No. 744,857. PATENTED NOV. 24, 1903.

C. N. COOK.

STARTING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.

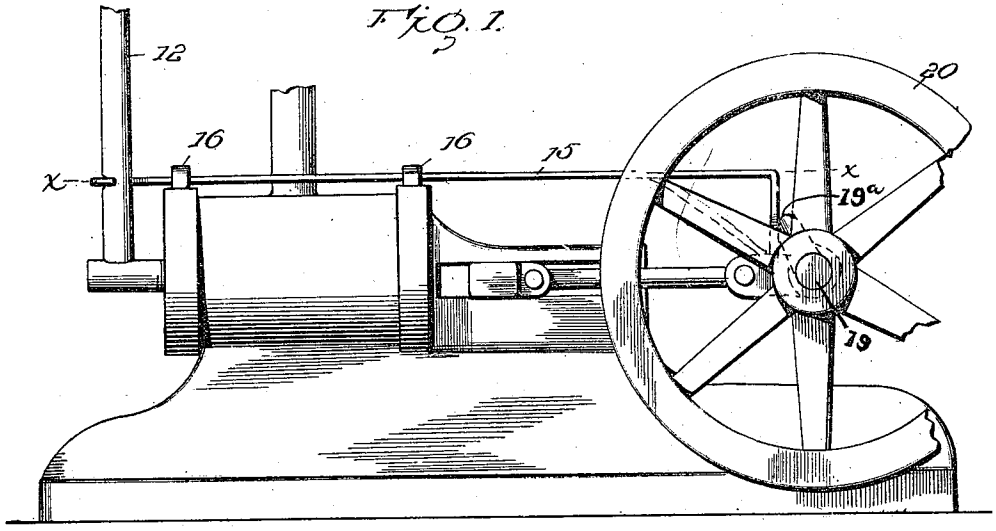


FIG. 2.

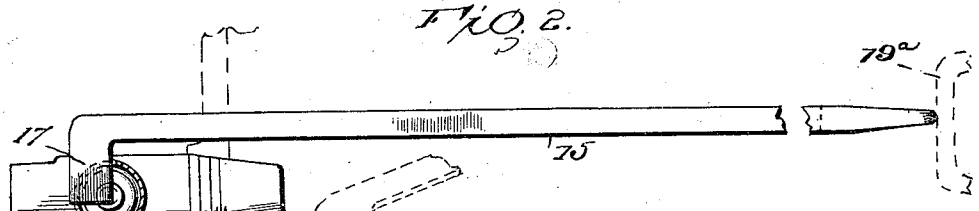
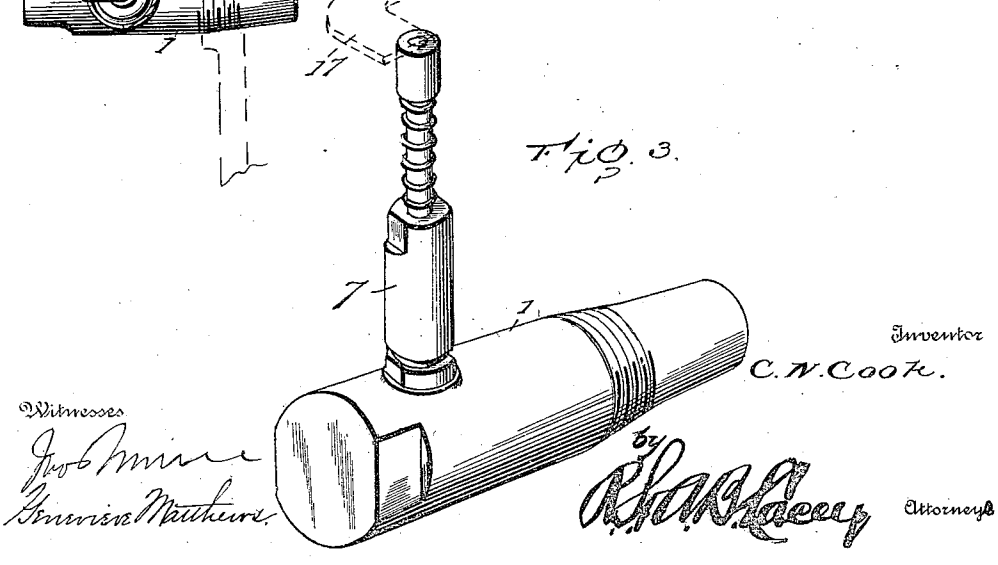


FIG. 3.



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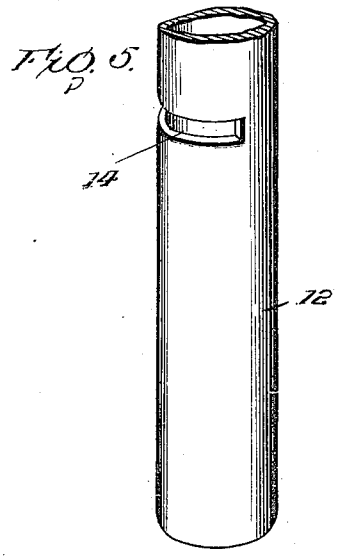
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STARTING MECHANISM FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 25, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

FIG. 5.



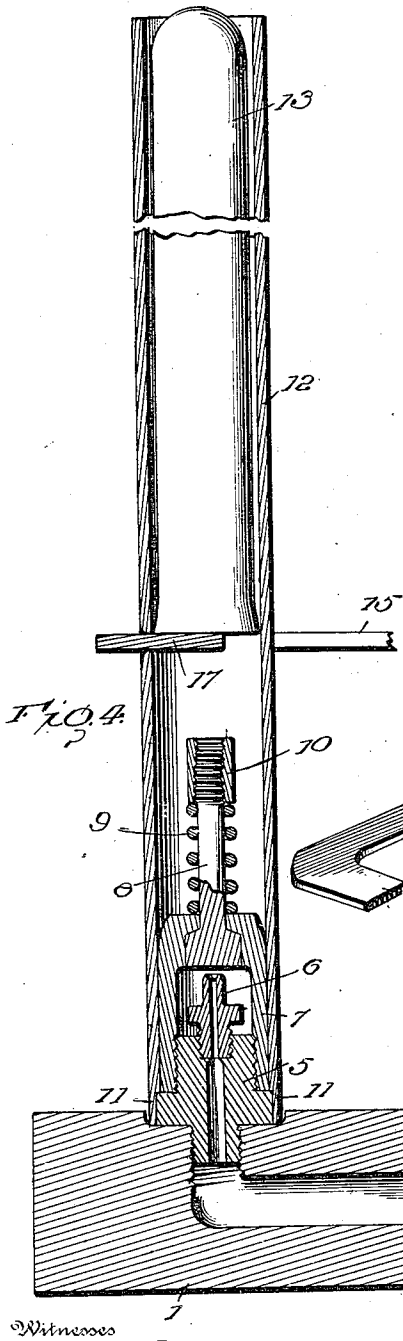
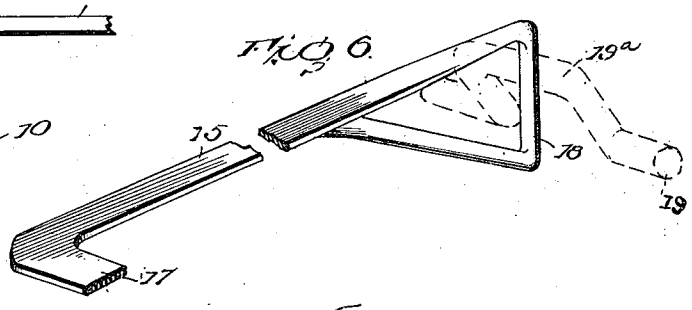


FIG. 4.

FIG. 6.



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No. 744,857. Patented November 24, 1903.

UNITED STATES PATENT OFFICE.

CLARENCE N. COOK, OF MUNGEN, OHIO.

STARTING MECHANISM FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 744,857, dated November 24, 1903.

Application filed March 25, 1903. Serial No. 149,570. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE N. COOK, a citizen of the United States, residing at Mungen, in the county of Wood and State of Ohio, have invented certain new and useful Improvements in Starting Mechanism for Explosive-Engines, of which the following is a specification.

Considerable difficulty has been experienced in starting engines of the explosive type, and it often happens that valuable time has been consumed and much trouble and annoyance occasioned before the desired result has been attained.

To overcome these objectionable features and others attendant upon the use of engines of the type aforesaid are the primal objects of this invention.

In accordance with this invention an explosive, such as gunpowder, is utilized for firing the first gaseous mixture in the cylinder and at the same time imparting the initial movement to the piston, whereby the momentum of the fly-wheel is sufficient to return the parts to proper position for operation by explosion of the second charge by the electric spark or other igniting means commonly employed in engines of this type.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of an explosive-engine equipped with starting mechanism embodying the invention. Fig. 2 is a section of the starting mechanism on the line X X of Fig. 1, on a larger scale, showing the relation of the crank to the trip-bar for releasing the firing-pin. Fig. 3 is a detail perspective view of the explosion-barrel and adjunctive parts. Fig. 4 is a vertical central section of the explosion-barrel, means for setting off the percussion-cap, firing-pin, guide therefor, and trip-bar. Fig. 5 is a perspective view of the lower portion of the guide for the firing-pin. Fig. 6 is a perspective view of the trip-bar and operating-crank.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The engine illustrated is of common construction, being shown to demonstrate the workings of the invention. The explosion-barrel 1 is of substantial formation to withstand the internal pressure resulting from setting off an explosive, such as gunpowder. The explosion-barrel is threaded at one end to make firm connection with the head 2 of the engine-cylinder and is in communication with the latter to admit of the flash igniting and effecting explosion of the gaseous mixture, by means of which the engine is operated. The explosion-barrel is constructed for reception of a wrench or spanner, whereby same may be fitted to or removed from the engine-cylinder at will, and, as shown, the barrel is flattened at opposite sides, as indicated at 3. The bore 4 of the barrel communicates with a lateral opening internally threaded to receive coupling 5, provided at its outer end with nipple 6 for reception of the percussion-cap, whereby the explosive is supplied to the barrel when starting the engine. A bonnet 7 is fitted to the outer end of coupling 5 and forms a housing for nipple 6 and serves to confine the force of the explosion. The hammer 8 for striking the percussion-cap is mounted in the upper end of bonnet 7 and is directed in its movements thereby and is held at the limit of its upward movement by coil-spring 9, mounted upon its stem and confined between bonnet 7 and stop 10, fitted to the upper threaded end of the hammer-stem. Bonnet 7 may be readily disconnected from the upper threaded end of coupling 5, and opposite sides are flattened for reception of a wrench or spanner for this purpose. Coupling 5 is provided intermediate of its ends with flange or collar 11, which constitutes a stop and is flattened at opposite points for reception of a tool to admit of tightening or loosening said coupling, as may be desired.

The guide 12 for reception of firing-pin 13 is tubular and consists, preferably, of a section of pipe adapted to be fitted at its lower end to bonnet 7 and collar 11, whereby it is

held in place. A transverse slot 14 is formed in a side of guide 12 a distance above the hammer 8 to provide sufficient fall for firing-pin 13 in order to insure explosion of the percussion-cap applied to nipple 6. The firing-pin 13 consists of a heavy bar loosely fitted in the upper portion of guide 12 and normally supported by trip-bar 15, which has a portion entering slot 14 a distance to support the firing-pin. The trip-bar 15 is supported in any suitable manner, preferably by keepers 16 applied to the engine-cylinder and forming guides to direct the trip-bar in its movements and hold same in place. The outer end of the trip-bar is bent about at a right angle, as shown at 17, to enter slot 14 and support firing-pin 13. The rear end of trip-bar has vertical extension 18, extended within the path of the projection 19^a of the crank-shaft 19, to which the balance or fly wheel 20 is secured.

The engine is primed for starting by supplying explosion-barrel 4 with a charge of gunpowder or other explosive, same being supplied to the barrel either by removing the latter from the engine-cylinder or by disconnecting coupling 5 therefrom and placing the charge in position through the side opening in communication with the bore of the barrel. The percussion-cap is fitted to nipple 6 by removing bonnet 7, the latter being replaced in order to confine the gas resulting from the explosion. The firing-pin is supported within the upper part of guide 12 by the bent end 17 of trip-bar 15. The fly-wheel 20 is turned to draw a charge of carbureted air or other explosive mixture into the engine-cylinder, and when the piston has reached the proper point in the cylinder crank 19 comes in contact with trip-bar 15 and moves same to release firing-pin 13, which descends and drives hammer 8 against the percussion-cap and sets off same and explodes the gunpowder in explosion-barrel 4, the flash entering the cylinder and setting off the gaseous mixture and driving the piston forward with a force to overcome the inertia of the parts and impart a momentum to the fly-wheel sufficient to keep the engine in motion, provided the igniter and means for supplying carbureted or explosive mixture to the engine are in working condition.

Having thus described the invention, what is claimed as new is—

1. In starting mechanism for explosive-engines, the combination of an explosion-barrel, a percussive igniter, a bonnet inclosing the percussive igniter, a tubular guide fitted to said bonnet and supported thereby, a firing-pin located within said guide and directed in its movements thereby, and a trip-bar coöperating with the tubular guide for supporting the firing-pin and adapted to be operated by a moving part of the engine to effect a release of the firing-pin at the proper time, substantially as set forth.

2. The herein-described starting mechanism for explosive-engines comprising an explosion-barrel, a coupling fitted in a lateral opening in communication with the bore of the barrel, a nipple applied to the coupling, a bonnet threaded to said coupling and housing the nipple, a hammer fitted to the bonnet, a spring for normally holding the hammer a distance from said nipple, a tubular guide fitted to the bonnet and provided in a side with a slot, a firing-pin, and a trip-bar having an end portion bent to enter the slot of the guide and normally supporting the firing-pin and having its opposite end extended into the path of a projection of the crank-shaft to be struck thereby for releasing the firing-pin at the proper time, substantially as set forth.

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

CLARENCE N. COOK. [L. S.]

Witnesses:
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JOHN BEMEN.