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TOOL AND METHOD FOR REMOVING GENERATORS

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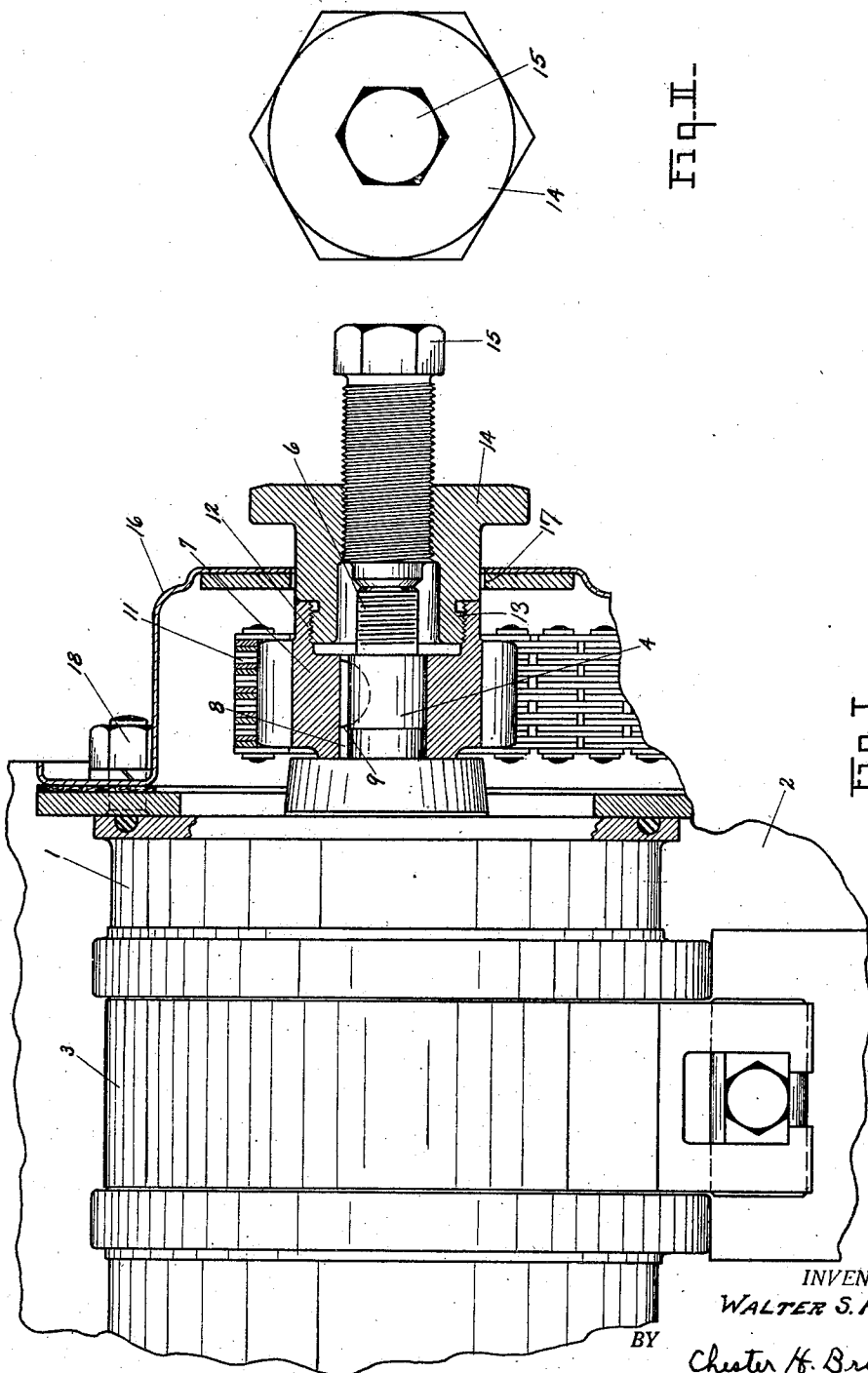


Fig. II--

Fig. I--

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TOOL AND METHOD FOR REMOVING GENERATORS

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My invention relates to machines embodying sprocket and chain driven elements which bear a definite spaced relation to each other, and it is particularly related to a device or tool by which certain of the driven elements may be replaced without disturbing the position of the others.

The principal object of the invention is to provide a construction embodying sprocket and chain driven members wherein a shaft may be removed without first disengaging the chain, and as an additional object, the invention contemplates the provision of an inexpensive tool by which the removal may be performed, readily.

Another object of the invention is to provide a construction which will enable one to remove a shaft without necessitating a free access to the complete sprocket and chain drive.

An additional object of the invention resides in the provision of a novel method of disengaging a shaft free of its chain and sprocket drive without dismounting the chain end while maintaining the position of the sprocket.

It is a further object of the invention to simplify and facilitate the operations involved in the replacement of rotatable shafts to which there is keyed a sprocket having a chain trained thereover. These, together with other objects, will become more apparent from a consideration of the drawings and detailed description hereinafter set forth.

According to the present day practice, when it is desired to remove an automobile generator which is actuated through a chain drive from the crankshaft of the engine, it has been necessary to remove the chain by dismounting one of the chain links, and subsequently, to remove the sprocket before the generator could be freed. Generally, the chain drive is partially immersed in oil and even if actual immersion is not practiced, the elements are coated with grease. Furthermore, access to these elements is had only with considerable difficulty. According to my invention I have provided a tool which is screwed into the sprocket or otherwise rigidly secured thereto, and which is capable of

supporting the sprocket and chain trained thereover. The tool includes a bolt which undergoes relative axial movement and which engages the shaft to which the sprocket is keyed. By rotating the bolt the shaft is forced out of engagement with the sprocket leaving the sprocket and chain supported by the tool.

A better understanding of an embodiment of my invention, which may be preferred, can be had by referring to the accompanying drawings in which:

Figure I is an elevational view partly in section, of a generator and its mounting, and illustrates the relation which the tool elements bear to the generator elements; and

Fig. II is an end view of the tool illustrated in Fig. I.

As illustrated, a generator housing 1 is suitably mounted on an engine casing 2 by means of a flexible band 3 that is adjustably secured to the casing. Within the housing, a generator armature is rotatably mounted upon a shaft 4 that projects a short distance beyond its bearings which are contained within the housing. Threads 6 are formed on the extreme end of the shaft which is machined to a smaller diameter than the adjacent portion to which a sprocket 7 provided with a keyway 8, is rigidly secured by a key 9 and is driven by a chain 11 that is trained thereover. The sprocket 7 is formed with a female threaded portion 12 that meshes with a male threaded portion 13 of a nut 14 having both internal and external threads and is provided with a hexagonal head. The internal threads of the nut accommodate a bolt 15 which may be caused to move axially into engagement with the end of the shaft by rotating the same. A cover member 16 having an aperture 17 therein for receiving the hexagonal nut is secured to the frame or engine casing by bolts 18 and functions as a support for the nut when the shaft which, normally, is keyed to the sprocket, is forced out of engagement therewith.

When the generator is operated a washer and nut (not shown) are fitted on the threaded end 6 of the shaft 4 to assure the proper positioning of the sprocket 7 with respect to

the chain 11, and also to avoid displacement by reason of any thrust action. In order to remove the generator and its shaft 4, the nut and washer (not shown) are removed and the hexagonal tool nut 14 is screwed in the sprocket 7 to assume the position illustrated in Fig. 1. Subsequently the bolt 15 is caused to engage the end of the shaft 4 and by continued rotation forces the shaft out of engagement with the sprocket. Since the octagonal nut is supported within the aperture 17 of the cover member 16, the chain and sprocket which under these conditions are secured rigidly thereto, remain in substantially their normal operative position. When it is desired to replace the shaft 4, the bolt is withdrawn, the shaft is replaced and the tool nut removed. A face plate may be provided to close the aperture in the cover member 16, thereby obviating any likelihood of an accumulation of dirt upon the lubricated driven elements.

From the description it is obvious that although the embodiment illustrated is that of an automobile generator, the principles underlying the invention may be extended to other chain and sprocket driven elements where it would be desirable to remove the shaft from time to time without unharnessing the sprocket as a preliminary operation. In like manner, the principles may be extended to a pulley and belt drive or any other combination of power transmitting elements in which it is desirable to maintain the position of the sprocket or pulley while the shaft supporting the same is withdrawn.

The drawings illustrated a sprocket provided with an internal threaded portion. It is to be understood, of course, that the tool may be secured to the sprocket in any desired manner, provided the combination is sufficiently secure to sustain the tension of the chain or other flexible power transmitting member. In the claims the term "sprocket" is employed in a broad sense to designate a gear, pulley or the like. Similarly, the term "chain" is to be understood as embracing a belt, chain or any other analogous power transmitting means.

Although there is illustrated and described but a single specific embodiment of the principles of my invention, it will be apparent to those skilled in the art that the invention is susceptible to many modifications without departing from the spirit thereof, and I desire therefore that it be limited only as indicated in the appended claims.

I claim:

1. In a machine having a rotatable shaft, a sprocket mounted thereon, and a chain trained about the sprocket; a tool for removing the shaft comprising means adapted to engage and maintain the operative position of the sprocket, and means operatively associated with the engaging means for forcing

the shaft out of engagement with the sprocket.

2. In a machine having a rotatable shaft, a sprocket mounted thereon, and a chain trained about the sprocket; a tool for removing the shaft comprising means adapted to be screwed into engagement with the sprocket and to maintain the operative position of the same, and means relatively movable with respect to the engaging means adapted to force the shaft out of engagement with the sprocket.

3. In a machine having a rotatable shaft, a sprocket mounted thereon, and a chain trained about the sprocket; a tool for removing the shaft comprising means adapted to engage and maintain the position of the sprocket, and a screw member mounted within the engaging and supporting means relatively movable therewith, adapted to force the shaft out of engagement with the sprocket.

4. In a machine having a rotatable shaft, a sprocket having a threaded portion mounted on the shaft, and a chain trained about the sprocket; a tool for removing the shaft comprising a member having a threaded portion adapted to mesh with the threaded portion of the sprocket, a bolt mounted within the member adapted to be rotated into engagement with the shaft and to force the same out of contact with the sprocket, and means for supporting and maintaining the position of the threaded member.

5. In an automobile generator unit including a frame portion, a rotatable armature shaft mounted within the frame portion, a threaded sprocket keyed to the shaft and a chain trained thereover; a tool for removing the shaft while maintaining the position of the sprocket and chain, comprising a threaded member adapted to engage and mesh with the threaded portion of the sprocket, said threaded member being provided with a bolt adapted to be screwed axially of the shaft and into engagement therewith and to force said shaft out of engagement with said sprocket.

6. In an automobile generator unit including a frame portion, a rotatable shaft mounted within the frame portion, an internally threaded sprocket keyed to the shaft, and a chain trained thereover; a tool for removing the generator while maintaining the position of the sprocket or chain, comprising a nut having internal and external threads adapted to be supported by the frame, the outer threaded surface of said nut being adapted to mesh with the internally threaded sprocket and a bolt adapted to mesh with the internal threads of the nut and to engage and force the shaft out of contact with the sprocket.

7. A method of repairing a device including a sprocket and chain driven shaft that comprises forcing the shaft out of engagement

ment with the sprocket and thereafter maintaining the position of the sprocket while replacing the shaft.

5 8. The method of removing a gear driven armature and shaft supporting the same from an automobile generator that comprises securing the gear driving the armature in its operative position independently of the armature shaft, and forcing the shaft out of
10 engagement with the gear without disturbing its relation with respect to the gear driving elements substantially as set forth.

9. In a machine having a rotatable shaft and means for driving the shaft including a
15 gear secured thereto, means for removing the shaft while maintaining the position of the driving means including threaded means for engaging and making secure the normal position of the gear independently of the shaft,
20 and a screw member mounted on the threaded means engageable with the shaft and axially movable therewith adapted to force the shaft out of its keyed relation with respect to the gear.

25 In testimony whereof, I affix my signature.
WALTER S. FISHER.

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