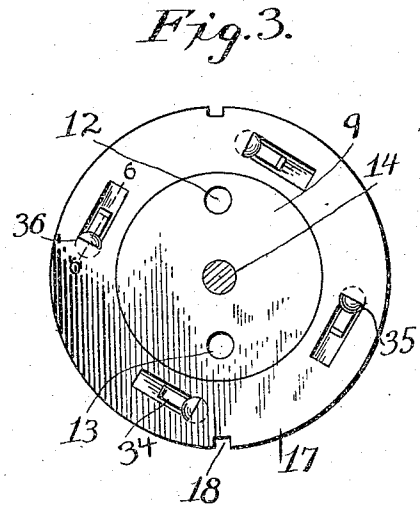
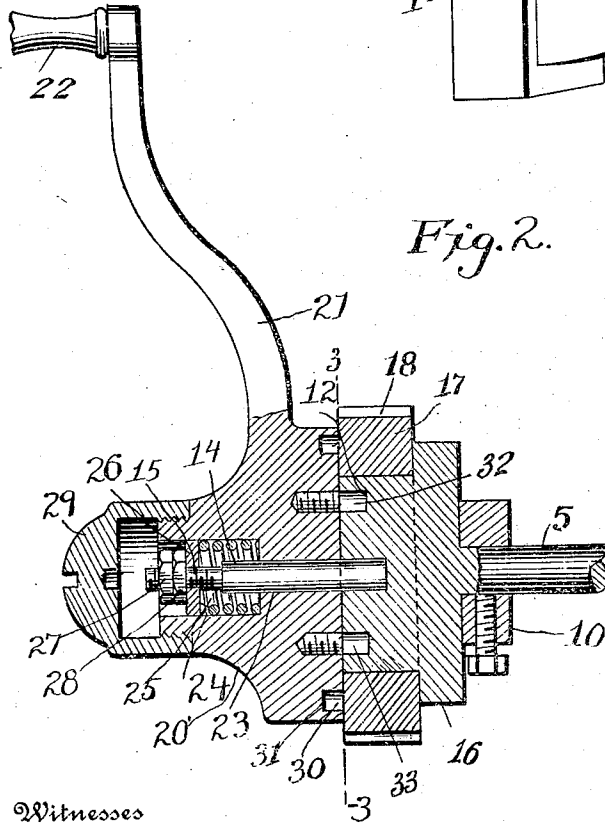
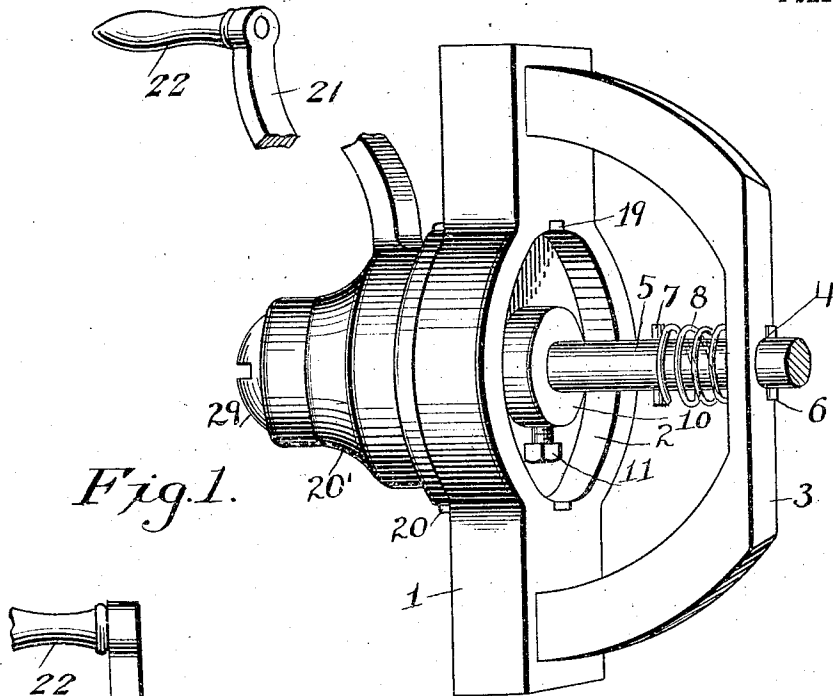


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SAFETY CRANKING DEVICE FOR ENGINES.
APPLICATION FILED NOV. 25, 1911.

1,057,888.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 1.



Witnesses

R. H. Jones.

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Inventor
Adolph Schreck.

By Victor J. Evans

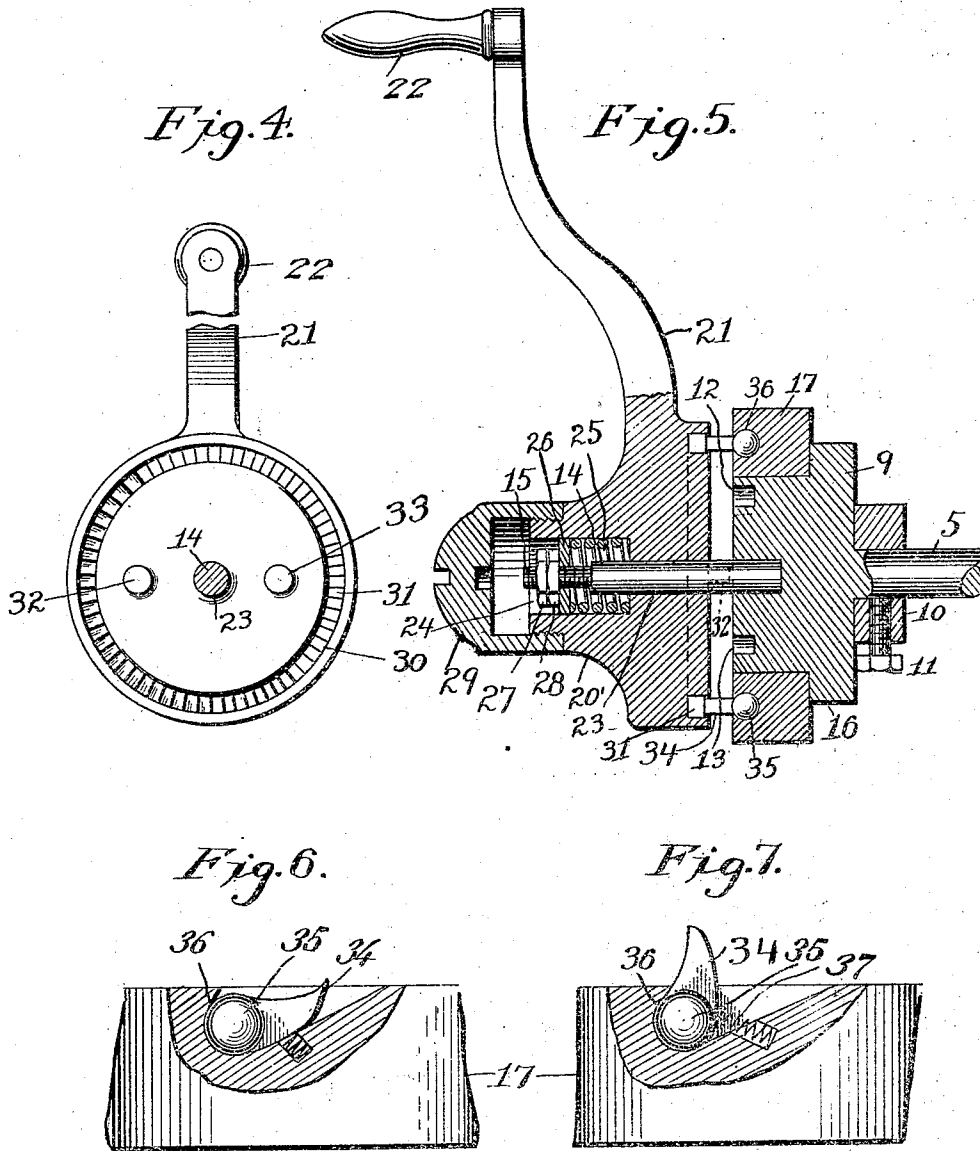
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UNITED STATES PATENT OFFICE.

ADOLPH SCHRECK, OF PHOENIX, ARIZONA, ASSIGNOR OF ONE-THIRD TO J. FRED CLEVELAND, OF PHOENIX, ARIZONA.

SAFETY CRANKING DEVICE FOR ENGINES.

1,057,888.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed November 25, 1911. Serial No. 662,374.

To all whom it may concern:

Be it known that I, ADOLPH SCHRECK, a citizen of the United States, residing at Phoenix, in the county of Maricopa and State of Arizona, have invented new and useful Improvements in Safety Cranking Devices for Engines, of which the following is a specification.

This invention relates to a safety cranking device for starting explosive engines, the object of the invention being to provide a simple, reliable and effective device of this character which, in the event of the engine back-firing while being cranked, will automatically free or release the crank handle, thus preventing injury to the operator.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a perspective view of an engine cranking device embodying my invention. Fig. 2 is a longitudinal section on the plane of the locking pins and sockets. Fig. 3 is a transverse section on line 3—3 of Fig. 2, looking toward the collar and bearing ring. Fig. 4 is a similar section looking toward the hub of the crank. Fig. 5 is a view similar to Fig. 2, showing the position of the parts when the engine back fires and the crank is released. Figs. 6 and 7 are detail sections showing the normal and releasing positions of one of the dogs.

Referring to the drawings, 1 designates a suitable bracket plate or support, having a socket or opening 2 and which carries a bearing yoke 3 provided with a central opening 4 through which passes the shaft 5 of the cranking device, which is rotatably and slidably mounted in said opening. The inner end of the shaft 5 is provided in practice with the usual clutch jaw for engagement with a cooperating clutch jaw on the crank shaft of the engine or auxiliary shaft in gear therewith. As will be readily understood, the clutch jaws are normally separated and are adapted to be connected by sliding the shaft 5 inwardly, so as to couple the two shafts together for the cranking action. The shaft 5 is limited in its rearward sliding motion by a stop pin 6 and in its forward or inward sliding motion by a stop pin 7, which stop pins are adapted to engage the cross-piece of the yoke 3. A

spiral spring 8 surrounds the shaft between said cross-piece and the pin 7, and normally operates to slide the shaft rearwardly and hold the clutch jaws normally out of engagement with each other.

In practice, the bracket or supporting member 1 may form part of the frame of the engine or of the automobile or other vehicle on which the engine is mounted, or may be independent of the frame of the engine or vehicle in order that the cranking device as a whole may be constructed as an attachment applicable to any ordinary type of engine or vehicle.

The rear end of the shaft carries a clutch collar or member 9 against which bears a sleeve 10 secured to the shaft by a binding screw 11. The outer face of this collar is flat and provided with a pair of sockets 12 and 13 arranged diametrically opposite each other and at different distances from the axial center of said face. Fixed at its inner end to the collar in line with its axial center and projecting outwardly therefrom is a pin or shaft 14 having a reduced outer threaded end 15. The collar is provided at its inner side with a peripheral retaining flange 16 against which rests a bearing ring 17, which fits within the opening 2 of the bracket or support 1, and has its outer face terminating flush with the outer face of the collar. The ring is provided at suitable points with grooves or key seats 18, and the wall of the opening 2 is provided with similar grooves or key seats 19. Keys or feathers 20 engage said seats and hold the ring from revoluble movement within the opening 2 while permitting it to slide therein with the shaft 5. Slidably and revolubly mounted on the pin or shaft 14 is a second clutch member or hub 20' carrying a crank arm 21 provided with a suitable handle 22. This hub has an axle opening 23 through which the pin 14 passes, which opening communicates at its outer end with a counterbore or socket 24, through which the outer end of the pin projects. Arranged within said socket is a coiled spring 25 adapted to bear at one end against the inner wall of the socket and against its other end against a washer or head 26 mounted on the threaded end of the pin or shaft and retained in position by check and lock nuts 27 and 28. A cap nut 29 engages the outer end of the hub and closes the socket, and is adapted, upon removal, to

permit ready access to the spring and other inclosed parts to be obtained, for the purpose of cleaning or repairing the same or adjusting the nuts to regulate the tension of the spring. The spring acts to normally hold the flat inner face of the hub in engagement with the flat outer face of the collar or clutch member 9, and to permit outward sliding movement of the hub on the pin or shaft 14. The said flat inner face of the hub is provided with an annular groove 30 in which is arranged an annular series of ratchet teeth 31, and from said face of the hub projects a pair of pins 32 and 33 disposed at diametrically opposite sides of the opening 23 and at different distances therefrom, which pins are adapted to engage the sockets 12 and 13 in the collar 9 to normally lock the collar and hub together for the transmission of turning motion from the crank arm and handle 21 and 22 to the shaft 5.

The ratchet teeth 31 are provided for co-operation with a series of hook-shaped or longitudinally curved locking dogs or pawls 34 carried upon the outer face of the bearing ring 17, each of which dogs or pawls is provided with a circular head or bearing member 35 journaled in a socket 36, said pawls being backed by springs 37. The beveled faces of the ratchet teeth 31 are adapted to normally slide over said dogs, whereby the hub and collar are adapted to be normally turned or rotated in a proper direction for the cranking action without interference from the dogs. The dogs are, however, adapted to swing outward on engaging the square shoulders of the ratchet teeth to a position substantially at right angles to the faces of the collar and hub, so that their hooked extremities will interlock positively with said square shoulders of the ratchet teeth, and at the same time transmit an outward sliding motion to the hub against the resistance of the spring 25, to free the hub from engagement with the collar when the collar and shaft 5 are rotated in a retrograde direction on the back-firing of the engine.

In operation, the parts are normally disposed as shown in Figs. 1 and 2, in which the clutch jaw on the shaft 5 is held out of engagement with the clutch jaw on the crank shaft or the shaft in gear therewith. By sliding the shaft 5 inwardly against the pressure of the spring 8, the clutch jaws may be thrown into engagement, so that upon turning the crank handle 22, motion will be transmitted to the shaft 5 to crank the engine, the pins 32 and 33 in this action being seated in the sockets 12 and 13 and holding the collar 9 and hub 20 positively coupled together. On such motion of the collar and hub, the ratchet teeth 31 slide freely over the pawls 34, and the collar 9

turns loosely in the ring 17, as will be readily understood. After the engine has been cranked and the inward pressure is removed from the shaft 5, the latter is returned to normal position by the spring 8, thus retracting the cranking device in an obvious manner. If, during the cranking action, back firing in the engine should occur and the engine shaft rotate in retrograde direction, the backward movement imparted to the hub 20 would cause the ratchet teeth 31 to engage the points of the dogs or pawls 34, which will thus be swung outwardly, thereby transmitting an outward motion to the hub, which will slide on the pin or shaft 14 against the resistance of the spring 25 to a position in which the locking pins 32 and 33 are withdrawn from engagement with the sockets 12 and 13, thus uncoupling the hub from the collar and shaft, leaving the hub free and stationary in the hand of the operator, whereby injury to the latter will be prevented. The pins 32 and 33 and sockets 12 and 13 are arranged at different distances from the bolt 14 and opening 23 in order to adapt them to be matched to couple the hub and collar together again, which operation requires a complete revolution of the hub, during which the dogs are returned to normal position and the parts reset for subsequent automatic operation to free the handle in the event of back-firing of the engine.

From the foregoing description, taken in connection with the drawings, the construction and mode of operation of my improved engine cranking device will be readily understood, and it will be seen that the invention provides a device of this character which is simple of construction, adapted to be manufactured and sold at a comparatively low cost, which is efficient in operation, and that is adapted to effect the automatic release from the shaft 5 in order to prevent injury to the hand or arm of the operator in the event that the shaft should be turned in a retrograde direction when back firing occurs.

Having thus described the invention, what I claim as new, is:—

1. In an engine cranking device, the combination of a starting shaft, a clutch member connected therewith, a second clutch member slidably and rotatably connected with the first-named clutch member, said clutch members being provided with coacting pairs of locking elements arranged at different distances from their axes, a spring for normally holding the second-named clutch member in engagement with the first-named clutch member and permitting outward sliding motion to said second-named clutch member, a stationary element, ratchet teeth upon the second-named clutch member, and one or more dogs carried by said sta-

tionary member to engage and slide said second-named clutch member outward when the shaft turns in a retrograde direction.

2. In an engine cranking device, the combination of a starting shaft, a clutch member connected therewith and having a pin extending axially therefrom, a second clutch member slidably and rotatably mounted on said pin and having a crank handle, said clutch members being provided with coacting pairs of locking elements arranged at different distances from their axes, a stationary element, ratchet teeth upon the second-named clutch member, a spring operating upon the pin and second-named clutch member to normally brace said clutch member toward the first-named clutch member and to permit outward movement of said second-named clutch member, and one or more dogs upon the fixed member adapted to engage said ratchet teeth and move said second-named clutch member out of locking engagement with the first-named clutch member when the starting shaft turns in a retrograde direction.

3. In an engine cranking device, the combination of a starting shaft, a clutch member connected therewith, a pin extending axially from said clutch member, a second clutch member slidably and rotatably mounted on said pin, said clutch members being provided with pairs of coacting locking elements arranged at different distances from their axes, and said second clutch member being provided with a starting crank, a series of ratchet teeth and a socket receiving the outer end of said pin, a spring inclosed within said socket, and acting on said pin and second-named clutch member to force the latter against the first-named

clutch member, a cap closing said socket, and a stationary member provided with one or more dogs to engage said ratchet teeth and force said second-named clutch member out of engagement with the first-named clutch member when the starting shaft rotates in a retrograde direction.

4. In an engine starting device, the combination of a sliding and rotatable starting shaft, a support in which said shaft is slidably and rotatably mounted, a spring for normally holding said shaft slidably retracted, a clutch collar fixed to the shaft, a bearing ring carried by the support and in which said collar is slidably and rotatably mounted, a pin projecting from the collar, a second-clutch member slidably and rotatably mounted on said pin and provided with a crank handle, said clutch collar and second clutch member being provided with coacting pairs of locking elements arranged at different distances from their axes and said second clutch member having a series of ratchet teeth, a spring associated with said second clutch member and pin for normally holding said clutch member in locking engagement with the clutch collar and permitting relative outward movement of said second clutch member, and spring retracted dogs carried by said bearing ring for engagement with said ratchet teeth to force the second clutch member outward when the shaft rotates in a retrograde direction.

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

ADOLPH SCHRECK.

Witnesses:

HARRY L. SHEDD,
C. E. PETTINGALL.