

F. G. McKLVEEN & L. W. NAYLOR.
ENGINE STARTER FOR AUTOMOBILES.
APPLICATION FILED NOV. 10, 1910.

985,689.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 1.

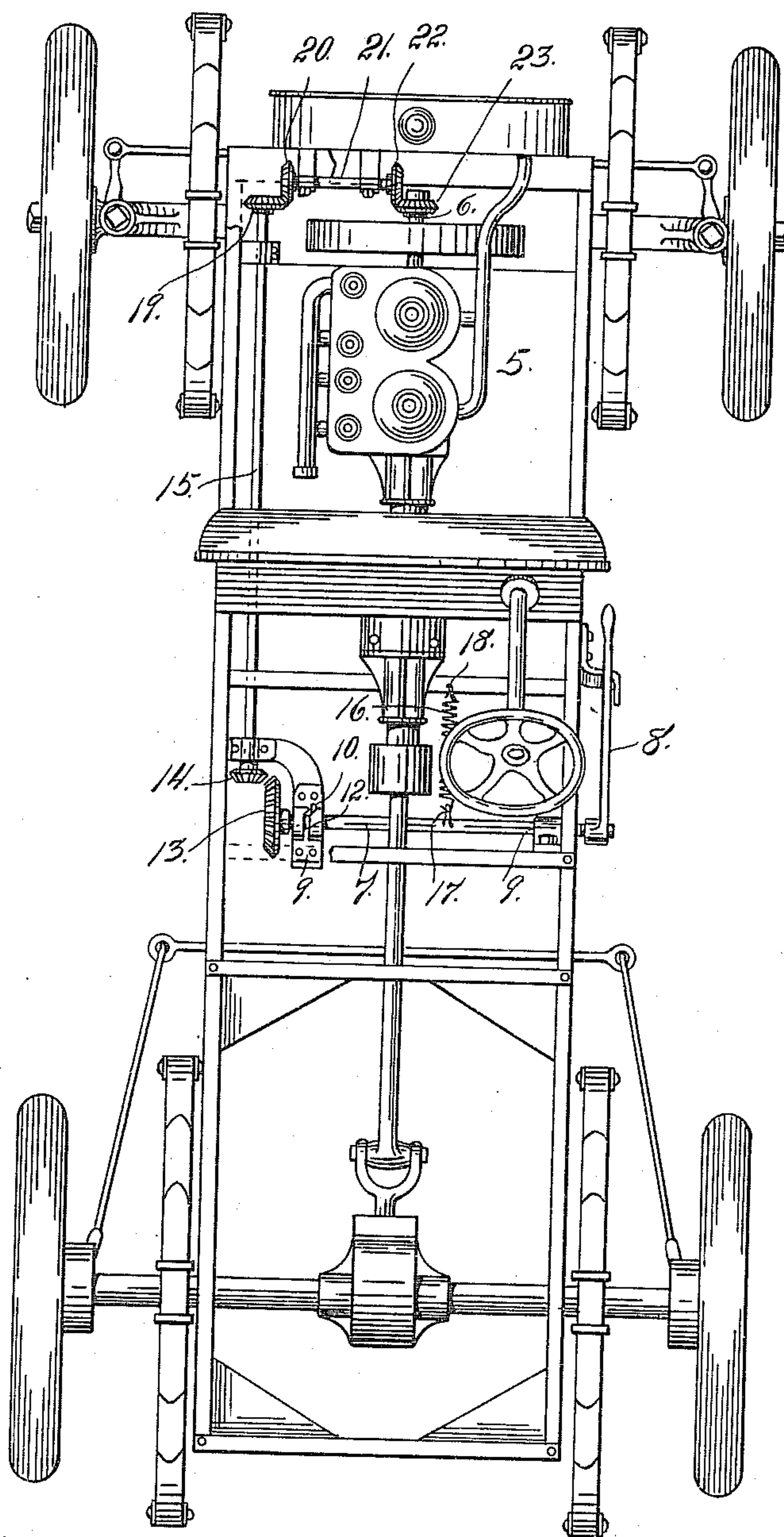


Fig. 1.

Witnesses

Otto E. Haddick
Jno. G. Powell

Inventors

Frank G. McKlveen.
Leslie W. Naylor.
By O. J. O'Brien. Attorney

F. G. McKLVEEN & L. W. NAYLOR.
ENGINE STARTER FOR AUTOMOBILES.
APPLICATION FILED NOV. 10, 1910.

985,689.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 2.

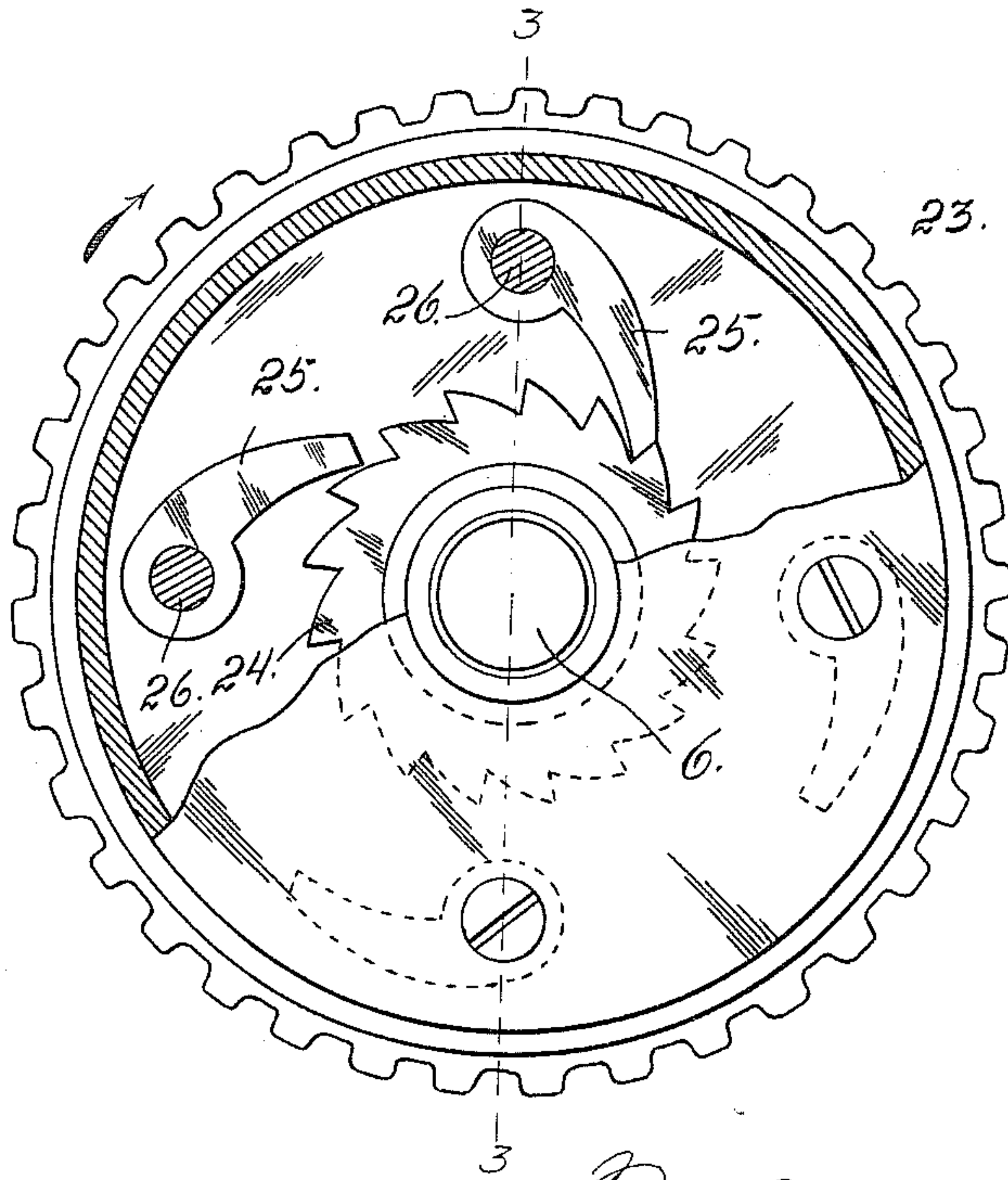


Fig. 2.

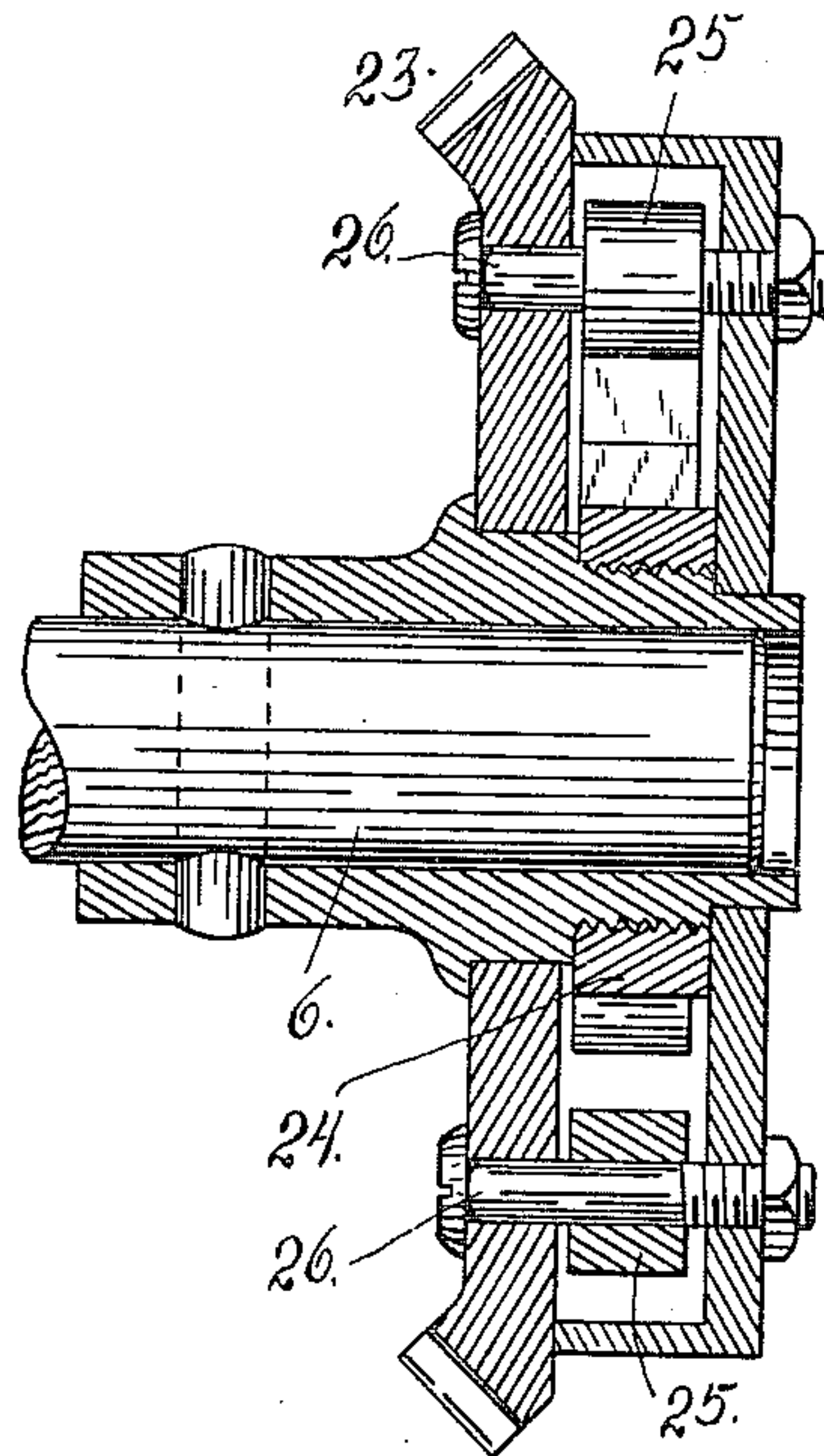


Fig. 3.

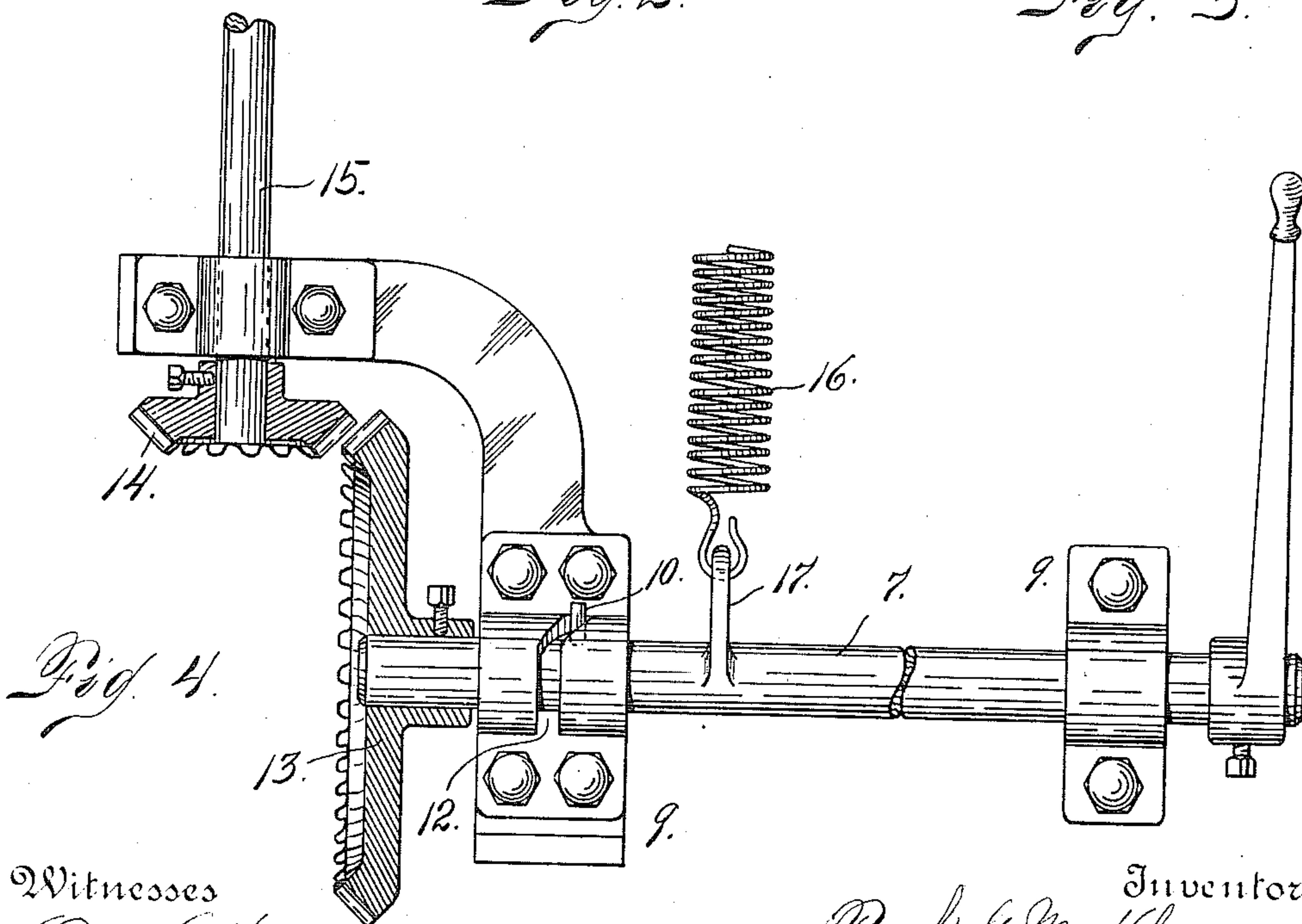


Fig. 4.

Witnesses

Otto E. Hoddick
Jno. G. Brawl

Inventors

Frank G. McKlveen
Leslie W. Naylor
By *W. J. O'Brien* Attorney

F. G. McKLVEEN & L. W. NAYLOR.
ENGINE STARTER FOR AUTOMOBILES.
APPLICATION FILED NOV. 10, 1910.

985,689.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 3.

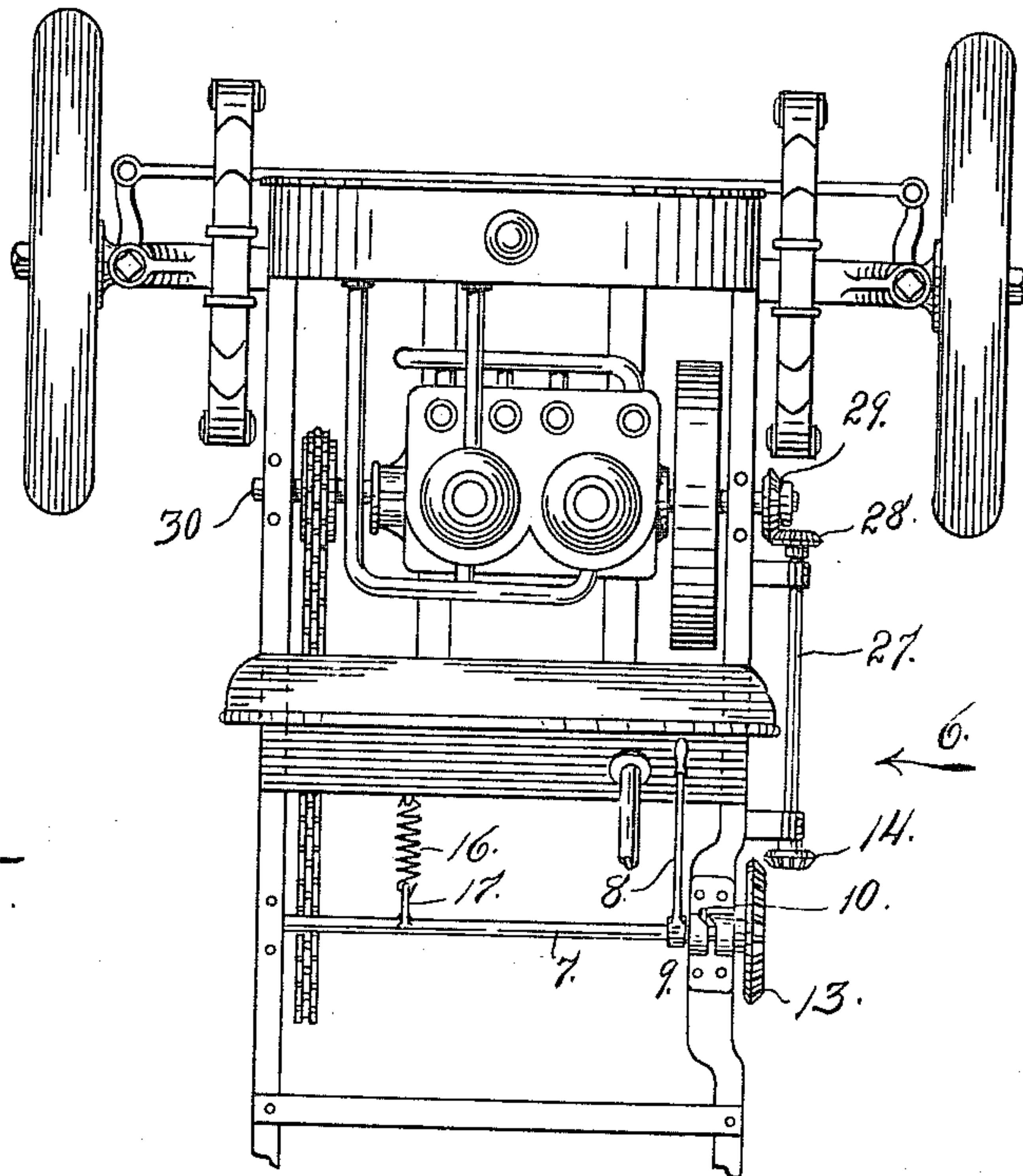


Fig. 5.

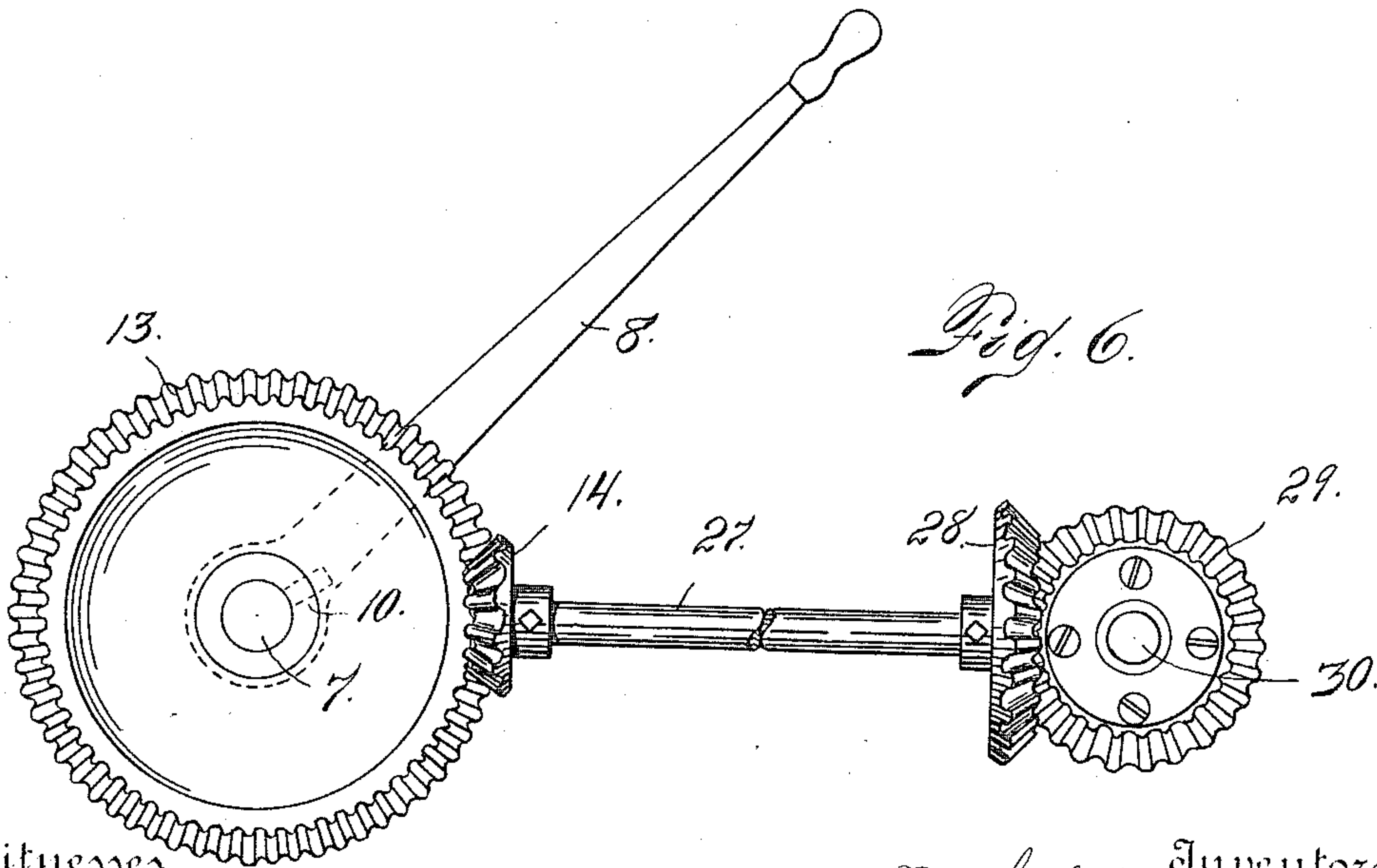


Fig. 6.

Witnesses

Otto E. Hoddick
John Powell

Inventors

Frank G. McKlveen
Leslie W. Naylor

By G. J. O'Brien

Attorney

UNITED STATES PATENT OFFICE

FRANK G. McKLVEEN AND LESLIE W. NAYLOR, OF DENVER, COLORADO.

ENGINE-STARTER FOR AUTOMOBILES.

985,689.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed November 10, 1910. Serial No. 591,620.

To all whom it may concern:

Be it known that we, FRANK G. McKLVEEN and LESLIE W. NAYLOR, citizens of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Engine-Starters for Automobiles; and we do 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in engine starters for use in connection with automobiles and consists of a structure whereby the chauffeur or person in charge of the machine may easily start the engine by the manipulation of a single lever arm which is connected with the engine shaft in such a manner as to perform the required function.

This mechanism obviates the necessity for cranking the engine by hand, which is the method in vogue where other provision is not made.

In our present construction the lever arm employed is connected with a rock shaft upon which is mounted a gear normally disconnected from a second gear which is connected in operative relation with the engine shaft through the instrumentality of one or more shafts, according to the arrangement of the engine upon the vehicle. Provision is made whereby as the rock shaft is actuated for engine-cranking purposes, for imparting a longitudinal thrust to the rock shaft, whereby its gear is brought into mesh with the coöperating gear of the intermediate shaft so that the necessary movement is imparted for cranking the engine. A spring connected in operative relation with the rock shaft is adapted to return the latter to its normal position, whereby the gear of the rock shaft is disconnected from that of the intermediate shaft.

Having briefly outlined our improved construction, we will proceed to describe the

same in detail, reference being made to the 50 accompanying drawing in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a top plan view of an automobile equipped with our improved starting mechanism. Fig. 2 is a 55 detail view on a larger scale, illustrating the ratchet and pawl connection between the gear on the engine shaft and the said shaft. This is a side view of the wheel partly broken away to disclose the ratchet pawl 60 construction. Fig. 3 is a section taken on the line 3—3, Fig. 2. Fig. 4 is a top plan view in detail and on a larger scale, illustrating the rock shaft and the means for imparting to it the endwise thrust for the 65 purpose of moving its gear from its normal position to a position into mesh with the gear of the intermediate shaft. Fig. 5 is a top plan view of the vehicle, illustrating a slightly modified form of construction which 70 is adapted for use when the engine shaft protrudes from the side rather than from the end of the vehicle. Fig. 6 is a detail view of the intermediate shaft and its connections shown on a larger scale. This is a view 75 looking in the direction of arrow 6, Fig. 5.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the engine and 6 its shaft. A rock shaft 7 equipped 80 with a hand lever 8 is journaled in bearings 9 and is also adapted to move endwise therein when a partial rotary movement is imparted to the shaft, since a pin 10 fast on the shaft protrudes through a cam slot 12 85 formed in the bearing 9, and of such shape as to move the shaft in a direction to cause its gear 13 to move into mesh with a coöperating gear 14 mounted on an operating shaft 15 when the shaft 7 is moved in the 90 proper direction. A spring 16 connected at one extremity with an arm 17 on the shaft 7 and at its opposite extremity with a stationary part as shown at 18, serves to normally retain the rock shaft 7 in such position that 95 the gear 13 will be normally disconnected from the gear 14 by virtue of the movement of the pin 10 in the slot 12.

When the engine shaft is disposed longitudinally of the vehicle and protrudes at the forward extremity thereof (see Fig. 1), a shaft 15 is employed, which extends parallel with the engine shaft and is provided at its forward extremity with a beveled gear 19 meshing with a similar gear 20 fast on a short shaft 21, whose opposite extremity is equipped with a beveled gear 22 meshing with a gear 23 on the engine shaft, the latter having a ratchet and pawl connection with the engine shaft which is clearly illustrated in Figs. 2 and 3 of the drawing. By referring to these views, particularly Fig. 2, it will be seen that the engine shaft is equipped with a ratchet collar 24 toothed to engage pawls 25 pivotally mounted on the body of the gear as shown at 26. When the gear 23 is actuated for the purpose of cranking the engine by imparting the necessary rotary movement to the engine shaft, the gear travels in the direction indicated by the arrow in Fig. 2; but after the shaft is started and the engine is working, the shaft 23 and its ratchet move independently of the gear and its pawls, which engage the ratchet only by gravity. Hence the gear 23 and the other cranking mechanism connected therewith, remain stationary at all times except during the cranking operation. Hence with this form of construction it is only necessary to move the lever arm 8 sufficiently to impart a partial rotary movement to the rock shaft 7. This rotary movement of the shaft also imparts an endwise thrust thereto, whereby the gear 13 is brought into mesh with the cooperating gear 14 on the operating shaft 15, whereby the last named shaft is rotated and the shaft 21 actuated by virtue of the gearing connection between the shafts 15 and 21. The rotary movement of the shaft 21 imparts the necessary starting movement to the engine shaft in the manner heretofore explained.

Where the engine shaft protrudes from one side of the vehicle, the lever arm 8 and the rock shaft 7 together with the gears 13 and 14, are substantially the same as in the other form of construction. However, the gear 14 is fast on a relatively short shaft 27 which virtually corresponds to the shaft 21 of the other form of construction, since it may be assumed that the shaft 15 and its two gears are entirely eliminated from this form of construction. Upon the extremity of the shaft 27 remote from the gear 14 is a beveled gear 28 meshing with a similar gear 29 on the engine shaft 30. The gear 29 is substantially the same in construction as the gear 23 heretofore described, having a ratchet and pawl connection with the engine shaft the same as heretofore explained when describing the gear 23.

Having thus described our invention, what we claim is:

1. In an engine starter for automobiles, the combination with an engine shaft, of a rock shaft mounted on the vehicle, an operating shaft intermediate the rock shaft and the engine shaft, means for normally maintaining the rock shaft in disconnected relation with the operating shaft, means for bringing the rock shaft and operating shaft into operating relation by imparting an endwise thrust to the rock shaft, and an operative connection between the operating shaft and the engine shaft, including a gearing connection between the two shafts, the gear on the engine shaft having a ratchet and pawl connection with the said shaft, for the purpose set forth.

2. In an engine starter for automobiles, the combination with an engine shaft, of a rock shaft mounted on the vehicle, an operating shaft having a gearing connection with the engine shaft, a shaft interposed between the rock shaft and the operating shaft and having a gearing connection with both shafts, the rock shaft being normally disconnected from the interposed shaft, and means for imparting an endwise thrust to the rock shaft simultaneously with its rotary action, whereby the gears of the rock shaft and the interposed shaft are brought into meshing relation and the necessary movement imparted to the engine shaft for starting purposes, substantially as described.

3. The combination of a rock shaft provided with a gear, an operating shaft having a gearing connection with the engine shaft, the gear on the engine shaft being loose thereon, but having a ratchet and pawl connection therewith, a third shaft interposed between the rock shaft and the operating shaft and having a constant gearing connection with the operating shaft, the adjacent extremities of the interposed shaft and the rock shaft being equipped with cooperating gears, means for normally maintaining the gear of the rock shaft disconnected from the gear of the interposed shaft, and means for imparting an endwise movement to the rock shaft whereby its gear is brought into meshing relation with the gear of the interposed shaft simultaneously with the necessary rotary movement of the rock shaft for engine-starting purposes, substantially as described.

4. In an engine starter for automobiles, the combination with an engine shaft, of a rock shaft mounted on the vehicle, an operating shaft intermediate the rock shaft and the engine, means for normally maintaining the rock shaft in disconnected relation with the operating shaft, operating gears mounted on the rock shaft and operating shaft, means for moving the gear on the rock shaft in the

direction of its axis to cause it to mesh with
the gear on the operating shaft, and an op-
erative connection between the operating
shaft and the engine shaft including a gear-
5 ing connection between the two shafts, the
gear on the engine shaft having a clutch con-
nection with the said shaft to cause the shaft
to rotate when the gear is turned, but per-
mitting the shaft to rotate independently of

the gear after the engine is started, substan- 10
tially as described.

In testimony whereof we affix our signa-
tures in presence of two witnesses.

FRANK G. McKLVEEN.
LESLIE W. NAYLOR.

Witnesses:

A. J. O'BRIEN,
F. E. BOWEN.