

Oil pump

(Follow the instruction for assembly most carefully!) (fig. 13)

1. Turn plunger B to its highest position.
2. Coat the packing surface of the pump and the corresponding surface of the crankcase with oil. Assemble the parts without paper gasket, attach pump and slightly tighten the bolts A.
3. Set the oil pump in such a way that plunger B fully meshes with the worm C, with a side clearance of 0,00472 to 0,00787 in.
4. Tighten the bolts A uniformly but not too tightly. Make sure that plunger B can move freely within the flank clearance allowed. If the bolts A are tightened excessively, there is a danger of the oil pump plunger B seizing. This

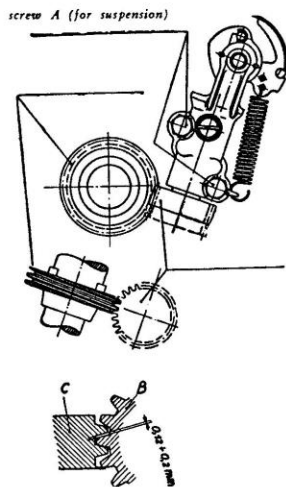


Fig. 13: Mounting the Oil pump

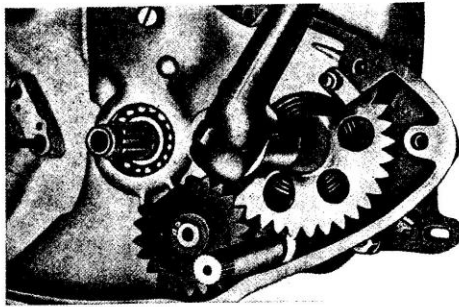


Fig. 14: Kickstarter

can be seen immediately from plunger B being difficult to turn within the gear clearance.

Kickstarter (fig. 14)

1. Put on intermediate gear and secure it by means of a snapping.
2. Attach kickstarter spring to the dog clutch gear of the starter shaft, fit big thrust collar in such a way that it comes to lie between spring and crankcase. Attach spring to the retaining pin in the crankcase and give the spring initial tension until the starter shaft can be inserted in the bore of the crankcase in the position indicated in fig. 14.
3. Mount the small thrust collar (fig. 15/1) facing the crankcase cover.

Clutch and Gearbox Sprocket

1. Put spring washer (fig. 15/2) on the crankshaft stub and insert woodruff key (fig. 15/3). Place check plate (fig. 15/4) and bushing (fig. 15/5) on countershaft.

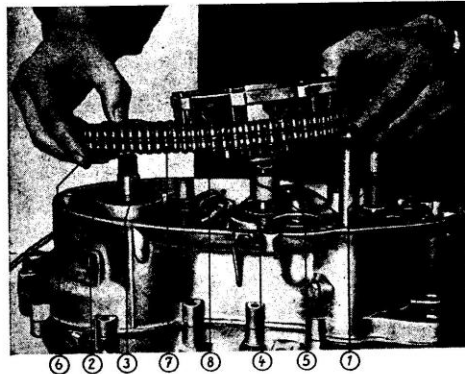


Fig. 15: Clutch

- | | |
|-----------------|-------------------|
| 1 Thrust collar | 5 Bushing |
| 2 Spring washer | 6 Engine sprocket |
| 3 Woodruff key | 7 Front chain |
| 4 Thrust collar | 8 Clutch drum |

2. Install engine sprocket (fig. 15/6) together with the chain (fig. 15/7) and clutch drum (fig. 15/8). Mount clutch hub, put in clutch hub holding tool and chain sprocket clamp, fit locking discs on crankshaft stub and countershaft, put on nuts (fig. 17/1/2) and tighten them lightly at first. Check chain tension (see fig. 16). If the sag exceeds 0,276 in., the chain should be exchanged for a new one. After inspection tighten nuts (fig. 17/1/2) and bend up locking discs.
3. Put key and chain sprocket together with locking disc on mainshaft, tighten nut and bend up locking disc. Remove clutch hub holding tool and chain sprocket clamp.

This not a very complete description, so I will elaborate.

The key to setting up the pump is to start as the book states; with the pump in its uppermost position (e.g. piston of pump run fully up into the pump body). Once you fit the pump to the case snug the bolts, but do not tighten them fully, or re-wire them.

What you must do is keep your index finger on the pinion gear of the pump, and as you tighten it up you need to be able to "wobble" the gear; especially when nearly tight. If you can't you need to remove one of the bolts and swing the pump away from the crankshaft worm gear and move the pinion gear a couple of teeth, and try again. Once you have the pump snug, and the gear still wiggles you can progress to the next step.

The next step is to keep your index finger on the pinion gear; constantly "wiggling" it back and forth as you-SIMULTANEOUSLY- rotate the engine. To make life easier pull out the spark plugs (if you have the head on [I usually set up the pump as I am building the lower end alone]), and have a socket set up for the engine sprocket nut so that you can turn the engine over with your other hand. Now; while turning over the engine keep wiggling the gear. The gear MUST wiggle 100% of the time through a full range of the pump piston's travel. That is a bunch of rotations like 20 + 360 degree rotations.

Now; if the gear binds up at any point you must stop, and again remove one bolt of the pump; loosen the other; swing the pump out from the crank worm gear; rotate the pinion gear one or two teeth, and start over.

It sounds hard but it isn't. It is just fiddly. You have to just work with it until you hit the sweet spot. In the sweet spot the gear will wiggle all the way up and down as the pump piston runs through a pumping cycle.

Trust me that there a sweet spot-somewhere- very close to where you start setting up the pump. This is why they have you start at the top of the pump's travel. The sweet spot is just a couple of teeth in either direction from where you first introduce the pump gear to the crankshaft gear. I know it seems that there should be marks to align it, and I have always thought this process was poorly executed for such an integral part of the engine's function. The truth is that a bad pump set-up can temporarily lock up an engine; that is until it destroys the pump gear to get past it!!!

The "wobble" is the key. Just set it up so the gear wiggles all the time, and when you are pretty sure it is right run those bolts up tight. The book has no torque spec for them, but since they are 6mm I use 10 ft. lbs. as a spec. Then; re-check your gear lash (or "wobble" in my highly technical terminology) to be sure nothing has changed. Once you are happy re-wire the bolts.

Last thing-there is no gasket behind the pump, and you do not use any sealant on the pump face or case face. Be sure to clean the two faces carefully. A Scotch Brite pad works well to clean up the pump face. I did the pump you just got-so just do the case (I am sure you already have done this anyway).