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COUNTRY USSR

REPORT

SUBJECT Soviet Specifications for Electric Impulse Machine Models 4723, 473 and 4A722

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Electric Impulse Machine Models 4A722, 473 and 4723, a machine tool designed "for sinking cavities and piercing holes in workpieces made of electrically conductive hardy machinable materials"--in English. Photographs included.  
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**INFORMATION REPORT INFORMATION REPORT**

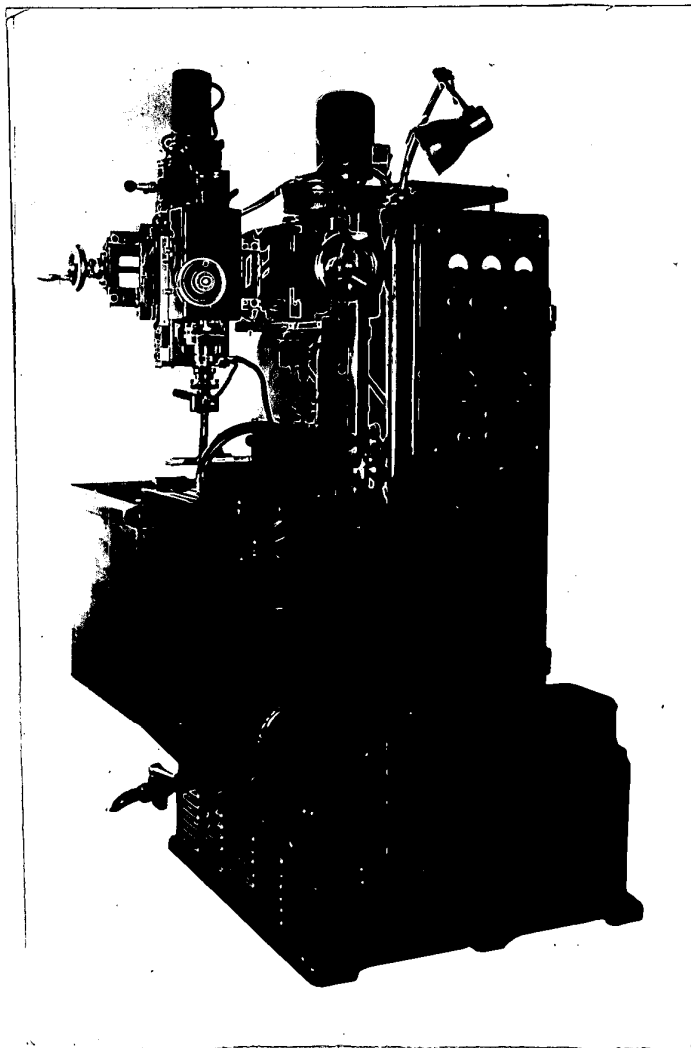
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ELECTRIC - IMPULSE MACHINE

MODEL 4A722



ELECTRIC - IMPULSE MACHINE

MODEL 4A722

The electric-impulse machine is designed for sinking cavities and piercing holes in pieces made of electrically conductive hardly machinable materials such as Nimenics, wear-resistant magnetic alloys, tungsten carbide, hardened and high-alloy steels.

The machine performs the following operations:

1. Piercing holes of any desired shape in sheet material.
2. Machining and restoring of forging dies.
3. Machining of chills.
4. Machining of plastic moulding dies.
5. Preforming of tungsten carbide punching, extruding and embossing dies.
6. Preforming of tungsten carbide draw plates.
7. Machining of external surfaces of complex shapes.
8. Removing of broken drills, taps and reamers.

-Specifications

Max. work area.....20000 mm<sup>2</sup>

Working surface of the table (width x length)

250mm x 400mm

Max. workpiece dimensions (length x width x height)

300mm x 200mm x 150mm

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Max. production rate.....1500 mm<sup>3</sup>/ min  
 Max. vertical tool travel.....150 mm  
 Max. values of relative tool and workpiece travel  
     longitudinal.....260 mm  
     transverse.....160 mm  
 Dielectric tank capacity.....280 l  
 Generator type.....MTM-2M  
 Power consumption.....10 kw  
 Main dimensions(length x width x height)  
     1355mm x 1000mm x 2050mm  
 Weight.....1000 kg

### Features

Metal removal rate of the machine 4A722 is 1500 mm<sup>3</sup>/ min which is 2-3 times faster than that of the best electric-spark machines.

Electrodes made of low cost materials such as aluminium and aluminium alloys can be used on this machine, and electrodes of special carbon graphitic materials being the most wear-resistant are also used.

Workpiece is mounted on a lifting-type table which permits fast immersion and removal of the workpiece from the dielectric enabling inspection of workpiece. The dielectric can be pumped through the electrode.

The electrode has two cross locating co-ordinate movements

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in a horizontal plate and vertical movement effected manually or mechanically.

The machine tool is provided with an automatic adjusting device which maintains preselected feed rate and process stability. The machine tool head can be tilted at a small angle relatively horizontal axle.

The vertical movement of the tool head is indicated by a dial indicator which is set up for a given head stroke, the latter being reached the machine tool automatically stops.

Electrical equipment and control board are mounted in the machine tool bed, the impulse generator is mounted on a separate plate.

The machine tool bath is provided with an exhaust pipe which is connected with common ventilation system.

ELECTRIC - IMPULSE MACHINE MODEL 473.

Electric - Impulse Machine Model 473.

This machine tool is designed for sinking cavities and piercing holes in workpieces made of electrically conductive hardly machinable materials such as Nimonics, wear - resistant, magnetic alloys, tungsten carbide, hardened and high-alloy steels.

The following operations can be performed on the machine tool.

1. Piercing holes of any desired shape in sheet material.
2. Machining and restoring forging dies.
3. Machining chills.
4. Machining plastic moulding dies.
5. Preforming punching, extruding and embossing dies made of tungsten carbide.
6. Preforming tungsten carbide draw plates.
7. Machining external surfaces of complex shape.
8. Removing broken drills, taps and reamers.

Specifications.

Maximum work area.....80.000mm<sup>2</sup>.

Working surface of table.  
/ width x length /.....400mm x 500mm.

Maximum workpiece dimensions  
/length x width x height /.....340mm x 260mm x 250mm.



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Rate of metal removal

rated capacity /current 200 A./.....3000mm<sup>3</sup>/min.

one-hour load /current 300 A./.....4500mm<sup>3</sup>/min.

Max vertical head travel.....280mm

Max relative electrode travel relatively the table

longitudinal.....380mm.

transverse.....250mm.

Dielectric tank capacity.....500 L.

Power of electropump.....0,6 kw.

Dielectric pump capacity.....180 L/min.

Generator type.....

Power consumption..... 20 kw.

Overall dimensions

/ length x width x height /.....1460mm x 1100mm x 1900mm

Weight.....1500 kg.

### Features.

Metal removal rate of this machine is 3000mm<sup>3</sup>/min at normal rating and 4500mm<sup>3</sup>/min at one-hour rating which is 4-6 faster than that of the best electric-spark machines.

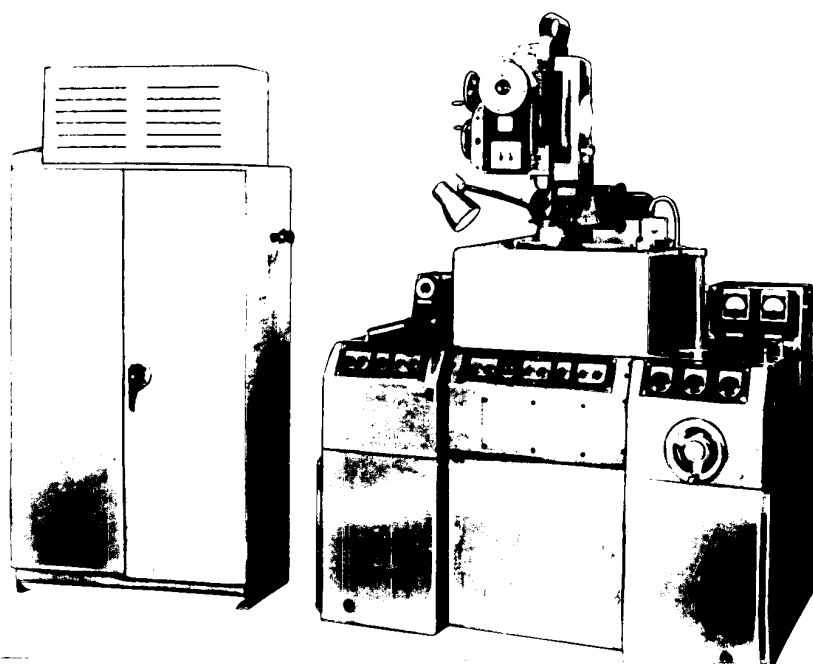
Electrodes made of low-cost aluminium and aluminium alloys can be used on the machine.

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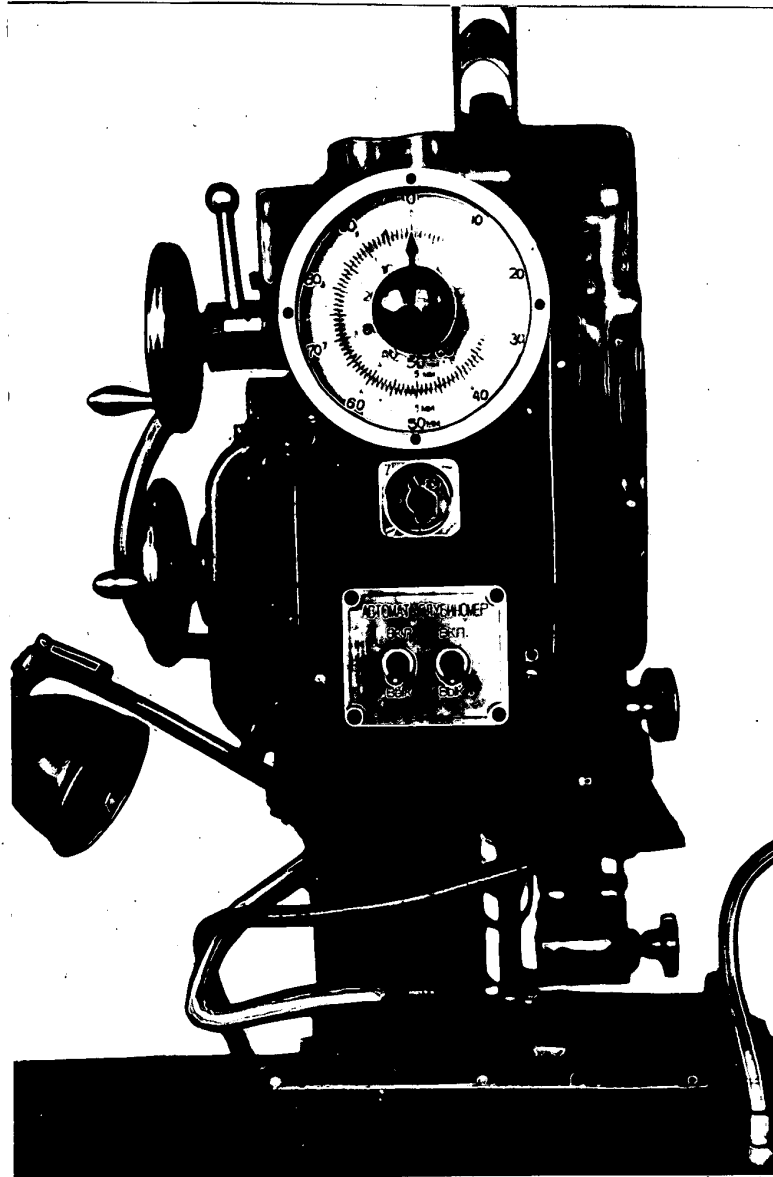
The wear of electrodes / 0,2-18% / is 6-30 less than that of the electrodes of the best electric-spark machines.

The units of the machine are conveniently arranged. Electrical equipment and control board : are mounted in the machine-tool bed; the impulse generator is mounted on a separate plate.

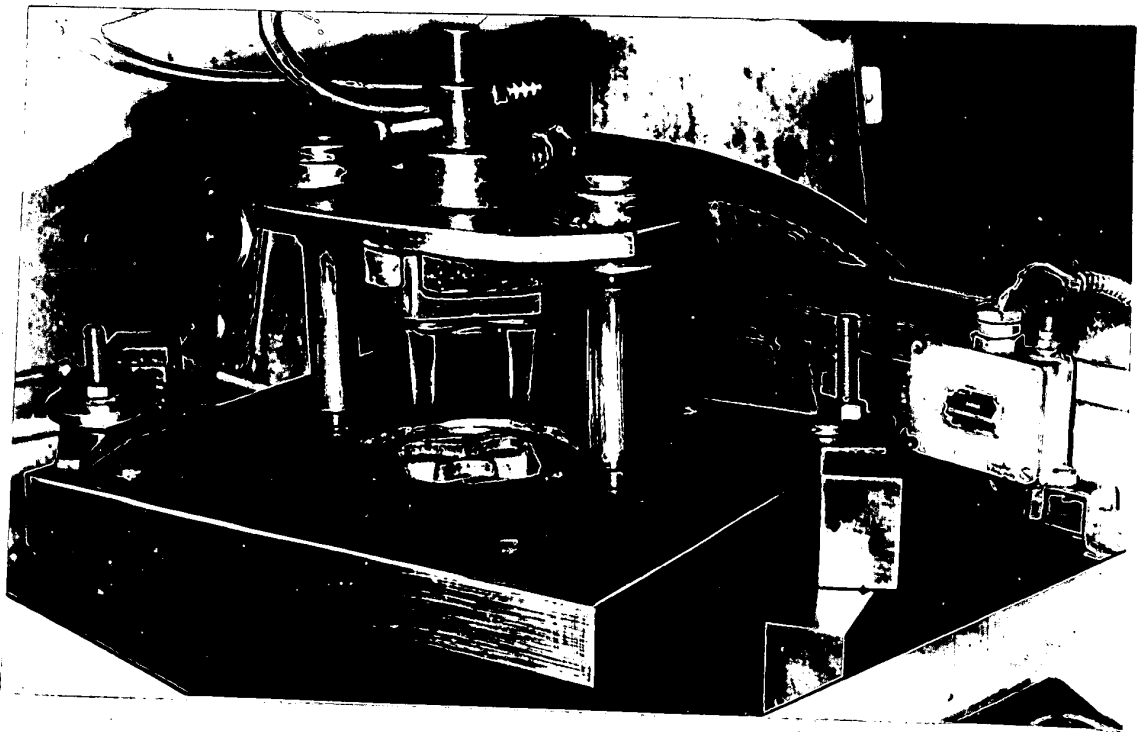
The machine tool bath is provided with an exhaust pipe connected with a common ventilation system.



The indicator of vertical tool head movement.



The machining of forging die on the machine tool model 473.

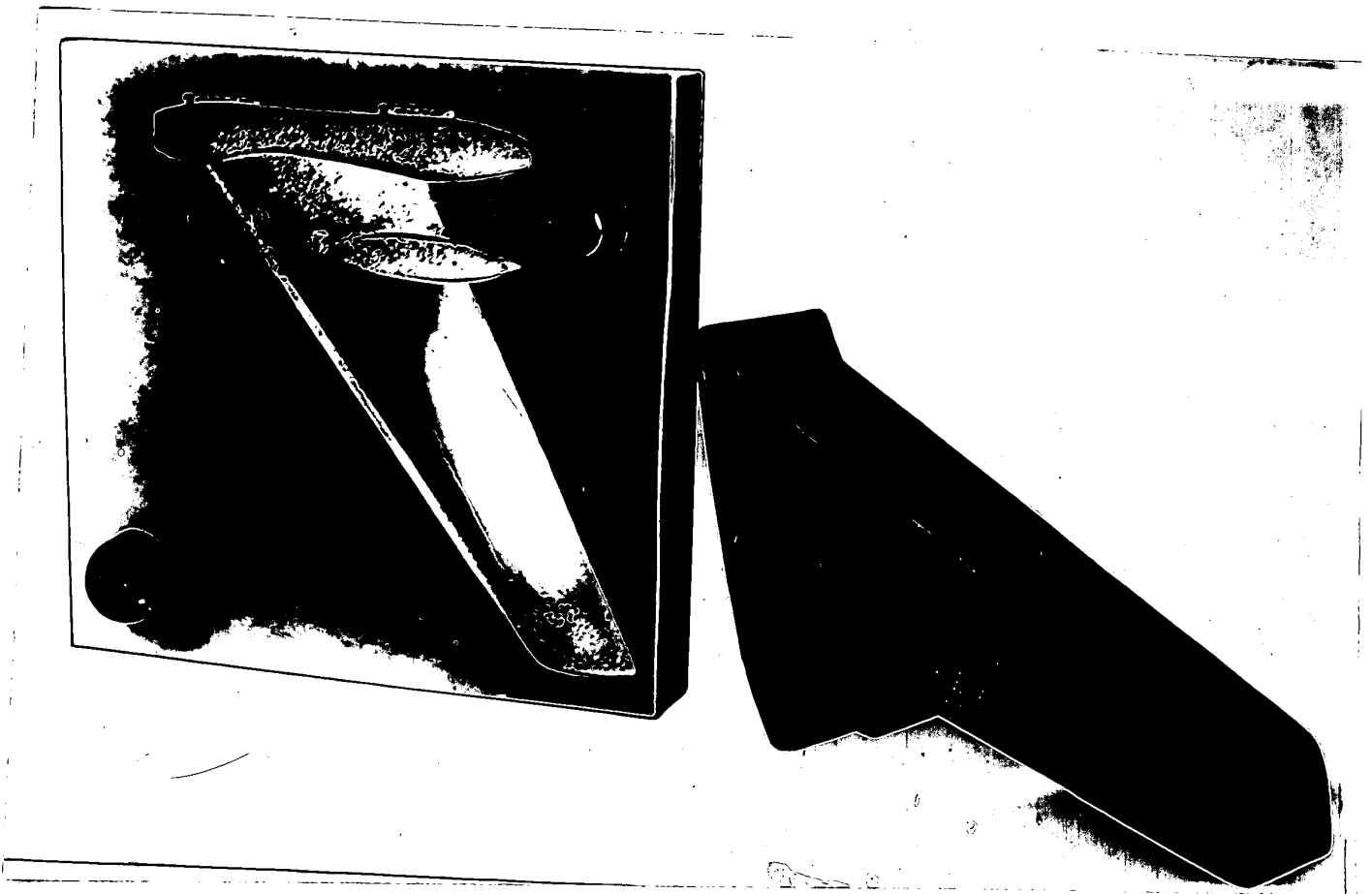


Forging die strengthened with tungsten carbide for trunnion of the car " Moskvitch ". Machining time-90min. Small allowance makes it possible to carry out finishing on the electric -- impulse machine during 110 min.

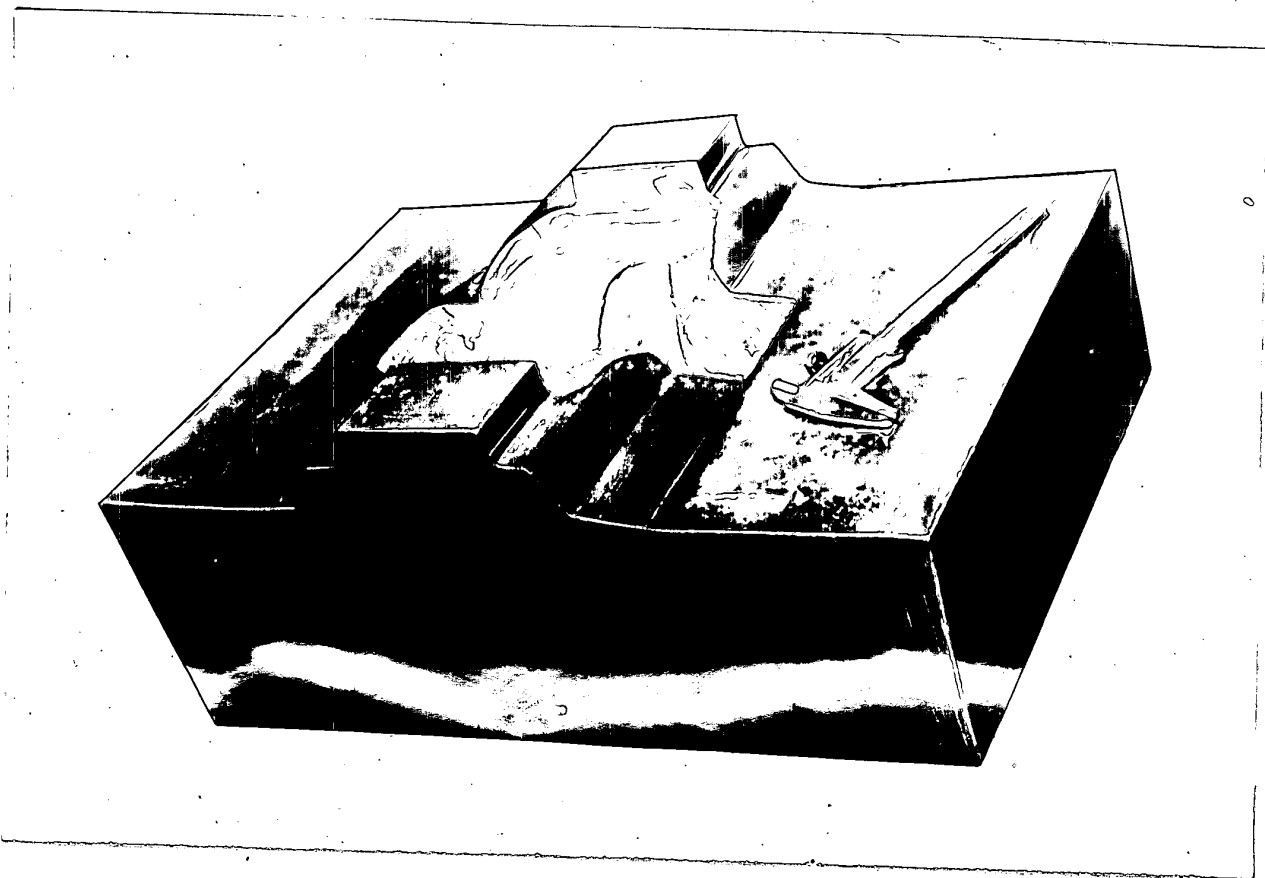


Complicated press-form is machined with an electrode made  
of graphitic material for 40 minutes.

scale : 1 ; 1,5



Forging die for a towing hook of a lorry is machined on the electric-impulse machine model 473 for 8 hours.





Forging die for a connecting rod of the car " Moskvitch ".

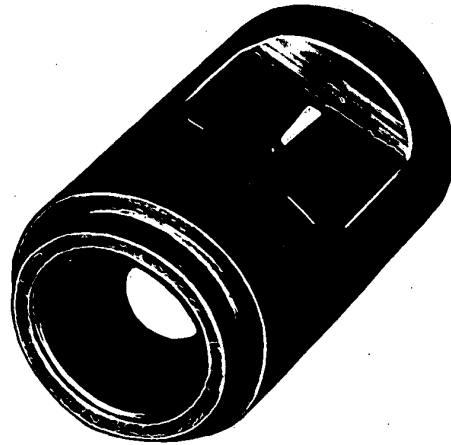
Machining time-32 min. /below/

/ Scale 1 : 5 /

The detail of a choke.

Machining time- 3 min. /right/

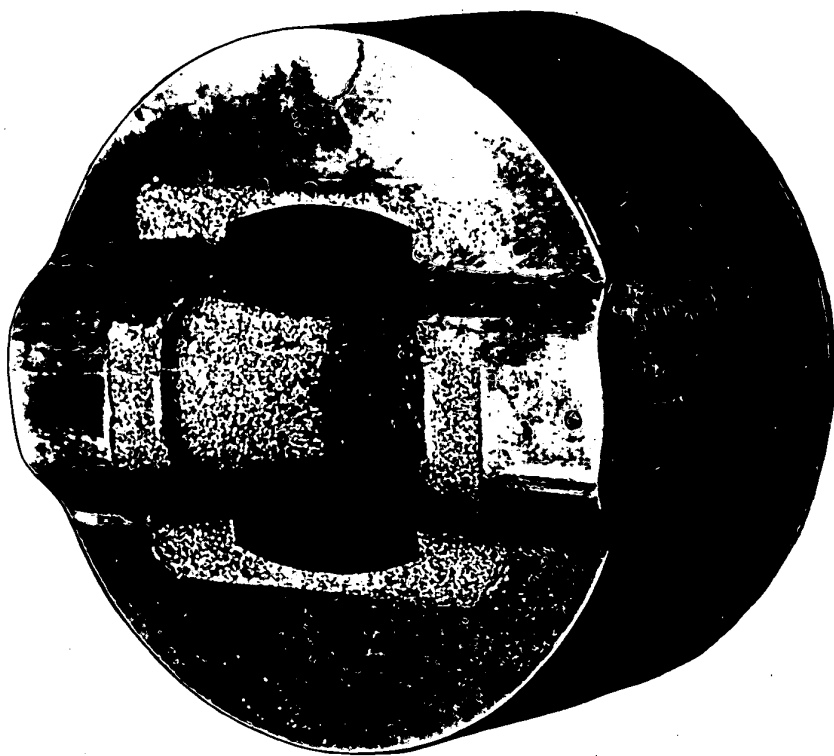
/ Scale 1 : 1 /.



Forging die for a shifting fork of the car " Moskvitch ".

Machining time-90min.

/ Scale I : I,5 /



ELECTRIC - IMPULSE MACHINE MODEL 4723

ELECTRIC - IMPULSE MACHINE MODEL 4723

This machine tool is designed for sinking cavities and piercing holes in workpieces made of electrically conductive hard-ly machinable materials such as Nimonics, wear-resistant magnetic alloys, tungsten carbide, hardened and high-alloy steels.

The following operations can be performed on the machine tool:

1. Piercing holes of any desired shape in sheet material.
2. Machining and restoring forging dies.
3. Machining chills.
4. Machining plastic moulding dies.
5. Preforming tungsten carbide punching, extruding and embossing dies.
6. Preforming tungsten carbide draw plates.
7. Machining external surfaces of complex shape.
8. Removing broken drills, taps and reamers.

Specifications

Maximum work area ..... 80000 mm<sup>2</sup>  
Working surface of table  
  /width x length/..... 400mm x 500mm  
Maximum workpiece dimensions  
  /length x width x height/..... 340mm x 360mm x 300mm  
Maximum metal removal  
  rated capacity/current 200A/... 3500 mm<sup>3</sup>/min  
  one hour load/current 300A/... 5000 mm<sup>3</sup>/min  
Maximum vertical head travel..... 200 mm

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Maximum electrode travel relatively the table

|  |                          |
|--|--------------------------|
| longitudinal .....   | 380 mm                   |
| transverse .....   | 250 mm                   |
| Dielectric tank capacity .....   | 550 l                    |
| Power of electropump for feeding dielectric from the<br>tank to the bath ..... | 0,6 kw                   |
| Dielectric pump capacity .....   | 180 l/min                |
| Power of electropump for pumping dielectric<br>through the electrode .....     | 0.12 kw                  |
| Generator type .....   | MTM-3M                   |
| Power consumption .....  | 20 kw                    |
| Overall dimensions   |                          |
| /length x width x height/.....   | 1500mm x 1170mm x 2000mm |
| Weight/without electrical equipment/.....                                      | 1800 kg                  |

### Features

Metal removal rate of this machine model 4723 is 4-6 times higher than that of the best electro-sparking machines and can be  $3500 \text{ mm}^3/\text{min}$  at rated capacity and  $5000 \text{ mm}^3/\text{min}$  at one hour load.

Electrodes made of low cost aluminium, aluminium alloys and special graphitic material 39T can be used on the machine. The wear of such electrodes is 8-20% of the metal volume removed. That is 5-6 times less than for electro-sparking machines. When special graphitic material electrodes are used the wear is reduced to 0,2-1% or 40-60 times less than that of electrodes of electro-sparking machines. Graphite electrodes are used at current up to 150A.

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The units of the machine are originally and conveniently arranged. Lightened traverse sliding on circular way at the rear of the machine is used for longitudinal positioning of the tool head. This arrangement is an advantage of the model 4723 as compared with other designs and provides convenient maintenance, overall weight of the machine being smaller.

The remarkably robust table and its convenient arrangement permit machining any heavy parts which can be mounted on the table. Heavy parts can be mounted by crane which is an accessory of the machine. When the crane is used the traverse is moved aside, to the left, making free space over the table.

On both sides of the machine are installed two through conveyers facilitating mounting heavy workpieces.

Tank capacity of 550 l and continuous circulation of the dielectric provide relatively low working temperature, good cleaning of the work space at high power machining. Working fluid cooling is provided for roughing rate, when much heat is generated.

The use of lifting type tank permits very rapid immersion (20-30 sec.) of a piece into the dielectric oil and, which is very important, rapid lifting of a piece out of the dielectric for intermediate check.

For reducing setting up time the machine is provided with devices for rapid travels of the tool head in longitudinal, transverse and vertical directions. Vertical travel of the electrode is read on special graduated dial of large diameter mounted conveniently for the operator.

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The machine is provided with automatic stop device which breaks off machining process and withdraws rapidly the electrode out of the workpiece when required depth is obtained.

The head design permits electrode vibrations with variable amplitude for facilitating chip removal.

The forced circulation of the dielectric through the electrode is provided on the machine, for this purpose a special pump is used. The regulating of the power is stepless.

The machine is supplied by a reliable uni-polar impulse generator MPM-3M. Precision co-ordinate positioning of the tool is assured by direct reading devices.

Working time is controlled by special clock with push button.

The machine can perform electro-impulse grinding of surfaces by rotating electrode, cutting by fine disk or electrode of complicated forms with suitably shaped disk.