R. E. GUTIG.

APPARATUS FOR STARTING AUTOMOBILE ENGINES.

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982,596. **Patented Jan. 24, 1911.**

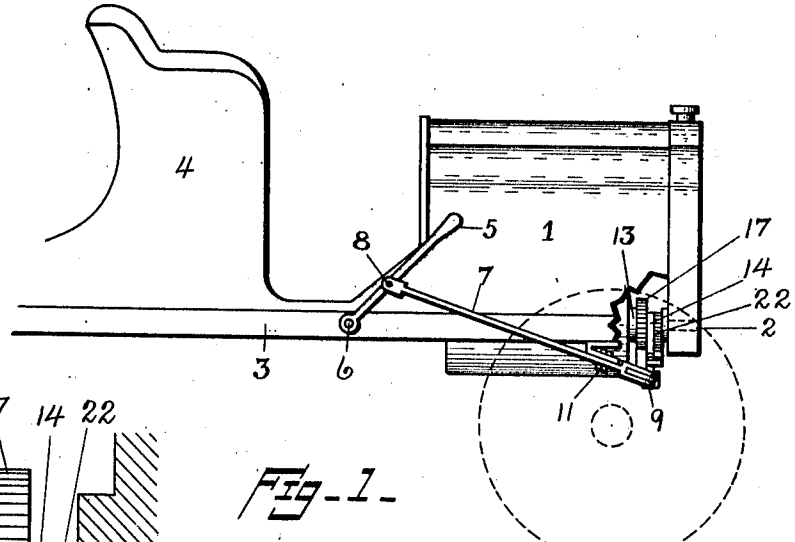

Fig. 1.

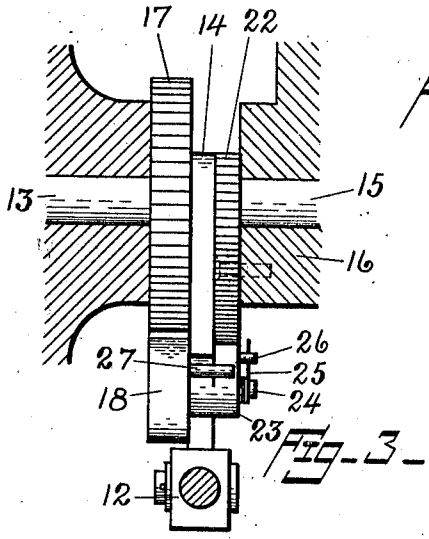

Fig. 3.

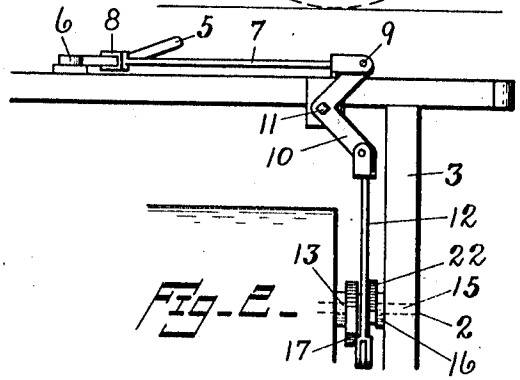

Fig. 2.

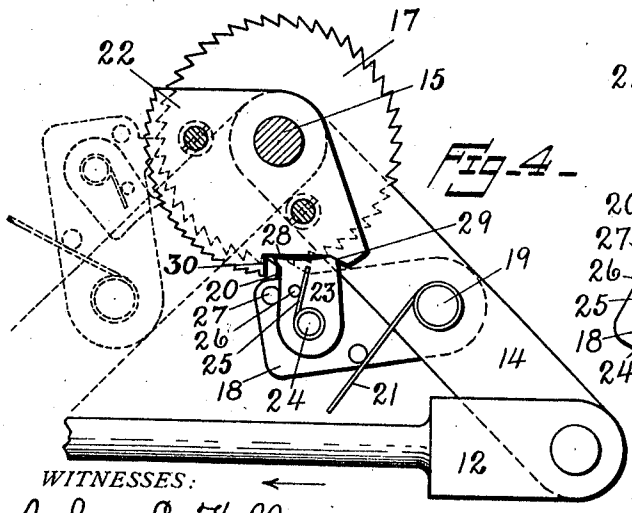

Fig. 4.

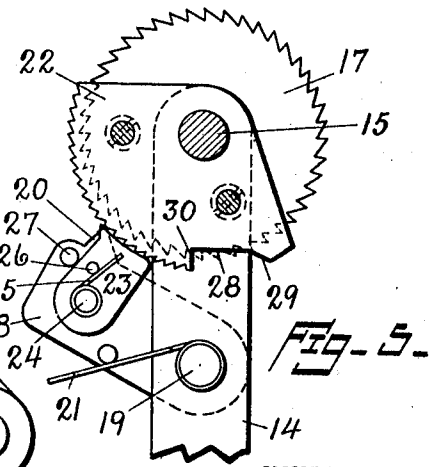

Fig. 5.

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APPARATUS FOR STARTING AUTOMOBILE-ENGINES.

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To all whom it may concern:

Be it known that I, ROBERT E. GUTIG, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Apparatus for Starting Automobile-Engines, of which the following is a specification.

This invention relates to apparatus for cranking gasolene engines of automobiles, and the objects of my improvement are, to provide means by which the engine may be cranked from the chauffeur's seat, to provide means by which the engine may be started with the exertion of comparatively little strength, so that this may be accomplished by ladies and others with little physical strength; to provide means by which the cranking means is automatically released upon the engine's back-firing, so as to avoid the danger of injury to the operator; simplicity of construction and operation; and to provide apparatus of the class described which may be readily applied to automobiles of conventional construction. These objects I attain by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2, a bottom plan view; Fig. 3, a detail side elevation, partly in section, of the parts applied immediately to the engine; Fig. 4, a detail view of the ratchet-gear; and Fig. 5 is a detail view of the ratchet-gear, showing the pawl disengaged as the result of back-firing.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

The apparatus embodying my invention is shown in the drawings as applied to a conventional type of automobile, 1, which has the engine in the hood in front and is ordinarily provided with a crank in front, at 2, and a clutch, for starting the engine. On the side of the chassis, 3, in front of the chauffeur's seat, 4, is placed a lever, 5, pivoted or fulcrumed at 6, where it will be in easy reach of the chauffeur, and inclined forward, so as to be entirely out of the way. This arrangement of the lever also gives the operator a good purchase.

A connecting-rod, 7, is attached to lever 5 at a point, 8, at a suitable distance above the fulcrum 6 and extends forward, where its opposite end is connected at 9 to a bell-crank lever, 10, or similar means for changing the direction of force, fulcrumed to the chassis 3 at 11. A second connecting-rod, 12, is attached to lever 10 and extends across toward the engine shaft, 13. Here one end of connecting-rod 12 is pivotally attached to a lever or crank-arm, 14, which is pivoted to a stud, 15, secured to the front part of the chassis in a bracket, 16, in front of and in alinement with the engine shaft 13. On the front end of the engine shaft is secured a ratchet-wheel, 17, between the engine and the crank arm 14. It will now be understood that when lever 5 is moved back and forth crank arm 14 is oscillated. Crank-arm 14 is provided with a pawl, 18, pivoted suitably to engage the teeth of ratchet-wheel 17. Pawl 18 is pressed into engagement with the ratchet-wheel 17 by a spring 21. Thus pawl 18 is adapted to engage ratchet-wheel 17 and turn the engine shaft 15 forward when crank arm 14 is moved forward, and means is thus provided for "cranking" the engine.

Many casualties have occurred through starting gas engines with the ordinary crank, on account of the engine back-firing. To avoid this I have provided means for releasing the manipulating means upon the backward motion of the engine shaft due to back-firing. This I have accomplished preferably by means of the stationary ratchet-quadrant, 22, secured on bracket 16, between the bracket and crank-arm 14. A secondary pawl, 23, is pivoted on pawl 18 toward its free end with stud 24 arranged to stand normally at right angles to pawl 18. It is held normally in this position by a spring, 25, pressing against a stud, 26, secured in itself, and a stop-stud, 27, secured to pawl 18. A notch, 28, is provided in quadrant 22, where the teeth of the quadrant are cut away so as to allow pawl 23 to drop in and permit tooth 20 of pawl 18 to engage the teeth of ratchet-wheel 17. The rear wall of notch 28 forms an inclined plane, 29, and the front wall 30 is radial, relative to the circumference of the quadrant.

In Fig. 4, arm 14 is shown in such a position that pawl 23 has dropped into notch 28 and pawl 18 is engaging the ratchet-wheel 17.

It will be understood that if arm 14 is moved backward or toward the right a little farther than shown, which is its normal position when lever 5 is thrown forward and is out of use, pawl 23 will ride up inclined plane 29 and raise pawl 18 out of engage-

ment with the ratchet-wheel. This avoids continual rattling which would occur if tooth 20 rested continually upon the teeth of the ratchet-wheel while the engine is running. But as soon as arm 14 is turned forward a little, the heel of pawl 23 rides down inclined plane 29 and tooth 20 of pawl 18 engages the teeth of the ratchet-wheel. If the operator now continues to pull upon lever 5, arm 14 continues to swing forward, and the bit of pawl 23 engages wall 30 of the quadrant and is folded back to the position shown in the dotted lines in Fig. 4, so that it clicks forward over the teeth of quadrant 22, leaving tooth 20 in engagement with ratchet-wheel 17. Should the engine backfire during this operation, arm 14 would be turned backward slightly. Pawl 23 would immediately engage one of the teeth of the quadrant be raised thereby to the vertical position shown in Fig. 5, and pawl 18 would be lifted out of engagement with the ratchet-wheel. Pawl 23 would now be free to slide back and forth over the tops of the teeth of quadrant 22 without engaging them until arm 14 is thrown back to the limit of its backward motion where pawl 23 may drop into notch 28. It will thus be understood that when the engine back-fires, lever 5 is moved backward just a little and all danger from the back stroke is obviated, and the operator cannot cause tooth 20 to engage the ratchet-wheel by continuing to pull forward on lever 5, but he must first throw the lever back fully to the limit of its backward stroke before he can make another effort to start the engine.

I have thus described the means for accomplishing the results described which I prefer to use at present, but I do not contemplate being restricted narrowly to these. I contemplate using the apparatus also upon automobiles which are cranked from the sides of the chassis. In this case, the lever 5 may be used without connecting rods, in the place of arm 14.

I am aware that changes in details of construction will have to be made to suit the varying conditions incident to variant construction of various makes of automobiles, and I have thus described my invention so that any one skilled in the art pertaining thereto may readily construct and apply it and any one of ordinary intelligence will be able to operate it.

I claim—

1. In apparatus of the class described, the combination, with an engine shaft, a driving ratchet wheel fixed on said engine shaft, a lever, and a driving pawl mounted on said lever, of a stationary ratchet quadrant, a releasing pawl formed with a concave heel adapted to slide over the teeth of said stationary ratchet quadrant and to hold said driving pawl free from said driving ratchet wheel mounted on said driving pawl.

2. In apparatus for starting engines, the combination, with an engine shaft, and a driving ratchet wheel fixed on said engine shaft, of a driving pawl, a releasing pawl mounted on said driving pawl, a stationary releasing ratchet quadrant, said releasing ratchet quadrant being formed with a starting notch to permit said driving pawl to bite, and said releasing pawl being provided with means for holding said driving ratchet out of engagement with said driving ratchet wheel while moving in either direction till returned to said starting notch.

3. In apparatus of the class described, an engine shaft, a ratchet wheel mounted on and adapted to turn said engine shaft forward, in combination with a driving pawl adapted to engage said ratchet wheel in the forward direction and provided with a stop, a stationary ratchet quadrant having its teeth inclined oppositely to those of said ratchet wheel on the engine shaft and provided with a notch, and a releasing pawl mounted on said driving pawl, resting normally against said stop and provided with a bit and a concaved heel which is adapted to slide over the tops of the teeth of said ratchet quadrant.

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