

No. 883,461.

PATENTED MAR. 31, 1908.

C. C. ILG.
EXPLOSIVE ENGINE STARTER.
APPLICATION FILED MAR. 15, 1907.

FIG. 1

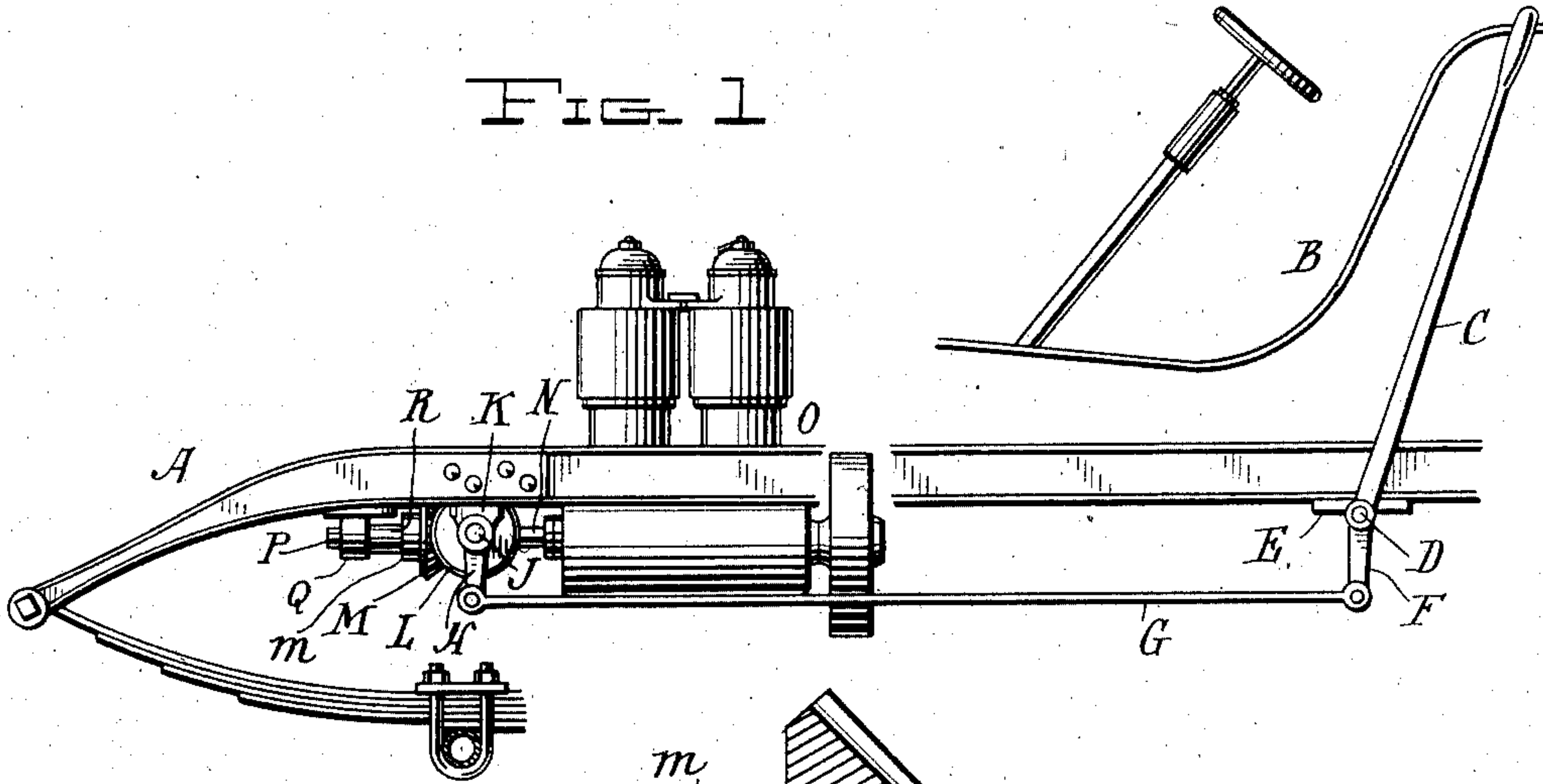


FIG. 2

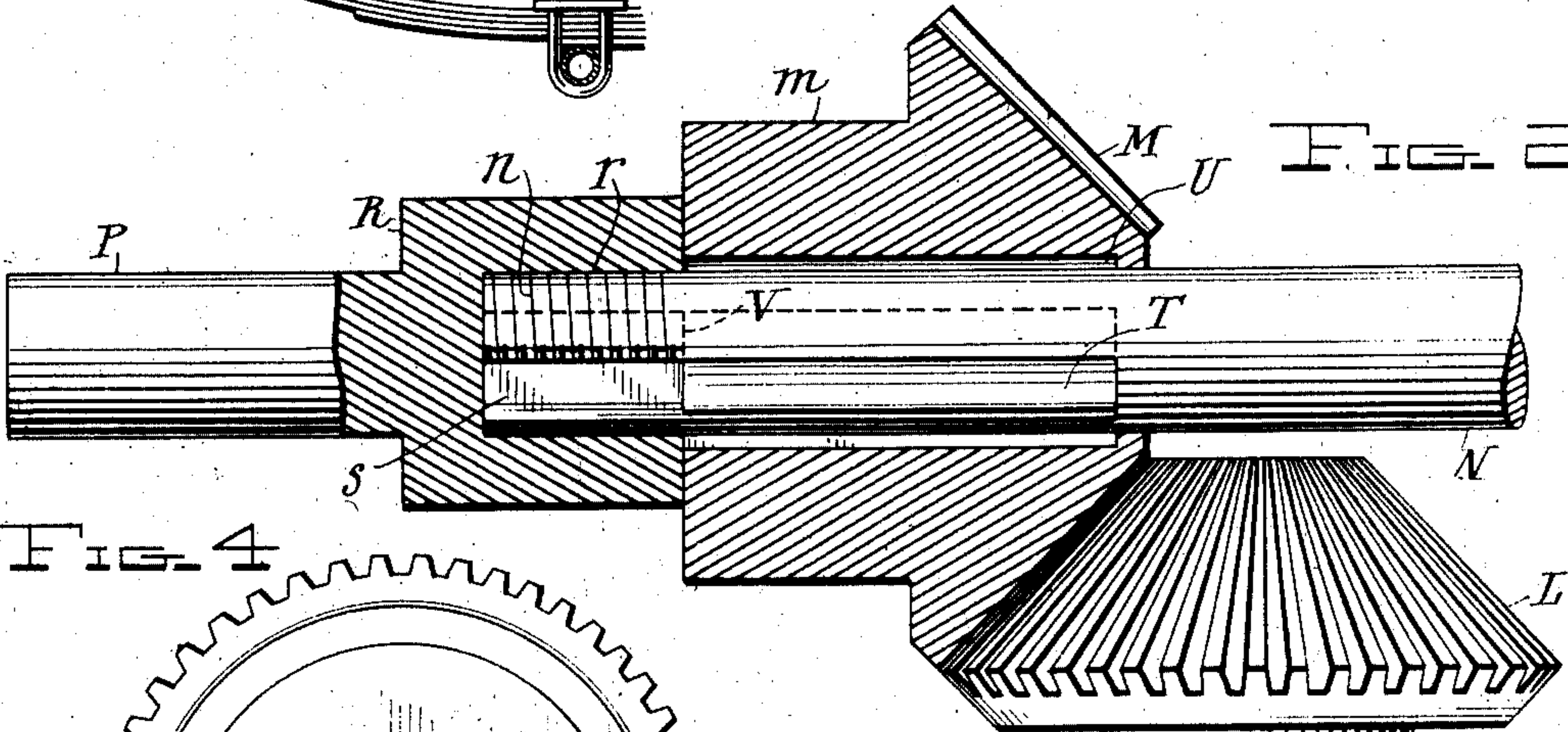


FIG. 4

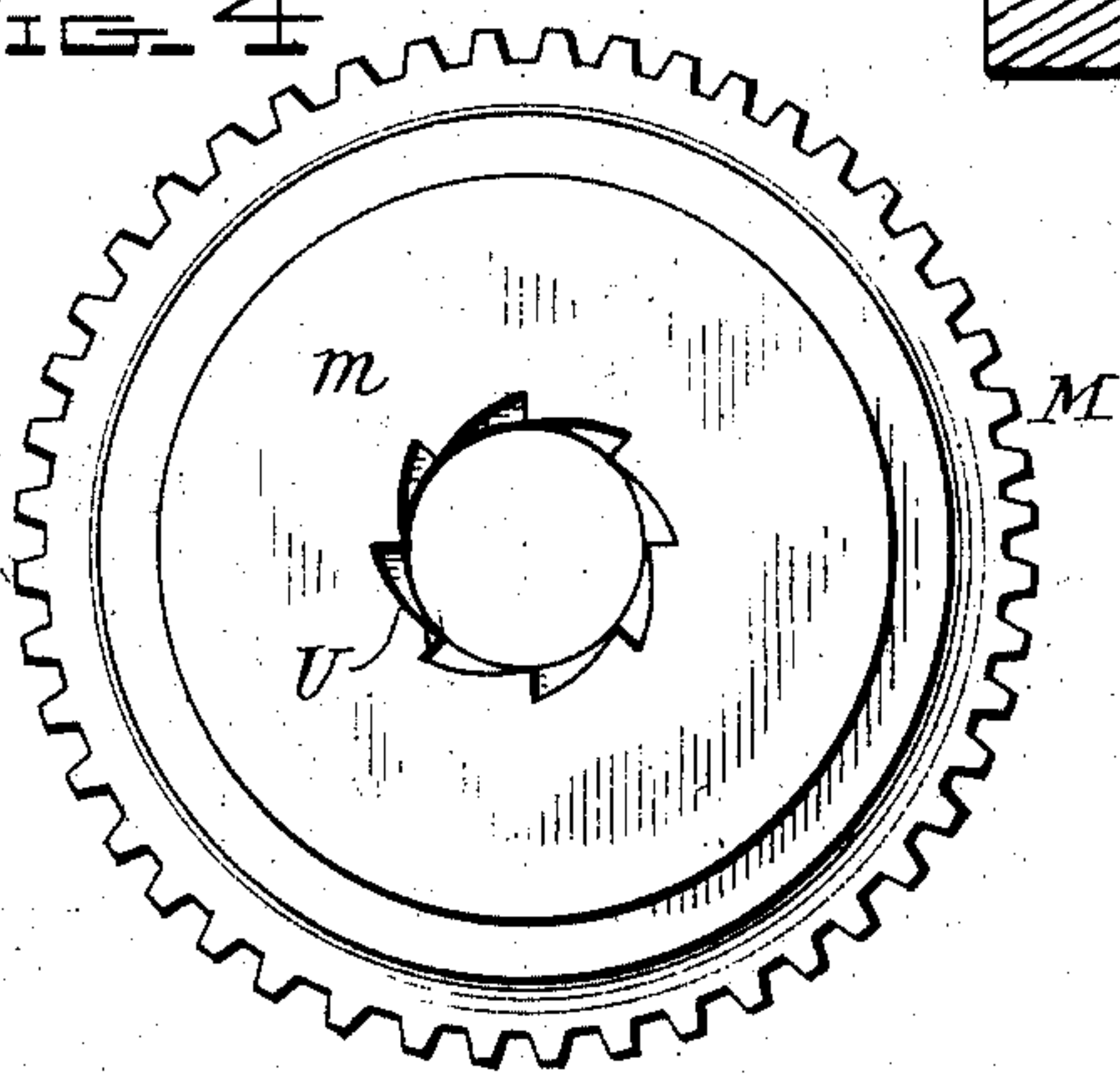


FIG. 5

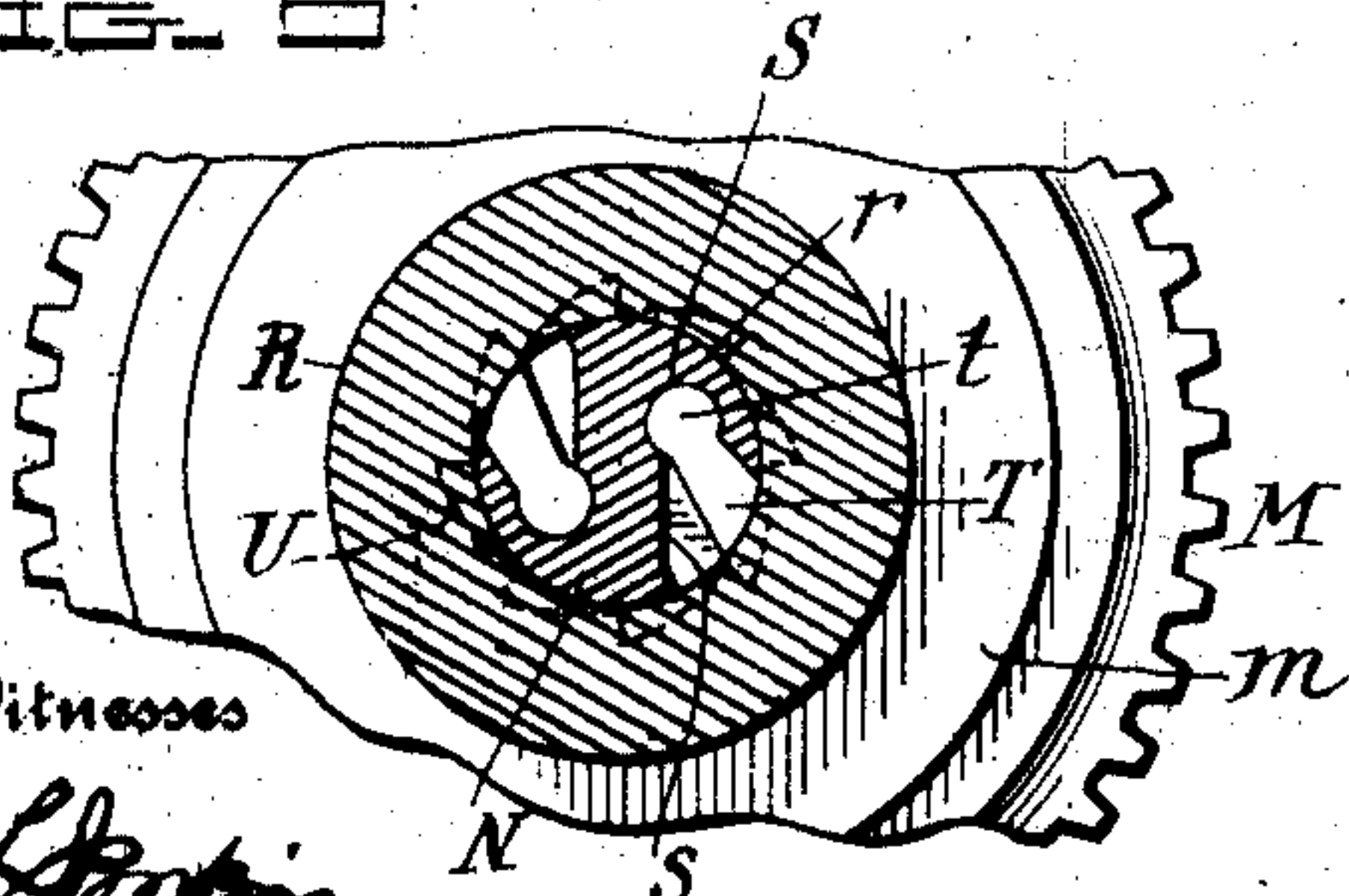
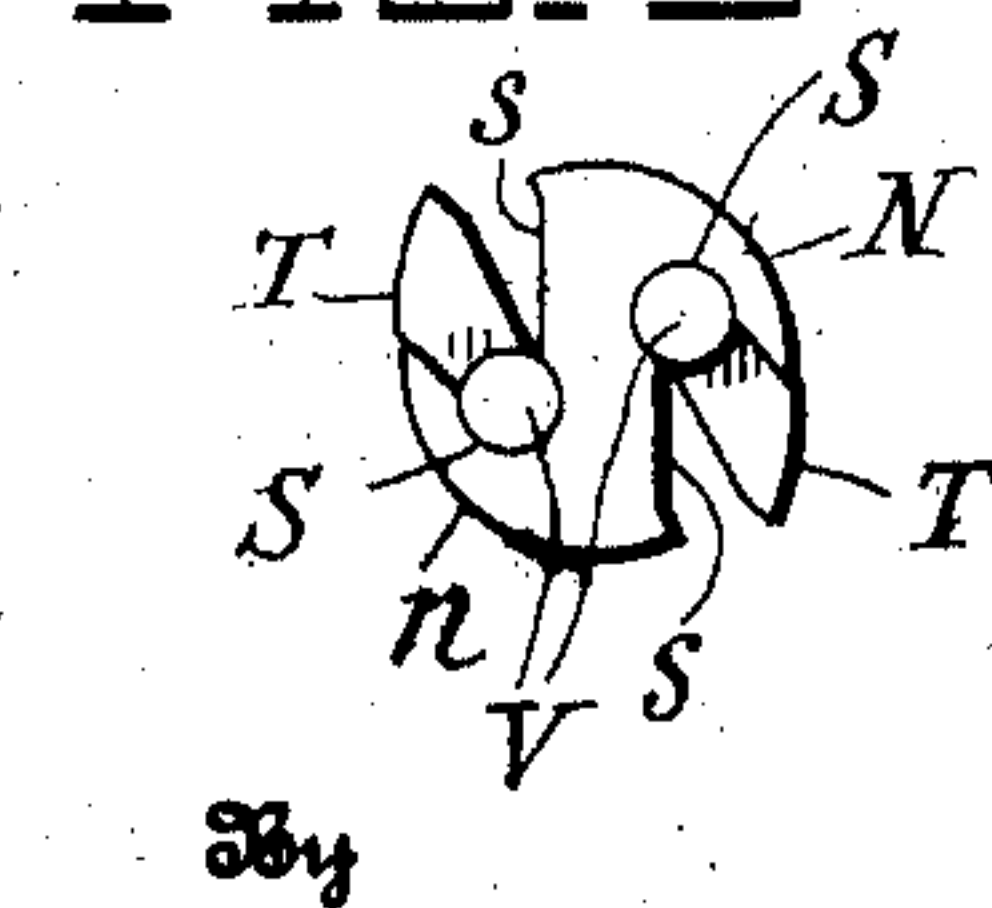


FIG. 3



Inventor

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UNITED STATES PATENT OFFICE.

CARL C. ILG, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-THIRD TO NATHAN B. L. COSEL AND ONE-THIRD TO RICHARD FRANKENBUSH, OF NEW YORK, N. Y.

EXPLOSIVE-ENGINE STARTER.

No. 883,461.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed March 15, 1907. Serial No. 362,492.

To all whom it may concern:

Be it known that I, CARL C. ILG, citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Explosive-Engine Starters, of which the following is a specification.

My invention relates to explosive engine starters, and has for its object the production of certain particularly constructed and arranged mechanism whereby the shaft and flywheel of the engine may be set in rotation by means of a lever situated near the seat of the operator, who may conveniently reach and actuate the lever without leaving his seat. By the use of my invention the crank usually found at present upon the front or side of motor vehicles is rendered unnecessary.

My invention belongs more particularly in that class of starting devices examples of which include ratchet and pawl elements of various forms, so disposed that when the explosions begin and the engine has started the ratchet and pawl cease to engage. For example, if, as in my invention, the pawls be carried by the shaft and the ratchet is operated by the lever, upon the starting of the engine the shaft rotates faster than the hand-moved ratchet and the pawls are drawn free from and past the ratchet teeth, and, thus, no obstacle is raised by the ratchet or pawls to the increasing speed of the shaft.

It is with the particular construction of the ratchet and pawl devices and their disposition with respect to the gearing employed that my invention is directly concerned, and I accomplish the objects explained above by fashioning and associating parts as illustrated in the accompanying drawings, of which

Figure 1 represents a side view of a portion of a motor carriage showing my invention applied thereto. Fig. 2 is a plan view of the operating shaft, the engine shaft, and gearing. This view, and those following, are upon an increased scale of drawing to more clearly exhibit the various parts of my invention and their arrangement which it is desired to describe. Fig. 3 is an end view of the engine shaft, and shows the form of the pawl-receiving and pawl-retaining cavities, and the manner of stopping or plugging those cavities to keep the pawls in place. Fig. 4

is a rear view of the ratchet gear alone, and Fig. 5 is a rear view of the ratchet gear with the shaft shown in cross-section, and the pawls in place in the cavities formed to receive them.

Like letters of reference are used to refer to the same parts throughout the specification and drawings.

The letter A designates one side of the frame of any automobile propelled by an explosive engine. Near the seat B, and within convenient reach of the hand of the operator is a lever C. The lower end of the lever is secured to a shaft D supported transversely beneath the frame A in the bearings E. At a suitable point the shaft D is provided with an arm F, and that arm is pivotally connected with a rod G. The rod G is arranged horizontally beneath the frame and extends towards the front of the machine where it is pivotally connected with an arm H. The arm H is secured to and operates the short transverse shaft J, as also shown in Fig. 2. Shaft J is supported in the bearings K beneath the frame A, and its inner end bears the miter gear L. The miter gear L meshes with a fellow miter gear M, and through gear M passes the shaft N of the engine O.

The front end, that is to say, the end towards the left in the drawings of the engine shaft is marked P and it is detachable. It is constructed with a portion of the same size of shaft N of the engine, and that normal portion constitutes the journal by which the extremity of the engine shaft is supported in the bearings Q, as illustrated in Fig. 1. The remaining portion of the detachable shaft-end P which is referred to by the letter R is enlarged as illustrated, and it is constructed with a central, cylindrical, threaded cavity adapted to receive the correspondingly threaded end *n* of the engine shaft and thereby continue that shaft in order that its outer extremity may be adequately supported in the bearings Q as explained.

A portion of the engine shaft N at its said threaded end *n*, is slotted or recessed longitudinally. The recesses thus formed, and as shown in Figs. 3 and 5, at their inner parts or bottom portions are cylindrical cavities *s*, and from those cylindrical cavities straight, flat walls *s* extend divergently to the periphery or surface of the shaft. The office of the cylindrical cavity S is to receive and remov-

ably retain the cylindrical end of the pawls T, and it will be here noted as illustrated in Fig. 5 that the wedge-form portion of each pawl, meaning that portion other than the cylindrical end *t* of each pawl, while corresponding generally in form to the V-shaped part of the recesses in the shaft, is not so large, thus permitting the pawls to turn inwardly upon their cylindrical ends, when in place as shown in Fig. 5, and free themselves from the ratchet teeth U formed interiorly in the hub *m* of gear M, through which, as previously explained the engine shaft N passes

It will be understood from the foregoing and the drawings that the recesses in the engine shaft extend from the end of the shaft, and they are equal in length to that of the threaded end *n* of the shaft and the thickness of gear M and its hub. The reason for recessing the shaft to its end is that the pawls must be introduced sidewise in order that the cylindrical portions of the recesses and of the pawls may appropriately engage each other. The pawls are as ordinarily constructed only as long as the thickness of gear M and its hub, that thickness being usually made greater than customary, to give extra strength to the pawl and ratchet elements, having in view the somewhat severe service expected of them. The central opening through the gear M and its hub in which are formed the ratchet teeth, are, therefore, equal in length to the pawls. The construction just described leaves the recesses in the threaded end *n* of the engine shaft empty, and as the pawls were slipped in that way they would or might become displaced in the same direction. To prevent this displacement, the cylindrical portions of the recesses are stopped by plugs V, as shown in Figs. 2 and 3. Those plugs are equal in length to the portion of the recesses not occupied by the pawls, and when the shaft-end P is screwed into place the plugs, as well as the pawls, are securely locked in.

To operate my invention the lever C is worked back and forth by the hand of the rider, and the meshing miter gears are turned correspondingly. By natural gravitation one or the other of the pawls will be brought into such a position as to be engaged by the revolving ratchet-teeth of the gear M, and the engine shaft will be turned. As the parts are very strong, a considerable impulse may be given the engine shaft and the fly wheel W. Ordinarily, but one or two vigorous movements of the lever, which, by reason of the leverage introduced does not demand excessive muscular exertion, is sufficient to throw the flywheel into revolution igniting the charge and starting the engine.

Having now described my invention and explained the mode of its operation, what I claim is.—

65 1. In an explosive engine starter, the com-

bination with an engine, of a shaft connected with the engine and by which the engine may be actuated, a wheel fitting said shaft movably, the said wheel having internal ratchet teeth, the said shaft having recesses extending lengthwise from one end, the said wheel being placed on the shaft over the said recesses, pawls constructed to be inserted from the end of the shaft into said recesses after the wheel is in place and arranged to engage the ratchet teeth of the wheel, means for retaining the pawls against longitudinal displacement, and means for operating the wheel from a distance.

2. In an explosive engine starter, the combination with an engine, of a shaft connected with the engine and by which the engine may be actuated, a wheel fitting said shaft movably, the said wheel having internal ratchet teeth, the said shaft having recesses extending lengthwise from one end, the said wheel being placed on the shaft over the said recesses, pawls constructed to be inserted from the end of the shaft into said recesses after the wheel is in place and arranged to engage the ratchet teeth of the wheel, the said recesses having cavities and the said pawls having correspondingly shaped portions constructed to engage the said cavities whereby the pawls are movably retained in the cavities against lateral displacement, means for retaining the pawls against longitudinal displacement, and means for operating the said wheel from a distance.

3. In an explosive engine starter, the combination with an engine, of a shaft connected with the engine and by which the engine may be actuated, a wheel fitting said shaft movably, the said wheel having internal ratchet teeth, the said shaft having recesses extending lengthwise from one end, the said wheel being placed on the shaft over the said recesses, pawls constructed to be inserted from the end of the shaft into said recesses after the wheel is in place and arranged to engage the ratchet teeth of the wheel, the said recesses having longitudinal cylindrical cavities and the said pawls having correspondingly shaped portions constructed to enter the said cavities from the end of the shaft only whereby the pawls are movably retained in the cavities against lateral displacement, means for retaining the pawls against longitudinal displacement, and means for operating the said wheel from a distance.

4. In an explosive engine starter, the combination with an engine, of a shaft connected with the engine and by which the engine may be actuated, a wheel fitting said shaft movably, the said wheel having internal ratchet teeth, the said shaft having recesses extending lengthwise from one end, the said wheel being placed on the shaft over the said recesses, pawls constructed to be inserted from the end of the shaft into said recesses after

the wheel is in place and arranged to engage the ratchet teeth of the wheel, means for retaining the pawls against longitudinal displacement, the end of the said shaft being
5 threaded, a shaft-end engaging the threaded end of the shaft, and means for operating the said wheel from a distance.

In testimony whereof I affix my signature in presence of two witnesses.

CARL C. ILG.

Witnesses:

FERDINAND BAUER,
GOTTLIEB BAERN.