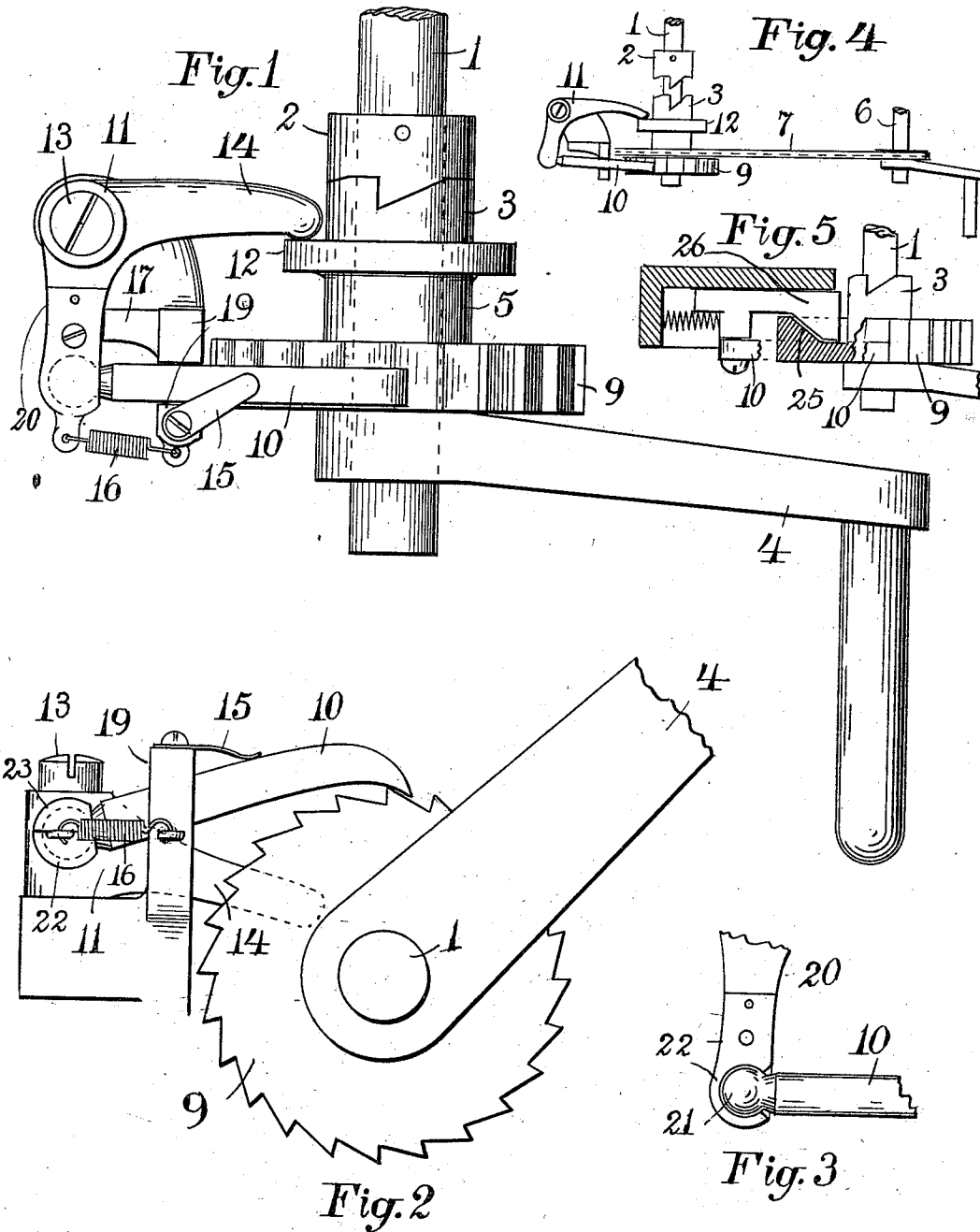


G. B. SINCLAIR.
STARTER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED DEC. 9, 1910.

1,023,279.

Patented Apr. 16, 1912.



Witnesses;
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UNITED STATES PATENT OFFICE.

GEORGE B. SINCLAIR, OF MEDFORD, MASSACHUSETTS.

STARTER FOR INTERNAL-COMBUSTION ENGINES.

1,023,279.

Specification of Letters Patent.

Patented Apr. 16, 1912.

Application filed December 9, 1910. Serial No. 596,531.

To all whom it may concern:

Be it known that I, GEORGE B. SINCLAIR, a citizen of the United States, residing at Medford, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Starters for Internal-Combustion Engines, of which the following is a specification.

In cranking up an internal combustion engine, there is great danger of the charge becoming ignited and exploding as the plunger is approaching the head of the cylinder. When this occurs, the engine and consequently the starter-crank are given a violent backward revolution, and the chauffeur's arm or wrist either broken or at least badly injured by the powerful blow given thereto by the crank.

The object of this invention is the absolute prevention of such injuries, by so contriving the mechanism that such backward kicks of the engine cannot impart a corresponding kick to the starter crank. To this end, I provide the starter with an unshipping device which instantly acts upon the clutch between the crank and engine shaft the moment the latter begins to turn backward, and thereby causes the crank to swing freely during the back kick of the engine.

Referring to the drawings forming part of this specification, Figure 1 is a plan view of a starter crank and its-clutch connection with the engine shaft, provided with my unshipping device. Fig. 2 is an elevation of the same from the front. Fig. 3 is a detail view of the pawl and its pivotal connection. Fig. 4 is a plan view on a much smaller scale of a slight modification of the starter. Fig. 5 is a sectional view of another modification of the invention.

The reference numeral 1 designates the engine shaft of the internal combustion engine to which the improvement is to be attached; 2, the clutch member fixed upon said shaft; 3, the clutch member movable on said shaft; and 4, the starter crank. Said clutch member 3 and crank are rigidly connected by means of the sleeve 5, whereby, when the crank is first pressed inward to cause the engagement of the clutch members, and then forcibly turned toward the right, the shaft is rotated; the charge compressed and the engine started. This is the usual construction, unless, as is often done, the crank is located upon a separate spindle, as 6, con-

nected with the clutch sleeve 5 by means of sprockets and sprocket chain 7, as illustrated in Fig. 4.

My attachment comprises a ratchet wheel 9 fixed upon the sleeve 5, a pawl 10 engaging the teeth of said ratchet wheel, a pivotally supported bell-crank lever 11 carrying said pawl at the end of one arm, and having its other arm engaging a shoulder 12 on said sleeve. By this means, whenever said sleeve and ratchet wheel turn backward, the latter engages and forces said pawl rearward, the bell-crank lever swings on its pivot 13, its arm 14 presses against said shoulder, and the sleeve is disengaged from the clutch member 2.

As is evident, it requires but the merest fraction of a turn on the part of the engine and wheel 9 to force the two clutch-members apart and so unship the crank and render the latter incapable of harm.

A spring 15 is preferably provided to insure the engagement of the pawl and ratchet-wheel; and a tension spring 16 and stop 17, to retain the bell-crank lever and pawl in their normal positions. Guides 19 are also given to the pawl to keep it from lateral displacement, and a ball-and-socket pivotal attachment given to the pawl and arm 20 of the bell-crank lever. This comprises a ball 21 formed at the end of the pawl, and a two-part socket 22 at the end of the arm 20. In Fig. 3 the top-plate 23 of this two-part socket is represented as removed in order better to illustrate the construction.

I do not restrict myself to the particular arrangement of mechanism illustrated, inasmuch as any good mechanic after having been shown the possibility of automatically unshipping the clutch members, can soon devise other contrivances for the purpose. For instance, as shown in Fig. 5, the ratchet wheel may be formed with an inclined flange 25 having a wedge member 26 in contact therewith, and the pawl 10 pivoted to said wedge member. When the wheel turns backward, the pawl is caused to force the wedge radially outward and to thereby unship the clutch.

What I claim as my invention and for which I desire Letters Patent is as follows, to wit:—

1. The combination with an internal combustion engine and its shaft, of a clutch member slidably mounted on said shaft, a clutch member normally engaging said slid-

able member and fixed on said shaft, said
slidable clutch member having a shoulder, a
bell crank lever suitably fulcrumed and hav-
ing one arm engaging said shoulder, a
5 ratchet wheel fixed on said slidable clutch
member, and a pawl carried by the other
arm of said bell crank lever and engaging
said ratchet wheel.

2. The combination with an internal com-
10 bustion engine and a shaft rotating there-
with, of clutch members on said shaft, one
fixed thereon and the other slidable there-
on, a bell crank lever having one arm longer
than the other, said longer arm being adapt-

ed to engage the slidable clutch member to 15
force it out of clutch with the fixed member
but to permit the latter's rotation, a ratchet
wheel rotatable with said shaft, and a pawl
carried by the shorter arm of said bell crank
lever and adapted to engage said ratchet 20
wheel.

In testimony that I claim the foregoing
invention, I have hereunto set my hand this
8th day of December, 1910.

GEORGE B. SINCLAIR.

Witnesses:

A. B. UPHAM,
ETHELBERT V. GRABILL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."