

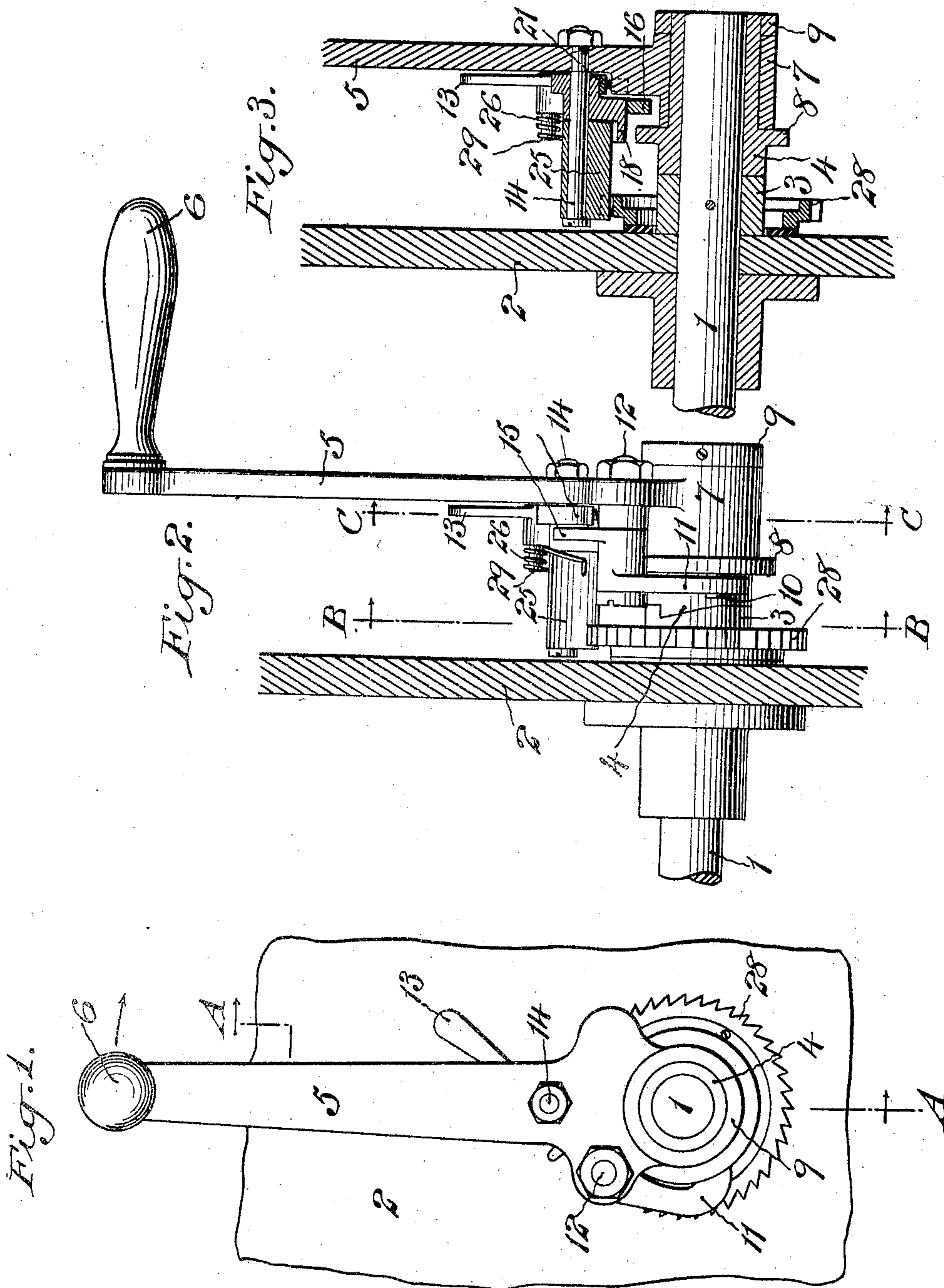
No. 813,068.

PATENTED FEB. 20, 1906.

H. J. WIEGAND.  
EXPLOSIVE ENGINE STARTING MECHANISM.

APPLICATION FILED MAY 21, 1904.

2 SHEETS—SHEET 1.



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Fig. 6.

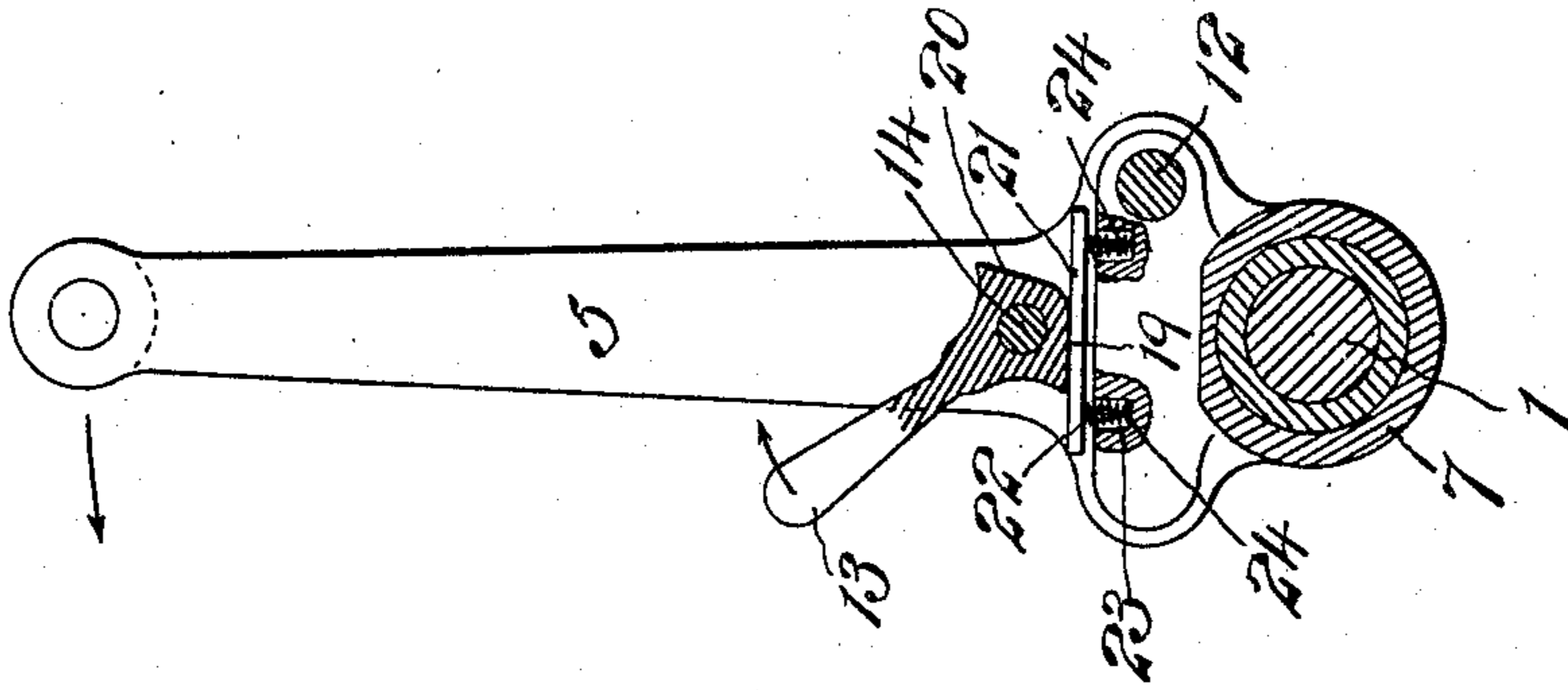


Fig. 5.

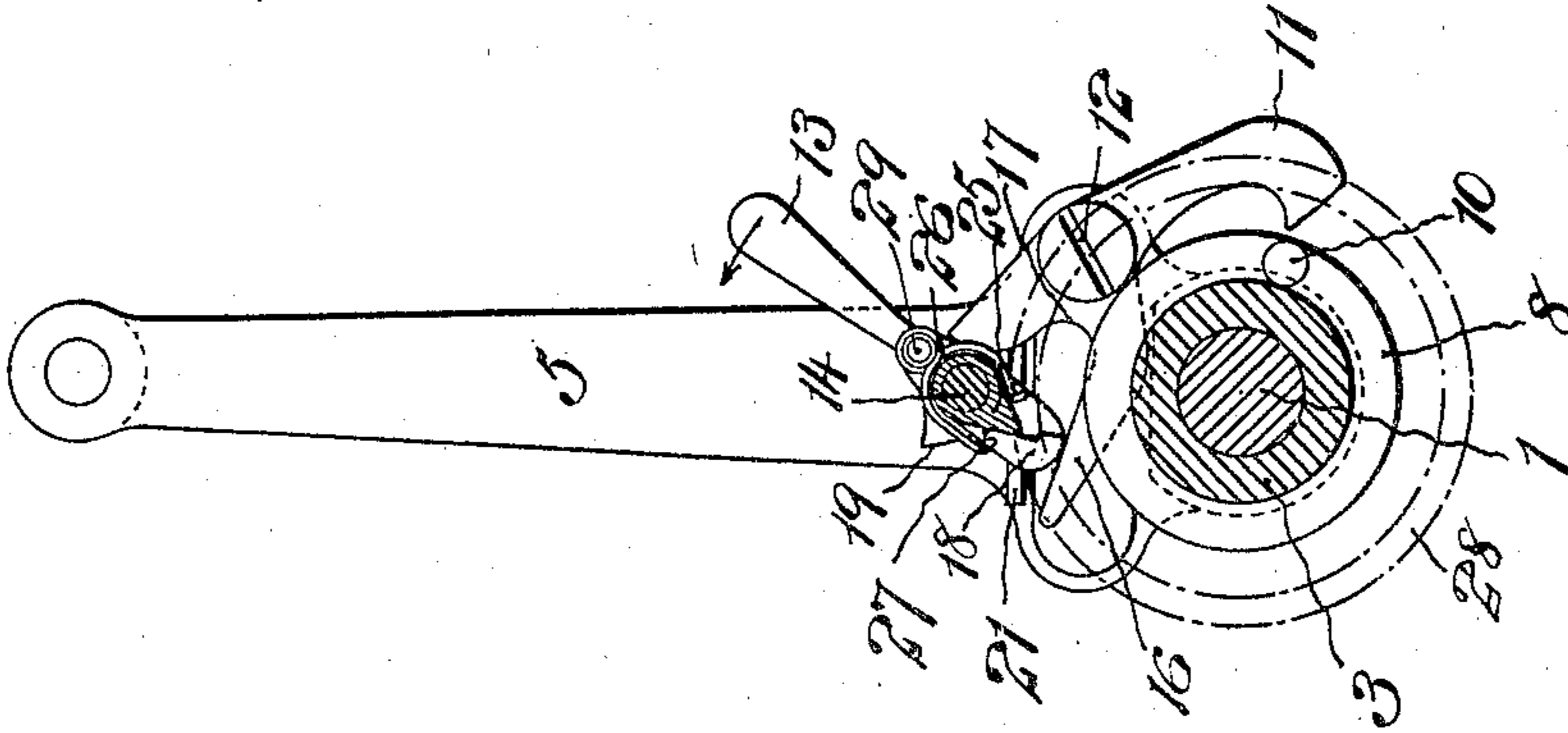
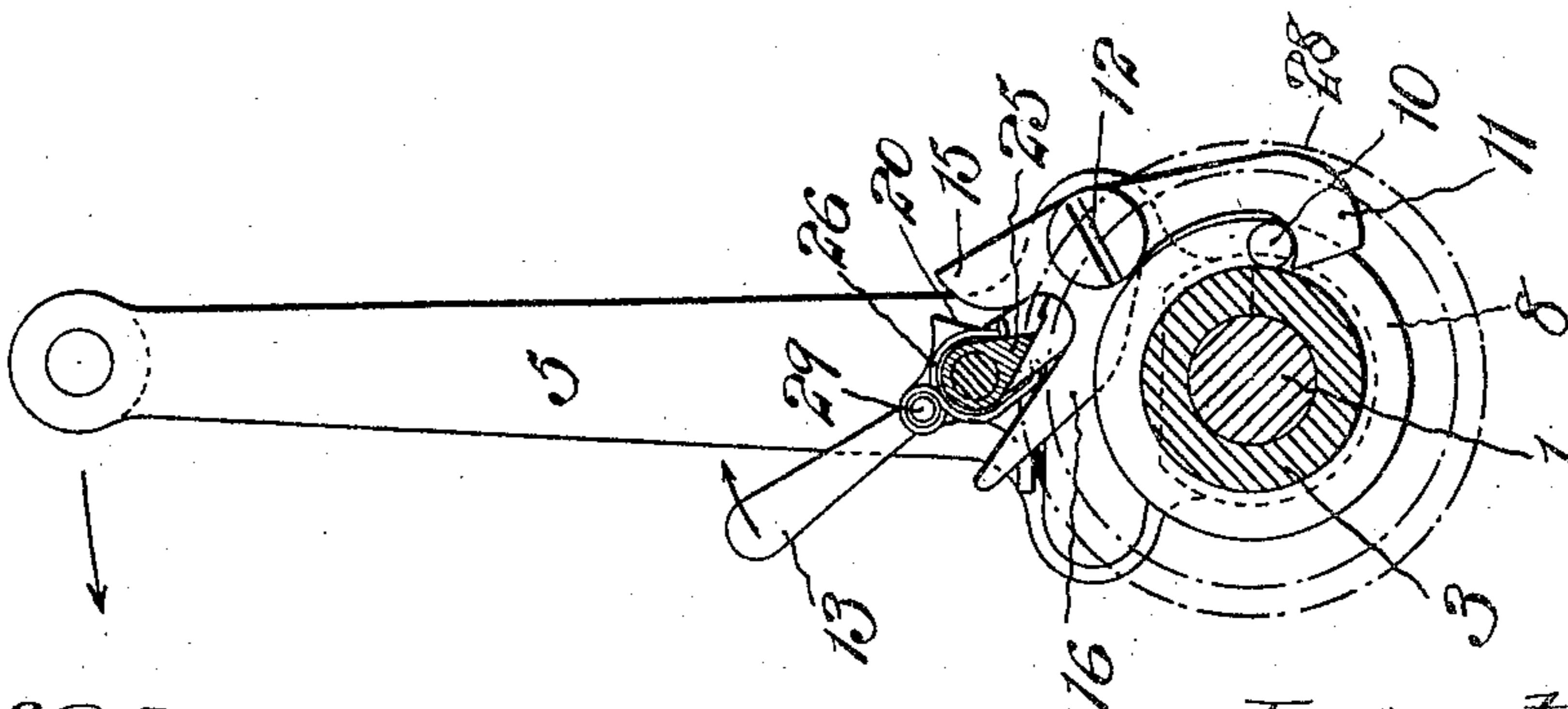


Fig. 4.



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# UNITED STATES PATENT OFFICE.

HENRY J. WIEGAND, OF MILWAUKEE, WISCONSIN.

## EXPLOSIVE-ENGINE-STARTING MECHANISM.

No. 813,068.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed May 21, 1904. Serial No. 209,018.

*To all whom it may concern:*

Be it known that I, HENRY J. WIEGAND, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Explosive-Engine-Starting Mechanism, of which the following is a specification.

My invention relates to improvements in explosive-engine-starting mechanism, and is more particularly devoted to means for automatically releasing the starting mechanism from the engine-shaft should a reverse impulse be given to the shaft by a premature explosion in the cylinder.

This invention is particularly applicable for use in connection with explosive hydrocarbon engines used as motors for automobiles and launches, where the danger to the operator by the premature explosion in the engine is great by reason of the person having hold of the starting mechanism and not being able to get out of its way in time. This premature explosion in the engine has been the cause of many accidents, owing to the starting-crank handle being locked to the engine-shaft, so as to rotate therewith.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents in front elevation so much of a starting mechanism and its adjacent parts as will give a clear understanding of my invention. Fig. 2 is a side view of the same. Fig. 3 is a partial vertical central section taken in the plane of the line A A of Fig. 1 looking in the direction of the arrows. Fig. 4 is a transverse section taken in the plane of the line B B of Fig. 2 looking in the direction of the arrows, the parts being in their normal position. Fig. 5 is a similar view with the parts in the position which they assume when the starting mechanism has been thrown out of operation by a reverse movement of the shaft due to a premature explosion in the engine-cylinder, and Fig. 6 is a transverse section taken in the plane of the line C C of Fig. 2 looking in the direction of the arrows.

The shaft of an explosive hydrocarbon engine is herein denoted by 1, and one of its supports is denoted by 2. This shaft has fixed thereto near its end exterior to the support 2 a clutch member 3, which is arranged to be interlocked with a clutch member 4, having a free sliding movement on the shaft.

The starting-crank is denoted by 5, its

handle by 6, and its hub by 7. This hub is loosely mounted on the movable clutch member 4 and is held rotatively thereon between a permanent circumferential flange 8 and a collar 9, fixed to said movable clutch member. The flange 8 of the clutch member is provided with an inwardly-projected stud 10. The crank 5 is provided with a catch 11, hinged at 12 on the crank 5. This catch 11 is normally held in engagement with the stud 10 by a cam-lever 13, hinged at 14 to the crank.

The engagement between the cam-lever 13 and the catch 11 is as follows: The catch is provided with branches 15 16, forming between them a recess 17, arranged to receive an arm 18, depending from the cam-lever 13. The cam-lever 13 is provided with two faces 19 20, arranged to be engaged by a spring-actuated lock 21 for holding the cam-lever in the one or the other of its two positions. When the spring-actuated lock 21 is engaged with the cam-face 19, the arm 18 will be located within the recess 17 of the catch, thus permitting the catch to engage the stud 10 of the movable clutch member 4. When the spring-actuated lock 21 is in engagement with the cam-face 20 of the lever 13, the arm 18 of the lever will be swung outwardly into engagement with the branch 16 of the catch, thus depressing said branch and lifting the hook of the catch out of engagement with the stud 10 of the movable clutch member.

The spring-actuated lock hereinbefore referred to comprises a plate having depending lugs 22 inserted in sockets 23 in the crank 5 at its hub, within which sockets and around the lugs I provide springs 24, tending to yieldingly hold the plate against the one or the other of the cam-faces 19 and 20 of the cam-lever 13.

The means which I have shown for accomplishing the swinging movement of the cam-lever 13 to release the catch is as follows: A spring-actuated pawl 25 is hinged at 14 to the lever 13, which pawl is yieldingly held by a spring 26 against a shoulder 27 on the depending arm 18, formed by cutting away a portion of the said depending arm. A ratchet-wheel 28 is secured to the support 2 concentric with the engine-shaft 1, with its teeth projected in a direction permitting the pawl 25 to trail over the teeth when the crank is turned in a direction to rotate the shaft to start the engine. The spring 26 is shown as being coiled about a stud 29 on the cam-lever

13, one end of the said spring pressing against the depending arm 18 and the other end of the spring pressing against the free face of the pawl 25.

5 The operation of the device is as follows: The crank, with its movable clutch member and other parts, is inserted into position on the end of the engine-shaft. The crank is then swung in the required direction to im-  
 10 part a rotary movement to the engine-shaft in its proper direction to start the engine. The pawl 25 will run freely over the stationary ratchet-wheel, and the movable clutch member will be brought into interlocking  
 15 engagement with the fixed clutch member. The catch will be caused to engage the stud 10 for locking the crank to the movable clutch member. If the explosion occurs at the proper time, the shaft will be continued  
 20 in its rotary motion in the proper direction, causing the clutch member fixed thereto to slip by the movable clutch member, thus disengaging the starting device from the shaft. Should a premature explosion occur in the  
 25 engine-cylinder, causing a reverse movement of the engine-shaft, the engine-shaft will start the crank in the reverse direction. As it does so the pawl 25, because of its engagement with one of the teeth of the stationary  
 30 ratchet, will be swung over into the position shown in Fig. 5, and thereby swing the depending arm 18 of the cam-lever out of the recess 17 in the catch and along the branch 16 thereof, swinging the hook of the catch  
 35 out of its engagement with the stud 10, thus

releasing the crank from its engagement with the shaft and permitting the shaft to continue its reverse motion without carrying the crank therewith. The reverse motion of the crank is so slight as to do no harm before it is  
 40 automatically released from the engine-shaft.

While I have shown the device herein as applied in connection with a removable starting-crank, it is to be understood that the device may be equally well applied to a start-  
 45 ing-crank which is carried at all times on the shaft.

It is evident that changes may be resorted to in the construction, form, and arrangement of the several parts without departing  
 50 from the spirit and scope of my invention. Hence I do not wish to limit myself to the exact structure herein set forth; but

What I claim is—

The combination with an explosive-engine  
 55 shaft, a starting-crank therefor, a catch for locking the crank to the shaft, a cam-lever for controlling the catch, a pawl for controlling the movement of the lever and a station-  
 60 ary part arranged to move the pawl to disengage the catch when the shaft is moved in a reverse direction.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 18th day of  
 65 May, 1904.

HENRY J. WIEGAND.

Witnesses:

JOHN HAAS,

A. S. HOPKINS.