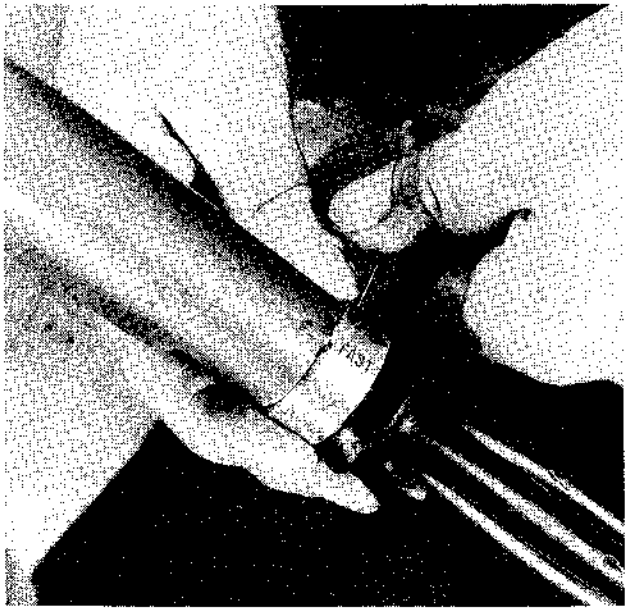
hard steering, the tension can be adjusted by tightening or loosening the nut as shown. It is good practice to lubricate the upper and lower shock mounts at least twice a season, or more often if required, using SAE #30 motor oil.

SECTION 3

16 H.P. ELGIN

(Scene 121)
NARRATOR:

In general, the principles and procedures, which you have already seen, apply also to the 16 H.P. Elgin. There are a few things which are different and must be considered.



(Scene 122)
NARRATOR:

For example, the spark and throttle controls are synchronized for smooth performance throughout the entire speed range and are controlled by rotating the steering handle grip.

To adjust the synchronized controls properly, four adjustments are necessary.

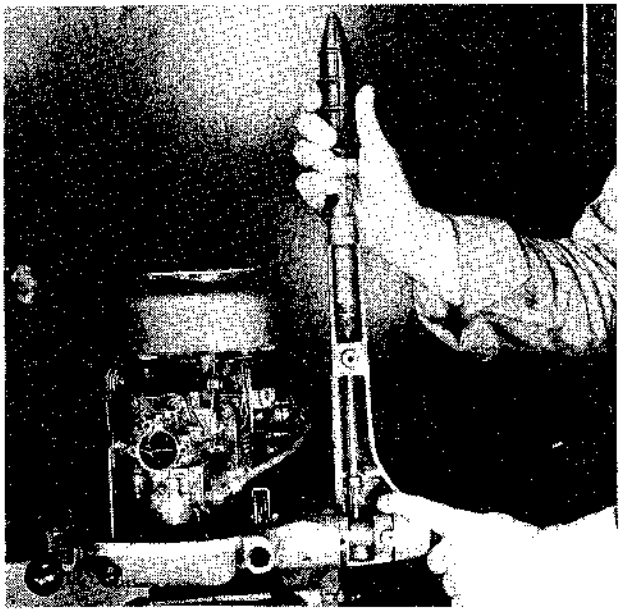
1. Proper positioning of the control rod pinion.

2. Adjustment of the magneto control cable.

3. Proper setting of the steering handle collar.

4. Adjustment of the throttle bell-crank linkage.

The first step is to turn the steering handle grip control counterclockwise as far as possible, then ...



(Scene 123)
NARRATOR:

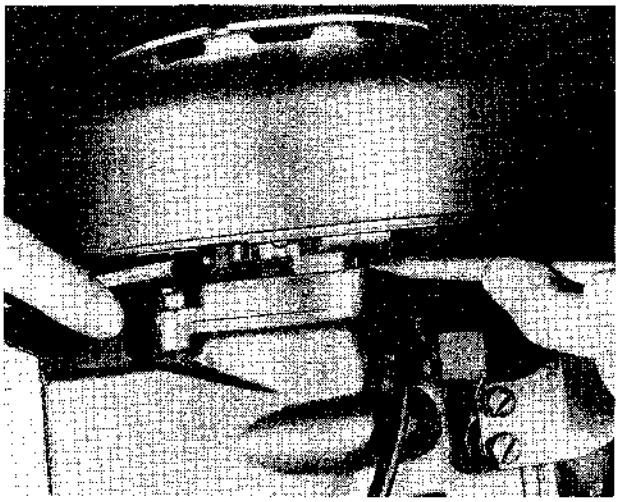
...lift the steering handle and observe the position of the control rod pinion in relation to the steering handle rack which moves side-ways as the steering handle is rotated.

The control rod pinion should be at

the extreme left end of the teeth in the steering handle rack. If such is not the case, remove the set screw underneath the steering handle and pull the control handle up until the pinion is disengaged from the rack, as shown.

Then move the steering handle rack to the right as far as desired and engage the pinion with the rack by pushing the control handle down.

Reinstall the set screw.



(Scene 124)
NARRATOR:

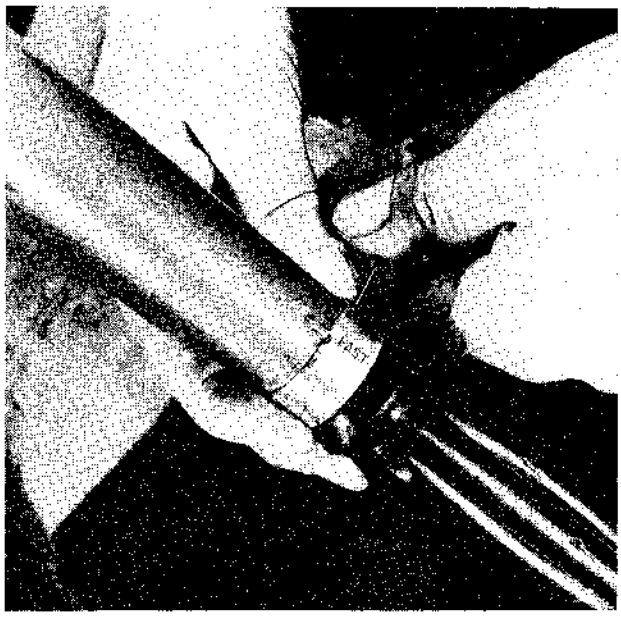
Observe the postion of the magneto stator plate. The projection on the lower side of the stator plate should be resting against the magneto control stop pin, indicated by the point of the pencil.

If adjustment is necessary, slightly loosen the screw which holds the magneto control cable slip in place and rotate the stator plate as desired.

This screw is located at the rear of the stator plate and can be seen at the point of the screwdriver in the picture.

Be sure to tighten this screw after the adjustment has been made.

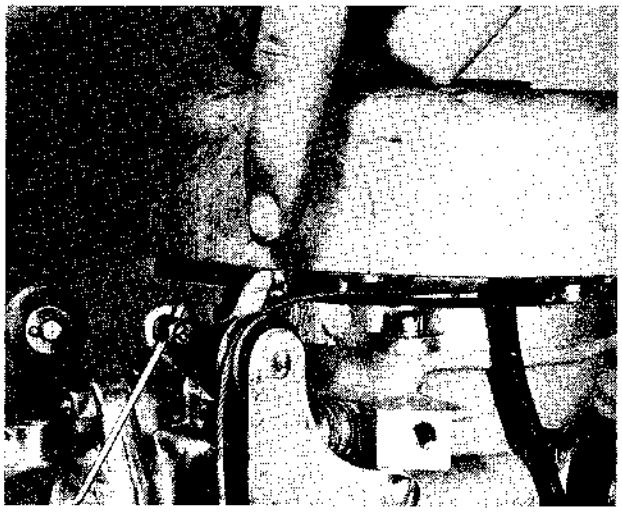
(Scene 125)
NARRATOR:



When the steering handle rack and pinion are in the positions mentioned, the stator plate projection is against the stop pin, and the steering handle collar should be at "FAST" position.

To adjust the collar, loosen the allen head set screw and turn collar as desired.

Be sure to tighten the set screw.



(Scene 126)
NARRATOR:

The last step is to adjust the throttle bellcrank linkage.

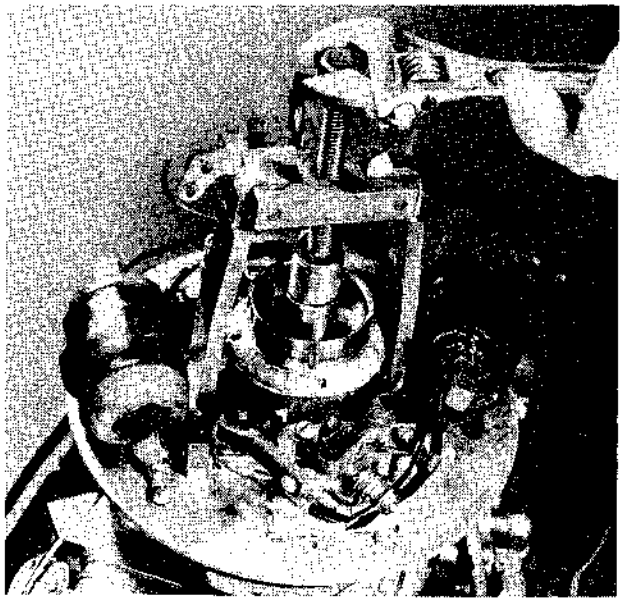
Turn the steering handle control clockwise to stop position; then turn it

counterclockwise until the bellcrank indicated by the arrow just begins to move forward.

This will be approximately at "SHIFT" position.

At this point, the throttle shutter in the carburetor should still be closed, there should be no slack in the bellcrank or throttle link, and the end of the throttle cam should be approximately 3/16 inch beyond the cam follower portion of the bellcrank, as shown below the finger. Now, turn the steering handle control counterclockwise to "FAST" position. The throttle shutter should now be completely open (horizontal) but may vary as much as 10 degrees from the horizontal and still be satisfactory.

To adjust the throttle link, loosen the small round head screw and shorten or lengthen the link as required Tighten the screw.



(Scene 127)
NARRATOR:

The Fairbanks-Morse magneto used on the earlier 16 H.P. Elgin is of the rotor type.

The magnets are contained in the rotor rather than in the flywheel as used on the smaller Elgins.

Here, we see the rotor being removed, using the special puller, T-1904, found in the Elgin tool kit for the 16 H.P. motor.

To use the rotor puller, loosen both sets of breaker points and both coils from the stator plate as shown.

Below the rotor is a Waldes snap ring and spring which must be removed before the stator plate can be lifted from the upper bearing cage.

FAIRBANKS MORSE

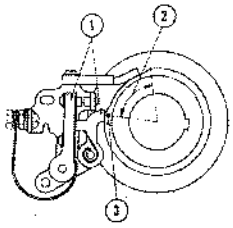


FIG. A OLD STYLE

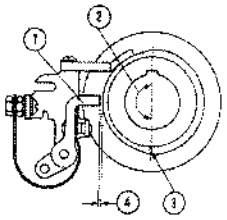


FIG. B NEW STYLE

(Scene 128)
NARRATOR:

Two different Fairbanks magnetos were used on the 16 Prior to 1953.

The major differences are shown here.

In Figure A, the breaker point assembly is of two-piece construction, one piece being the cam follower and the other the breaker point arm, shown as item one.

The flat portion of the cam covers slightly less than 90 degrees, shown as item two.

In this version, the breaker point spacing is set at .020 thousandths with the cam follower at the high point of the cam, at the mark indicated by item #3.

In Figure B, the breaker point is of one-piece construction, item one.

The flat portion of the cam covers nearly 180 degrees, item two.

In this version, the breaker point spacing is not actually measured.

The rotor is rotated until the cam follower is in the center of the flat protion of the cam.

The breaker assembly is moved until the follower is about .008 thousandths away from the cam, as shown in item four.

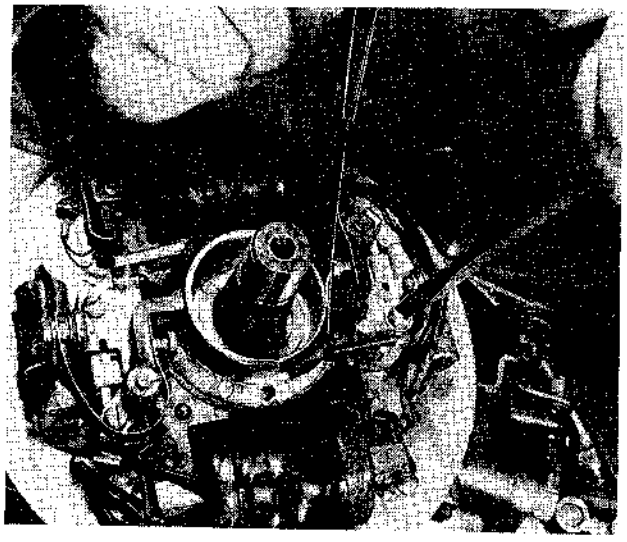
The mark on the rotor, item three, is completely disregarded.

When the breaker points are set in this way, the time of point opening is more rigidly controlled, and the points will close even after considerable wear of the cam follower, bearing cage, upper, and other parts involved.

Be sure to adjust both sets of breaker points in this manner and also to check the spacing, item four, at full advance as well as at full retard.

In order to accomplish this check, turn the control handle to "SLOW", check the spacing and then turn it to "FAST" and recheck.

If necessary, readjust the breaker points to obtain a minimum of .008 thousandths at both extremes.

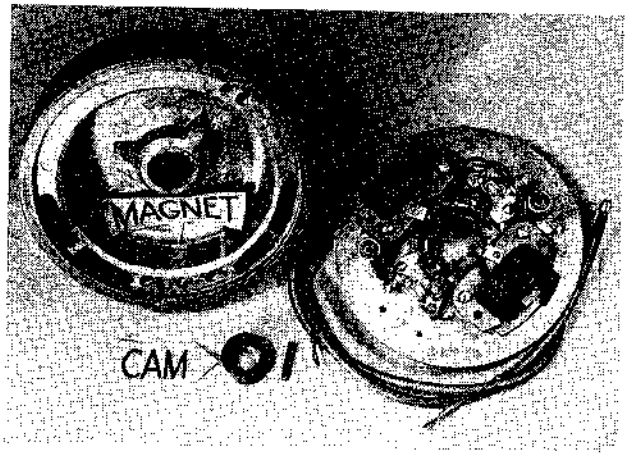


(Scene 129)
NARRATOR:

To adjust the breaker points as just described, place the feeler gauge between the cam follower and the center of the flat portion of the cam.

Adjust both sets of breaker points and recheck both sets at full retard and full advance to be sure a minimum of .008 thousandths is maintained at all times.

In setting breaker points by this method, the amount of breaker point opening is not actually measured, but will be about .015 thousandths.



(Scene 130)
NARRATOR:

Beginning with Model 58823, the 16 H.P. Elgins will have a new Fairbanks-Morse flywheel type magneto. The magnets are contained in the flywheel, and a breaker cam is used in place of the rotor previously used.

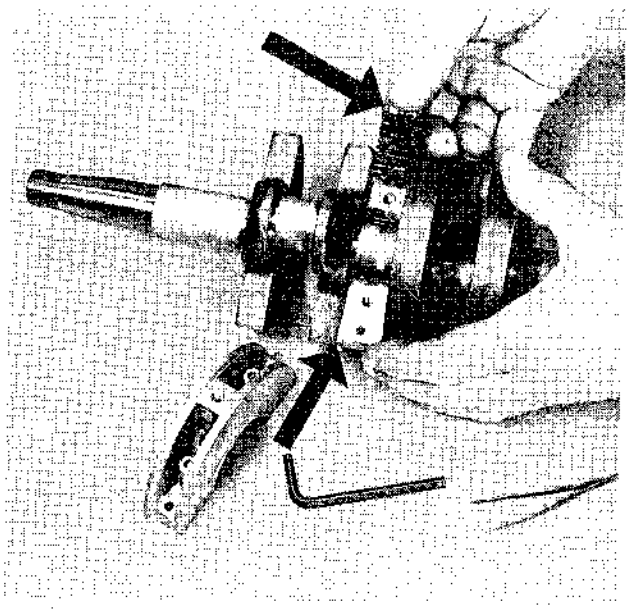
Breaker point spacing in this type magneto will be .020 and will be adjusted in the conventional manner. This magneto is similar to Wico in construction, and requires no new service procedures.

(Scene 131)
NARRATOR:

The 16 H.P. Elgin has loose needle bearings at the center main bearing location as well as at the connecting rods.

A center main bearing cage and a steel bearing race are also used.

The halves of the bearing race are



separated by the "fracture" method and have the same rough edges as the connecting rods to provide perfect alignment upon reassembly.

Match marks are provided as a guide.

To assemble the center main bearing assembly to the crankshaft, coat both halves of the bearing race with grease and place 14 loose needles on each half.

Take the half of the bearing race, containing the dowel hole, and place it under the center main bearing of the crankshaft.

Place the half of the center main bearing cage over the race, inserting the dowel of the cage into the hole in the race.

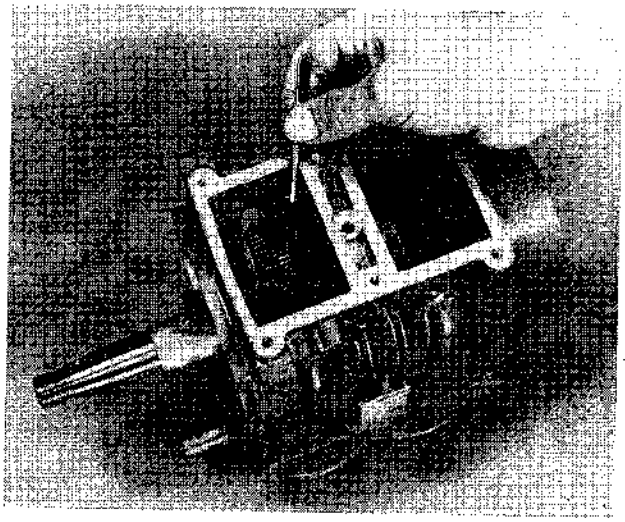
Be sure the flange of the center bearing cage is toward the top of the crankshaft as illustrated. This flange fits into a machined recess in the crankcase and must be toward the top of the crankshaft. Assemble the other half of the bearing race to the top of the center main bearing with the match marks together to insure a perfect joint.

Install the other half of the center bearing cage with the flange toward the top of the crankshaft. Drive in the dowels and tighten the socket head screws.

Draw the screws up tight.

Test the alignment of the bearing and needles by spinning the bearing cage on the crankshaft.

If assembly has been correct, the bearing cage should spin freely.

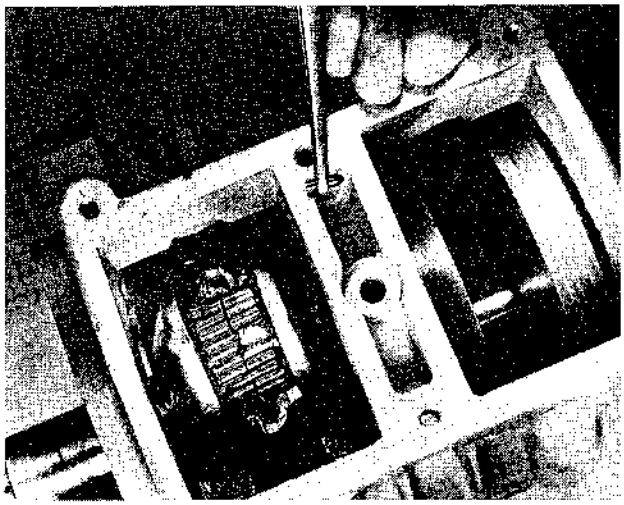


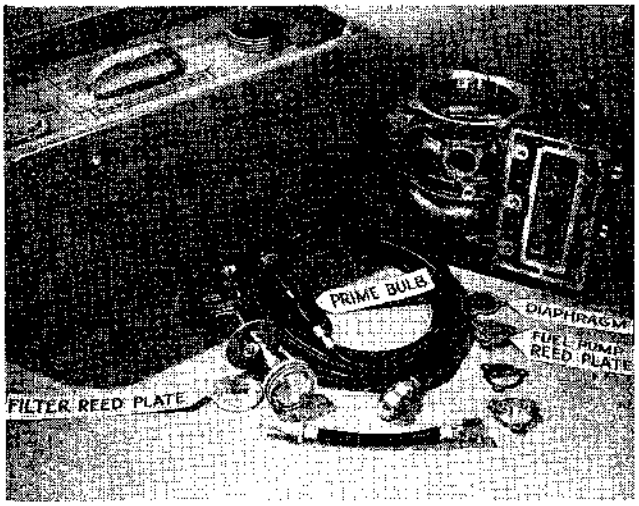
(Scene 132)
NARRATOR:

The original 16 H.P. Elgins used the same needle bearings at both the center main bearing and at the connecting rod locations.

Later, the needles at the connecting rod location were changed to shorter needles.

They are about one half the length of the original ones and twice as many are used -- arranged in two rows in each connecting rod. The method of assembly is the same as outlined for the 7-1/2 H.P. Elgin except that extreme care must be taken to keep them properly aligned in two rows during assembly, and they should be counted to be sure the correct number (54 per rod) are used. After the caps have been properly assembled and aligned, torque wrench pressure of .140-150 inch pounds should be applied.





(Scene 133)
NARRATOR:

In late 1952, the short needles were changed from two tapered ends to a new needle which has one tapered and one straight end as shown.

This was done to increase needle bearing life.

These needles must be assembled to the rod with the straight ends toward the center of the rod to provide an adequate thrust face and to prevent misalignment.

DETAILS OF

THE FUEL SYSTEM

(Scene 134)
NARRATOR:

Details of the fuel system.

(Scene 135)
NARRATOR:

The Elgin 16 H.P. fuel system is composed of a separate fuel tank prime bulb, a fuel pump and a neoprene fuel line which snaps on to the motor. The fuel tank holds 5-3/4 gallons of fuel mixture, sufficient for 2-1/4 hours of high speed operation. The prime bulb transfers fuel from the tank to the fuel line and carburetor when the engine is not running. A reed plate located inside the tank acts as a check valve and prevents the fuel from flowing back into the tank.

The fuel pump, shown in exploded form just below the crankcase, has a reed plate with two reeds and a diaphragm.

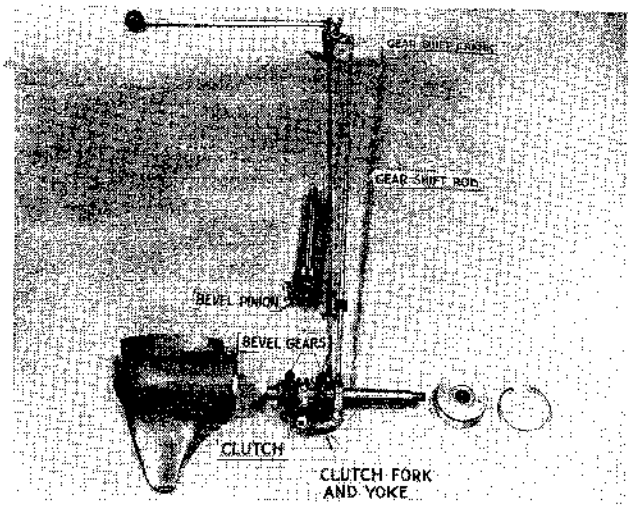
Before the motor is started, the prime bulb is squeezed several times to fill the fuel line and carburetor.

When the motor starts, crankcase pressure causes the diaphragm to pulsate drawing fuel from the tank with each pulsation.

The fuel pump reeds act as check valves, allowing the fuel to pass through and prevent it from flowing back into the fuel line.

All three reeds should seat against their respective reed plates, and the diaphragm must be free from holes or cracks for the fuel system to function properly.

(Scene 136)
NARRATOR:



Let's look at the gear shift mechanism of the 16 H.P. Elgin.

There is a bevel pinion on the end of the lower drive shaft.

Motion is transmitted to the bevel pinion through the drive shaft and coupling.

The two bevel gears on the propeller shaft engage with the pinion and all three revolve while the engine is running.

These gears have jaws which engage with the jaws of the clutch when the motor is shifted to forward or reverse.

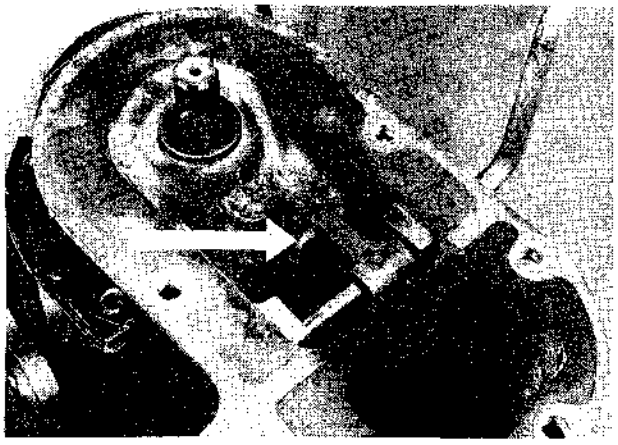
The clutch transmits the motion of the gear to the propeller shaft by means of internal splines in the clutch which match external splines on the propeller shaft.

When the motor is in neutral, the clutch is midway between the two gears, and the jaws do not engage with those on either gear.

When the motor is shifted to either forward or reverse, the clutch moves on the splines, until its jaws engage with the jaws on the proper gear.

The movement of the clutch is accomplished by the clutch fork and yoke connected to the gear shift crank by the long rod shown in the center of this picture.

A very fine screw thread at the lower end of this long rod permits adjustment to insure proper movement to all shift positions.



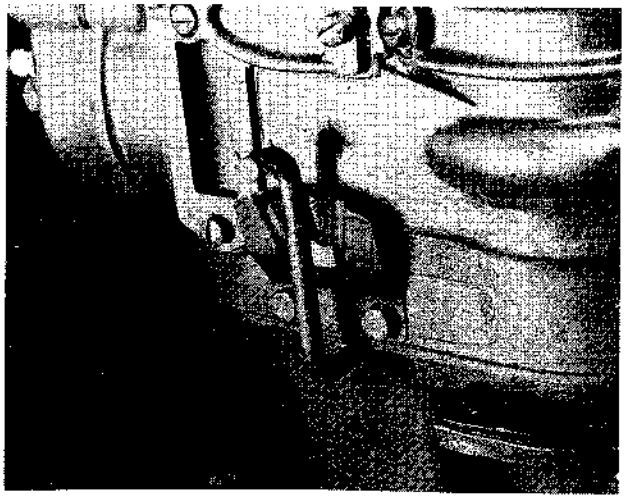
(Scene 137)
NARRATOR:

This is the upper end of the long gear shift rod.

The arrow indicates the point where it attaches to the gear shift crank.

The correct position of the gear shift crank when the motor is in neutral is perpendicular to the top of the motor leg.

If the gear shift crank is not in the position illustrated when the motor is in neutral, remove the upper end of the long gear shift rod from the hole in the arm and screw the rod in or out as required to obtain the correct adjustment.

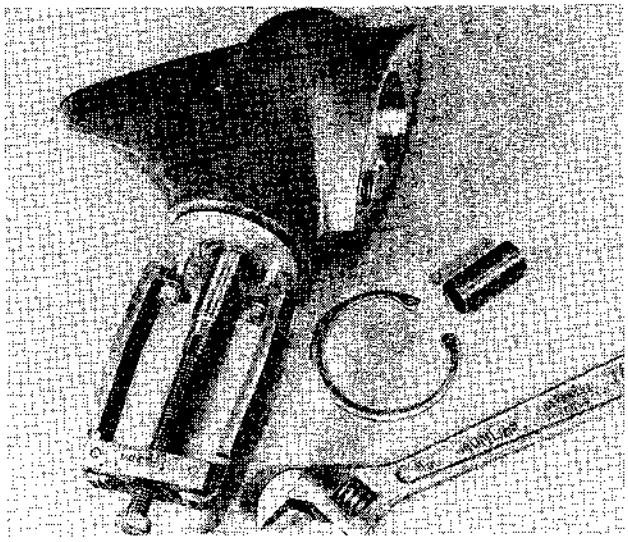


(Scene 138)
NARRATOR:

As a further check of the correct gear shift linkage adjustment, assemble the powerhead to the motor leg and observe where the gear shift crank fits into the grooves in the gear shift quadrant attached to the cylinder block.

The crank should fit into the center groove in the quadrant, as shown here, when the motor is in neutral. Rotate the propeller to be sure the motor is in neutral.

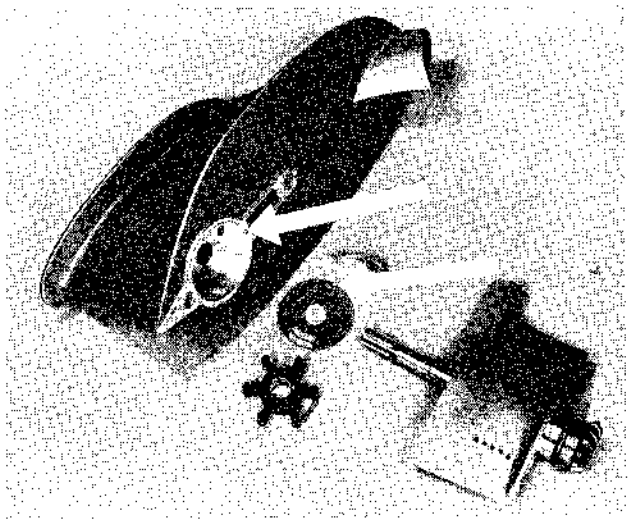
If the crank does not line up with the center groove in the quadrant, loosen the two hex head screws which hold the quadrant to the cylinder and move the quadrant until proper alignment is obtained.



(Scene 139)
NARRATOR:

If difficulty is experienced in removing the propeller shaft bearing cage from the gear housing, remove the Waldes snap ring, screw two 1/4 inch screws into the holes provided in the bearing cage and use the puller furnished in the 16 H.P. Elgin tool kit as illustrated.

This is the same puller that is used to remove the rotor from the magneto T-1904.



(Scene 140)
NARRATOR:

The water pump of the 16 H.P. Elgin is similar in design and operation to the one used on the smaller Elgins.

The water pump cam is removable and can be replaced when it becomes worn.

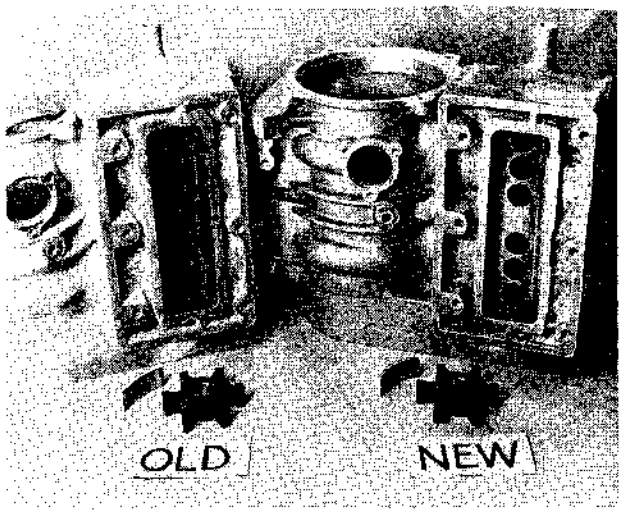
The water pump cover is also replaceable, and is now being treated with a hard coating which provides greater resistance to wear and corrosion.

When reassembling the 16 H.P. water pump, place the water pump cover over the drive shaft, lower, with the small notch toward the rear of the motor. Insert the water pump drive pin into the hole in the drive shaft, lower and place the impeller over the shaft with the recess over the drive pin. The cam should be assembled in the cavity of the motor leg, lower.

When assembling the water pump to the motor leg, rotate the drive shaft slightly, this will compress the vanes of the impeller enough to allow them to bend around the water pump cam.

Be sure that the small notch in the water pump cover fits over the groove pin located in the motor leg at the rear of the water pump cavity. The groove pin and notch are indicated by arrows.

(Scene 141)
NARRATOR:



The first 809 16 H.P.Elgins were built as shown on the left.

The water passages in the cylinder block were narrow, causing excessive back pressure to build up in the cooling system and resulting in failure of the water pump impellers.

A thick water pump cam and standard impeller were used in this version.

To correct this condition, the water passages were enlarged, the water pump cam was made thinner, and the impeller was reworked to provide relief behind the vanes to enable them to flex more readily.

If the engine still has the old style block with the narrow water passages, the thick cam and the reworked impeller with relief behind the vanes must be used. If the cylinder block has the wider water passages, the thin cam and the standard impeller should be used.

(Scene 141A)
NARRATOR:

To do a good job, proper tools are required. This kit covers all the special tools needed to work on all Elgins except the 16 H.P.

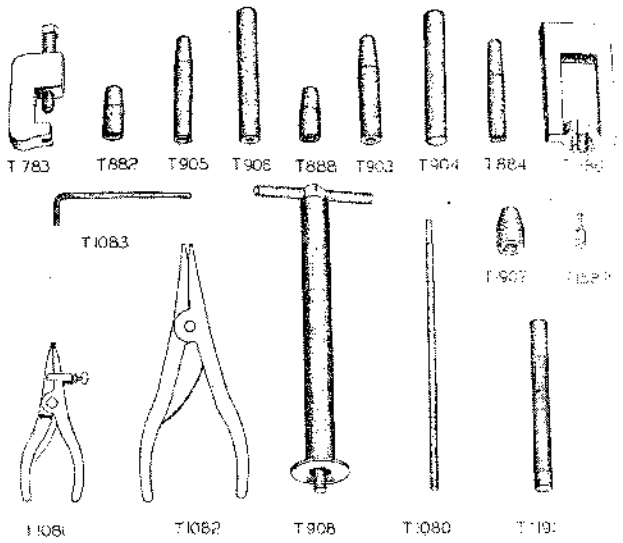


FIG 71 SPECIAL OVERHAUL TOOLS ELGIN OUTBOARD MOTORS

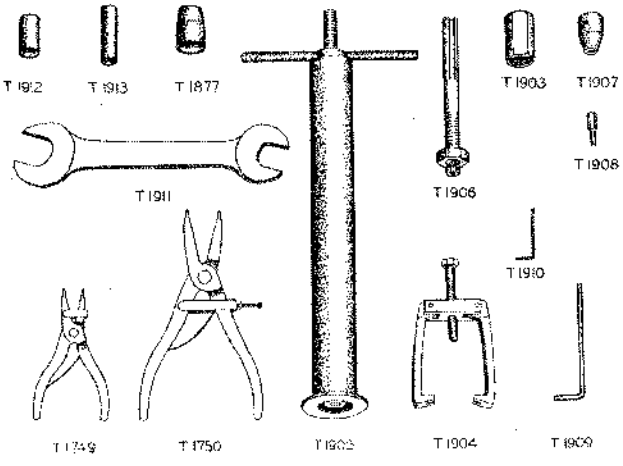


FIG 73 SPECIAL OVERHAUL TOOL KIT 16 H.P. ELGIN

(Scene 141B)
NARRATOR:

This kit is for the 16 H.P. Elgin. For details, see SERVICE, Volume 13, June 1952, Number 8, Page 244.

(Scene 142)
NARRATOR:

Here's one thing the salesman can do to help prevent minor complaints from the customer. Make sure the customer understands how to start and operate his Elgin.

Before delivering an Elgin motor to the customer, go out to the demonstration tank, put the Elgin in the tank and show the customer how easily it starts. Show him the starter, full reverse, neutral clutch, filtrap, bowl carburetor,

shock mounts and slip clutch. Point out that full instructions for starting and operating his Elgin are printed on the front decal. Tell him about the importance of reading and observing the instructions found in his parts list packed with each motor.

He will appreciate your thoroughness and will benefit from the instruction.

Your serviceman, too, will appreciate your efforts; the customer won't bring back the motor because he doesn't understand how to operate it.

(Scene 143)
NARRATOR:

The serviceman, too, should be sure the customer understands his Elgin and is satisfied with the work. When the customer calls for his motor, take him out to the tank, start and run the motor, invite the customer to operate the motor himself. He will be pleased to see how well his Elgin runs and grateful for the fast service he obtained.

(Scene 144)
NARRATOR:

Here's the happy ending to another story of a satisfied Sears customer.

The customer can go on his vacation confident that his Elgin will perform the way he wants it to. The serviceman feels the pride of a job well done. And the cash register has rung to the tune of $8.50 which shows a nice profit to the department. Everybody's happy, and that's the way it has to be at Sears.