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F. F. DORSEY

ENGINE STARTER MECHANISM

Filed Feb. 11, 1926

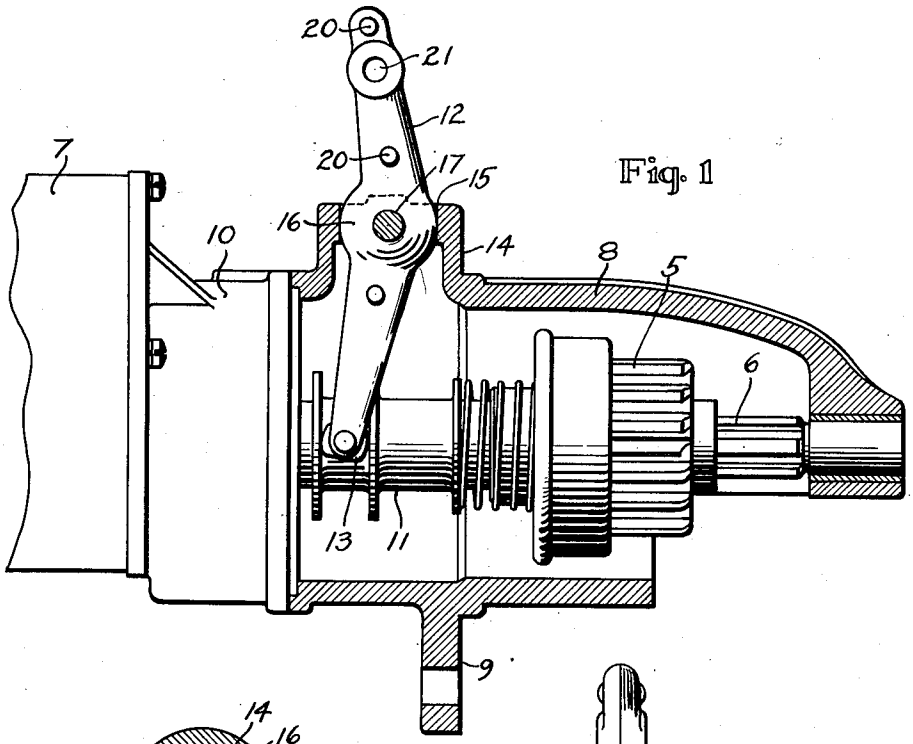


Fig. 1

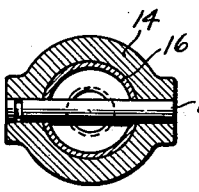


Fig. 3

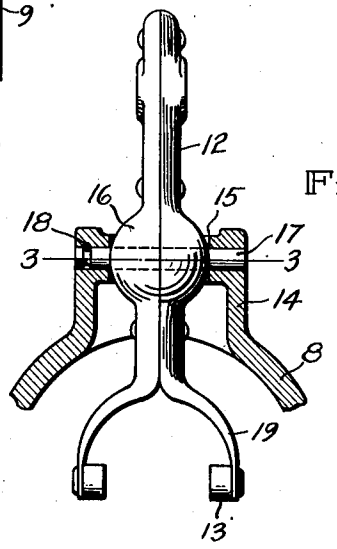


Fig. 2

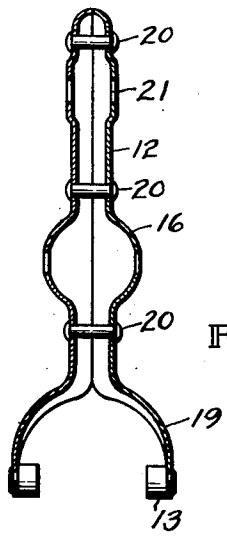


Fig. 4

Inventor:
Farnum F. Dorsey

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UNITED STATES PATENT OFFICE.

FARNUM F. DORSEY, OF ROCHESTER, NEW YORK, ASSIGNOR TO NORTH EAST ELECTRIC COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

ENGINE-STARTER MECHANISM.

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This invention relates to mechanism for starting an internal combustion engine, by power derived from an electric motor or other suitable source.

In mechanism for the purpose in question it is common to provide the flywheel of the engine with a ring of gear teeth, and to connect the motor with the engine, at the time of starting, by means of a pinion which is moved axially along a splined shaft driven by the motor, this axial movement of the pinion bringing its teeth into mesh with those on the flywheel. To produce the axial movement of the pinion, it is common to provide it with a slotted collar engaged by a forked lever, this lever being pivoted on the wall of a housing which encloses the pinion and its shaft. The lever extends to the exterior of the housing, and is arranged to be operated manually in any convenient manner.

In a construction such as just described, the pinion housing is attached to the flywheel housing of the engine, and has an opening, at its inner end, to permit engagement of the pinion and the gear ring, while the outer part of the housing is necessarily provided with an opening for the reception of the pinion-shifting lever. It is desirable that this last mentioned opening be fitted as closely as possible to the lever, in order to provide against the admission of dirt to the pinion housing, and thence into the flywheel housing of the engine.

One object of the present invention is to provide a novel form of construction for the shift-lever and the housing, with respect particularly to the parts adjacent the pivotal support of the lever, by which a close joint may be maintained at this point, while the construction shall, at the same time, be simple and inexpensive, and the parts easy to assemble or dis-assemble.

Another object of the invention is to provide a simple and inexpensive construction by which the pinion-shifting lever may be given the form characteristic of the present invention.

To the foregoing ends, the invention consists in the construction illustrated in the accompanying drawings and hereinafter described, as it is defined in the annexed claims.

In the accompanying drawings, Fig. 1 is a side-elevation, partly in vertical section, of engine-starter mechanism embodying the present invention. Fig. 2 is a detail-view showing the pinion-shifting lever in rear elevation, and the adjacent part of the housing in section. Fig. 3 is a detail sectional view, on the line 3—3 in Fig. 2; and Fig. 4 is a vertical transverse section of the shifting lever.

The invention is illustrated as embodied in a mechanism in which a pinion 5 is mounted to slide upon a splined power-shaft 6. This shaft may be rotated by power derived from an electric motor 7, and the shaft is journalled, at one end, in a housing 8 which is provided with a flange 9, by which it may be attached to the flywheel housing of an engine in the usual manner. The housing 8 is rigidly connected with the frame of the motor 7 by an intermediate member or housing 10, which may enclose suitable gears or other means for connecting the shaft 6 with the armature shaft of the motor.

The pinion 5 is provided with an extension or sleeve 11 having a slotted portion for engagement with a pinion-shifting lever 12. This lever is forked at its lower end and provided with blocks 13 which enter the slot, so that the sleeve and the pinion may be shifted axially by a rocking movement of the lever. As a feature of the present invention, the housing 8 is provided with an outward projection 14, and a straight circular opening 15 is bored through the outer end of this projection. The lever 12 is provided with a spherically curved convex portion 16, of a diameter such that it closely fits the bore 15. The lever is supported by a pivot-pin 17, which passes axially through the spherical portion 16, and is seated in transverse perforations in the part 14. The pivot-pin 17 may be secured in place by a cotter-pin 18 engaging a groove in the pivot-pin, as shown in Fig. 2.

The construction just described is such that the pivot-pin 17 constitutes the support and bearing for the lever, and restricts it to rocking movements in one plane. The spherical portion 16 closely fits the bore 15, so as to exclude foreign matter, and the particular value of the spherical form is that it permits the bore 15 to be machined inexpensively as a cylindrical opening, and

at the same time to secure a close fit with the lever in all positions of the latter. Since the spherical part is of greater diameter than any part of the outer arm of the lever, the lever may be introduced into the bore 15 from the inside, in assembling the mechanism.

To facilitate the manufacture of the lever 12, particularly in the formation of the spherical part, it is proposed to make this lever of two pieces of sheet material, each piece stamped into concavo-convex form so as to provide a half of the lever, including one of the lower forked extremities 19, and a half of spherical portion 16. These two half-levers may then be secured together in any convenient manner as, for example, by rivets 20. The lever is shown as provided, near its upper end, with an opening 21 which may receive the usual rod or other means, (not shown), through which it is connected with the pedal by which the starting mechanism is operated.

While the sheet material construction of the lever is in some ways preferable, it is not essential to the invention in its broadest aspects.

The invention claimed is:

1. The combination of a housing with an end-opening and with a straight cylindrical lateral bore; a shifting lever having a forked end of greater diameter than said bore, a single end of less diameter than the bore, and an intermediate spherical part of a diameter to fit the bore closely, the lever, as a whole, being insertable through the open end of the housing; and a pivot-pin passing transversely through the spherical part of the lever and securing it pivotally within said bore, with the forked end of the lever within the housing.

2. The combination of claim 1, with the shifter-lever comprising two similar concavo-convex drawn sheet-metal halves, each including one forked extremity of the lever and one half of the single end and the spherical part, said halves of the lever being joined in a plane normal to the pivotal axis.

FARNUM F. DORSEY.