Nov. 12, 1929. R. L. ASPDEN 1,734,955

ELECTRIC STARTER FOR INTERNAL COMBUSTION ENGINES

Filed July 10, 1928

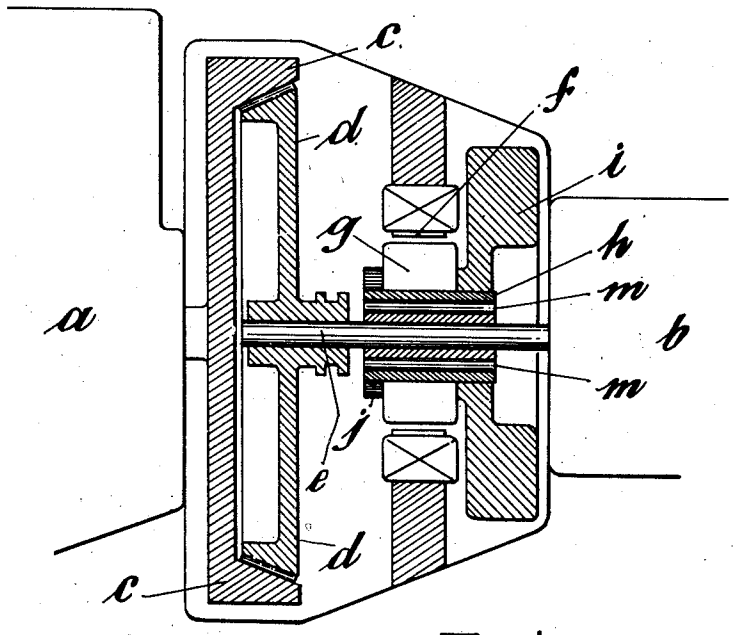


FIG 1

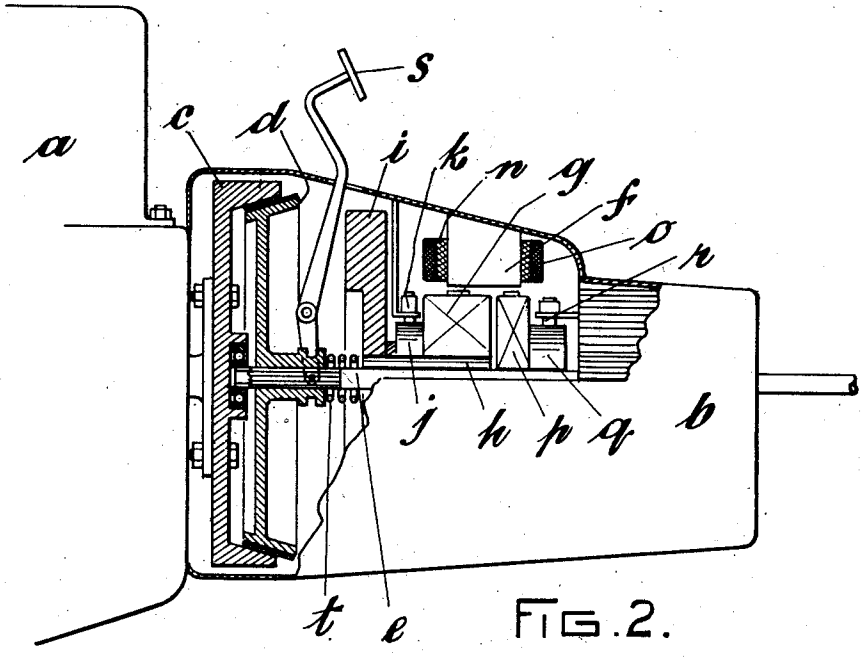


FIG. 2.

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UNITED STATES PATENT OFFICE

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ELECTRIC STARTER FOR INTERNAL-COMBUSTION ENGINES

Application filed July 10, 1928, Serial No. 291,545, and in Great Britain July 15, 1927.

This invention relates to electric starters, starter-generators or dynamotors for internal combustion engines, and has for its object to provide an improved arrangement of the type in which the starting motor drives a flywheel and is adapted to be clutch connected to the engine shaft.

My invention comprises the improved combinations and arrangements of parts hereinafter described and claimed.

Referring to the accompanying sheet of explanatory drawings:—

Figure 1 is a sectional elevation showing my improved electric starter applied to an engine clutch shaft.

Figure 2 is a similar view showing a combined generator and starter applied to an engine clutch shaft.

In the Figures, *a* indicates the engine to be started, *b* the gear box, *c* the engine flywheel, *d* the clutch connecting the engine flywheel to the clutch shaft *e* which drives the gearing in the gear box *b*.

The starter comprises the usual field magnets *f* and armature *g* on the hollow shaft *h* to which the flywheel *i* is secured. The commutator of the starter armature is shown at *j* and the brush gear therefor at *k*, Figure 2. Between the hollow shaft *h* and the clutch shaft *e* is arranged a one-way clutch or free wheel drive preferably of the roller type. Two rollers of said clutch or free wheel are shown at *m*, Figure 1.

In Figure 2, the field magnet *f* has two windings *n*, *o*, a series winding for the starter and a shunt winding across the generator, the armature *p* (with its commutator *q*) of which is secured directly upon the clutch shaft *e*. *r* indicates the generator brush gear.

s indicates the clutch pedal for releasing the clutch *d* and *t* the spring for putting the clutch in engagement.

In service, the clutch *d* is released, and the starting motor caused to speed up the clutch shaft in order to store energy in the flywheel *i*. The clutch *d* is then engaged and the engine rotated due to the momentum of the flywheel *i*. When the engine commences to function, the clutch *m* allows the starter motor to come to rest when the starter switch is released.

My improved starting arrangement may be employed in motor vehicles, aeroplanes and the like.

What I claim is:—

1. In electric starters for internal combustion engines, the combination with an engine crank shaft, of a clutch, a shaft driven from said crank through said clutch, a gear box with gearing driven from said clutch driven shaft, a one-way clutch around a portion of said clutch driven shaft, a starting motor surrounding said one-way clutch and driving the clutch driven shaft therethrough, and a flywheel on the motor armature shaft.

2. An electric starter for an internal combustion engine comprising a field magnet, an armature with a hollow shaft, a flywheel upon said shaft and a one way clutch within said shaft.

3. A combined electric starter and generator for an internal combustion engine comprising an engine, a single field magnet, dual windings upon said magnet, two armatures within said magnet, a hollow shaft and a flywheel associated with one armature, a one-way clutch within such hollow shaft, a clutch shaft driven by the engine extending through said one way clutch, and means connecting the other armature to the engine driven clutch shaft so that it is driven thereby.

4. Combined electric starting and generating means for internal combustion engines comprising the combination with an engine clutch shaft, of an armature, a hollow shaft within said armature, a flywheel upon said hollow shaft, a one-way clutch within said hollow shaft by which the engine clutch shaft is driven from the armature, a second armature driven by the engine clutch shaft, and a common field magnet with dual windings for the two armatures.

In testimony whereof I have signed my name to this specification.

RALPH LEONARD ASPDEN.