BULLETIN K119
MODELS AFFECTED: All
SUBJECT: Importance of Analyzing Causes of Engine Failure

Don't jump to conclusions! Always analyze the cause of engine failure and determine the true facts from the available evidence.

The cylinder (shown in the illustrations below) and the piston, pin bearings and "loose pin bearing" (figure 1) illustrate the perils of jumping to conclusions. All the parts were returned to the factory with the statement that the MC-6 engine had been ruined by a "loose pin bearing dropped in at the factory as all needle bearings were intact."

Factory examination and analysis of the cylinder, piston, piston pin bearings and "loose pin bearing" disclosed the following:

1. The "loose pin bearing" was not a connecting rod roller but was from a needle bearing assembly similar to the piston pin bearings on the MC-6.

2. The "loose pin bearing" is longer than the pins used in the MC-6 piston pin bearings and the bearings contained all their pins.

3. No "loose pin bearings" of this size are available at the factory.

4. The "loos e pin bearing" was dropped or fell into the engine.

   A. It entered the cylinder through the third port cavity. There is a dent in the bottom of the cavity to show this clearly (figure 2).

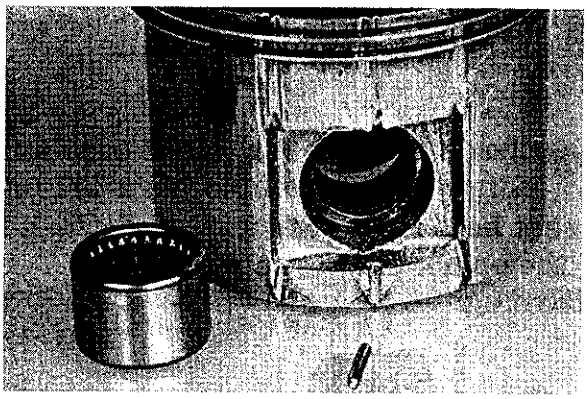


FIGURE 1

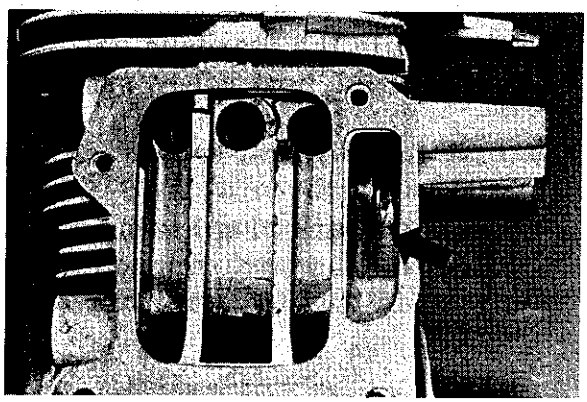


FIGURE 2

B. The pin was caught by the piston and driven up and down until it worked free and fell into the crankcase. The grooves on the third-port side of the piston (figure 3) and on the third-port side of the cylinder (figure 4) show this.

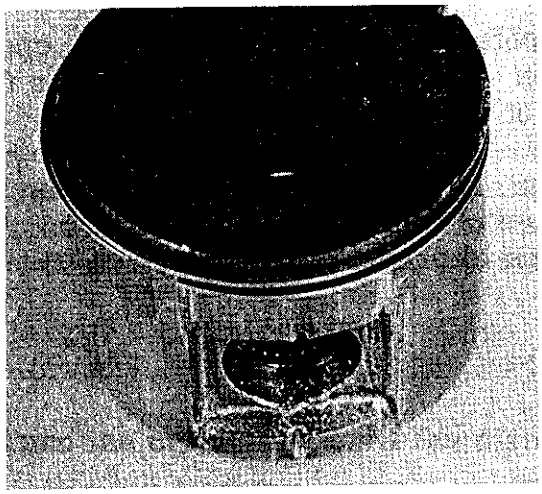


FIGURE 3

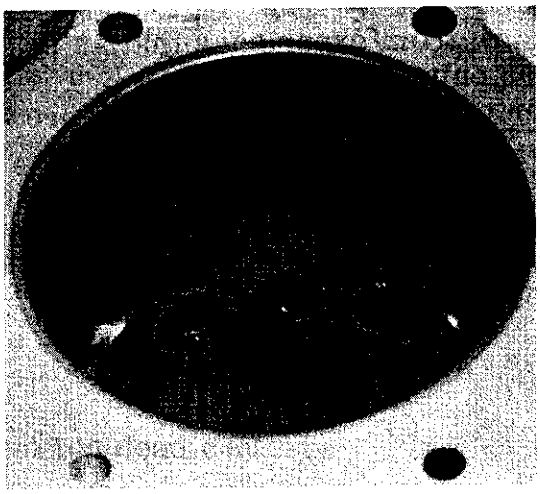


FIGURE 4

C. The pin was drawn out of the crankcase almost immediately. The absence of scars or dents in the crankcase shows this.

D. The pin was drawn into the combustion chamber and bounced up and down probably only once. The single dent in the top of the piston indicates this (A, figure 5).

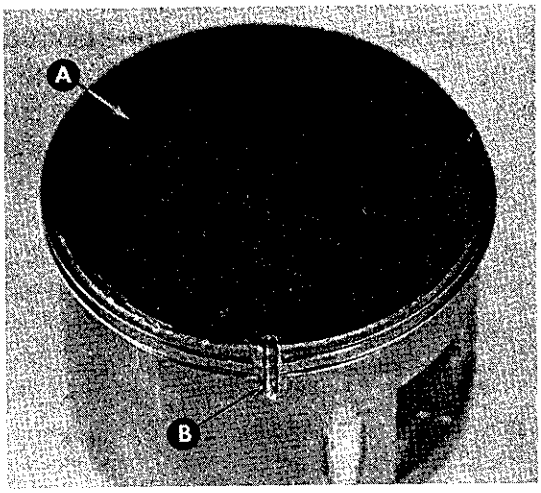


FIGURE 5

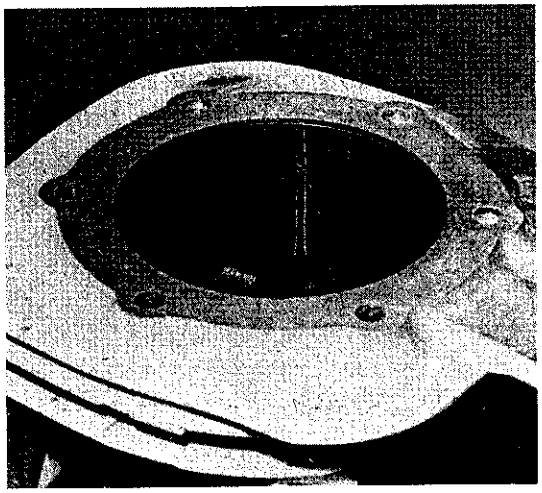


FIGURE 6

E. The pin was thrown to the side and caught between the piston and cylinder where it was dragged up and down until the engine stopped. This is shown in the groove in the side of the piston (B, figure 5) and the furrow in the side of the cylinder (figure 6).

We know from experience that an engine containing a foreign object can operate for only a very short time. The carbon on the piston head indicates a far longer operating period than the presence of the pin would permit.

Two conclusions should be drawn from this: First, dealers should not automatically blame the factory for the presence of foreign objects in kart engines. Second, dealers and users should take steps to prevent foreign objects from falling or dropping into kart engines.

BULLETIN K122
MODELS AFFECTED: All
SUBJECT: Piston and Cylinder Head Gasket Interference

The greater power of the newer McCulloch engines has been obtained in several ways. One of these is in closer tolerances of piston, cylinder head and cylinder head gasket. When improperly installed, the cylinder head and cylinder head gasket can cause piston failure.

The proper way to install the cylinder head and cylinder head gasket is as follows:

1. Turn the crankshaft until the piston is at top dead center.

2. Install the cylinder head gasket and cylinder head but leave the screws loose enough so that both the cylinder head and cylinder head gasket can be shifted from side to side.

3. Shift the cylinder head gasket and cylinder head until they fit over the piston without interference and then tighten the cylinder head screws to the correct torque value (55 to 60 inch-pounds).

4. Turn the crankshaft through several revolutions to make sure there is no interference between piston and gasket and cylinder head. If interference exists, loosen the screws and recenter the gasket and cylinder head. Make sure that no interference exists before you finish.

BULLETIN K123
MODELS AFFECTED: All
SUBJECT: Leaning Out Can Be Due to Inadequate Fuel Supply

Symptoms of leanness can be due to an inadequate fuel supply if the kart engine has a tendency to either cut out or run out of fuel on the high end of operation even though the main fuel adjustment needle is turned out beyond the normal setting. These conditions can result from an improperly operating carburetor fuel inlet control lever and can be caused by the use of fuel additives*, by infrequent operation of the engine or from improper setting of the inlet control lever after a new fuel inlet needle seat has been installed.

When fuel additives* are used in the fuel mixture, there is always the possibility that the carburetor fuel inlet needle seat will swell. The degree of such swelling depends on (1) the type of additive used and (2) the proportion of the additive in the fuel mixture. When the needle seat swells, the inlet valve needle is forced out of the seat and, in turn, moves the inlet control lever (against the pressure of the inlet control spring) away from the carburetor diaphragm. If the swelling is severe, the movement of the inlet control lever may be so great that movement of the carburetor diaphragm will not actuate the lever or the inlet valve needle.

If the wet side of the carburetor diaphragm "dries out" as a result of infrequent operation of the engine, it is possible that the lever position will change.

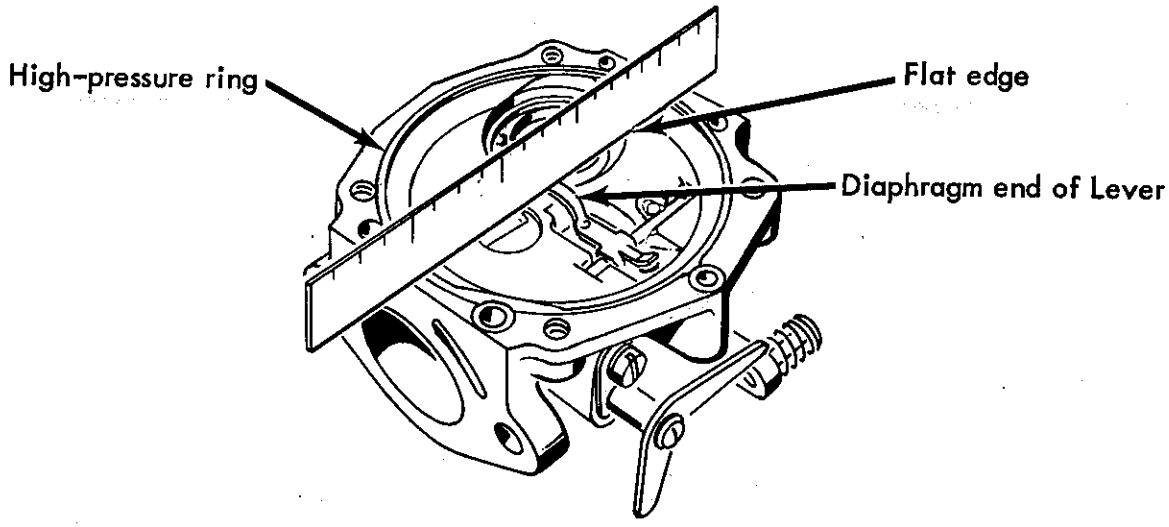
If the inlet needle seat is replaced without properly adjusting the lever, the lever may not permit correct operation of the needle valve.

For best results, it is recommended that the needle seat be soaked for several hours in a regular gasoline/oil mixture before installing a new seat or making any adjustment of the lever. Then the lever should again be checked and readjusted, if necessary, after a week or so of operation.

If fuel additives are used, the owner of the engine should be cautioned that the position of the lever should be checked and readjusted, if necessary, after several hours of operation.

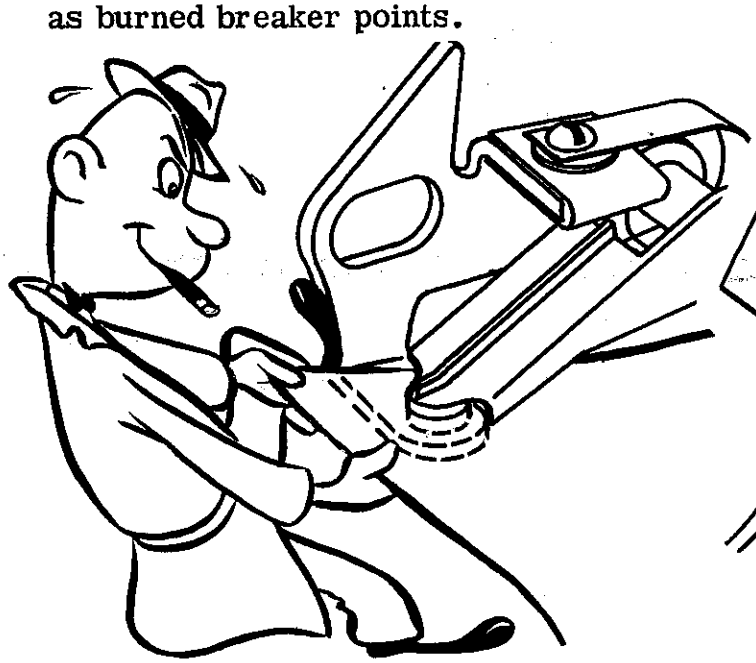
*Fuel additives containing ether, acetone, ethyl-methyl acetate, etc., will cause swelling of the material from which the seat is made.

The lever will be in the correct position if the diaphragm end of the lever is flush with the surface of the high pressure ring on the carburetor body with the seat and needle installed. Lay a flat edge across the high pressure ring and draw the flat edge across the body. The flat edge will just touch the diaphragm end of the lever, but not depress it, if the lever is correctly positioned. If the lever is not correctly positioned, bend the lever gently to bring it into the correct position.

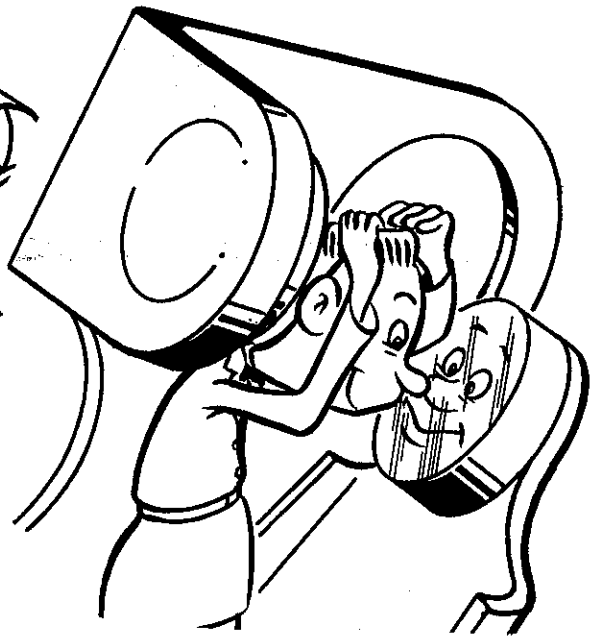


BULLETIN K125
MODELS AFFECTED: MC-5, MC-6, MC-10, MC-20
SUBJECT: Cleaning Breaker Points

Complaints about early breaker point failure can be eliminated by changing the method of cleaning. The most popular method - that of drawing an emery stick or small card through the breaker points - will not always remove wax-type preservatives found on all new breaker points. The high spots will be cleaned, but more wax will be compressed into the low spots on the point surface. Later, when this collected wax burns, it will have the same appearance as burned breaker points.



To remove the wax, saturate a small calling card in carbon tetrachloride and draw it between the breaker points.



The carbon tetrachloride will dissolve all the wax and leave a clean breaker point surface.

WARNING

Carbon tetrachloride is toxic! Keep in small quantities when using and make sure room is well-ventilated. Avoid inhaling fumes!

When installing a new breaker point assembly, place the assembly in a small can and pour in enough carbon tetrachloride to cover the points. Shake the can. The sloshing of the carbon tetrachloride will remove the wax from the points.

BULLETIN K126
MODELS AFFECTED: MC-5, MC-6, MC-10, MC-20
SUBJECT: Installation of Throttle and Choke Plate

An improperly installed choke or throttle butterfly plate screw can cause severe engine damage if it becomes loose and is sucked into the crankcase. When replacing either a choke or a throttle butterfly plate, always stake the butterfly plate screw securely to the butterfly shaft.

To stake the throttle butterfly plate screw, turn the carburetor throttle end down. Support the throttle butterfly shaft on a solid surface so that the head of the butterfly screw and the throttle shaft are firmly supported (Figure 1). Stake or upset the screw threads with a hammer and screwdriver, punch or chisel.

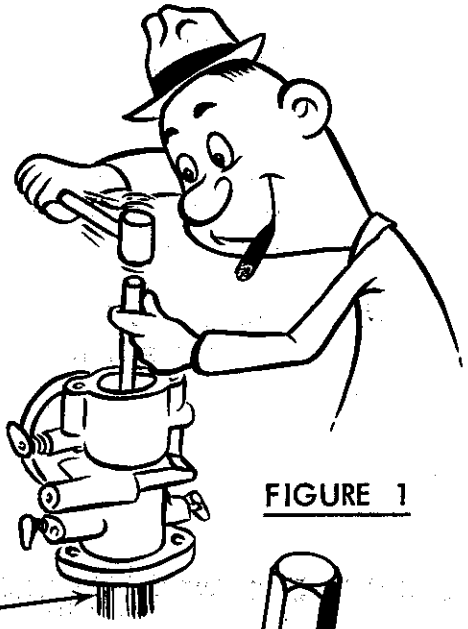


FIGURE 1

To stake the choke butterfly plate screw, unhook the choke spring from the pin on the side of the carburetor barrel (Figure 2). Turn the carburetor choke end down and support the choke butterfly shaft and head of the screw on a solid surface. Stake or upset the screw threads and then hook the choke spring back on the pin.

CAUTION

If the butterfly shafts are not properly supported during the staking process, the shafts can be bent and the plates will not be able to operate properly.

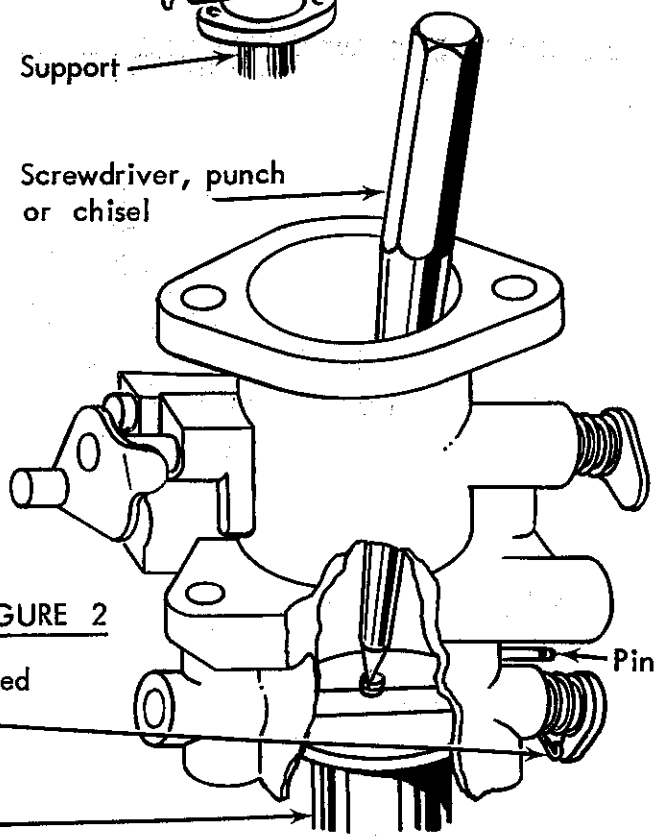


FIGURE 2

BULLETIN K128
MODELS AFFECTED: MC-5, MC-6, MC-10, MC-20
SUBJECT: Removal of Starter Ratchet & Rewind Spring

When a Starter Assembly, P/N 57117B, is installed on a MC-5, MC-6, MC-10 or a MC-20 Kart Engine, easy removal of the Starter Ratchet, P/N 57790, or the Starter Rewind Spring, P/N 51665, can be accomplished in the following manner:

1. Remove the fan housing (with starter assembly attached) from the engine.

2. Remove the starter assembly from the fan housing and remove the starter cover from the starter assembly. Unwind the starter rope but do not remove the rope from the drum hub.

3. Carefully drill two 0.1990-inch diameter holes (No. 8 drill) through the starter base and into and through the starter drum at the location shown in Figure 1.

NOTE

Drill slowly and cautiously to prevent damaging the starter base and the starter spring.

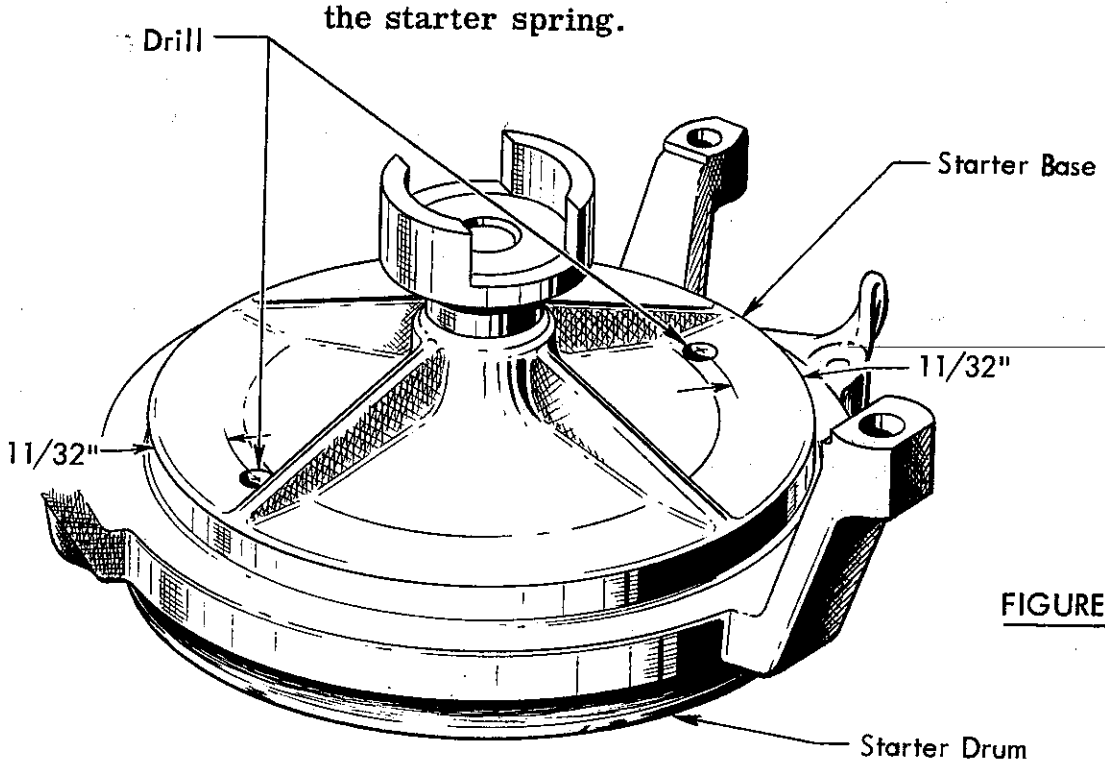


FIGURE 1

4. Insert two 10-24 x 2-inch long screws through the drilled holes to lock the starter drum to the starter base. Put the starter assembly on a bench vise with the threads of the two screws in the jaws of the vise (see Figure 2). Tighten the vise securely.

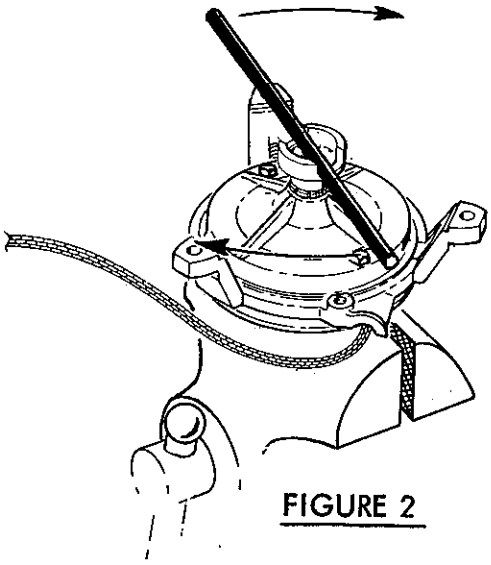


FIGURE 2

5. Place a small bar between the two teeth of the starter ratchet and pull the bar around clockwise to break the starter ratchet loose (see Figure 2). Remove the starter ratchet from the drum shaft.

CAUTION

Do not turn the bar counter-clockwise or the starter ratchet which contains left-hand threads may strip.

6. Remove the starter assembly from the vise. Take out the two screws and carefully slip the end of the starter spring off the starter drum hub with the end of a screwdriver. Remove the starter base from the starter drum. Be careful when removing the starter base to prevent the rewind spring from jumping loose. Remove the spring from the base.

7. Remove and inspect the two starter base bushings. If the bushings are damaged or worn, replace them with two new Bushings, P/N 57535. If the starter base does not have a keyway on each end of the bore (see Figure 3) to hold the key on the 57535 bushing, make one of the following two modifications:

(No. 7 continued)

a. Using a small hacksaw and a flat file, notch a keyway wide and deep enough to take the key on the bushing, on each end of the starter base bore (Figure 3). This is the recommended method because the keyways prevent the bushings from turning and reduce bushing wear.

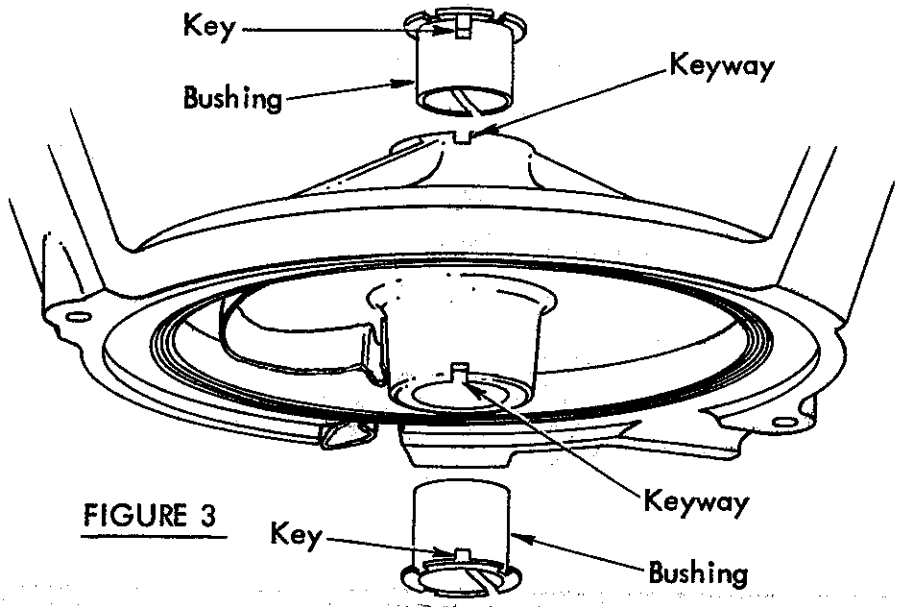


FIGURE 3

b. Alternate method. Using a sharp razor blade or knife, carefully remove the key on the bushing as shown in Figure 4.

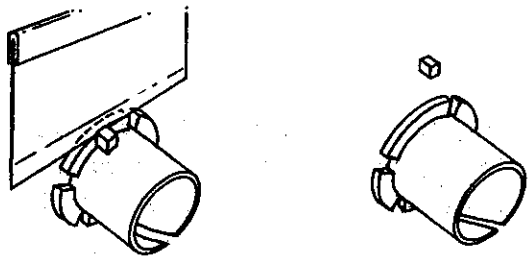


FIGURE 4

8. Clean all the starter assembly parts, file off any sharp edges and blow low pressure air through the passages to remove any metal filings left from drilling the two locking screw holes and filing the keyways.

9. Install the rewind spring using the following method:

a. Unfasten the two clips holding the new spring and release the spring in a box or other protective container allowing it to unwind harmlessly.

b. Slip the spring eyelet at the end of the spring into the hole provided in the rim of the starter base.

c. Hand-wind the starter spring in a counter-clockwise direction inside the starter base.

10. Slide the starter drum shaft into the starter base with the free end of the spring fitting into the spring slot of the drum. Install the starter ratchet on the starter drum shaft by turning it counter-clockwise. Rewind the starter rope on the drum. If the rope hangs loose after being rewound, wind the balance onto the drum and pull the drum around so that all the rope is coiled on the drum and the drum is under spring tension. Reinstall the starter cover on the base, the starter base on the fan housing and the fan housing on the engine.