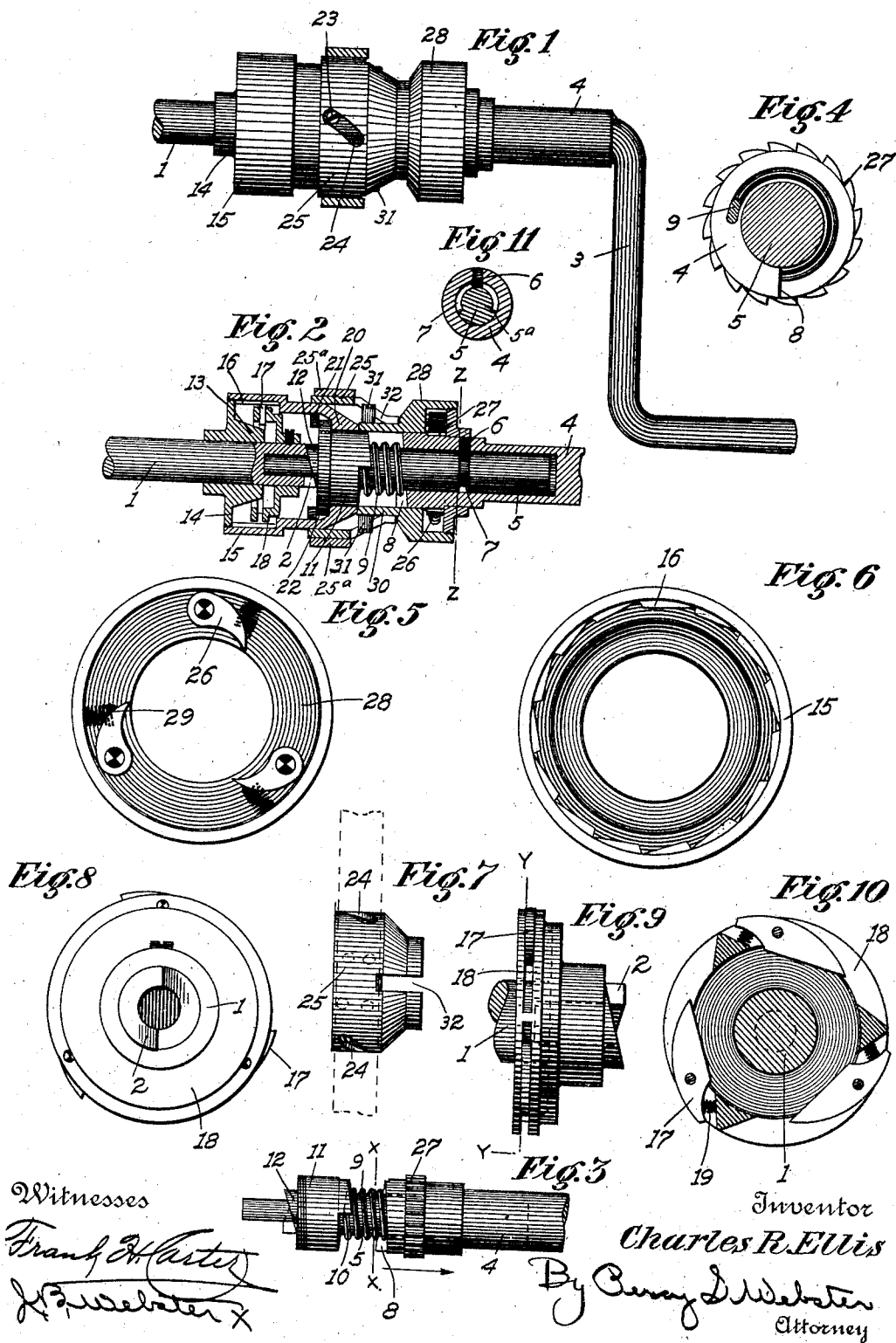


C. R. ELLIS.
SAFETY STARTING CRANK FOR EXPLOSIVE MOTORS.
APPLICATION FILED AUG. 22, 1910.

1,007,775.

Patented Nov. 7, 1911.



UNITED STATES PATENT OFFICE.

CHARLES R. ELLIS, OF STOCKTON, CALIFORNIA.

SAFETY STARTING-CRANK FOR EXPLOSIVE-MOTORS.

1,007,775.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed August 22, 1910. Serial No. 573,417.

To all whom it may concern:

Be it known that I, CHARLES R. ELLIS, a citizen of the United States, residing at Stockton, in the county of San Joaquin, State of California, have invented certain new and useful Improvements in Safety Starting-Cranks for Explosive-Motors; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in explosive motors and particularly to the starting cranks thereon, the object of the invention being to produce such a starting crank as will not throw back when the motor back fires but will remain stationary during such back fire.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a side elevation of my improved starting crank. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a side elevation of the interior of the crank proper. Fig. 4 is a sectional view taken on a line $x-x$ of Fig. 3. Fig. 5 is a front elevation of a ratchet box and dogs therein. Fig. 6 is a front elevation of an internal ratchet wheel. Fig. 7 is a side elevation of supporting box. Fig. 8 is a front elevation of the crank shaft of the motor showing a pawl carrying box thereon. Fig. 9 is a side elevation of the same. Fig. 10 is a sectional view taken relatively on a line $y-y$ of Fig. 9. Fig. 11 is a sectional view taken on a line $z-z$ of Fig. 2.

Referring now more particularly to the characters of reference on the drawings, 1 designates a crank shaft of an engine having the usual clutch 2 at its outer end to receive the starting crank.

The starting crank of my improved device is constructed substantially with a handle 3 having a projecting sleeve 4 in which is a freely turnable pin 5 held against longitudinal movement by means of a set screw 6 projecting through the sleeve 4 into the groove 7 in said pin 5. The inner end of said sleeve 4 has a shoulder 8 normally operating against a spring 9 disposed around the pin 5 the other end of said spring 9 operating against a shoulder 10 on the collar 11 forming a part of the pin 5, the inner end of said pin 5 having a clutch 12 to engage the clutch 2. In cranking the engine the handle 3 is operated which causes the sleeve 4 to operate against the spring 9 to turn the collar 11 and incidentally the pin 5 which being clutched to the crank shaft 1 by the clutches 12 and 2 turns such crank shaft as is desired.

Now when the engine back fires and the crank shaft 1 reverses from its normal forward movement, I throw the two clutches 12 and 2 out of engagement with each other by means of the following structure, viz: Suitably mounted on the crank shaft 1 is a cone 13 having a flange 14 screwed into a box 15 having ratchets 16 engaged by pawls 17 pivotally secured in the ratchet box 18 which is secured to the shaft 1. The pawls 17 are held normally in engagement with the ratchets 16 by means of springs 19, the lower ends of said pawls projecting into the box 18, such pawls 17 being adapted to turn the box 15 when the shaft 1 turns backward when the motor back fires. This box 15 projects from the member 11 and is held in position thereon by means of flanges 20 and 21 which secure the member 15 to a flange or collar 22 on the said collar 11.

Now when the engine back fires and the pawls 17 engaging the ratchets 16 turn the box 15 as described; the same is pulled forward by reason of the pins 23 movable in curving slots 24 in a box 25 fixed stationary with respect to the other parts of the crank by means of straps 25^a adapted to be connected with the frame of the motor or the frame of the vehicle to which the motor is attached. This forward movement causes the cone 13 to move in between the pawls 17 and spread them apart thus disengaging them from the ratchets 16 and permitting the crank shaft 1 and box 18 to turn freely and the clutches 12 and 2 having been in the meantime disengaged by reason of the

box 15 moving the collar 11 and putting its disconnected parts forward, the sleeve 4 and handle 3 having been held stationary during this operation by reason of dogs 26 engaging ratchets 27 on said sleeve 4, said dogs 26 being mounted in the box 28 and held normally in engagement with said ratchets 27 by means of springs 29. The first start of the backward movement of the crank 1 is received by the spring 9 which overcomes any tendency to tearing apart, by reason of the first shock of the back fire, before the parts have operated to disengage the clutches 2 and 12 as described. The box 28 has a projecting flange or shoulder 30 to engage the member 15 in order that it may be moved outward with the other parts as described, any independent rotary movement by said box 28 being prohibited by means of pins 31 projecting through slots 32 in the member 24. The slot 7 does not extend around the inner periphery of the pin 5 but has a shoulder 5^a against which the set screw 6 would impinge in order to operate the parts if the tension of the spring 9 was a little too weak.

From the foregoing description it will readily be seen that I have produced such a safety starting crank as will not recoil with the back fire of the engine, but which will remain stationary and be immediately disengaged with the crank shaft when the back fire occurs.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention.

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

1. In a device of the character described, the combination of a crank shaft, a starting crank comprising a handle, a sleeve on said handle, a pin projecting into said sleeve in a freely turnable manner, means holding said pin against longitudinal movement in

said sleeve, a shoulder on said sleeve, a collar on the end of said pin at a spaced distance from said shoulder, a spring interposed between said shoulder and said collar, a means on said collar for engaging said crank shaft, and means interposed between said crank shaft and said sleeve for disengaging said engaging means on said collar from said crank shaft when said crank shaft moves backward as described.

2. In a device of the character described, the combination of a crank shaft, a starting crank adapted to engage said crank shaft, a box secured to said starting crank and projecting over said crank shaft, an internal ratchet wheel on said box, pawls secured to said crank shaft and adapted to engage said ratchet wheel and turn said box when said crank shaft moves backward, a means operating within said box and adapted to throw said pawls out of engagement with said ratchet wheel when said crank shaft moves backward and means for throwing said starting crank out of engagement with said crank shaft when said box turns as described.

3. A crank shaft, a starting crank adapted to engage said crank shaft, an internal ratchet wheel, a box secured to said crank shaft and having pawls engaging said ratchet wheel, a cone slidable on said crank shaft and secured to said ratchet wheel, means for sliding said cone forward when said crank shaft turns backward whereby said pawls will be disengaged from said ratchet wheel, and a means for connecting said ratchet wheel with said starting crank whereby when said cone and ratchet wheel moves forward, said starting crank will be disengaged from said crank shaft as described.

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

CHARLES R. ELLIS.

Witnesses:

PERCY S. WEBSTER,
FRANK H. CARTER.