

H. MALLARD AND H. C. WHITE.
SELF STARTER.

APPLICATION FILED FEB. 12, 1921.

1,420,121.

Patented June 20, 1922.

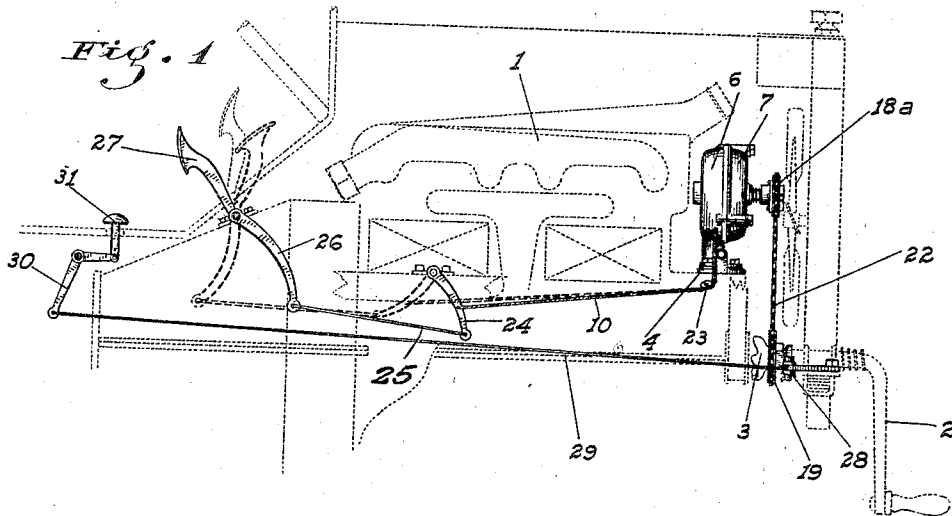
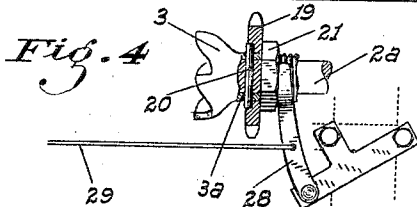
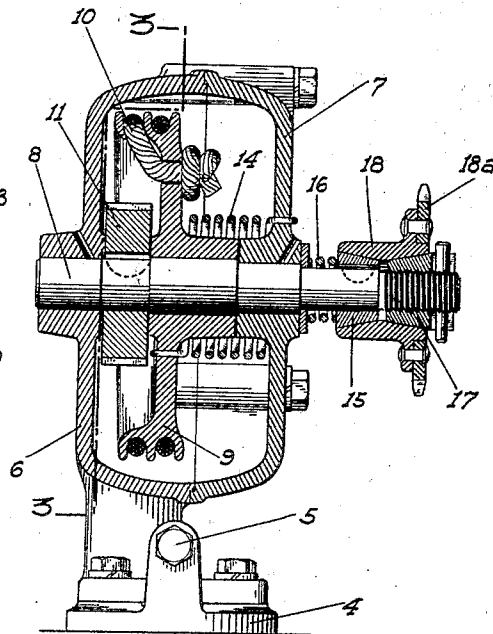
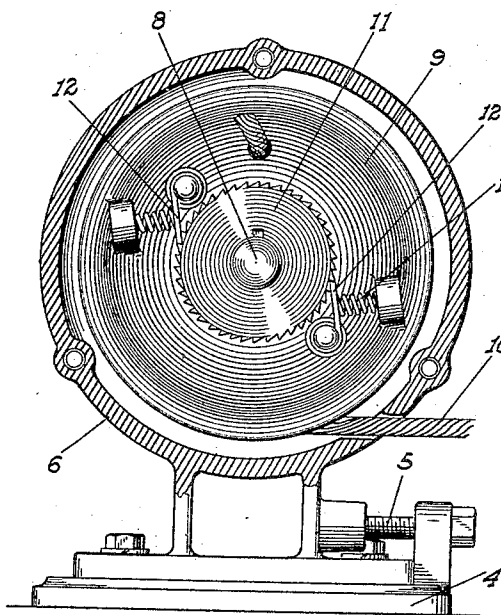


Fig. 3

Fig. 2



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UNITED STATES PATENT OFFICE.

HENRY MALLARD AND HAROLD C. WHITE, OF STOCKTON, CALIFORNIA, ASSIGNORS,
BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-FOURTH TO SAID HENRY MALLARD
AND ONE-FOURTH TO FRANK A. GUERNSEY, OF STOCKTON, CALIFORNIA, AND ONE-
HALF TO EDWARD S. MUNFORD, J. L. CRAIG, AND W. SAM CLARK, ALL OF STOCK-
TON, CALIFORNIA.

SELF-STARTER.

1,420,121.

Specification of Letters Patent. Patented June 20, 1922.

Application filed February 12, 1921. Serial No. 444,391.

To all whom it may concern:

Be it known that we, HENRY MALLARD and HAROLD C. WHITE, citizens of the United States, residing at Stockton, county of San Joaquin, State of California, have invented certain new and useful Improvements in Self-Starters; and we do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in mechanical self-starters for internal combustion engines, being especially designed for use in connection with automobile engines, and particularly with regard to the "Ford" type of engine.

This invention moreover is also particularly an improvement over that type of device shown in Patent No. 1,335,345 granted to Henry Mallard March 30th, 1920, the principal object of the present invention being to include an automatic clutch attachment which will eliminate the dangers attendant on backfiring of the motor, which can hardly be avoided altogether but which very often results in serious injury to the operator.

Another object is to construct the device so that all the mechanism is enclosed, and with so few and simple working parts that there is very little likelihood of the device breaking down and failing to function.

We have also designed the main member of the device so that it will have a compact and neat appearance, and which, together with the remaining attachments, may be easily installed on the chassis of the car.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects we accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is an outline side elevation of a Ford engine, showing our improved starter installed in connection therewith.

Fig. 2 is a sectional view through the main operating member.

Fig. 3 is a cross section taken on the line 3—3 of Fig. 2.

Fig. 4 is a detached detail plan of a clutch mechanism for connecting the starting mechanism with the engine crank-shaft.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes the engine in general and 2 the usual crank handle which is provided with a ratchet clutch 3 on its inner end, the handle being adapted to move toward the engine so that the clutch will engage a pin on the forward end of the crank shaft but is normally held therefrom. This feature is not shown, since it is common to engines of the type mentioned.

A bracket 4 is mounted on the engine at its forward end, and to one side of the vertical center thereof so as not to interfere with the fan and other attachments of the engine.

Slidably mounted on this bracket and arranged for horizontal adjustment transversely of the engine by reason of an adjustment screw 5 mounted on the bracket 4 is a casing 6, preferably circular and of such a general shape as to represent or imitate an electric motor, the front portion of the casing being preferably formed as a removable cover 7 separate from that portion which bears on the bracket 4. For convenience of description, the casing will hereinafter be referred to as a single member.

A shaft 8 is journaled in said casing, projecting through the front end thereof, and has, inside the casing, a grooved sheave 9, turnable thereon, fixed to which and passing around the grooves and then out through the side of the casing is a cable 10, the further connections of which will be described later.

Fixed on the shaft 8 adjacent the sheave 9 is a ratchet wheel 11 constantly engaged by pawls 12 mounted on the sheave and forced against the ratchet by springs 13. A spring 14 in the casing is attached thereto

and to the sheave and operates to turn the latter in that direction in which the pawls merely slip past the ratchet teeth.

Splined on the shaft 8 outside the casing is a taper sleeve 15, forced outwardly from the casing by a spring 16 around the shaft, while adjustably secured thereon at the outer end is a similar sleeve 17, these sleeves tapering inwardly toward each other. Mounted over both sleeves and double-taper bored to be engaged thereby is a hub 18 having a sprocket 18^a in vertical alinement with a similar sprocket 19 mounted on the hub 3^a of the clutch 3 by means of a pin 20 driven through the said hub and handle shaft 2^a as is standard practice with this make of engine, the ends of this pin being merely socketed into the inner face of the sprocket, which is maintained against longitudinal movement by an outer lock nut 21 on the hub 3^a.

A chain 22 passes around both sprockets so that they will of course rotate in the same direction.

The device is operated as follows:—The cable 10 beyond the casing passes around a pulley 23 mounted on the engine frame to a link or swing-arm 24 mounted on the chassis. From the lower end of the arm a rod 25 goes to the lower end of an arm 26 pivoted on the chassis in connection with an operating pedal 27, so that with a forward movement of the pedal the cable will be moved rearwardly.

The clutch 3 is operated independently of the main structure by means of a yoke-arm 28 pivotally mounted on the chassis adjacent the sprocket 19 and bearing thereagainst or against the nut 21. A pull rod or cable 29 extends rearwardly from this arm to a bell crank 30 operatively connected with a button-pedal 31 projecting through the floor of the car and within reach of the heel of one foot of the driver, his other foot operating the pedal 27.

In operation, when the pedal 27 is worked, the cable 10 is unwound from the sheave, at the same time rotating the same, the pawls thereon engaging the ratchet wheel and causing a rotation of the shaft 8. At the same time, the spring 14 is being placed in tension, so that when the pressure on the cable is removed, the sheave is rotated in the opposite direction, winding up the cable thereon, while no movement is then imparted to the ratchet wheel or shaft.

Rotative movement of the shaft is normally transmitted unbroken to the sprocket 18^a, from there to the sprocket 19 and to the crank shaft of the engine, the clutch 3 being held in engagement therewith by pressure on the pedal 31, so that the engine is turned over, this pedal being held in, and the pedal

27, being reciprocated, as long as is necessary to get the engine started under its own power.

The frictional engagement of the hub 18 with the sleeves 15 and 17 is sufficient to turn the engine over without slipping, but if the engine backfires, thus producing a very heavy and sudden rotative effect in the opposite direction, the hub 18 slips on its sleeves, preventing any movement or damage to the mechanism in the casing.

By reason of the transverse adjustability of the casing on its bracket, the chain 22 may be taken up or let out as may be desired, and it is therefore not necessary to figure beforehand any single and exact size of sprocket, or center-to-center distance between the sprockets.

The adjustable sleeve 17 of course allows for take-up thereof, and so permits of altering the tension of the spring 16, thereby altering the frictional pressure or engagement of the hub 18 with the sleeves.

From the foregoing description it will be readily seen that we have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to and do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described our invention, what we claim as new and useful and desire to secure by Letters Patent is:

1. A slip-coupling device for gas engine starters comprising a shaft rotatable at the will of an operator, a pair of opposed taper sleeves mounted on the shaft to turn therewith, one of said sleeves being slidable thereon while the other is arranged for positive longitudinal adjustment on the shaft, a driven member bored to fit the sleeves mounted thereon and frictionally engaged thereby, and spring means acting to force the slidable sleeve toward the other sleeve.

2. A slip-coupling device for gas engine starters comprising a shaft rotatable at the will of an operator, a pair of opposed taper sleeves mounted on the shaft to turn therewith, one of said sleeves being slidable thereon, while the other is adjustably threaded thereon, a driven member mounted on and frictionally engaged by the sleeves, and a spring about the shaft bearing against a fixed support at one end and against the slidable sleeve at the other.

In testimony whereof we affix our signatures.

HENRY MALLARD.
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