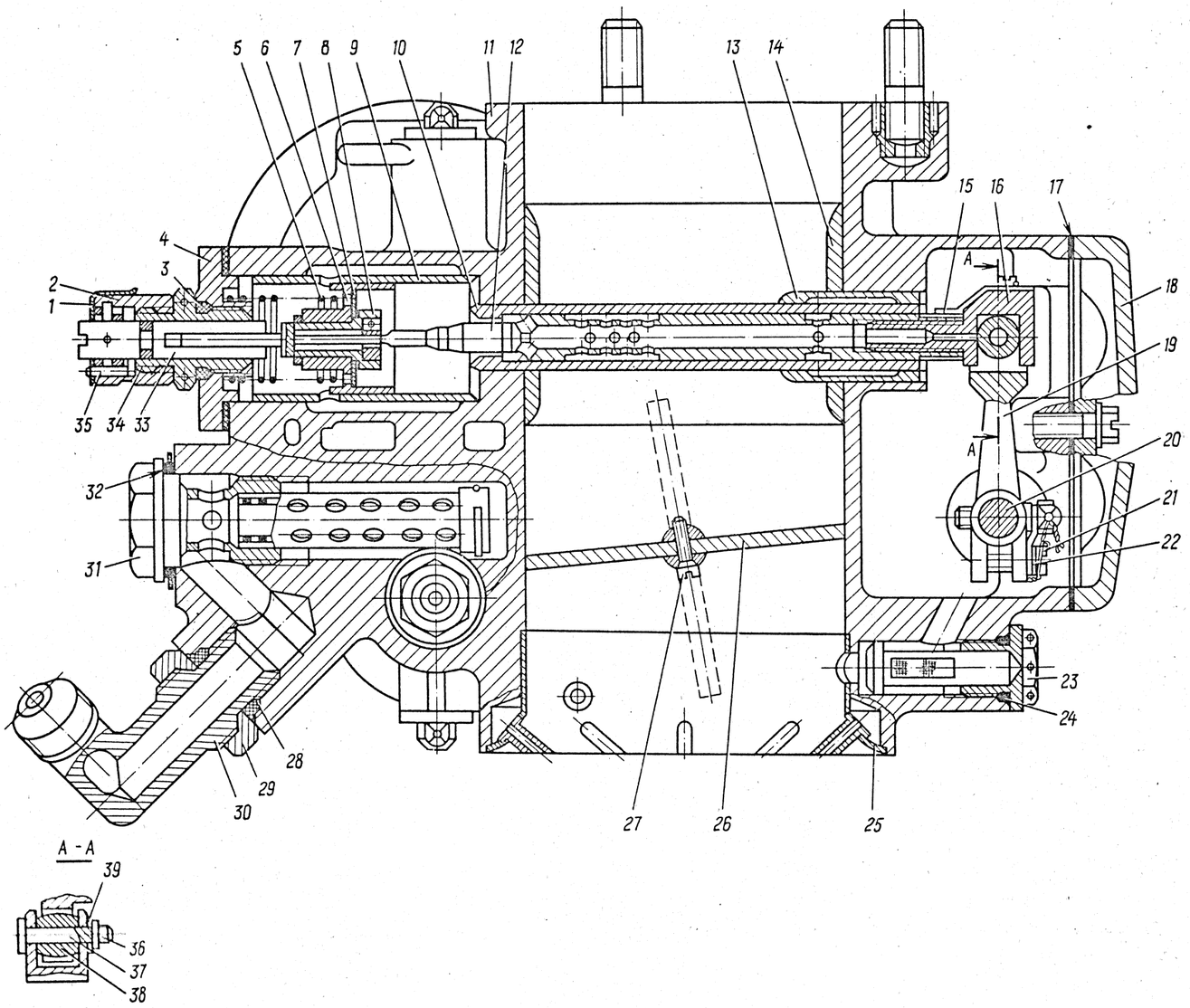
1. Thrust Pin Holder
2. Nut
3. Sealing Ring
4. Pump Cover
5. Spring
6. Piston
7. Valve
8. Coupling
9. Valve
10. Nozzle
11. Carburetor Body
12. Metering Needle
13. Sleeve
14. Venturi
15. Spring
16. Trunnion
17. Gasket
18. Lever Chamber Cover
19. Metering Needle Lever
20. Metering Needle Link Shaft
21. Setting Pin
22. Lock
23. Air Filter
24. Sealing Ring
25. Air Manifold
26. Throttle
27. Throttle Attachment Screw
28. Sealing Ring
29. Nut
30. Fuel Inlet Connection
31. Fuel Filter
32. Sealing Ring
33. Adjustment Shaft
34. Connection
35. Thrust Pin
36. Cotter Pin
37. Axle
38. Roller
39. Washer



Carburetor AK-14P

Figure 2

Driven with pitch diameter interference into the bushing threaded holes of the upper flange are attachment studs.

The lower flange has two threaded holes for the air manifold attachment screws.

Other features of the body are outlined when describing the base units and parts of the carburetor.

2.2.2. Pressure Regulator

The pressure regulator comprises diaphragm assembly (1) (Ref. Fig. 3), fuel valve (11) assembly and fuel valve lever (10) with lever support (8).

When assembling the carburetor, the fuel diaphragm assembly is clamped between the carburetor body and pressure regulator cover.

Fuel valve lever (10) adapted to couple the diaphragm with the fuel valve rotates freely on pivot (9) inserted into the hole of support (8).

The valve lever ball head enters a slot in the membrane trunnion, while the lever other end presses the fuel valve rod.

Fitted to pivot (9) of the lever is spring (7) acting upon the lever to close the fuel valve.

The left end of the rod of fuel valve (11) presses the ball to the edges of the hole in the valve seat pressed in the guide mounted in the valve body together with a rubber sealing ring and a washer and safetied with a lock.

Fuel valve (11) is screwed into a threaded hole located at the right lower side of the carburetor body and is closed with cover (17).

To seal and adjust the position of valve lever (10), fiber shims (12) of various thickness are placed under the support end face of valve (11) body.

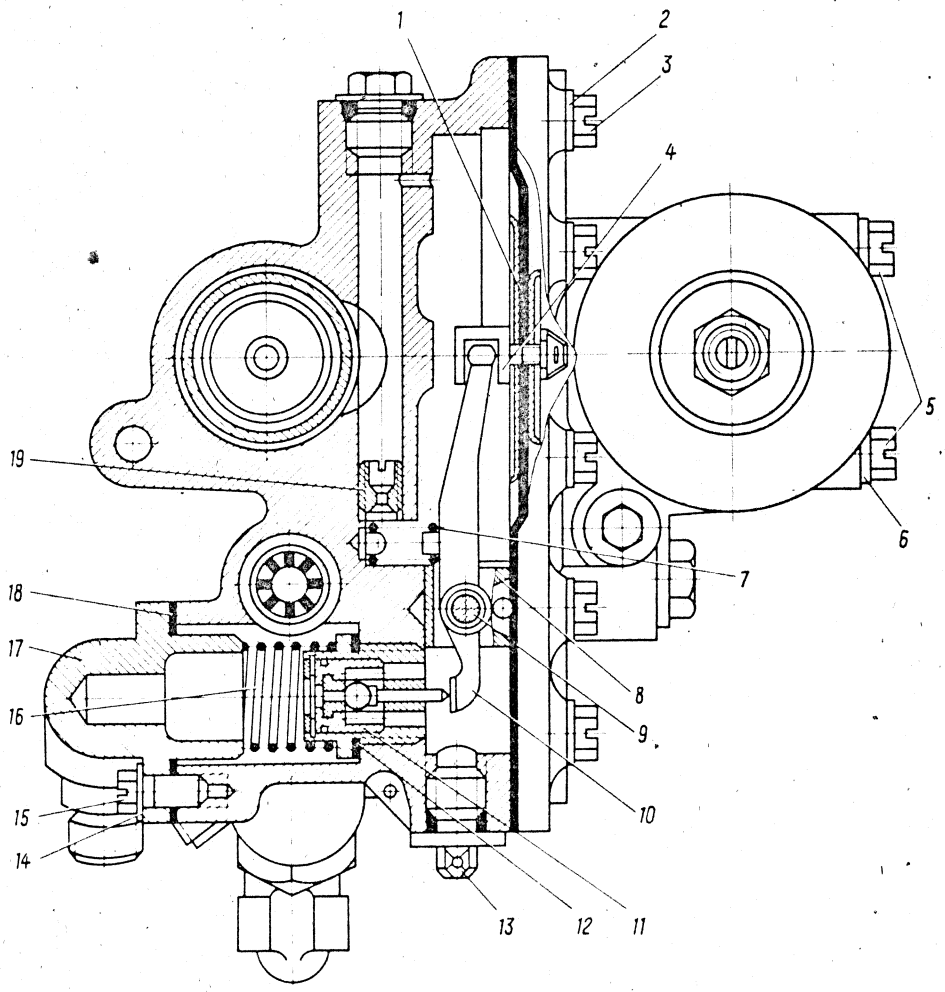
The valve rod freely moves in the central hole of the valve body.

Six longitudinal holes are drilled in the valve body and in the guide to pass fuel to the carburetor when the valve is open.

Fuel valve space cover (17) is cast of magnesium alloy. The cover guide end compresses locking spring (16) which in its turn presses the fuel valve body to preclude its unscrewing in operation.

Cover (17) is attached to the carburetor body by three screws (15), steel washers (14) are placed under the screw heads.

To seal the cover joint with the carburetor body, use is made of paronite gasket (18).



1. Diaphragm Assembly
2. Washer
3. Cover Attachment Screw
4. Diaphragm Trunnion
5. Elongated Cover Attachment Screws
6. Copper Sealing Ring
7. Lever Spring
8. Lever Support
9. Lever Pivot
10. Lever
11. Fuel Valve
12. Adjustment Shim
13. Lower Drain Plug
14. Washer
15. Fuel Valve Cover Attachment Screw
16. Spring
17. Fuel Valve Cover
18. Gasket
19. Fuel Jet

Diaphragm Assembly and Fuel Valve

Figure 3

Connection (7) (Ref. Fig. 5) is screwed into the threaded hole of the boss on the outside of the fuel valve cover.

Support (8) (Ref. Fig. 3) of the fuel valve lever is inserted into a special seat in the carburetor body and is so fitted to it that the support plane is aligned with the body flange or is depressed from it for up to 0.2 mm. Projection of the support over the flange plane precludes adjoining of the diaphragm to the body and makes a leaky joint.

The fuel valve lever support is drilled after fitting in the joint with the body and a locking ball is pressed into the hole.

2.2.3. Link Mechanism

The link mechanism is used to couple metering needle (12) (Ref. Fig. 2) with throttle shaft (14) (Ref. Fig. 4) and comprises a link, a link lever and a metering needle lever.

Pressed into a milled groove in the end of link shaft (11) is Woodruff key (26) which enters the link hole slot at assembly. Such a connection precludes turning of the link on the shaft. The link is finally secured on the shaft by tightening the link clamp with screw (27). Steel washer (28) is placed under the coupling screw head.

To preclude unscrewing of the screw and loosening of the link-to-shaft joint in operation, the screw is safetied to the shaft with wire.

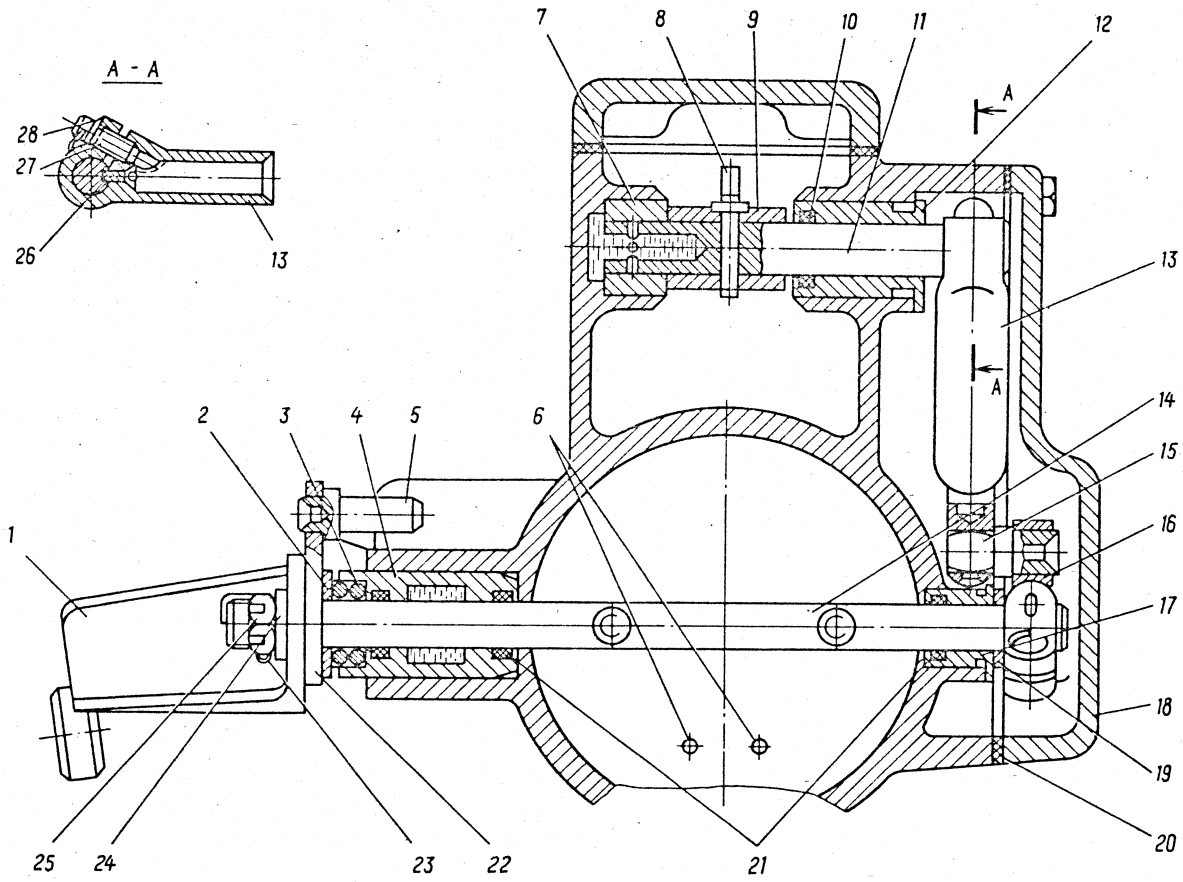
Then the link assembly is inserted with the shaft free end from the link chamber side into the boss holes and simultaneously into the hole of the lever of metering needle (12) (Ref. Fig. 2).

Link shaft (11) (Ref. Fig. 4) freely rotates in two bronze bushings (7) and (12) pressed into the carburetor body bosses. Rubber sealing ring (10) is installed in the recess of bushing (12).

The link lever assembly comprising lever (16) and pin (15) pressed into it is secured on the end of throttle shaft (14) extending into the link chamber by coupling screw (6) (Ref. Fig. 5). The lever pin enters the hole of slide (3) inserted into link (13) (Ref. Fig. 4).

The link chamber is filled with oil MK-8 through a hole in the body. A plug with a rubber sealing ring is screwed into the hole. The oil getting through the holes in the link and slide lubricates friction surfaces.

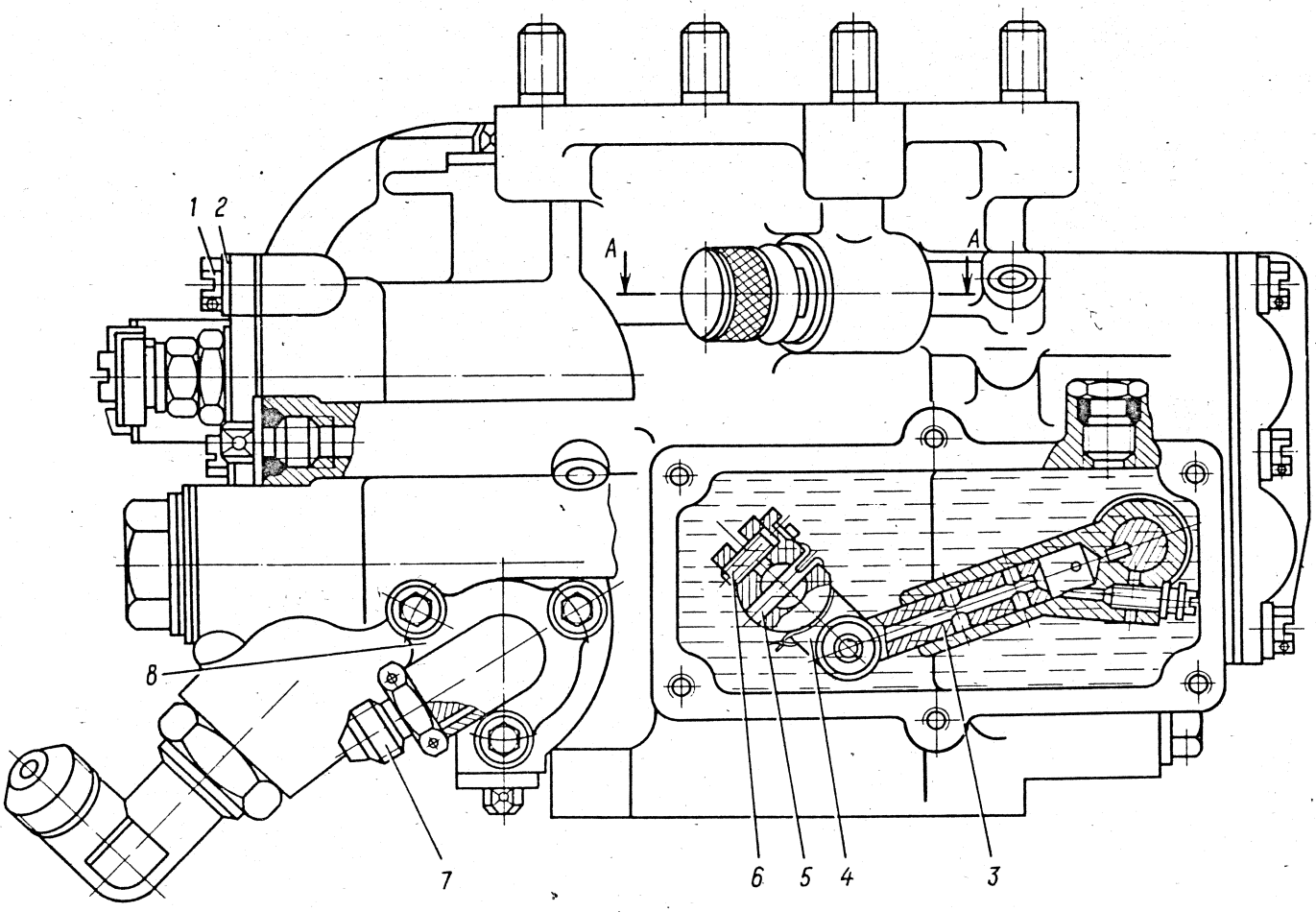
After installing metering needle (12) (Ref. Fig. 2) to the initial position and checking its travel versus angle of turn of the throttle, link lever (16) (Ref. Fig. 4) is finally tightened by screw (6) (Ref. Fig. 5) and is secured on the throttle shaft by tapered cotter pin (5). At the same time the metering needle lever and the shaft are drilled to receive setting pin (8) (Ref. Fig. 4).

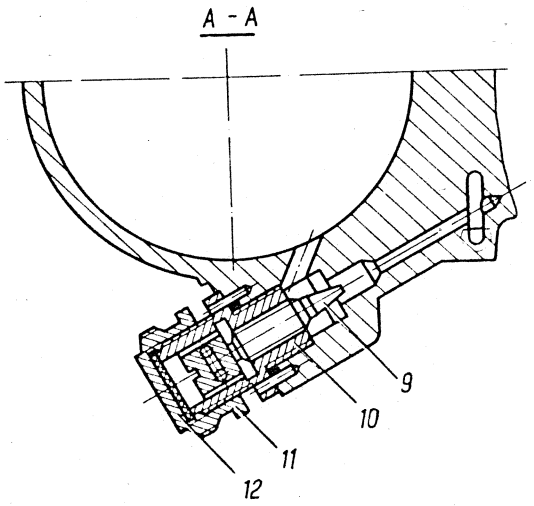


1. Carrier
2. Adjustment Washer
3. Clearance Take-Up Spring
4. Bushing
5. Pin
6. Holes, Dia. 2 mm
7. Bushing
8. Setting Pin
9. Metering Needle Lever
10. Sealing Ring
11. Link Shaft
12. Bushing
13. Link
14. Throttle Shaft
15. Link Lever Pin
16. Link Lever
17. Bushing
18. Link Chamber Cover
19. Washer
20. Gasket
21. Sealing Ring
22. Thrust Lever
23. Cotter Pin
24. Washer
25. Nut
26. Woodruff Key
27. Screw
28. Washer

Throttle Assembly

Figure 4





1. Screw
2. Washer
3. Slide
4. Link Lever
5. Tapered Cotter Pin
6. Screw
7. Fuel Pressure Measuring Connection
8. Fuel Valve Cover
9. Idle Needle
10. Coupling
11. Cap
12. Gasket

Link Mechanism and Idle Needle

Figure 5

Setting pin (8) is inserted into the hole and safetied against dropping out with lock (22) (Ref. Fig. 2) which is secured to the metering needle lever by two screws. The same screws are used to rigidly secure metering needle (12) lever to link shaft (20).

The upper part of the lever of metering needle (12) is a rectangular slot whose walls have one through hole each. Barrel-like roller (38) freely rotating on axle (37) is inserted inside the slot between the walls. Washer (39) safetied with cotter pin (36) is fitted to the axle end protruding from the lever.

Thus longitudinal play of the axle in the lever is limited on one side with the axle collar and on the other, with the washer. When installing the lever in the carburetor, roller (38) enters the slot in metering needle trunnion (16) thus coupling the needle kinematically with the carburetor link mechanism.

The carburetor link chamber is closed with cover (18) (Ref. Fig. 4) which is secured to the body by six screws. Steel washers are placed under screw heads.

The joint of the link chamber cover is sealed with paronite gasket (20).

2.2.4. Throttle Mechanism

The carburetor throttle chamber accommodates throttle (26) (Ref. Fig. 2) having two holes, dia. 2 mm, drilled near the edge and intended to improve atomization of fuel at idle rating.

Throttle (26) is tightly fitted to the carburetor barrel diameter and fully closes or opens the chamber at turning.

In assembly the throttle is inserted into the slot of shaft (14) (Ref. Fig. 4) and is secured to it by two screws (27) (Ref. Fig. 2).

Two longitudinal grooves are milled on the throttle plane to pass brass locking wire for safetying the throttle-to-shaft attachment screws.

Throttle shaft (14) (Ref. Fig. 4) rotates in two bronze bushings (17) and (4) pressed in the body.

One rubber sealing ring is installed in bushing (17) and two rubber sealing rings (21) are installed in bushing (4). The recess between the rings is packed with grease TsIATIM-201.

Fitted to the shaft at the link chamber side are washer (19) and link lever (16); clearance take-up spring (3), adjustment washer (2), throttle thrust lever assembly are installed at the other side. The throttle thrust lever assembly comprises lever (22) and pin (5) pressed and then flared in it. Arranged at the throttle thrust lever assembly side of the shaft are also throttle carrier (1) and a thrust washer assembly comprising washer (24) and a setting pin riveted in it.

The thrust lever is precluded against turning by flats provided on throttle shaft (14).

Thrust lever (22) and carrier (1) have holes of equal diameter uniformly spaced around the periphery; the carrier is provided with eight holes, and the thrust lever, nine holes.

When mounting thrust washer (24) on the throttle shaft, the setting pin enters the aligned holes of carrier (1) and thrust lever integrating them into one assembly.

Such a construction of the throttle control unit allows repositioning of the carrier to an angle of 5°.

After installation the throttle control unit is secured on the shaft by crown nut (25) locked with a cotter pin after tightening.

When installing the thrust lever on the idle stop, the lever bears with its pin (5) against the end of a thrust screw driven into the carburetor body boss and locked with a lock nut.

When the throttle is fully open, pin (5) of the lever bears against the boss on the body.

2.2.5. Metering System

The metering system comprises a nozzle assembly, a metering needle assembly and a venturi. The nozzle assembly is pressed into the carburetor body at the lever chamber side and includes nozzle (10) (Ref. Fig. 2) and sleeve (13) pressed onto its one end. The other end of the nozzle has a calibrated orifice which receives the shaped end of the metering needle assembly. The middle portion of the nozzle has holes serving to release fuel-air mixture. These holes are so arranged as to smoothly increase the area when being open by the shut-off edge of the metering needle. Provided inside sleeve (13) is a recess communicating six radial holes of the nozzle with one large hole in the sleeve. The fuel-air mixture passes through these holes and recess into the mixing chamber when the carburetor is idling. The second hole in the sleeve is provided to allow the use of the sleeve on other units.

To align the hole in the sleeve with the corresponding hole in the carburetor body, as well as to ensure required position of the holes in the mixing chamber relative to the air stream, the sleeve is pressed onto the nozzle and the nozzle assembly is pressed into the body in a strictly definite position.

To achieve this, milled splines offset from the part center are provided on the end faces of the nozzle and sleeve. Alignment of the nozzle spline with the sleeve spline indicates correct assembly of this unit.

When pressing the nozzle assembly into the carburetor body the splines should be directed along the lever chamber and be displaced towards the link chamber.

The nozzle interior serves as guide for metering needle (12).

The metering needle has a shaped portion intended to meter fuel. At the end of the needle the shaped portion transforms into a flat shank whereby the needle is turned to adjust fuel consumption. Twelve longitudinal splines are milled on the outer cylindrical surface of the needle other end.

Drilled at the shaped portion base are four inclined holes to supply metered fuel to the inner space of the needle. The outer diameter surface of the metering needle has a wide recess with fourteen holes to supply fuel and air to the nozzle holes. Closer to the splined end on the outside of the needle there is a groove with four drilled holes to supply fuel and air to idle holes in the nozzle. The splined end face of the needle has a threaded hole for attachment of trunnion (16). The trunnion has a calibrated hole, dia. 2.2 mm, serving as an air jet and connecting the inner space of the metering needle with the lever chamber. Plate U-shaped locking spring (15) is secured on top of the trunnion by two screws. The middle of the bridge of this spring has a locating lug entering a recess of the spline on the metering needle and being pressed to it by the spring force.

Such a construction positively fixes the metering needle against inadvertent turning that might offset fuel consumption during operation of the engine.

When turning the needle, the locating lug of the spring moves to the adjacent recess of the needle splined portion and a distinct click is heard. The number of clicks may be counted to estimate the longitudinal displacement of the metering needle.

One click corresponds to a needle movement of 0.08 mm.

Such a construction allows displacement of the needle on the assembled carburetor irrespective of the throttle position. This is needed to change the initial position of the metering needle when adjusting carburetor fuel consumption.

The metering needle is connected by the link mechanism with throttle shaft (14) (Ref. Fig. 4). Therefore, when the throttle shaft is turned, the link mechanism turns lever (19) (Ref. Fig. 2) of metering needle (12) which moves the latter. Thus, the needle is moved in the nozzle at change of engine ratings.

After installing the metering needle assembly in the carburetor, cover (18) is attached to the lever chamber flange by six bolts. Steel washers are placed under the bolt heads. The joint between the cover and the body of the carburetor is sealed with paronite gasket (17).

Air is fed to the air jet from the lever chamber where it gets from the throttle chamber via air filter (23) driven into the threaded hole of the boss provided at the lower part of the carburetor body under the lever chamber.

The air filter is constructed as follows: a mesh is inserted into a frame made from a sheet brass and rolled into a tube; the frame tube is brazed at the joint and is inserted with one end into the plug hole and is brazed to its threaded end. A ring

is brazed to the other end of the frame. The filter assembly is sealed in the housing with a rubber sealing ring.

Venturi (14) is inserted into the carburetor barrel from the lower flange side. The nozzle with sleeve are accommodated in the venturi slot.

2.2.6. Mechanical Acceleration Pump

Piston (6) of the mechanical acceleration pump reciprocates inside a steel cylinder of valve (9) (Ref. Fig. 2) pressed in the carburetor body. A wide cylindrical bore in the body near the cylinder communicates with the fuel chamber of the pressure regulator by a passage drilled in a special boss. Thus, fuel fed from the fuel chamber of the pressure regulator fills the annular space between the cylinder and the bore wall in the body and gets inside the cylinder through radial holes drilled in it.

Piston (6) of the mechanical acceleration pump, turned as a hollow thin-walled cylinder, has an internal partition with four fuel holes iniformly spaced around the circumference. A boss with internal through hole is provided at the center at one side of the partition. The other side of the partition has a lapped surface.

Two shallow dirt traps are turned on the outer surface of the piston.

Valve (7) being a flat duralumin washer is fitted with its hole on the cylindrical band at the middle part of coupling (8). This cylindrical band serves as a valve guide.

Coupling (8) is installed with a small radial clearance in the central through hole of piston (6) to thrust against the middle bend end.

The coupling is locked against longitudinal play with a lock crimped in the groove on the coupling end protruding from the piston. Mechanical acceleration pump flat valve (7) moves longitudinally within the guide band length. In the leftmost position it is tightly pressed by fuel pressure to the lapped surface of the piston partition to shut off fuel holes; on the other hand when being moved rightward to thrust against the end of the head on the right end of the coupling, it opens the holes and forms a gap for free passage of fuel.

The coupling flat shank is intended for mating with the slot of adjustment shaft (33). Pressed in the internal cylindrical bore in the coupling head is a bushing with a central through rectangular hole for passing the flat shank of the metering needle. The bushing is fixed in the coupling by a round pin pressed in the holes of the coupling and bushing. Spring (5) constantly presses the mechanical acceleration pump piston assembly to the end face of the metering needle flat shank. Thus, any longitudinal displacement of the needle causes the same displacement of the pump piston. The same spring takes up clearance between metering needle trunnion (16) and lever barrel-like roller (38). The left end of the spring bears against cover (4) of the mechanical acceleration pump. The cover is attached to the carburetor body by three

screws; steel washers are placed under the screw heads. The joint between the cover and the body is sealed with a paronite gasket.

A through threaded hole made at the center of cover (4) receives connection (34). The joint between the connection and the cover is sealed with a rubber sealing ring.

Adjustment shaft (33) is inserted in connection (34) through the internal through hole. The shaft has a slot to receive the flat shank of coupling (8), protruding from the piston assembly of the mechanical acceleration pump. Union nut (2) connected with shaft (33) by a thrust pin is screwed onto the second threaded end of the connection to bear against the hexagon. The thrust pin is pressed to stop in the hole made in the side surface of the adjustment shaft. Pressing is carried out through one of four radial holes drilled on the cylindrical band of union nut (2).

The thrust pin end protruding from the shaft is accommodated in a groove inside the nut so that the shaft is free to rotate in the nut and connection. Longitudinal travel of the shaft is limited by the width of the nut internal bore.

The gap between the shaft and connection is sealed by a rubber ring lodged in the shaft groove.

A slot for a screwdriver is milled on the adjustment shaft end protruding from the union nut hole. In adjustment, the metering needle is turned and moved by a screwdriver inserted into the adjustment shaft slot owing to interconnection of shaft (33), coupling (8) and the metering needle.

To limit the shaft turn during adjustment of the carburetor, a special device, stop with holder, is mounted on the outer face of the union nut. This assembly comprises two parts: thrust pin (35) and pin holder (1) made of spring steel in the form of flat round washer with two tabs arranged in diametrically opposite directions. The hole of the holder short tab receives thrust pin (35) whose end is riveted on the tab. The holder longer tab is hooked and has a locking hole at the end. The free end of the thrust pin is inserted into one of six holes uniformly spaced around the outer face of union nut (2), while the holder is fitted with its central hole onto the splined end of the adjustment shaft. Its bent end tightly embraces (owing to springiness of the material) the side surface of the union nut thus retaining the assembly on the carburetor.

The adjustment shaft turn is limited by pin (35) bearing against the thrust pin. Thus, the range of adjustment shaft turn is less than one revolution for the pin diameter.

To ensure similar adjustment range of the metering needle in both directions, i.e. towards increasing and decreasing fuel consumption, the stop with holder is set by the Supplier in such a position which allows the shaft to turn through about the same angle in both sides.

For more reliable attachment and to preclude exceeding of the permissible adjustment range of the metering needle in service, the stop with holder is locked with wire

passed through the hole at the holder end and in the attachment bolts of the mechanical acceleration pump cover. The wire is sealed with the Supplier's seal.

2.2.7. Idle Needle

A threaded hole in a special boss above the link chamber receives idle adjustment needle coupling sealed at the end with a lead gasket. The coupling is fixed in the boss against turning with two brass round pins. Made inside the coupling at the side of its portion screwed into the body is a threaded hole to receive the idle needle assembly; twelve longitudinal slots spaced uniformly around the circumference are made closer to the outer end. Idle needle assembly comprising needle (9) (Ref. Fig. 5) with a tapered end, two retaining balls with a spring in-between is screwed into the coupling so that the tapered end of the needle enters the passage drilled in the carburetor body.

The retaining balls forced outside by the spring enter diametrically opposite slots of the coupling to fix the needle in the required position.

When the needle is rotated by a screwdriver inserted in the slot on the needle head, clicks are heard; the number of clicks allows to estimate the needle longitudinal travel.

Screwed on to the outer end of the coupling is cap (11). Flexible textolite sealing gasket (12) is arranged inside the cap to seal the coupling end face. To connect the idle passage with the nozzle hole, a hole is drilled in the boss cast on the lever chamber wall and closed with a production plug on the outside.

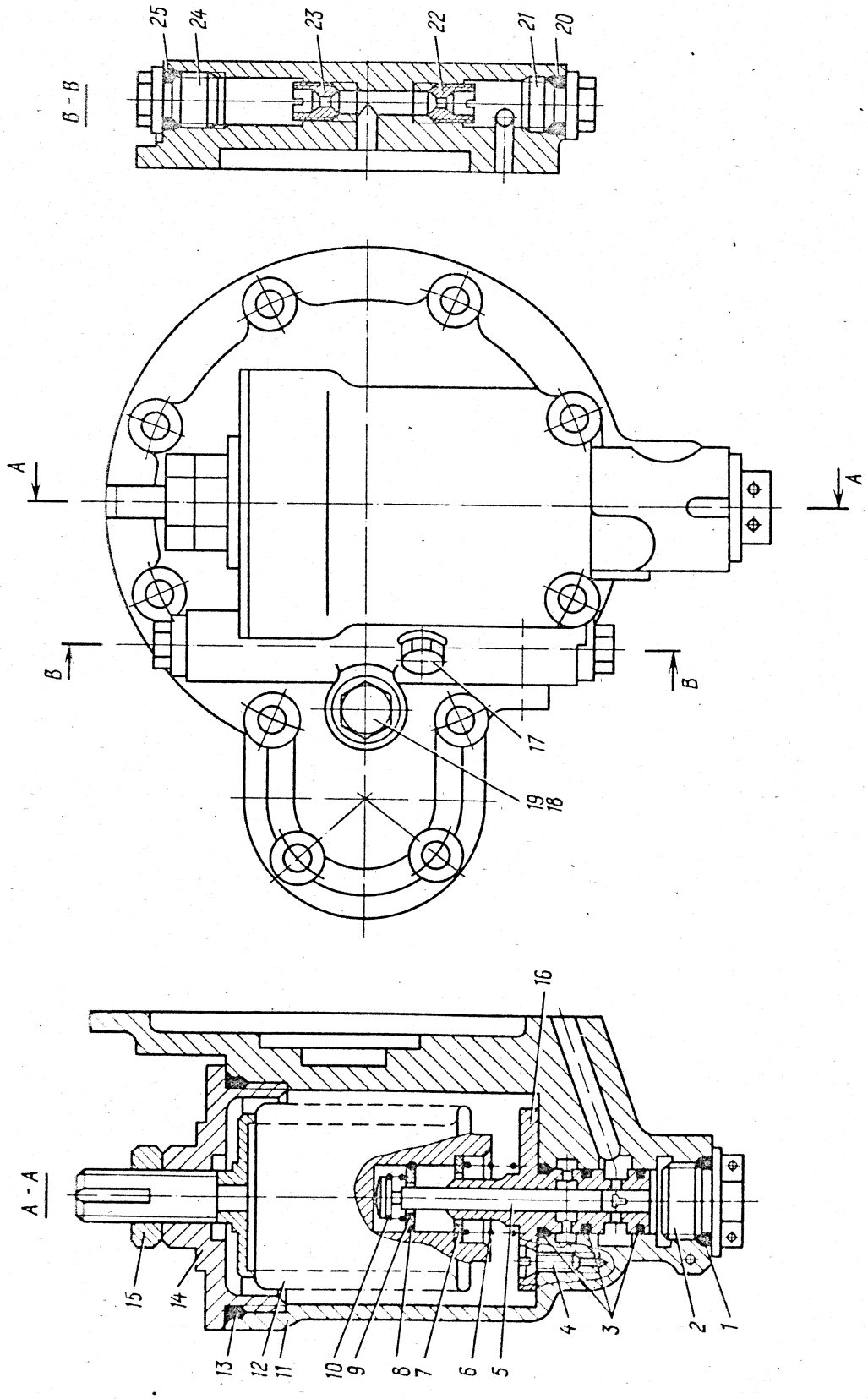
2.2.8. Supply of Fuel to Carburetor

Fuel is fed to the carburetor through fuel inlet connection (30) (Ref. Fig. 2). The connection is locked with nut (29). The connection-to-body joint is sealed with rubber ring (28). On passing the connection, fuel gets to fuel filter (31). The fuel filter assembly driven into the boss threaded hole is located under the fuel inlet boss. The filter connection face is sealed with ring (32). Plugs with rubber sealing rings driven into the holes at the top and bottom of the fuel chamber of the pressure regulator serve to drain fuel from the carburetor.

2.2.9. Altitude Control

Cover (11) (Ref. Fig. 6) closing the aneroid space doubles as a body for the altitude control.

The body aneroid space accommodates bushing (16) inserted in the aneroid space hole and sealed in it by three rubber sealing rings (3). The bushing is secured to the space bottom by two screws (4) locked by punching. Plug (2) with rubber sealing ring (1) is screwed into the threaded hole from the outside. Needle (5) is connected with aneroid capsule (12) by spring (10), thrust ring (9) and retaining ring (8).



1. Sealing Ring
2. Plug
3. Sealing Ring
4. Screw
5. Needle
6. Spring
7. Thrust Washer
8. Retaining Ring
9. Thrust Ring
10. Spring
11. Cover
12. Aneroid Capsule
13. Sealing Ring
14. Cover
15. Lock Nut
16. Bushing
17. Plug
18. Plug
19. Sealing Ring
20. Sealing Ring
21. Plug
22. Suction Jet
23. Inlet Air Jet
24. Plug
25. Sealing Ring

Altitude Control

Figure 6

In climbing, aneroid capsule (12) moves needle (5) in the bushing to shut off shaped ports. The needle is returned back by spring (6).

The threaded shank of aneroid capsule (12) is screwed into cover (14) and is safetied with lock nut (15); the cover is screwed into the body and is sealed with rubber ring (13).

A passage with two jets is made in a special boss under the aneroid space. Inlet air jet (23) and suction jet (22) are driven into the passage. The passage is closed on both sides with plugs (21) and (24) fitted with rubber sealing rings.

The aneroid space communicates with atmosphere through special plug (17).

A hole for measuring air pressure in the pressure regulator chamber is provided in the aneroid space cover. Plug (18) with rubber sealing ring (19) is screwed into the hole.

The altitude control assembly is attached to the flange of the pressure regulator fuel chamber by eight screws (3) (Ref. Fig. 3) and two elongated screws (5). Eight steel washers (2) and two sealing copper rings (6) are placed under the screw heads.

2.2.10. Air Manifold

Air manifold (25) (Ref. Fig. 2) made as a thin-walled steel ring with collar is mounted in a special recess in the carburetor body at the lower flange side. Eight ram pressure copper pipes are uniformly spaced around the ring. The manifold has a hole to supply air to the air filter. The manifold is attached by the collar with the aid of two screws.

2.2.11. Air Acceleration Pump

The air acceleration pump is mounted in the carburetor adapter boss.

Air pipe (18) (Ref. Fig. 1) and fuel pipe (17) of the pump entering the mixing chamber are pressed in the holes of the adapter wall. Two studs for attachment of the carburetor to the engine are screwed into the upper flange of the adapter; four studs for attachment of the pump cover to the adapter are driven into the boss flange.

A needle valve seat with two rubber sealing rings is inserted into the boss hole at the flange side.

Needle valve (22) is inserted into the valve seat. The needle valve carries an aluminium washer, a diaphragm disk, a rubberized fabric diaphragm, a second diaphragm disk, aluminium sealing ring, crown nut safetied with cotter pin, internal spring, stop, lock, outer spring and adjustment washer.

The acceleration pump cover with air jet (21) screwed into it is fitted onto the boss flange studs.

The cover is attached to the adapter by four nuts with spring washers. The cover-to-body joint is sealed by the diaphragm. The carburetor adapter is secured on the body upper flange studs by four nuts safetied with plate locks. The adapter-to-carburetor joint is sealed with a paronite gasket.

CARBURETOR AK-14P -TROUBLE SHOOTING

For mostly often encountered troubles and their remedies, refer to the Table given below.

Trouble	Possible cause	Correction
1. Exhaust to carburetor at idle rating	(1) Excessive opening of throttle at starting (especially in cold weather)	Close throttle
	(2) Lean mixture	Enrich mixture by idle adjustment screw (Ref. Task Card No. 204)
	(3) Air leakage in suction pipe	Eliminate leakage in suction pipe
	(4) Incorrect setting of magneto	Check magneto setting (Ref. 074.10.01, Task Card No. 202)
	(5) Mixed leads in magneto blocks	Check high-tension wiring and eliminate defects (Ref. 072.00.00, Task Card No. 237)
	(6) Clogged jets	Check and clean jets (Ref. Task Card No. 202)
	(7) Clogged fine fuel filter	Replace filtering element (Ref. 072.00.00, Task Card No. 257)
	(8) Low fuel pressure	Adjust fuel pressure to be at least 0.15 kgf/cm^2 at idle rating (Ref. 073.10.01, Task Card No. 204)
2. Fuel leaks from carburetor nozzle	Dirt gets under carburetor fuel valve	Wash fuel passage by passing gasoline through lower drain plug with main fuel jet plug open (Ref. Task Card No. 202)

CARBURETOR AK-14P - MAINTENANCE PRACTICES

1. LIST OF TASK CARDS

Title	Task Card No.
Removal	201
Depreservation of New Carburetor	202
Installation	203
Idle Adjustment	204
Adjustment at Main Ratings	205
Adjustment of Altitude Control	206
Adjustment of Acceleration Pump	207

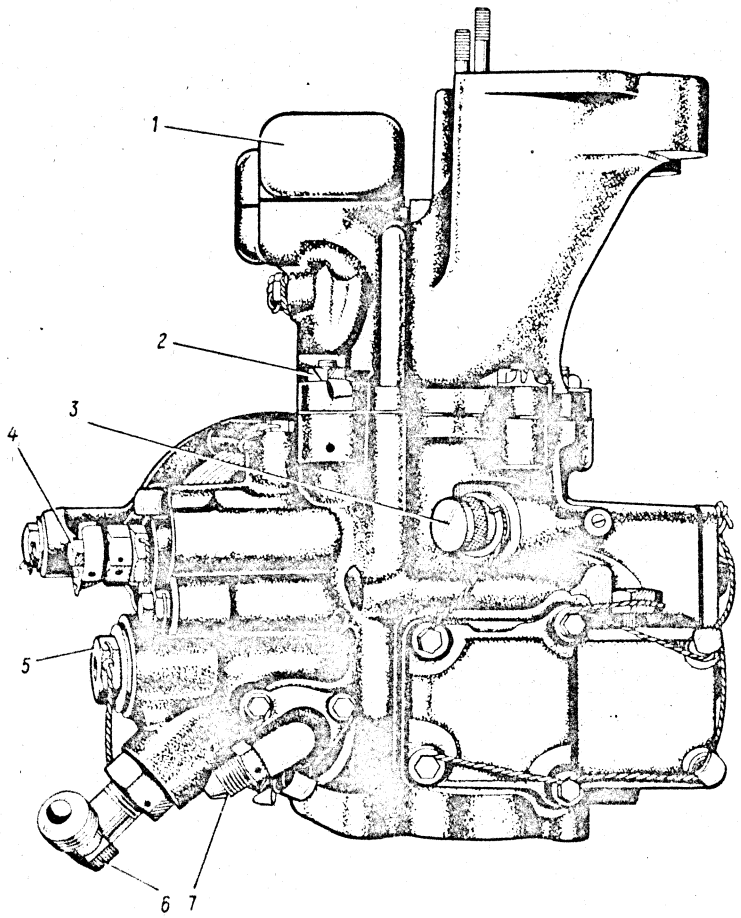
2. OPERATION PROCEDURE

TO M-14P M.S.	TASK CARD No. 201	PAGE(S) 203, 204
M.S. ITEM	PROCEDURE: Removal	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
1. Disconnect the fuel line from fuel inlet connection (6) (Ref. Fig. 201). 2. Disconnect the throttle control rod. 3. Disconnect the fuel pressure measuring pipe from connection (7). 4. Unlock and undo four carburetor attachment nuts. 5. Remove the carburetor. 6. Remove the gasket.		

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Pliers, flat-nosed 150 Screwdriver 70345 A150x0.5 Wrench 24x27 700880-8 Wrench 11x14 14-24-861 Wrench 27x30 7811-0041 Wrench 14x17 14-232-03	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY



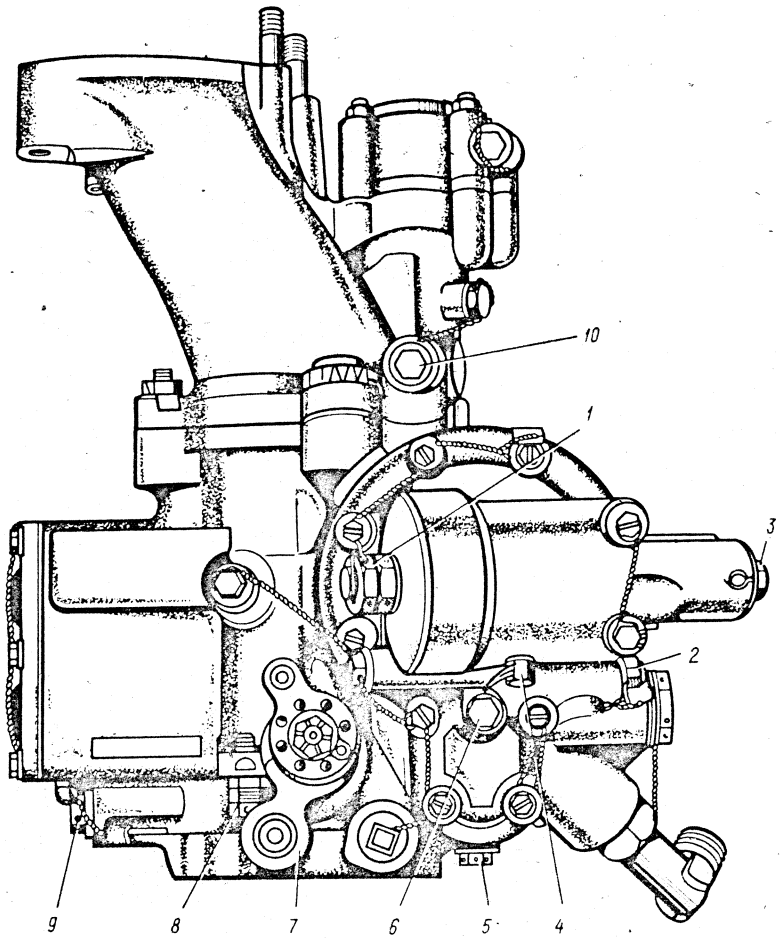
1. Air Acceleration Pump
2. Upper Drain Plug
3. Idle Needle
4. Metering Needle Adjustment Screw
5. Fuel Filter
6. Fuel Inlet Connection
7. Carburetor Inlet Fuel Pressure Measuring Connection

Carburetor AK-14P (Right Side View)

Figure 201

TO M-14P M.S.	TASK CARD No. 202	PAGE(S) 205 - 208
M.S. ITEM	PROCEDURE: Depreservation of New Carburetor	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
1. Unpack the new carburetor. 2. Remove preserving grease from the external surfaces with a brush moistened in clean gasoline. 3. Blow the external surfaces with dry compressed air. 4. Drive out upper drain plug (2) (Ref. Fig. 201). 5. Drive out plug (3) (Ref. Fig. 202) for measuring the initial position of the altitude control needle. 6. Remove shipping cap from fuel inlet connection (6) (Ref. Fig. 201). 7. Connect the hand pump line to connection (6). 8. Set the throttle lever to the full open stop. 9. Drive out plug (6) (Ref. Fig. 202) for measuring air pressure in the regulator air space. 10. Supply air at a pressure of up to 0.5 kgf/cm^2 into the hole for plug (6). 11. Flush clean gasoline at a pressure of (0.5 ± 0.2) kgf/cm^2 through fuel inlet connection (6) (Ref. Fig. 201) till gasoline appears from the hole for upper drain plug (2). 12. After gasoline appears from the hole, reinstall plug (2).		



1. Altitude Control Needle Adjustment Screw
2. Suction Jet Plug
3. Plug for Measuring Initial Position of Altitude Control Needle
4. Breathing Plug
5. Lower Drain Plug
6. Plug for Measuring Air Pressure in Regulator Air Space
7. Throttle Control Lever
8. Throttle Idle Stop Screw
9. Air Filter
10. Acceleration Pump Jet Plug

Carburetor AK-14P (Left Side View)

Figure 202

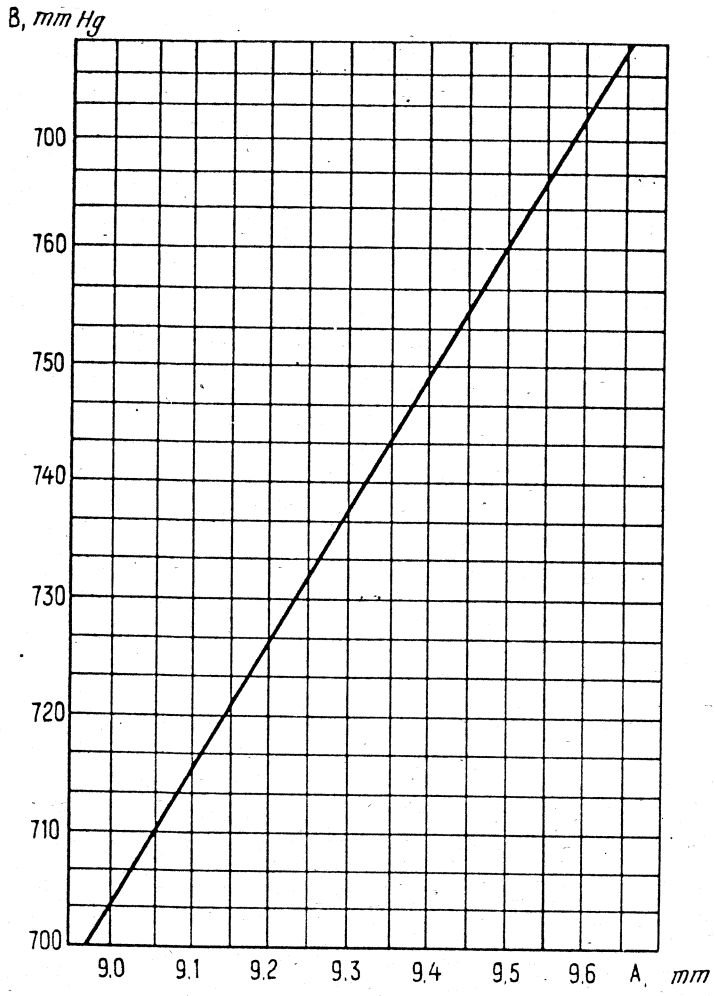
OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
13. Keep on flushing till clean gasoline emerges from the hole for plug (3) (Ref. Fig. 202) of the altitude control. 14. Reinstall altitude control plug (3). 15. Keep on flushing till clean gasoline emerges from the nozzle. 16. Turn the throttle lever from the idle stop to the throttle fully open position three or four times. NOTE: Do not drain gasoline remainder. 17. Tighten and lock the plugs. 18. Set the throttle lever to the full open stop. 19. Flush clean gasoline through the hole of lower drain plug (5) at a pressure of 0.1 kgf/cm^2. 20. Drain fuel remainder through the hole of diaphragm chamber plug (5). 21. Blow the hole for plug (5) with dry air at a pressure of 0.5 kgf/cm^2. 22. Reinstall and lock plug (5). 23. Remove plug (4). 24. Check cleanliness of the hole for breathing plug (4). 25. Wash the hole for plug (4) with clean gasoline if grease is found in the hole. 26. Reinstall and lock plug (4).		

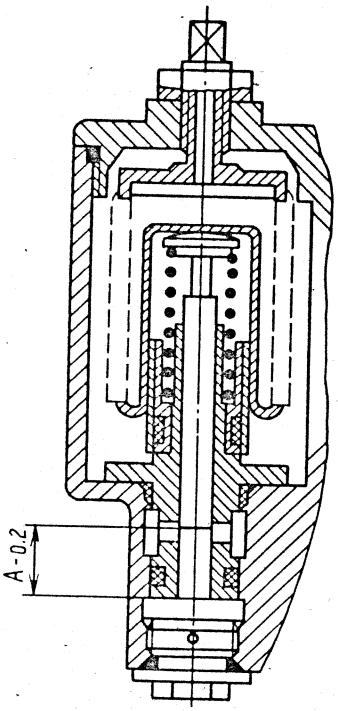
OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
27. Disconnect the hand pump line from connection (6) (Ref. Fig. 201). 28. Install the shipping cap on the connection. 29. Wipe the carburetor externally with a clean cloth.		

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Bath, depreservation Wrench 11x14 14-24-861 Wrench 17x19 UB-24-07 Wrench 27x30 7811-0041 Wrench 19x22 700880-7	Gasoline Nefras-S 50/170 or BR-1, BR-2 Brush, hair Air, compressed Cloths

TO M-14P M.S.	TASK CARD No. 203	PAGE(S) 209 - 212
M.S. ITEM	PROCEDURE: Installation	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
1. Measure the initial position of the altitude control needle (Ref. Fig. 202). 2. Adjust the altitude control needle position, if required, according to the graph (Ref. Fig. 203 and Task Card No. 206). 3. Make sure the carburetor and mixture collector flanges are free from nicks. T.R. Nicks are not allowed. 4. Install a new sealing gasket on the carburetor flange. 5. Install the carburetor on the mixture collector. 6. Install four locks and screw on four carburetor attachment nuts. 7. Uniformly tighten and lock the carburetor attachment nuts. 8. Connect the throttle control rod to the carburetor. 9. Connect the fuel supply line to connection (6) (Ref. Fig. 201) and lock it. 10. Connect the pipe for measuring fuel pressure at carburetor inlet to connection (7). 11. Operate the hand priming pump to build up a pressure in the fuel system.	Dress nicks	





Carburetor Altitude Control Needle Position
Versus Barometric Pressure (Barometric Graph)

Figure 203

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
12. Check fuel line joints for leakage. T.R. Fuel leakage is not allowed.	Eliminate leakage by tightening connections, nuts, plugs	
13. Coat hinged joints with grease TsIATIM-201.		
14. Check smooth travel of the throttle from stop to stop. T.R. The throttle should move smoothly from stop to stop	Adjust throttle travel by repositioning the control lever on the throttle shaft (Ref. Fig. 202)	
15. Make sure there are no plays in the throttle control linkage. T.R. Plays are not allowed.	Eliminate plays	
16. Start and warm up the engine (Ref. 072.00.00, Task Card No. 201).		
17. Check fuel line and carburetor joints for leakage (Ref. 072.00.00, Task Card No. 231).		
18. Check carburetor operation at all ratings and adjust it if required (Ref. Task Card No. 204).		

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Template 60660-3863 Pliers, flat-nosed 150 Wrench 19x22 700880-7 Wrench 11x14 14-24-861 Wrench 7x9 700880-2 Screwdriver 530-280-1 Pump, priming UB-24-05 Wrench 17x19 UB-24-07	Sealant "50" Wire, locking KO-0.8 Grease TsIATIM-201

TO M-14P M.S.	TASK CARD No. 204	PAGE(S) 213, 214
M.S. ITEM	PROCEDURE: Idle Adjustment	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY

1. Start and warm up the engine (Ref. 072.00.00, Task Card No. 201).

2. Adjust carburetor inlet fuel pressure to be 0.2 to 0.5 kgf/cm^2 at main ratings and at least 0.15 kgf/cm^2 at the idle rating (Ref. 073.10.01, Task Card No. 204).

3. Unlock and undo the cap of idle needle (3) (Ref. Fig. 201).

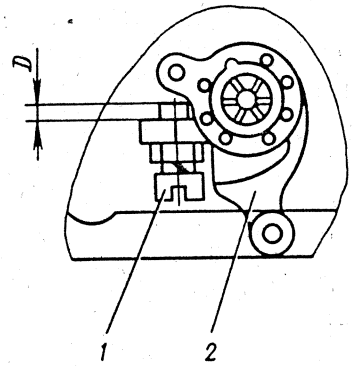
4. Remove the cap and sealing gasket.

5. Turn the idle needle to either side to set idle speed of up to 26 %. It is allowed to adjust idle speed by screw (8) (Ref. Fig. 202) of the throttle stop at the idle rating set by the Supplier to size D (Ref. Fig. 204) (the size is entered in the carburetor Certificate) within ±1.5 turns; size D is changed within ±1.5 mm.

6. Reinstall the sealing gasket and idle needle cap.

7. Screw on and lock the cap.

   CAUTION: ADJUST IDLE SPEED FINALLY AFTER ADJUSTING MAIN RATINGS.

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
 1. Throttle Idle Stop Screw 2. Carburetor Throttle Control Lever Determining size D Figure 204		

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Pliers, flat-nosed 150 Screwdriver 700345 A150x0.5	Wire, locking KO-0.8

TO M-14P M.S.	TASK CARD No. 205	PAGE(S) 215, 216
M.S. ITEM	PROCEDURE: Adjustment at Main Ratings	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY

1. Check engine operation at all ratings on the initial adjustment starting from the take-off rating (Ref. 072.00.00, Task Card No. 202).

   NOTE: If engine operates poorly at separate ratings, adjust the carburetor.

2. Adjust fuel consumption at take-off and nominal ratings using the following procedure:

   (1) Unlock and undo suction jet plug (2) (Ref. Fig. 202).

   (2) Select and replace the suction jet.

   NOTE: It is allowed to install jet, dia. 1.3 to 2.0 mm. Increasing the jet diameter leans out the mixture, decreasing it, enriches the mixture. The jet diameter change of 0.05 mm changes specific fuel consumption at take-off rating for 2 to 5 g/hp·h.

   (3) Install and lock suction jet plug (2).

3. Adjust the engine in cruise rating II using the following procedure:

   (1) Unlock metering needle adjustment screw (4) (Ref. Fig. 201).

   (2) Turn adjustment screw (4) to the required side to obtain the desired fuel consumption.

   NOTES: 1. Adjust the carburetor on the shutdown engine. Rotating the shaft clockwise enriches the mixture and vice versa.

   2. Turn the metering needle screw up to the limit stops in either direction from the initial adjustment setting.

   3. The adjustment range to stop is eight clicks. One click of the metering needle adjustment shaft changes fuel consumption from 4 to 8 g/hp·h.

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
(3) Lock adjustment screw (4). 4. Start the engine and check engine operation at cruise rating I and nominal rating II (Ref. 072.00.00, Task Card No. 202) since the change in the metering needle position affects fuel consumption. 5. Perform additional adjustment with the metering needle screw in case of deviations at cruise rating I and nominal rating II. CAUTION: NEVER TURN THE METERING NEEDLE ADJUSTMENT SCREW BEYOND THE STOPS, OTHERWISE PREVIOUSLY ADJUSTED FUEL CONSUMPTIONS FOR TAKE-OFF, NOMINAL RATINGS I AND II WOULD BE ABRUPTLY CHANGED AND CARBURETOR INITIAL SETTING COULD NOT BE ADJUSTED.		

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Wrench 19x22 700880-7 Pliers, flat-nosed 150 Screwdriver 700346 A200x1 Wrench 14x17 14-232-03	Wire, locking KO-0.8

TO M-14P M.S.	TASK CARD No. 206	PAGE(S) 217, 218
M.S. ITEM	PROCEDURE: Adjustment of Altitude Control	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY

1. Measure the altitude control needle position, using the following procedure.
   (1) Unlock and drive out plug (3) (Ref. Fig. 202) from the carburetor.
   (2) Using a special template or depth gauge, measure the actual initial position of the needle (Ref. Fig. 203).
   (3) Determine the required initial position of the altitude control needle against the barometric graph, size A.

2. Adjust the altitude control if measured size A is other than size A required by the barometric graph using the following procedure:
   (1) Unlock and undo the lock nut of screw (1) (Ref. Fig. 202).
   (2) Turn screw (1) to the required side.
   NOTE: To decrease aneroid capsule size A, drive in the screw, to increase it, drive the screw out. One revolution of the screw corresponds to 1 mm.
   (3) Tighten the lock nut of screw (1).
   (4) Lock the lock nut with wire.

3. Screw on plug (3) and lock it.

4. Make an entry on the operations performed in the carburetor Certificate.

NOTES: 1. Check the altitude control needle position for correspondence to the barometric graph when installing a new carburetor and after every 100 h of engine operation.
2. Carry out the check on the shutdown engine.
3. It is allowed to adjust the altitude control only if the needle initial position is other than found from the barometric graph.

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Template 60680-3863 Wrench 11x14 14-24-861 Wrench, flat 7x9 700880-2 Pliers, flat-nosed 150	Wire, locking KO-0.8

TO M-14P M.S.	TASK CARD No. 207	PAGE(S) 219
M.S. ITEM	PROCEDURE: Adjustment of Acceleration Pump	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
1. Unlock and drive out plug (10) (Ref. Fig. 202). 2. Drive out the acceleration pump fuel jet. 3. Select a fuel jet. NOTES: 1. It is allowed to install jets, dia. 0.9 to 1.4 mm. 2. The jets required for adjustments are included in the individual SPTA set of each carburetor. 3. When increasing the fuel jet diameter, the acceleration pump delivery increases and vice versa. 4. Screw in the selected jet. 5. Drive in and lock plug (10). NOTE: It is allowed to replace the fuel jet when installing a new carburetor.		

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Wrench 7x9 700880-2 Wrench 11x14 14-24-861 Pliers, flat-nosed 150 Wrench 14x17 14-232-03	Wire, locking K0-0.8

074.00.00

IGNITION SYSTEM

IGNITION SYSTEM - DESCRIPTION AND OPERATION

1. GENERAL

The ignition system ensures well-timed igniting of the working mixture in the cylinders.

The M-14P engine ignition system includes two M-9F magnetos, SD-49SMM spark plugs, shielded ignition harness (magneto selector switch and high-tension starting coil KP-4716).

2. DESCRIPTION

The mixture is ignited in the cylinders by a high-tension spark generated in two magnetos mounted on the rear cover of the engine crankcase.

High-tension current from the magneto is transmitted to the spark plugs via high-tension cables enclosed in a shielded ignition harness. Both magnetos are of the LH rotation type. The RH magneto serves the rear spark plugs and the LH one, the front spark plugs.

To ignite the working mixture in the cylinders at starting, starting coil KP-4716 is included in the system.

Current from the airplane electrical system passing through the primary winding of coil KP-4716 magnetizes its core and the starting coil breaker points, previously open, close the primary winding to ground. Magnetic field disappearing with current, induces high voltage in the coil secondary winding, which is needed to generate spark between the spark plug electrodes.

High voltage is fed to the starting electrode of the magneto rotor and through the distributor electrodes to the cylinder spark plugs.

When the engine accelerates to a speed of 12 to 14 % (300 to 400 r/min), the magneto is switched on and starting coil KP-4716 is cut out. In this case high voltage from the secondary winding of the magneto transformer is fed to the working electrode of the rotor and then through the distributor electrodes to the cylinder spark plugs.

The magnetos are cut in and out by means of a selector switch the knob of which can be set to either of the following four positions:

"0" - both magnetos are off.

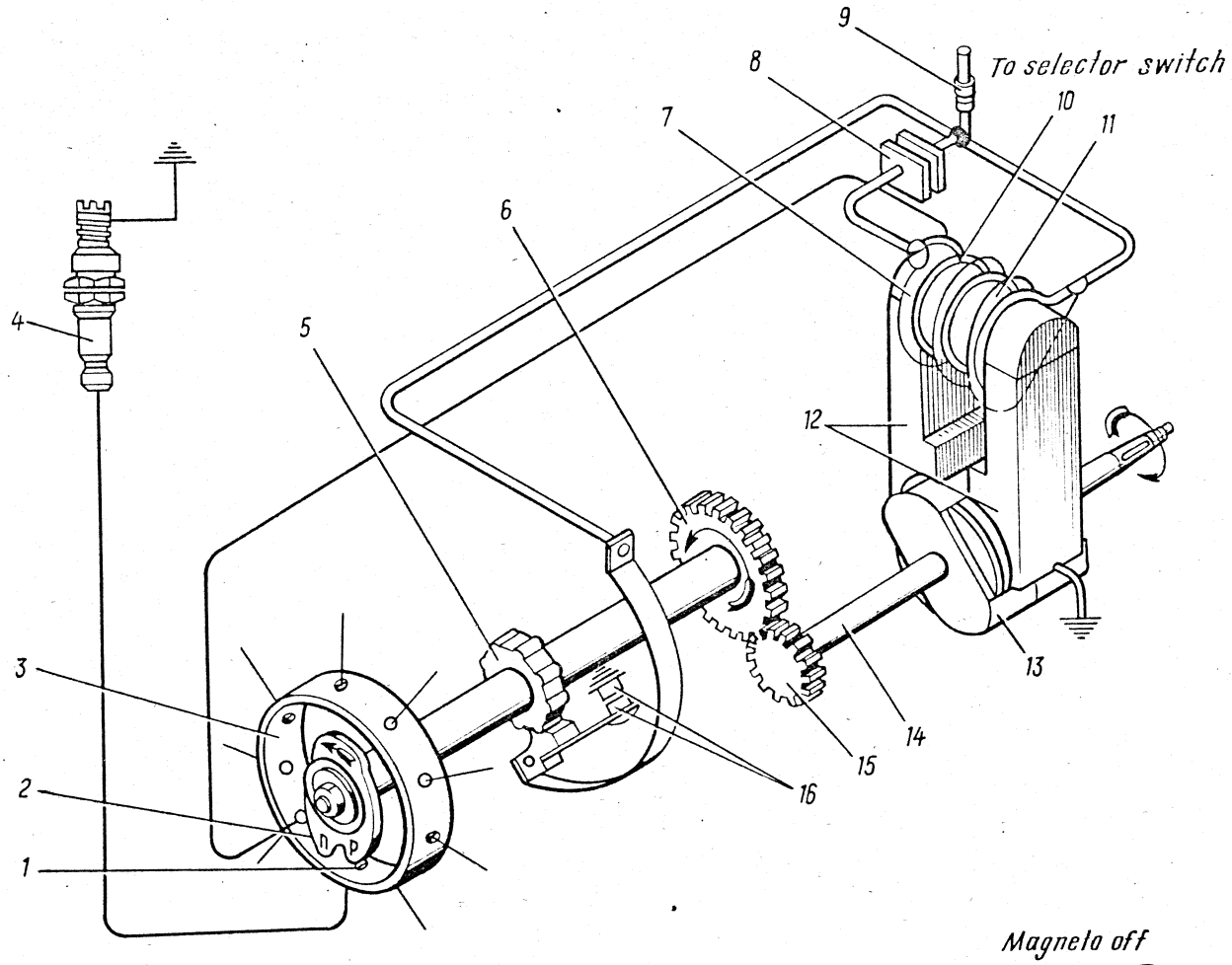
"1" - the LH magneto is on and the RH magneto is off.

"2" - the RH magneto is on and the LH magneto is off.

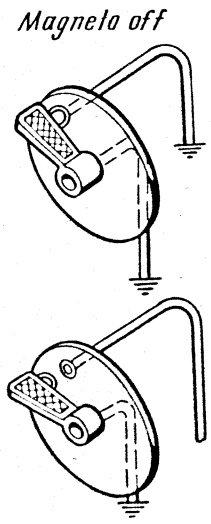
"1+2" - both magnetos are on.

High-tension starting coil KP-4716 is connected to the starting electrode of the LH magneto.

The ignition circuit diagram is shown in Fig. 1.



1. Working Electrode
2. Rotor
3. Distributor
4. Spark Plug
5. Cam
6. Gear
7. Transformer Secondary Winding
8. Condenser
9. Selector Switch Lead
10. Transformer Primary Winding
11. Transformer Core
12. Pole Shoes
13. Magnet
14. Rotor Shaft
15. Pinion
16. Breaker Points



Ignition Diagram

Figure 1

074.10.00

POWER SUPPLY

MAGNETO M-9F - DESCRIPTION AND OPERATION

1. GENERAL

The M-9F magneto (Ref. Fig. 1) is intended to generate high-tension current and distribute it among the spark plugs of piston engines for igniting the working mixture.

The M-9F magneto is of a rotor construction (permanent magnet is rotating, the transformer is stationary).

The M-9F magneto has fixed spark, i.e. it does not include a spark advance mechanism.

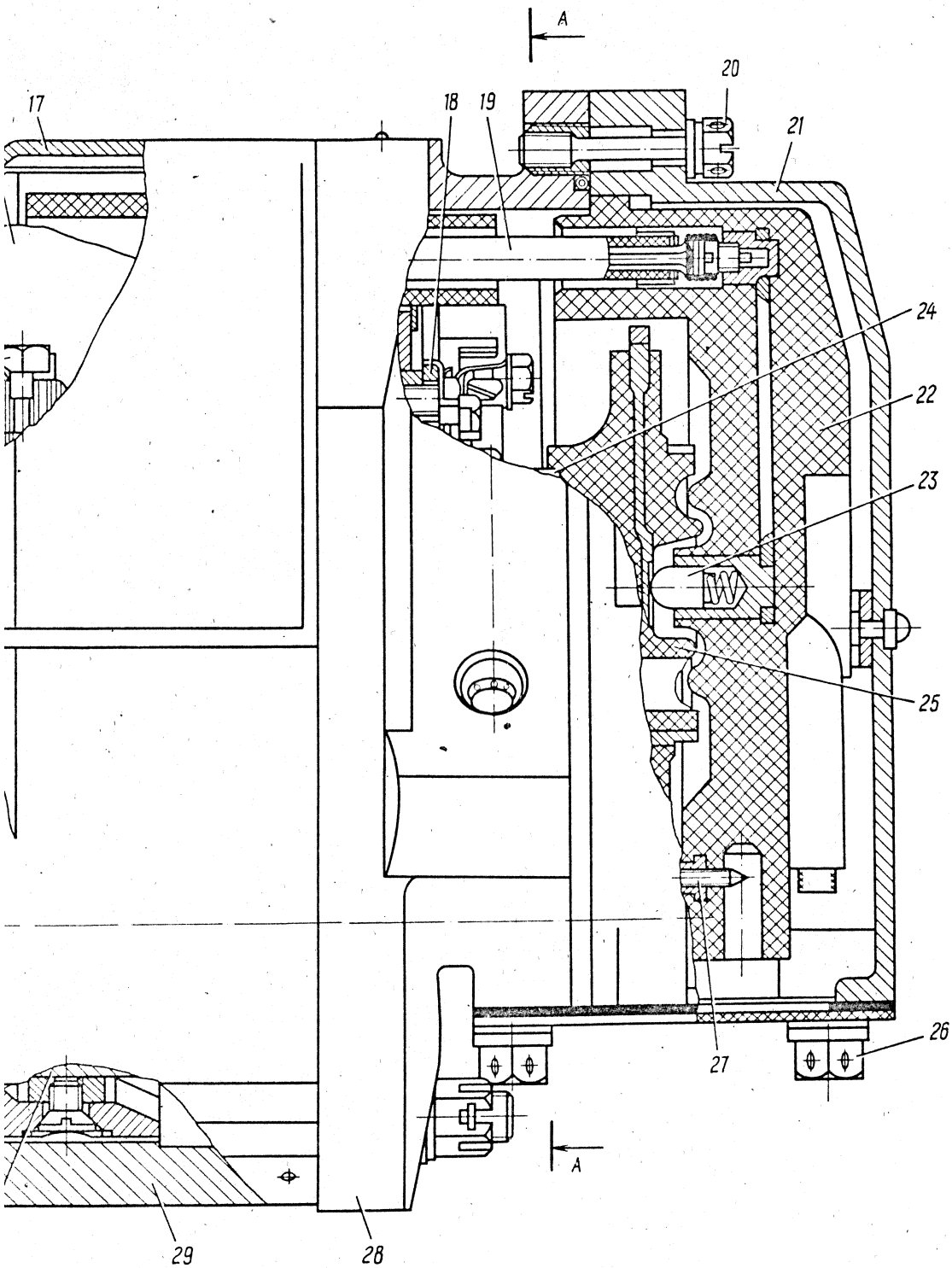
The magneto operates jointly with coupling MR-09 serving to set the spark when mounting the magneto on the engine and to ensure smooth transmission of drive torque to the rotor.

The M-9F magneto is designed for starting the engine with the use of starting coil KP-4716.

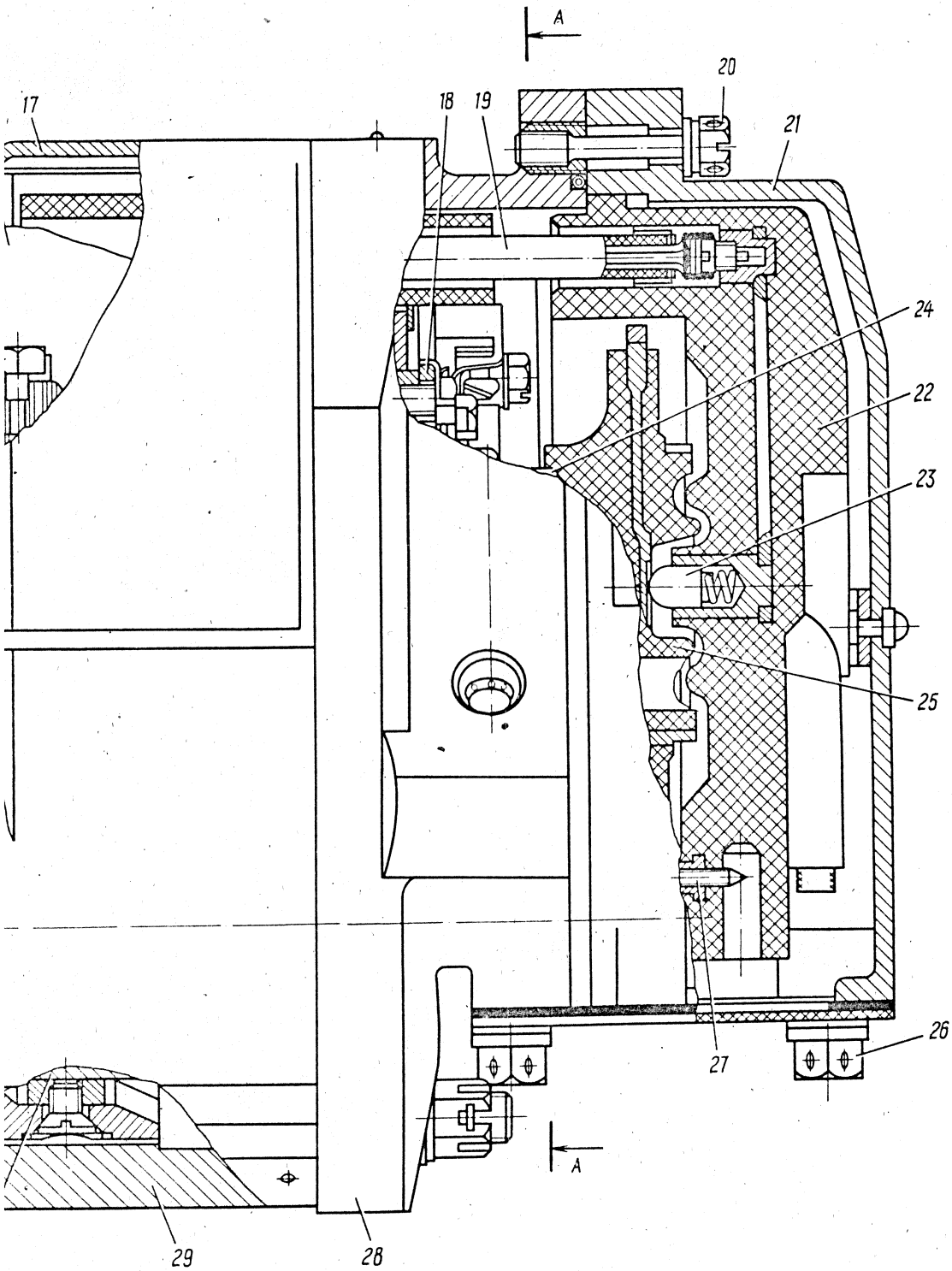
2. DESCRIPTION

2.1. SPECIFICATIONS

Vibration load frequency at amplitude:	
0.8 mm	Up to 50 Hz
3 mm	At least 1.5 Hz
Ambient temperature (atmospheric air with gasoline vapors)	$\pm$60 °C
Rotor speed at which magneto offers troublefree operation	600 to 3420 r/min
Breaker point gap	0.25 to 0.35 mm
Breaker point pressure	(650$\pm$100) gf
Dwell (angle of rotor turn from neutral position to beginning of breaker point operating)	13 to 16°
Rotor direction of rotation (if viewed from magneto drive side)	LH
Mass	Up to 5.4 kg



1. Washer
2. Wick
3. Point Support Plate Screw
4. Point
5. Spring
6. Rubbing Block
7. Point Plate
8. Eccentric
9. Shaft
10. Shoe
11. Screw
12. Connection
13. Shaped Nut
14. Lock
15. Cut-Out Terminal
16. Transformer
17. Cover
18. Breaker
19. High-Tension Lead
20. Screw (of Shield)
21. Shield
22. Distributor
23. Carbon Knob
24. Cam
25. Rotor
26. Screw
27. Contact Screw
28. Rear Cover
29. Housing
30. Rotor
31. Front Cover



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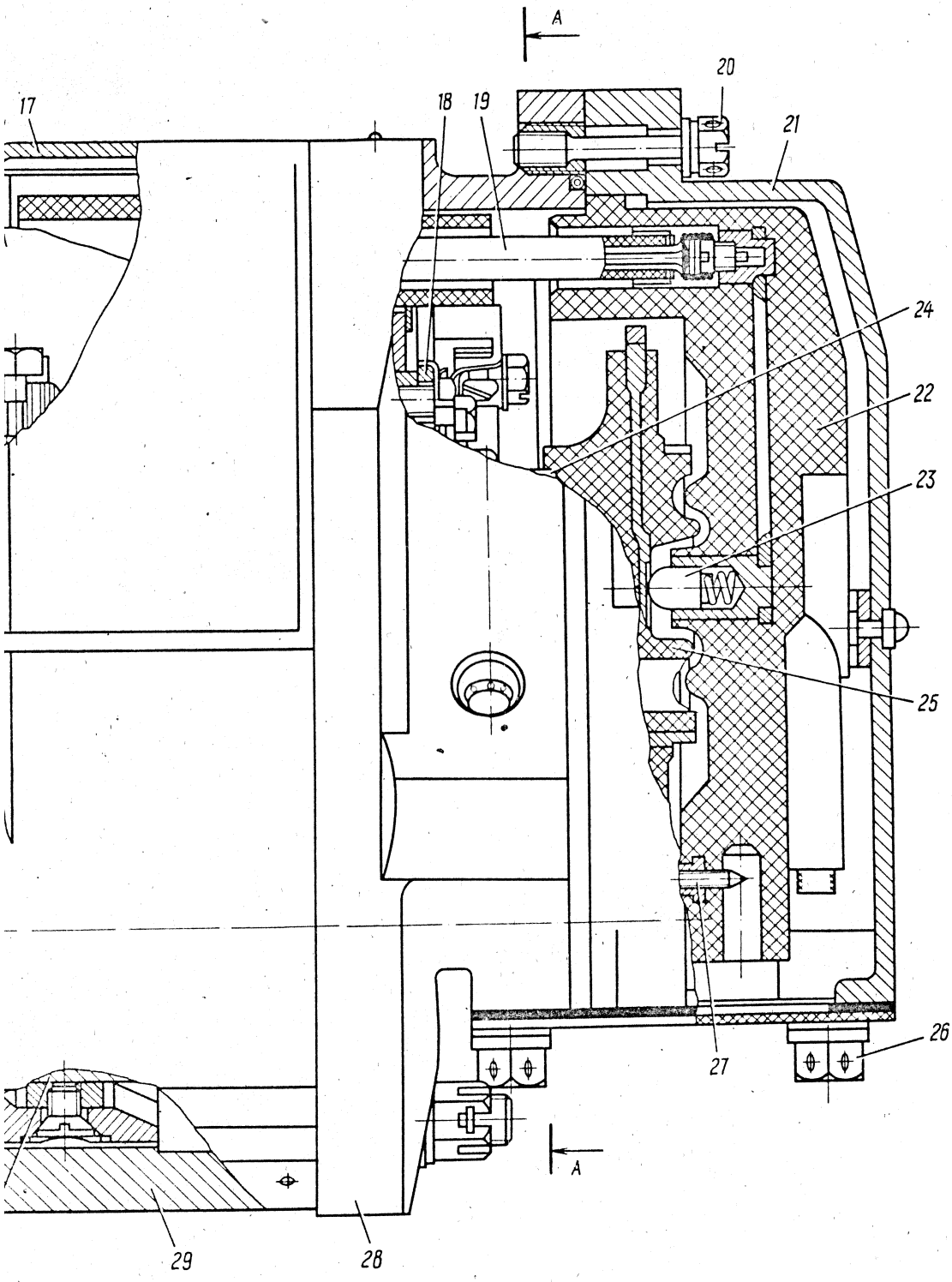

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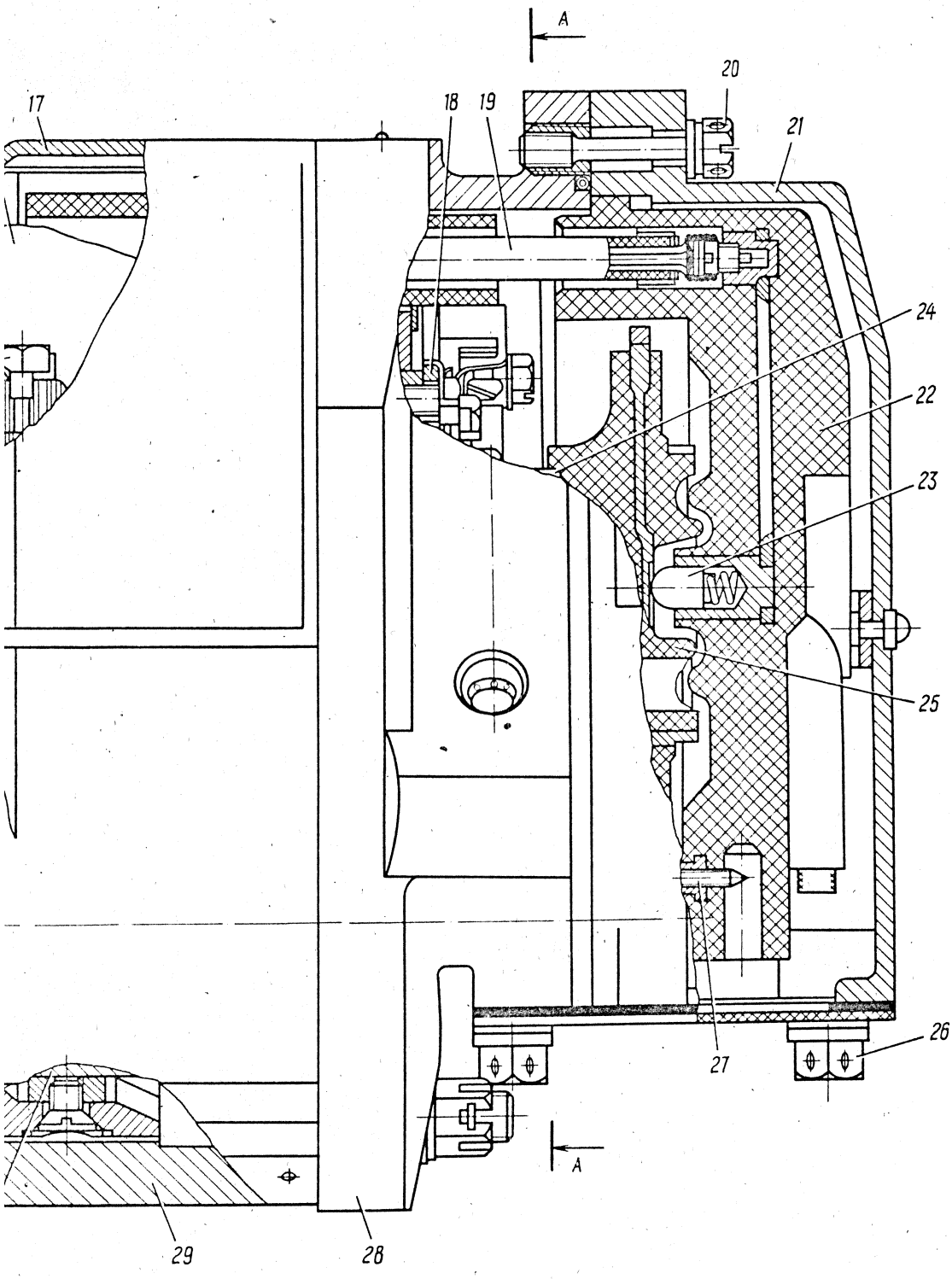
21. Shield
22. Distributor
23. Carbon Knob
24. Cam
25. Rotor
26. Screw
27. Contact Screw
28. Rear Cover
29. Housing
30. Rotor
31. Front Cover



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23. Carbon Knob
24. Cam
25. Rotor
26. Screw
27. Contact Screw
28. Rear Cover
29. Housing
30. Rotor
31. Front Cover

MAGNETO M-9F - TROUBLE SHOOTING

For mostly often encountered troubles and their remedies, refer to the Table given below.

Trouble	Possible cause	Correction
1. Magneto does not produce sparks	(1) Heavy carbon deposit or oxidation on points (4) (Ref. Fig. 1) of breaker (18)	Burnish breaker (18) points
	(2) Poor ground contact of transformer (16)	Tighten screws (11) securing transformer (16) to shoes (10) of housing (29)
	(3) Oiling of points (4) of breaker (18) because of ingress of oil into breaker space	Clean points (4) and space of breaker (18) and wipe with chamois or clean dense cloth (calico) slightly moistened in gasoline. Eliminate cause of oil ingress into space of breaker (18)
	(4) Breakdown of transformer (16)	Replace transformer (16)
	(5) Incorrect connection of high-tension lead (19), broken carbon knob (23) of distributor (22)	Check connection of high-tension lead (19) and condition of carbon knob (23), replace carbon knob
	(6) Cracks in distributor (22)	Replace distributor (22)
2. Magneto keeps on operating with selector switch cut off	(1) Broken contact springs on transformer (16)	Replace transformer (16)
	(2) Poor connection of wire to cut-out terminal (15)	Check connection of wire
	(3) Soiling of terminal (15) of transformer (16)	Wipe terminal (15)
	(4) Rotor (25) broken down or burnt through	Replace rotor (25)
3. Magneto misses some spark plugs	(1) Maladjusted magneto	Adjust gap of points (4)
	(2) Poor connection of wires to distributor (22)	Check connection of wires to distributor (22), tighten contact screws (27)
	(3) Breakdown of spark plug high-tension cable	Replace cable

MAGNETO M-9F - MAINTENANCE PRACTICES

1. LIST OF TASK CARDS

Title	Task Cards No.
Depreservation of New Magneto	201
Installation	202
Adjustment of Breaker Point Gap	203
Replacement of Magneto Distributor and Ignition Harness Cables	204
Removal	205

2. OPERATION PROCEDURE

TO M-14P M.S.	TASK CARD No. 201	PAGE(S) 203, 204
M.S. ITEM	PROCEDURE: Depreservation of New Magneto	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
1. Release the magneto from its packaging.		
2. Remove grease from the shank of shaft (9) (Ref. Fig. 1) of rotor (30).		
3. Unlock and undo four screws (26) for attachment of the pipe, remove shield (21) and distributor (22). NOTE: When removing distributor (22), see to it that high-tension lead (19) is not bent and its insulation is not damaged. CAUTION: DO NOT ROTATE MAGNETO ROTOR (30) BEFORE REMOVING THE BAND.		
4. Carefully move spring (5) with rubbing block away, remove band impregnated with grease from cam (24) using tweezers, carefully clean spring (5) of breaker (18) of grease and remove grease from cam (24) and all the parts of breaker (18). NOTE: Perform depreservation using dry chamois or calico cloth.		
5. After depreserving wipe cam (24) bright with clean chamois or calico cloth moistened in clean gasoline.		
6. Lubricate the working surface of cam (24) and spring of breaker (18) with a thin layer of turbine oil T22 using a brush. T.R. Runs of oil and its getting on points (4) and parts near the points are not allowed.	If oil gets on points (4), wipe them with clean chamois or calico cloth moistened in alcohol	

OPERATIONS AND TECHNICAL REQUIREMENTS	CORRECTIVE ACTIONS	CHECKED BY
7. Fill two droplets of turbine oil T22 on the end of wick (2) protruding from the oil fitting cup to lubricate cam (24) using a medical pipet. CAUTION: FILL THE OIL FITTING WHEN DEPRESERVING THE MAGNETO AFTER PROLONGED STORAGE (AT LEAST TWO YEARS) OR WHEN STORING ON THE ENGINE. IF THE STORAGE PERIOD WAS LESS THAN TWO YEARS, DO NOT FILL OIL. NEVER WASH BREAKER (18) AND CAM (24) WITH GASOLINE OR OTHER SOLVENTS.		
8. Carefully wipe points (4) of breaker (18) with clean chamois or calico cloth moistened in clean alcohol. T.R. Corrosion on parts is not allowed. Never dress corrosion on spring (5) of breaker (18) and working profile of cam (24).	Dress corroded areas, wipe them and lubricate Replace corroded parts	

TEST EQUIPMENT	TOOLS AND FIXTURES	MATERIALS
	Wrench 14 UB-24-16 Screwdriver 700345 A150x0.5 Brush Pipet, medical Tweezers	Cloths, calico Alcohol Oil, turbine T22