

C. H. SMITH & A. L. GODDARD.

ENGINE STARTER.

APPLICATION FILED FEB. 23, 1910.

989,934.

Patented Apr. 18, 1911.

2 SHEETS—SHEET 1.

Fig. 1

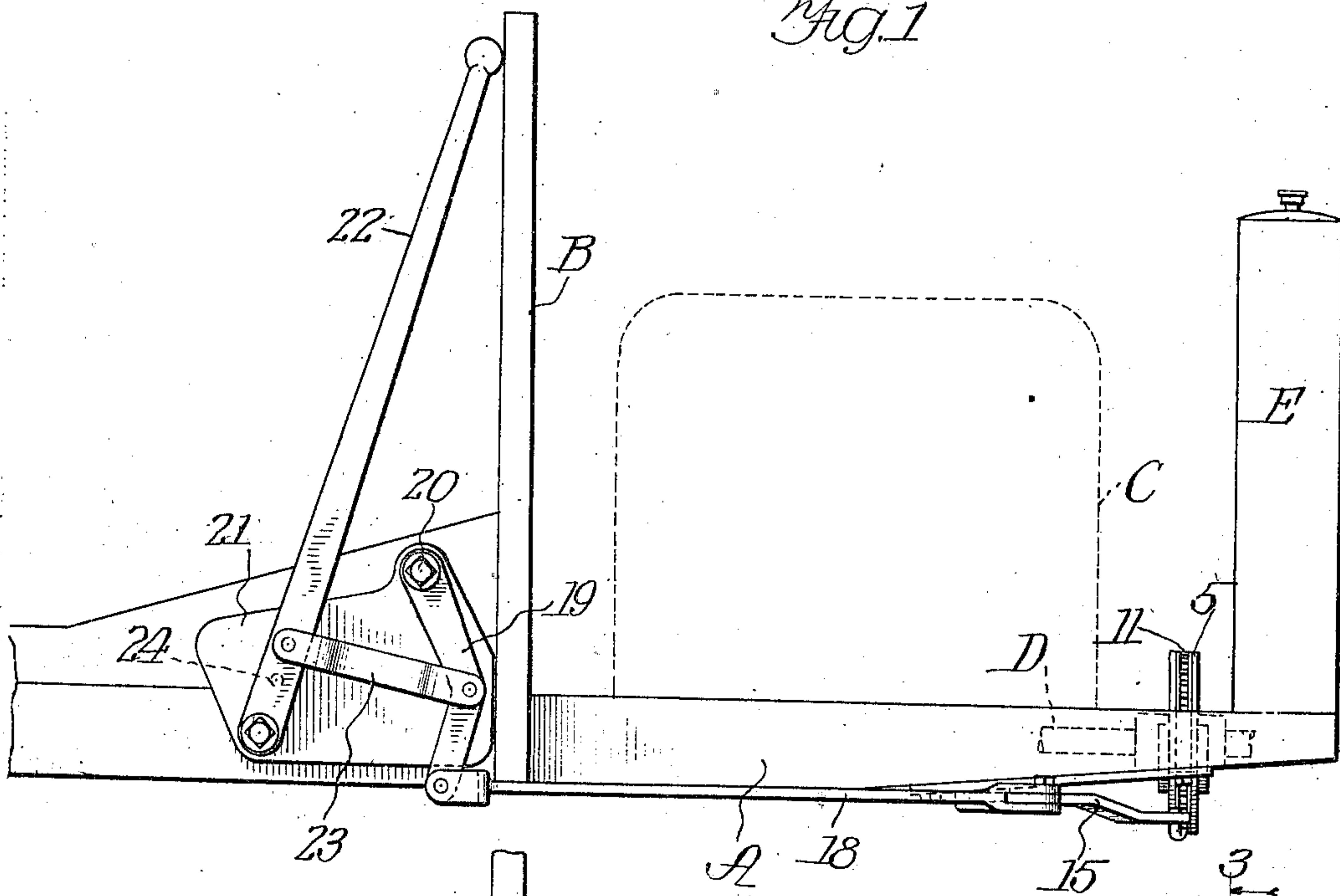
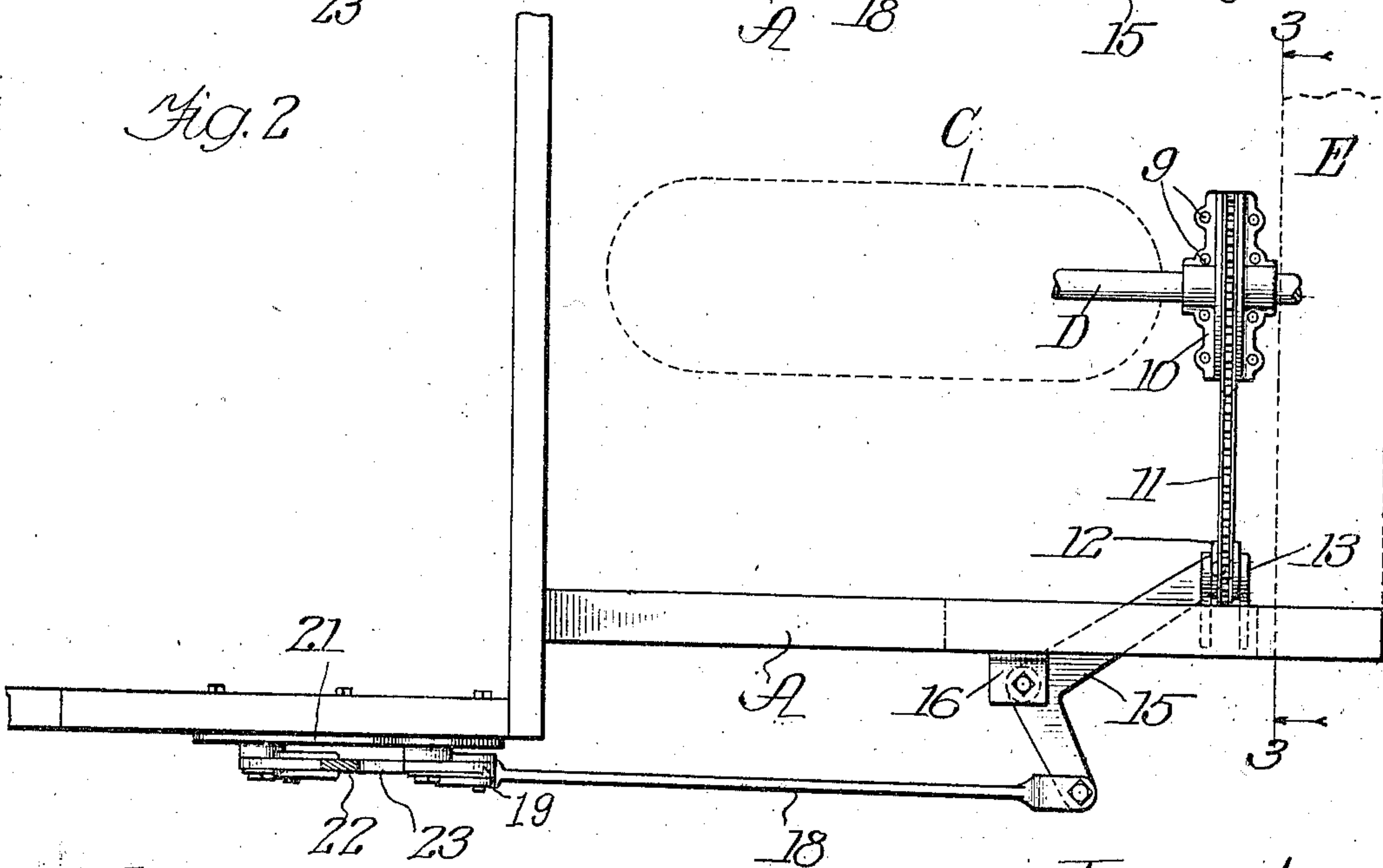


Fig. 2



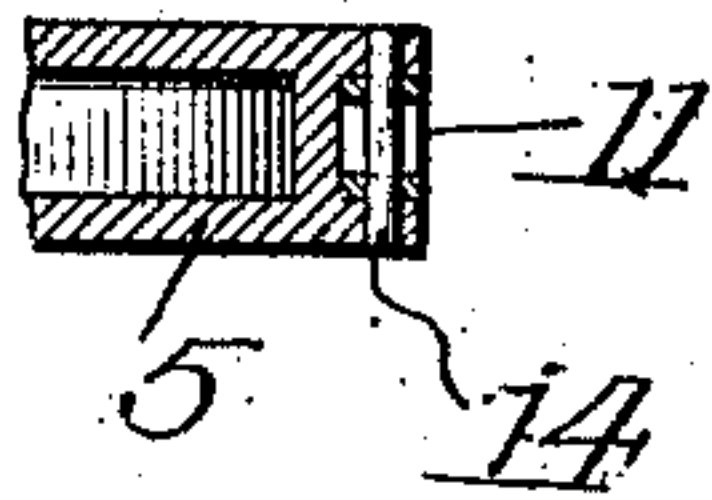
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

CHARLES H. SMITH AND ARTHUR L. GODDARD, OF ROCKFORD, ILLINOIS; SAID GODDARD ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-FOURTH TO WALTER M. LAWTON AND ONE-FOURTH TO WALTER B. TAYLOR, BOTH OF ROCKFORD, ILLINOIS.

## ENGINE-STARTER.

989,934.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed February 23, 1910. Serial No. 545,356.

*To all whom it may concern:*

Be it known that we, CHARLES H. SMITH and ARTHUR L. GODDARD, citizens of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Engine-Starters, of which the following is a specification.

The object of this invention is to produce a simple and convenient device for starting the internal-combustion engine of an automobile or motor boat.

Another object is to provide an engine-starting apparatus which may be readily applied to existing motor cars.

In the accompanying drawings, Figure 1 is a side elevation illustrating the application to an automobile of an engine-starting apparatus embodying the features of our invention. Fig. 2 is a top plan view of the parts shown in Fig. 1. Fig. 3 is a vertical sectional view taken in the plane of dotted line 3 3 of Fig. 2. Fig. 4 is an enlarged view of some of the parts shown in Fig. 3. Fig. 5 is a sectional detail illustrating a lock for the operating lever. Fig. 6 is a section on line 6 6 of Fig. 4. Fig. 7 is a section on line 7 7 of Fig. 4.

In the illustrative embodiment herein shown of our invention, A is one of the side sills of the chassis of a motor car, B is the dash, C is the engine, D is the engine shaft, and E is the radiator. The shaft D is arranged to be rotated, for the purpose of starting the engine, by means comprising a pawl and ratchet mechanism. The ratchet wheel 1 may be made in sections, as herein shown, for convenience in applying the invention to existing cars. We have shown the sections of the ratchet wheel 1 as secured together by means of keys 2 and the wheel as being secured to the engine shaft D by a key 3. The ratchet wheel is located forward of the engine, in the narrow space between the engine and the radiator.

The ratchet wheel 1 is arranged to be engaged by the pawl 4 which is mounted within a flanged pulley or drum 5 and is pivotally supported upon a pin 6 or other suitable member secured in the sides of the pulley. A spring 7 of any suitable form tends to move the pawl 4 into engagement with the ratchet wheel 1. 8 is a stop to

limit the movement of the pawl away from the ratchet wheel.

To facilitate the application of the invention to existing structures, the pulley 5 is made in two sections secured together by bolts or other suitable fastenings 9 passing through flanges 10 on the pulley sections. The pulley is loosely mounted on the engine shaft, so that the latter may rotate without rotating the pulley. The pulley 5 is arranged to be rotated by the operator through the medium of mechanism comprising a suitable flexible connection, such as an endless chain 11, said chain extending about the pulley 5 and an idler 12 mounted in a suitable bracket 13 attached to the sill A. The chain 11 is suitably connected with the pulley 5, as, for example, by means of one or more rivets 14 extending through the chain and the flanges of the pulley.

The means herein shown for moving the chain 11 to rotate the pulley 5 consists of a bell-crank lever 15 pivotally connected to a bracket 16 on the sill A. One arm of the bell-crank is connected with the chain by means of a link 17. The other arm of the bell-crank is connected through the medium of a link 18 with the lower end of a lever 19, the upper end of said lever being pivoted at 20 upon a base plate 21 attached, in this instance, to the side of the car just rearwardly of the dash. An operating hand-lever 22 is pivoted at its lower end to the base plate 21 and is connected by means of a link 23 with the lever 19 at a point between the ends of the latter.

Suitable means may be provided for preventing the lever 22 from being jarred or otherwise accidentally moved out of its normal position. We have herein shown a spring-pressed plunger 24 mounted on the base plate 21 and adapted to enter a socket in the adjacent face of the hand-lever.

In order to withdraw the pawl 4 from the ratchet wheel after the engine has been started, and for permitting the spring 7 to engage the pawl with the ratchet wheel, we provide upon the inner end of the link 17 a projection 25 adapted to engage the tail 26 of the pawl and rock the pawl upon its pivot when the link is moved inwardly, that is to say, toward the shaft. An opening is formed in the peripheral wall of the pul-



ley 5, through which opening the inner end of the link extends. The projection 28 on the angular inner end of the link 17 assists to guide said angular end into the opening 5 27. As shown in Fig. 4, the periphery of the pulley lies between the chain and the projection 28, said projection assisting to prevent sagging of the chain at this point or downward withdrawal of the projection 10 25 from the tail 26 of the pawl.

When it is desired to start the engine, the operator grasps the hand-lever 22 and swings it rearwardly, thereby causing the bell-crank 15 to be rocked and drawing the link 17 outwardly. The movement of the link causes a movement of the chain 11, and the latter being connected to the pulley 5, causes a partial rotation of said pulley. As the link 17 moves outwardly and the pulley 20 5 commences to rotate, the projection 25 and the tail 26 of the pawl move apart, thereby permitting the spring 7 to throw the pawl into engagement with the ratchet wheel. Continuing movement of the link, chain, 25 and pulley causes rotation of the engine shaft. The extent of the movement thus imparted to the engine shaft may be sufficient to start the engine; if it is not, the operator causes further rotation of the engine shaft 30 by swinging the lever 22 back and forth. When the hand-lever is thrown into the position shown in Fig. 1, the projection 25 is moved into engagement with the tail 26 of the pawl 4, thereby withdrawing said pawl 35 from the ratchet wheel.

It will be seen that the apparatus herein described is simple, and is arranged for convenient operation from the driver's seat. The portions adjacent the engine shaft are 40 small and compactly arranged, so that the apparatus can be applied to cars now in use by connection with the shaft at the only point generally available, namely, in the narrow space between the engine and the radiator. 45 ator.

The invention is not limited to the precise details illustrated and described, for various modifications will occur to persons skilled in the art.

50 We claim as our invention:

1. In an engine starter, in combination, a shaft; a ratchet wheel fixed on said shaft; a pulley loosely mounted on said shaft; a pawl carried by said pulley and adapted to 55 engage said ratchet wheel; an idler; an endless connection extending about said pulley and said idler and attached to the pulley; a hand-lever; and connections between said hand-lever and said endless connection, said 60 connections including a link having a portion adapted to engage the pawl and remove the pawl from engagement with the ratchet wheel.

2. In an engine starter, in combination, a 65 shaft; a ratchet wheel fixed on said shaft; a

pulley loosely mounted on the shaft and inclosing the ratchet wheel; a pawl pivotally supported within said pulley and adapted to engage said ratchet wheel; means tending to move the pawl into engagement with the 70 ratchet wheel; an idler; an endless connection extending about said pulley and said idler, said connection being attached to the pulley; means for pulling said connection to turn the pulley; and a member moving 75 with said connection and movable into and out of the pulley through an opening therein, said member being adapted to engage said pawl to disengage it from the ratchet wheel. 80

3. The combination, in an automobile, of an engine located forward of the dash; a wheel fixed on the engine shaft forward of the engine; a member supported adjacent to the wheel and adapted to engage the lat- 85 ter for turning it; a bell-crank lever mounted upon the chassis; connections between one arm of the bell-crank lever and said wheel-turning member; a hand-lever pivoted by its lower end rearwardly of the dash; a 90 lever pivoted by its upper end rearwardly of the dash and having a link connection at its lower end with the other arm of said bell-crank; and a link connecting the two 95 last mentioned levers.

4. In an engine starter, in combination, a shaft; a ratchet wheel fixed on said shaft; a pulley loosely mounted on said shaft; a pawl carried by said pulley and adapted to engage said ratchet wheel; an idler; an end- 100 less connection extending about said pulley and said idler and attached to the pulley; and means for moving said connection, said means including a link attached to the end- 105 less connection, said link having a portion movable into and out of the pulley through an opening therein, said portion being adapted to engage said pawl to disengage it from the ratchet wheel.

5. In an engine starter, in combination, a 110 shaft; a ratchet wheel fixed on said shaft; a pulley loosely mounted on the shaft; a pawl carried by said pulley and adapted to engage said ratchet wheel; an idler; an end- 115 less connection extending about said pulley and said idler and attached to the pulley; means for pulling said connection to turn the pulley; and a member attached to said connection and movable into and out of the pulley through an opening in its periphery, 120 said member having a projection adapted to engage said pawl to disengage it from the ratchet wheel, said member also having a portion adapted to extend into the pulley and prevent sagging of said endless connec- 125 tion and serving to guide said member into said opening.

6. The combination, in an automobile, of an engine located forward of the dash; a wheel fixed on the engine shaft forward of 130



the engine; a wheel supported adjacent to  
the first mentioned wheel and carrying means  
adapted to engage the first mentioned wheel  
for turning it; an idler; an endless connec-  
5 tion extending about the idler and the second  
mentioned wheel and attached to the latter;  
a bell-crank lever mounted in the forward  
portion of the automobile in a horizontal  
position; a link connecting one arm of said  
10 bell-crank lever with said endless connec-  
tion; a base plate attached to the side of

the automobile rearwardly of the dash; a  
hand-lever and another lever pivotally  
mounted on said base plate and linked to-  
gether; and a link connecting said other 15  
lever with the other arm of said bell-crank  
lever.

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

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