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STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

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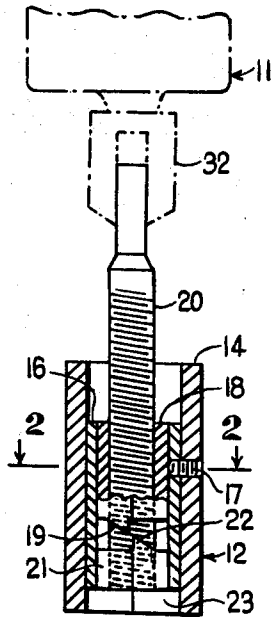


Fig. 1

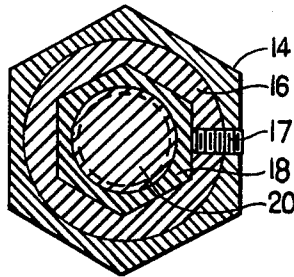


Fig. 2

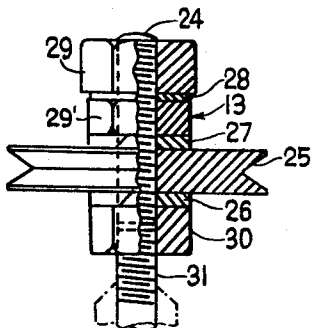


Fig. 3

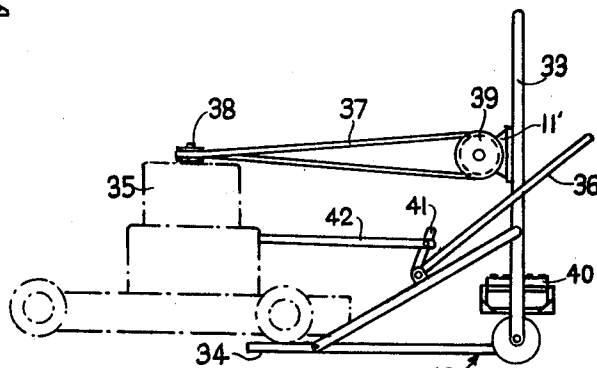


Fig. 4

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1 Claim. (Cl. 74-6)

ABSTRACT OF THE DISCLOSURE

There are two modifications of the starting device. One modification includes a socket assembly to be secured to a drill chuck. The socket assembly includes a lower end portion in the form of a socket, a portion to be connected to a drill chuck and novel structure interconnecting these portions.

If the engine shaft does not extend above its hood an engine shaft extension may be secured to said engine shaft, the extension having a nut at its outer end to cooperate with the said socket.

The second mentioned modification will include the said engine shaft extension if the engine shaft does not have an exposed pulley at its upper end. This second modification has a supporting frame including a horizontally disposed platform, a vertical member secured to the platform, a motor having a pulley, said motor secured to said vertical member, a belt to encompass the motor pulley and a pulley on an engine shaft, a horizontal rod and a hand lever pivotally secured to the supporting frame and pivotally secured to one end of the horizontal rod so that the horizontal member and hand lever can be used to tighten the belt.

This invention relates to internal combustion engines, and more particularly, to a starting device for internal combustion engines. Still more particularly, it relates to a device of the character described that is especially adapted to start types of internal combustion engines that are used to power lawn mowers and the like.

The starting of the internal combustion engine of a lawn mower, which generally has a small single cylinder vertically disposed gasoline engine, has always presented a problem. This is especially true when people are not physically strong.

It is, therefore, the principal object of this invention to provide a starting device for internal combustion engines that is especially adapted to the starting of the engine of a lawn mower although the device is not to be limited to such use.

Another object of this invention is to provide a starting device for internal combustion engines that will permit one to utilize the motor of an electric drill or the like to start the engine when it is the source of power for a lawn mower.

Still another object of this invention is to provide a starting device for internal combustion engines containing a minimum number of parts, simple to operate, and being adaptable to nearly any small internal combustion engine.

Other and further objects of this invention will become apparent as the specification proceeds, and the drawing accompanying the specification is examined. In the drawing:

FIG. 1 is a longitudinal sectional view of the major portion of this invention.

FIG. 2 is a sectional view of this invention, taken along line 2-2 of FIGURE 1, and viewed in the direction indicated by the arrows.

FIG. 3 is a partial sectional view of another part of this invention.

FIG. 4 is a side view of a typical lawn mower powered with a small internal combustion engine that is started by means of a modified form of this invention which is secured to the structure and is shown by means of solid lines.

One modification of this invention in its entirety comprises: an electric motor 11, the socket assembly 12, and the engine shaft extension assembly 13. The aforesaid socket assembly 12, being the crux of this invention, is the first herein described part of this invention. It is constructed as follows:

The socket assembly 12 embodies a tubular member 14. An internal member 16 is located inside the aforesaid tubular member 14 and is secured in place in the same by means of the set screw 17 which also secures the internally threaded member 18 within the aforesaid internal member 16, which internal member 18 has a left hand thread. The lower end of the internally threaded member 18 is provided with a downwardly extending tooth 19. A left hand threaded shaft 20, having a head 21 which head is rotatable in member 16 and is provided with a tooth 22, is fixedly secured to the end of the aforesaid threaded shaft 20, by structure including said thread as is clearly shown in FIGURE 1 of the drawing.

The engine shaft extension assembly 13, on which the lower end 23 of the above described socket assembly 12 is placed, as will hereinafter be described, consists of an externally threaded shaft 24 on which is placed the pulley 25. This pulley 25 has a lock washer 26 on one side of the aforesaid shaft and under the aforesaid pulley 25 while an alike lock washer 27 is likewise screwed on the other end of the aforesaid shaft and on top of the just mentioned pulley 25. A flat washer 28 is located on the upper end of the aforesaid shaft 24 between the top of nut 29' and the underside of the nut 29, while a connecting nut 30 is on the lowermost end of the aforesaid shaft 24 and secures the aforesaid engine shaft extension assembly to the upper end of the engine shaft 31.

The way in which the above two assemblies 12 and 13, that go to make up this invention in its simplest form, are used is as follows:

The electric drill 11 is secured to the upper end of the left hand threaded rod 20 by means of the drill chuck 32. The aforesaid threaded rod 20 has already been assembled in part in the tubular member 14 with its previously described associated mechanisms. As shown in FIGURE 1, the lower end 23 of the tubular member 14 of the socket assembly 12 is hexagonal on its inside in order that the lower end of the tubular member 14 can be slipped down over the top of a nut such as 29 that forms a part of the previously described engine shaft assembly 13 of this invention. Some engines of this type having a simple rope starter have a pulley such as 25 secured to the upper end of the motor shaft by a nut such as nut 29. If the motor does not have such a pulley, the engine shaft extension assembly of FIGURE 3 is attached to the motor shaft. It may be necessary to drill a hole in the hood at the top of the engine to permit engine shaft extension assembly 13 to extend through the top of the said hood. This last mentioned assembly is, as has been previously stated, secured to the upper end of the engine shaft 31 of the internal combustion engine that one desires to start by means of this useful and novel invention. When the electric drill motor 11 is activated in the usual manner, the rotation of the threaded rod 20 will lift the nut 21 up to the member 18. When the tooth 19 of member 18 becomes engaged with the tooth 22 of the nut 21, the aforesaid tubular member 14 will, as previously stated, turn to the right to crank

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the engine. When the engine starts, shaft 31 of the engine will rotate faster than shaft 20. As a result, the power of the engine will cause the head 21 to force the nut 29 out of the socket portion 23. This action will also cause head 21 to move away from threaded member 18, thus moving tooth 22 out of contact with tooth 19, disconnecting shafts 20 and 21.

In the modification of FIGURE 4, there is a supporting frame 10, having a vertical member 33. Motor 11' is mounted on vertical member 33. This motor may be a motor like that of FIGURE 1, or a suitable motor connected to storage battery 40. Supporting frame 10 has a horizontally disposed platform 34 on which one end of a lawn mower 35 is placed. Lawn mower 35 has a pulley 38 which may be the pulley of the engine shaft extension assembly 13 of FIGURE 3. A belt 37 connects pulley 38 to pulley 39 of motor 11'. A hand lever 36 is pivotally connected to supporting frame 10. Said hand lever 36 has a crank arm 41 and a horizontal rod 42 to adjust the tension of belt 37.

In using the modification of FIGURE 4, the lawn mower 35 is placed as shown in FIGURE 4 with belt 37 placed as shown. Lever 36 is moved to place the necessary tension on the belt and motor 11' is started to crank the engine.

This invention is subject to any changes and modifications that may fall within the scope and intent of the appended claim.

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What I now claim as new and desire to secure by Letters Patent is:

1. A starting device for small portable internal combustion engines; a supporting frame comprising, a horizontally disposed platform and a vertically disposed member fixedly secured to said platform, an electric motor having a rotating shaft and a pulley secured to said shaft, the motor secured to said vertically disposed member, a belt to encompass the said pulley and the pulley of a small portable internal combustion engine, a horizontally disposed rod, a hand lever pivotally secured to said supporting frame, said lever also pivotally secured to the end of said horizontally disposed rod, whereby such an engine having a pulley secured to the crankshaft thereof can be placed on a portion of said platform, the belt placed around the pulley of said motor and the pulley of the engine, the free end of the rod can be placed against the engine and the hand lever can be rotated to apply tension to the belt.

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