March 16, 1956

George:

Please pass the enclosed Progress Report on to [redacted] STAT
We are trying to set up a mechanism to get daily activity reports to you. This is beginning to amount to publishing a daily newspaper.

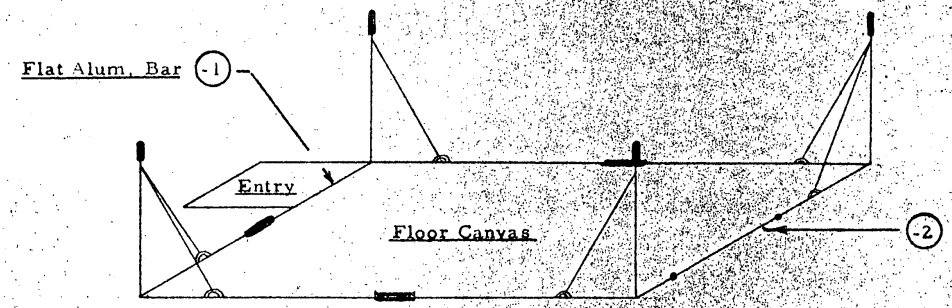
RMS

dg

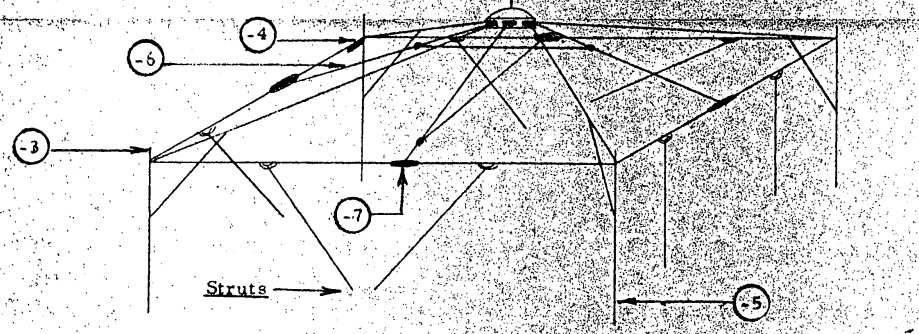
RMS/dmg

SEQUENCE OF PROCEDURE FOR TENT AND FRAME ASSEMBLY

1. Unfold floor canvas and spread on ground.
2. Erect bottom half of frame on top of floor canvas, positioning the frame with the floor canvas, so that the flat aluminum bar (-1) crosses the entry way. Place removable aluminum tube (-2) in place.



3. Erect top half of frame, (on ground) and insert supports (-6) and (-7). Before putting legs (-5) in place; place nylon tent in position over frame, noting to have eyelets of tent through tie down posts (-3) and entry hub (-4). Erect legs in place and bolt tight.



4. Place top half of frame in bottom half of frame.
5. Place supports designated by numbers (1 through 5) in proper locations, bolt down struts to bottom half of frame.
6. Pull down nylon cover and zip to floor canvas. Tie down tent to frame structure.
7. Entry frame can now be attached to main frame, placing flat aluminum bar attached, on the ground and bolt entry to base of main frame, then top of entry frame slides onto posts mounted on main frame. Bolt struts in place.
8. Nylon covering is then placed over entry frame, zipping it to main frame and canvas flooring.

Enclosure "A"

Date 24 May 1957

To: [redacted] STAT

From:

Subject: Engineering Report - Installation Shelter

Enclosures: "A" Shelter Assembly Instructions
"B" Photographs (3 pages)
Appendix I

I. Objective

1.1 This report covers the requirements for and the field evaluation of the Photo Systems Installation Shelter, Part No. 735915, as delivered and tested under Contract 44, Schedule I, Item No. 8. Also included is the report of damage incurred by the shelter due to high velocity winds at the project test site.

II. Requirement for Installation Shelter

2.1 The intent of the installation shelter is to provide an easily portable, quickly errected, dust and temperature controlled facility for the installation and removal of Photo Systems where a hangar or other suitable enclosure is not accessable. The nature of this program and the required ultimate product of high quality photography, consistent with reliability, demand that utmost consideration be given for proper installation techniques and facilities. The prime factors necessitating use of such an enclosure are:

a. The intricate instrument type mechanics of the configurations must at all times be in a dust free environment to assure proper operation.
b. The exposed optics such as lenses, mirrors, windows and filters must be protected from dust during installation to assure high resolution photo quality.
c. Protection from adverse weather conditions such as rain, snow, wind, heat and cold is required for the photo configurations, the A/C equipment bay, hatches and installation personnel.
d. To exercise maximum security precautions.

III. General Discussion

3.1 The installation shelter was first errected at the factory (Plant 3) during March 1957. After initial inspection for proper assembly of the frame and fit of the nylon cover, the item was shipped to the test site for operational field use and evaluation. On 3 April 1957, under

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the direction of the acting site supervisor, the shelter was assembled. Because of adverse weather conditions prevailing that date, namely 20 knot winds with gusts up to 25 knots, a total of nine (9) men were required to raise the structure. Assembly was accomplished in accordance with the instructions as outlined in Enclosure "A". Due to the wind, it was necessary to utilize two (2) fork-lifts in pulling the top cover into place.. With the following noted exceptions, the shelter was found to assemble with a minimum of difficulty. It was indicated by the assembly crew that if personnel were more familiarized with the errection procedure and special techniques were developed for quick assembly, that a crew of four (4) men could easily accomplish set up or disassembly in several hours. The Appendix to this report outlines some of the minor problems encountered during field evaluation.

IV. Damage to Installation Shelter

4.1 Weather Conditions - On 6 April 1957, weather conditions at the test site were extremely adverse. The site weather station reported high wind velocities in a SSW direction of 45 mph shortly afternoon. Increased wind gusts were reported up to 55 mph as measured by the weather recorder. The wind direction shifted to the North several hours later. At approximately 1530 two very strong gusts were reported. It was at this time that the installation shelter broke free.

4.2 Visual Observation of Shelter During Storm - Being Saturday, there were no Photo Systems personnel present at the test site. Therefore, only the control tower operator, security guards and several A/C line personnel were able to observe the shelter during the storm. A tape recording was made concerning their observations and comments on damage which is on file at the factory.

4.3 The following is a brief discription of the events that led up to and during the break away of the shelter. Realizing that the wind intensity was increasing, a gasoline truck and trailer was positioned next to the shelter to serve as a wind break. Due to a quick shift of the wind to the North however, this precaution was not fully effective. Because of the great amount of dust in the air, the shelter was not clearly visible at all times. After an exceptionally large wind gust (possibly over 55mph), and when the dust had cleared, it was observed that the shelter had been carried away. In it's path were A/C 371 and A/C 367, both of which received damage. In order not to further damage A/C 367, a crew of ten (10) men proceeded to slash the cover material and beat the frame structure to allow the wind to spill. After this they succeeded in pulling the frame from the A/C wing section. The stabilizer on A/C 367 was damaged. Damage to A/C 371 was in the area of aileron and flap. These items were replaced with parts from A/C 363 which was being

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shipped back to the factory for modification. The Enclosure "B" photographs clearly indicate the resultant condition of the shelter after the storm.

4.4 Factors Attributed to Failure - The shelter was designed to specifications which required that it with stand wind velocities up to 65 mph. There is the possibility that the sudden gusts to which it was subjected were approaching or passed this limitation. From the visual reports and photographs, it is evident that the steel stakes held securely, however, two (2) of the cast aluminium snaps holding the tie down lines broke. (Ref. Enc. "B" Photo No. 28) It is believed that the continual jerking and strain on these snaps resulted in metal fatigue and ultimate breakage. After the two snaps had failed, the wind was then able to get under the shelter and lift it from the ground. The remaining tie down lines then pulled free of the securing eyelets on the nylon covering until the complete shelter was free.

V. Disposition of Shelter

5.1 The shelter was disassembled and returned to the Factory where damage assessment is being determined. Re assembly of the frame structure will be attempted to evaluate the extent of repair necessary.

VI. General Evaluation and Summary

6.1 Due to the very limited operational experience with the installation shelter (only one (1) configuration removal), it is difficult to evaluate its adequacy. However, indications thus far show that it will fulfill all of the basic intended requirements as follows:

a. will effectively provide protection to equipment and personnel from the elements.
b. affords a relatively dust free environment in which to work.
c. can be easily transported and assembled on any flat area with a four (4) man crew in several hours.
d. could be easily camoflaged if necessary.
e. dimensions of the structure are adequate for installation and removal operations.
f. provides a visually secure work area.
g. the "A" frame hoist proved very satisfactory.
h. no difficulties were encountered with regard to positioning the A/C nose into the shelter and obtaining a dust free fit.
i. with proper interior lighting and airconditioning, installations can be made under most any environmental conditions.

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6.2 It is recognized that there are several areas of redesign necessary to make this shelter unquestionably substantial within the limitations perscribed. The main redesign consideration would be to secure the tie down lines through the eyelets in the nylon cover material to the aluminium framework. In addition, a heavy duty type snap would be substituted in place of the type which failed. The other points outlined in Appendix I are all quite minor and can easily be corrected.

Submitted by:

[redacted] STAT

Sr. Field Engineer

DMT:bc
cc: B. Marcus (Less Enclosure "B")
E. Evans (Less Enclosure "B")

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APPENDIX I

1. The errection instructions were found to be somewhat lacking in sufficient data, such as base dimensions and tie down methods. Also the assembly sketches were difficult to interpret.

2. The bottom panel which zippers around the A/C was not cut to accomodate the landing gear doors. This part was supplied by the A/C manufacturer and corrective action was initiated.

3. The "T" braces would be more easily secured if pip-pins were used in lieu of the large roll pins which require tools for installation.

4. The framework which runs along the bottom of the tent had a tendency to buckle toward the center. To correct this and also to secure the bottom corners, ropes were tied about the frame at the critical points and run outside to steel tie down stakes. It was required that holes be cut in the nylon covering to accomodate these lines.

5. The equipment door entrance had a tendency to buckle upward when the cover snaps were fastened. To prevent this, small stakes were driven into the ground to hold it flat.

6. The tie down stakes provided (12") were too short to secure in the sandy soil. Therefore, substitute steel stakes were utilized which were approximately 3' in length.

7. One of the tie points on the nylon cover pulled out during assembly. The hole was covered with gun tape. This indicates the possibility that the fabric is not rugged enough to serve as a tie down point. Consideration should be given to securing the lines directly to the frame.

8. An interference problem was encountered with the pip-pins securing the framework corners. Both pins could not be installed from the inside at the same time. This required that one be installed from the outside, and therefore necessitated padding to prevent damage to the nylon cover material.

9. One of the welds on the framework gave way during assembly. This point was temporarily wired securely in place. (Ref. Encl. "B" Photo No. 18)

10. The plywood floor provided was to thin and had a tendency to warp when the weight of a configuration was on it. The small casters on the carriage would catch when moved across the floor. There was insufficient plywood to give complete coverage of the entire floor area.

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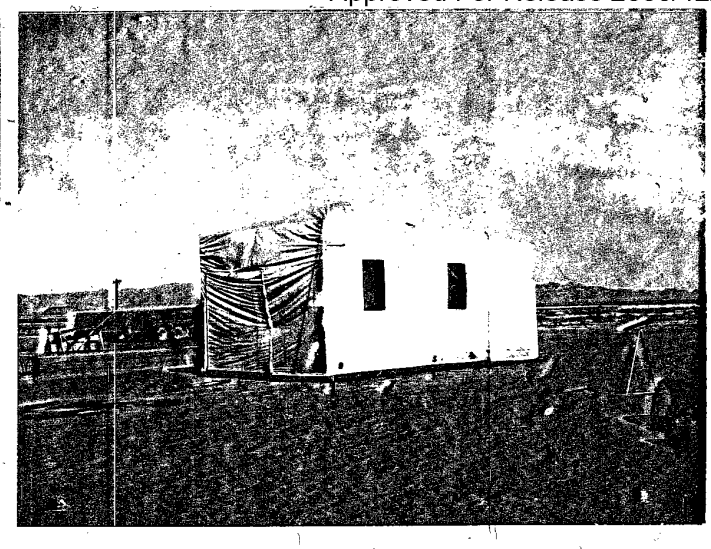
APPENDIX I Continued -

11. The nylon covering was found to be slightly undersize for the frame thus necessitation considerable stretch in order to properly fit.

12. The tie down lines were too short and required lengthening.



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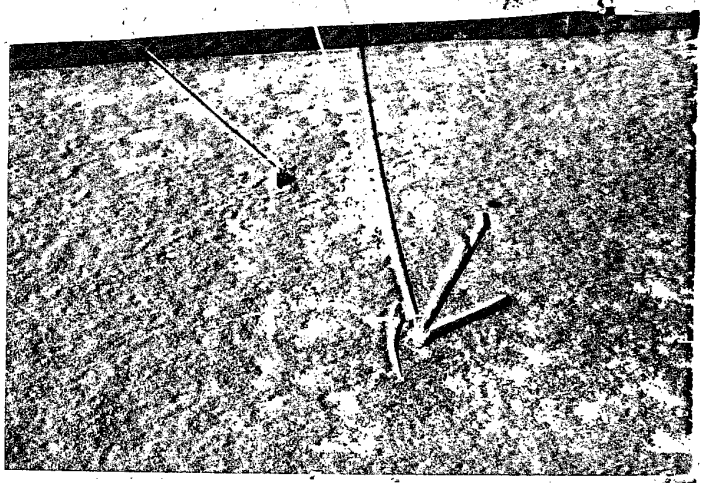

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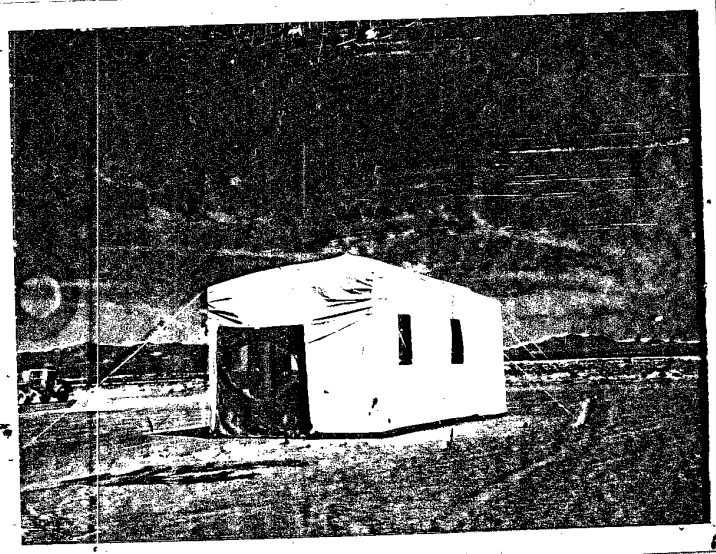

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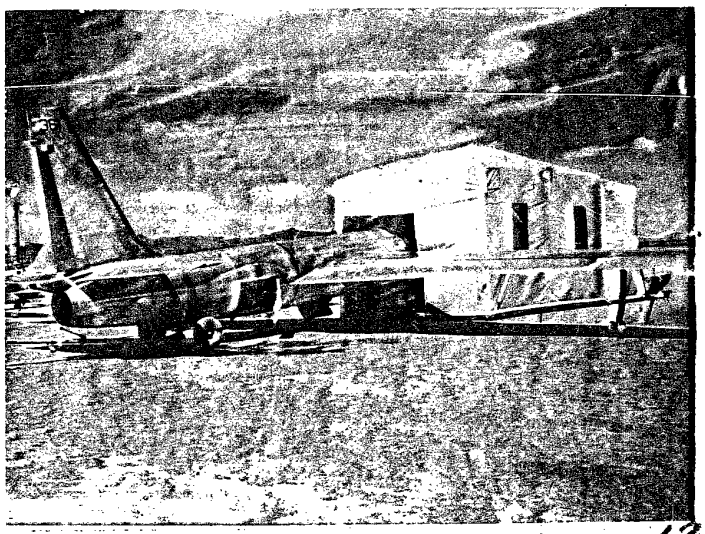

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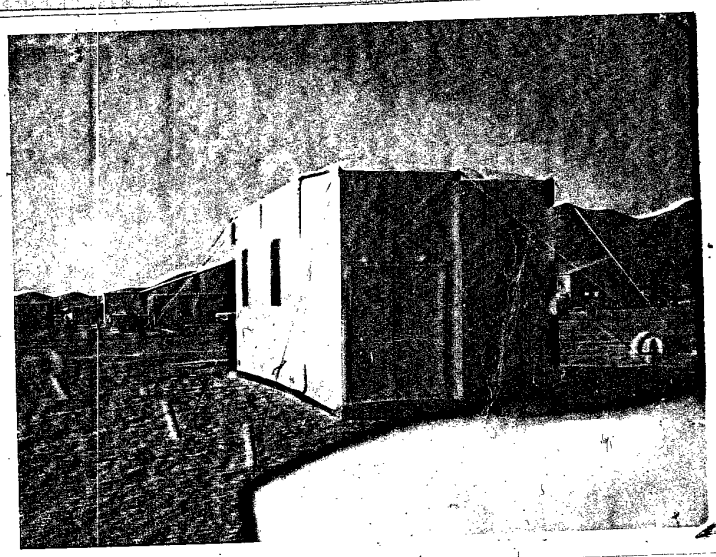

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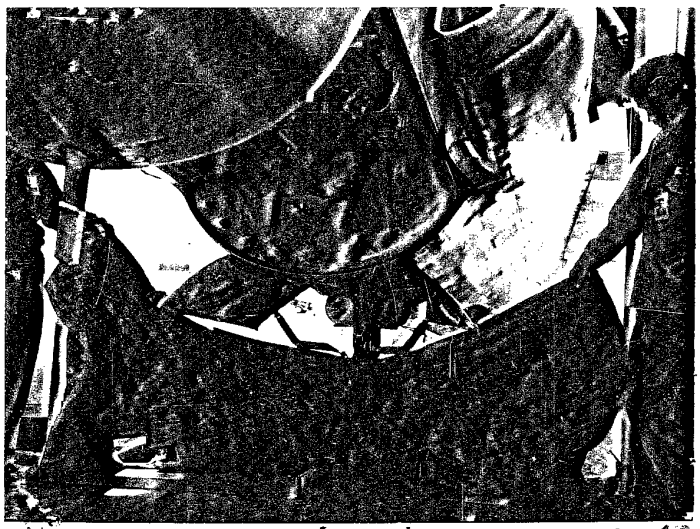

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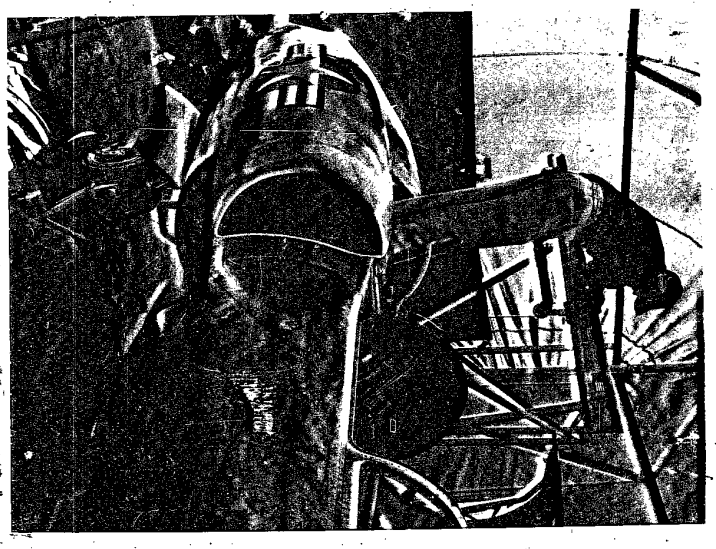

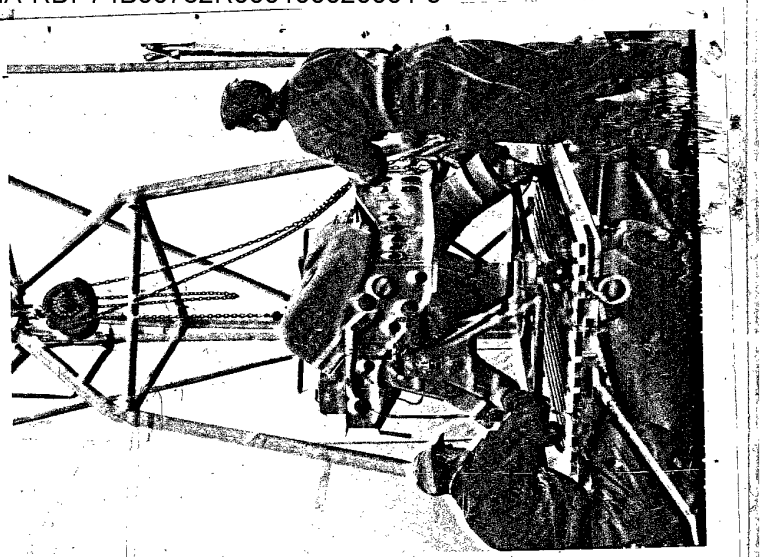

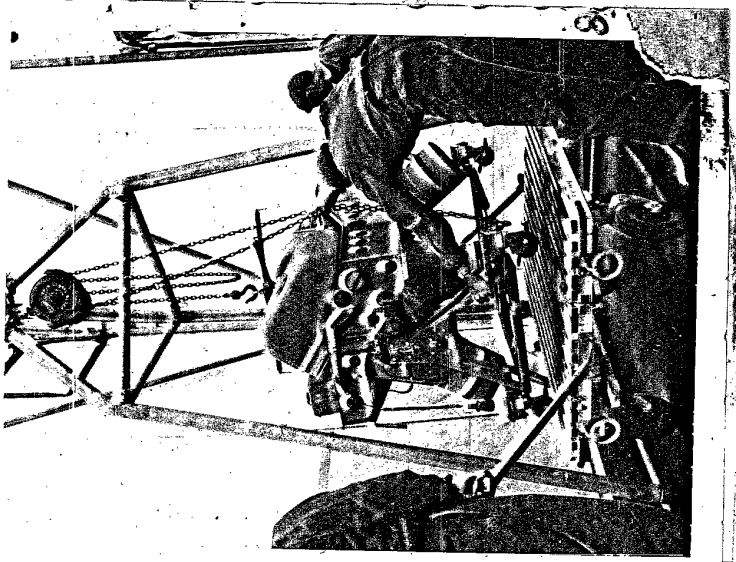

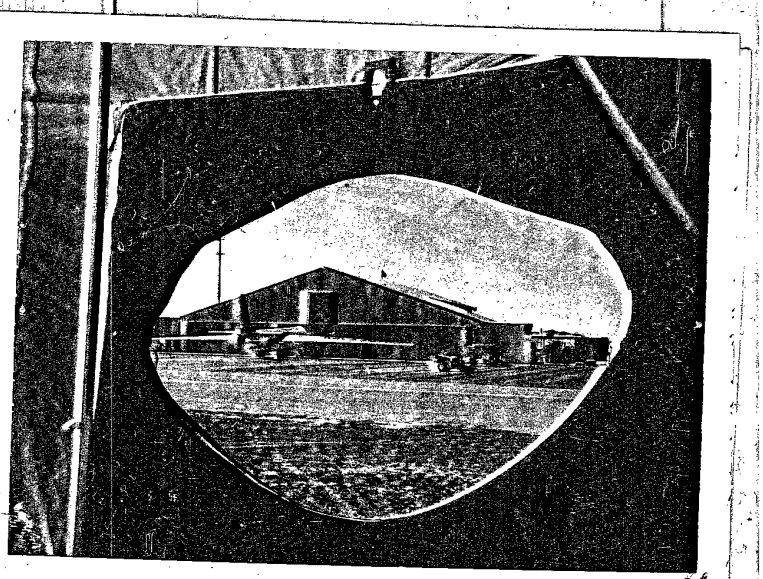

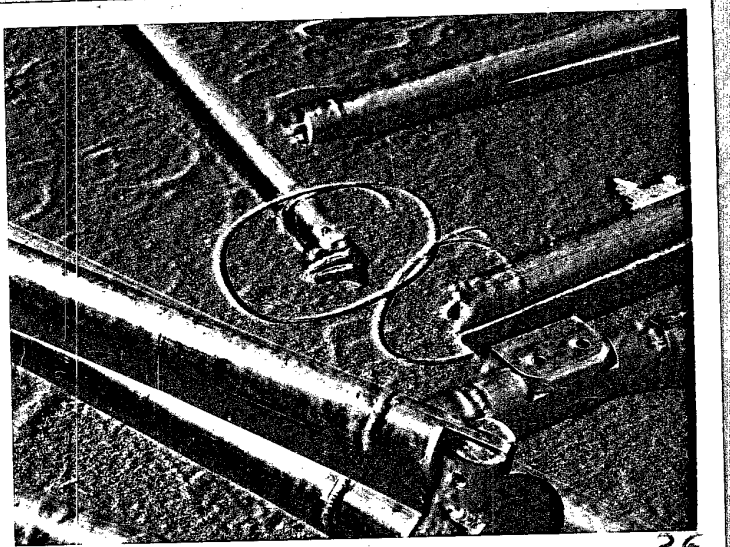

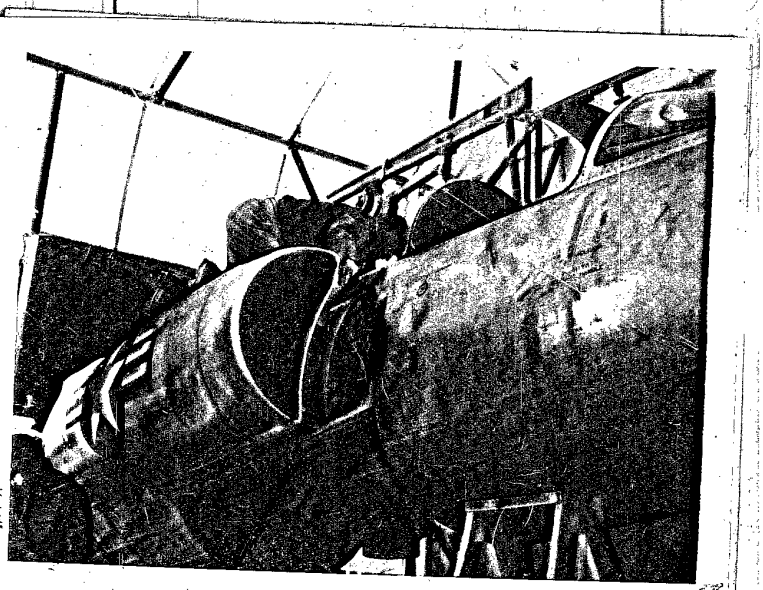

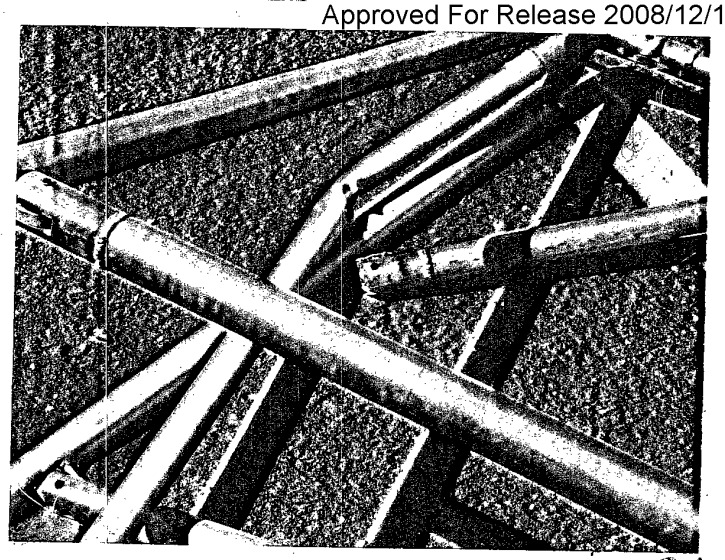

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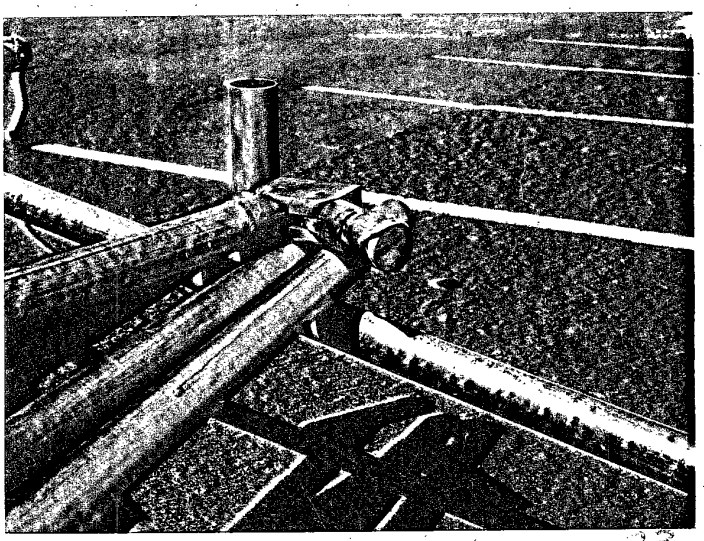

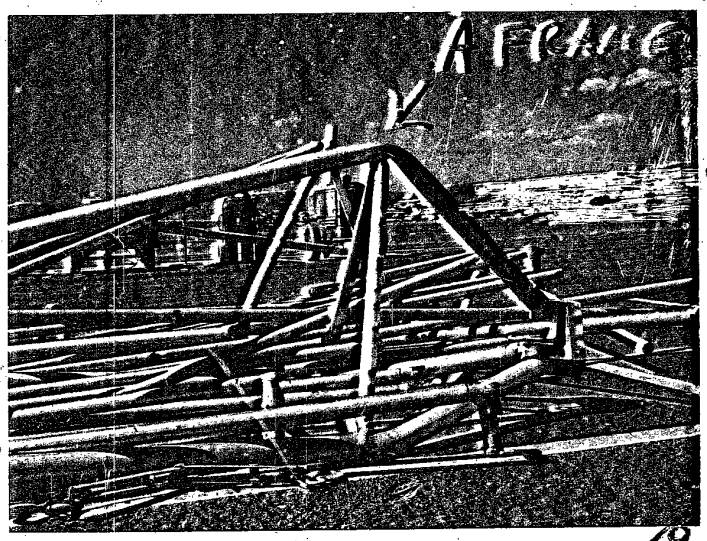

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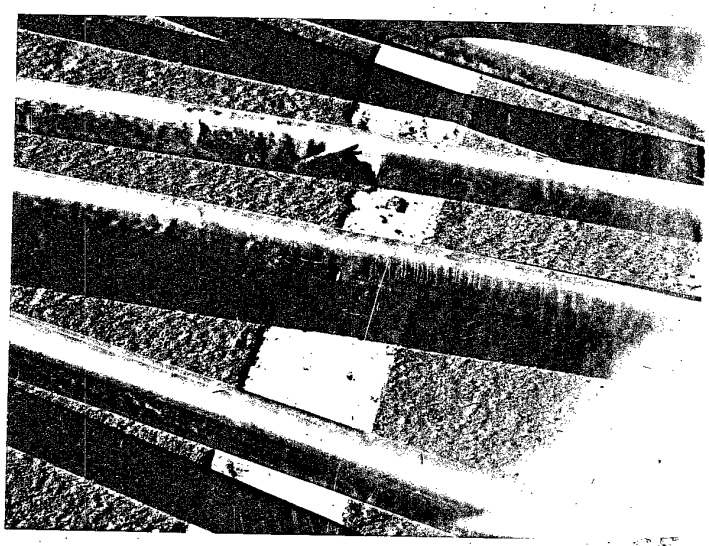

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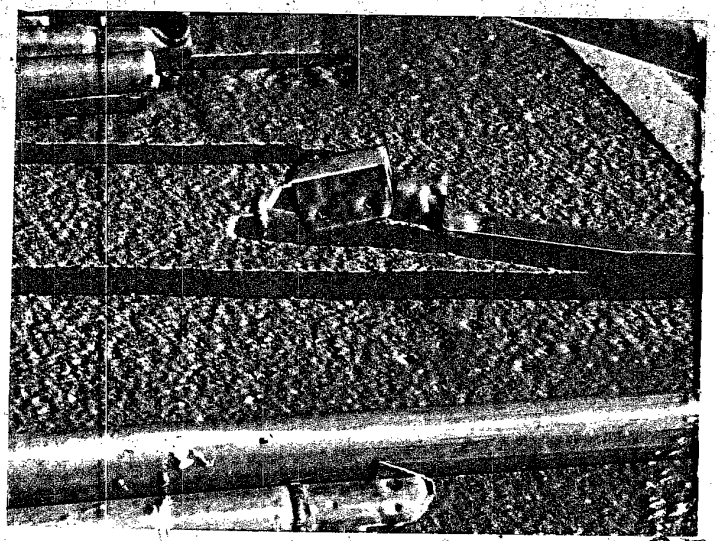

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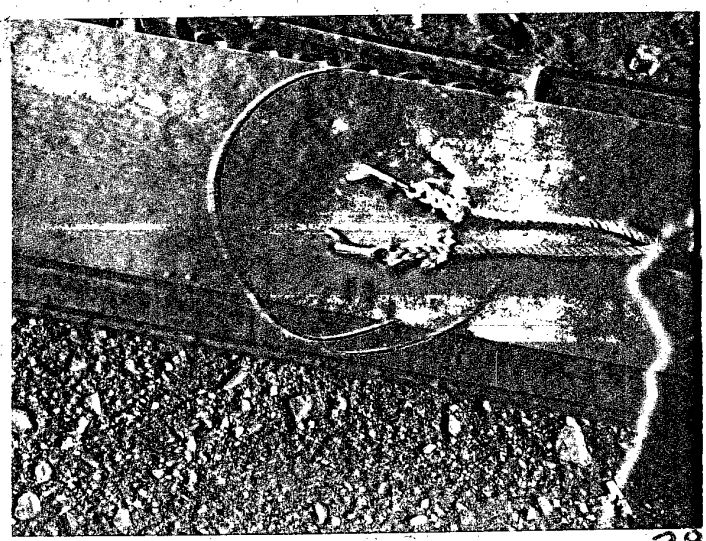

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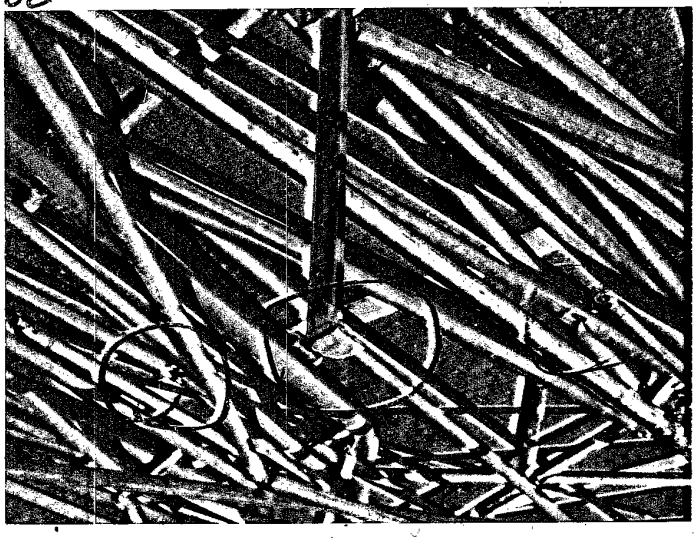

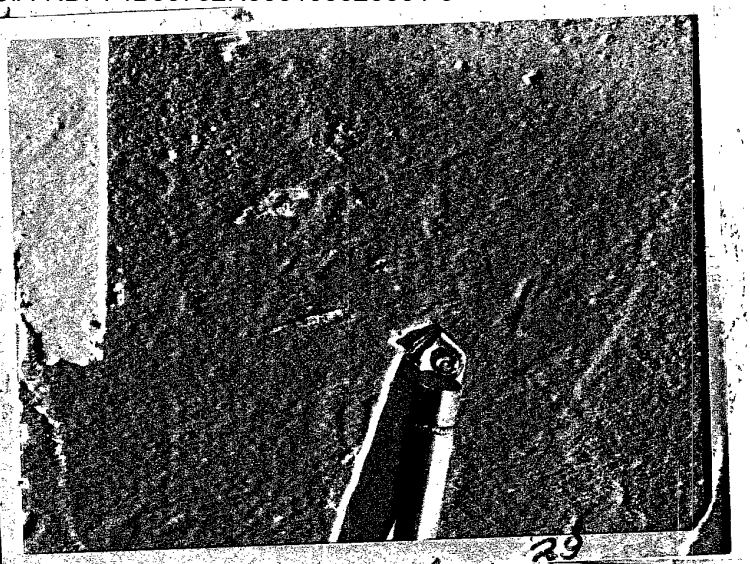

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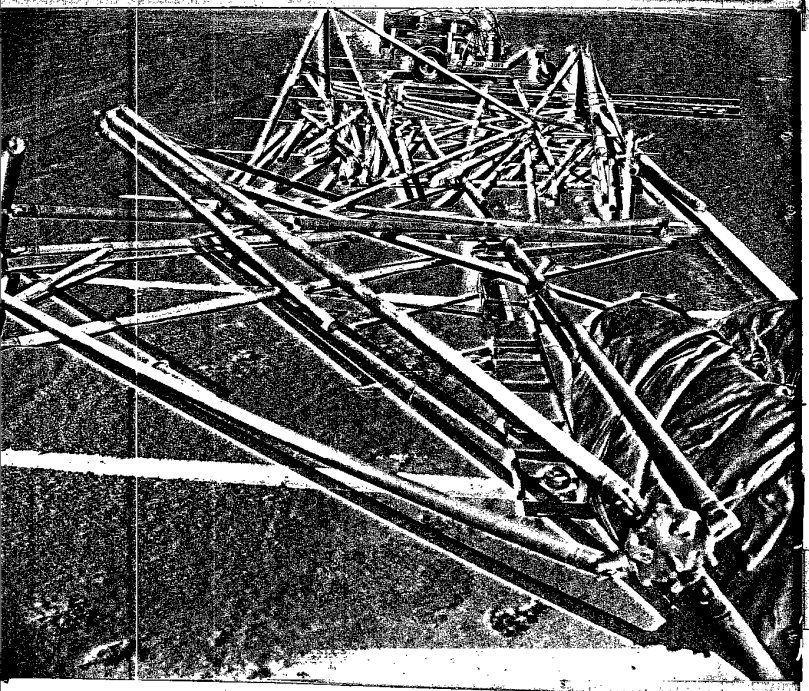

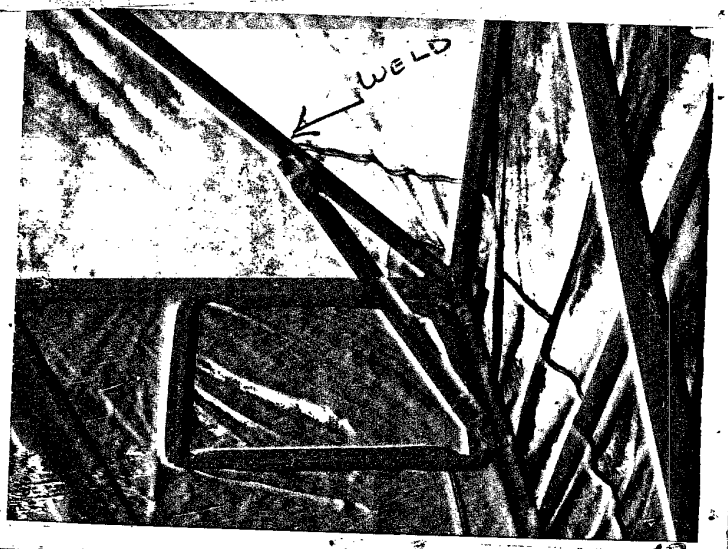

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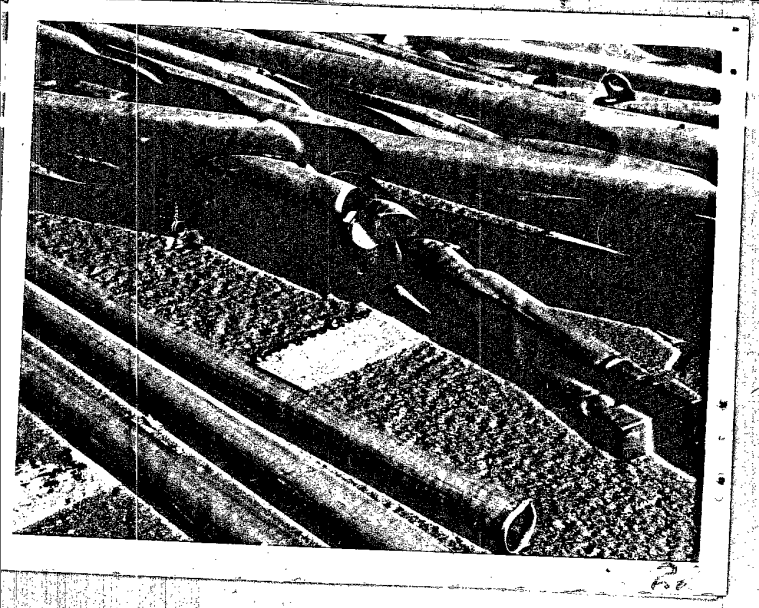

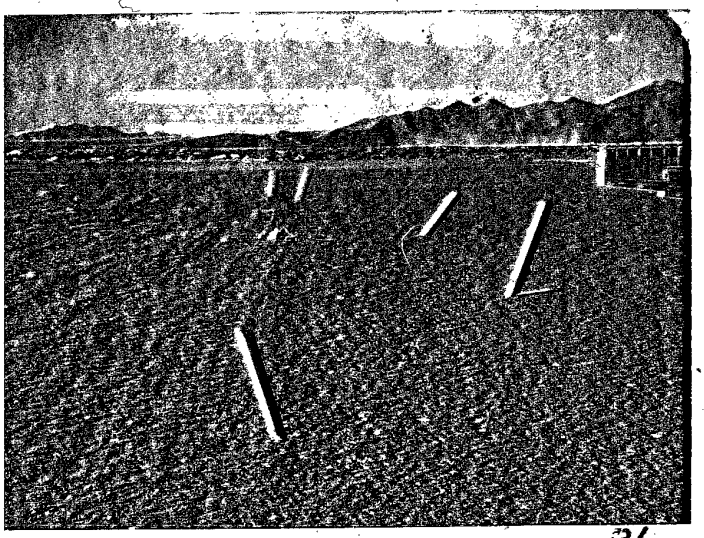

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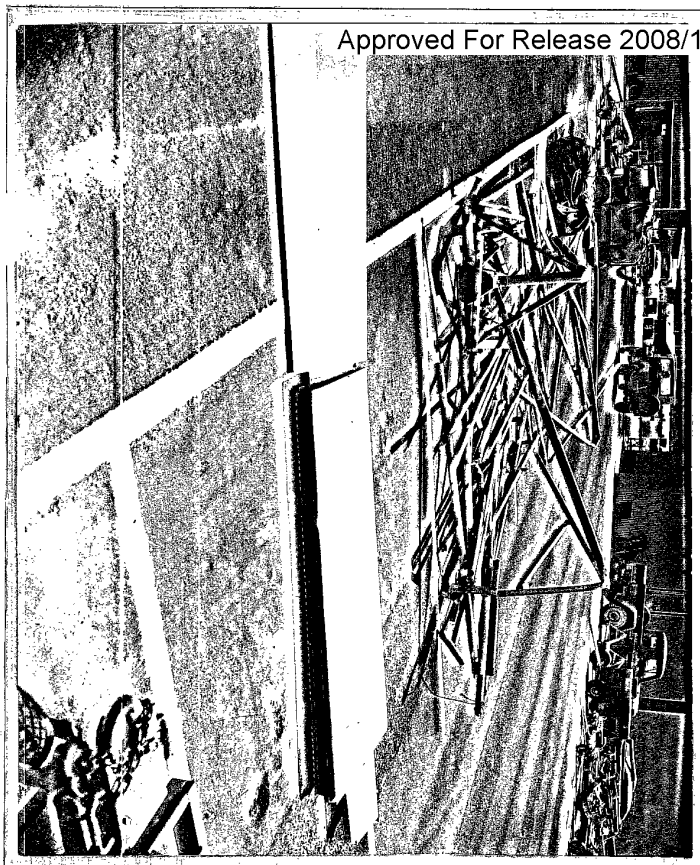

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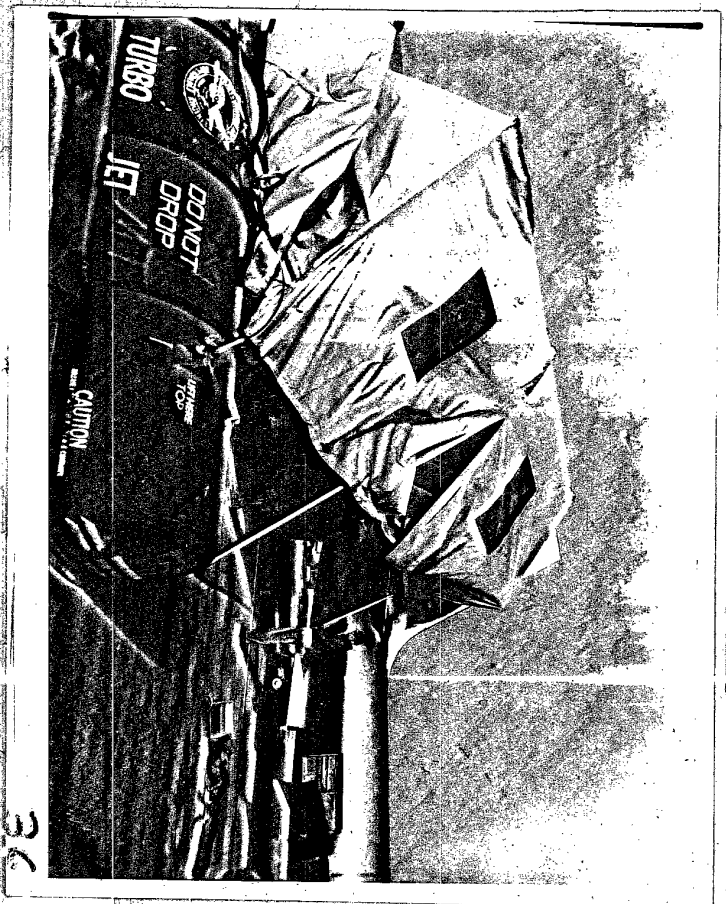

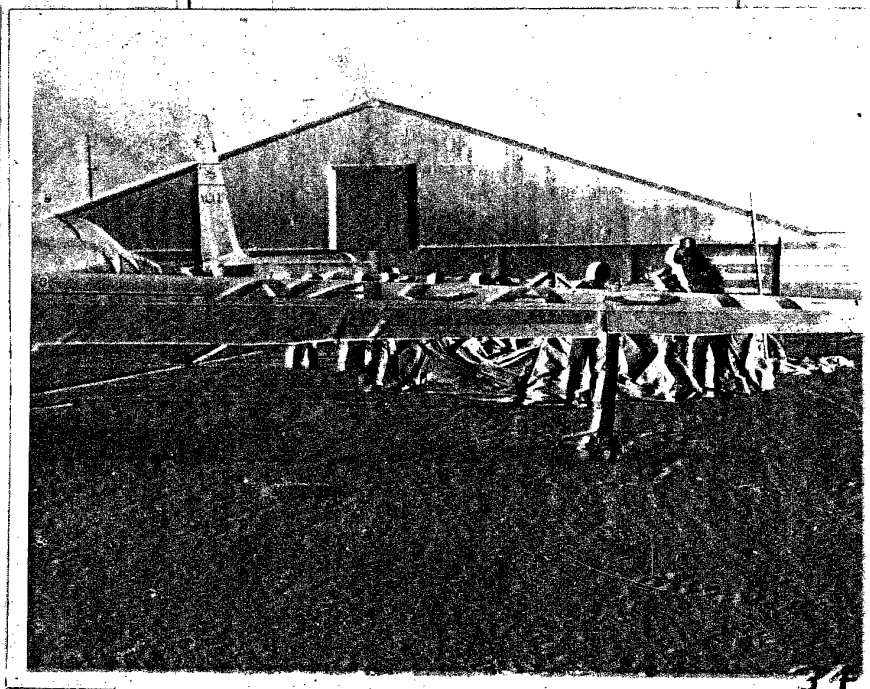

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