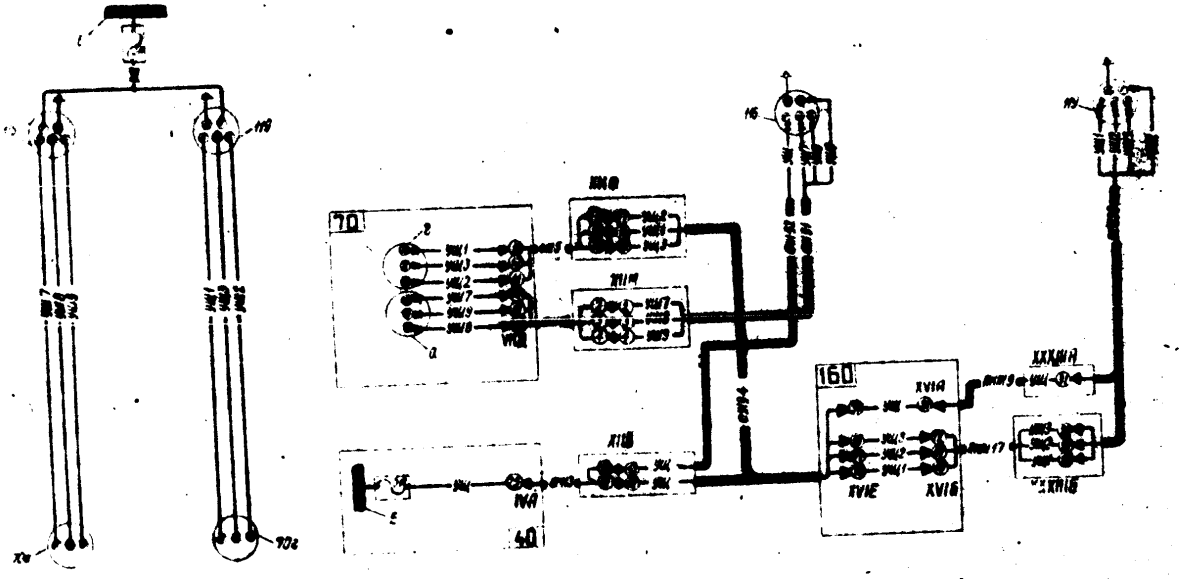

Fig. 119. Schematic and assembly diagram of the pneumatic mechanism of the wing flaps and nose gear

 VI

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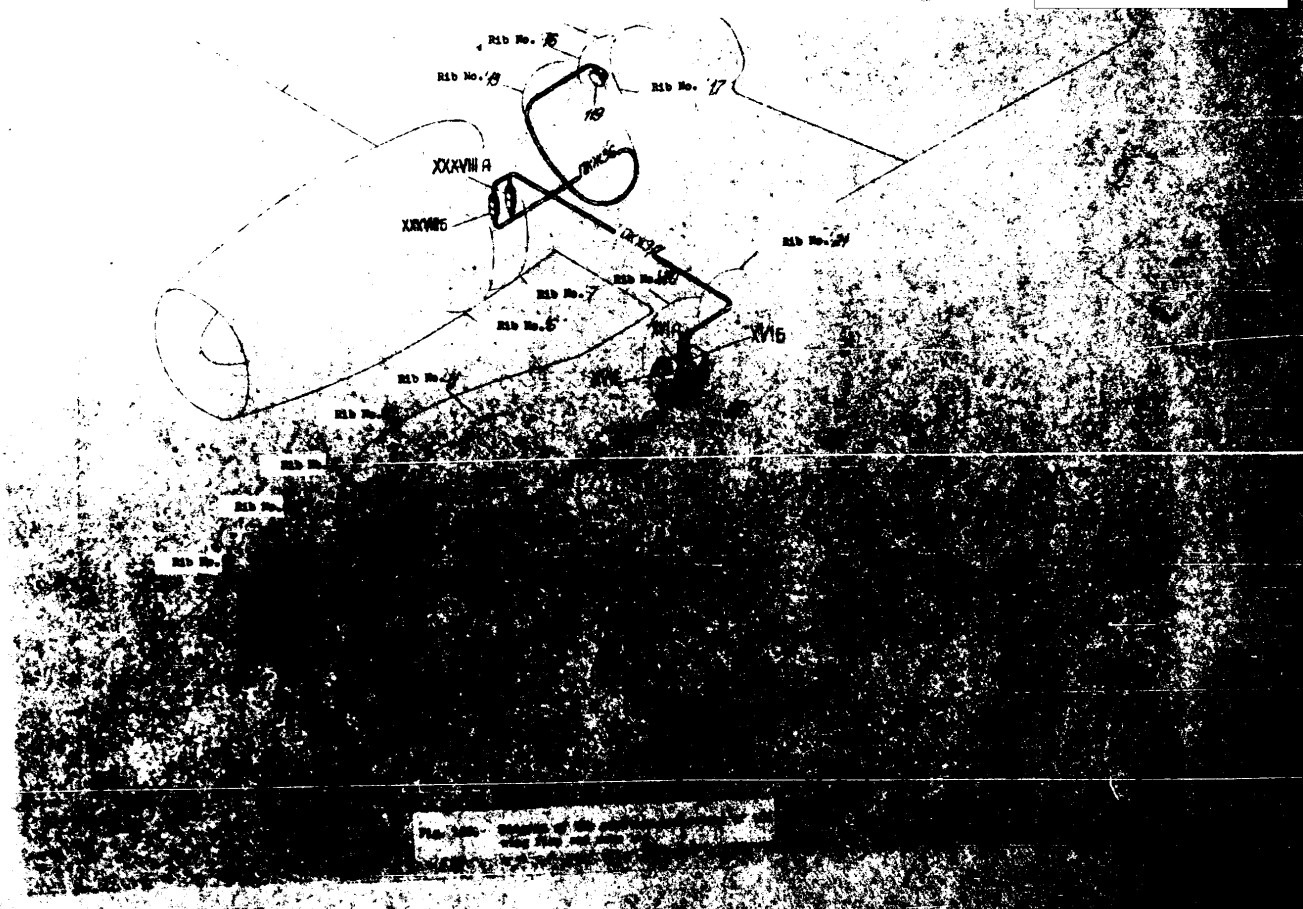

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CIRCUIT DIAGRAM OF THE AMBIENT AIR AND NAV
CLOCK HEATING THERMOMETERS.
/Figs. 121, 122/

No of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	П	Navig. clock heating switch	1	B-45	Navig. CDB
	Б	CDB bus bar	1	Made by manufacturer	- " -
	ТНВ	Net limit switch of thermometers	1	АЗС-5	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	Ц	Ambient air temperature indicator	1	ТУЗ-48	Pilot's instr. board
90		Navig. instr. board	1	Made by manufacturer	Navig. cabin, left board, between ribs No. 3 & 4
	е	Navig. clock	1	АЧКО	Navig. instr. board
	ж	Ambient air temperature indicator	1	ТУЗ-48	- " -
192		Ambient air temperature sensing element	1	ТУЗ-48	Pilot's [illegible] cock pit
234		Dtto	1	ТУЗ-48	- " -
IV	А	Navig. CDB connector	1	ШРС0П45НГ1	CDB
VII	Б	Pilot's instr. board connector	1	74k	Right [illegible] rib No. [illegible]
	Ж	Dtto	1	ШР48П126НШ1	Navig. [illegible] board
IX	А	Navig. instr. board connector	1	ШР48П126НШ1	Navig. [illegible] board
XII	Н	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's [illegible]

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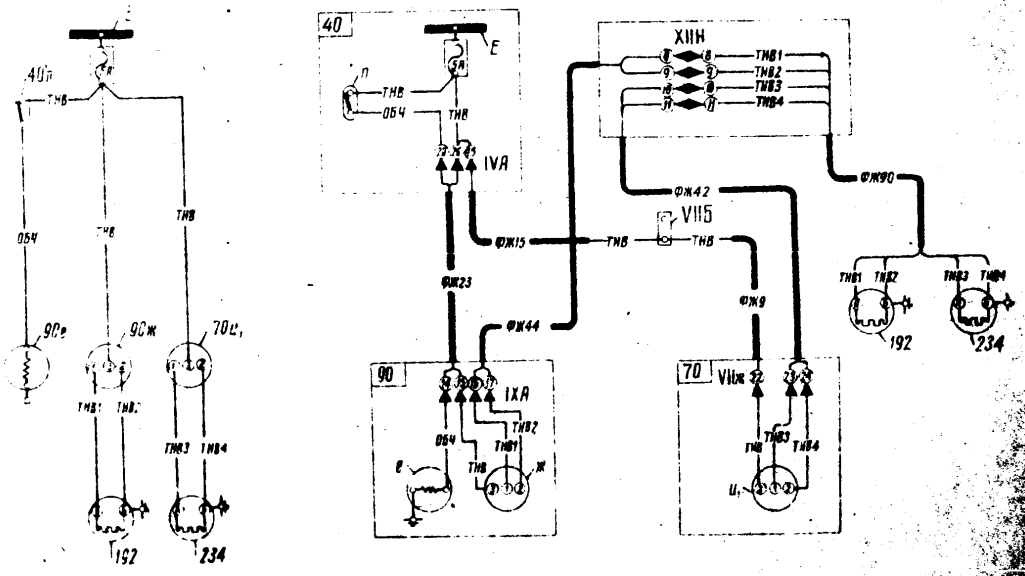

Fig. 121. Principal and assembly diagram of the surrounding air thermometer and the navigator's clock heating.

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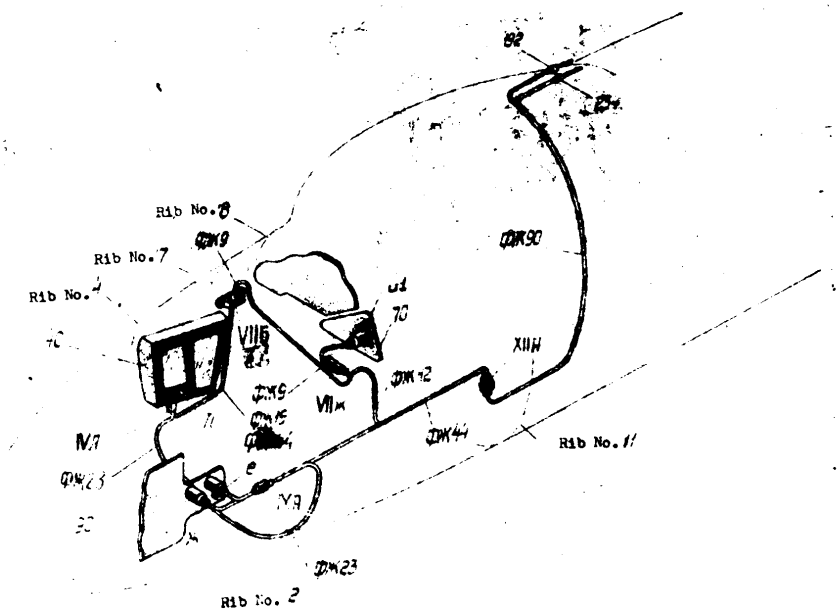

Fig. 122. Assembly diagram of the surrounding air thermometer and of the navigator's clock heater.

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CIRCUIT DIAGRAM OF PILOT'S VOLTMETER.

/Fig. 13/

No. on diagram	Designation	Name	No. of elements	Type of element	Location
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
	[illegible]	Pilot's right desk bar	1	Otto	Pilot's right desk
	[illegible]	Set limit switch of pilot's voltmeter	1	[illegible]	- " -
70		Pilot's right board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	[illegible]	Voltmeter	1	[illegible]	Pilot's instr. board
VI	[illegible]	Pilot's right desk connector	1	WPS5M31HM3	Pilot's right desk
VII	[illegible]	Pilot's instr. board connector	1	WP40M16HW2 (from 2001, 0101, 0501)	Pilot's instr. board

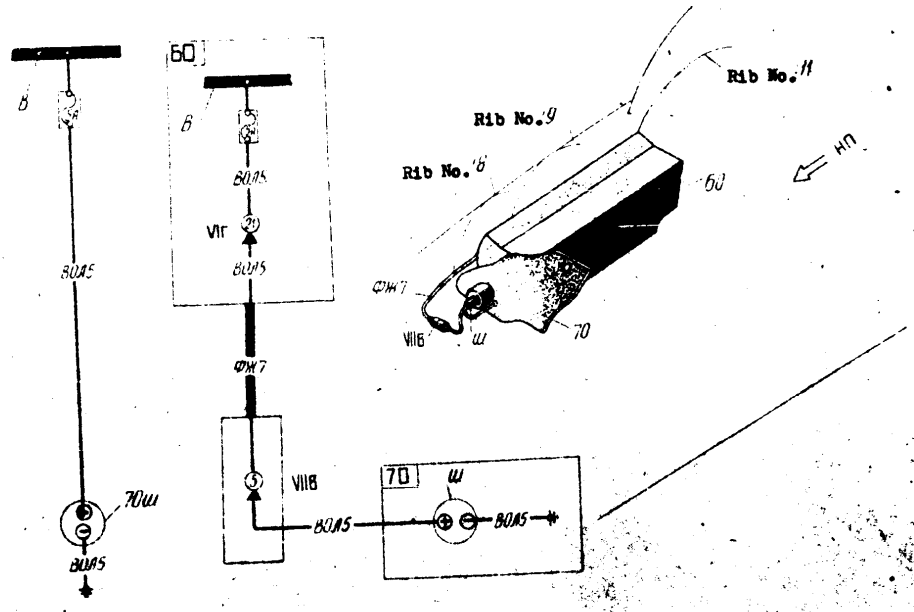

Fig. 125. Circuit diagram of the pilot's voltmeter.

CIRCUIT DIAGRAM OF A. C. VOLTMETER.

/Fig. 124/

No. on diag.	No. of pos.	Name	No. of elements	Type of element pos-ces	Location
1	2	3	4	5	6
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	V	A. c. voltmeter	1	ЭВ-46	Navig. CDB
	H	A. c. voltmeter switch	1	2ПП-45	- " -
	H	A. c. bus bar	1	Made by manufacturer	- " -
	ВОП7	A. c. voltmeter fuse	1	ПВ-2	A. c. board
IV	A	Navig. CDB connector	1	ШР60П45НГ2	Navig. CDB
	Г	A. c. board connector	1	ШР31П4Н4Ш6	- " -
	Д	Dtto	1	ШР31П4Н4Ш5	- " -
Block 21 M		Dynamotor control block	1	From unit ПСОВ-М	Navig. cabin, left board rib No. 2

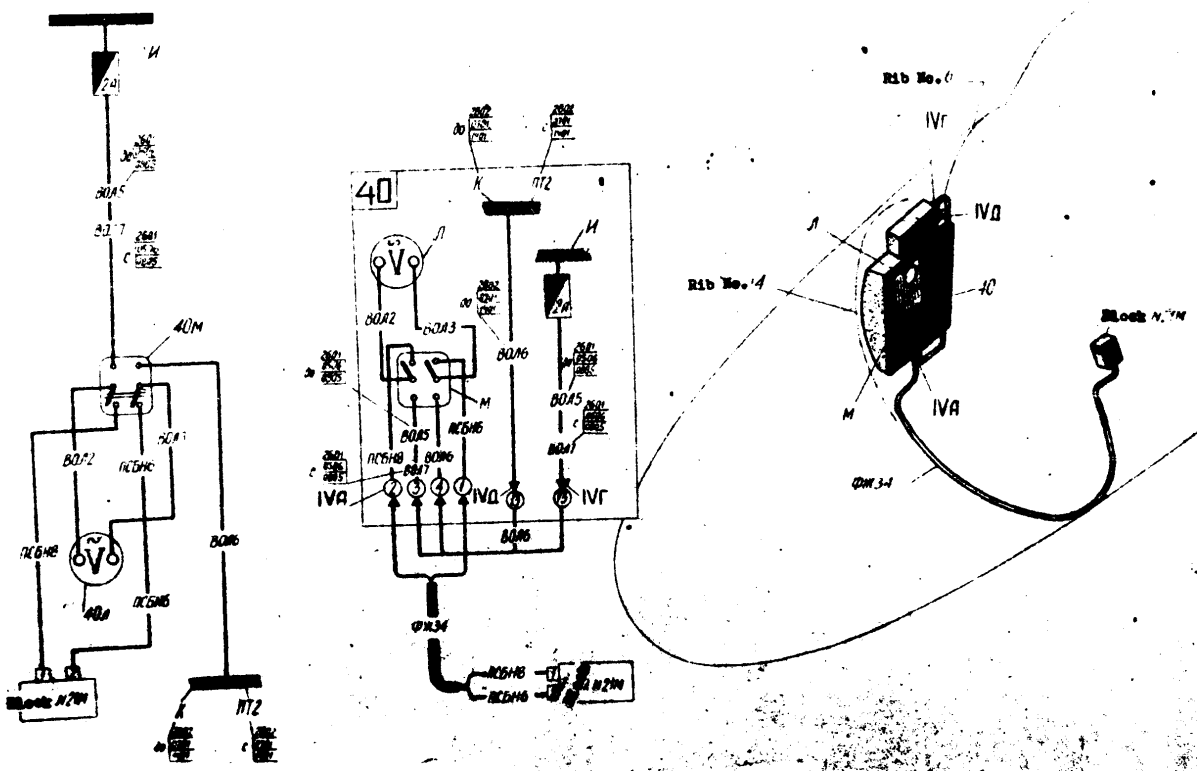

Fig. 124. Circuit diagram of the [illegible]

POWER SUPPLY OF THE INDICATION INSTRUMENTS AND THE HEATING OF THE SYSTEM.

The indication /warning/ instruments are: the altitude indicator and the dangerous pressure difference indicator.

The altitude indicators BC-46, 60ϕ_1, 110i are located in the front and rear cabin. The instruments close the circuit of the indication lamps "высота в кабине" /Altitude of cabin/, corresponding to the altitude, that has been adjusted on the instrument scales, and so warning the crew to use the oxygen apparatus.

The instrument is adjusted to a given altitude by means of the knob with a scale. The scale is divided for altitudes in the range of 2,5 to 5 km.

The indicators of dangerous pressure difference are placed in the front and rear cabins.

The instruments close the circuits of indication lamps and bells at too large pressure /0,46 At/ or vacuum /0,02 At/ in the hermetic cabin and so warn the crew to dehermetize the cabin.

The bells can be switched off by means of switches /60c$_1$/ and/110 /.

The following power consuming instruments are supplied through the limit switches of this group of instruments:

a/ the heating of the receivers of air pressure ИВД and unreduced air pressure ТИ 156 /220/;

b/ the heating of the pilot's clock /70n/

c/ the heating of the gunner's clock /[illegible]/

CIRCUIT DIAGRAM OF THE ALTITUDE INDICA[illegible]
ROUS PRESSURE INDICATOR AND OF THE PILOT'S CLOCK HEATING

/Fig. 132/

/Valid from 3101, 1001, 1601/

No. of pos.	No. of ind.	Name	No. of element pieces	Type of element	Location
1	2	3	4	5	6
10		Navig. left desk	1	Made by manufacturer	Navig. cabin, left board, betw[illegible] rib No. 1 & 4
	ш	Altitude indicator lamp	1	СМ-51	Navig. left desk
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between rib No. 4 & [illegible]
	Е	Navig. CDB bar	1	Dtto	Navig. CDB
	СДП	Net limit switch, clock heating, altitude indic., dangerous pressure ind.	1	АЗС-5	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between rib No. 8 & 11
	е	Junction box	1	75K	Pilot's right desk
	р	Pilot's clock heating switch	1	В-45	Pilot's right desk
	с	Dangerous pressure indicator bell switch	1	В-45	" - " -
	т	Dangerous pressure indication lamp	1	СМ-51	- " -
	у	Dangerous pressure indication bell	1	СМ-2-45	- " -
	ф	Altitude indicator	1	ВС-46	- " -
	ч	Dangerous pressure difference indicator	1	СОДА-50	- " -
70		Pilot's instrument board	1	Made by manufac-	Pilot's [illegible] rib No. [illegible]
	t_1	Pilot's clock	1	АЧРМ	Pilot's [illegible] board
	a_1	Nose gear warning lamp	1	СМ-51	- " -
1	$б^1$	Navig. left desk connector	[illegible]	[illegible]	Navig. [illegible] desk
2	ш	Navig. cabin connector	1	[illegible]	Navig. [illegible] right [illegible] rib No. [illegible]

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1	2	3	4	5	6
IV	A	CDB connector	1 ШР60П45НП2		CDB
VI	Д	Pilot's right desk connector	1 ШР48П16НШ2		Pilot's right desk
VII	Б	Junction block	1	74K	Pilot's cabin right board, rib No. 5
	В	Pilot's instr. board connector	1 ШР40П46НШ2 /from 2001, 0301, 0501/		Pilot's instr. board
	Д	Pilot's instr. board connector	1 ШР60П42НШ2 /from 5401, 2501, 3704/		Pilot's instr. board

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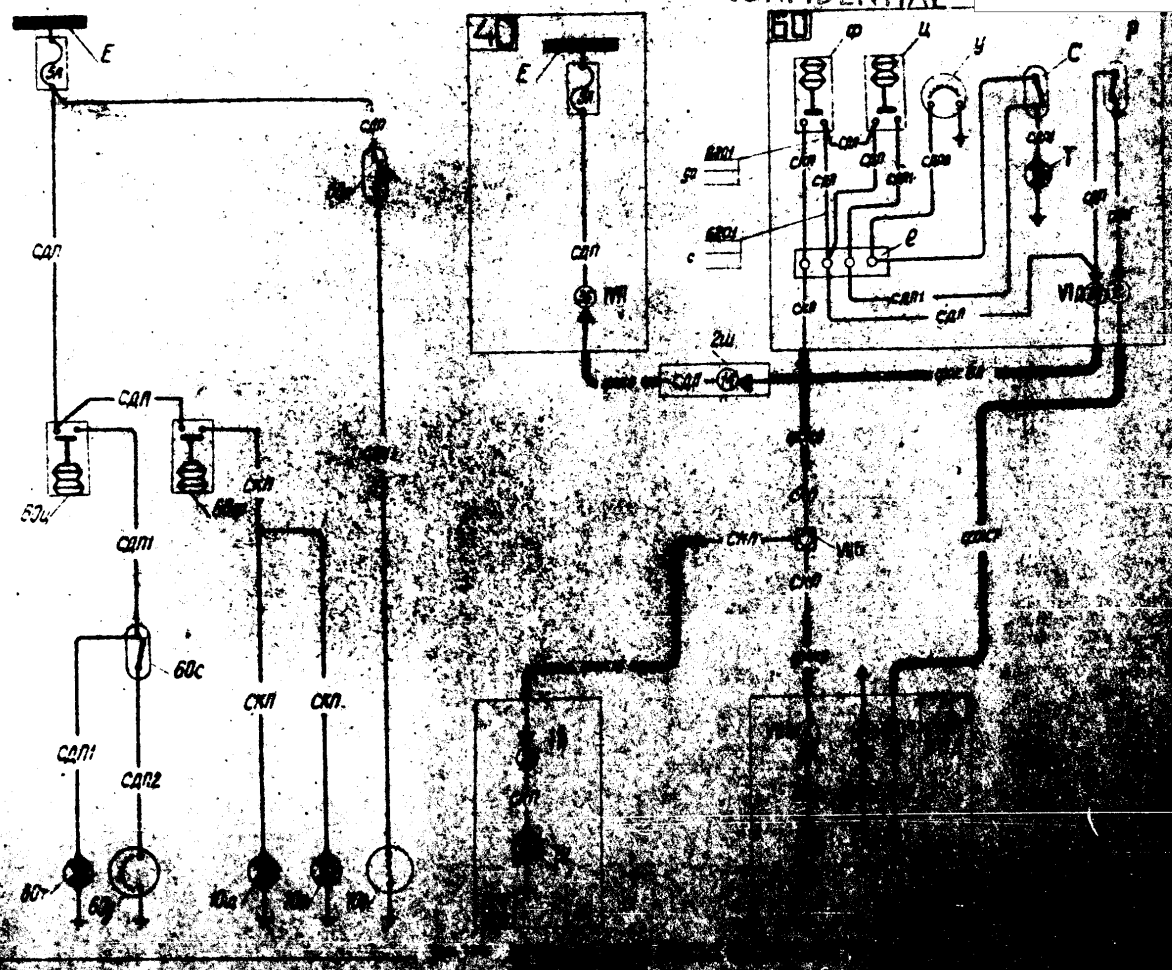

CIRCUIT DIAGRAM OF THE VOLTMETER, DANGEROUS PRESSURE INDICATOR AND GUNNER'S CLOCK

/Fig. 134, 135/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
80		Gunner's right desk	1	Made by manufacturer	Gunner's cabin, right board, between ribs No. 42 & 43
	б	Gunner's clock heating switch	1	B-45	Gunner's right desk
	г	Gunner's right desk bar	1	Made by manufacturer	- " -
	ВОЛ4	Net limit switch	1	A3C-5	- " -
	СЖС	Dtto	1	A3C-5	- " -
100		Pilot lamps panel	1	Made by manufacturer	Gunner's cabin, right board, rib No. 45
	а	Indication lamp of altitude indicator /with inscription "Включи кислород" /Use oxygen/	1	CJ4-51	Ind. lamp board
	б	Indi. lamp of dangerous pressure indication	1	CJ4-51	- " -
110		Gunner's left desk	1	Made by manufacturer	Gunner's cabin, left board, between ribs No. 42 & 43
	а	Voltmeter	1	B-46	Gunner's left desk
	б	Altitude indicator	1	BC-46	- " -
	в	Dangerous pressure ind.	1	BC-46	- " -
	г	Switch of bell	1	B-45	- " -
	е	Dangerous pressure indication bell	1	G33-2-45	- " -
	ж	Gunner's clock	1	AEPM	- " -
188	а	Cabin lamp junction block	1	75K	Gunner's cabin, left board, rib No. [illegible]
VIII		Gunner's right desk connector	1	[illegible]	Gunner's [illegible]
XI		Gunner's left desk connector	1	[illegible]	Gunner's [illegible]

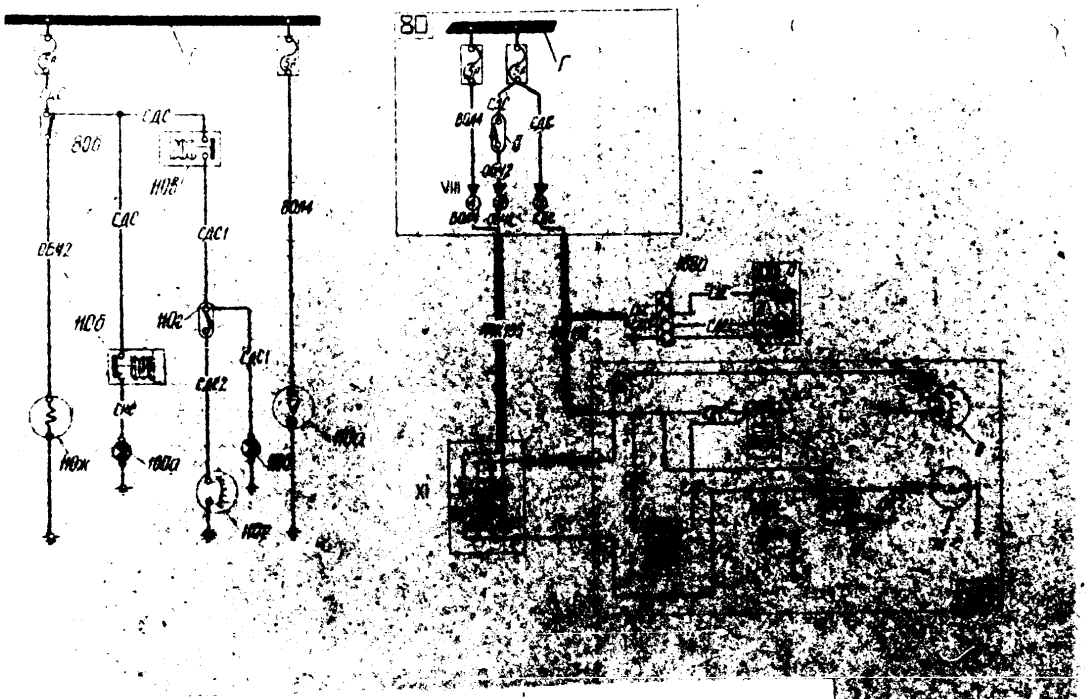

Fig. 134. Principal and assembly diagram of the voltmeter, the altitude indicator, the dangerous pressure difference indicator and the gunner's clock heater.

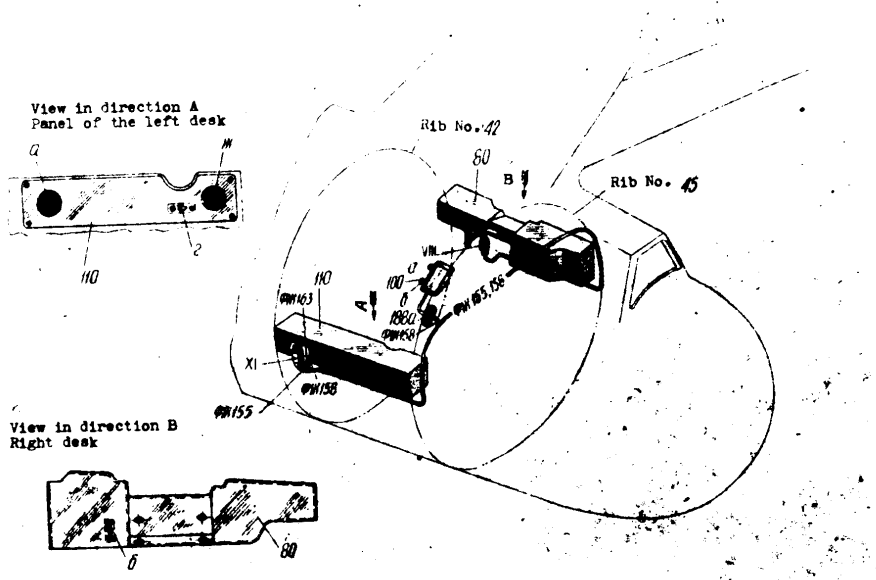

Fig. 135. Assembly diagram of the voltmeter, the altitude indicator, the dangerous pressure difference indicator and the gunner's clock heater.

LIGHTING AND INDICATION SYSTEM.

The lighting system of the aeroplane includes:

1. Pilot's cabin lighting /fig. 136 - 144/
2. Rear compartment lighting /fig. 145 - 147/
3. Rear turret lighting / 218 - 223/
4. Bomb compartment lighting /fig. 194 - 202/
5. Landing lights ЛСВ-45 /fig. 152 - 155/

For the cabin lighting sources of ultra-violet radiation АРФОМ-45 and sources of visible light are used /lamps КМСТК-45 and instrument illumination lamps, and lamps ВЛС-45/. The rear and bomb compartment and the rear turret are lighted by means of ceiling lamp fittings ПС-39. In the rear compartment there is a socket for the connection of a portable lamp.

The indication system of the aeroplane, located in this part, includes:

1. Position lights БАНО-45 /on the wings/ and ХС-39 /on the tail/ /fig. 148, 149/
2. 8 formation lights ПССО-45 /fig. 150 - 151/
3. Signalling flares /fig. 156 - 158/
4. Three colour indication /fig. 162 - 165/
5. Landing gear warning system /fig. 159 - 161/.

PILOT's CABIN LIGHTING CIRCUIT.

/Fig. 138, 139/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
25		Landing lights control board	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 9
	e	Compass KW-11 lighting rheostat	1	PWK-49	Landing lights control board
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	CDB bus bar	1	Dtto	Navig. CDB
	O	Pilot's cabin lighting net limit switch	1	A3C-5	- " -
	OM1	Dtto	1	A3C-5	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
		Pilot's right desk YØO fitting rheostat	1	PYØO-48	Pilot's right desk
	k	Rheostat of pilot's instr. board lighting /on steering column/	1	PYØO-48	- " -
	л	Rheostat of pilot's left desk lighting	1	PYØO-48	- " -
	м	Rheostat of right part of instr. board lighting	1	PYØO-48	- " -
	п	Rheostat of left part of instr. board lighting	1	PYØO-48	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	$Ш_1$	Pilot's compass lighting lamp	1	From unit KW-11	Pilot's instr. desk
209		Instr. board lighting lamp	1	APYØCW-45	Steering column

1	2	3	4	5	6
Z10		Pilot's instr. board lighting lamp supply junction block	1	73K	Steering column
Z11		Junction block of lighting lamp of pilot's left desk	1	73K	Pilot's cabin, left board, rib No. 11a
Z12		Lighting lamp of pilot's left desk	1	APY⊕OW-45	Pilot's cabin, left board, rib No. 11a
Z13		Pilot's lamp	1	BJIC-45	Dtto, rib 11
	a	Pilot's lamp connector /from 3901/	1	HP-1	- " -
Z14		Pilot's instr.board right part ZOO fitting	1	APY⊕OW-45	Pilot's cabin, right board, rib No. 9
Z15		Pilot's left desk lighting lamp supply connector block	1	73K	- " -
Z17		Dtto	1	73K	Pilot's cabin, left board, rib No. 9
Z18		Left part of instr. board lighting lamp	1	APY⊕OW-45	- " -
Z19		Pilot's cabin lamp	1	KJICPK-45	Pilot's cabin, right board, rib No. 10
	a	Pilot's cabin lamp junction block	1	73K	- " -
248		Pilot's right desk lighting lamp	1	APY⊕OW-45	Pilot's cabin, right board, between ribs No. 10 & 11
	a	Pilot's right desk lighting lamp supply junction block	1	75K	- " -
2	W	Navig. cabin connector	1	WP48П26HW2	Navig. cabin, right board, rib No. 6
IV	A	CDB connector	1	WP60Q45HP2	CDB
VI	П	Pilot's right desk connector	1	WP55П31HP3	Pilot's right desk
	Д	Pilot's right desk connector	1	WP48П26HW2	- " -

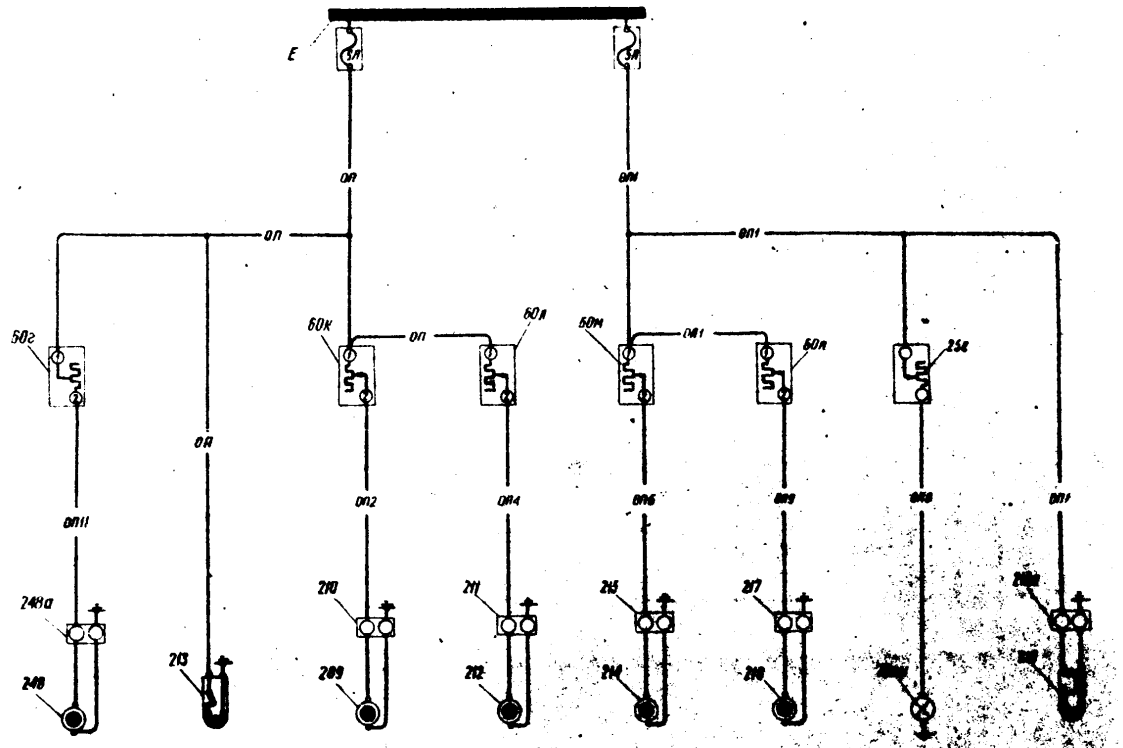

Fig. 136. Principal circuit diagram of the pilot's cabin illumination.

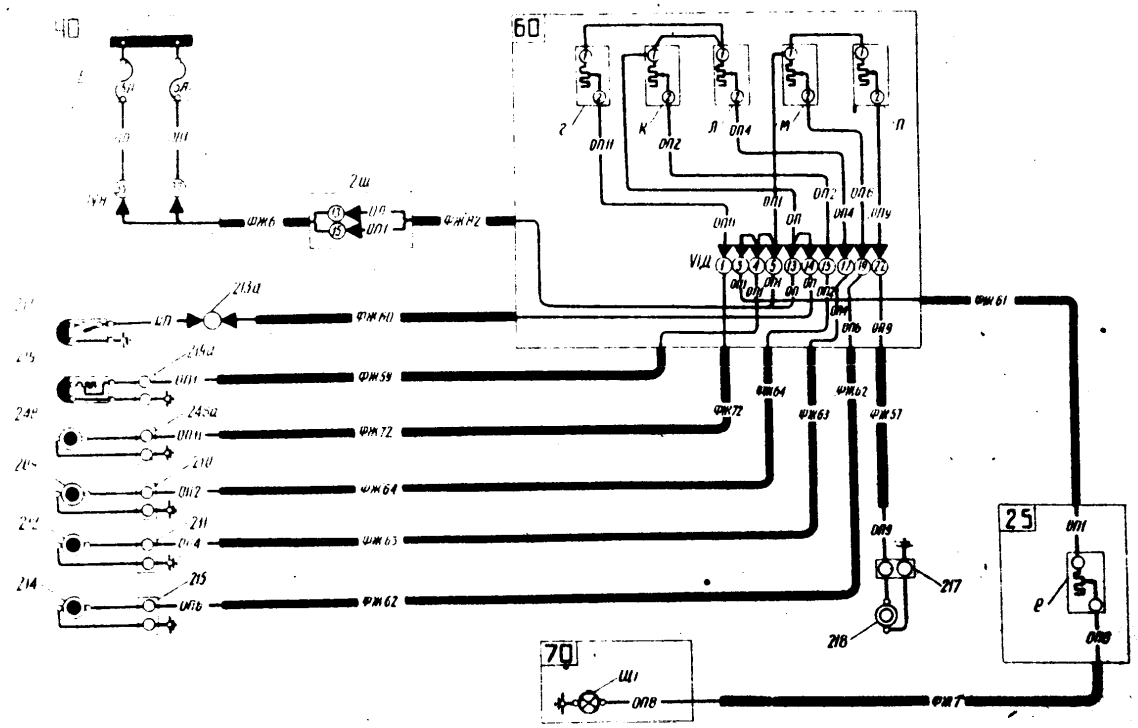

Fig. 138. Assembly diagram of the pilot's cabin illumination.

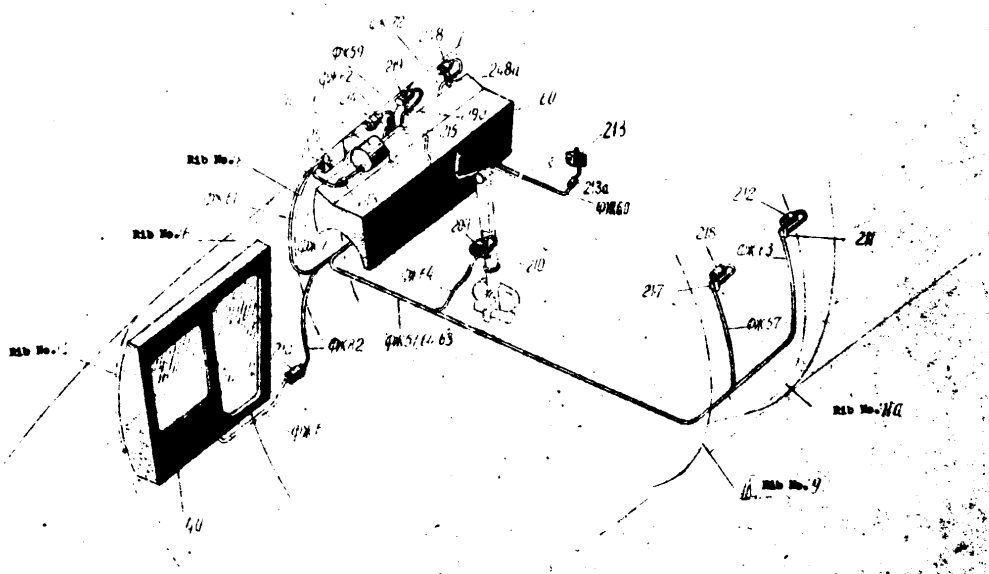

Fig. 139. Assembly diagram of the pilot's cabin illumination.

CIRCUIT DIAGRAM OF THE NAVIGATOR'S CABIN LIGHTING.

/Fig. 141, 142/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
20		Navig. right desk	1	Made by manufacturer	Navig. cabin, right board, between ribs 1 & 4
	c	Socket of sight lighting	1	47K	Navig. desk /right/
	y	Rheostat of sight YØ /from 5801, 3201, 4101/	1	PYØ-48	- " -
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs 4 & 6
	E	CDB bus bar	1	Dtto	CDB
	OW	Navig. cabin lighting net limit switch	1	A3C-5	-"-
	OWL	Dtto	1	A3C-5	-"-
	y	Rheostat of navig. CDB YØ	1	PYØ-48	-"-
	x	Navig. CDB YØ fitting	1	APYØOW-45	-"-
90		Navig. instr. board	1	Made by manufacturer	Navig. cabin, left board, between ribs No. 3 & 4
	3	Rheostat of compass lighting lamp / KM-11/	1	PMK-49	Navig. instr. board
	M	Navig. left desk lighting lamp rheostat	1	PYØ-48	- " -
	k	Aiming set lighting lamp rheostat	1	PYØ-48	- " -
	M	Dtto	1	PYØ-48	- " -
199		Navig. compass lighting lamp	1	From unit KM-11	Navig. cabin, right board, compass KM-11
200		Left desk lighting lamp junction block	1	73K	Navig. cabin, left board, rib No. [illegible]
201		Navig. left desk lighting lamp	1	APYØOW45	- " -
202		Aiming set lamp junction block	1	75K	Navig. [illegible] left [illegible] rib [illegible]

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1	2	3	4	5	6
203		Lining set lighting lamp	1	АРУФОШ-45	Navig. cabin, left board, rib No. 1
205		CDB lighting lamp	1	АРУФОШ-45	- " -
	a	Junction block /from 3401,2901,3704/	1	73K	Navig. cabin, right board, rib No. 4
206		Navig. cabin lamp	1	КЛСРК-45	Navig. cabin, right board, rib No. 3
207		Navig. lamp	1	КЛС-45	Navig. cabin rib No. 4
	a	Navig. lamp connector /from 3401, 2901, 3704/	1	ИР-1	- " -
		/from 5801, 3201, 4101/	1	АРУФОШ-48	Navig. cabin, right board, rib No. 1
	a	Junction block /from 5801, 3201, 4101/	1	73K	- " -
261		Navig. table lighting lamp	1	КЛСРК-45	Navig. cabin, left board, rib No. 2
	a	Junction block of navig. table lighting lamp	1	73K	- " -
II	A	Navig. right desk connector	1	ШР48П16НШ2	Navig. right desk
IV	A	CDB connector	1	ШР60П45НР2	CDB
IX	A	Navig. instr. board connector	1	ШР48П26НШ2	Navig. instr. board

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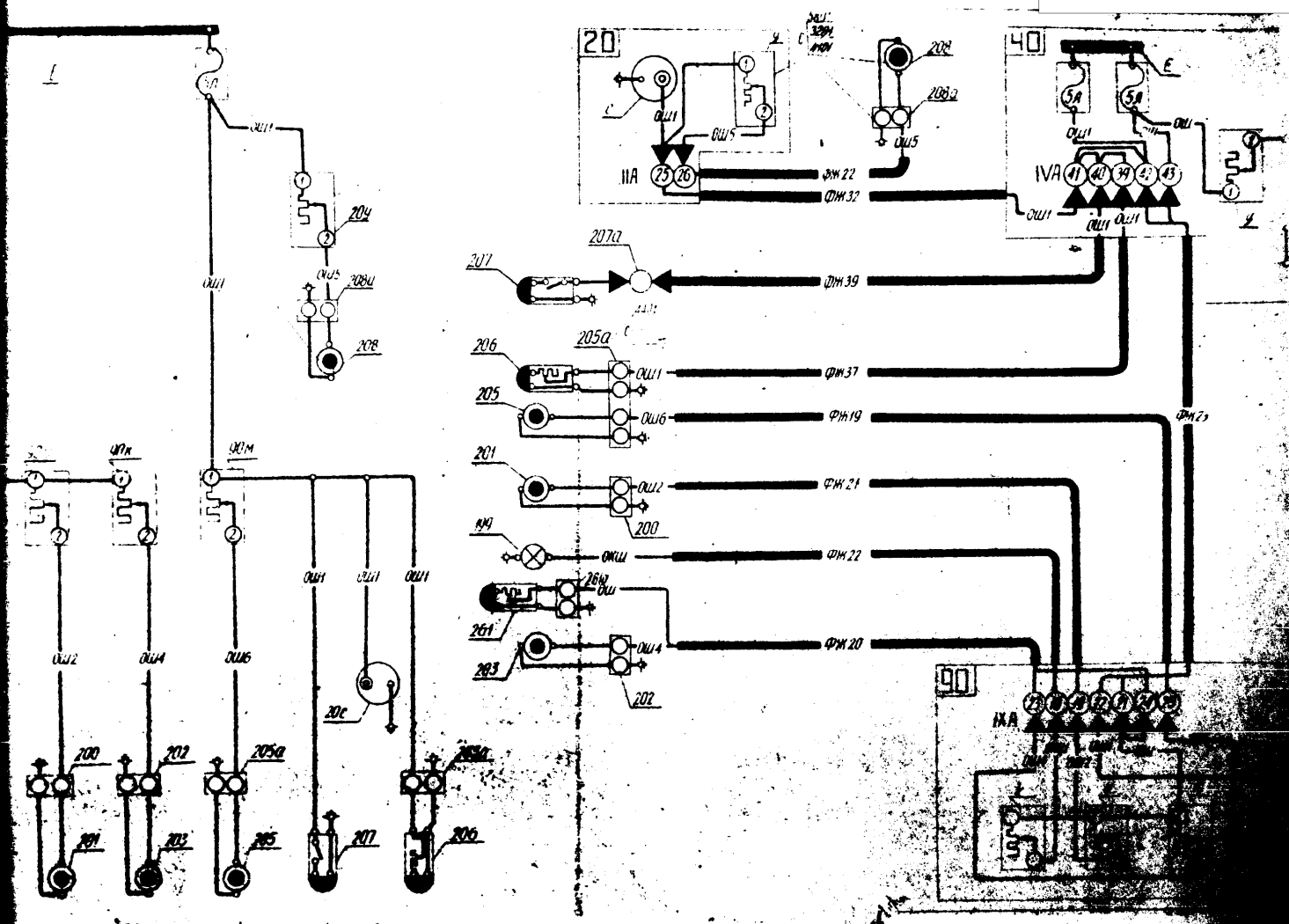

Fig. 141. Principal and assembly diagram of the navigator's cabin illumination.

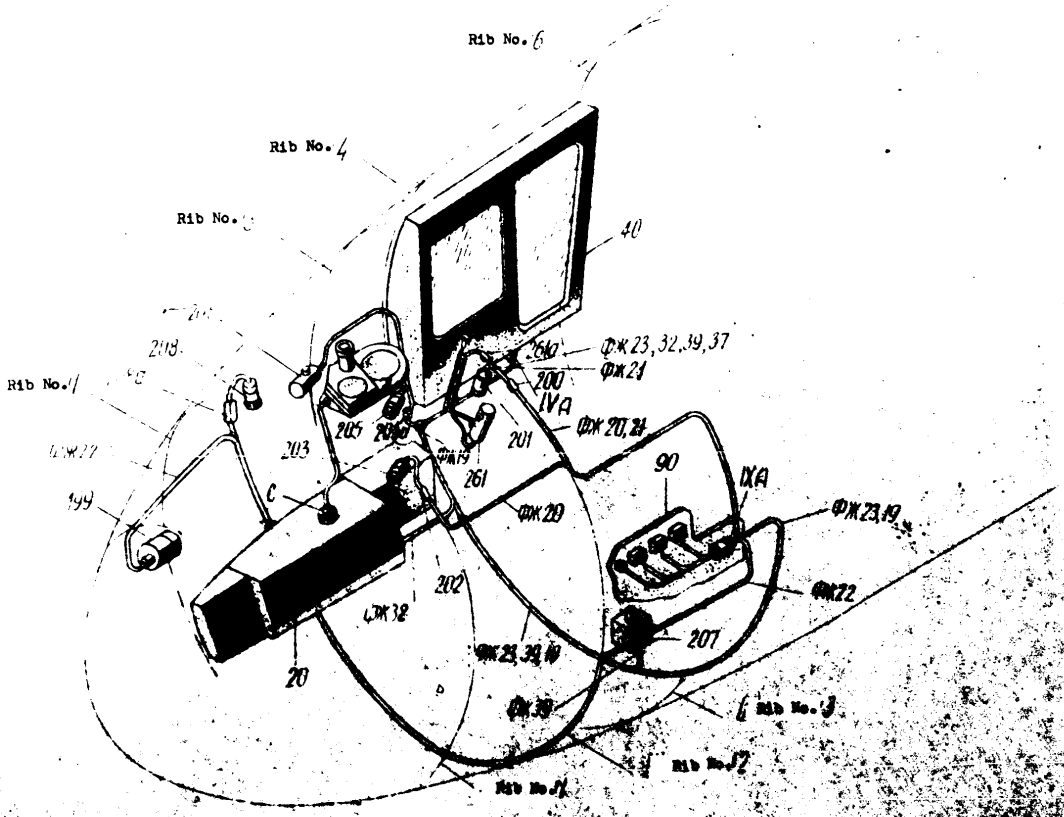

Fig. 142. Assembly diagram of the navigator's cabin illuminating

CIRCUIT DIAGRAM OF THE GUNNER'S CABIN LIGHTING.

/Fig. 143, 144/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
80		Gunner's right desk	1	Made by manufacturer	Gunner's cabin, right board, between ribs No. 42 & 45
		Gunner's desk fluorescent lamp fitting rheostat	1	PYØO-48	Gunner's right desk
	a	Dtto, left desk	1	PYØO-48	- " -
	b	Gunner's right desk bus bar	1	Made by manufacturer	- " -
	0C	Gunner's cabin lighting net limit switch	1	A3C-5	- " -
131		Gunner's cabin lamp	1	KJCPK-45	Gunner's cabin, right board, rib No. 44
	a	Gunner's cabin lamp junction block	1	73K	- " -
182		Gunner's right desk lamp	1	APYФOW-45	- " -
183		Gunner's left desk lamp	1	APYФOW-45	Gunner's cabin, left board, rib No. 45
184		Gunner's right desk lamp junction block	1	73K	Gunner's cabin, right board, rib No. 44
185		Dtto, left desk	1	73K	Gunner's cabin, left board, rib No. 45
188		Gunner's cabin lamp	1	KJCPK-45	Gunner's cabin, left board, rib No. 45
	a	Gunner's cabin lamp junction block	1	75K	- " -
VIII		Gunner's & right desk connector	1	WP60П31HW1	Gunner's right desk

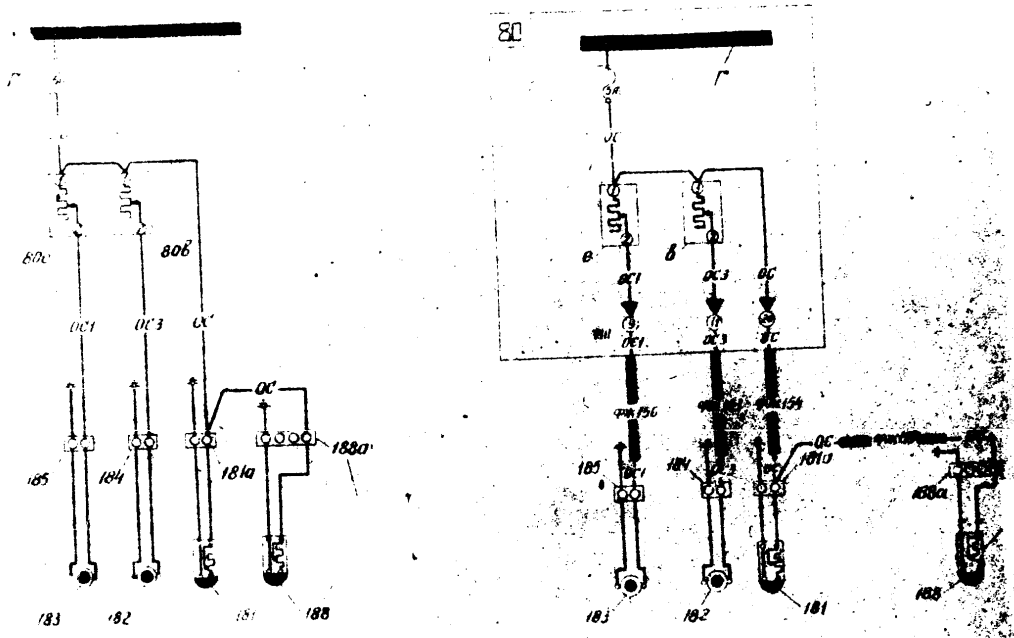

Fig. 143. Principal and assembly diagram of the gunner's cabin illumination.

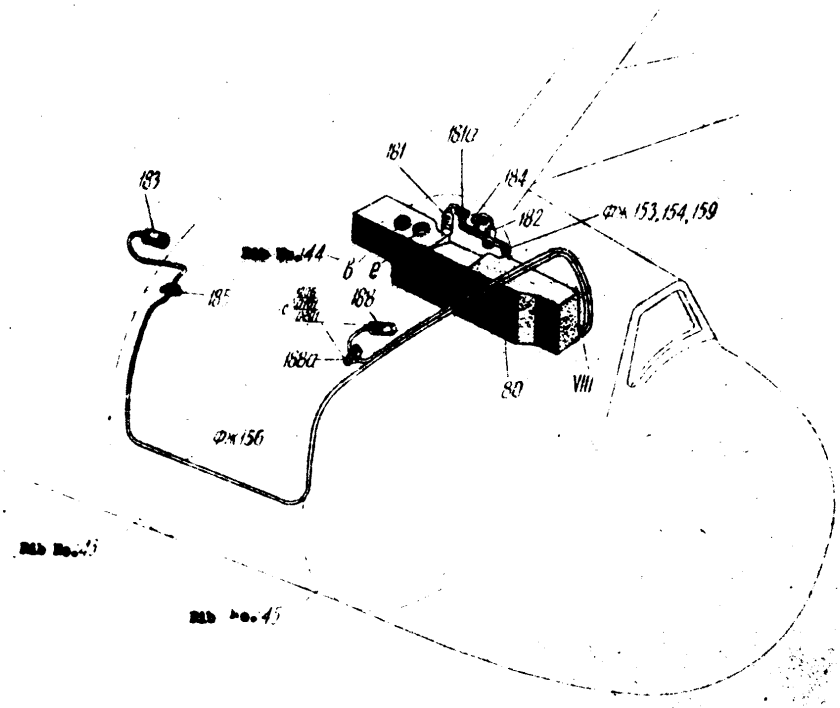

Fig. 144. Assembly diagram of the gunsight cabin illumination.

CIRCUIT DIAGRAM OF THE TAIL COMPARTMENT LIGHT

/Fig. 146, 147/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	CDB bus bar	1	Ditto	CDB
	P	Fuselage lighting net limit switch	1	A3C-5	-"-
195		Tail compartment ceiling lamp fitting switch	1	B-45	Fuselge, rib No. 40
196		Tail compartment ceiling lamp fitting	1	П-39	Fuselage, rib No. 37
198		Portable lamp connection socket in tail compartm.	1	47K	Fuselage, rib No. 40
278		Portable lamp socket in nose of fuselage	1	47K	Fuselage, left board, rib 12
318		Lighting fitting, compartment ПСБН-М /from 4301, 2201, 2805/	1	П-39	C H-M compartm., rib No. 12
319		Lighting fitting switch compartment ПСБН-М	1	B-45	- " -
IV	A	CDB connector	1	ШРБОП45НГ2	CDB
XII	B	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor

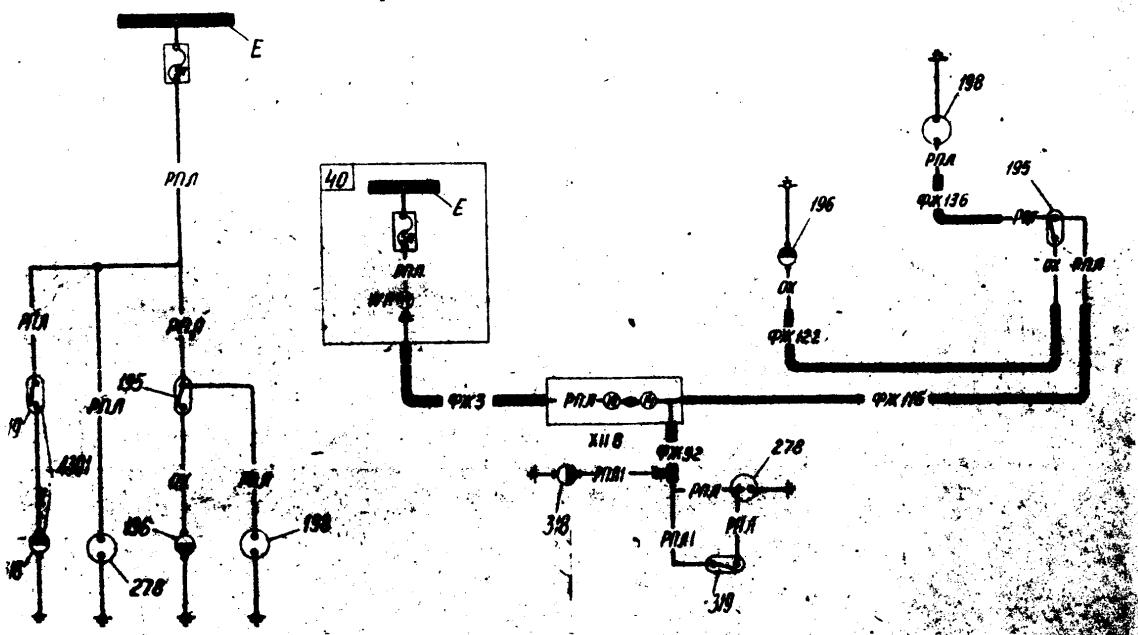

Fig. 146. Principal and assembly diagram of the test [illegible] illumination.

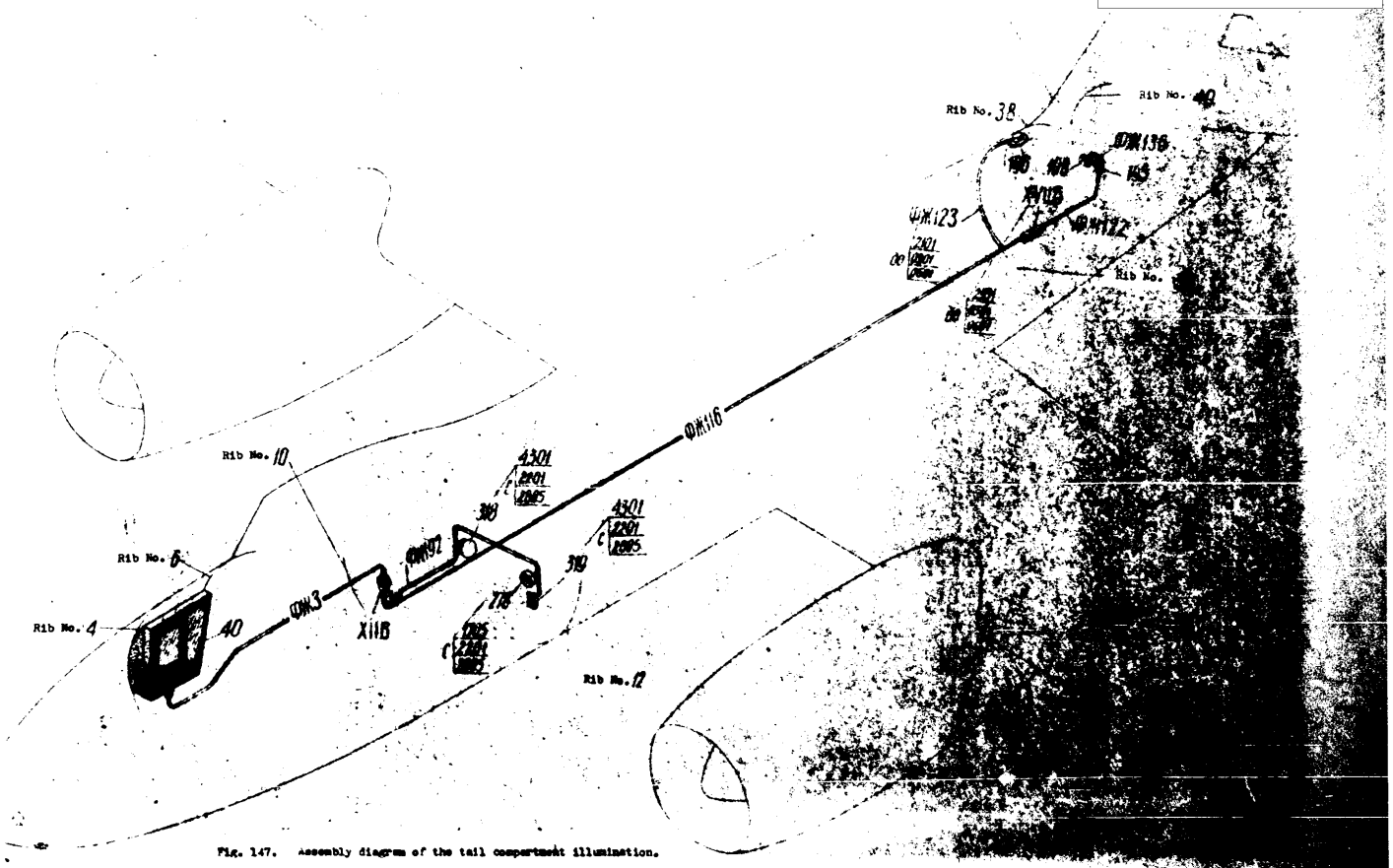

Fig. 147. Assembly diagram of the tail compartment illumination.

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CIRCUIT DIAGRAM OF THE POSITION LIGHTS.

/Fig. 148, 149/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs 4 & 6
	E	CDB bus bar	1	Dtto	CDB
	AHO	Position light net limit switch	1	A3C-5	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
		Position light switch	1	B-45	Pilot's right desk
131		Tail position light	1	XC-39	Bottom turret
	a	Tail position light junction block	1	73K	- " -
135		Left position light	1	6AHO-45	Left wing
	a	Left position light junction block	1	48 K	- " -
136		Right position light	1	6AHO-45	Right wing
	a	Right position light junction block	1	48K	- " -
150		Left CDS	1	Made by manufacturer	Fuselage, [illegible] board, between ribs 20 & [illegible]
160		Right CDS	1	Dtto	Fuselage, [illegible] board, between ribs No. 20 [illegible]
IV		CDB connector	1	ШРБ5П31НР3	CDB
VI	Д	Pilot's right desk connector	1	ШР48П26НШ2 дк	Pilot's right desk
XII	Н	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
XV	A	Left CDS connector	1	ШР60П47НР2	Left CDS
	N	Left CDS connector	1	ШР48П26НШ2	Left CDS
XVI	A	Right CDS connector	1	ШР60П47НР2	Right CDS
	E	Dtto	1	ШР60П47НР2	- " -
	З	Dtto	1	ШР48П26НШ2	- " -
	И	Dtto	1	ШР60П46АР3	- " -
XXII	Б	Rear cabin hermetic connector	1	ШРГ-23	Rear [illegible]
2	Ш	Navig. cabin connector	1	ШР48П26НШ2	[illegible] rib [illegible]
XXIII		Turret hermetic connector	1	ШРГ-23	Turret [illegible] rib No. 4

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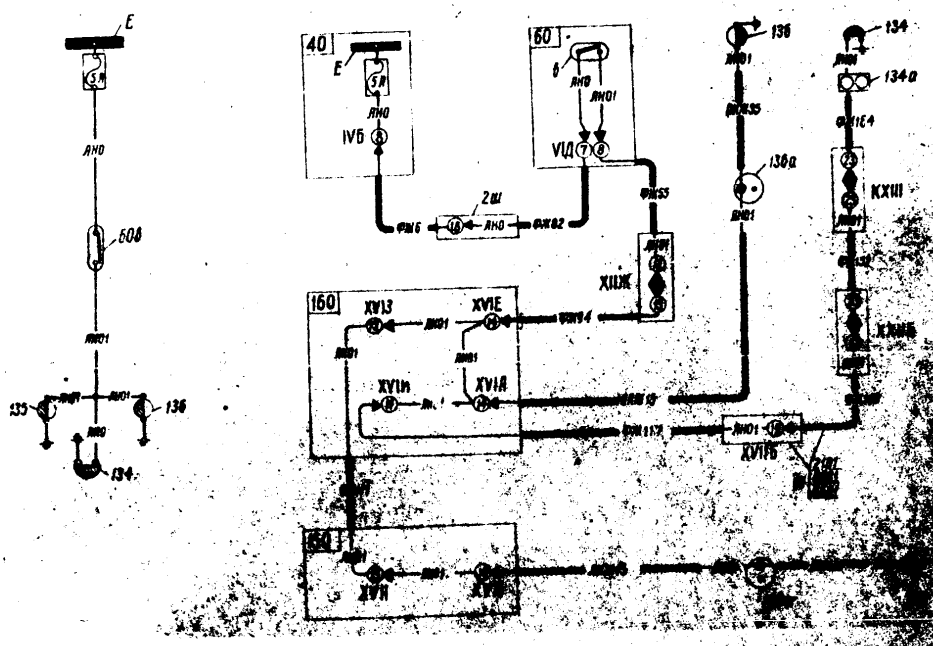

Fig. 148. Principal and assembly diagram of the position lights.

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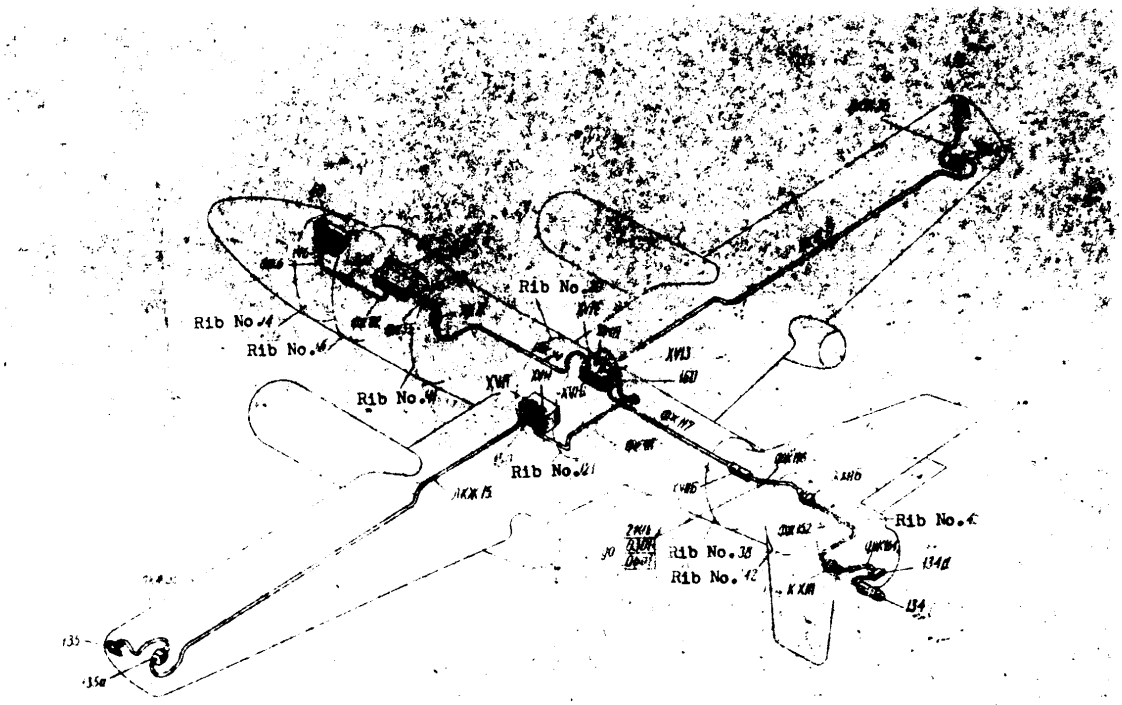

Fig. 149. Assembly diagram of the position lights.

CIRCUIT DIAGRAM OF THE FORMATION LI

/Fig. 150, 151/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. [illegible] right [illegible] between [illegible] No. 4 & [illegible]
	E	[illegible] bus bar	1	Dtto	CDB
	CO	Formation light net [illegible] switch	1	ASC-5	-"-
60		Pilot's right desk	1	Made by manufacturer	Pilot's [illegible] right [illegible] between [illegible] No. 8 & [illegible]
	a	Top formation light switch	1	B-45	Pilot's [illegible] desk
	ж	Bottom formation light switch	1	ALHAW-4S	- " -
141		Left wing top formation light	1	ACCO-45	Left [illegible] ween [illegible] 33
142		Right wing top formation light	1	ACCO-45	Right [illegible] ween [illegible] 32
143		Fuselage formation light /top, rear/	1	ACCO-45	Fuse[illegible] No. [illegible]
150		Left CDS	1	Made by manufacturer	[illegible]
151		Rear bottom fuselage formation light	1	ACCO-45	[illegible]
152		Right wing bottom formation light	1	ACCO-45	[illegible]
150		Right CDS	1	Made by manufacturer	[illegible]
258		Left wing bottom formation light	1	ACCO-45	[illegible]
259		Front top fuselage formation light	[illegible]	[illegible]	[illegible]
260		Front bottom fuselage formation light	[illegible]	[illegible]	[illegible]

1	2	3	4	5	6
XVIII		Front formation light connector	1	75K	Left [illegible] rib No. [illegible]
IV	В	CDS connector	1	ШРЗЗП34НГ3	CDS
VI	Д	Pilot's right desk connector	1	ШР48П26НШ2	Pilot's [illegible] desk
XII		Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's [illegible] floor
XV	А	Left CDS connector	1	ШР60П43НГ2	Left CDS
	Н	Dtto	1	ШР48П26НШ2	-
XVI	А	Right CDS connector	1	ШР60П43НГ2	Right CDS
	Е	Dtto	1	ШР60П43НГ2	-
	Ж	Dtto	1	ШР60П34НШ4	-
	И	Dtto	1	ШР40П46НГ3	-
XXI		Formation light and indication light connector	1	ШР20ПК33Г6	Fuselage [illegible] No. 2
2	Б	Navig. cabin connector	1	ШР48П26НШ2	Navig. [illegible] right [illegible] rib No. [illegible]

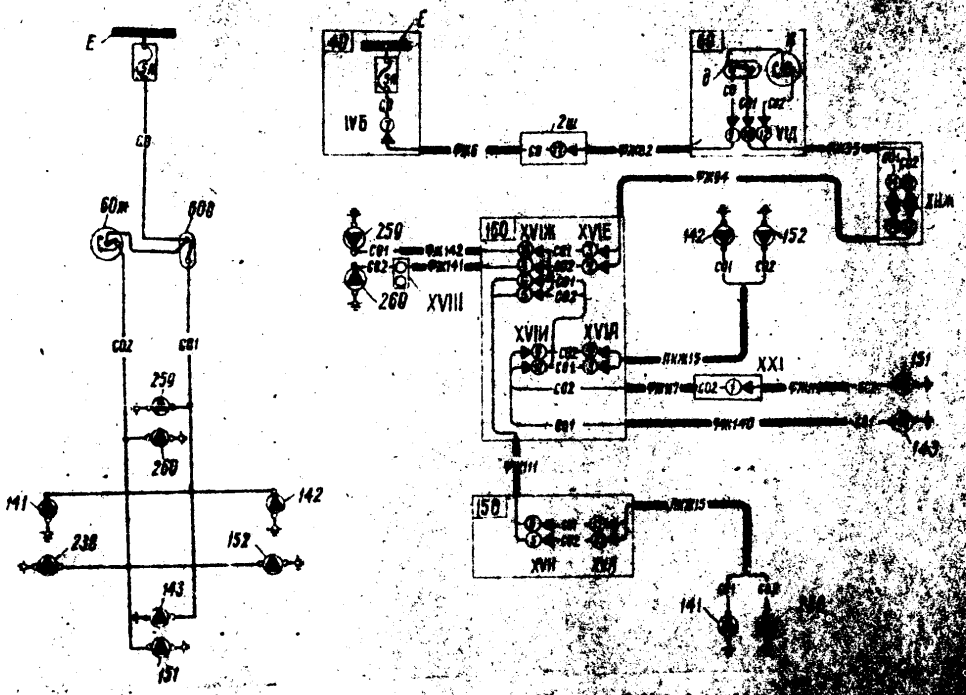

Fig. 150. Principal and assembly diagram of the [illegible]

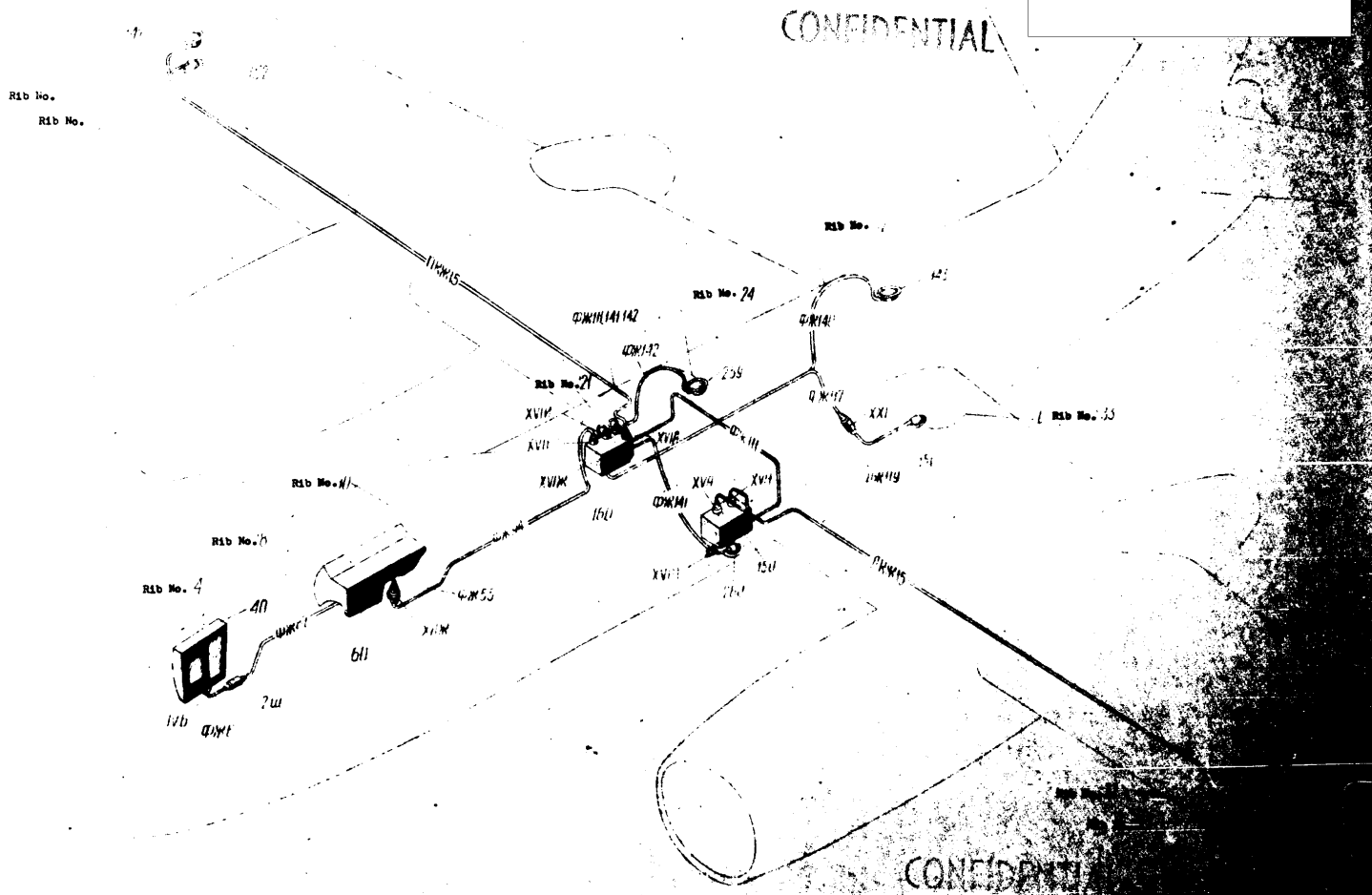

Fig. 15. Assembly diagram of the formation lights.

LANDING LIGHT SUPPLY CIRCUIT

/Fig. 154, 155/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
25		Landing light control board	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 9
	П	Left landing light control switch	1	ПП-45	Land. light control board
	Л	Dtto, left l. light	1	ПП-45	- " -
	Я	Landing light switch	1	ЗВ-45	- " -
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	Б	Navig. CDB bus bar	1	Dtto	Navig. CDB
	Ф3	Left landing light control net limit switch	1	АЗС-5	- " -
	Ф4	Right landing light control net limit switch	1	АЗС-5	- " -
69		Left landing light	1	ЛФСВ-45	Left nacelle
100		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs 20 & 21
	А	Left CDS bus bar	1	Dtto	Left CDS
	Ф15	Left landing light fuse	1	ИП-30	-"-
160		Right CDS	1	Made by manufacturer	Fuselage, right board, between ribs 20 & [illegible]
	Б	Right CDS bus bar	1	Dtto	Right CDS
	Ф16	Right landing light fuse	1	ИП-30	-"-
233		Right landing light	1	ЛФСВ-45	Right n[illegible]
315		Left landing light switching contactor	1	К-50Д	Fuselage [illegible] board [illegible]
316		Dtto, right landing light	1	К-50Д	[illegible]
2	Ш	Navig. cabin connector	1	ШР4ВВ26Ш[illegible]	[illegible]
IV	В	CDB connector	1	ШР55П [illegible]	[illegible]
XII	Ж	Pilot's cabin hermetic connector	1	ШРП-2[illegible]	[illegible]
	Р	Dtto	1	Ш[illegible]	[illegible]
	Т	Dtto	1	Ш[illegible]	[illegible]
XV	А	Left CDS connector	1	[illegible]	[illegible]
	Б	Dtto	1	[illegible]	[illegible]
	Д	Dtto	1	[illegible]	[illegible]

1	2	3	4	5	6
XVI	A	Right CDS connector	1	WPC0N47HF2	Right CDS
	B	Dtto	1	WPY4N2BHW4	- " -
	E	Dtto	1	WPL0N47HF2	- " -
XXXVII					
	A	Left nacelle connector	1	WPL0N47HW2	Left nacelle, right board, between ribs No. 6 & 7
XXXVII					
	A	Right nacelle connector	1	WPL0N47HW2	Right nacelle, left board, between ribs No. 6 & 7

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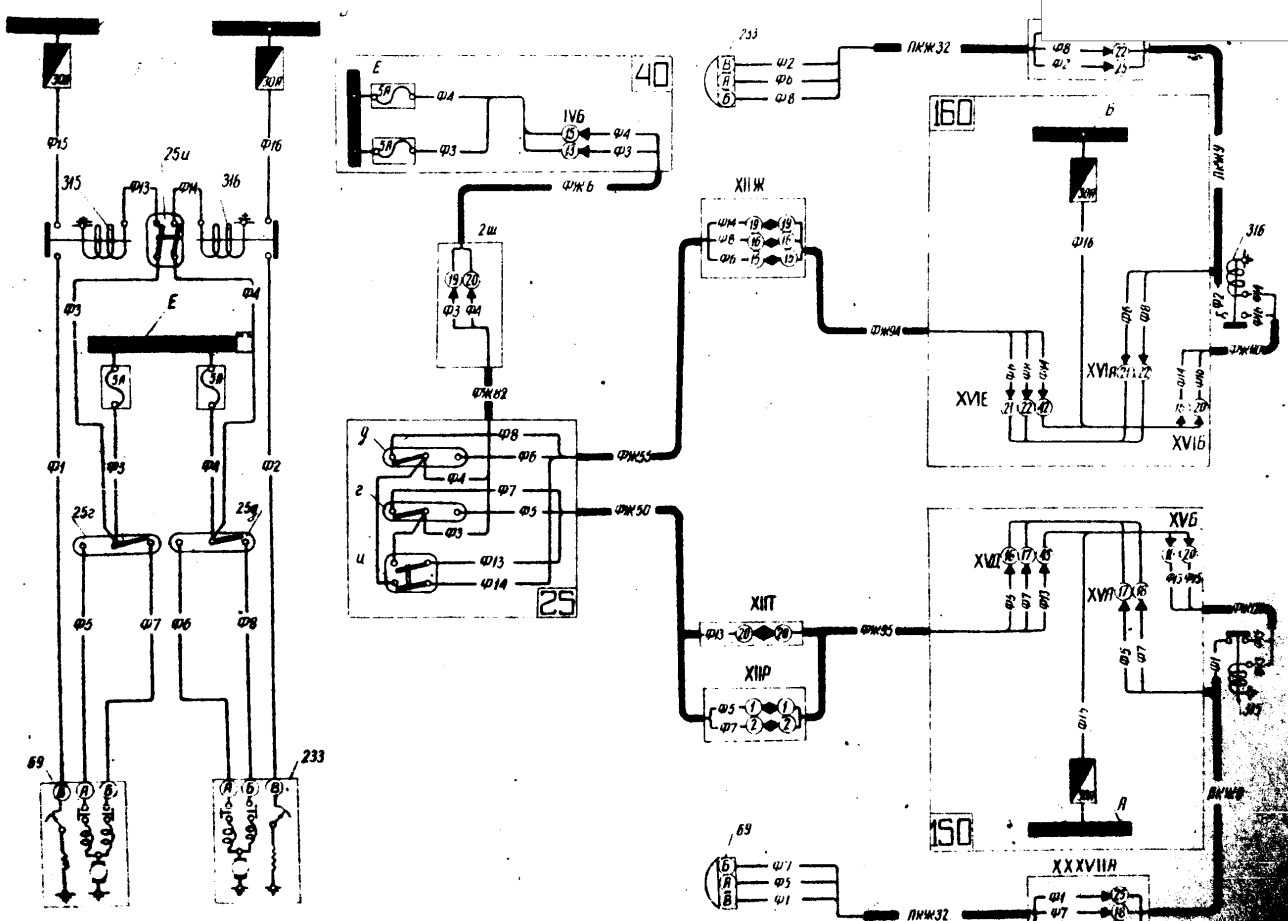

Fig. 154. Principal and assembly diagram of the landing light power supply.

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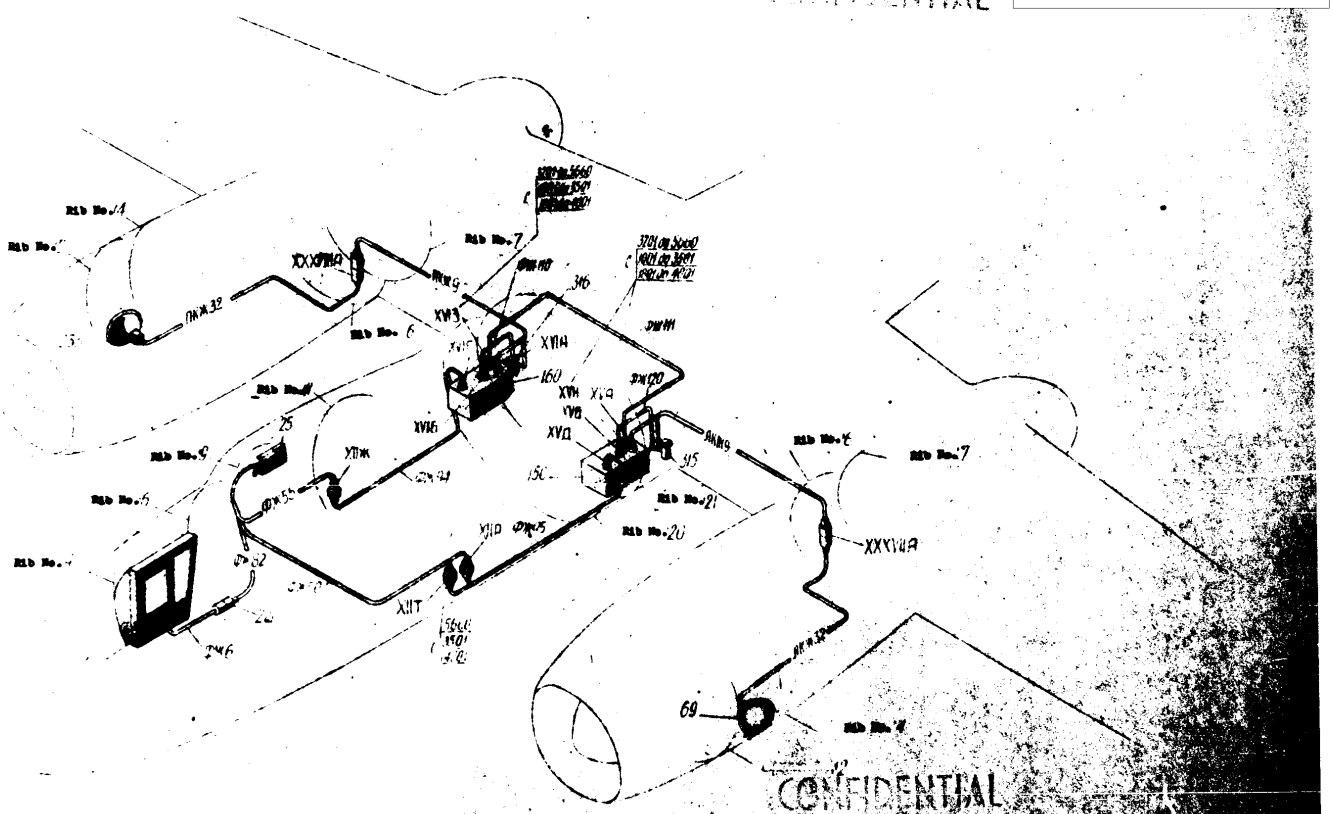

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Fig. [illegible]. Assembly diagram of the landing light [illegible] [illegible]

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CIRCUIT DIAGRAM OF THE SIGNALLING

/Fig. 157, 158/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
20		Navig. right desk	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 1 & 4
	а	Upper signalling flare firing button	1	ПУСП-28	Navig. right desk
	б	Dtto, middle flares	1	ПУСП-28	- " -
	в	Dtto, bottom flares	1	ПУСП-28	- " -
40		CDB of navigator	1	Made by manufac-	Navig. cabin, right board between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	Navig. CDB
	CP12	Signalling flare firing system net limit switch	1	АЗС-5	- " -
153		Top signalling flare casing	1	ЭКСР-46	Fuselage, right board, between ribs 11 & 12
154		Central signalling flare casing	1	ЭКСР-46	- " -
163		Bottom signalling flare casing	1	ЭКСР-46	- " -
mII	A	Navig. right desk connector	1	[illegible]	Navig. [illegible] desk
	б	Dtto	1	74K	- " -
IV	б	CDB connector	1	[illegible]	CDB
XII	б	Pilot's cabin hermetic connector	1	[illegible]	[illegible]

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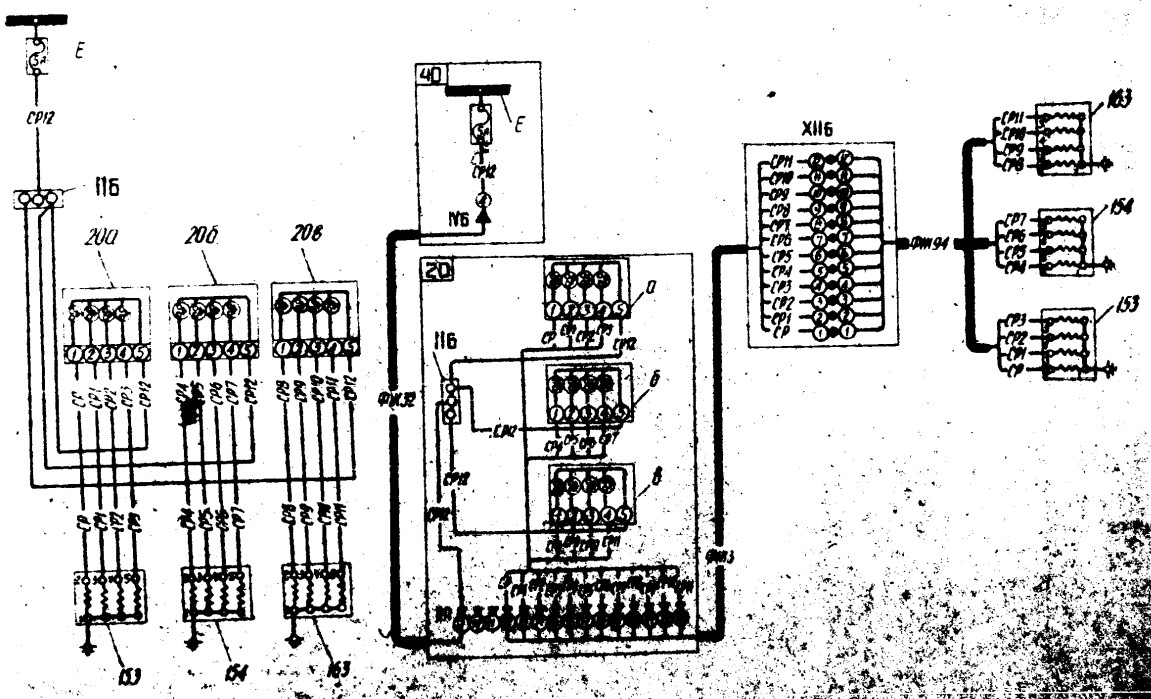
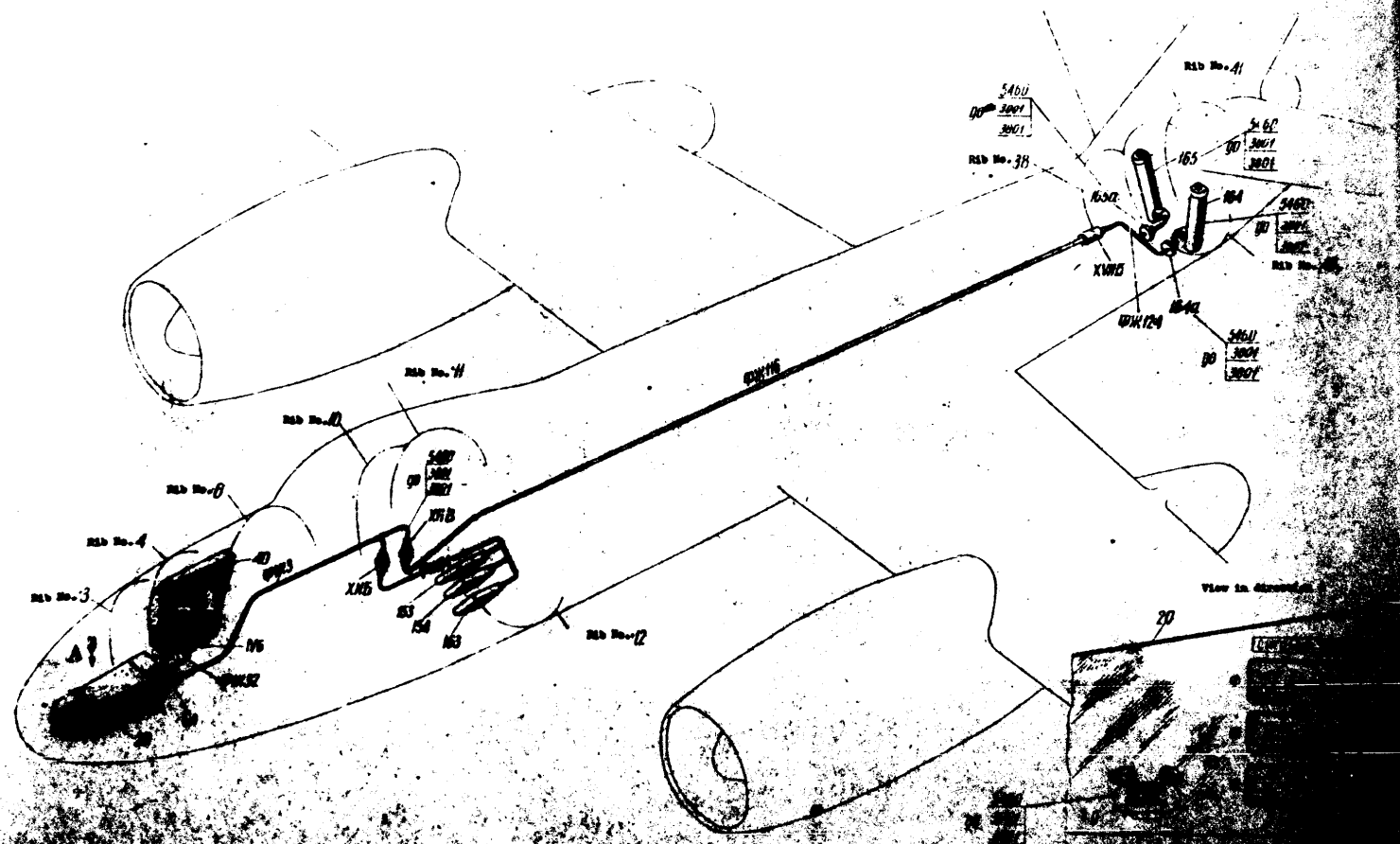


Fig. 137. Schedule and assembly diagram of the [illegible] system.



LANDING GEAR WARNING SYSTEM.

The position of the landing gear is indicated by colour indications: retracted - by three red pilot lamps, ready for landing, by three green pilot lamps. The pilot lamps are placed on the pilot's instrument board.

Besides this, the retracted position of the landing gear is indicated by means of a sirene 35m.

When the landing gear is in position for landing, the limit switches 122, 123, 127, which close the circuits of the green pilot lamps, are pushed.

When the landing gear is retracted, the limit switch 126 and the button switches 124, 125, which close the circuit of the red pilot lamps, are pushed.

To prevent tiring of the sight of the pilot, the red pilot lamps can be switched off by means of switch 70M.

If the power of the engines is decreased when the landing gear is retracted /both engines simultaneously/, a sirene is switched on automatically, when the revolutions of the engines fall to 6000 rev/min.

 1-HUM

LANDING GEAR WARNING SYSTEM.

/Fig. 159, 160, 161/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 11
	H_1	Button switch of accoustic landing gear indication	1	BK-2-140A-1	Pilot's left desk
	H_1	Landing gear indication sirene	1	C-1	- " -
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	Navig. CDB
	C	Landing gear warning system limit switch	1	ASC-5	Navig. CDB
70		Pilot's instr.board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	e	Left la. gear position indicating lamp	1	CЛЦ-51	Pilot's instr. board
	[illegible]	Dtto	1	CЛЦ-51	- " -
	[illegible]	Nose gear position indicating lamp	1	CЛЦ-51	- " -
	[illegible]	Dtto	1	CЛЦ-51	- " -
	k	Right landing gear position indicating lamp	1	CЛЦ-51	- " -
	[illegible]	Dtto	1	CЛЦ-51	- " -
	H	Landing gear indication system switch	1	ПП-45	- " -
122		Right landing gear limit switch	1	BK-44	Right nacelle, rib No. 9
123		Left landing gear limit switch	1	BK-44	Left nacelle, rib No. 9
124		Right landing gear push-button switch	1	BK2-142	Right nacelle, rib No. [illegible]
125		Left landing gear push button switch	1	BK2-142	Left nacelle, rib No. [illegible]
126		Nose gear limit switch	1	BK-44	Fuselage, rib No. [illegible]
127		Nose gear limit switch	1	BK-44	[illegible]
150		Left CDS	1	Made by manufacturer	[illegible]

 JM

LANDING GEAR WARNING SYSTEM.

/Fig. 159, 160, 161/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 11
	u_1	Button switch of accoustic landing gear indication	1	ЗК-2-140А-1	Pilot's left desk
	u_1	Landing gear indication sirene	1	С-1	- " -
40		Navigator's CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	Navig. CDB
	C	Landing gear warning system limit switch	1	АЗС-5	Navig. CDB
70		Pilot's instr.board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	e	Left la. gear position indicating lamp	1	СЛЦ-51	Pilot's instr. board
	ж	Dtto	1	СЛЦ-51	- " -
	ч	Nose gear position indicating lamp	1	СЛЦ-51	- " -
	ц	Dtto	1	СЛЦ-51	- " -
	k	Right landing gear position indicating lamp	1	СЛЦ-51	- " -
	м	Dtto	1	СЛЦ-51	- " -
	н	Landing gear indication system switch	1	ПП-45	- " -
122		Right landing gear [redacted] limit switch	1	ВК-44	Right [redacted] rib [redacted]
123		Left landing gear [redacted] limit switch	1	ВК-44	Left [redacted] rib [redacted]
124		Right landing gear push-button switch	1	ВК2-142	[redacted]
125		Left landing gear push button switch	1	ВК2-142	[redacted]
126		Nose gear [redacted] limit switch	1	[redacted]	[redacted]
127		Nose gear limit switch	1	ВК-44	[redacted]
150		Left CDS	1	[redacted] turer	[redacted]

1	2	3	4	5	6
160		Right CDS	1	made by manufacturer	Fuselage, right board, between ribs 20 & 21
III	A	Pilot's left desk connector	1	ШР60П45НШ2	Pilot's left desk
IV	Б	CDB connector	1	ШР55П31НГ3	CDB
VII	Д	Pilot's instr. board connector	1	ШР60П47НШ2	Pilot's instr. board
XII	В	Pilot's cabin hermetic connector	1	ШРГ-28	Pilot's cabin floor
	Г	Dtto	1	ШРГ-23	- " -
	М	Dtto	1	ШРГ-23	- " -
	С	Dtto	1	ШРГ-23	- " -
XV	А	Left CDS connector	1	ШР60П47НГ2	Left CDS
	Д	Dtto	1	ШР60П47НГ2	- " -
	Н	Dtto	1	ШР48П26НШ2	- " -
XVI	А	Right CDS	1	ШР60П47НГ2	- " -
	Е	Dtto	1	ШР60П47НГ2	- " -
	З	Dtto	1	ШР48П26НШ2	- " -
XXXVII	A	Left nacelle connector	1	ШР60П47НШ2	Left nacelle right board, bet. r. 6 & 7
XXXVIII	A	Right nacelle connector	1	ШР60П47НШ2	Right nacelle left board, between ribs No. 6 & 7

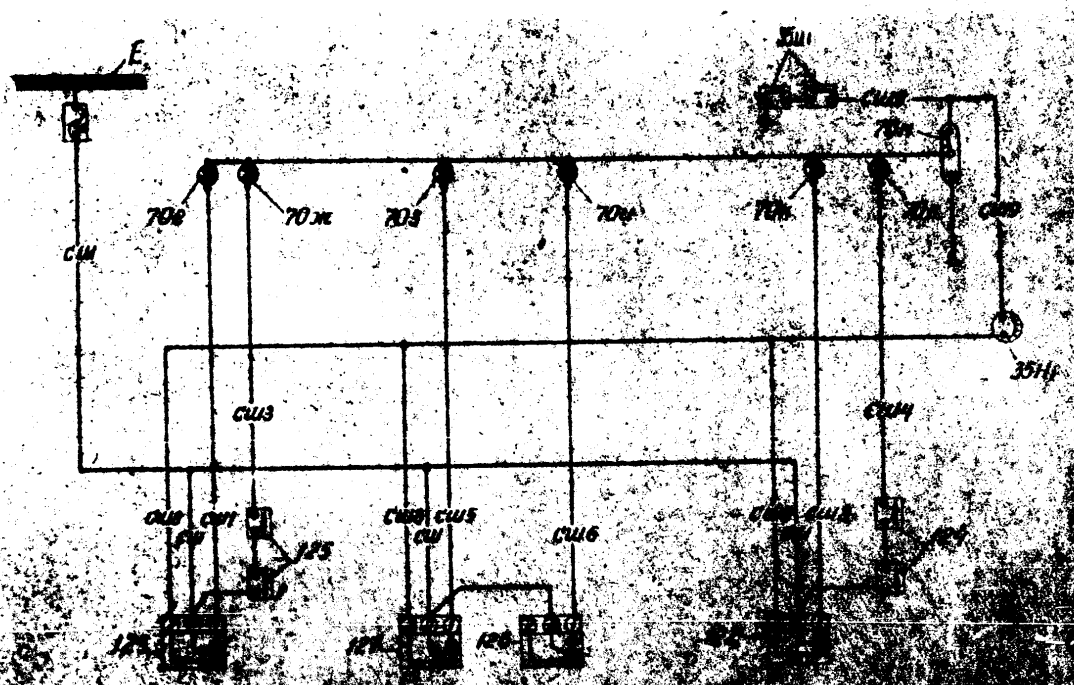


Fig. 18. Electrical circuit diagram of the [illegible]

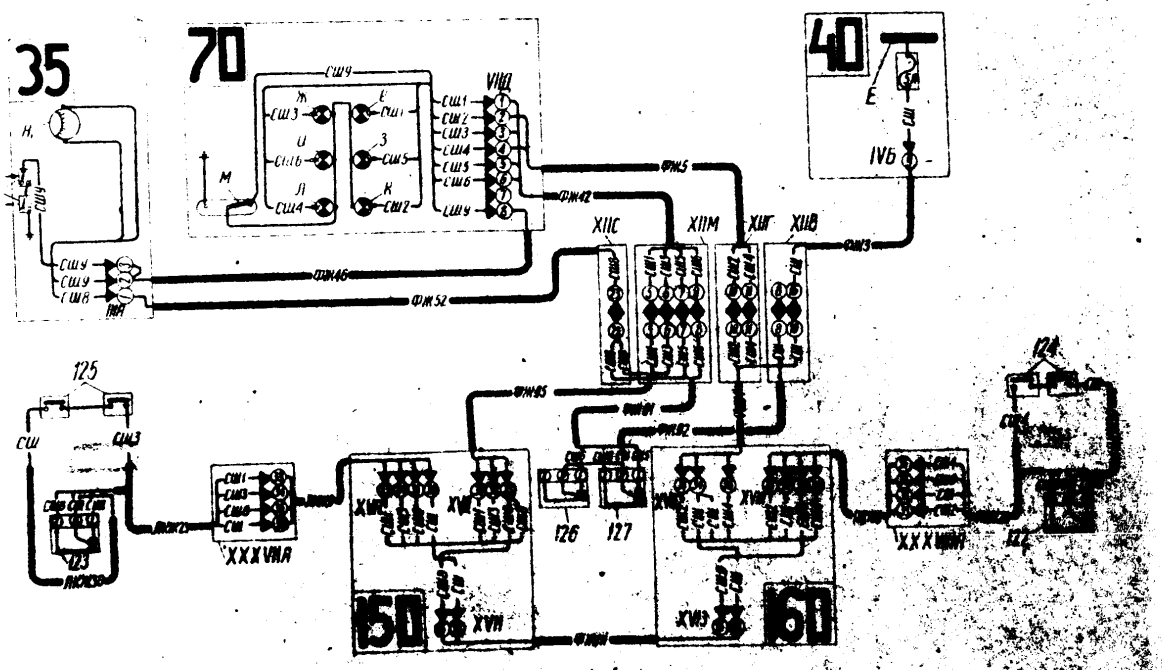


Fig. 160. Assembly diagram of the landing gear warning system.

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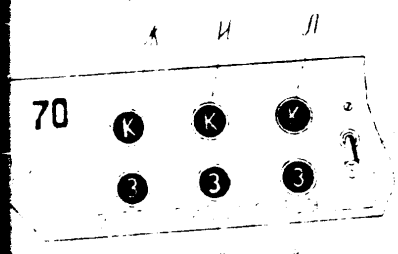
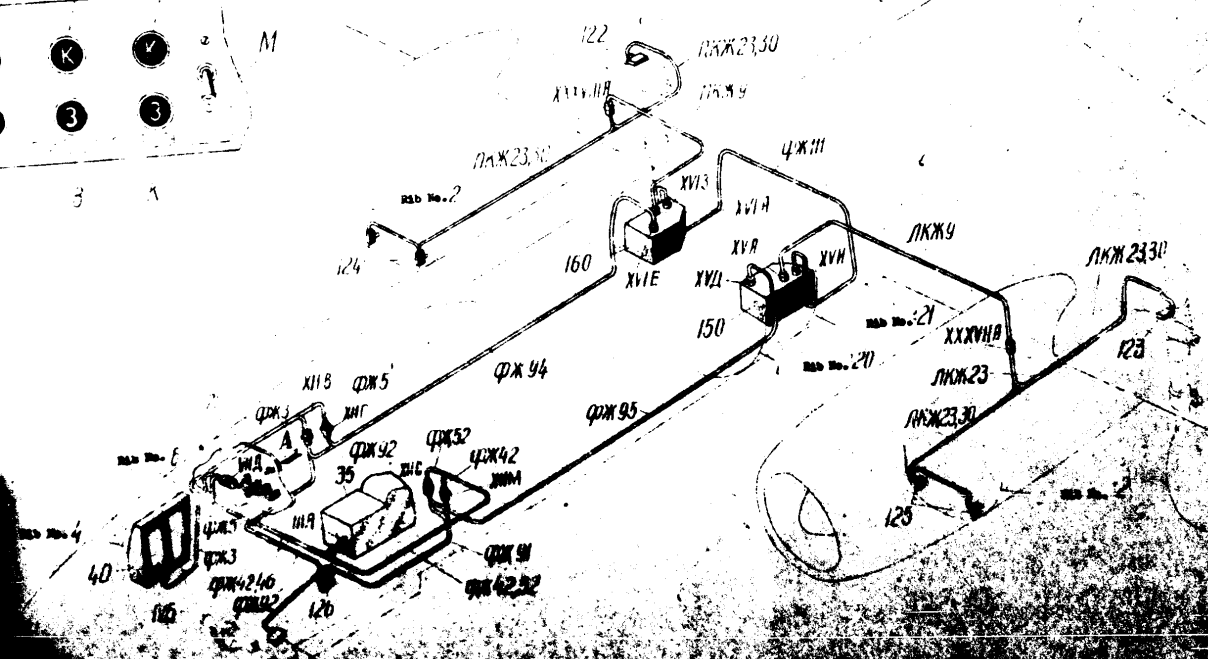
View in direction A





CIRCUIT DIAGRAM OF THE THREE C

/Fig. 162, 164, 165/

nNo. of pos.	No. of ind.	Name	No. of pie ces	Type of elem ent	Location
1	2	3	4	5	6
20		Navig. right desk	1	Made by manufac-turer	Navig. cabin, right board, between ribs No. 1 & 4
	3	Red button of navig. three colour indication	1	5KC	Navig. right desk
	и	Dtto, white button	1	5KC	- " -
	к	Dtto, green button	1	5KC	- " -
25		Landing lights control board	1	Made by manufac-turer	Pilot's cabin, right board, between ribs No. 8 & 9
	a	Red button of pilot's three colour indication	1	5KC	Landing lights control board
	б	Dtto, white button	1	5KC	- " -
	в	Dtto, green button	1	5KC	- " -
70		Pilot's instr. board	1	Made by manufac-turer	Pilot's cabin, rib No. 8
	a_1	Red lamp of pilot's three colour indication	1	СМ4-51	Pilot's instr. board
	$б_1$	Dtto, white lamp	1	СМ4-51	- " -
	$в_1$	Dtto, green lamp	1	СМ4-51	- " -
80		Gunner's right desk	1	Made by manufac-turer	Gunner's cabin, right board, between ribs No. 42 & 45
	Г	Gunner's right desk bus bar	1	Dtto	Gunner's right desk
	TC	Net limit switch, three colour indication	1	АЗОа5	- " -
90		Navig. instr. board	1	Made by manufac-turer	Navig. cabin, [illegible]
	a	Red lamp of navig. three colour indication	1	СМ4-51	[illegible]
	б	Dtto, white lamp	1	[illegible]	[illegible]
	в	Dtto, green lamp	1	[illegible]	[illegible]
100		Gunner's three colour indication board	1	[illegible]	[illegible]

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1	2	3	4	5	6
120	a	Green lamp of gunner's three colour indication	1	СЖ-51	Gunner's three colour ind. board
	б	Dtto, red lamp	1	СЖ-51	- " -
	в	Dtto, white lamp	1	СЖ-51	- " -
	г	Green button of gunner's three colour indication	1	5КС	- " -
	д	Dtto, red button	1	5КС	- " -
	е	Dtto, white button	1	5КС	- " -
II	А	Navig. right desk connector	1	ШР48П26НШ2	Navig. right desk
VII	А	Pilot's instr. desk connector	1	75К	Pilot's cabin, left board, rib No. 8
	Д	Pilot's instr. desk connector	1	ШР60П47НШ1	Pilot's instr. desk
VIII	А	Gunner's right desk connector	1	ШР40П31НШ1	Gunner's right desk
IX	А	Navig. right desk connector	1	ШР48П26НШ2	Navig. right desk
XII	Ч	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
XXII	Б	Rear cabin hermetic connector	1	ШРГ-23	Fuselage right board, rib No. 43

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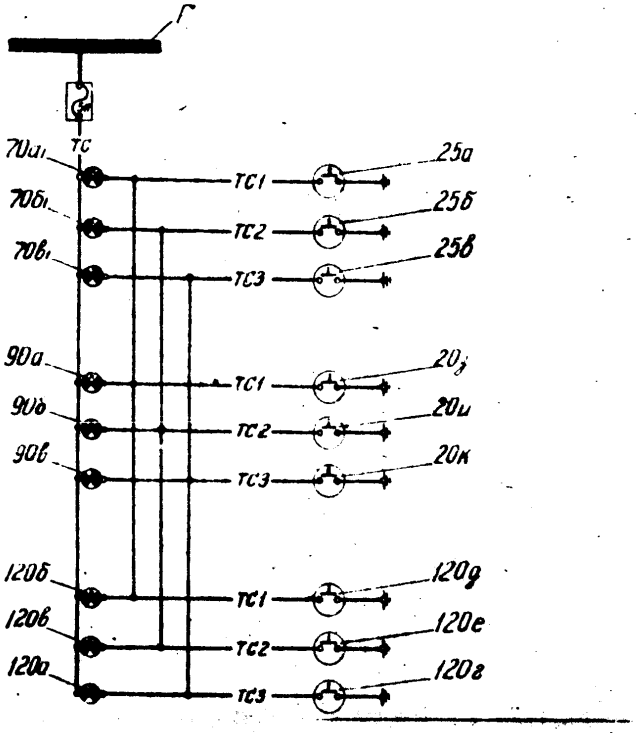

Fig. 162. Principal circuit diagram of the three colour indication.

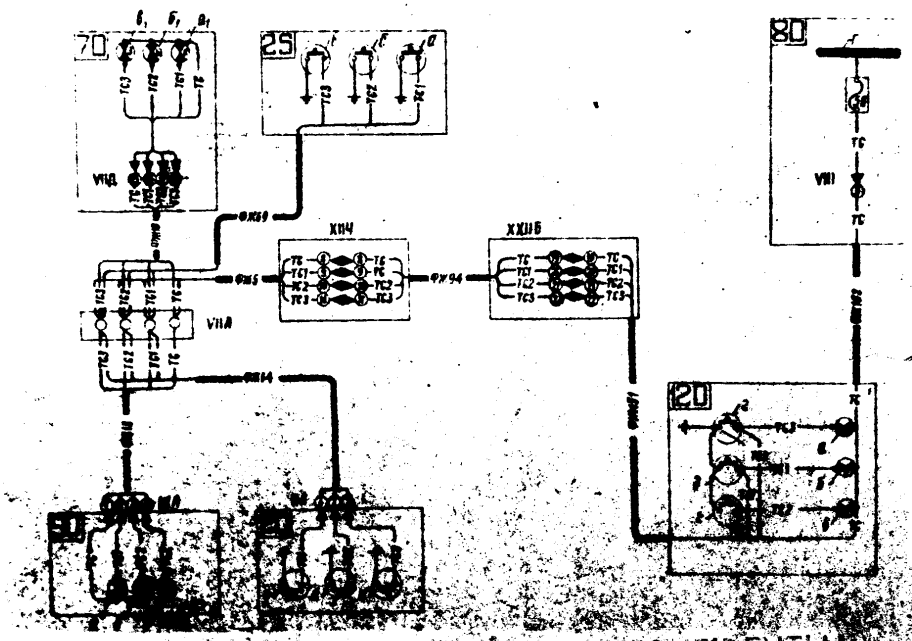

Fig. 164. Assembly diagram of the three-color [illegible]

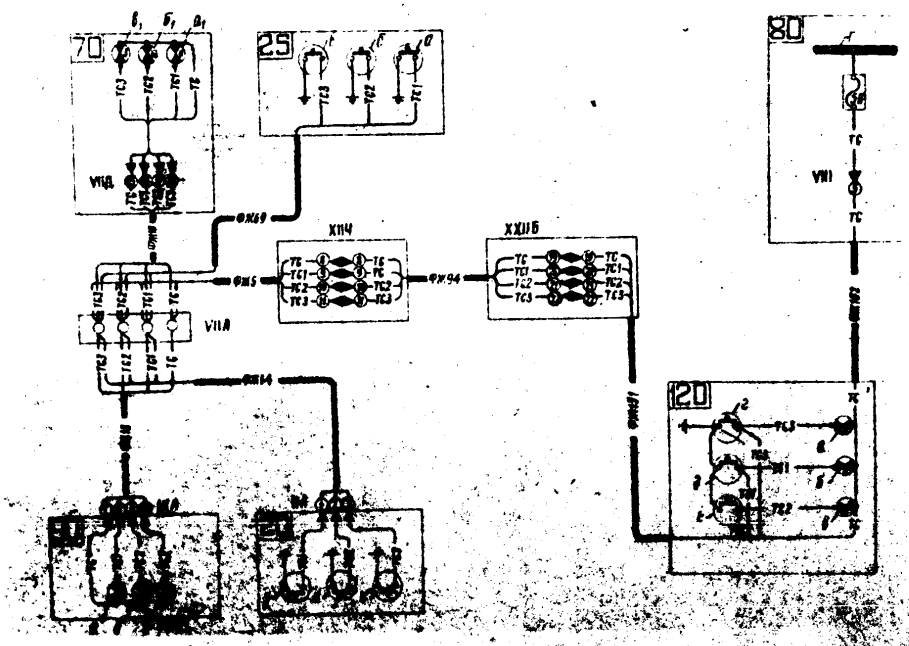

Fig. 164. Assembly diagram of the three colour indication.

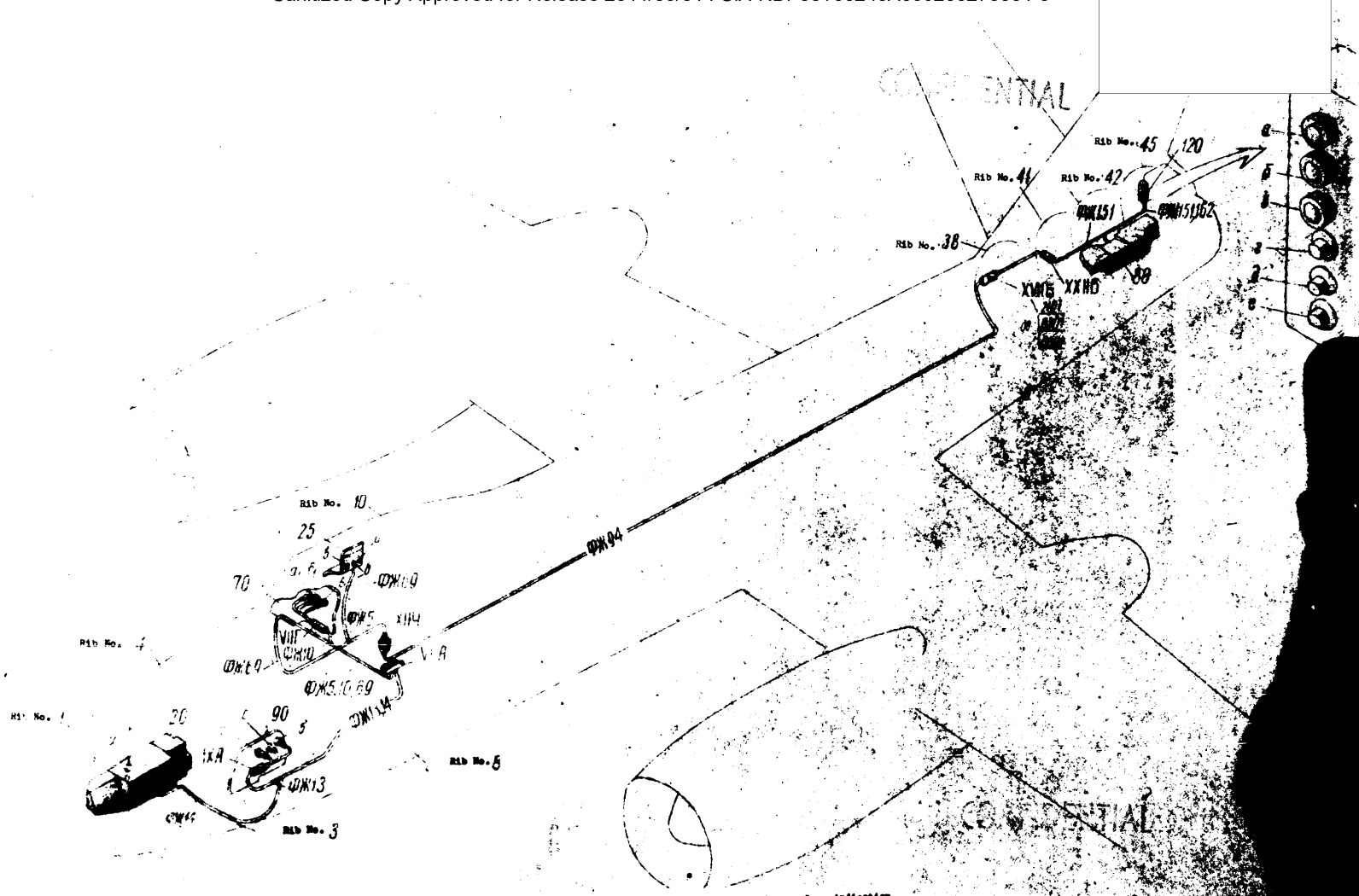

Fig. 165. Assembly diagram of the three colour indication.

[illegible] HEATING [illegible] CABIN VENTILATION [illegible]

The control mechanism of the heating system throtle valves.
/Fig. 166, 167/

The valves, opening the way to hot air into the heating system of the aeroplane, are controlled by means of electro-mechanisms MI-3 /[illegible], 260/.

The electro-mechanisms MI-3 are controlled by means of switches /330$_1$ and 329$_1$/.

The cabin air temperature regulation system.
/Fig. 168, 169, 170/

The valves for regulation of the hot and cool air are controlled by means of electro-mechanisms MPT-1 /93, 94/ with thermostat TPUK-3 /60H/.

The temperature, at which the instruments are to be kept, is adjusted on the scale of the thermostat /16 - 28°C/. When the temperature of the air in the cabin becomes below the wanted temperature, the thermostat opens the valves of the hot air by means of the electro-mechanisms MPT-1. If the temperature in the cabin rises, the thermostat opens the valves of the cool air.

DIAGRAM OF THE MECHANISM CONTROLLING THE VALVES OF THE DE-ICING SYSTEM.

/Fig. 166, 167/.

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board, between ribs 8 & 11
	P_1	Right wing de-icing system control switch	1	ПП-45	Pilot's left desk
	C_1	Dtto, left wing	1	ПП-45	- " -
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	CDB of navig.
	OEK	De-icing system control mechanism net limit switch	1	АЗС-5	- " -
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs 20 & 21
160		Right CDS	1	Dtto	Dtto, right board
249		Left wing de-icing system valve control mechanism	1	ТТ-3	Left nacelle, between ribs No. 3 & 4
250		Dtto, right wing	1	ТТ-3	Right nacelle, between ribs No. 3 & 4
I	Ш	Navig. cabin connector	1	ШРБ5П9Н6Г3	Navig. cabin, left board, rib No. 6
II	A	Pilot's left desk connector	1	ШРБ0П4БНШ2	Pilot's left desk
IV	B	CDB connector	1	ШРБ8П9НШ1	CDB
XII	T	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
	Ч	Dtto	1	ШРГ-23	- " -
XV	Б	Left CDS connector	1	ШРБ8П10НШ1	Left CDS
	Е	Dtto	1	ШРБ8П10НШ1	- " -
XVI	Б	Right CDS connector	1	ШРБ8П10НШ1	Right CDS
	А	Dtto	1	ШРБ8П10НШ1	- " -

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1	2	3	4	5	6
XXXVII	6	Left nacelle connector	1 WP48N26HW2		Left nacelle, right board, between ribs No. 6 & 7
XXXVIII	6	Right nacelle connector	1 WP48N26HW2		Right nacelle, left board, between ribs No. 6 & 7

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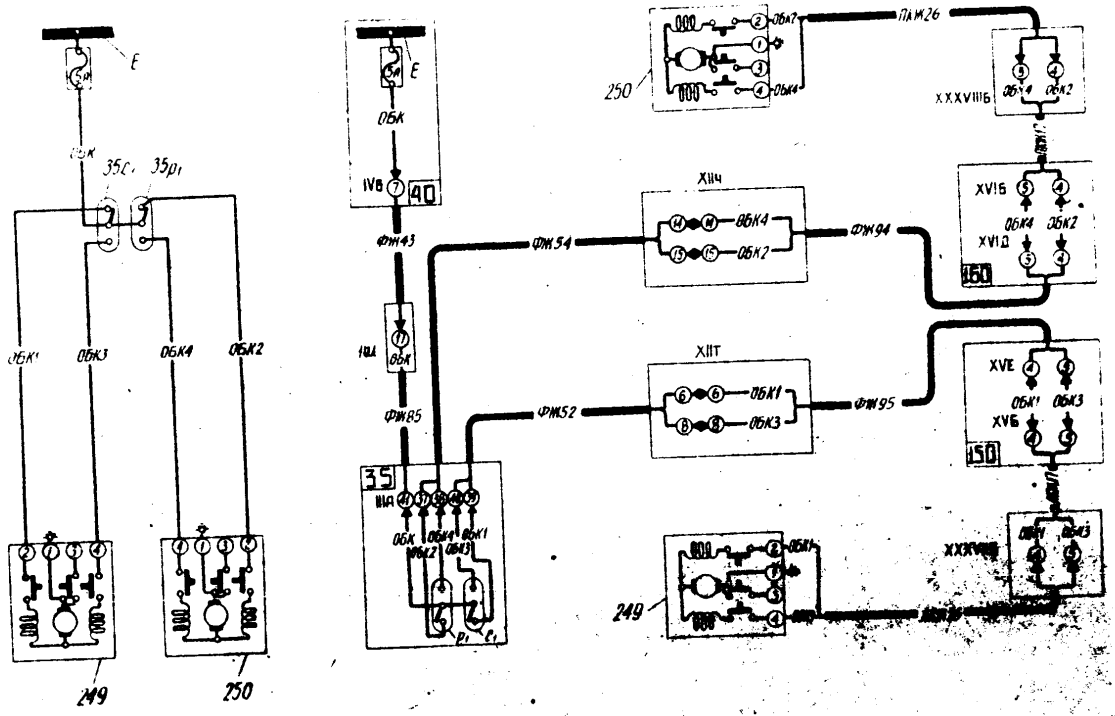

Fig. 166. Principal and assembly diagram of the mechanism for control of the heating system valves

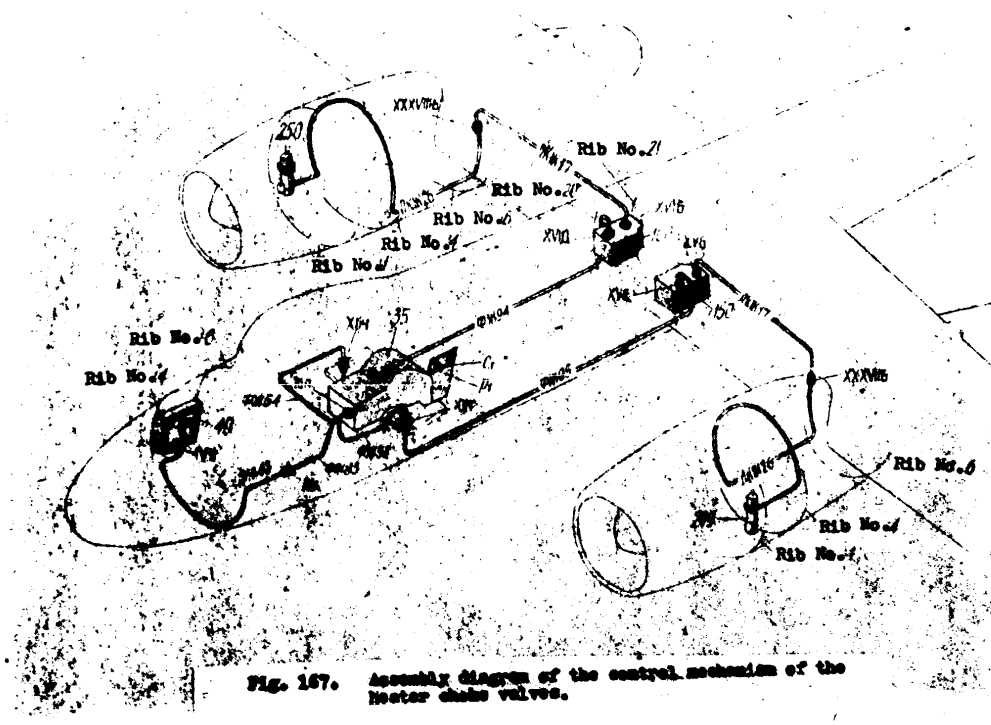

Fig. 167. Assembly diagram of the control mechanism of the heater shake valves.

CIRCUIT OF THE CABIN AIR TEMPERATURE REGULATOR AND THERMOMETER

/Fig. 168, 169, 170/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	CDB
	PT1	Set limit switch, cabin air temperature regulation	1	A3C-5	-"-
	PT2	Set limit switch, cabin air temperature regulation and thermometer	1	A3C-5	-"-
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
	δ	Cabin air heating temperature indicator	1	TY3-48	Pilot's right desk
	H	Cabin air temperature regulator	1	PTBK-45	- " -
93		Left radiator valve control mechanism	1	MPT-1	Left nacelle, rib No. 13
	a	Junction block	1	75K	- " -
94		Right radiator valve control mechanism	1	MPT-1	Right nacelle, rib No. 13
	a	Junction box	1	75K	- " -
96		Cabin air thermometer sensing element	1	TY3-48	Pilot's cabin, between ribs No. 7 & 8
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs [illegible]
160		Right CDS	1	Dtto	Fuselage, right board, ribs [illegible]
2	W	Navig. cabin connector	1	[illegible]	Navig. [illegible]
IV	Б	CDB connector	1	[illegible]	CDB
XII	Ф	Pilot's cabin hermetic connector	1	[illegible]	[illegible]
	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	
	P	Dtto	1	[illegible]	[illegible]
	Ч	Dtto	1	[illegible]	[illegible]

1	2	3	4	5	6
XV	A	Left CDS connector	1	ШР60П47НГ2	Left CDS
	Д	Dtto	1	ШР60П47НГ2	-"-
	H	Dtto	1	ШР48П26НШ2	- " -
XVI	A	Right CDS connector	1	ШР60П47НГ2	- " -
	E	Dtto	1	ШР60П47НГ2	- " -
	3	Dtto	1	ШР48П26НШ2	- " -
XXXVII	A	Left nacelle connector	1	ШР60П47НШ2	Left nacelle, right board, between ribs No. 6 & 7
XXXVIII	A	Right nacelle connector	1	ШР60П47НШ2	Right nacelle, left board, between ribs No. 6 & 7

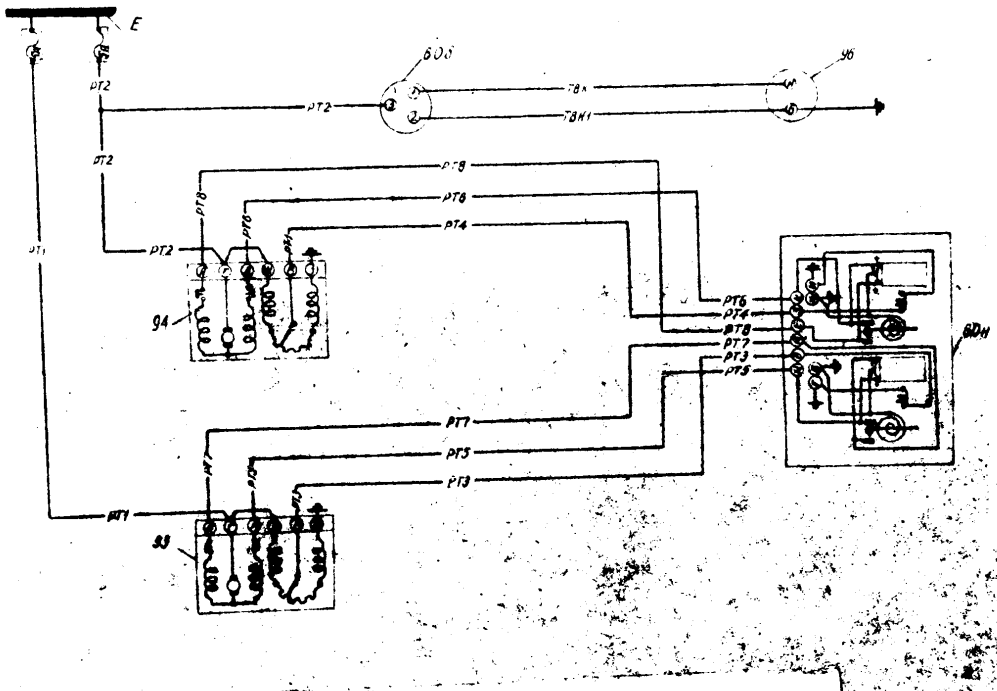

Fig. 168. Principal circuit diagram of the air temperature regulation and the cabin air thermometer.

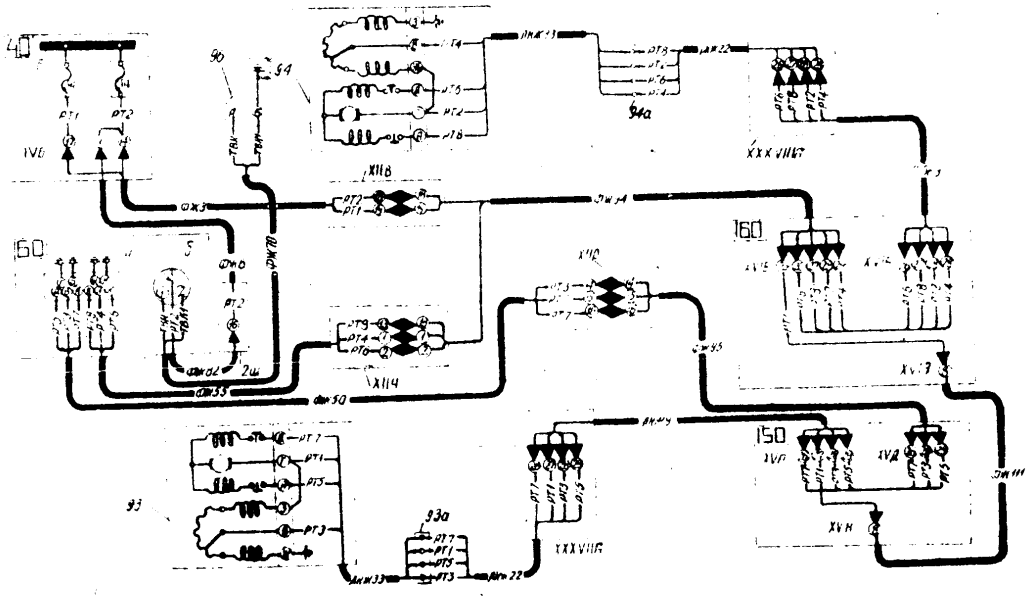

Fig. 169. Assembly diagram of the cabin air temperature regulation and the cabin air thermometer.

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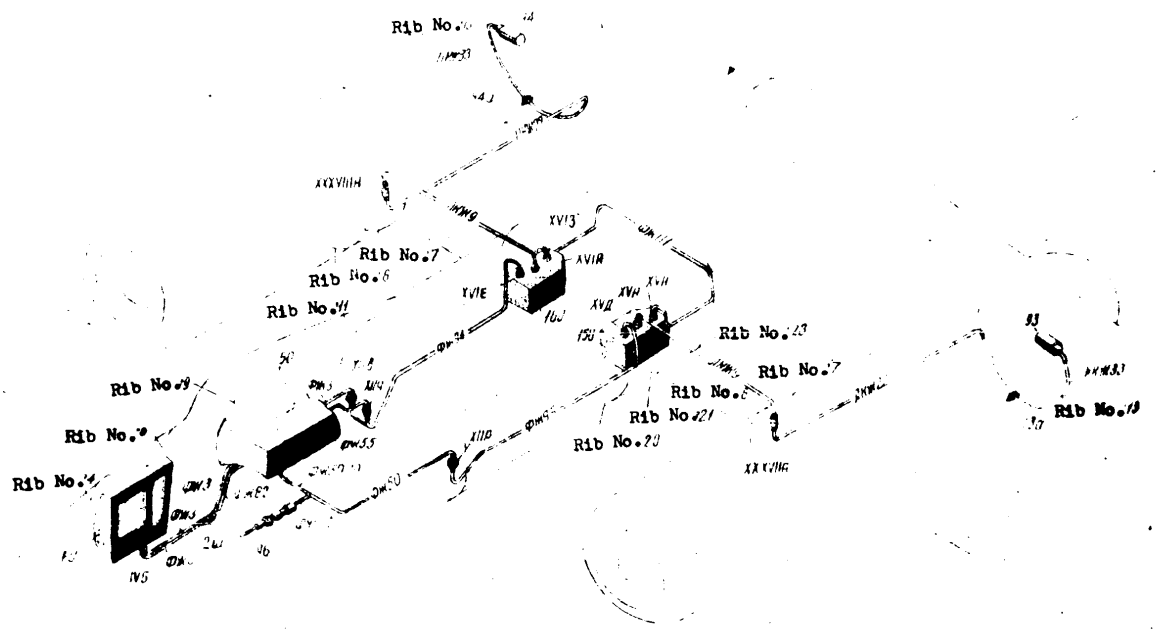

Fig. 170. Assembly diagram of the cabin air temperature regulation and cabin air thermometer.

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CIRCUIT OF THE HEATING OF THE PILOT'S A[illegible]
CLOTHING. -
/Fig. 171, 172/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E 00W	Navig. CDB bus bar	1	Ditto	Navig. CDB
		Net limit switch, pilot's and navig. clothes heating	1	A30-51	- " -
253		Navig. ~~xxxxxxxxx~~ clothes heating rheostat	1	PO3-45	Navig. cabin, rib No. 4
254		Pilot's clothes heating rheostat	1	PO3-45	Pilot's cabin, rib No. 11
2	W	Navig. cabin connector	1	WP48N26HW2	Navig. cabin, right board, rib No. 6
IV	B	CDB connector	1	WPSSN31HP3	CDB

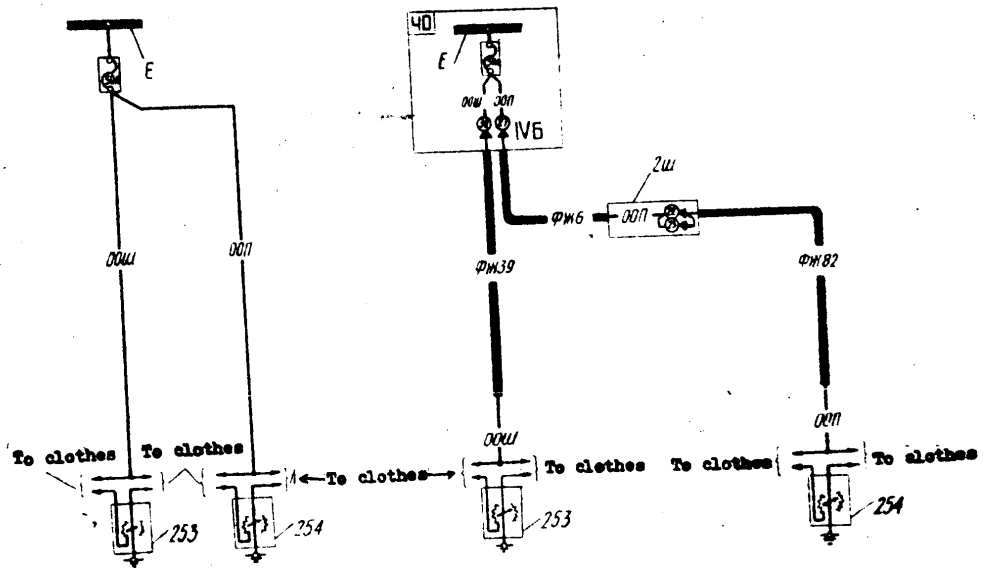

Fig. 171 Principal and assembly diagram of the pilot's and navigator's clothes heating.

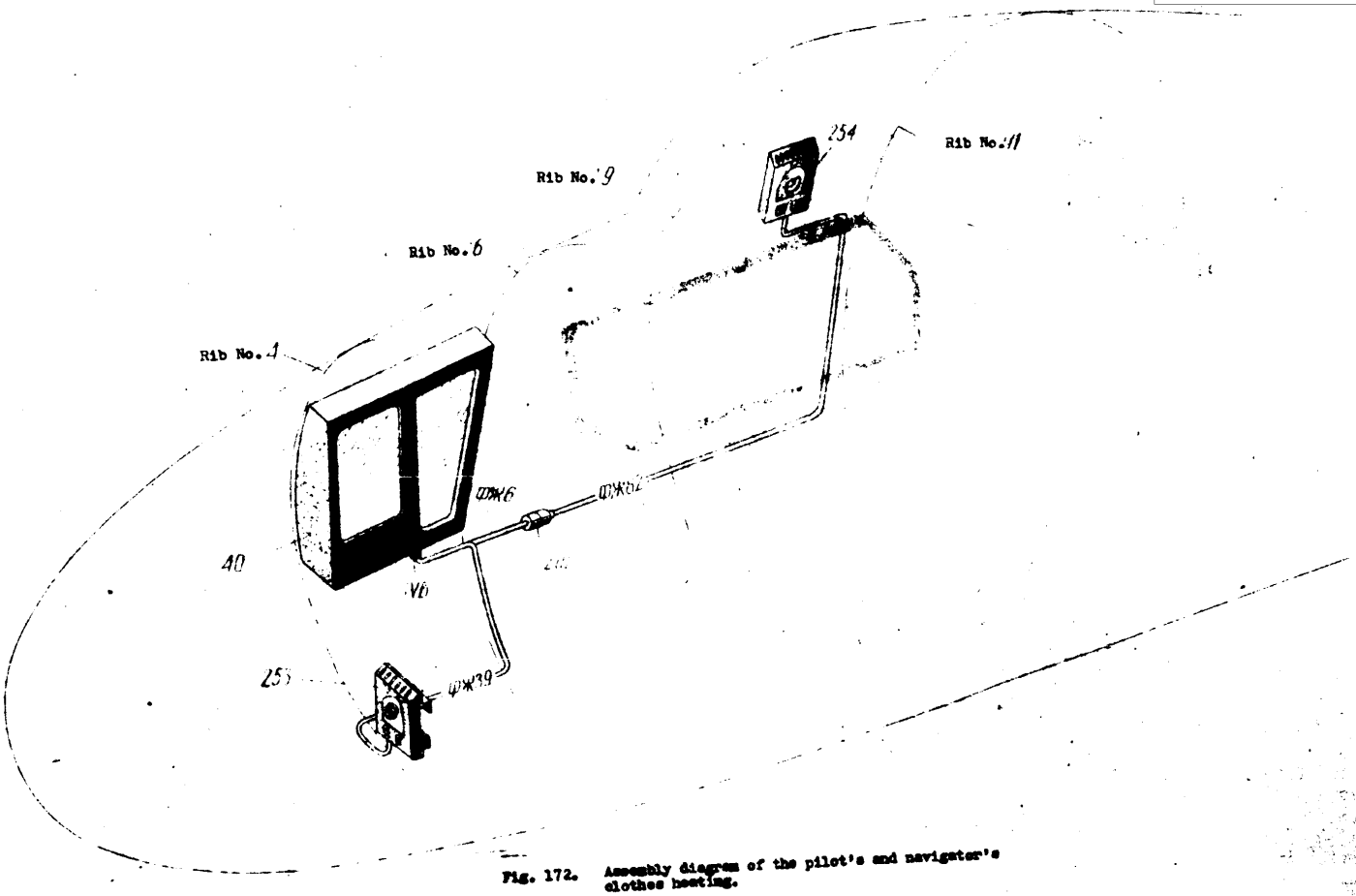

Fig. 172. Assembly diagram of the pilot's and navigator's clothes heating.

CIRCUIT OF THE GUNNER'S CLOTHING HEATING.

/Valid to 6.264/

/Fig. 173/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
80		Gunner's right desk	1	Made by manufacturer	Gunner's cabin, right board, between ribs No. 42 & 45
	a	Rheostat of gunner's clothing heating	1	IC3-45	Gunner's right desk
	c	Gunner's right desk bus bar	1	Made by manufacturer	- " -
	000	Net limit switch, gunner's clothes heating	1	A3C-30	- " -

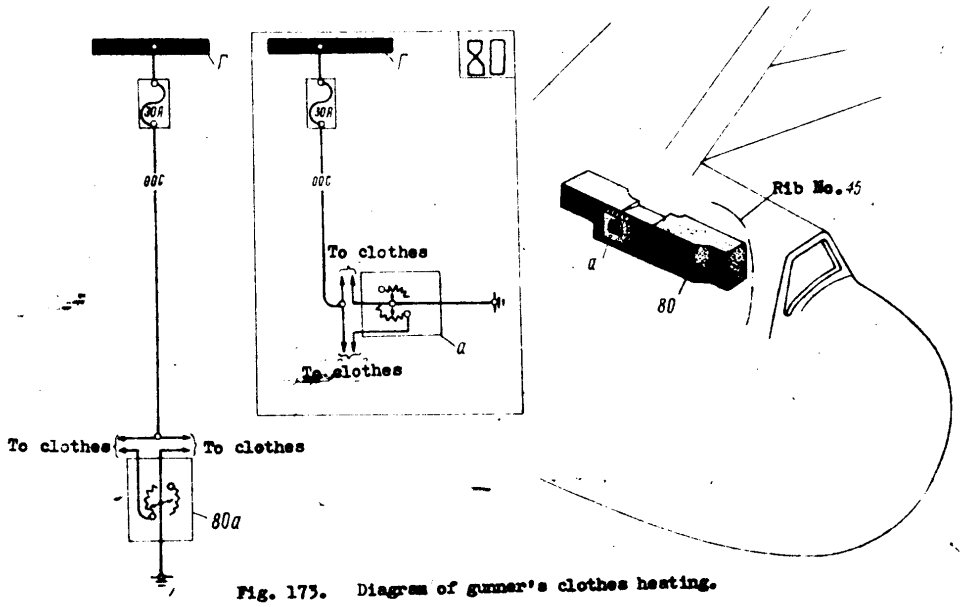

Fig. 173. Diagram of gunner's clothes heating.

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CIRCUIT DIAGRAM OF THE CABIN HEATIN

/Fig. 174, 175/

/From 3901, 4301/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin, left board, between ribs
	Ф1	Cabin heating on ground, switch	1	ПП-45	Pilot's left desk
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	OK	Net limit switch, cabin heating on ground	1	A3C-5	Navig. CDB
	E	Navig. CDB bus bar	1	Made by manufacturer	Navig. CDB
160		Right CDS	1	Dtto	Fuselage, right board, between ribs 20 & 21
258		Control mechanism of cabin heating on ground	1	YT-3	Right nacelle, rib No. 15
I	Ш	Navig. cabin connector	1	ШРSSП34НГ3	Navig. cabin, left board, rib No. 6
III	Б	Pilot's left desk connector	1	ШРSSП34НШ3	Pilot's left desk
IV	Б	CDB connector	1	ШРSSП34НГ3	Navig. CDB
XII	4	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
XVI	Б	Right CDS connector	1	ШР48П20НШ4	Right CDS
	E	Dtto	1	ШР60П47НГ2	- " -
XXXVIII	Б	Right nacelle connector	1	ШР48П16НШ2	Right nacelle, left board, between ribs No. 6 & 7

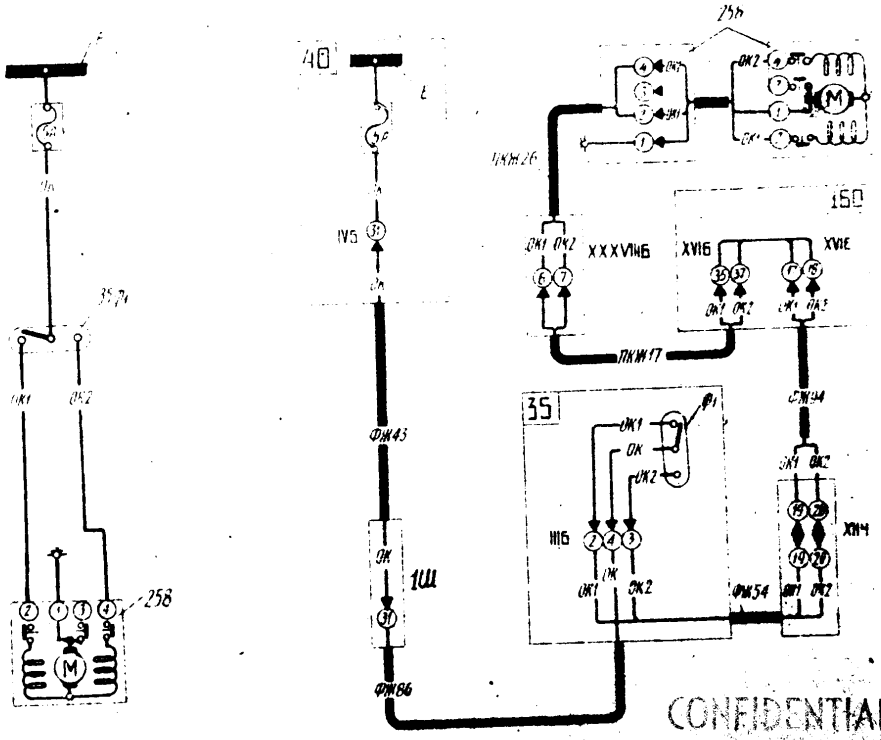

Fig. 174. Principal and assembly diagram of the ground [illegible] control/with 9835, 9842, 9846/.

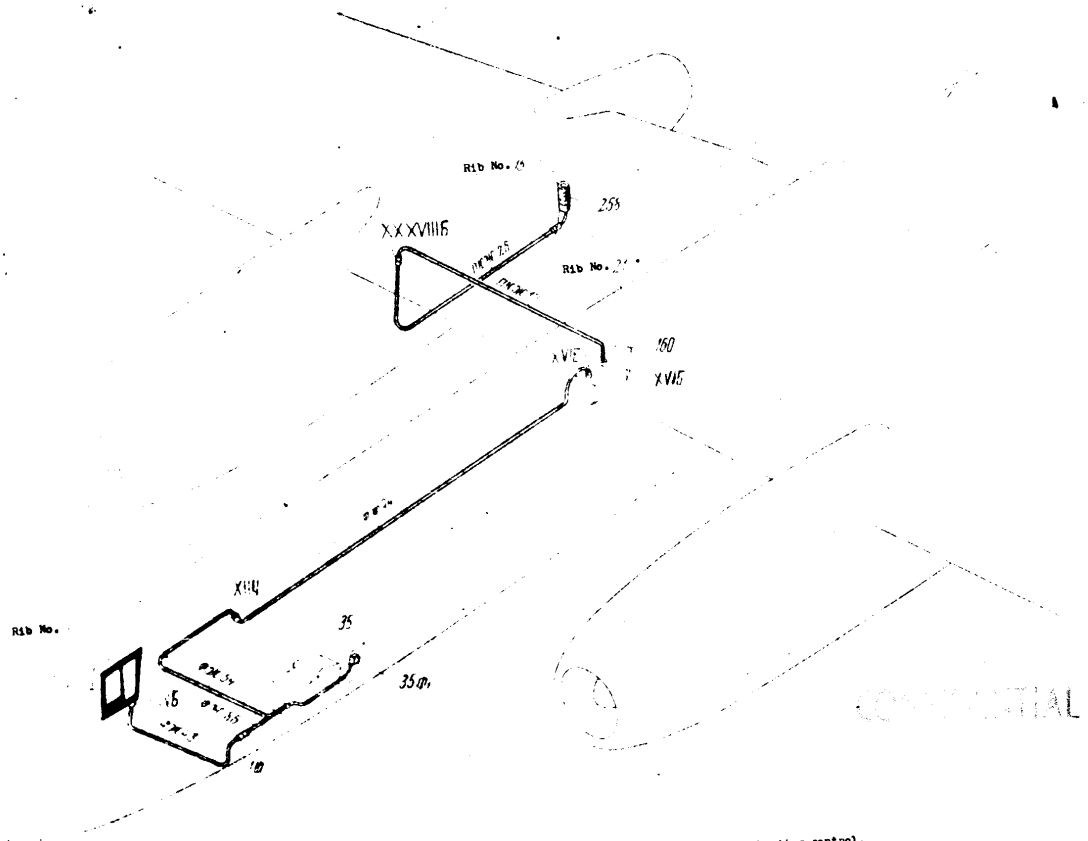

Fig. 175. Assembly diagram of the ground cabin-heating control.

CIRCUIT OF THE PILOT'S, NAVIGATOR'S AND GUNNER'S VENTILATORS.

/Fig. 176, 177/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	ВЕН	Net limit switch, navig. and pilot's ventilator	1	АЗС-5	Navig. CDB
	и	Navig. ventilator switch	1	В-45	- " -
50		Trim tab control board	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 9
	е	Pilot's cabin ventilator switch	1	В-45	Trim tab control board
	ж	Junction block	1	73К	- " -
80		Gunner's right desk	1	Made by manufacture	Gunner's cabin, right board, between ribs No. 42 & 43
	ВЕН4	Net limit switch, Gunner's cabin ventil.	1	АЗС-5	Gunner's right desk
	Б	Gunner's right desk bus bar	1	Made by manufacturer	- " -
320		Pilot's cabin ventil.	1	ДВ-3	Pilot's cabin, right board
	а	Pilot's ventil. connect.	1	ИР-1	- " -
321		Navig. cabin ventil.	1	ДВ-3	Navig. cabin, right board
	а	Navig. cabin ventil. connector	1	ИР-1	
322		Gunner's cabin ventil.	1	ДВ-3	Gunner's cabin
	а	Gunner's cabin ventil. connector	1	ИР-1	
I	Ш	Navig. cabin connector	1	ШРС53М4С1	Navig. cabin

1	2	3	4	5	6
IV	A	CDB connector	1	ШР60П45НП2	CDB
	Б	Dtto	1	ШР55П34НП3	Dtto
VIII		Gunner's right desk connector	1	ШР60П34НШ4	Gunner's right desk

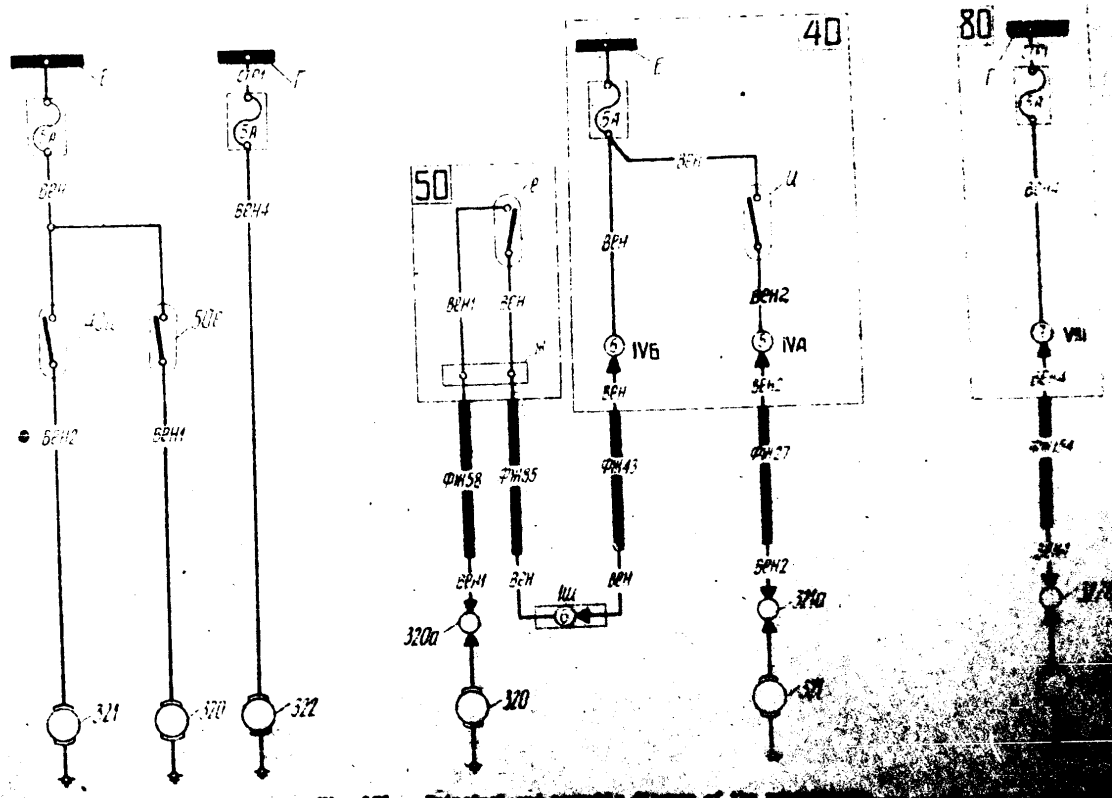

Fig. 176. [illegible]

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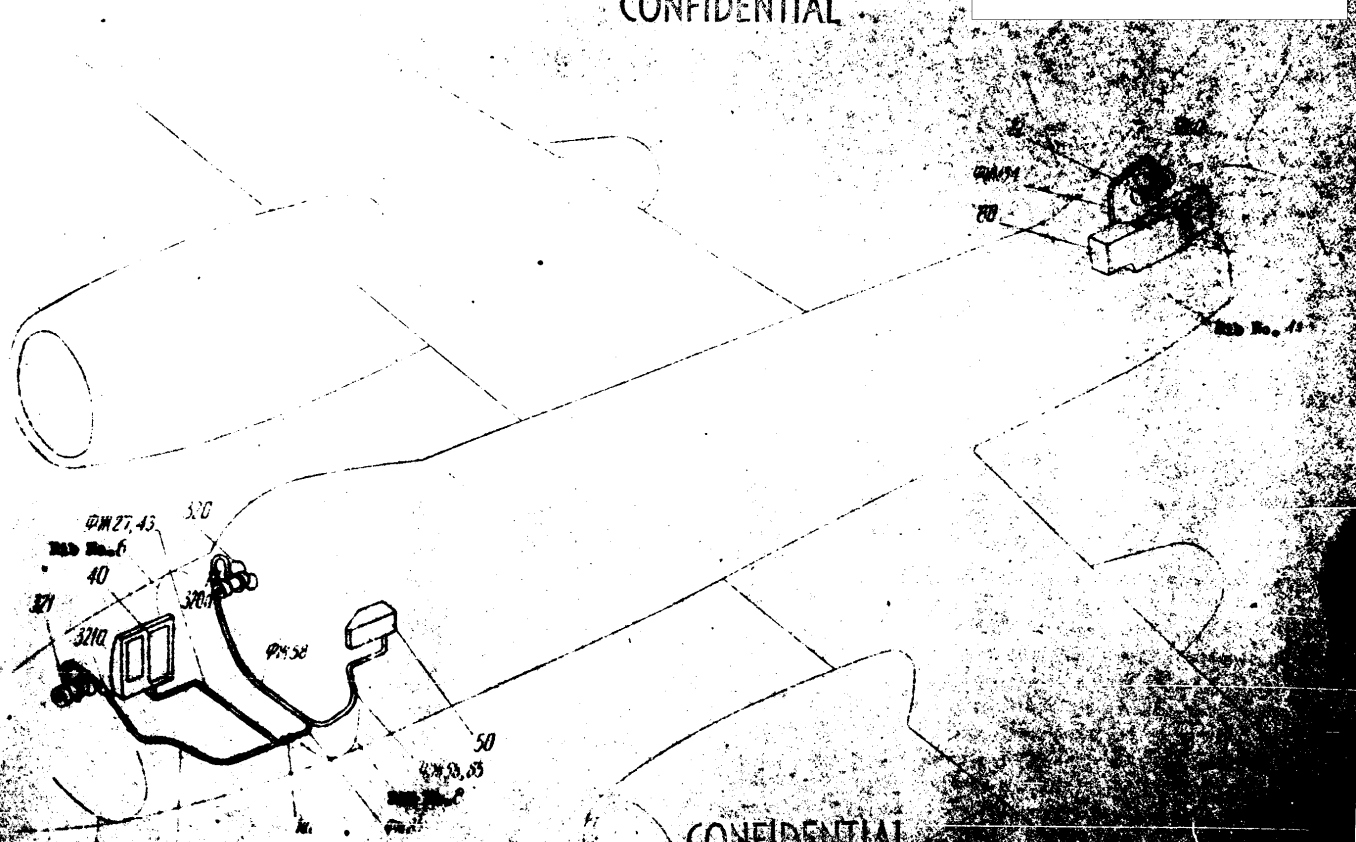

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FIRE-FIGHTING EQUIPMENT.

Engine fire fighting equipment.

/Fig. 178, 179, 180/

In the left and right nacelles there are thermo-sensing elements 245, 246, which in case of fire close the circuit of the red pilot lamps $70M_1$, $70H_1$. To suppress the fire the mechanisms of the fire cocks /113, 114/ are switched on by means of switches $70y_1$, $70\Phi_1$. The cocks control the fuel pipes.

By pushing the buttons $70T_1$, $60p_1$, $70n_1$, current is fed to the pyro-cartridges of the fire extinguisher gas cylinders. The pyro-cartridges open the way to the gas into the nacelles.

After the temperature in the nacelles has dropped, the thermo-sensing elements open the circuits of the red lamps.

The pilot lamps, the fire cock switches, and the pyro-cartridge switches are placed on the pilot's instrument board.

Flooding of the 1-st and 2-nd zones by fire extinguisher gas.

/Fig. 181, 182/

The fuel tanks /1-st zone/ are flooded by fire-extinguishing gas by switching $70\alpha_1$, which switches on the heating elements 270 and pyro-cartridge 161.

For flooding the space between the fuel tanks of the front and rear group /2-nd zone/, buttons $70\alpha_1$ and [illegible] are placed on the instrument board. When the buttons are pushed, the pyro-cartridges /151, 152/ of the fire extinguisher gas cylinders open the way to the gas into the [illegible] zone of the [illegible]

CIRCUIT OF THE NACELLE FIRE-EXTINGUISHING EQUIPMENT.

/Fig. 178, 179, 180/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
		Pilot's right desk bus bar	1	Made by manufacturer	Pilot's right desk
	ПК	Met limit switch, left tank fire cock control mechanism	1	A3C-10	- " -
	ПК1	Dtto, right engine tank	1	A3C-10	- " -
	ПК03	Met limit switch, engine fire-fighting equipment control	1	A3C-15	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	H_1	Left engine fire alarm lamp	1	СЛЦ-51	Pilot's instr. desk
	H_1	Right engine fire alarm lamp	1	СЛЦ-51	- " -
	$П_1$	Button switch of fire extinguishing gas from 1-st cylinder of left engine	1	5KC	- " -
	P_1	Dtto	1	5KC	- " -
	C_1	Dtto	1	5KC	- " -
	T_1	Button switch of fire extinguishing gas from 2-nd cylinder to right engine	1	5KC	- " -
	M_1	Switch of left engine fire cock	1	ПП-45	- " -
	M_1	Switch of right engine fire cock	1	ПП-45	- " -
113		Left engine fire cock control mechanism	1	[illegible]	[illegible]
114		Dtto, right engine	1	[illegible]	[illegible]
150		Left CP3	1	[illegible]	[illegible]

1	2	3	4	5	6
160		Right CDS	1	Made by manufacturer	Fuselage, right board, between ribs 20 & 21
241		1-st pyro-cartridge of 1-st gas cylinder	1	ПП-3	Gas-cylinder
	a	Socket of 1-st pyro-cartridge of 1-st gas cylinder	1	48K	Fuselage, right board, rib 25
242		2-nd pyro-cartridge of 1-st gas cylinder	1	ПП-3	Gas cylinder
	a	Socket of 2-nd pyro cartridge of 1-st gas cylinder	1	48K	Fuselage, right board, rib 25
243		1-st pyro-cartridge of 2-nd gas cylinder	1	ПП-3	Gas cylinder
	a	Socket of 1-st pyro-cartridge of 2-nd gas cylinder	1	48K	Fuselage, right board, rib 25
244		Pyro-cartridge of 2-nd gas cylinder	1	ПП-3	Gas cylinder
	a	Socket of 2-nd pyro-cartridge of 2-nd gas cylinder	1	48K	Fuselage, right board, rib 25
245		Left engine fire alarm contact	1	Made by manufacturer	Left engine supporting
	a	Junction block	1	73K	Left nacelle, rib No. 1
246		Right engine fire alarm contact	1	Made by manufacturer	Right engine support
	a	Junction block	1	73K	Right nacelle, rib No. 1
VI	Г	Pilot's right desk connector	1	ШРС5П31НП3	Pilot's right desk
VII	Ж	Pilot's instr. board connector	1	ШРМ26НШ2	Pilot's instr. board
XII	М	Pilot's cabin hermetic connector	1	ШРГ-23	Cabin
	Ч	Dtto	1	ШРГ-23	
	Ф	Dtto	1	ШРГ-23	
XV	А	Left CDS connector	1	[illegible]	Left
	Д	Dtto	1	[illegible]	
XVI	А	Right CDS connector	1	[illegible]	Right
XVI	Б	Right CDS connector	1	[illegible]	
XXXVII	А	Left nacelle connector	1	[illegible]	

1	2	3	4	5	6
XXXVIII	A	Right nacelle connector	1	WP60N47HW2	Right nacelle left wing between rib No. 6 & 7

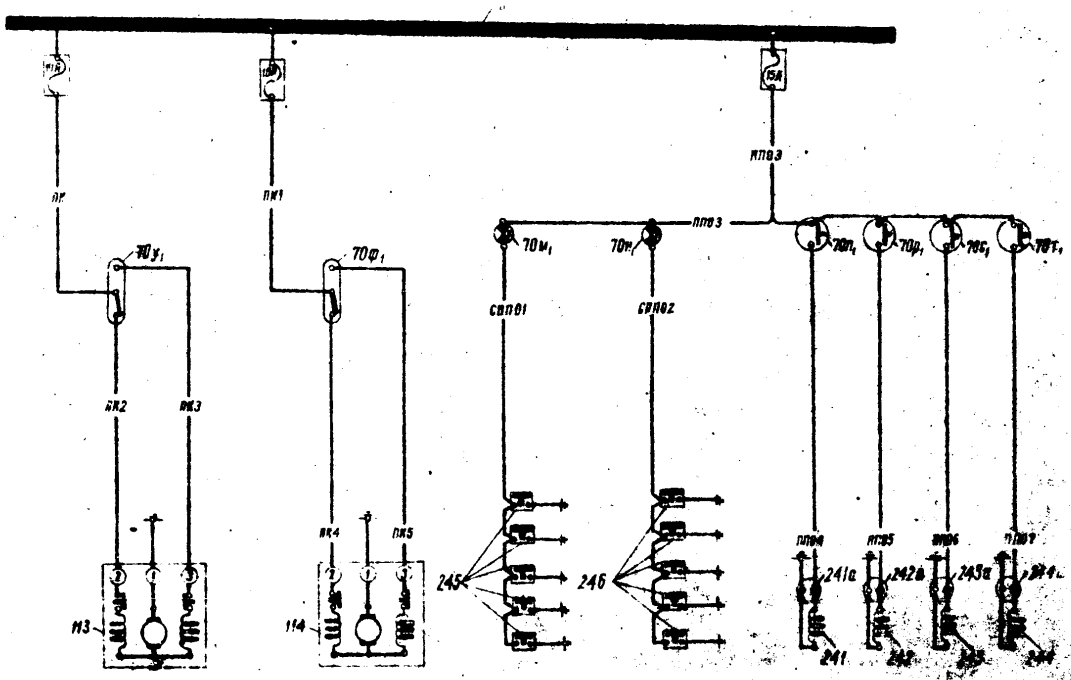


Fig. 178. Principal circuit diagram of the fire extinguishing system of the engines.

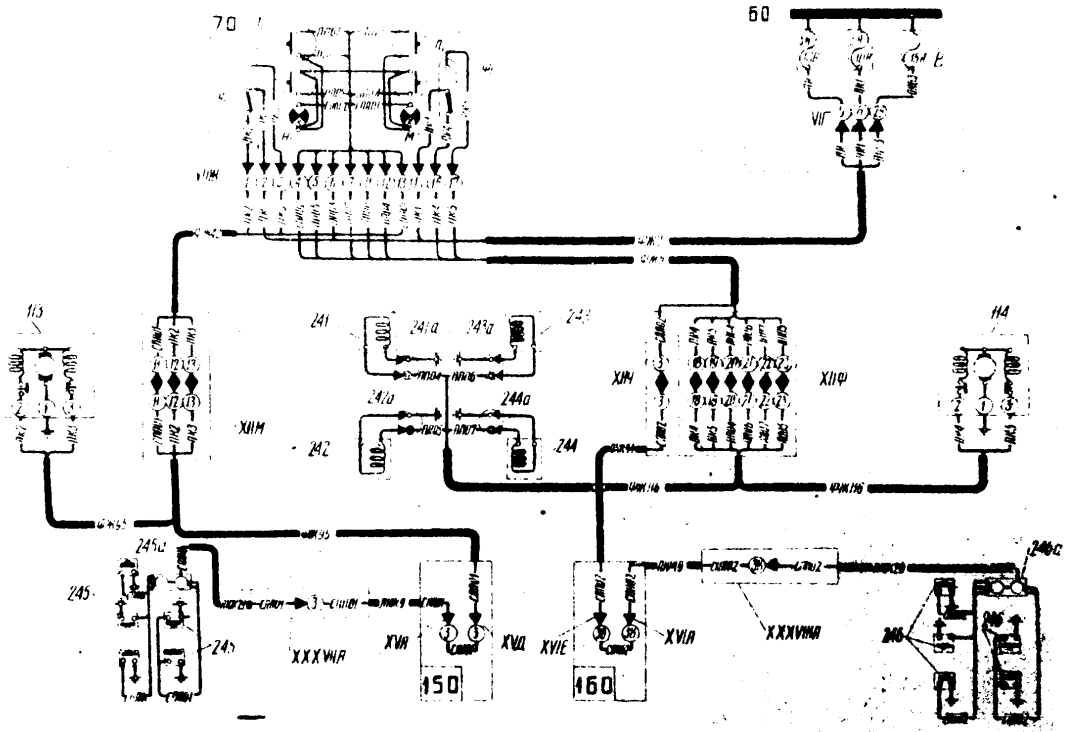


Fig. 179. Assembly diagram of the engines' fire extinguishing system

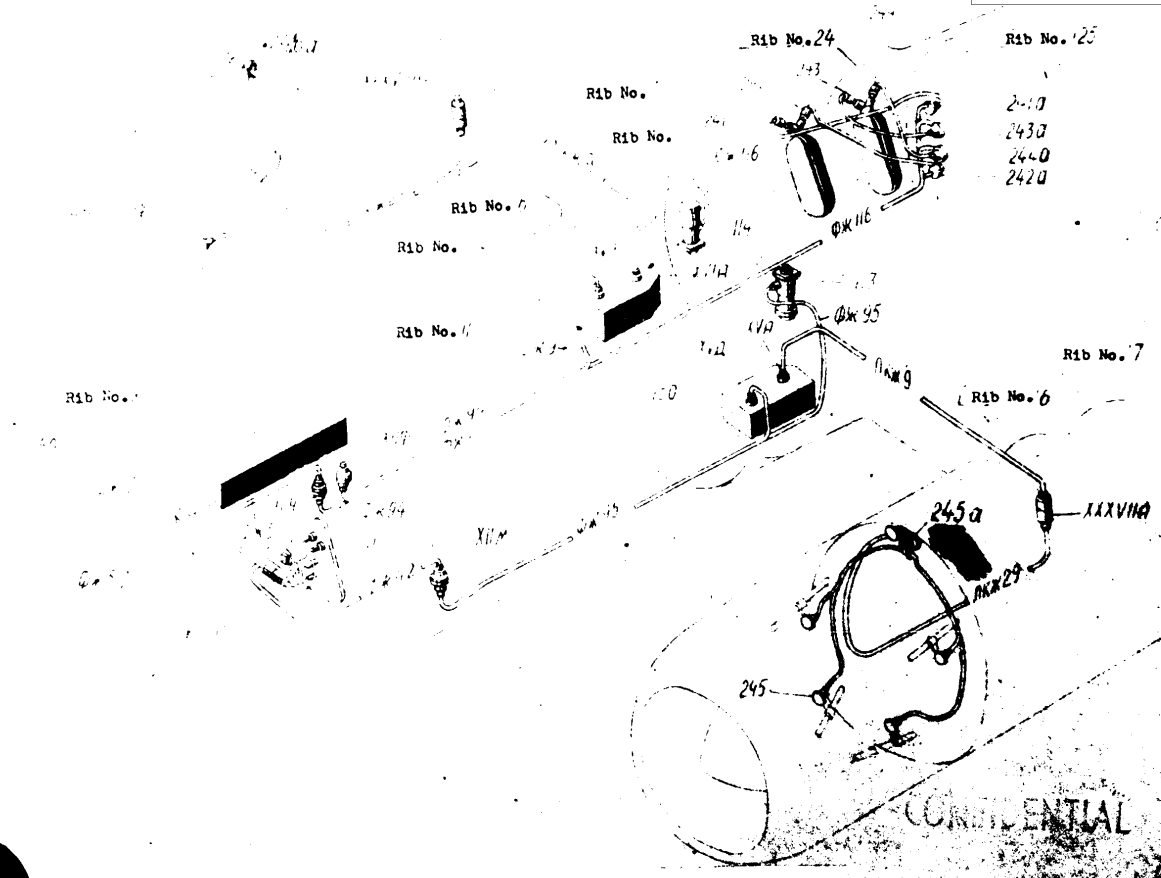


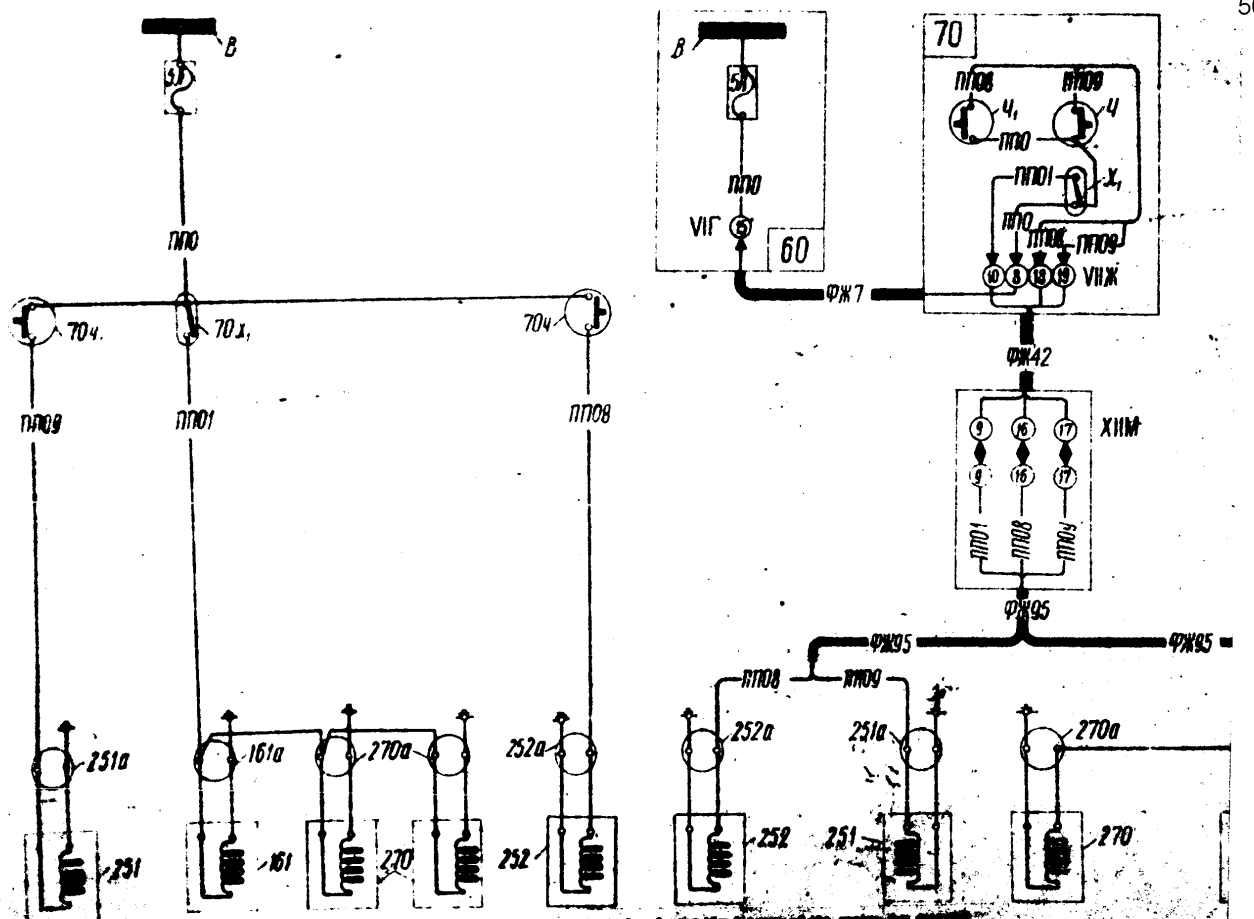
Fig. 180. Assembly diagram of the engines' fire extinguishing system

CIRCUIT OF FLOODING THE 1-ST AND 2-ND ZONE OF [illegible] THE FUEL TANKS WITH FIRE-EXTINGUISHING GAS.

/Fig. 181, 182/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 8 & 11
	B	Pilot's right desk bus bar	1	Otto	Pilot's right desk
	ПП0	Net limit switch, fire-extinguishing gas system control	1	A3C-5	- " -
70		Pilot's instr. desk	1	Made by manufacturer	Pilot's cabin, rib No. 8
	4	Button switch of fire-extinguishing gas of the 2-nd zone of the front group of tanks	1	5KC	Pilot's instr. board
	4_1	Otto. 2-nd zone of the rear group of tanks	1	5-KC	- " -
	4_1	1-st zone of front tanks fire-extinguishing gas switch	1	[illegible]	- " -
161		1-st zone gas cylinder pyro-cartridge	1	ПП-3	Gas cylinder
	a	Socket of 1-st zone pyro-cartridge	1	48-K	Fuselage, left board, rib 24
251		2-nd zone front tank gas cylinder pyro-cartridge	1	ПП-3	Gas cylinder
	a	Socket of 2-nd zone front group of tanks pyro-cartridge	1	48-K	Fuselage, left board, rib 28
252		2-nd zone rear tanks gas cylinder pyro-cartridge	1	ПП-3	Gas cylinder
	a	2-nd zone rear tanks pyro-cartridge socket	1	48-K	Fuselage, left board, rib [illegible]
270		Heating element of the calibrated pipe of the 1-st tank zone	2	Made by manufacturer	Fuselage, left board, between ribs [illegible]

1	2	3	4	5	6
[illegible]	a	Socket of heating element of cylinder of 1-st tank zone	1	48-K	Fuselage, left board, rib 24
VI	Г	Pilot's right desk connector	1	ШРС5П31НГ3	Pilot's right desk
VII	Ж	Pilot's instr. desk connector	1	ШРС4П26НШ2	Pilot's instr. board
XII	М	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor



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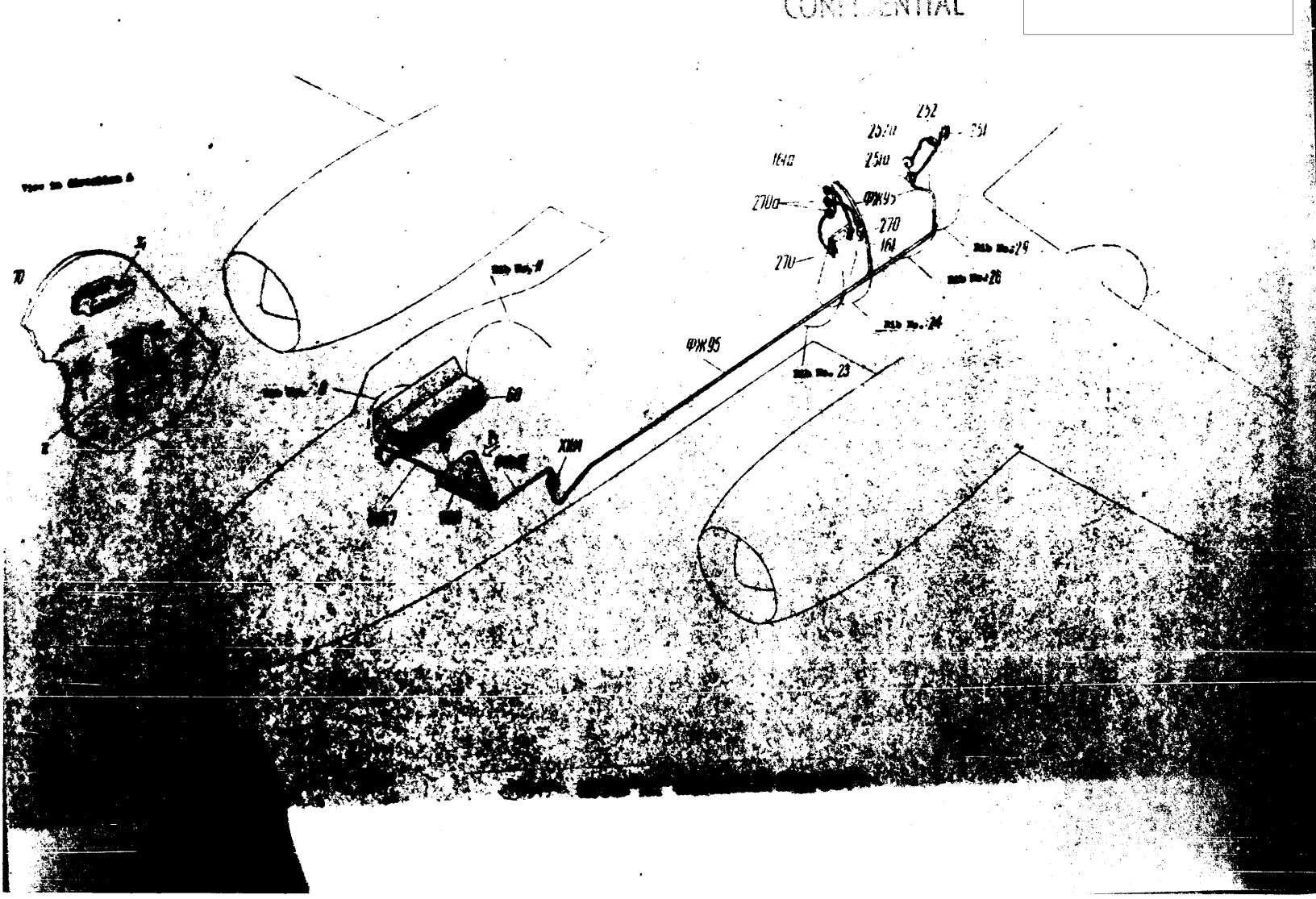

POWER SUPPLY OF THE PHOTO EQUIPMENT.

The aeroplane carries two cameras: the perspective and the panoramic camera.

The cameras are controlled by means of the instruments 20M, 20H, placed on the navigator's left board.

The panoramic camera is used with open bomb bay doors. It is supplied by power through the socket 20л . The heating of the photo camera is supplied by power from the socket 166.

The perspective camera operates with the camera well open.

The camera well is opened by electro-mechanisms YP-7M /174/, which are operated ny means of switch 20c.

The camera well door is opened by pushing the button switch 173, which operates the electro-mechanism YP-7M and switches on the pilot lamp "Фотолюк открит " /Photo-well open/ 20c.

The camera heating is supplied by power from the socket 172.

NOTE: The aeroplane is equipped by a blocking system of switching on the cameras with closed doors. The blocking system assures operation of the cameras only with open doors of the wells.

CIRCUIT OF THE PHOTO CAMERA POWER SUPPLY.

/Fig. 185, 186, 187/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
20		Navig. right desk	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 1 & 4
	e	Perspective camera well control switch	1	ПП-45	Navig. right desk
	ж	Open camera well pilot lamp	1	СЛЦ-51	- " -
	л	Panoramic camera control apparatus socket	1	48-K	- " -
	м	Panoramic camera control apparatus	1	From photo unit	- " -
	н	Perspective camera control apparatus	1	Dtto	- " -
	o	Persp. camera control apparatus socket	1	48-K	- " -
	п	Persp. camera control apparatus plug connector	1	ШР32ПС8ЭР3	- " -
	р	Panoramic camera control apparatus plug connector	1	ШР32ПС8ЭР3	- " -
	т	Socket for connecting the AØA with ЭС 5 P	1	48-K	- " -
4		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	E	Navig. CDB bus bar	1	Dtto	Navig. CDB
	AØA	Net limit switch, panoramic camera	1	A3C-15	- " -
	AØA1	Net limit switch, perspective camera	1	A3C-15	- " -
166		AØA heating socket	1	48-K	Fuselage, [illegible] No. 19
171		Panoramic camera [illegible] connector	1	ШР32ПС8ЭР3	Fuselage, [illegible] ween [illegible] No. 18

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1	2	3	4	5	6
171	a	Panoramic camera	1		
172		Perspective camera AØA heating socket	1	48-K	
173		Camera well position push-button switch	2x	BKØ-140A-1	
	a	Dtto	1	Dtto	
174		Perspective camera well control machanism	1	YP-7M	
178		Perspective camera connector	1	ШР32ПС39Г3	
	a	Perspective camera	1		
283		Right AØA blocking contact	1	BK2-140A-1	
	a	Dtto	1	Dtto	
II	A	Navig. right desk connector	1	ШР48П26НШ2	
2	Ш	Navig. cabin connector	1	ШР48П26НШ2	
IV	A	CDS connector	1	ШР60П46НГ3	
	Б	Dtto	1	ШР55П34НГ3	
XII	B	Pilot's cabin hermetic connector	1	ШРГ-25	Pilot's cabin floor
	Г	Dtto	1	ШРГ-25	
	C	Dtto	1	ШРГ-25	
	T	Dtto	1	ШРГ-25	
	P	Dtto	1	ШРГ-25	

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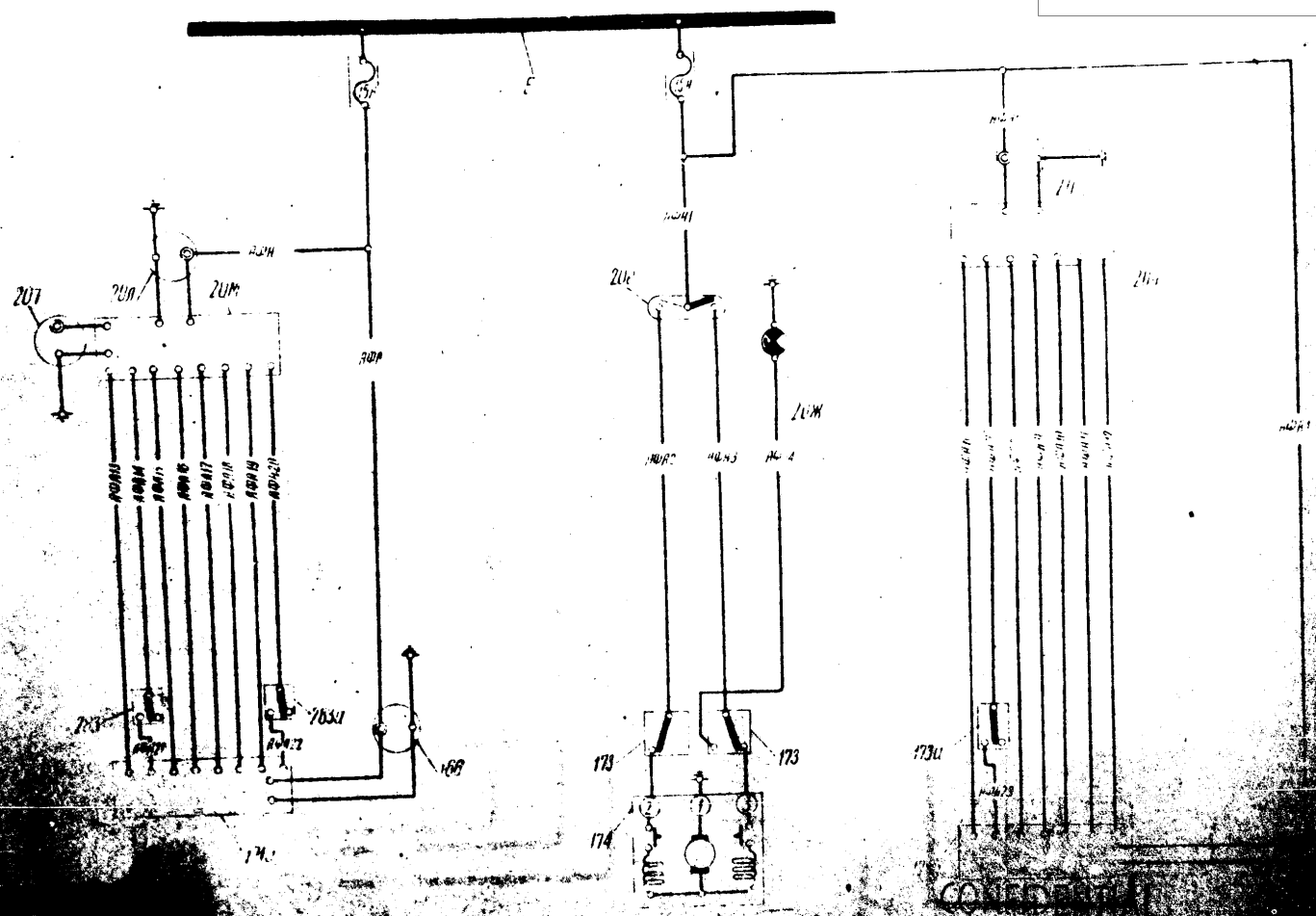


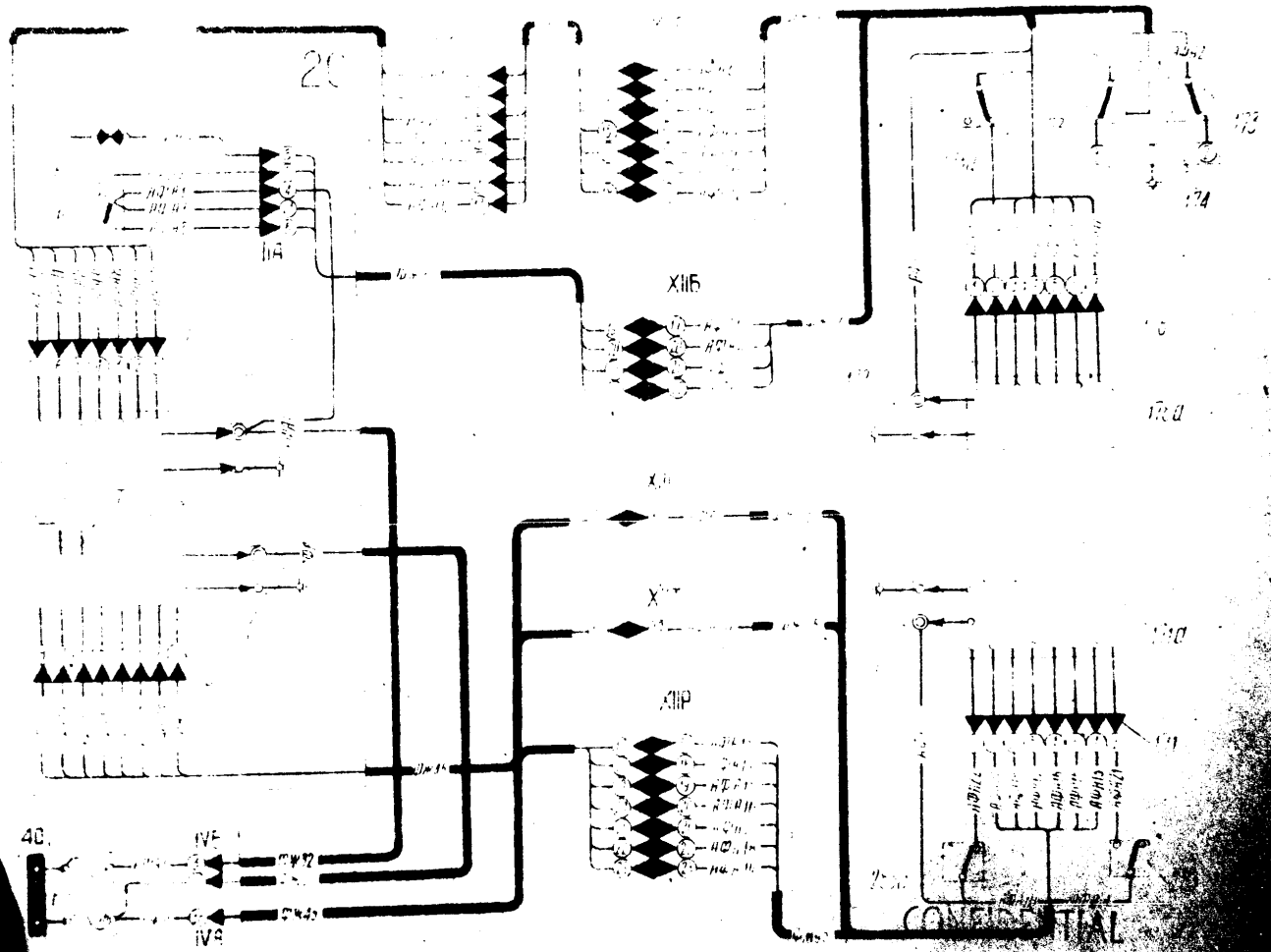
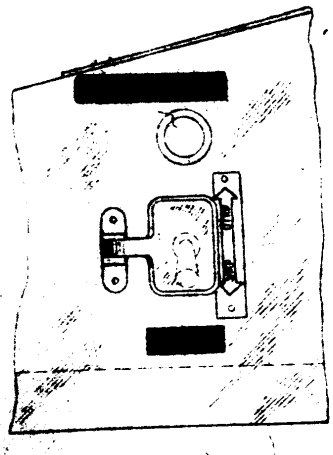
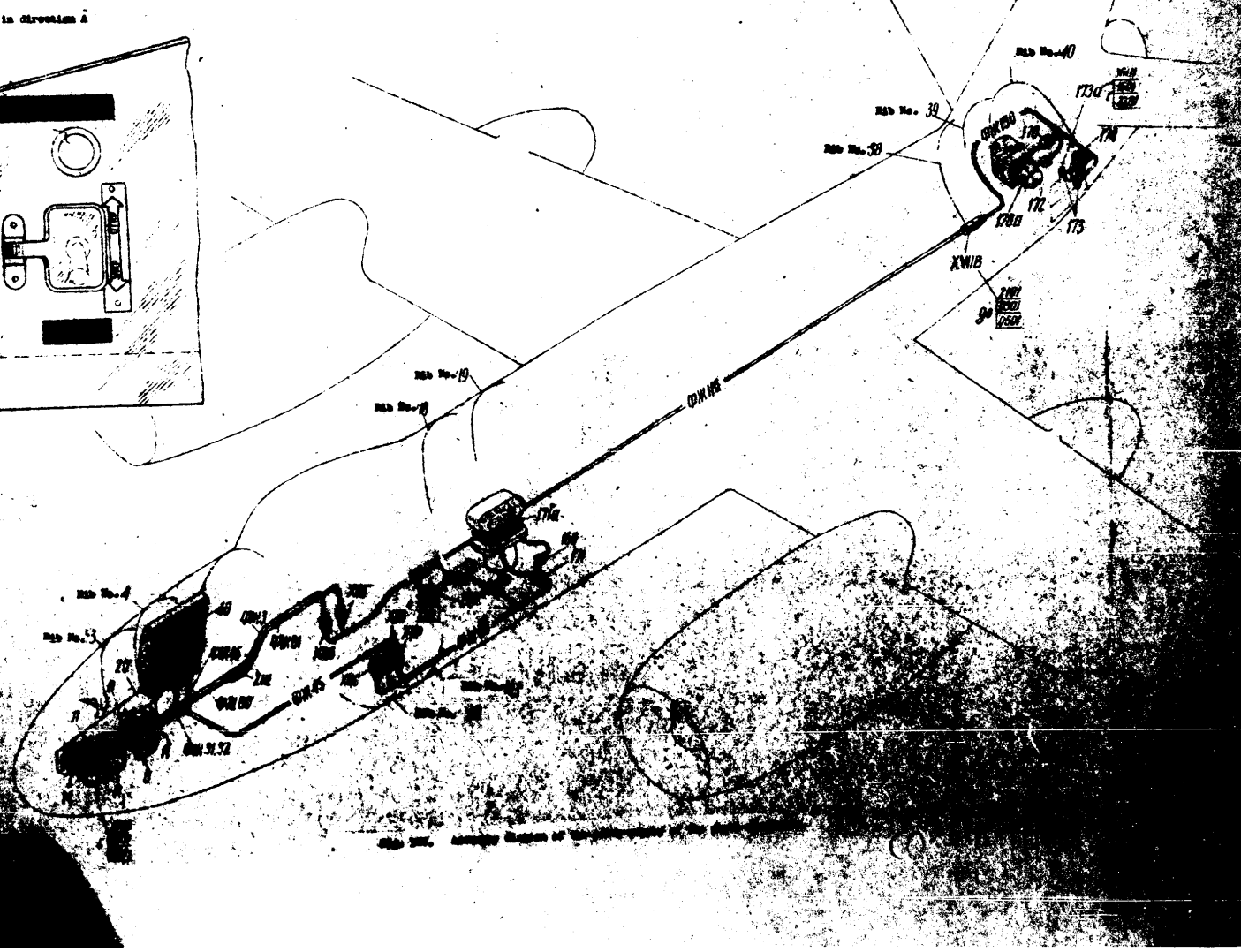


Fig. 186. Assembly diagram of the power supply of the photo equipment.





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[illegible]

INSTRUMENTS WITH INDEPENDENT SUPPLY.

The following are the instruments with independent supply:

- the tachometers /fig. 188, 189/
- the exhaust gas thermometers /fig 190, 191/
- the de-icing system thermometers /fig. 192, 193a/

The given instruments are not connected to the board power system.

A current, depending on the number of revolutions /the tachometers/ and on the temperature /the thermometers/, originates in the sensing elements, and is transmitted to the indicating instruments by conductors.

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THE TACHOMETER CIRCUIT.

/Fig. 188, 189/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
	Н	Left engine tachometer indicator	1	ТЭ-15	Pilot's instr. board
	И	Dtto, right engine	1	ТЭ-15	- " -
130		Right engine tachometer sensing element	1	Д-10	Right engine
131		Left engine tachometer sensing element	1	Д-10	Left engine
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs 20 & 21
160		Right CDS	1	Dtto	Fuselage, right board, between ribs 20 & 21
VII	Г	Pilot's instr. board connector	1	ШРБ0П4НШ2	Pilot's instr. board
XII	Л	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
	Ф	Dtto	1	ШРГ-23	- " -
XIII		Left engine connector	1	ШР-23С	Left engine
XIV		Right engine connector	1	ШР-23С	Right engine
XV	А	Left CDS connector	1	ШРБ0П4НГ1	Left CDS
	Д	Dtto	1	ШРБ0П4НГ2	- " -
XVI	А	Right CDS connector	1	ШРБ0П4НГ2	Right CDS
	Е	Dtto	1	ШРБ0П4НГ1	- " -
XXXVII	А	Left nacelle connector	1	ШРБ0П4НШ2	Left [illegible]
XXXVIII	А	Right nacelle connector	1	ШРБ0П4НШ1	Right [illegible]

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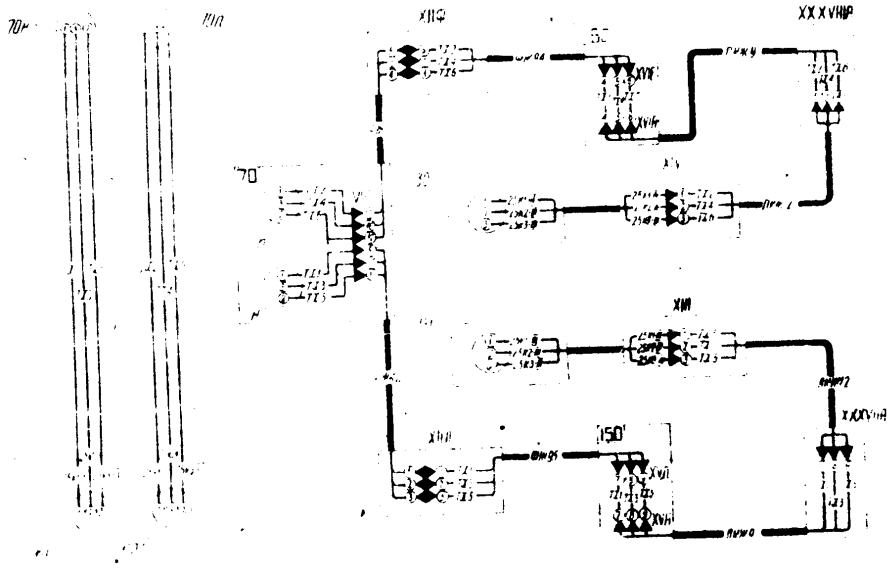

Fig. 188. Principal and assembly diagram of the revolution meters.

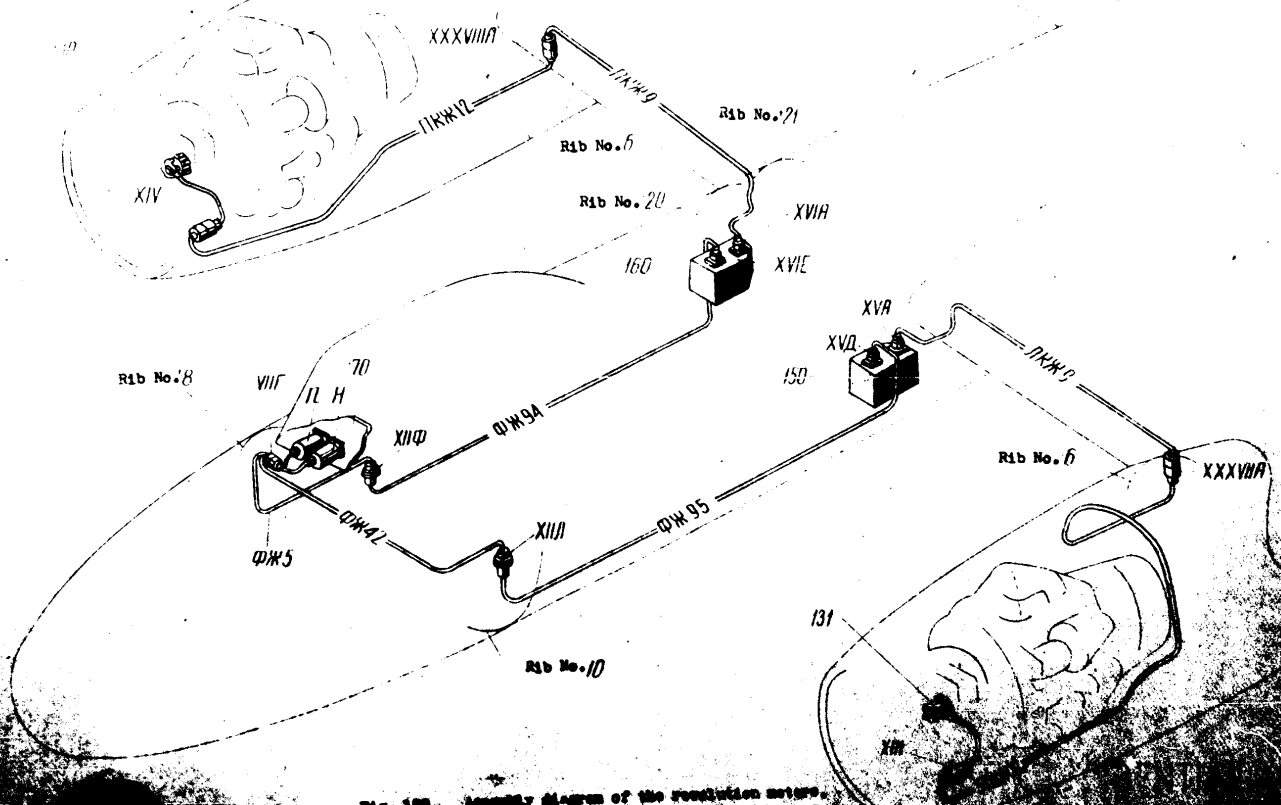

Fig. 188. Assembly diagram of the ventilation motors.

ENGINE EXHAUST GAS THERMOMETER CIRCUIT.

/Fig. 190, 191/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	[illegible]
1	2	3	4	5	6
70		Pilot's instr. board	1	Made by manufacturer	[illegible]
	P	Left engine exh. gas temperature indicator	1	TBГ-11	[illegible]
	c	Dtto, right engine	1	TBГ-11	[illegible]
132		Right engine exh. gas temperature sensing elem.	1	TBГ-11	Right engine [illegible]
133		Dtto, left engine	1	TBГ-11	Left engine [illegible]
150		Left CDS	1	Made by manufacturer	[illegible]
160		Right CDS	1	Dtto	[illegible]
222		Right engine exh. gas thermometer junction block	1	TBГ-11	Right engine [illegible]
223		Dtto, left engine	1	TBГ-11	[illegible]
VII	Г	Pilot's instr. board connector	1	ШРБ004Т4Ш1	[illegible]
XII	Л	Pilot's cabin hermetic connecter	1	ШРГ-23	[illegible]
	Б	Dtto	1	ШРГ-23	[illegible]
XV	A	Left CDS connector	1	ШРБ004Т4Ш1	[illegible]
	A	Dtto	1	ШРБ004Т4Ш1	[illegible]
XVI	A	Right CDS connecter	1	ШРБ004Т4Ш1	[illegible]
	E	Dtto	1	ШРБ004Т4Ш1	[illegible]
XXXVII	A	Left nacelle connecter	1	ШРБ004Т4Ш1	[illegible]
XXXVIII	A	Right nacelle connecter	1	ШРБ[illegible]	[illegible]

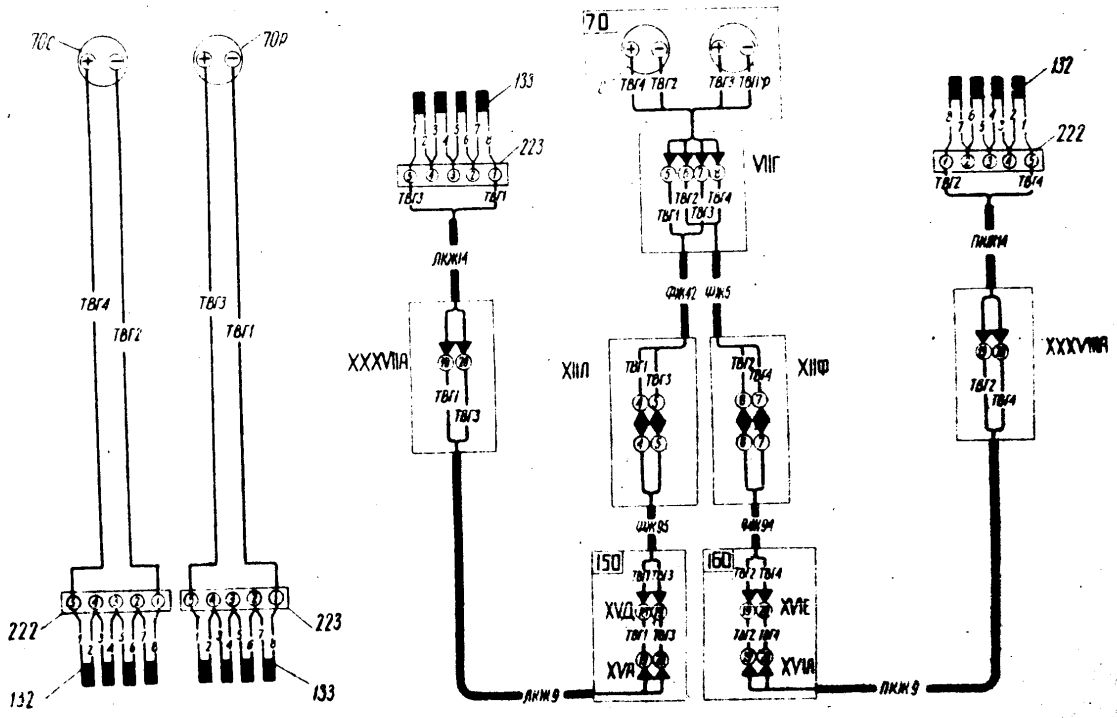

Fig. 190. Principal and assembly diagram of the exhaust gas thermometers.

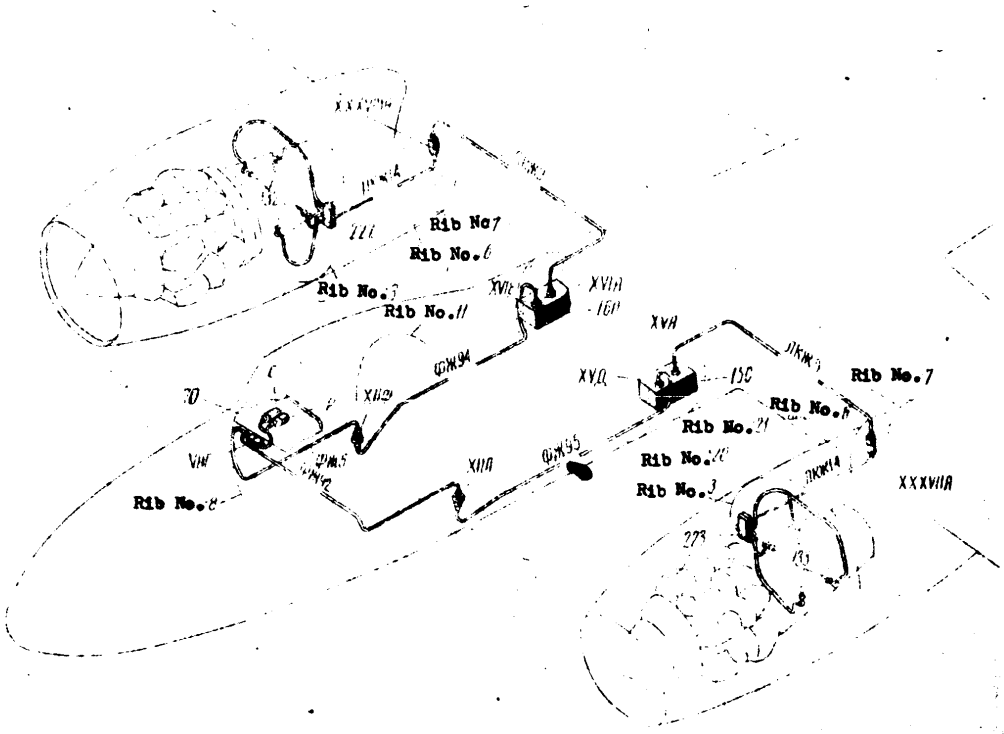

Fig. 191. Assembly diagram of the exhaust gas thermometers.

DE-ICING SYSTEM THERMOMETER CIRCUITS

/Fig. 192, 192a/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's [illegible] left [illegible] between [illegible] No. 8 & [illegible]
	o	Left wing de-icing syst. temperature indicator	1	T4T-9	Pilot's [illegible] desk
	o_1	Dtto, keel and stabilizer	1	T4T-9	- " -
	c_1	Dtto, right wing	1	T4T-9	- " -
167		Receiver of thermometer of keel and stabilizer de-icing system	1	T4T-9	Fuselage, [illegible] No. [illegible]
255		Dtto, left wing	1	T4T-9	Left [illegible] between [illegible] No. 4 & [illegible]
256		Dtto, right wing	1	T4T-9	Right [illegible] type [illegible] 4 & 5

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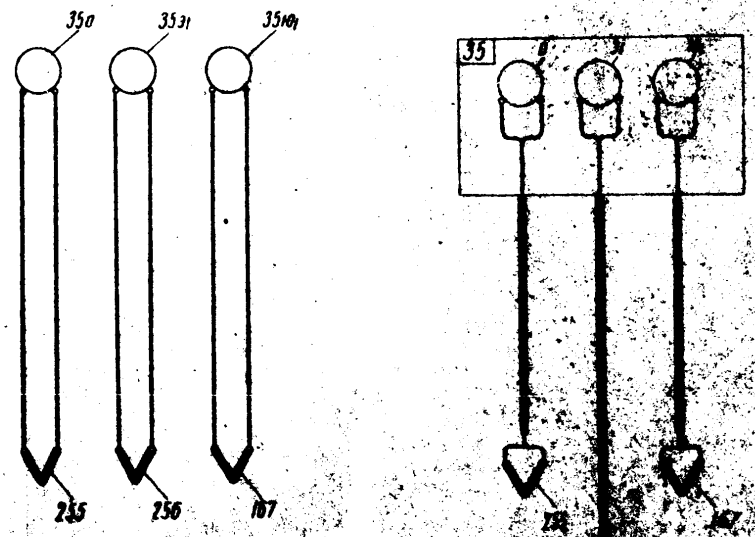

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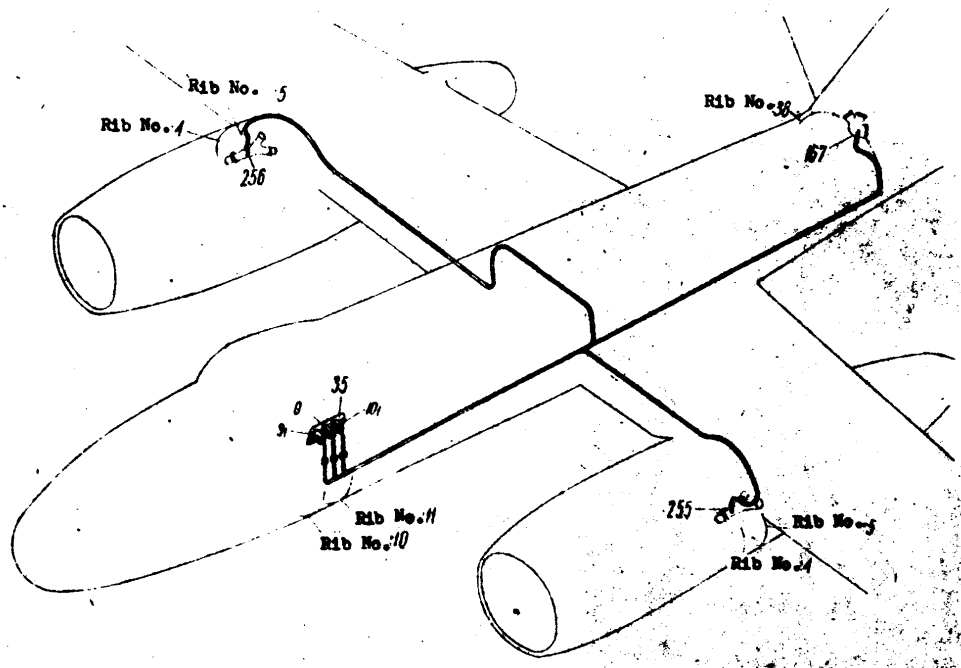

Fig. 192a. Assembly diagram of the de-icing system thermometers.

CIRCUIT OF THE BREAKING PARACHUTE

/Fig. 193/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
50		Trim tab control board	1	Made by manufacturer	Pilot's cabin, left wall, between girder No. 6 & 7
	e	Pilot's ventilator switch	1	B-45	Trim tab control board
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right wall, between girder No. 6 & 11
	B	Pilot's right desk bus bar	1	Dtto	Pilot's right desk
	Y	Breaking parachute net limit switch	1	A3C-5	- " -
226		Breaking parachute release button	1	204-KC	Steering column
227		Dtto	1	204-KC	- " -
401		Br. parachute lock socket	1	48-K	Fuselage, rib No. 40, left board
402		Dtto	1	Д3-50	Br. parachute container
403		Br. parachute releasing lock	1	Д4-49	Fuselage, between ribs 40 & 41
V		Trim tab control board connector	1	ШРУ0К6Ч№3	Pilot's cabin, left wall, between girder No. 6 & 7
VI	Г	Pilot's right desk connector	1	ШРЗЗП3МНГ3	Pilot's right desk
XII	M	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
	H	Dtto	1	ШРГ-23	- " -

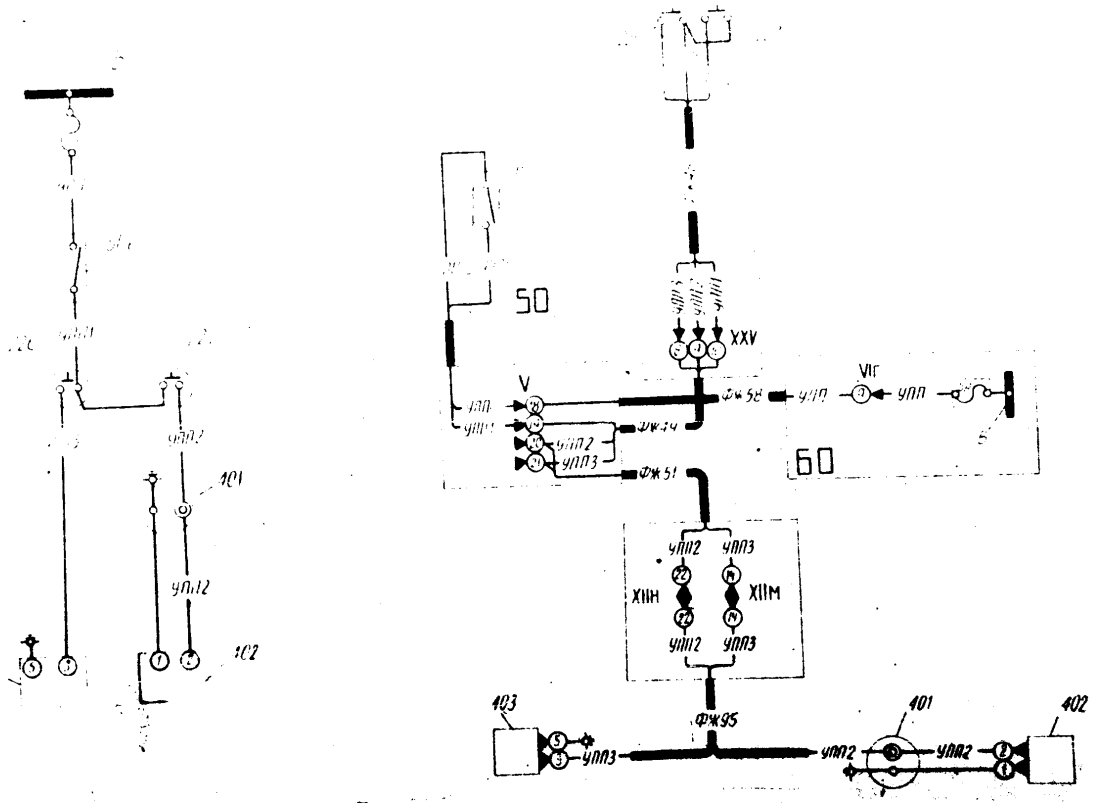

Fig. 195. Principal and assembly diagram of the heating procedure.

The bombs are being released by two electric circuits: the battle and emergency circuit.

In battle the bombs are released automatically by the navigator with fuses adjusted for explosion.

In emergency the bombs can be released with fuses adjusted for explosion, or for no explosion by the navigator or the pilot.

The electrical circuit for releasing of the bombs is coupled with the bomb bay door circuit, so that the bombs cannot be released, when the bomb bay doors are shut.

The circuit for control of the bomb bay door serves for:

- opening and shutting the door by the navigator /switch 10r/
- emergency opening and shutting of the door by the navigator /switch 10m/
- emergency opening shutting of the door by the pilot /switch 3.7/.

With emergency releasing of the bombs by the pilot or the navigator the bomb bay doors open automatically by means of the bomb release switch 10m or 35m .

Battle releasing.

Before releasing the clamp switch 10m and 10m is connected. When the main switch is operated, the relay 10a operates, and closes the circuits: release with fuses adjusted for explosion, and indication.

When the switch 10p is put in the position, corresponding to open bay doors, the electric valve 521 opens and air is let into the cylinder controlling the doors, are opened.

When the doors are opened, button switches 529 are closed.

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As a result of the closing of button switches 525 the relay 502 operates and closes the circuit, feeding current to the bomb release box КВС5-48А /500/.

When the push-button switch 529 is closed, the circuit of the mechanism МВН-48, for adjusting the fuses for explosion or no explosion operates, and adjusts the fuses for explosion.

The bombs are released by means of the electric bomb releasing device ЭСБР-49М /10М/, by pushing the knob 534 or by the closing of the circuit on the aiming set 9.

The order of releasing of the bombs is set on the electric releasing device /10М/.

The sequence of the releasing is assured by the box 500, which distributes the current pulses to the leads of the bomb holders ПБД-46, to the locks of the bomb holders.

Emergency releasing.

Emergency releasing, with the fuses adjusted for no explosion, is achieved by closing the switch 10л of the navigator or 35л of the pilot. The switch "Взрыв - Невзрыв" /Explosion - no explosion/, 10х of the navigator and 35к of the pilot, is in the corresponding position "Невзрыв" /No explosion/.

When the switch "Аварийный сброс" /Emergency releasing/ is closed, the relay 10щ or operates, and opens the electro-valve 518, which lets the air into the door controlling cylinder, and so opens the doors of the bomb bay.

When the doors open, the button switch 524 is closed. When the switch 523 is closed, relay 531 operates, and [illegible] current to the bomb holders.

When the bombs have been released, the switch "Аварийный сброс" /Emergency releasing/ is put back to the original position to close the bomb bay doors.

Emergency releasing with the fuses adjusted for explosion is achieved by putting the switch [illegible] the position corresponding to "Explosion", [illegible] button for emergency releasing /1л or 35л/.

The mechanism "Взрыв - Невзрыв" [illegible] no explosion/ operates on "Взрыв" /Explosion/.

Indication.

The bombing equipment includes the indication:

1/ of closed bomb bay doors - red lamp 10x and white lamp 35ж for shut, and green lamps 10ц and 33в for open.

2/ of current in the releasing system - white lamp 10c/

3/ of position of the mechanism for adjusting the fuses for explosion or no explosion /explosion - red lamps 10T, 35e/

4/ of operation of the electro-unit ЭСБР-49М /white lamp 10y/

5/ of the bomb holders /white lamps 10a, 10б, 10в, 10г, 10д, 35a, 35б, 35в, 35г, 35д/

6/ hanging of the bombs on the beam holder - green lamps 508 for show, red lamps 509 for stop/

7/ of switched on power net, connected to the bomb bay door control system. This indication serves for ascertaining the safety of work in the bomb compartment.

For work in the bomb compartment the switches 517 and 510 are used to disconnect the door shutting valves 516, 518 and 509 /500/, so that it is not possible to close the doors and release the bombs.

NOTE: When working in the bomb bay disconnect the traction elements of the doors.

The indication and warning lamps of the bombing equipment are checked by rotating the switch 10H.

Firing control and feeding.

For firing the steering wheel is provided with a trigger button /651/, which closes the circuit of relay /671, 655/. The relay operates, and feeds current to the gun firing mechanism /694, 654/. Each gun can be switched on by means of switch /670,652/. This allows each gun to be fired separately, or both guns to be fired simultaneously.

The refeeding of the guns is achieved by pushing the buttons 600 and 661, which close the circuits of the electro-valves, /697, 659/ and the releasing electromagnets of the re-feeding mechanism /696/. The guns are put into position "Ready for battle", and the re-feeding system into the initial position. In this position the electric contacts of the guns are closed, and the lamps of the cartridge counters /698, 654/ shine.

The refeeding system provides for four re-feeding of the gun. After this it is necessary to re-load the guns and to put the re-feeding system into the initial position by pushing the re-feeding knobs.

The firing control of the rear turret and the re-feeding is similar.

Control of the photo-gun.

When the firing button of the guns is pushed /651/ the photo-gun is also fed by power /655/. Pilot lamp 656 indicates the operation of the photo-gun.

The rear turret aiming set.

Fig. 218 to 223 gives the circuits of connection of the aiming set ACП-3П to the board power system and the aiming set aggregates.

The button 602 serves for fixing the cross of the aiming set during quick moves of the equipment.

To stabilize the voltage the circuit includes a voltage regulator 80k. The output voltage of the regulator is measured on the socket 80м. The ceiling lamp fitting of the rear turret is also supplied by power through the fuse of the aiming set.

The rear turret is controlled by means of of hydro-electric system.

The electric system is supplied by a. c. from the aeroplane dynamotor MA-500 and by d. c. from the board power system.

The electrical system is switched on by means of switch 605a , which switches on the dynamotor MA-500, and by means of tumbler-switch 605e , which connects the d. c. to the system.

When directing the arms upon the target the gunner moves the aiming set. The vertical and horizontal movement of the aiming set is transferred to the arms, which, following the movements of the aiming set, are also directed upon the target.

In the handle of the aiming set switch 602e with a pedal is placed. When the pedal is pressed, the switch operates the relay of the releasing box 664, which switches on the electric instrument MM-2500 /668/ and the pumping aggregate AMM-5.

When the pedal is let loose, the relay automatically switches off the supply of the MM-2500.

The electric control system operates on the principle of an potentiometer bridge. When the voltages on the aiming set and on the arms are equal, the system is in equilibrium, and no current flows through the system.

When the position of the aiming set is changed, the pulses of the sender-potentiometers change simultaneously the system is no longer balanced, and a current flows through the system. This current is amplified in the amplifier 611 and closes the relay, which switches on the power relays /613/ of the electromechanical breakes and clutch mechanisms in the PTM-3. The second amplifier is a spare one, and is switched on in case of a defect of the first one, by means of button 605a.

The power relay connects the power supply /the board power system/ to the leads of the mechanism РУП-3.

The electromagnetic break releases the mechanism РУП-3.

When the amplifier supplies no current, the mechanisms ~~xxxxxx~~ РУП-3 are breaked.

Electromagnetic clutches couple the rotating shafts of the reducing gears to rotate ~~xx~~ in this or the other direction, according to the voltage, due to the movement of the aiming set.

Operating power in the hydraulic system is obtained from pumps, which are activated by the mechanism РУП-3.

The inclination of the pumps and their power is the larger, the larger the change of position of the aiming set.

When the handle of the aiming set is released, the set, and simultaneously the arms, automatically return into the initial position. The switch 602 returns into the initial position, and the current through this switch and the closed button switch 602м proceeds to the relays 80р and 80м .

The button switch 602м is open only, when the aiming set is in the initial position.

The relay 80р switches on the electro-valve 80Н, which opens the way to the air into the mechanism of the initial position, serving to return the aiming set into the initial position. The ralay 80м switches on the pumps. So the aiming set is returned into the initial position by air, and the arms in the usual manner.

NOTE: The rear turret -КВ-51 used on aeroplanes differs from the turret МА-КВ in the following:

a/ the amplifiers operate in parallel, and so the amplifier switching board is ~~xxxxxxx~~ omitted;

b/ the dynamotor МА-100 is not used. The ~~xx~~ c. is drawn from the common dynamotor ~~xx~~-500 in the navigator's cabin;

a/ a potentiometric system for returning to the initial position is used; thus the electromechanical system for returning to the initial position [illegible]

For a detail description of the [illegible] "Technical description of the rear gun turret [illegible]

In the rear turret [illegible] with the releasing box MK-2500 is [illegible] distribution box PKY-6-[illegible] is used, and the [illegible] 1 and 2 operate in parallel.

CIRCUITS OF THE BOMBING EQUIPMENT.

/Fig. 197 - 202/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
9		Automatic pilot course stabiliser	1	АП-5	Navig. [illegible] front part
10		Navig. left desk	1	Made by manufacturer	Navig. [illegible] left [illegible] between [illegible] No. 1 & 4
	а	Bomb release from left front bay indic. lamp	1	СЛЦ-51	Navig. left desk
	б	Dtto, right front bay	1	СЛЦ-51	" " "
	в	Dtto, beam holder	1	СЛЦ-51	" " "
	г	Dtto, left rear bay	1	СЛЦ-51	" " "
	д	Dtto, right rear bay	1	СЛЦ-51	" " "
	ж	Switch	1	2В-45	" " "
	$ж_1$	Closed bay indication lamp switch	1	В-45	" " "
	з	Rear bay switch	1	В-45	" " "
	и	Front bay switch	1	2В-45	" " "
	л	Emergency bomb release switch	1	2ПП-45	" " "
	М	Electro-releasing	1	ЭСБР-49М	" " "
	Н	Lamp checking switch of the emergency bay control system	1	ПВ-12А-2	" " "
	п	Emergency bay control switch	1	ПН-45	" " "
	р	Bay control switch	1	ПН-45	" " "
	с	Pilot lamp "Bombing net on"	1	СЛЦ-51	" " "
	Т	Pilot lamp "Explosion"	1	СЛЦ-51	" " "
	у	Pilot lamp "ЭСБР oper."	1	СЛЦ-51	" " "
	х	Pilot lamp "Bays shut"	1	СЛЦ-51	" " "
	ц	Pilot lamp "Bays open"	1	СЛЦ-51	" " "
	щ	Intermediate relay	1	РМ-[illegible]	" " "
	ъ	Dtto	1	РП-1	" " "
20		Navig. right desk	1	[illegible]	[illegible]
	Э	Socket for connecting the AGA with ЭСБР	1	[illegible]	[illegible]

1	2	3	4	5	6
35		Pilot's left desk	1	Made by manufacturer	Pilot's cabin ribs No. 8-11
	а	Left front bay bomb release indication lamp	1	СЛЦ-51	Pilot's left desk
	б	Dtto, right front bay	1	СЛЦ-51	- " -
	в	Dtto, beam holder	1	СЛЦ-51	- " -
	г	Dtto, left rear bay	1	СЛЦ-51	- " -
	Д	Dtto, right rear bay	1	СЛЦ-51	- " -
	е	Pilot lamp "Explosion"	1	СЛЦ-51	- " -
	ж	Pilot lamp "Bays shut"	1	СЛЦ-51	- " -
	з	Pilot lamp "Bays open"	1	СЛЦ-51	- " -
	И	Emergency releasing switch	1	ЗПП-45	- " -
	Н	Emergency bay shutting button	1	ЗКС	- " -
40		Navig. CDB	1	Made by manufacturer	Navig. cabin, right board, between ribs No. 4 & 6
	1	CDB bus bar	1	Made by manufacturer	CDB
	БП15	Met limit switch, bomb releasing	1	АЗС-10	CDB
	ОП	Met limit switch, bomb releasing /7.144 with aeroplanes 1101, 1101, 1701/	1	АЗС-5	CDB
	ДП	Met limit switch, bay door control	1	АЗС-10	CDB
	АРС	Met limit switch, bomb releasing	1	АЗС-10	CDB
	АКТ	Met limit switch, mechanism "Expl.-No expl./	1	АЗС-5	CDB
150		Left CDS	1	Made by manufacturer	Fuselage, left board, between ribs 20 & 21
160		Right CDS	1	Dtto	Fuselage, right board, between ribs 20 & 21
500		Bomb release sequence box	1	КВСБ-48А	Navig. cabin, between [illegible] No. [illegible]
502		Blocking relay of battle bomb releasing	1	МР-1	Navig. cabin, between [illegible] No. [illegible]

1	3	4	5	6
505	Ceiling lamp fitting of bomb compartment	1	П-39	Bomb compartment
506	Button switch of bomb holder indication	1	ВК2-140А-1	Beam holder
507	Dtto	2	КВ-6А	- " -
508	Lamp for lighting the inscription "Slow"	1	СМЦ-51	Fuselage, between ribs No. 33 & 34
509	Dtto, inscr. "Stop"	1	СМЦ-51	- " -
510	Right front bay	1	КА-3	Fuselage, right board, between ribs 20 & 21
511	Left front bay	1	КА-3	Fuselage, left board, between ribs 20 & 21
512	Lock "Explosion-no explosion"	1	МПП-48	Beam holder
513	Holder lead	1	ПВА-48	- " -
516	Electro-valve of emergency bay shutting	1	ЭК-48	Fuselage, rib No. 18
518	Dtto, emergency opening	1	ЭК-48	- " -
519	Electro-valve, bay shutting	1	ЭК-48	- " -
520	Switch of bay closing	1	ВВ-45	- " -
521	Electro-valve of battle opening of bays	1	ЭК-48	- " -
522	Right rear bay	1	КА-3	Fuselage, right board, between ribs 25 & 26
523	Left rear bay	1	КА-3	Fuselage, left board, between ribs 25 & 26
524	Emergency releasing button switch	1	ВК2-140А-1	Fuselage, rib [illegible]
525	Battle releasing button switch	1	Dtto	- " -
527	Lock blocking switch	2	Dtto	Beam holder
528	Indication board	1	Made by manufacturer	Fuselage, [illegible] rib No. 20
	a Lamp "Danger, switch on net"	1	СМЦ-51	Indication [illegible]
	b Ceiling fitting switch	1	В-45	- " -
	c Pilot lamp "Bomb net on"	1	СМЦ-51	Fuselage [illegible] No. [illegible]
529	Fuse blocking system button switch	1	ВК2-140А-1	[illegible]
530	Emergency bay opening relay	1	[illegible]	[illegible]
531	Emergency releasing contactor	1	К-[illegible]	[illegible]
517	Blocking switch, releasing and bay closing net	1	[illegible]	[illegible]

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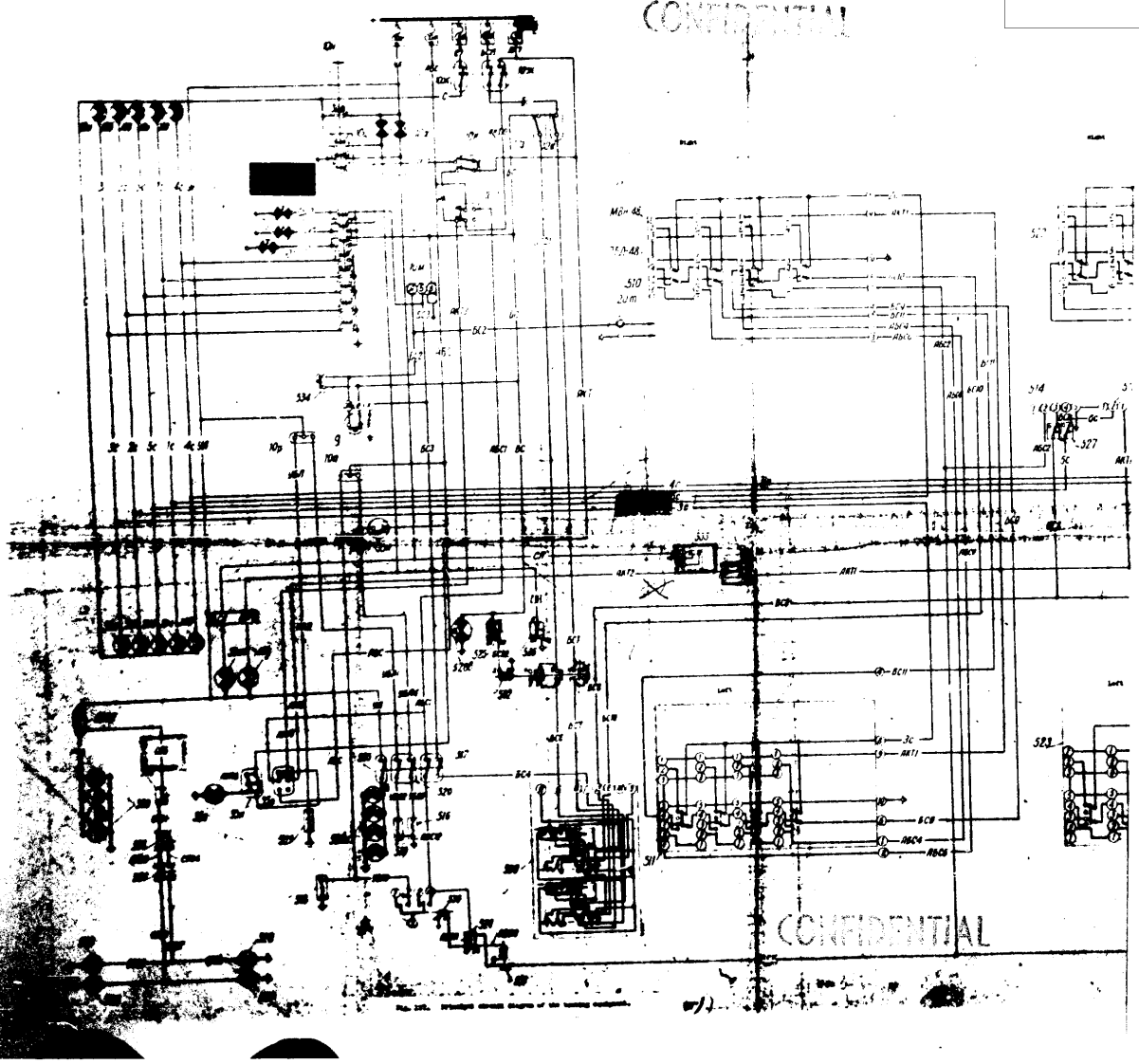
		1 ШР48 п26 нш2	
		1 ШР55 п34 нш3	
		1 ШР55 п34 нш3	
		1 ШР48 п26 нш2	
		1 ШР32 п12 нш1	
		1 ШР32 п12 нш1	
		1 ШР48 п26 нш2	
		1 ШР40 п16 нш3	
		1 ШР48 п9 нш1	-/from 2401, 2601, 3704/
	Signalling and formation light connector	1 ШР10 пк3 п6	Fuselage, right board, rib 32
	Beam holder connector	1 ШР32 пс10 нш1	Beam holder



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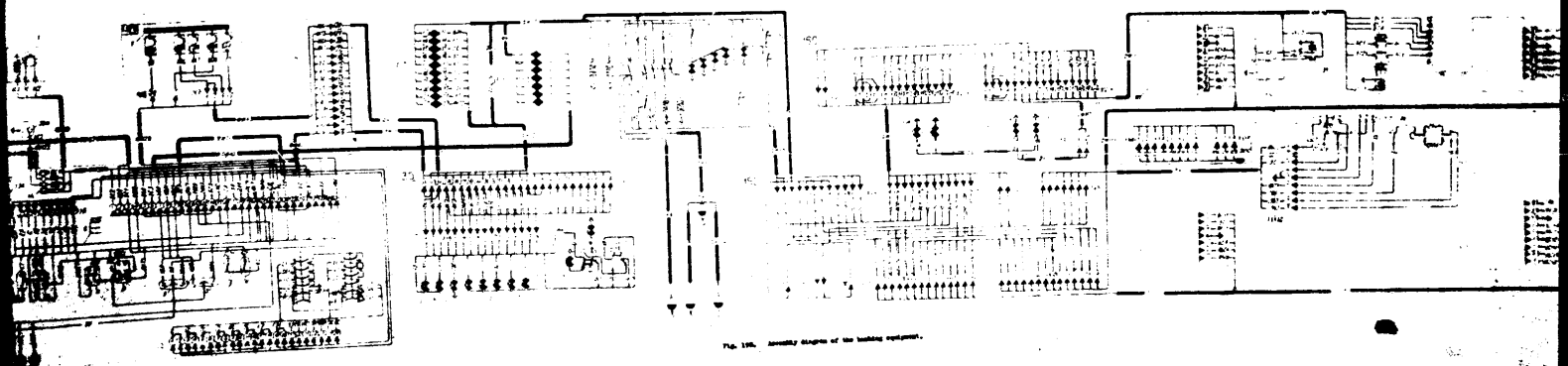

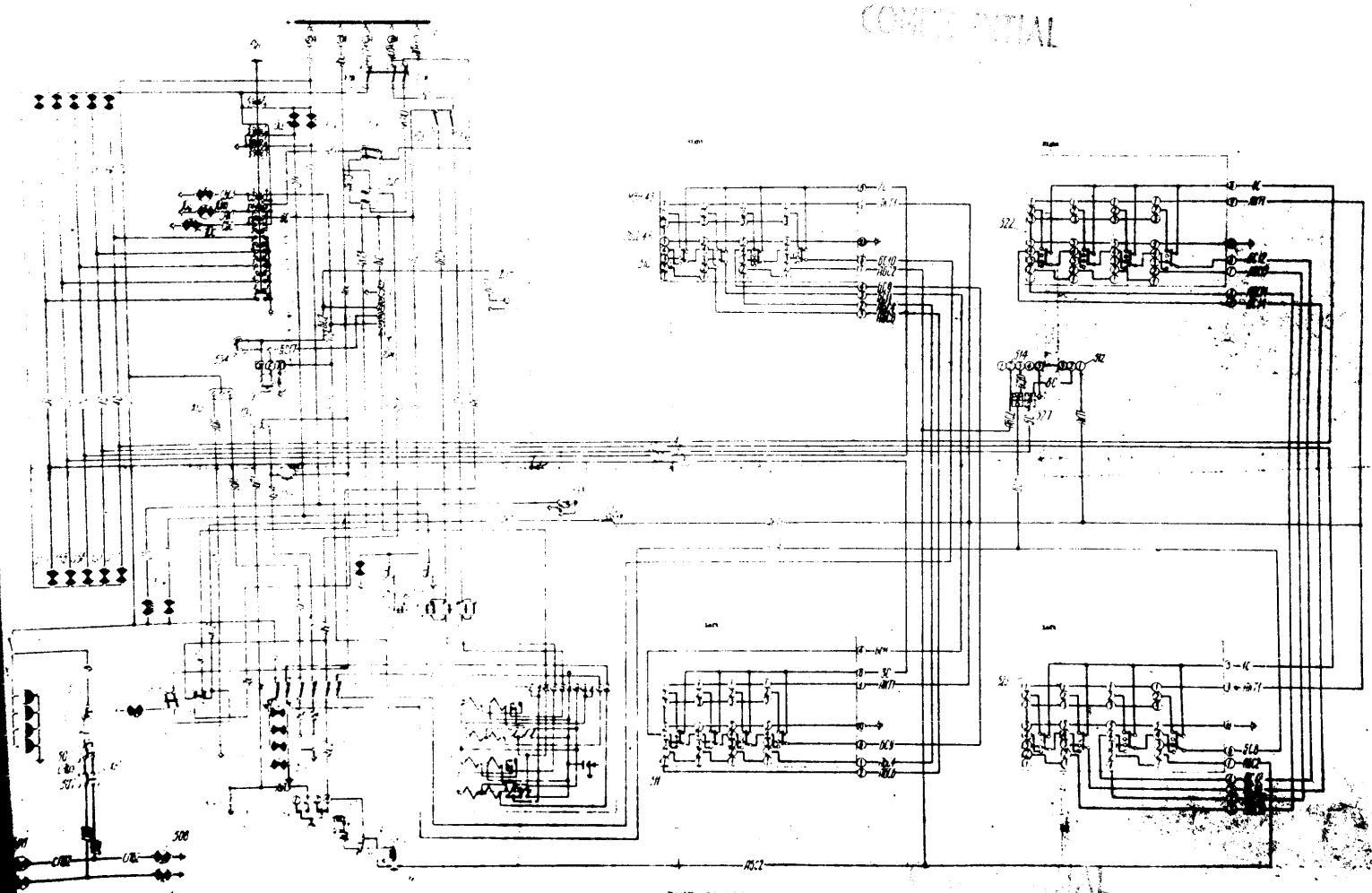

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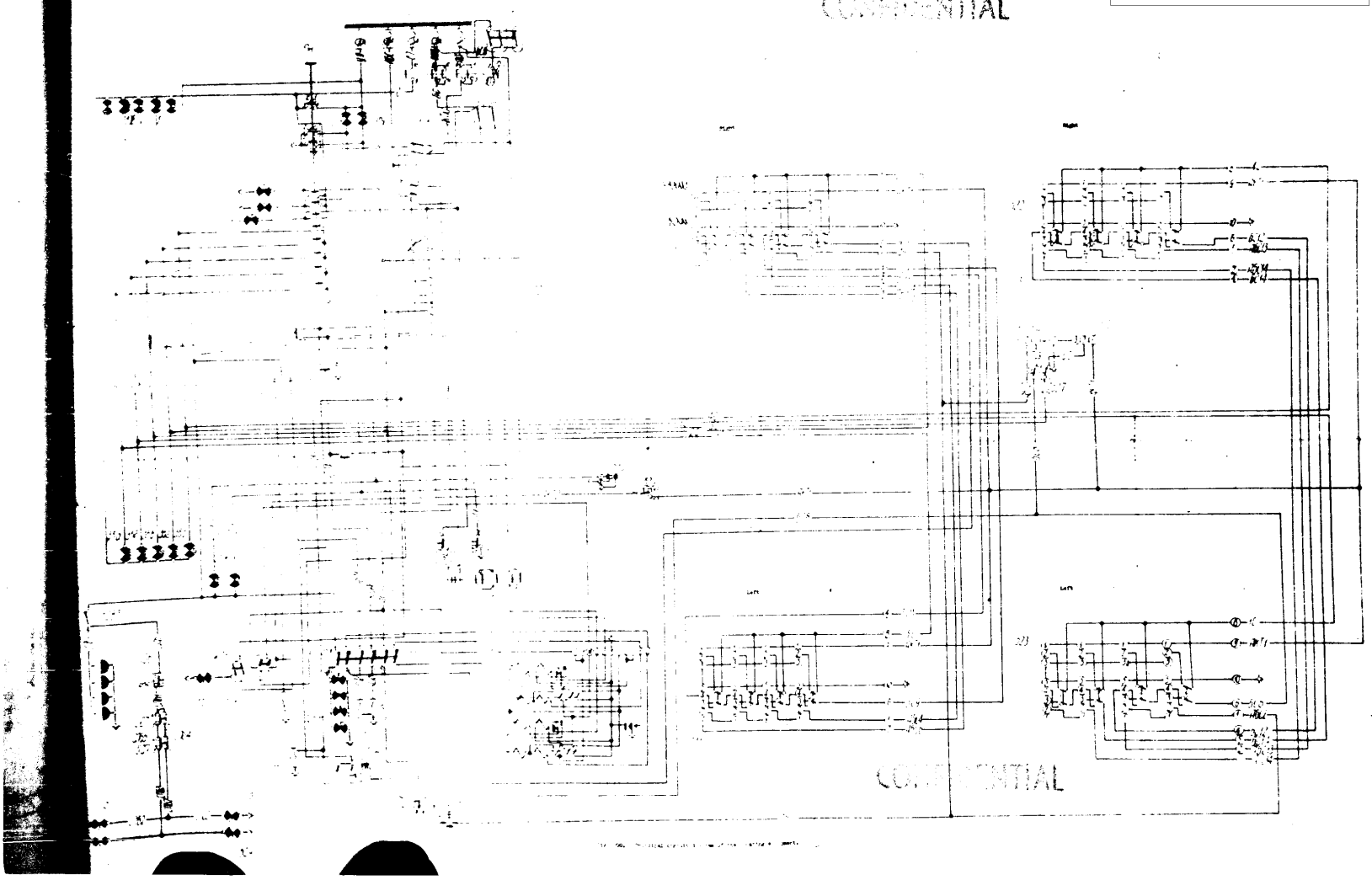

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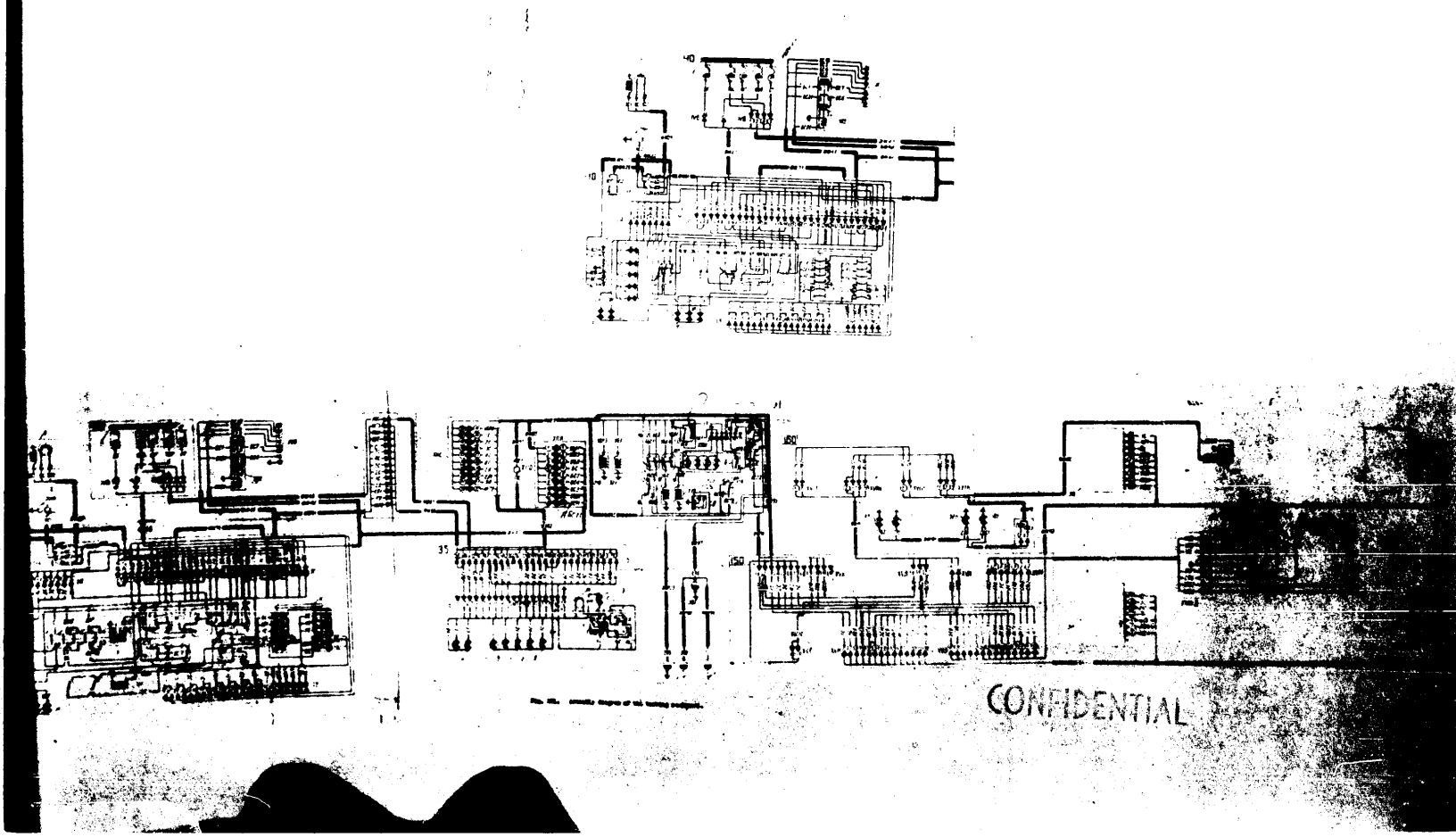

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CIRCUITS OF FIRING CONTROL AND FRONT M

/Fig. 206 ; 208/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
25		Landing light control board	1	Made by manufacturer	Pilot's cabin, left board, between ribs No. 8 & 9
	*	Aiming set lighting rheostat	1	ПКИ	Landing light control board
	3	Pilot's aiming set light socket	1	47-K	- " -
60		Pilot's right desk	1	Made by manufacturer	Pilot's cabin, right board, between ribs No. 6 & 11
	B	Pilot's right desk bus bar	1	Dtto	Pilot's right desk
	CП	Net limit switch of nose gun firing	1	A3C-5	- " -
	CП ПП CП10	Net limit switch of front gun firing	1	A3C-5	- " -
	AП04	Net limit switch, nose gun control	1	A3C-5	- " -
70		Pilot's instr. board	1	Made by manufacturer	Pilot's cabin, rib No. 8
600		Left nose gun re-loading button	1	204-KC	Pilot's instr. board
651		Nose gun firing button	1	204-KC	Pilot's [illegible] column
652		Right nose gun firing switch	1	B-45	Pilot's instr. board
653		Right gun firing contactor	1	K-100A	Fuselage [illegible] board, ribs [illegible]
654		Right nose gun	1	HP-23	[illegible]
655		Nose mounting [illegible]	1	D-13	[illegible]
656		[illegible]	[illegible]	[illegible]	[illegible]
658		Right nose gun cartridge counter	1	[illegible]	[illegible]

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1	2	3	4	5	6
659		Electro-valve of the right nose gun re-loading system	1	9K-48	Fuselage, right board, rib 4
661		Right nose gun re-loading button	1	204-KC	Pilot's instr. board
670		Left nose gun firing switch	1	B-45	- " -
671		Left nose gun firing contactor	1	K-100A	Fuselage, left board, between ribs 8 & 9
694		Left nose gun	1	HP-23	Fuselage, left board, between ribs 1 & 2
696		Net limit switch, nose gun re-loading	1	AM-5	Fuselage, left board, rib 4
	a	Capacitor block	1	From unit AM-5	- " -
	б	Junction box	1	75-K	- " -
697		Electro-valve of left nose gun re-loading	1	9K-48	Fuselage, left board, rib 4
698		Left nose gun cartridge counter	1	YC5-1	Pilot's instr. board
I	ш	Navig. cabin connector	1	ШРС5п31нп3	Navig. cabin, left board, rib No. 8
VI		Pilot's right desk connector	1	ШРС5п31нп3	Pilot's right desk
VII	Е	Pilot's instr. board connector	1	ШР48п24шм2	Pilot's instr. board
XII	П	Pilot's cabin hermetic connector	1	ШРГ-23	Pilot's cabin floor
XXV		Pilot's steering column connector	1	ШР28пк7нм7	Pilot's steering column

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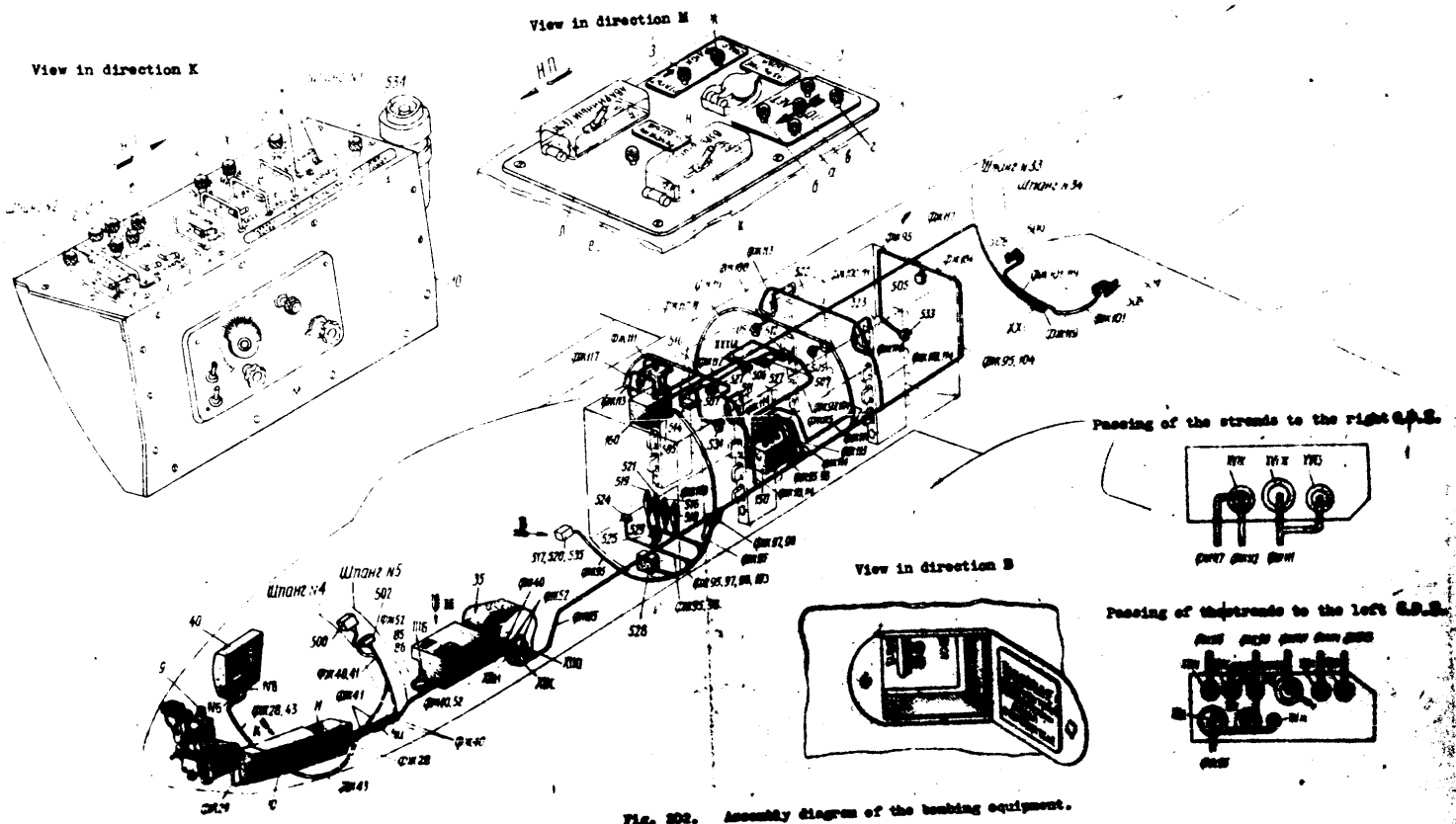

Fig. 202. Assembly diagram of the bombing equipment.

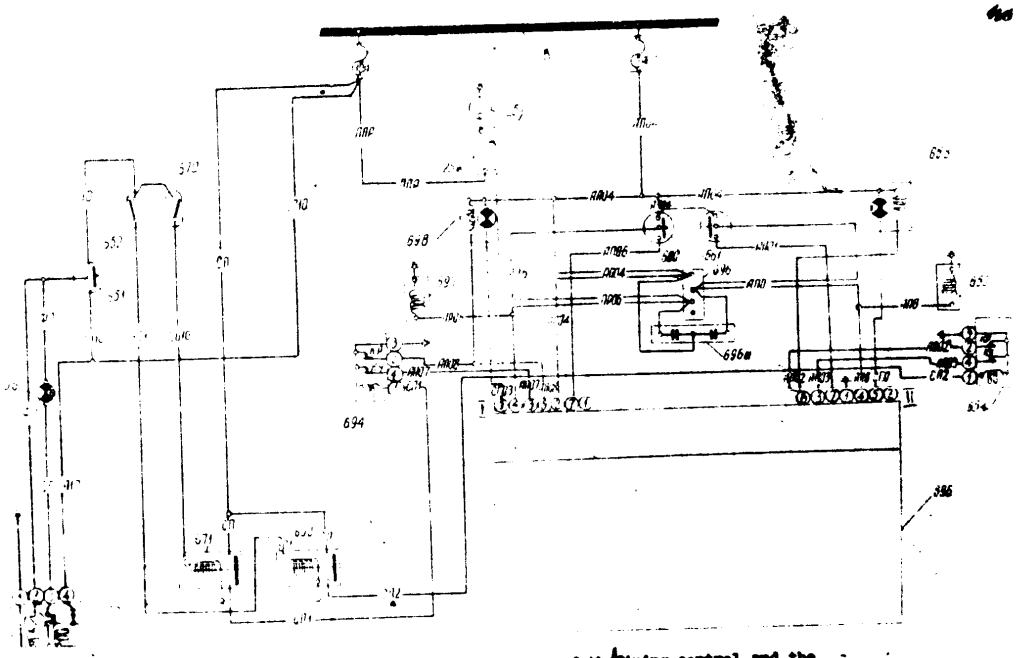

Fig. 205. Principal circuit diagram of the firing control and the reloading of the front mounting.

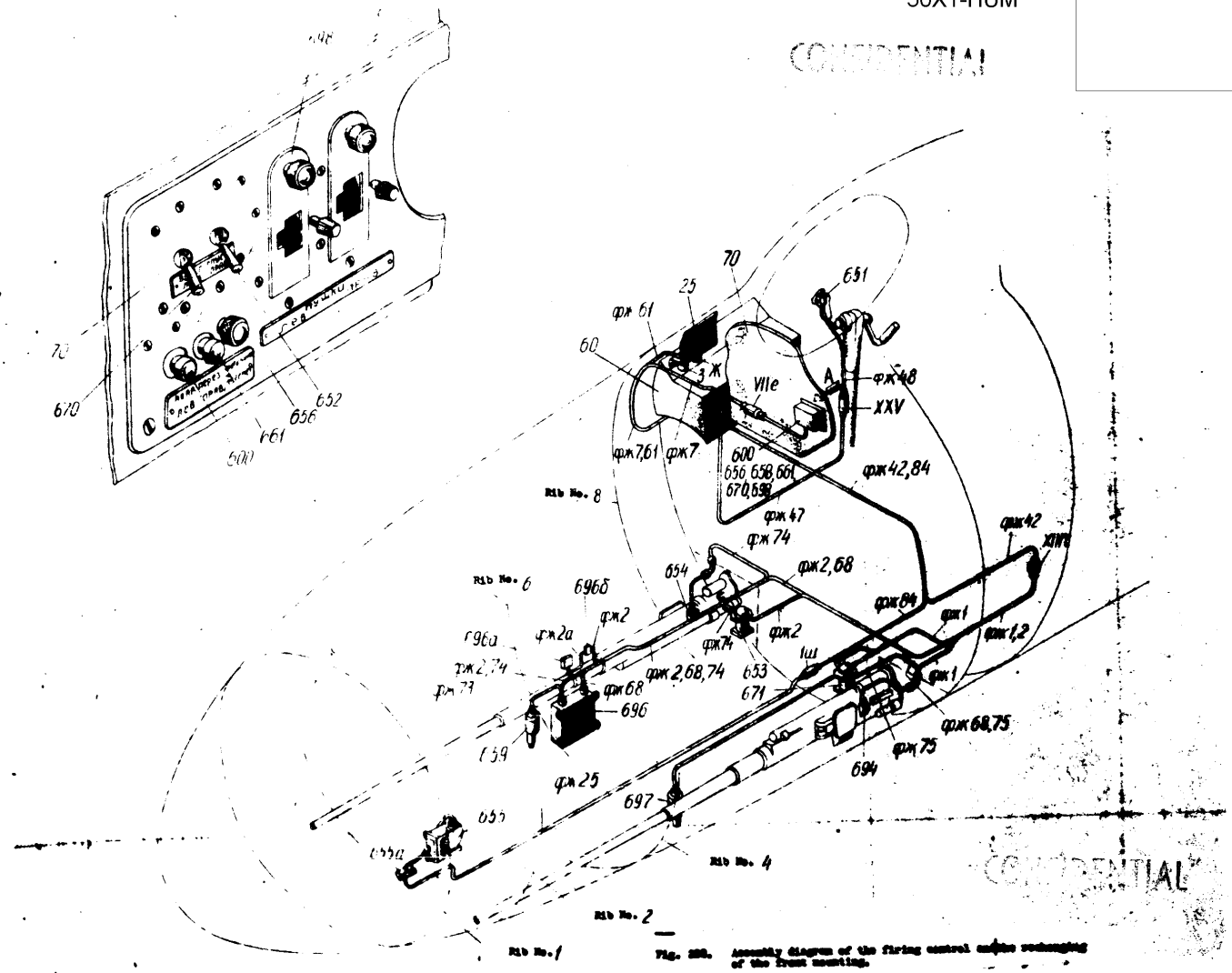

Fig. 288. Assembly diagram of the firing control engine mechanism of the front mounting.

CONTROL CIRCUIT OF FIRING AND RE-LOADING OF THE REAR TURRET ИЛ-К6.

/Fig. 216 to 217/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
85		Gunner's right desk	1	Made by manufacturer	Right board, between ribs No. 42 & 45
	ж	Left rear gun firing contactor	1	К-30А	Gunner's right desk
	з	Ditto, right gun	1	К-30Д	- " -
	р	Gunner's right desk bus bar	1	Made by manufacturer	- " -
	УО	Rear gun firing net limit switch	1	АЗС-5	- " -
	СП	Rear gun firing net limit switch	1	АЗС-5	- " -
	ПО	Rear gun re-loading control system net limit switch	1	АЗС-5	- " -
	ПУ7	Net limit switch of photo-gun, re-loading automatic system, rear turret control system power supply	1	АЗС-10	- " -
602		Aiming set	1	From unit ИЛ-К6	Gunner's cabin, between ribs No. 45 and 46
	р	Rear guns firing button	1	204-КС	Aiming set
	к	Photo-gun	1	ФКП-2-2	- " -
603		Rear turret board	1	From unit ИЛ-К6	Gunner's cabin, rib No. 46
	ь	Right gun re-loading button	1	204К6	Rear turret board
	а	Left gun re-loading button	1	204КС	- " -
	ф	Supply switch	1	В-45	- " -
	ж	Left gun firing switch	1	В-45	- " -
	з	Ditto, right gun	1	В-45	- " -
	и	Left gun cartridge counter	1	УСВ-1	- " -
	к	Ditto, right gun	1	УСВ-1	- " -
	л	Photo-gun indic. lamp	1	СМП-51	- " -

1	2	3	4	5	6
604		Rear turret	1	From unit ИЛ-К6	Rear part of fuselage
	a	Electro-valve of the left gun re-loading system	1	ЭК-48	Rear turret
	б	Ditto, right gun	1	ЭК-48	- " -
	В	Left gun	1	НР-23	- " -
	г	Photo-gun	1	С-13	- " -
	А	Right gun	1	НР-23	- " -
684		Rear gun re-loading automatic system	1	АП-5	Fuselage, right board, rib 42
	а	Capacitor block	1	From unit АП-5	- " -
	б	Junction block	1	75К	- " -
KVIII		Plug connector	1	ШР55ПК35НШ2	Gunner's cabin, between ribs 41 & 42
KXIII		Turret hermetic connector	1	ШРГ-23	Rear turret, rib No. 45

NOTE: The plug connectors: KVII, KVIIA, KVIII, KVIIIB, KVIII, KXII, KIXB, KXIVA, KXX KXIV, KXIVB are included in the unit ИЛ-К6 of the rear turret.

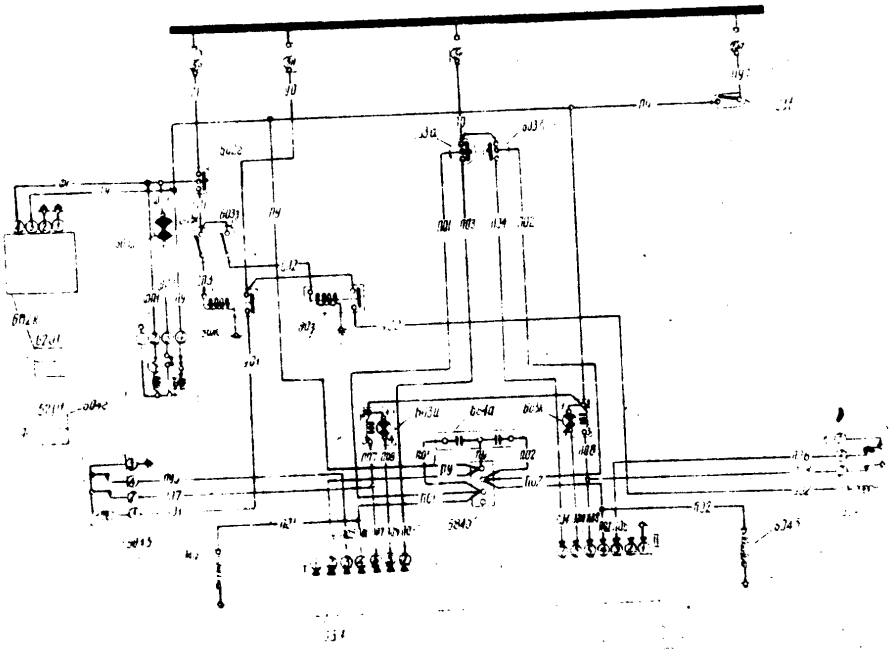

Fig. 215. Principal circuit diagram of the firing control and reloading of the rear mounting.

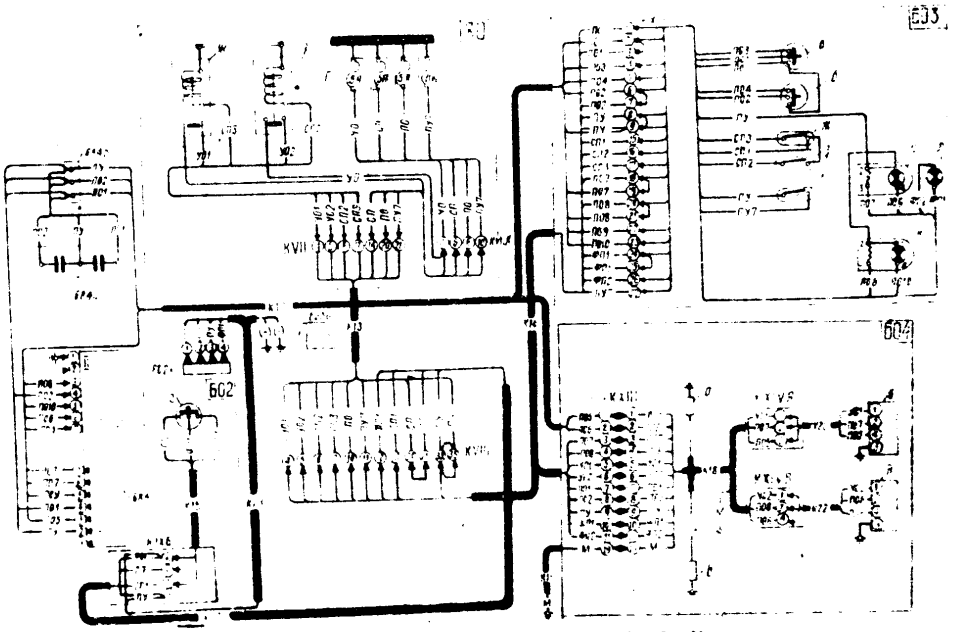

Fig. 216. Assembly diagram of the firing control and reloading of the rear mounting.

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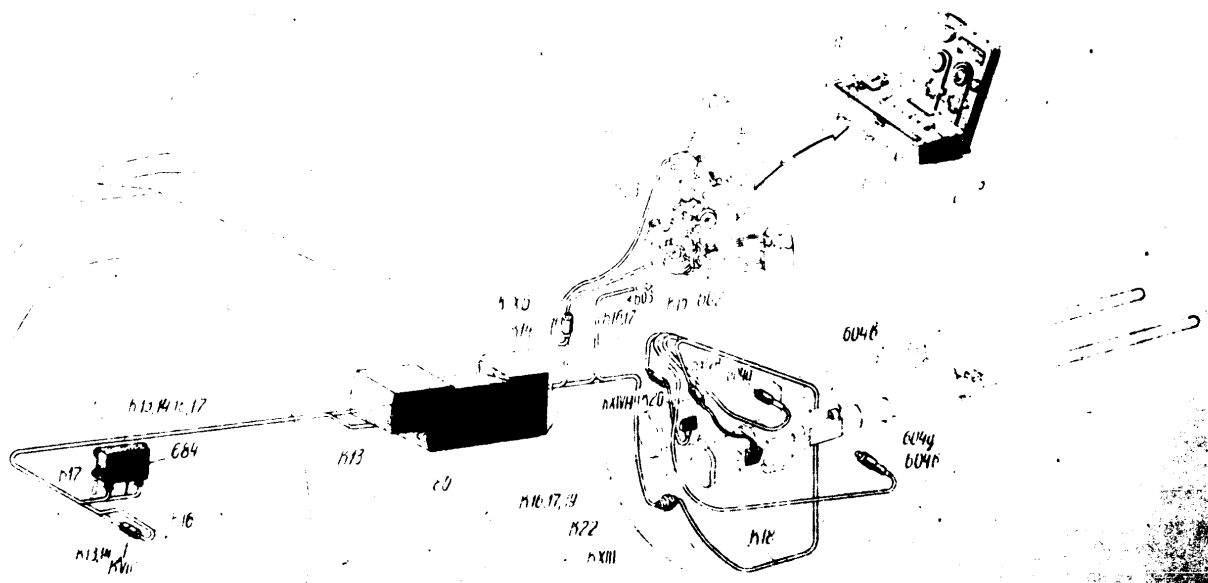

Fig. No. 42

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CIRCUIT OF THE REAR TURRET AIMING SET./И

/Fig. 222, to 223/

No. of pos.	No. of ind.	Name	No. of pieces	Type of element	Location
1	2	3	4	5	6
60		Gunner's right desk	1	Made by manufacturer	Gunner's cabin, right board ribs 42 & 45
	Г	Gunner's right desk bus bar	1	Dtto	Gunner's right desk
	и	Aiming set voltage checking socket	1	48K	- " -
	к	Voltage regulator	1	From unit АСП-3П	- " -
	л	Distribution box	1	Dtto	- " -
	у	Altitude mechanism	1	Dtto	- " -
	ф	Speed mechanism	1	Dtto	- " -
	АСП1	Aiming set net limit switch	1	АЗС-5	- " -
601		Rear turret junction box	1	From unit ИЛ-К6	Fuselage, rib No. 42
602		Aiming set	1		Gunner's cabin, rib 45 - 46
		Push-button	1	205	Aiming set
	з	Vertical initial position potentiometer	1	From unit АСП-5П	- " -
	и	Dtto, horizontal in. pos.	1	Dtto	- " -
603		Rear turret board	1	From unit ИЛ-К6	Gunner's cabin, rib No. 46
	е	Aiming set switch	1	В-45	Rear turret board
604		Rear turret	1	From unit ИЛ-К6	Rear part of fuselage
	е	Turret lamp fitting switch	1	В-45	Rear turret
605	м	Turret lamp fitting	1	ПСМ-45	[illegible]
		Filter	1	Ф-144	Gunner's [illegible] rib [illegible]
XVII		Junction box connector	1	[illegible]	
	А	Dtto	1	[illegible]	
VIII	Б	Gunner's right desk connector	1	[illegible]	Gunner's [illegible] desk

1	2	3	4	5
			ШР32ПК12ар3	
[illegible]	Б	[illegible] desk connector	1 [illegible]	
[illegible]		Gunner's desk connector	1 ШР55пк30нш2	
[illegible]		[illegible] hydraulic connector	1 ШР[illegible]-23	Gunner's turret, rib 45
[illegible]		[illegible] right desk connector	1 ШР48п20нш1	Gunner's right desk
[illegible]		[illegible]	1 ШР55пк35нш3	

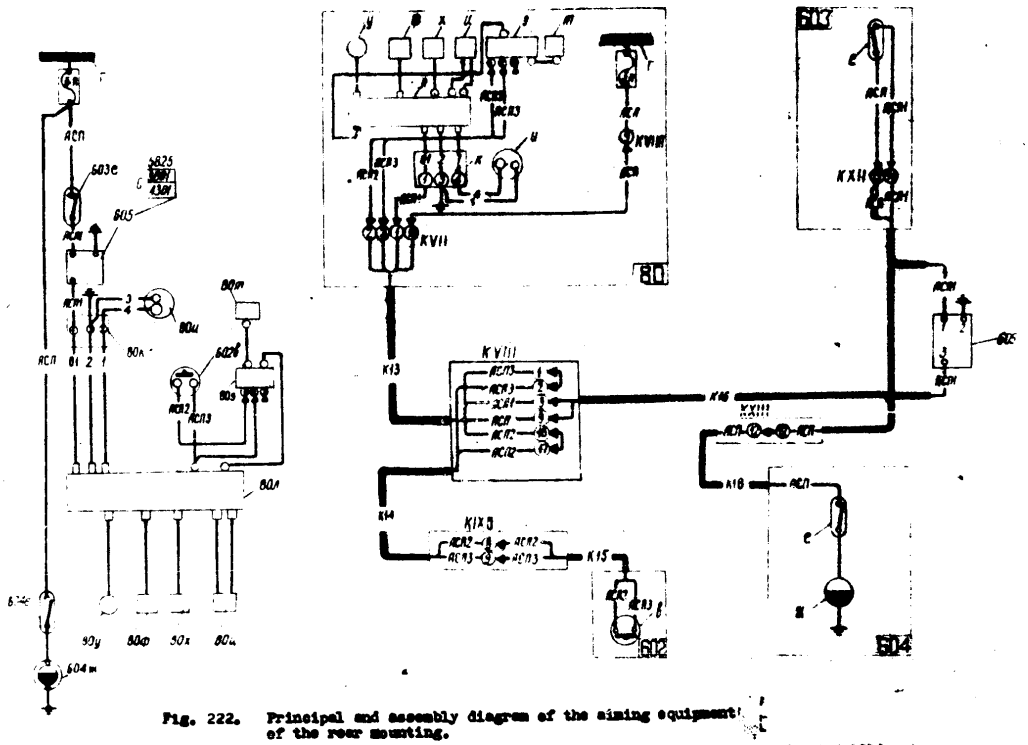

Fig. 222. Principal and assembly diagram of the aiming equipment of the rear mounting.

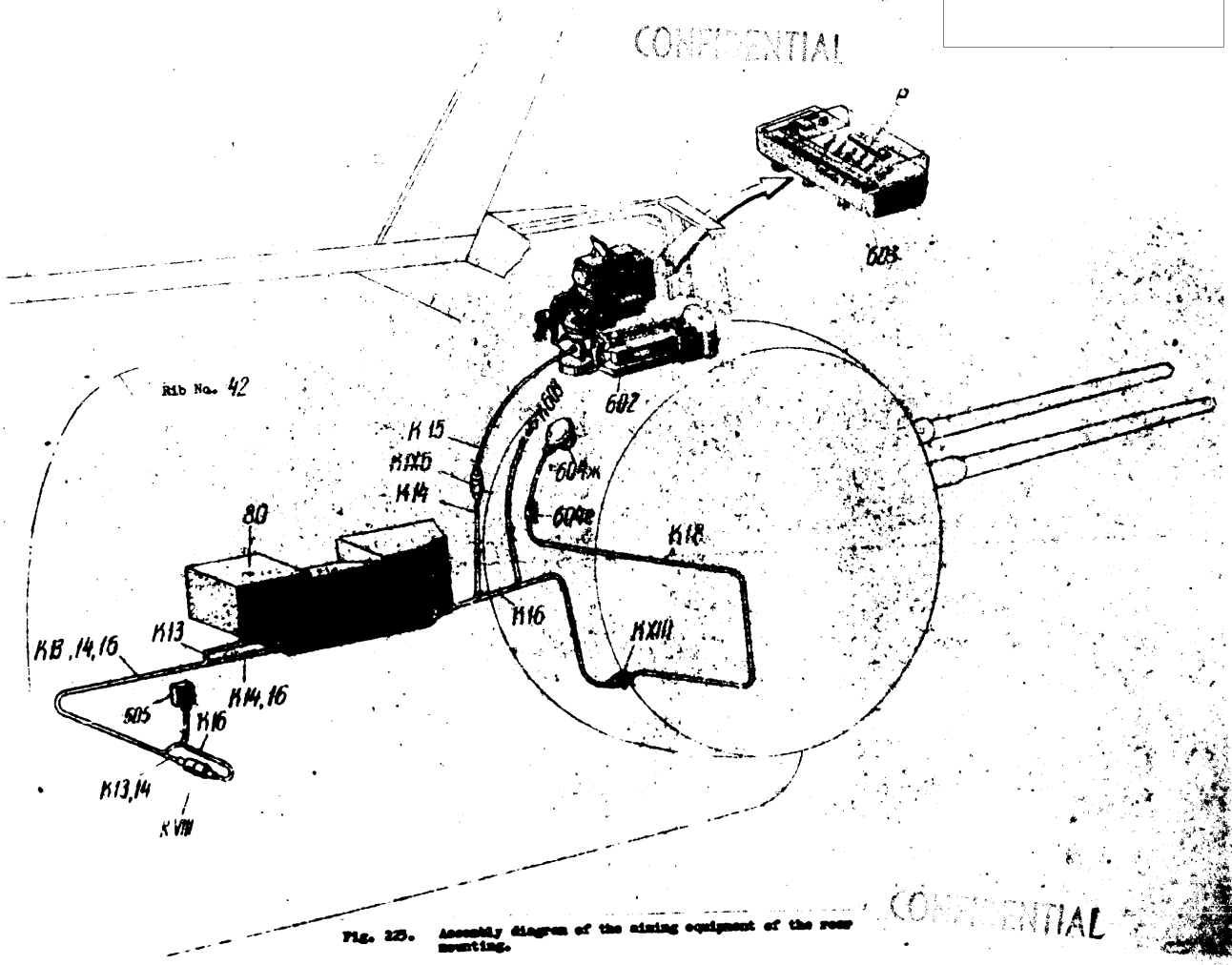

Fig. 225. Assembly diagram of the mixing equipment of the rear mounting.

C O N T E N T S :