

C. A. DEAL & M. E. COX.
 STARTING MECHANISM FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED AUG. 1, 1911.

1,046,277.

Patented Dec. 3, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

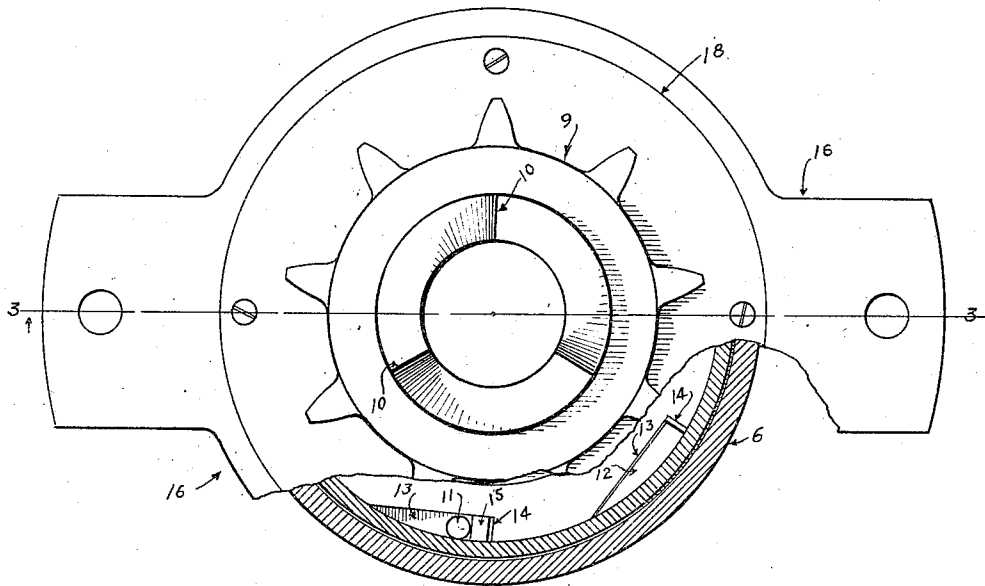
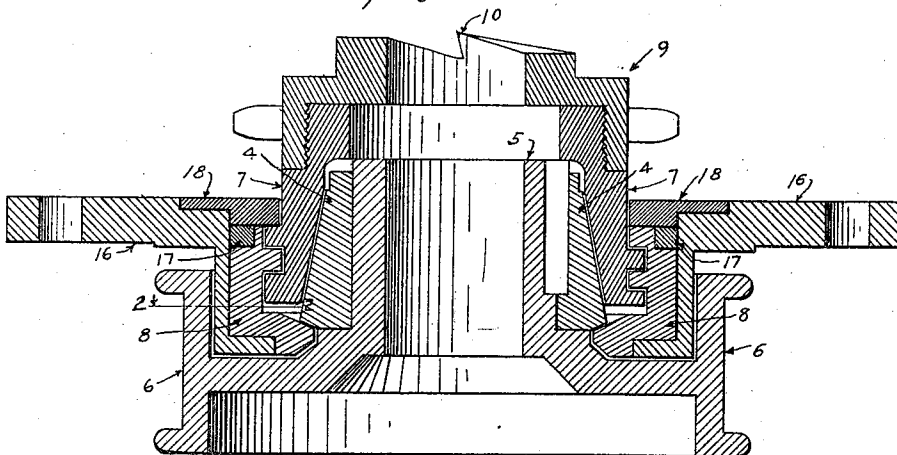


Fig. 2.



Witnesses.

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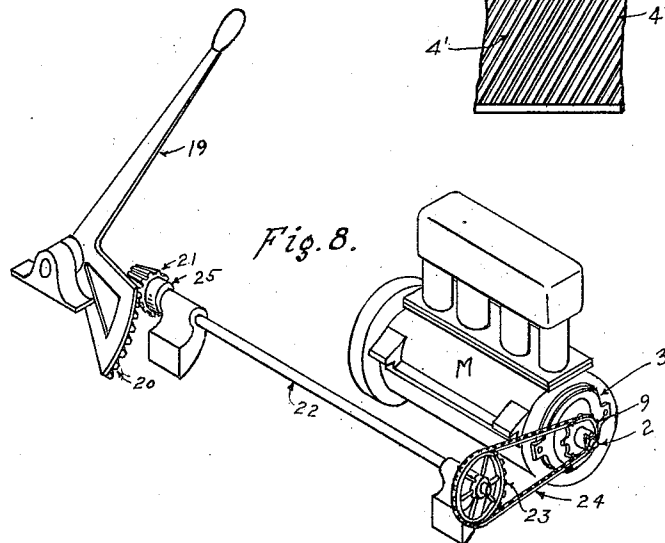
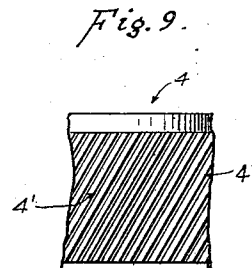
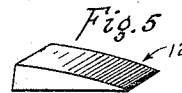
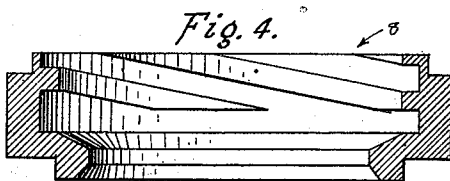
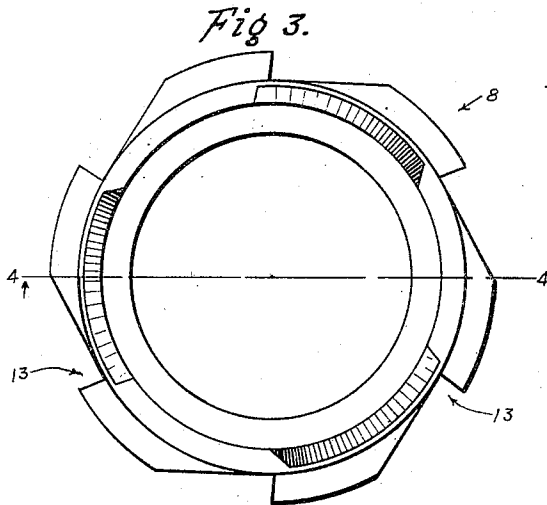
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES A. DEAL AND MARVIN E. COX, OF LOS ANGELES, CALIFORNIA.

STARTING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,046,277.

Specification of Letters Patent.

Patented Dec. 3, 1912.

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To all whom it may concern:

Be it known that we, CHARLES A. DEAL and MARVIN E. COX, both citizens of the United States of America, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a certain new and useful Starting Mechanism for Internal-Combustion Engines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to starting mechanism for internal-combustion engines, and it has for its object to provide a novel and improved construction therefor, which shall be of a simple character, easy and convenient to operate, strong and durable in use, positive and effective in its action, and by which is avoided all danger of injury to the operator in case of "back-firing", or rotation of the engine shaft in a reverse direction.

With the above and other objects in view, which will be apparent to those skilled in the art, the invention may be said to consist in the provision of the novel features and in the novel and improved construction, arrangement and combination of parts and devices as set forth in the claims, and as will appear from a consideration of the description hereinafter of a preferred form of construction in which the invention may be embodied; the construction being illustrated in the accompanying drawings forming part hereof.

In these drawings, Figure 1 is a plan view of a preferred form of construction embodying the invention, with a cut away portion and showing a partial section on the line 2—2 of Fig. 2; Fig. 2 is a section taken on the line 3—3 of Fig. 1; Fig. 3 is a plan view of the ball clutch; Fig. 4 is a section taken on line 4—4 of Fig. 3; Fig. 5 is a view of the blocks used alternately with the balls in the clutch; Fig. 6 is a view of a roller that may be used in place of the balls; Fig. 7 is a view of a spring showing same bent to shape before placing in clutch; Fig. 8 is a view showing the invention applied to a gas engine, with a device for cranking from the seat, and Fig. 9 is a fragmentary view of the cone.

On the crank shaft 2 of an internal combustion engine M may be mounted a device 3 to which is connected actuating mechanism

for turning the crank shaft to start the engine; the device being adapted to be disengaged from the actuating mechanism after the engine starts to operate.

As shown in Figs. 1 and 2, the device may comprise a cone 4 having grooves 4' on the periphery thereof and keyed to the sleeve 5 fast on the shaft 2. As shown, the sleeve 5 may be connected with the pulley 6. The cone 4 fits into the cone sleeve 7 the outer surface of which may be threaded to screwably fit into the clutch 8. On the cone sleeve 7 may be screwed the sprocket 9, formed to fit loosely over the shaft 2 and having on its outer face teeth or jaws 10 adapted to engage similar ones in case the engine is to be cranked from in front with the ordinary crank. The clutch 8 contains in its outer portion balls (or rollers) 11 and blocks 12 which may be alternately disposed in the recesses 13. Springs 14 and blocks 15 keep the balls 11 and the blocks 12 in constant contact with the inner face of the stationary part 16. A ring 17, which may be made of bronze or other suitable metal, is disposed on the outer end portion of the clutch 8. The cone sleeve 7 may be kept from screwing out, by a ring 18 suitably fastened to stationary part 16. The part 16 may be rigidly fastened to the engine frame in any convenient manner. From the pulley 6 a belt may be run to a fan, (not shown).

A device such as is shown in Fig. 8, or a modification thereof may be employed for the purpose of starting an automobile engine from the operator's seat. In Fig. 8 the lever 19 is shown in position for cranking. The lever on being pulled quickly to the vertical position raises the segmental gear 20 and thereby rotates the gear wheel 21, the ball clutch 25 and the shaft 22 operatively connected with the ball clutch 25, and the sprocket wheel 23, from left to right. A sprocket chain 24 connects sprocket wheel 23 with sprocket wheel 9, rotating it and the cone sleeve 7 in the same direction as the shaft 22. The rotation of the cone sleeve 7 causes it to screw into the clutch 8 and the inner periphery of the cone sleeve 7 will then come in contact with the grooved periphery of the cone 4 with such force as will prevent relative slipping between them and cause the engine shaft 2 to rotate in the same direction as the shaft 22. The operation of the lever 19 may be repeated until

the engine starts, it being understood that in consequence of the action of the ball clutch 25 the gear wheel 21 is operatively disconnected from the shaft 22 when the lever 19 is pushed downwardly from the vertical position; also it will be apparent that should the engine start to turn the shaft 2 in a forward direction, while the lever 19 is being moved, the cone 4 will be disengaged from the cone sleeve 7 in consequence of the clutch 8 tending to rotate faster than the cone sleeve 7, whereby the thread on said clutch forces the cone sleeve 7 outwardly and thereby disengages the latter from the cone 4. Should the engine back fire while the lever 19 is being moved to start the same it will be seen that the parts of the clutch 8 become engaged to hold it, and the cone 4 rotates the cone sleeve 7 backwardly until the latter has moved a sufficient distance outwardly, due to its screw connection with the clutch 8, to disengage the cone 4 from the cone sleeve 7. The cone 4 may then rotate backwardly without affecting the remaining parts.

While one form of construction in which the invention may be embodied has been illustrated and particularly described, many changes and modifications thereof will readily occur to those skilled in the art; wherefore the right is reserved to all such changes and modifications as do not depart from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. The combination of a shaft, a cone rigidly connected with the shaft, said cone having grooves on the periphery thereof, a sleeve into which said cone is fitted, a sprocket wheel affixed to the sleeve, said sprocket wheel formed to fit loosely over the shaft and provided with jaws for the purpose set forth, a clutch into which said cone sleeve is screwably fitted, a stationary part, means disposed in recesses in the outer portion of the clutch and adapted to engage with said stationary part when the clutch rotates in a predetermined direction, a lever, and means operatively connecting the lever

with said sprocket wheel, substantially as described.

2. The combination of a shaft, a pulley rigidly connected with the shaft, said pulley provided with a sleeve thereon, a cone rigidly mounted on said sleeve, said cone having grooves on the periphery thereof, a stationary part, a clutch fitted within said stationary part and provided with recesses in the outer portion thereof, means in said recesses to cause said clutch to engage with said stationary part when the clutch is rotated in a predetermined direction, a cone sleeve adapted to fit over said cone and threaded into said clutch, and means connected with said cone sleeve to rotate the same to cause engagement thereof with said cone.

3. The combination with a crank-shaft of an internal-combustion engine, of a pulley rigidly connected with the crank-shaft, said pulley provided with a sleeve, a cone rigidly mounted on said sleeve, a stationary part, a clutch disposed within said stationary part, said clutch provided with recesses and means therein adapted to engage with said stationary part when the clutch is turned in a predetermined direction, a cone sleeve adapted to fit over said cone and threaded into said clutch, a sprocket wheel connected to said cone sleeve, a shaft, a sprocket wheel on the last shaft connected with that connected to the cone sleeve, a gear wheel, a ball clutch for connecting said gear wheel to said shaft when the gear wheel is turned in a predetermined direction, a segmental gear adapted to mesh with said gear wheel, and a lever connected with said segmental gear, substantially as described.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses at Los Angeles, county of Los Angeles, State of California, this 20th day of June, A. D. 1911.

CHARLES A. DEAL.
MARVIN E. COX.

Witnesses:

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