

1,035,383.

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 STARTING MECHANISM FOR INTERNAL COMBUSTION ENGINES.
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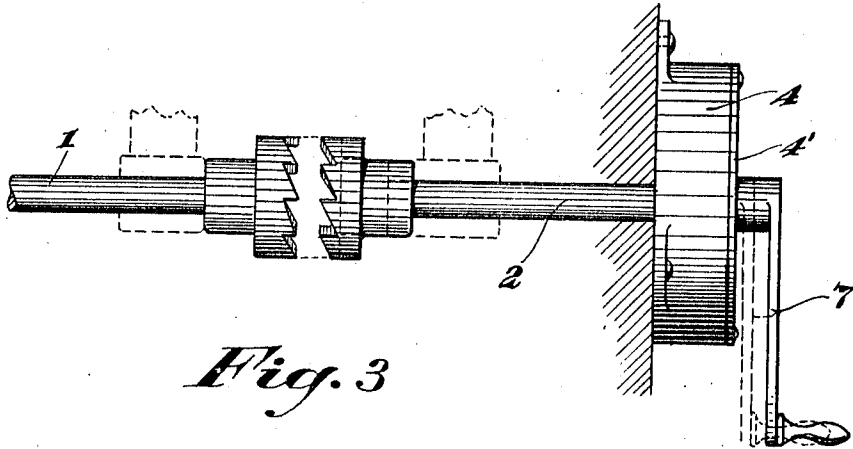


Fig. 3

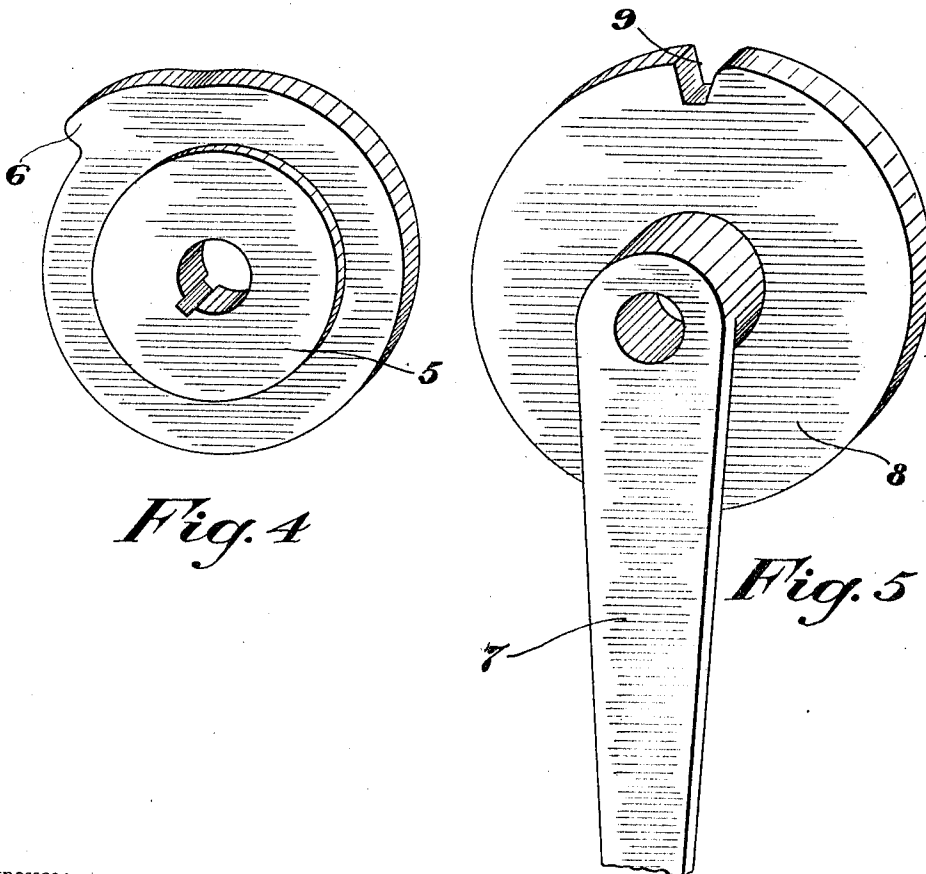


Fig. 4

Fig. 5

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UNITED STATES PATENT OFFICE.

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STARTING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,035,383.

Specification of Letters Patent.

Patented Aug. 13, 1912.

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To all whom it may concern:

Be it known that I, PIERRE ANTONIO PAINCHAUD, a subject of the King of Great Britain, residing at Plessisville, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Starting Mechanism for Internal-Combustion Engines; and I do hereby declare that the following is 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.

The invention to be hereinafter described relates to starting mechanism for internal combustion engines.

In order to more clearly disclose the construction, operation, and use of the invention, reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings like reference characters designate the same parts.

In the drawings: Figure 1 is a vertical cross section on line 1—1 of Fig. 2, looking in the direction of the arrows; Fig. 2 is a central, vertical, cross section on line 2—2 of Fig. 1, looking in the direction of the arrows; Fig. 3 is a side elevation of the invention, as applied; Fig. 4 is a perspective view of the cam disk; and Fig. 5 is a perspective view of the crank and its notched disk.

One object of the invention is to provide a simple, economical, efficient, durable, and compact starting mechanism.

A second and, in fact, the most important object is to provide a starting mechanism in which the crank will be substantially free from and unaffected by reverse rotation of the engine shaft due to "back-kick" of the engine.

A further object of the invention is to provide a starting mechanism which may be readily and easily applied to the starting shaft of any of the well known types of internal combustion engines, especially automobile engines.

Referring to the drawings in detail, 1 indicates the usual engine shaft and 2 the starting shaft, each provided with a clutch member, as usual, the starting shaft being slidably mounted, as usual, in order that its clutch member may be brought into and out of engagement with the cooperating clutch member of engine shaft 1. Normally, the

clutch members are held disengaged by means of the coil spring 3, as is evident on reference to the drawings. For rotating the starting shaft, a cam disk 5 has been provided. This disk is keyed to the starting shaft to rotate with it and is provided with a peripheral cam 6 having one very gradually inclined face and one very abrupt face, in the nature of a shoulder. Rotatably mounted on the outer end of the starting shaft is a crank handle 7 provided with an integrally formed disk 8 having a peripheral notch 9. This disk, preferably, is formed integrally with the crank handle, though it may be formed separate and then connected thereto, of course. These two disks 5 and 8 are arranged face-to-face, close together, as in Fig. 2, and they are both enclosed within the single hollow head or casing 10 which is provided with the removable cap plate or cover 11 to permit ready access to and removal of the parts within the casing. A pivot screw 12 is passed through the cap plate and threaded into the bottom wall of the casing. On this screw is pivoted a dog 13 having a leg 14 adapted to drop into the notch 9 when the disk 8 reaches the proper position. This notch is of sufficient width to extend rearwardly beyond disk 8 and into position to engage the cam 6. The other and longer leg 15 is adapted to rest on the edge of disk 8 while the shorter leg 14 is seated in the notch 9. A spring 16 bears upon this longer leg and forces the longer leg toward the edge of the disk 8 at all times, so that the shorter leg will become seated in the notch 9 as soon as the notch falls in the right position. Thus, in order to start the engine it is first necessary to force the starting shaft inward to overcome the action of spring 3 and engage the clutches; and then rotate the crank shaft, as usual. As the shaft is rotated, the notch 9 will fall into position to receive the short leg 14 of the dog 13. As soon as this leg drops into notch 9 the casing 10, which is freely rotatable on the starting shaft, will be yieldingly connected to the disk 8 which is also freely rotatable on the same shaft. Consequently, the disk 8 and casing 10 will rotate together about the shaft 2. During this rotation the leg 14 will engage the abrupt face or shoulder of cam 6, thus causing the cam disk to rotate with the disk 8. But, the cam disk is keyed to the starting

shaft. Thus, the starting shaft will also be compelled to rotate with the disk 8.

The most important feature of the whole invention is the means for preventing sudden and dangerous reverse rotation of the crank 7 when the engine "back-kicks" or starts on the reverse. For this purpose, a ratchet disk 17 and a cooperating spring actuated pawl 18 have been provided. The ratchet disk is fixed to and rotates with the casing 10, whereas the cooperating pawl 18 is mounted on the rear wall of the box 4 which, of course, is stationary and provided with a removal cap plate 4' to permit access to the interior. It will be noticed that the ratchet teeth of disk 17 are so directed as to slide freely under the pawl 18 while the starting shaft is being rotated to start the engine, but will be engaged by the pawl at once should reverse rotation be attempted. Consequently, if the engine "kicks back", the pawl 17 will engage the ratchet teeth at once and prevent such reverse rotation of the ratchet disk. The ratchet disk 17 and casing 10 being rigidly connected, both will be held stationary. However, the cam disk 5 is fixed to and rotates with the starting shaft 2. Accordingly, when the engine "kicks back" it will carry cam disk 5 with it, giving a sudden and powerful jerk. The result of this is that the cam 6, in contact with the leg 14, kicks the leg sharply, causing it to fly to the dotted line position of Fig. 1 so that it will no longer be in the notch 9 of disk 8, thus permitting the starting shaft 2 and cam disk 5 to rotate reversely without in any way affecting disk 8 or the crank 7. Thus, the only effect of the engine starting on the reverse is to disconnect or uncouple the crank, thereby avoiding all possible danger. It is evident, of

course, that reverse rotation of the crank 7, by hand, will have the same disconnecting or uncoupling result.

It is thought that the operation and use of the invention will be clear from the preceding detailed description.

Changes may be made in the construction, arrangement, and disposition of the several parts of the invention without in any way departing from the field and scope of the same and it is meant to include all such within this application wherein only a preferred form has been disclosed.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination, a starting shaft, a disk fixed thereto and provided with a cam, a crank loosely mounted on said shaft and provided with a disk having a notch, a casing loosely mounted on said shaft, a dog yieldingly mounted in said casing and provided with a leg adapted to be seated in said notch and to engage said cam, and means for preventing reverse rotation of said casing.

2. In combination, a starting shaft, a disk fixed thereto and provided with a cam, a crank loosely mounted on said shaft and provided with a disk having a notch, a casing loosely mounted on said shaft, a dog yieldingly mounted in said casing and provided with a leg adapted to be seated in said notch and to engage said cam, and pawl and ratchet mechanism for preventing reverse rotation of said casing.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

PIERRE ANTONIO PAINCHAUD.

Witnesses:

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