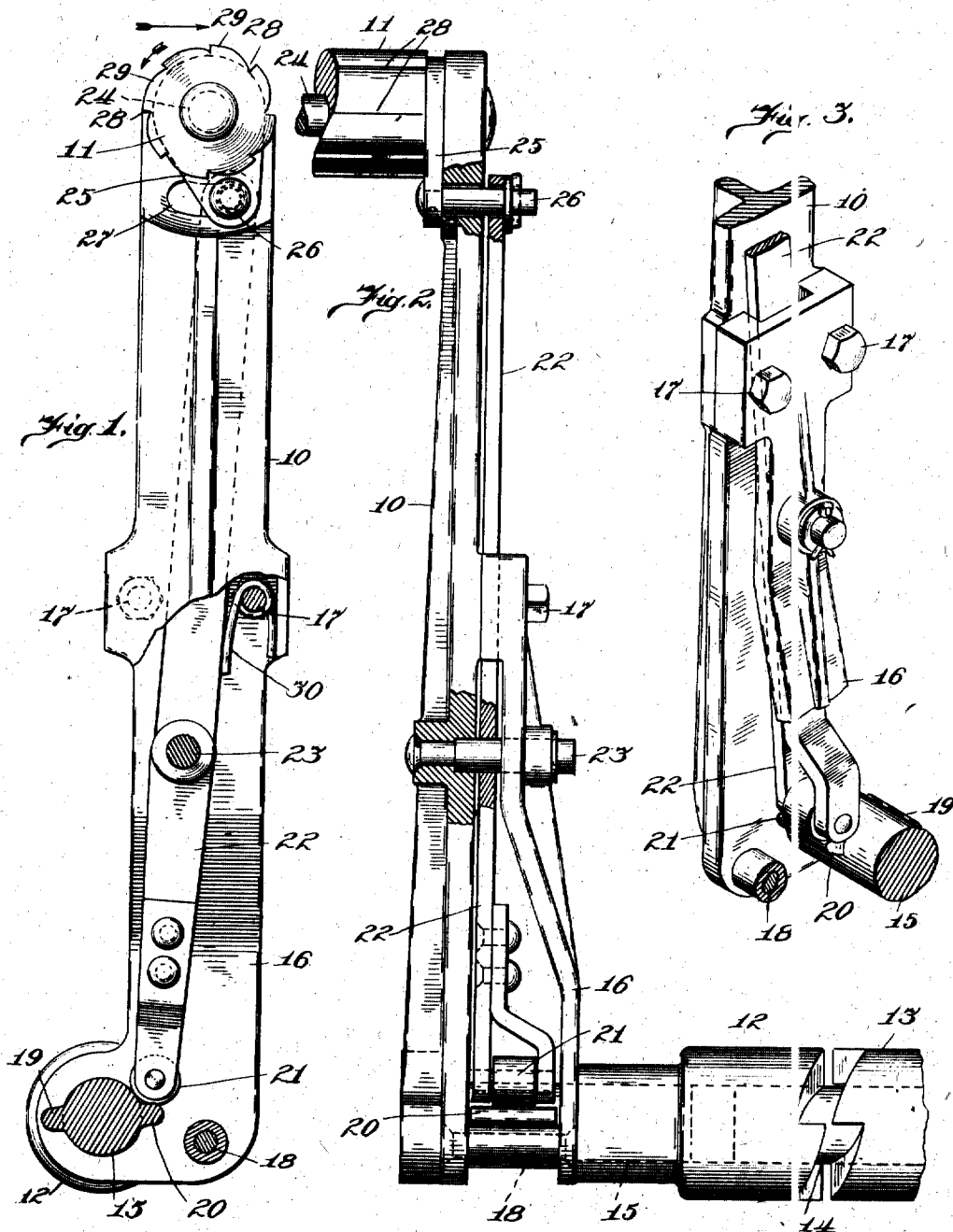


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GAS ENGINE STARTING CRANK.
APPLICATION FILED FEB. 23, 1911.

1,008,487.

Patented Nov. 14, 1911.



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UNITED STATES PATENT OFFICE.

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GAS-ENGINE-STARTING CRANK.

1,008,487.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed February 23, 1911. Serial No. 610,361.

To all whom it may concern:

Be it known that I, FRANK J. PELLING, a citizen of the United States, and resident of Oswego, county of Kendall, and State of Illinois, have invented certain new and useful Improvements in Gas-Engine-Starting Cranks, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to devices adapted for use in starting gas engines by hand, and its object is to provide an automatic release of the crank clutch in the event of the engine starting in the wrong direction.

The invention consists of a structure such as is hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the device in a plane parallel with the direction of its movement, some of the parts being broken away; Fig. 2 is a similar view in a plane perpendicular to the plane on which Fig. 1 is taken, and showing the manner of application of the device to an engine crank; and Fig. 3 is a detail in perspective showing the automatically releasable clutch.

The invention is designed to prevent accidents which are not uncommon in starting gas engines, and particularly in starting the engines of automobiles. The accidents referred to are such as result from the ignition of the first charge to be fired, before the piston has passed the center, that is to say, commenced its outstroke, with the result that the crank shaft is turned in the wrong direction and consequently injures the arm of the operator with which he is turning the starting crank. The invention provides for an automatic release of the starting crank in the event of the reversal of the engine shaft, and consequently removes the danger of accident to the operator.

The device as shown comprises the usual crank-arm 10, modified as hereinafter described; the crank handle 11, and the clutch head 12 for engaging a clutch-block 13 on the crank shaft 14 of the engine (not shown).

The clutch head 12 is carried by a shaft 15, upon which the crank-arm 10 is normally free to turn instead of being permanently fixed thereto, as in the practice which has heretofore prevailed. For the purpose of providing this shaft 15 with a suitable

bearing, a bracket arm 16 is attached to the crank-arm 10, as by the bolts 17, 18, its outer end being off-set from the crank-arm to provide a longer bearing for the shaft and to provide a housing for the clutch mechanism to be described.

The shaft 15 is provided with radially projecting lugs or shoulders 19, 20, as many thereof being used as the judgment of the designer may dictate. These lugs are located between the arm 10 and the bracket-arm 16. A dog for engaging the lugs 19, 20, and taking the form of a roller 21, is carried by an oscillating bar 22, pivotally attached, as shown at 23, to the crank-arm 10. The outer end of the bar 22 terminates a little short of the crank pin 24 upon which the grip member 11 is rotatably mounted. A short crank-arm 25 is fixed to the inner end of the grip 11, and is connected by means of a pin 26 with the bar 22, this pin extending loosely through a curved slot 27 in the crank-arm 10, being fixed in one of the members 22 or 25 and loosely engaging the other.

When the operator grasps the grip member 11 for the purpose of turning the crank-arm, the clutch head 12 having been connected with the clutch-block 13, the grip member is first turned on the crank pin 24 as the arm 10 begins to move, swinging the bar 22 on its pivot 23 and engaging the dog 21 with one of the lugs 19, 20, thus securely clutching the crank arm to the shaft 15. Should the crank shaft 14 of the engine be turned in the reverse direction by a premature ignition of the engine charge, the initial backward movement of the crank arm 10 causes the grip member 11 to be turned in the reverse direction, thereby immediately disengaging the dog from the lug 19 or 20, and thus relieving the operator from any danger of accident. By giving the dog 21 the form of a roller, its release from the crank lug is more easily and certainly effected. As a further precaution, and to insure the necessary movement of the grip member as to the crank-arm upon a reversal of direction, the grip member is channeled longitudinally, as shown at 28, one face of each channel being abrupt and the other being chamfered away, as shown at 29. The chamfering permits the grip member to easily slide through the operator's hand as the crank is turned in the normal

action, the vertical wall of the grooves preventing the grip from freely sliding in the hand upon a reversal of direction and thus insuring the desired movement of the dog-carrying bar 22.

As illustrated the device is adapted for use in place of the crank heretofore ordinarily employed in connection with gas engines, the shaft 15 being normally disconnected from the engine shaft. It is obvious, however, that the action of the safety device will be the same, even if the shaft 15 were a permanent part of the engine shaft. In that case, in order to prevent rattling, it is advisable to introduce a light spring to normally hold the dog 21 away from the lugs 19, 20. Such a spring is shown at 30 as wound around one of the bolts 17, and reacting between the bar 22 and a side wall of the cover plate 16.

I claim as my invention—

1. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm rotatably mounted on the shaft, an oscillatable bar carried by the arm, a dog carried by the bar for engaging the shoulder, a crank pin mounted on the outer end of the arm, an oscillatable hand grip carried by the pin and operatively connected with the bar.

2. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm rotatably mounted on the shaft, an oscillatable bar carried by the arm, a dog carried by the bar for engaging the shoulder, a crank pin mounted on the outer end of the arm, an oscillatable hand grip carried by the pin, a crank arm fixed to the grip, and a pin carried by the last-named crank arm and engaging the bar.

3. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm rotatably mounted on the

shaft, an oscillatable bar carried by the arm, a rotatable dog carried by the bar for engaging the shoulder, a crank pin mounted on the outer end of the arm, an oscillatable hand grip carried by the pin and operatively connected with the bar.

4. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm rotatably mounted on the shaft, an oscillatable bar carried by the arm, a dog carried by the bar for engaging the shoulder, a crank pin mounted on the outer end of the arm, an oscillatable hand grip carried by the pin and operatively connected with the bar, such grip having longitudinal shoulders the rearward faces of which are abrupt and their forward faces being inclined.

5. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm rotatably mounted on the shaft, an oscillatable bar carried by the arm, a dog carried by the bar for engaging the shoulder, a crank pin mounted on the outer end of the arm, an oscillatable hand grip carried by the pin and operatively connected with the bar, and a spring for normally holding the dog out of engagement with the shoulder.

6. In a starting crank for gas engines, in combination, a shaft having a radial shoulder, a crank arm pivoted on the shaft, a bar pivoted intermediate of its ends to the arm and being engageable with the shoulder, a grip member pivoted to the outer end of the arm, a crank arm fixed to the grip member and pivotally attached to the outer end of the bar, and a spring urging the bar away from the shoulder.

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