G. FREVERT.

ENGINE STARTER.

APPLICATION FILED JAN. 8, 1916.

1,179,620. Patented Apr. 18, 1916.

FIG. 1.

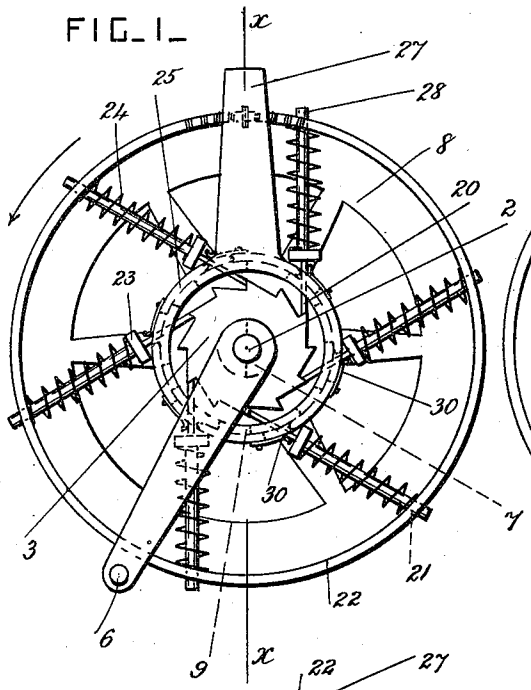


FIG. 2.

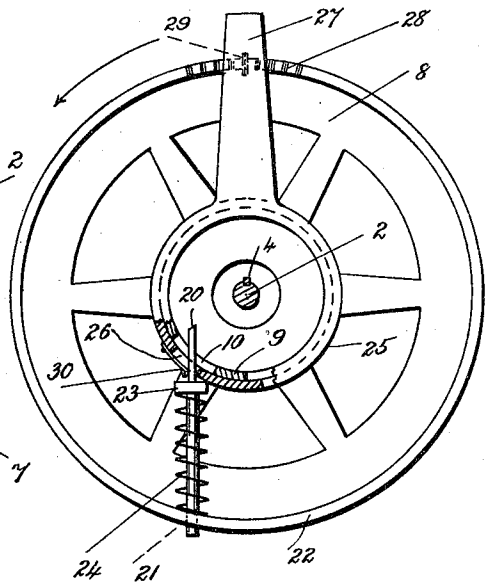


FIG. 3.

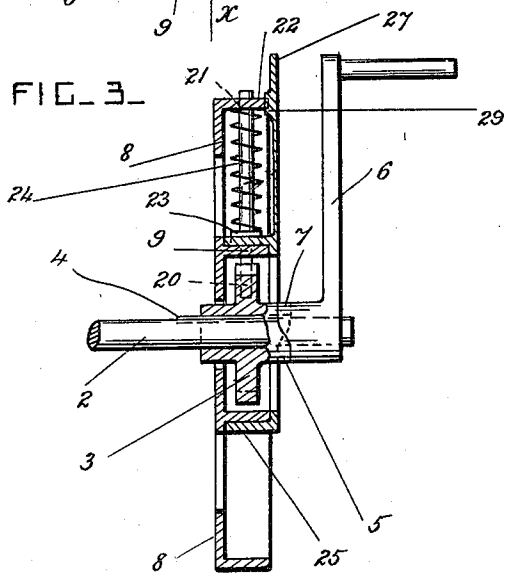
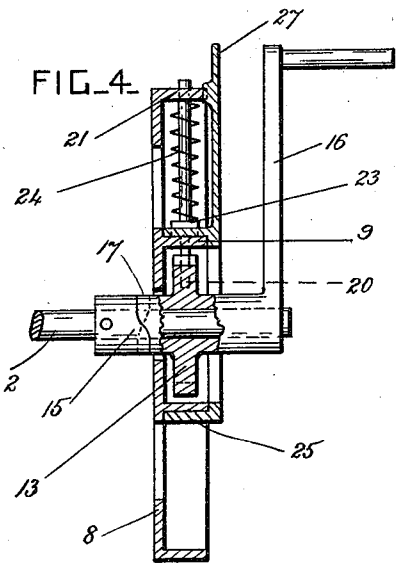


FIG. 4.



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ENGINE-STARTER.

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Application filed January 8, 1916. Serial No. 71,004.

To all whom it may concern:

Be it known that I, GUSTAVUS FREVERT, a citizen of the United States, residing at Bernheimer, in the county of Warren and State of Missouri, have invented certain new and useful Improvements in Engine-Starters; and I do hereby declare the following to be 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.

This invention relates to starters for the internal combustion engines of motor cars; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed, whereby the injurious effect of the shock caused by pre-ignition in the power cylinder is guarded against.

In the drawings, Figure 1 is a front view of an engine starter constructed according to this invention. Fig. 2 is a front view of portions of the engine starter partially in section, and with the starting handle and ratchet toothed wheel removed. Fig. 3 is a cross-section through the engine starter, taken on the line *x*—*x* in Fig. 1. Fig. 4 is a cross-section similar to Fig. 3, but showing a modification.

The crank shaft 2 of the engine, or any other starting shaft operatively connected with the engine, has a ratchet toothed wheel 3 on it, and preferably secured to it by a key 4. This wheel 3 has a clutch member 5 on one side. The starting handle 6 is mounted loosely on the end portion of the shaft 2, and may be removed and replaced as often as desirable. The starting handle 6 has a clutch member 7 on one side of it for engaging with the clutch member 5. These two clutch members are provided with inclined spiral portions so that they disengage automatically when the engine commences to run independently of the handle.

A frame 8 is secured to the engine or to the motor car, and is provided with a stationary annular bearing 9 which encircles the ratchet toothed wheel. This bearing 9 has holes or slots 10 in its periphery.

Retractable pawls 20 are provided and are arranged tangentially of the bearing 9. The inner end portions of the pawls work loosely in the slots 10, and the outer end portions of them slide in holes 21 in the outer portion or ring 22 of the frame 8. The pawls are formed of rods having collars 23 on them, and their inner ends are adapted to engage with the teeth of the ratchet wheel 3. Strong helical springs 24 are arranged around the rods between the collars 23 and the outer ring 22, and operate to press the pawls toward the ratchet wheel.

A sleeve 25 is mounted on the outside of the annular bearing 9, and has slots 26 in it so as to clear the pawls. The sleeve 25 has a handle 27, and 28 are notches in the outer ring 22 which engage with a projection 29 on the handle. The handle 27 can be sprung away from the outer ring 22, and moved to a limited extent in each direction. The notches and projection hold the handle 27 locked to the frame after its position has been adjusted. Any other approved locking mechanism may be used for securing the sleeve 25 to the frame after its position has been adjusted.

The adjusting sleeve 25 has springs 30 on it, and these springs are arranged to bear against one side of the pawls. When the sleeve 25 is moved in the direction of the curved arrows in Figs. 2 and 3, the pawls are pressed into engagement with the teeth of the ratchet wheel 3. When moved in the reverse direction the sleeve disengages the pawls from the teeth, and the sleeve can be set to adjust the amount of engagement of the pawls with the teeth, or to hold them clear of the teeth. One side or edge of the collars 23 bears against the adjusting sleeve, and one end of its slots bears against one side of the pawls so that the pawls can be moved laterally out of engagement with the ratchet toothed wheel 3. When the starting handle 6 is revolved by hand in the reverse direction from the said arrows, the crank shaft is revolved so as to start the engine, and the ratchet wheel teeth move the pawls laterally against the pressure of the light springs 30. When a pre-ignition occurs, the ratchet toothed wheel is held from revolving in the direction of the arrows by the pawls, and the pawls themselves are forced longitudinally by the wheel teeth against the pressure of the helical springs but not sufficiently to free them from the teeth. The helical springs absorb the shock caused by the pre-ignition, and prevent the starting mechanism from being broken and from injuring the person operating it. When the engine has been started the starting handle 6 is removed, and the handle 27 is moved so as to retract all the pawls out of engage-

ment with the teeth of the ratchet wheel 3. The light springs 30 equalize the action of the adjusting sleeve on the pawls, and permit them to be moved laterally by the ratchet toothed wheel while the engine is being started.

In the modification shown in Fig. 4, the ratchet toothed wheel 13 is mounted loosely on the shaft 2 instead of being keyed to it, and the starting handle 16 is secured to the wheel 13. The wheel 13 has a clutch member 17 on it which engages with a clutch member 15 which is keyed on the shaft 2. The retractable pawls absorb the shock of a pre-ignition the same as hereinbefore described, but when the engine has been started the wheel 13 is removed with the starting handle.

What I claim is:

1. In an engine starter, a revoluble starting shaft, a starting handle and a ratchet toothed wheel operatively connected together and with the starting shaft, a stationary frame provided with a bearing which encircles the said wheel, spring-pressed pawls movable in the said frame and adapted to engage with the said wheel, and an adjusting sleeve mounted on the said bearing and controlling the engagement of the pawls with the said wheel.

2. In an engine starter, a revoluble starting shaft, a starting handle and a ratchet toothed wheel operatively connected together and with the starting shaft, a stationary frame provided with a bearing which encircles the said wheel, pawls movable longitudinally and laterally in the said frame, springs pressing the pawls longitudinally toward the said wheel, and an adjusting sleeve mounted on the said bearing and provided with springs which press the pawls laterally into engagement with the teeth of the said wheel when said sleeve is moved in one direction.

3. In an engine starter, a revoluble starting shaft, a starting handle and a ratchet toothed wheel operatively connected together and with the starting shaft, a stationary frame provided with a bearing and an outer ring which enricle the said wheel, pawls arranged tangentially of the said bearing and movable laterally in it and slidable longitudinally in it and in the outer ring and provided with abutments, helical springs arranged between the said abutments and outer ring and pressing the pawls toward the said wheel, and an adjusting sleeve mounted on the said bearing and controlling the engagement of the pawls with the said wheel.

4. In an engine starter, a revoluble starting shaft, a ratchet toothed wheel secured on the said shaft, a starting handle mounted loosely on the starting shaft and operatively connected with the said wheel, a stationary frame provided with a bearing which encircles the said wheel, spring-pressed pawls movable in the said frame and adapted to engage with the said wheel, and an adjusting sleeve mounted on the said bearing and controlling the engagement of the pawls with the said wheel.

In testimony whereof I have affixed my signature.

GUSTAVUS FREVERT.

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