FLYWHEEL ROTATION DEVICE
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ABSTRACT OF THE DISCLOSURE
A flywheel rotation device having a pinion movable into engagement with a ring gear associated with an engine flywheel, the pinion being manually rotatable to produce rotation of the flywheel for engine timing purposes.

The present invention relates to a device for the rotation of an engine flywheel for timing purposes.

As is well known in the art, it is often necessary to time the components of an engine for the proper functioning thereof. The timing operation is usually carried out following the repair or replacement of an engine component such as, e.g., a gear, fuel pump, piston or balancer. In order to time the engine, it has been the practice in the prior art to manually rotate the engine flywheel. However, such practice has presented serious disadvantages. Also, it has often been difficult to gain access to the engine to be timed because of space limitations.

Another disadvantage is that it has been difficult to produce the desired rotation, because of the high compression pressures and weight of the engine components which must be turned. To facilitate the rotation of the flywheel, it has been a common practice to employ a pry bar for engaging the teeth of the ring gear usually associated with the flywheel. However, the use of such a pry bar permits movement through the space of only a few gear teeth at a time. In addition, the pry bar which is usually inserted through an opening in the flywheel housing, often causes damage to the latter.

The force required for manual flywheel rotation has, in the prior art, often been reduced by use of a compression release mechanism such as will reduce the piston compression pressures by maintaining the associated exhaust valves in open position. The use of such a compression release mechanism, however, represents an added element of cost for the engine timing operation. As a further element of cost, it has often been necessary to employ two men for such timing operation. Thus, one man may rotate the flywheel while the other man may observe the usual timing marks on the flywheel or manipulate the timing pin often used.

The present invention provides a flywheel rotation device which overcomes the above-discussed problems of the prior art. The advantages of the present invention will become apparent to one skilled in the art, from the following description when read in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic side elevational view being partly in cross section of an engine housing equipped with the flywheel rotation device of the invention;

FIG. 2 is an enlarged medial cross sectional view of the rotation device of FIG. 1; and

FIG. 3 is a view similar to FIG. 2 illustrating a modified form of the invention.

In FIG. 1, there is shown an internal combustion engine 10 of conventional type. A housing 12 for a flywheel 14 is provided with a conventional timing hole 16. Mounted for rotation with the flywheel 14 is a ring gear 18 of conventional design.

Mounted in association with the housing 12 is a flywheel rotation device 20 constructed in accordance with the invention. The device 20 (see also FIG. 2) provides a pinion 22. The pinion 22 is formed as a part of a shaft 23 and its teeth 24 are engageable with teeth 26 of the ring gear 18.

The pinion has a flange 28 at its rearward end and a socket 30 for reception of a tool by means of which it may be rotated.

When it is desired to rotate the flywheel 14 for engine timing purposes, the capscrews 36 are removed and the pinion is withdrawn for removal of the spacer 34. The pinion is then reinserted into the position indicated at 22a to mesh with the ring gear. A suitable tool (into shown) is then inserted in the socket 30 to rotate the pinion. Rotation of the ring gear and flywheel is thus effected. The timing hole 16 is then employed for observation of conventional timing marks which appear on the flywheel. The timing hole 16, may, alternatively, be used for the insertion of a conventional timing pin into a suitable bore provided in the flywheel. The invention provides a comparatively easy means for rotation of the flywheel for timing purposes. The invention assures ready access to the flywheel even where there is a serious space limitation.

The invention enables more rapid rotation of the flywheel than has been possible in the prior art. At the same time, the necessity of the use of a pry bar is eliminated.

It also serves to provide a mechanical advantage despite serious space limitations which also serves to eliminate the necessity of employing a compression release mechanism.

The invention is of comparatively low cost and its use permits the conducting of a timing operation by a single man.

In FIG. 3, there is shown a modified form of the invention. Here a flywheel rotation device is shown which is associated with a flywheel housing 12'. A pinion 22' has teeth 24' and a flange 28'. A counterbore 38 in the housing receives the flange 28'. Encircling the pinion 22' is a spring 40 which at its outer end bears against the flange 28' and at its inner end against a shoulder 42 of the counterbore 38. With this construction, the spring 40 tends to retain the pinion in its retracted or inoperative position. A plate 44, retained in place by capscrews 36', holds the parts in the position illustrated. The plate 44 has an extension 46 of a diameter which will fit within the counterbore 38 and also has a central opening with a closure stud 50. In order to cause engagement of the pinion with the ring gear capscrews 36' are removed, the stud 50 is removed and the plate 44 is reversed so that the extension 46 engages the shoulder 28' moving it inwardly against the force of spring 40 and thus also moving the pinion 24' inwardly and into engagement with the ring gear. With the ring gear thus engaged, a suitable tool may be inserted in a socket shown at 30' for timing the engine.

We claim:

1. A device for rotating an engine flywheel, comprising:

(a) a pinion adapted to engage a ring gear mounted on said flywheel, said pinion being adapted for manual rotation when in engagement with said gear and

(b) means mounting said pinion for movement between an operative position of engagement with said gear and an inoperative position of disengagement from said gear.
2. A device in accordance with claim 1, in which said pinion is of elongate, cylindrical shape.
3. A device in accordance with claim 2, in which said pinion is provided with a socket adapted to receive a tool for the purposes of said manual rotation.
4. A device in accordance with claim 1, in which said mounting means provide a bore adapted to receive said pinion for said movement between operative and inoperative positions.
5. A device in accordance with claim 4, in which said bore is formed in a housing for said flywheel.
6. A device in accordance with claim 1, in which said mounting means are adapted to maintain said pinion normally in said inoperative position.
7. A device in accordance with claim 6, in which said pinion is formed with a shoulder, said mounting means being adapted to engage said shoulder for maintaining said pinion in said inoperative position.
8. A device in accordance with claim 7, in which said mounting means include a spacer member for engaging said shoulder.
9. A device in accordance with claim 7, in which said mounting means include a spring for engaging said shoulder.
10. A device in accordance with claim 9, in which said mounting means include a retaining member having a flat side and a side with a projection, said retaining member being adapted for positioning with said flat side in engagement with said shoulder when said pinion is in said inoperative position, said retaining member being adapted for positioning of said projection in engagement with said shoulder, for movement of said pinion into said operative position.

References Cited

UNITED STATES PATENTS

2,694,901 11/1954 Schmidt et al. ------ 74—625 X
2,724,289 11/1955 Wight ------------- 74—405 X
2,831,362 4/1958 Truesdell 1-------- 74—40

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