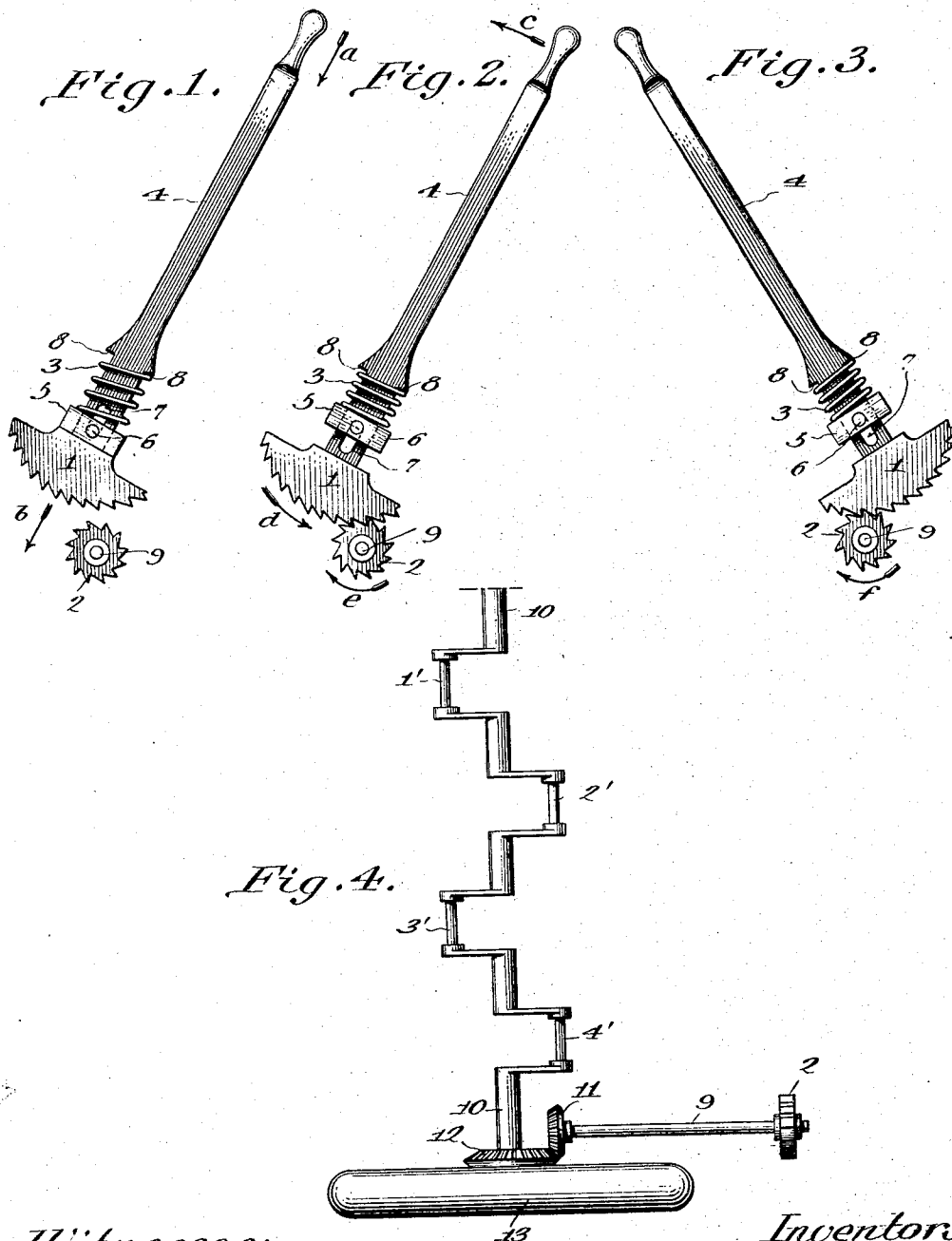


G. K. EWING & C. R. FARLEY.
MECHANICAL STARTER FOR AUTOMOBILES.
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Patented Oct. 15, 1912.



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UNITED STATES PATENT OFFICE.

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MECHANICAL STARTER FOR AUTOMOBILES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, GEORGE K. EWING and COLBY R. FARLEY, citizens of the United States of America, and residents of Ewington, Gallia county, in the State of Ohio, have jointly invented a new and useful Improvement in Mechanical Starters for Automobiles, of which the following is a specification.

10 This invention relates to mechanical devices for starting the internal combustion engine of an automobile, hereinafter termed the motor, from the seat of the vehicle, as a substitute for "cranking" the same from the ground.

15 The present invention consists in certain novel combinations of parts, hereinafter particularly described and claimed.

20 The leading object of the invention is to provide for starting the motor from the seat of the automobile by an effective hand-lever mechanism.

Other objects will be set forth in the general description which follows.

25 A sheet of drawings accompanies this specification as part thereof.

Figure 1 is an elevation of the distinctive parts of the improved starter, showing the same at rest; Figs. 2 and 3 are like views, illustrating the operation of the starter; Fig. 4 is a top view of the crank shaft, fly-wheel and starter connections of the motor.

Like reference characters refer to like parts in all the figures.

35 The leading parts of the starter mechanism are a ratchet-toothed sector and pinion, 1 and 2, constructed and arranged to intermesh with each other as shown in Figs. 2 and 3, but normally held out of mesh by a spring, 3, as in Fig. 1. The sector 1 is carried by the lower end of a hand-lever, 4, which in common with an abutment, 5, for the spring 3, is movable on a horizontal pivot, 6. As the fulcrum of the hand-lever 4 this pivot 6 extends through a longitudinal slot 7 formed therein, and occupies the lower end of this slot when the starter is at rest. (Fig. 1). The spring 3 is preferably and conveniently a helical spring surrounding the hand-lever and compressed between said abutment 5 and a superjacent shoulder or shoulders, 8, with which the hand-lever 4 is provided at a suitable point.

55 The pinion 2 is keyed fast on a horizontal starter shaft 9 which is conveniently ar-

ranged at right angles to the motor shaft 10, Fig. 4, and permanently geared thereto by bevel gearing 11-12, Fig. 4, which should be in perfect mesh.

The motor shaft 10 shown in Fig. 4 is 60 provided with cranks 1', 2', 3', 4' for a four-cylinder motor, and with a fly wheel, 13, adjacent to which the bevel gear 12 is keyed fast to the crank shaft. It will be obvious that the motor shaft may be that of any internal combustion motor.

The motor being still or "dead" and the starter at rest as in Fig. 1, the operator, grasping the handle of the hand-lever 4, presses the hand-lever endwise as represented by the arrows *a* and *b*, Fig. 1, until the sector 1 and pinion 2 are in perfect mesh as in Figs. 2 and 3, and then turns the hand-lever by a quick pull as represented by the arrows *c* and *d*, which turns the motor shaft 75 10 in the proper direction as represented by the arrow *e*. If the motor has not started by the end of a pull, illustrated by Fig. 3, endwise pressure on the hand-lever 4 is relaxed, which permits the spring 3 to disengage the sector 1, and the hand-lever is then returned to its position of rest, Fig. 1, and again operated as before; and this is repeated until the independent rotation of the motor shaft and therewith the pinion 2, represented by the arrow *f*, Fig. 3, has begun. Should the sector 1 and pinion 2 be in mesh when the motor starts, the beveled shape of the ratchet teeth of the sector and pinion causes them to be automatically disconnected, 90 and prevents any jerk on the hand lever. In the starting operation the momentum of the fly wheel 13 materially assists by prolonging the movements manually begun by the starter.

95 The sector 1 may be of greater or less angular extent if desired; other forms of spring may be substituted for the helical spring 3; and other like modifications in details will suggest themselves to those skilled in the art.

Having thus described said improvement, we claim as our invention, and desire to patent under this specification:

1. A mechanical starter for automobiles 105 having, in combination, an endwise movable hand-lever carrying a ratchet-toothed sector, a fulcrum for the same, a ratchet-toothed pinion constructed and arranged to mesh with said sector, and connected with 110

the motor shaft, and means whereby said hand lever and sector are rendered normally retracted.

2. A mechanical starter for automobiles having, in combination, an endwise movable hand-lever carrying a ratchet-toothed sector and constructed with a longitudinal slot and superjacent shoulders, a horizontal pivot extending through said slot, a spring abutment, movable on the same pivot, a spring compressed between said abutment and shoulders, a ratchet-toothed pinion constructed and arranged to mesh with said sector, and a shaft and gearing connecting said pinion with the motor shaft.

3. The combination of a horizontal motor shaft provided with a fly wheel, a horizontal starter shaft at right angles thereto,

bevel gearing connecting said shafts, a ratchet-toothed pinion fast on said starter shaft, a ratchet-toothed sector constructed and arranged to mesh with said pinion, a longitudinally slotted and shouldered hand-lever carrying said sector and extending upward therefrom, an abutment opposed to the shoulders of said hand-lever, a horizontal pivot, common to said hand-lever and abutment, extending through the slot of said hand-lever, and a helical retracting spring compressed between said abutment and shoulders, substantially as hereinbefore specified.

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