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V. B. MILLER.
STARTING MECHANISM FOR GAS ENGINES.

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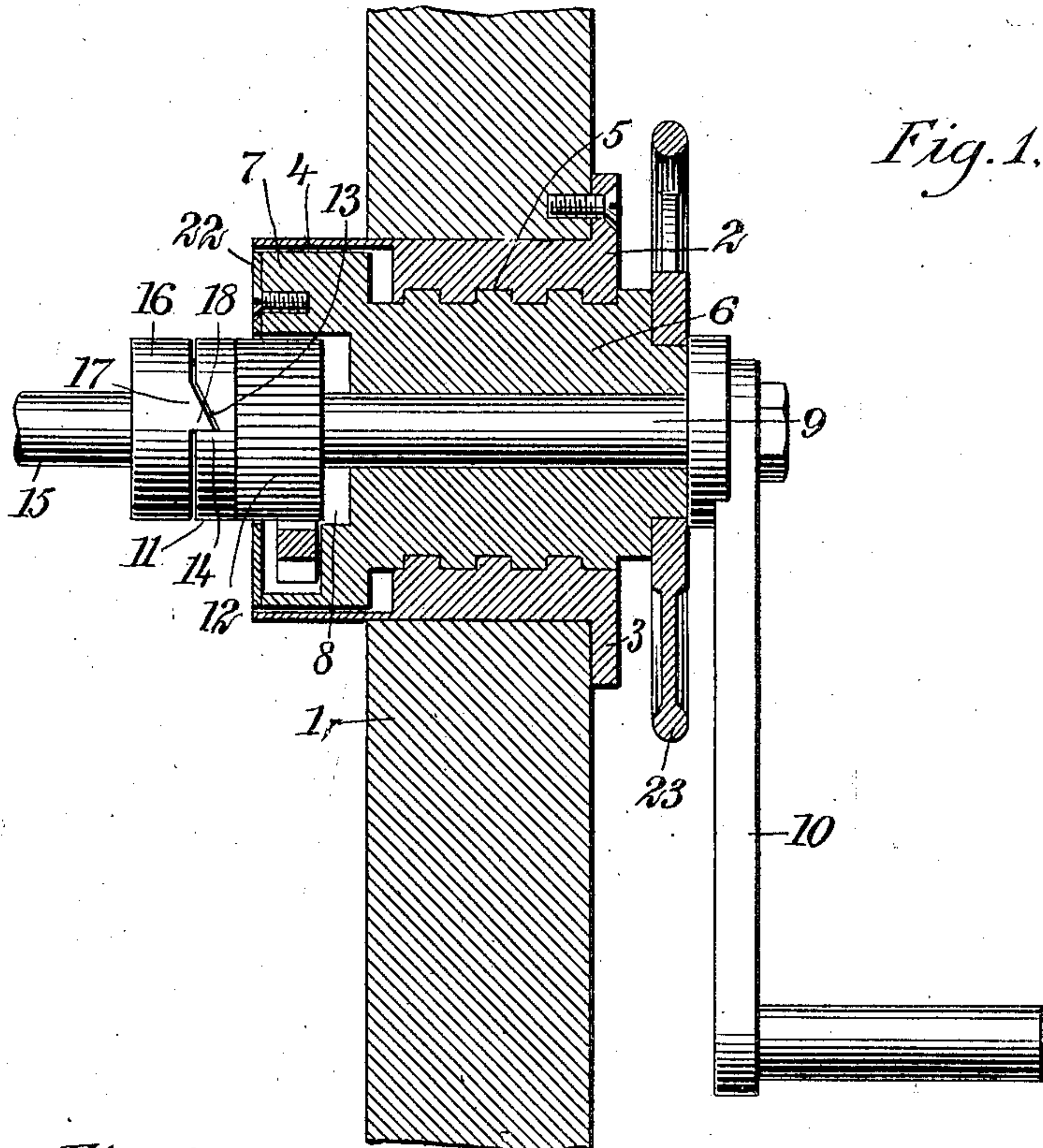


Fig. 1.

Fig. 2.

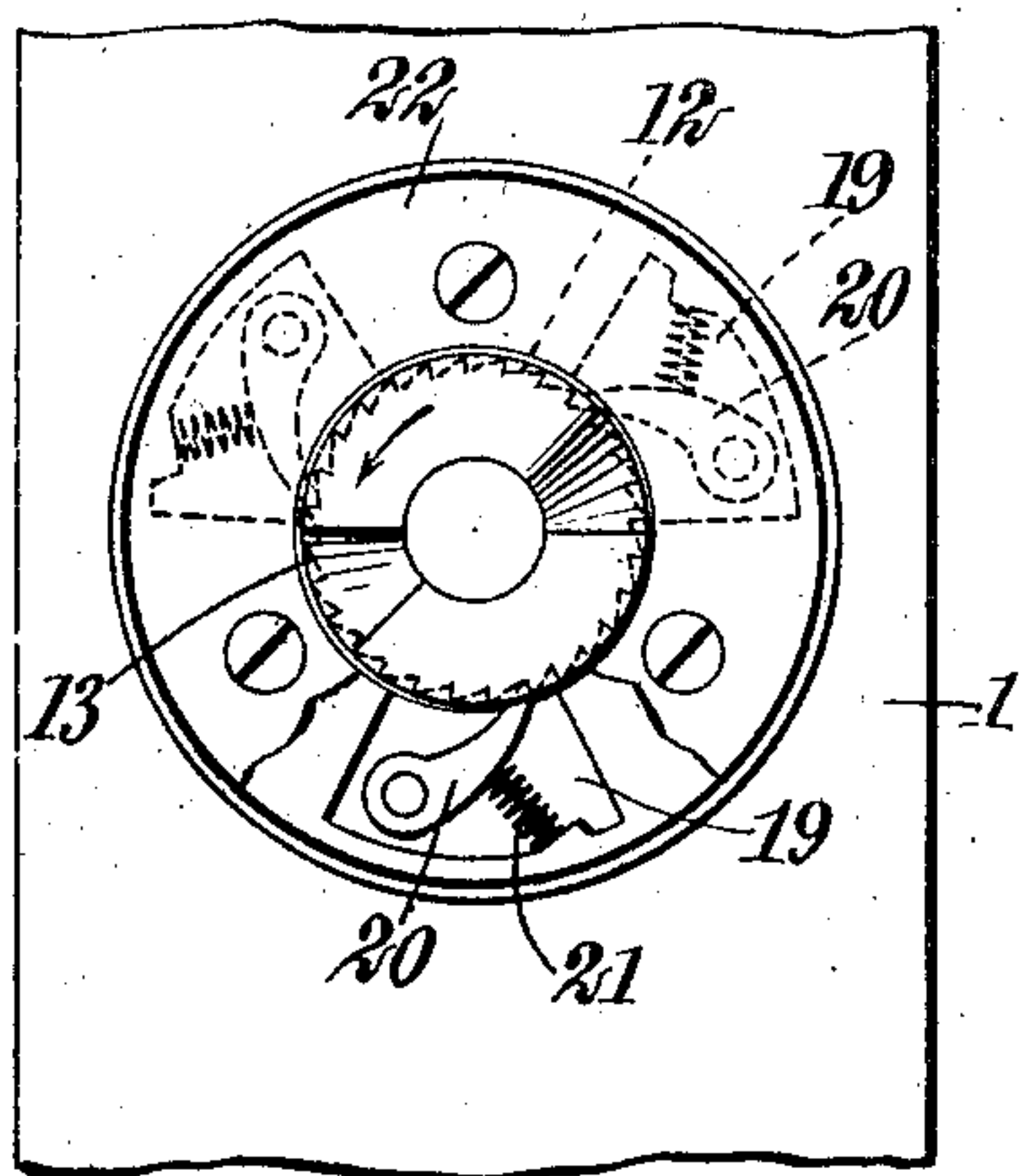
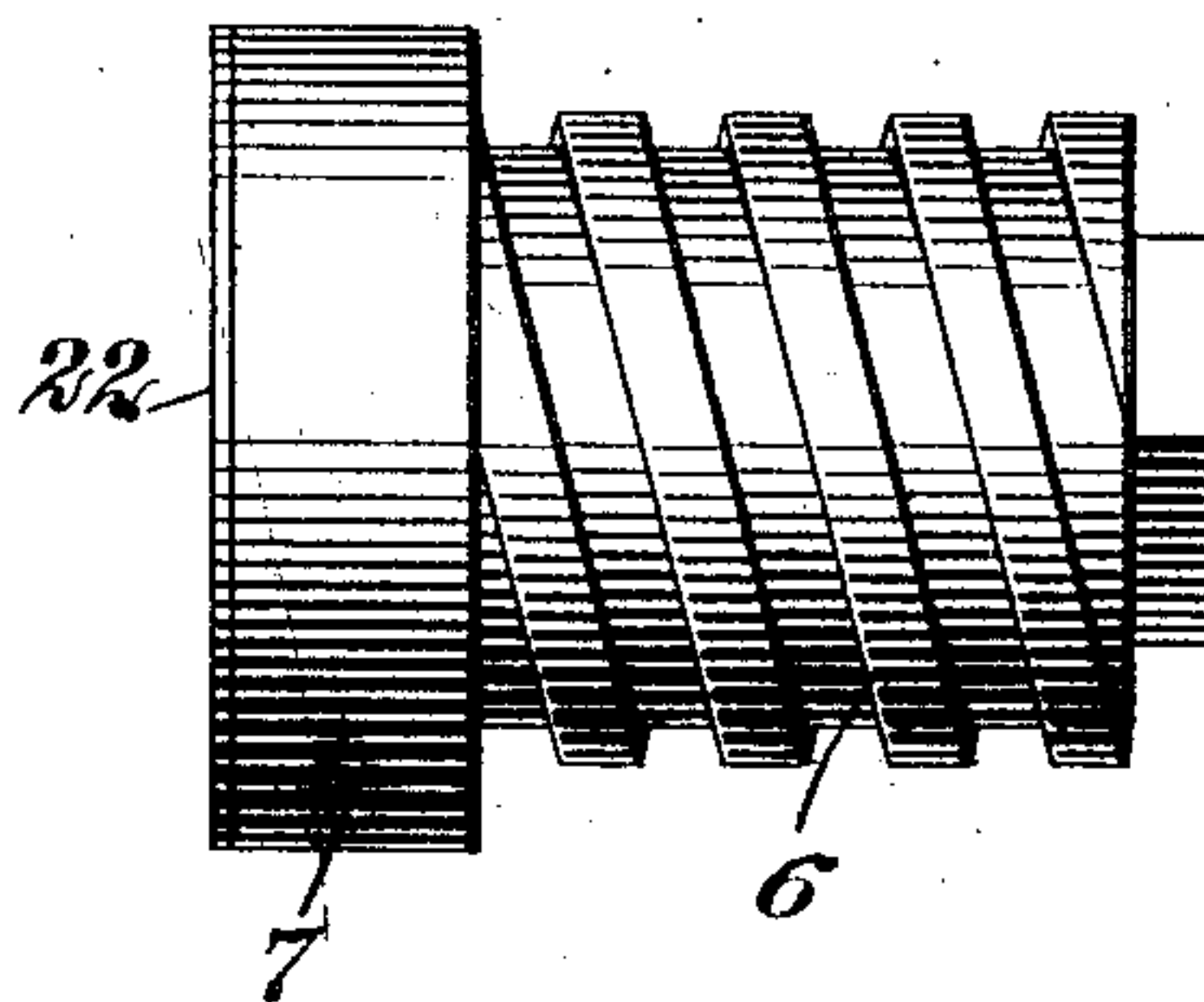


Fig. 3.



WITNESSES:

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STARTING MECHANISM FOR GAS-ENGINES.

No. 812,584.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed February 28, 1905. Serial No. 247,871.

To all whom it may concern:

Be it known that I, VERNON BANFORD MILLER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Starting Mechanism for Gas-Engines, of which the following is a full, clear, and exact description.

This invention relates to starting mechanism for explosion-engines. In starting engines of this class in the usual manner by means of a crank it frequently happens that the crank will be given a violent jerk or "back kick." In this way many accidents have occurred.

The object of this invention is to produce a mechanism of simple construction which will enable explosive-engines to be started without danger to one turning the crank.

The invention is especially applicable in connection with gas-engines of the type usually found on automobiles.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal central section taken through the starting mechanism. Fig. 2 is an elevation showing the mechanism from the inner side, and Fig. 3 is a side elevation of a sleeve which constitutes a part of the invention.

Referring more particularly to the parts, 1 represents a portion of the frame or a bracket in which the mechanism may be mounted. In this part a bushing 2 is rigidly attached at a suitable opening, said bushing being preferably provided at its outer end with a flange 3, adapted to set against the outer face of the member 1, as shown. At its inner extremity this bushing 2 is provided with an enlarged counterbore 4, the purpose of which will appear more fully hereinafter. The bore 5 of the bushing is provided with a helical thread of a high pitch, as indicated. In this bore 5 a sleeve 6 is mounted, the same being provided on its exterior with threads received in the bore, as will be readily understood. From this arrangement it should be understood that if the sleeve 6 is rotated it will advance longitudinally in the bushing. At its inner extremity the sleeve 6 is formed with an enlarged head 7, which is received in the aforesaid bore 4, as indicated, and it is further provided at this part with a circular recess 8.

The sleeve 6 is provided centrally with a

bore in which is rotatably mounted a starting-spindle 9, to the outer extremity of which a crank 10 attaches rigidly. To the inner extremity of the spindle 9 a ratchet-wheel 11 is rigidly attached. This ratchet-wheel is much elongated, as indicated, and provided, near its inner extremity, with a plurality of ratchet-teeth 12, which incline in the direction indicated in Fig. 2. Beyond the ratchet-teeth 12 the outer portion of the ratchet-wheel is preferably plane, as shown, and its outer face is preferably provided with a pair of oppositely-disposed notches or recesses 13, said notches presenting abrupt faces 14, as indicated.

In alinement with the starting-spindle 9 a crank-spindle 15 is rotatably mounted, the same being provided at its adjacent extremity with a head 16, the outer face whereof is provided with teeth 17. These teeth are adapted to cooperate with the notches 13 aforesaid, presenting, as they do, abrupt faces 18, which engage the abrupt faces 14 of the notches. When engagement between the ratchet-wheel and the head 16 is made in this way, the crank 10 affords means for rotating the crank-spindle 15. In this connection it should be stated that in order for the adjacent faces of the ratchet-wheel and the head 16 to engage the sleeve 6 must be screwed into its innermost position, and, conversely, when the sleeve 6 is unscrewed, so as to move the same outwardly, the ratchet-wheel 11 and the head 16 cannot engage.

In order to enable the starting-spindle 9 to be disengaged automatically from the starting-spindle in case of the sudden back kick or reversing of the engine, I provide in the head 7 of the sleeve a plurality of pockets 19. These pockets are preferably formed by the recess in the face of the recess 8. In each pocket 19 a pawl 20 is mounted so that its extremity normally lies in engagement with the teeth 12 of the ratchet-wheel 11. The contact is maintained, preferably, by means of small spring 21, one of which is used in connection with each pawl, as shown. These pockets, together with the pawls lying within them, are preferably all concealed from view by an annular face-plate 22, which is attached to the inner extremity of the sleeve, as shown. It should be understood that when the crank 10 is being rotated in the proper direction to start the engine the ratchet-wheel 11 will rotate in the direction indicated by the arrow in Fig. 2, and this direction, it will be ob-

served, is opposite to the direction in which the teeth 12 project, so that as the rotation of the ratchet-wheel takes place the pawls 20 will not prevent the rotation, but if the crank-spindle 15 is suddenly rotated in the rear direction, as by a back kick, the reverse movement of the ratchet-wheel 11 will produce a backward rotation also of the sleeve 6. The pitch of the threads of the sleeve 6 is so great that with a slight rotation of the sleeve it will move outwardly sufficient to disengage the ratchet-wheel from the head 16. Hence it will be seen that with a very slight reverse movement or back kick of the engine the starting-spindle 9 will become disengaged from the starting-spindle 15, and no dangerous results can follow.

In order to enable the position of the sleeve 6 to be adjusted as desired, its outer extremity is preferably provided with a hand-wheel 23 of any suitable construction, the same being rigidly attached in any suitable manner.

The starting mechanism described is evidently of very simple construction and affords efficient means for starting an engine, at the same time preventing any possibility of accidents from the violent movement of the crank which may occur from the first explosion in the cylinder.

In the operation of the device when the engine starts in the forward direction of course the inclined faces of the teeth 17 throw the starting-spindle out of connection in the usual manner.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a starting mechanism of the class described, in combination, a crank-spindle, a starting-spindle adapted to engage the same, a sleeve in which said starting-spindle is rotatably mounted, said sleeve having a thread of high pitch, a one-way clutch connection between said starting-spindle and said sleeve, and a member having a threaded bore receiving said sleeve.

2. In a starting mechanism of the class described, in combination, a crank-spindle having a collar with teeth, a starting-spindle, a ratchet-wheel carried thereby and also having recesses cooperating with said teeth, a sleeve in which said starting-spindle is rotatably mounted, and pawls carried by said sleeve and engaging said ratchet-wheel, said sleeve having a thread and a threaded bush receiving said sleeve.

3. In a starting mechanism of the class described, in combination, a member presenting a threaded bore, a sleeve having a thread engaging the same and rotatably mounted in said bore, said sleeve having a recess in the inner extremity thereof, a starting-spindle rotatably mounted in said sleeve, a ratchet-wheel rigidly carried by said starting-spindle and normally lying in said recess, pawls carried by said sleeve and engaging the teeth of said ratchet-wheel, a hand-wheel attached to said sleeve for adjusting the same, a crank-spindle, and means carried by said crank-spindle for engaging said ratchet-wheel.

4. In a starting mechanism of the class described, in combination, a sleeve having an external thread and a bore, a starting-spindle rotatably mounted in said bore and adapted to slide longitudinally therein, a ratchet-wheel attached to said starting-spindle, said sleeve having a plurality of pockets disposed circumferentially about said ratchet-wheel, a plurality of pawls carried respectively in said pockets and engaging said ratchet-wheel, a crank-spindle alining with said starting-spindle, a head carried by said crank-spindle, said head and said ratchet-wheel having means for engagement, and a threaded bush receiving said sleeve.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

VERNON BANFORD MILLER.

Witnesses:

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