J. A. ANGLADA.

SAFETY STARTING DEVICE FOR GAS ENGINES,

APPLICATION FILED MAR. 11, 1914.

1,192,489.

Patented July 25, 1916.

Fig. 1.

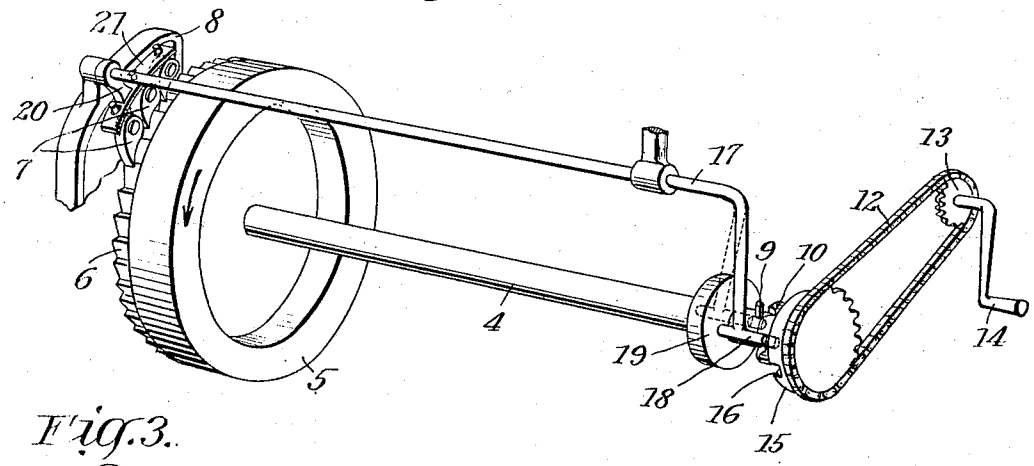


Fig. 3.

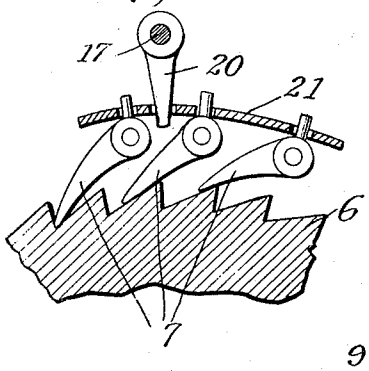
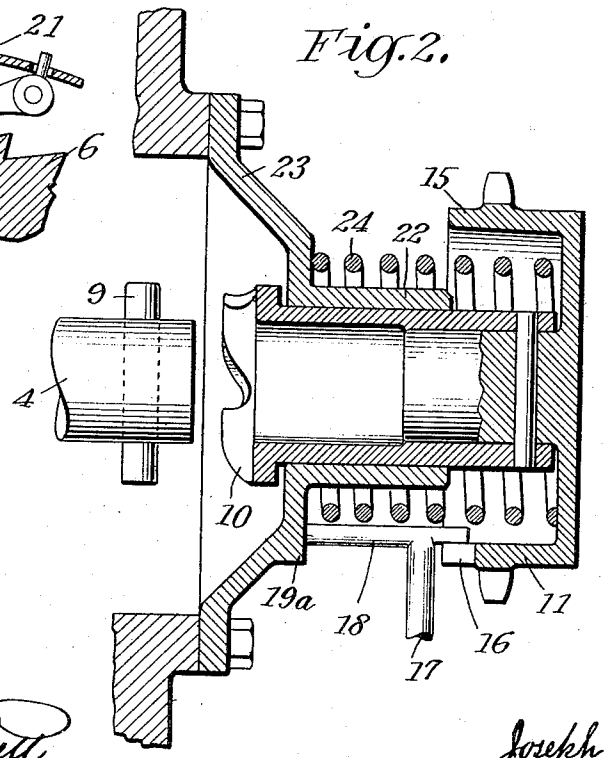


Fig. 2.



WITNESSES

J. Howden Bell.

S. L. Cockburn

INVENTOR

Joseph A. Anglada

BY

Edward A. Wright.

ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH A. ANGLADA, OF NEW YORK, N. Y., ASSIGNOR TO MILWAUKEE LOCOMOTIVE MANUFACTURING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

SAFETY STARTING DEVICE FOR GAS-ENGINES.

1,192,489. Specification of Letters Patent. Patented July 25, 1916.

Application filed March 11, 1914. Serial No. 823,870.

To all whom it may concern:

Be it known that I, JOSEPH A. ANGLADA, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have invented a certain new and useful Improvement in Safety Starting Devices for Gas-Engines, of which improvement the following is a specification.

This invention relates to starting devices for gas or other explosive engines, and has for one of its objects to provide an improved safety mechanism for preventing a backward revolution of the shaft in the event of a so-called "kick-back," or backward explosion at the time of starting the engine, and thereby avoid danger of injury to the operator. After the engine starts running, the device for preventing a backward revolution is ordinarily withdrawn from an operative position, and another object of my invention is to provide interlocking means whereby it is necessary to shift the locking device into its operative position before the starting device may be used to start the engine.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawing: Figure 1 is a perspective view illustrating my improvement as applied to the clutch shaft of a gas engine; Fig. 2, a longitudinal section of the starting device on a larger scale, and showing a slight modification; and Fig. 3, a detail view in transverse section, showing the relation of the ratchet teeth and pawls.

According to the construction shown in the drawing, the crank shaft or clutch shaft, 4, of the engine, is provided with a wheel, 5, having a ratchet, 6, adapted to coöperate with the pawls, 7, pivoted upon the frame, 8. Near the end of the shaft, 4, is mounted the starting pin, 9, adapted to be engaged by the jaw clutch, 10, which is longitudinally movable to and from the starting pin and rigidly attached to the sprocket, 11, driven by chain, 12, small sprocket, 13, and starting crank, 14.

The sprocket, 11, is provided with a cylindrical flange, 15, having a slot, 16, through which the lower horizontal end of the disengagement shaft, 17, is adapted to pass when in a certain position. The disengagement shaft, 17, is mounted in suitable bearings, and extends from the pawls, on the fly wheel out to the end of the clutch shaft, where it is bent at right angles and provided with a horizontal end, 18, which in one position swings downward between the circular stop flange, 19, and the sprocket, 11. Near the other end of the disengagement shaft is mounted the arm, 20, extending through a slot in the curved bar, 21, engaging the pawls, 7. A plurality of pawls, preferably three, are employed and the same are spaced slightly farther apart than the pitch of the ratchet teeth, so that when the pawls are bearing upon the ratchet wheel there is no position of the wheel in which there is a free backward movement greater than about one third of the pitch of the teeth. When the pawls are in engagement with the ratchet wheel, therefore, there is no opportunity for any material backward movement of the fly wheel.

When it is desired to start the engine, the bent end of the disengagement shaft must be turned upward to the position shown in dotted lines in Fig. 1, before the sprocket, 11, and jaw clutch, 10, can be moved longitudinally to engage the starting pin, 9, on the shaft, 4. This upward movement of the disengagement shaft turns the pawls, 7, so as to bear upon the teeth of the ratchet wheel. The jaw clutch is then held in engagement with the starting pin, and the starting crank turned by hand. If there should then be a kick-back of the engine, it will be seen that the pawls engaging the ratchet teeth will prevent any back movement of the wheel and shaft, and thereby avoid any chance of injury to the operator.

As soon as the engine starts running, the jaw clutch and sprocket, 11, are thrown out to the outer position, and the bent end of the disengagement shaft then falls down between the circular flange, 19, and the sprocket, 11, the horizontal end, 18, passing through the slot, 16, where it normally remains beneath the cylindrical flange, 15. This downward movement of the bent end of the disengagement shaft operates through the arm, 20, and bar, 21, to raise the pawls, 7, out of engagement with the ratchet during the normal running of the engine. This construction therefore serves as an interlocking mechanism between the starting device and pawls to prevent the application of the starting device until the pawls are

thrown down into engagement, and to release the pawls when the starting device is withdrawn.

As shown in Fig. 2, jaw clutch, 10, and sprocket, 11, are pinned together and rotatably mounted in a bearing, 22, in a housing, 23, secured to the frame, the clutch having also a longitudinal movement to and from the end of the clutch shaft, 4, and starting pin, 9. A spring, 24, mounted between the housing, 23, and the sprocket, 11, normally tends to throw said sprocket and jaw clutch to the outer disengaged position. When the horizontal end, 18, of the disengagement shaft passes through the slot, 16, the end is interposed between the sprocket, 11, and the stop flange, 19a, upon the housing, and prevents the application of the jaw clutch to the starting pin until said disengagement shaft is raised to its outer position with the pawls bearing upon the ratchet teeth.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a gas engine, the combination with a pawl and ratchet device for preventing a backward revolution, of a starting device, and an interlocking mechanism having one position for throwing the pawl and ratchet device into engagement and permitting the operation of the starting device, and another position for releasing the pawl and ratchet device, and serving as a stop to prevent the application of the starting device.

2. In a gas engine, the combination with a pawl and ratchet device for preventing a backward revolution, of a starting device including a longitudinally movable jaw clutch, and an interlocking mechanism adapted in one position to release the pawls and serve as a stop to prevent the longitudinal movement of the jaw clutch and in another position to throw the pawls into engagement and to remove the stop.

3. In a gas engine, the combination with a pawl and ratchet device for preventing a backward revolution, of a starting device including a longitudinally movable jaw clutch, and a manually operated shaft having a connection for actuating said pawl and means for preventing said longitudinal movement of the jaw clutch.

4. In a gas engine, the combination with a pawl and ratchet device for preventing a backward revolution, of a starting device including a longitudinally movable jaw clutch having a flange provided with a slot, and a disengagement shaft having a connection for actuating the pawl and a bent end adapted to engage said slot.

JOSEPH A. ANGLADA.

Witnesses:

THOMAS J. BYRNE,

EDWARD A. WRIGHT.