J. B. MOORE.

REVERSING MECHANISM FOR EXPLOSIVE ENGINES.

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1,024,945. Patented Apr. 30, 1912.

Fig. 1.

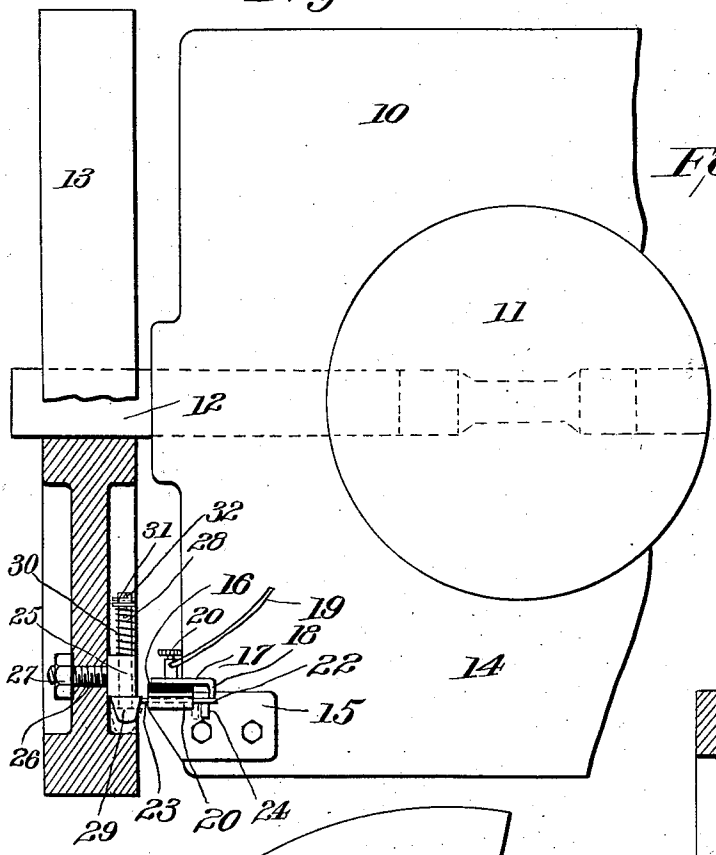


Fig. 3.

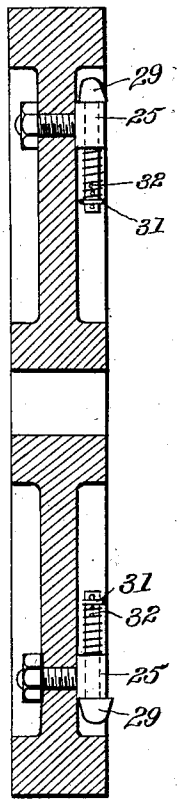


Fig. 2.

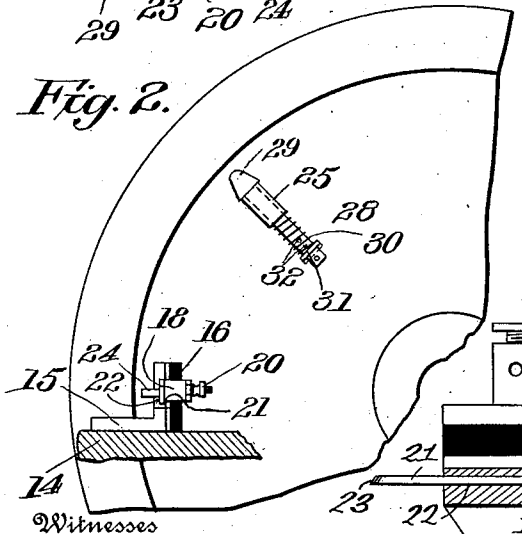


Fig. 4.

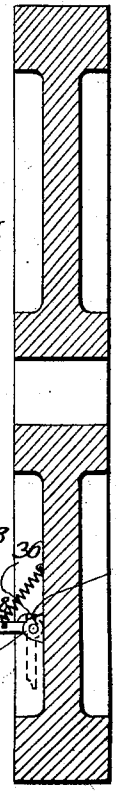


Fig. 5.

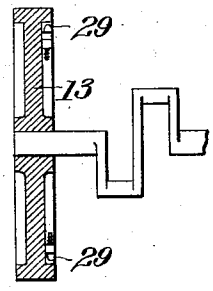
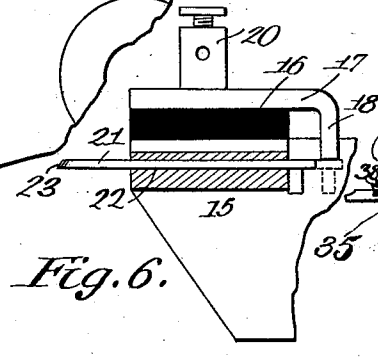


Fig. 6.



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REVERSING MECHANISM FOR EXPLOSIVE-ENGINES.

1,024,945. Specification of Letters Patent. Patented Apr. 30, 1912.

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To all whom it may concern:

Be it known that I, JOHN B. MOORE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Reversing Mechanism for Explosive-Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in reversing mechanism for explosive engines.

Heretofore when it has been desired to reverse an explosive engine of the two cycle type it has been general practice to break the ignition circuit and allow the engine to slow down. Just as the engine is about to stop, by again closing the ignition circuit, an explosion is caused which usually catches the piston in a position to effect a reversal of the engine, after which the operation continues in the usual way. This method is open to objection for the reason that considerable skill and judgment is required on the part of the operator to so time the applying of the spark as to cause the explosion to take place at the proper moment to effect the reverse rotation of the engine.

The object of the present invention is to overcome this uncertainty by providing a simple and inexpensive device which will automatically close the ignition circuit to cause an explosion when the momentum of the fly wheel of the engine has been sufficiently reduced, to effect a reversal of the rotation of the engine.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a top plan view of an explosive engine with my invention applied thereto. Fig. 2 is a face view of a portion of a fly wheel with a portion of the engine casing shown in section. Figs. 3 and 4 are sectional views of a fly wheel illustrating modifications. Fig. 5 is a view illustrating the relative arrangement of the operating members and cranks.

Referring to the drawings 10, designates an explosive engine of the two cycle type, conventionally illustrated, 11 the cylinder, 12 the crank shaft and 13 the fly wheel keyed or otherwise secured to the latter. These parts may be of any suitable or preferred construction. Secured to the base 14 of the engine is a bracket 15 carrying a block of insulating material 16 to which is secured an electric contact 17. This contact projects at one end beyond the insulating block 16 and said end is bent as indicated at 18. The ground wire 19 of the ignition circuit is connected to a binding post 20 secured in any suitable manner to contact 17. The bracket 15 is provided with a groove or channel 21 to receive a sliding contact 22 one end of which is adapted to engage the bent end of contact 17 to close the circuit, the other end being rounded off and beveled as indicated at 23. It is obvious that this contact may be of any preferred shape and supported in any suitable manner. A pin 24 is provided for conveniently sliding said contact 22.

The fly wheel 13 is provided on its inner face with a guide 25 provided with a threaded shank 26 passed through a suitable hole in said fly wheel and secured in position by a nut 27. The bore of the guide is arranged radially with relation to the center of the fly wheel, and receives the shank 28 of an operating member 29. The operating member is provided with a conical head having a flat shoulder at its inner end and a rounded outer end, said shoulder being normally held against the outer face of the guide 25 by means of a spring 30 bearing against the inner end of said guide and a washer 31 held in place by a cotter pin or other suitable device. For the purpose of adjusting the tension of the spring 30 a plurality of holes 32 are formed in the inner end of the shank 28. The outward movement of the member 29 is limited by any suitable means, such as the flange of the fly wheel.

In practice the contacts 17 and 22 are normally in engagement thereby grounding the ignition circuit in the usual way. When it is desired to reverse the engine the movable contact 22 is moved out toward the fly wheel thus breaking the ignition circuit, whereupon the speed of rotation of the fly wheel will gradually diminish. When rotating at full or normal speed the operating member will clear the sliding contact 22 by reason of the centrifugal force developed in the rotation of the fly wheel, but as the speed of rotation diminishes the spring will gradually overcome the centrifugal force, whereupon the operating member 29 will engage the rounded and beveled end 23 of the sliding contact and force the latter in-

ward into engagement with the hook end 18 of the stationary contact thereby closing the ignition circuit. The parts are so arranged that this action takes place just before the rotation of the fly wheel would cease and with the crank in such a position that an explosion is caused in the cylinder at just the right time to reverse the engine.

In Fig. 3 I have shown a modification adapted to an engine having two cylinders. In this form two operating members 29, one for each cylinder are mounted on the fly wheel both of said members being located approximately parallel with the respective cranks of shaft 12 and therefore opposite each other. In this form the usual timing device controls the ignition in the respective cylinders and one or the other operating device as the case may be, will close the ignition circuit through contacts 17 and 22 whereby an explosion may take place in that cylinder in which the piston has reached proper position to effect a reversal of the engine. It is obvious that the same idea may be carried out with a greater number of cylinders by correspondingly increasing the number of operating members 29.

In Fig. 4 I have illustrated a modified form of operating member which consists of a member 35 pivoted to lugs 36 on the fly wheel and normally held against a stop 37 by a spring 38. In practice the member 35 is swung outward by the centrifugal force, but as the momentum of the fly wheel diminishes the spring draws said member in a position to engage and shift the movable contact in the manner described in connection with Figs. 1 and 2. It will be noted that the movement of member 35 is radial with relation to the center of the fly wheel. I wish it also to be understood that while I have referred to a radial movement of members 29 and 35 I do not desire to be limited to a movement exactly radial with the center of the fly wheel, as these members may be arranged slightly out of alinement with the precise radial line and still be within the spirit of my invention.

Having thus explained the nature of my invention, and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what I claim is:—

1. In a reversing mechanism for explosive engines, the combination with a fly wheel, and a radially movable operating member carried thereby, of an ignition circuit including a stationary contact and a movable contact the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

2. In a reversing mechanism for explosive engines, the combination with a fly wheel, of a radially disposed guide secured to said fly wheel, an operating member movably mounted in said guide, and an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

3. In a reversing mechanism for explosive engines, the combination with a fly wheel, of a radially disposed guide secured to said fly wheel, a movable operating member mounted in said guide, a spring acting to hold said member normally retracted, and an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

4. In a reversing mechanism for explosive engines, the combination with a fly wheel, and a radially movable operating member carried thereby and provided with a conical head, of an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said conical head, whereby said movable contact may be shifted.

5. In a reversing mechanism for explosive engines, the combination with a fly wheel, and a radially movable operating member carried thereby, a bracket, an ignition circuit, a stationary contact in said circuit and carried by said bracket, said contact having a bent end, and a movable contact in said circuit also carried by said bracket and coöperating with the bent end of the stationary contact, said movable contact being adapted to intercept the path of movement of said operating member.

6. In a reversing mechanism for explosive engines, the combination with a fly wheel, and a radially movable operating member carried thereby, of an ignition circuit including a stationary contact and a movable contact the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted and a handle for shifting said movable contact into the path of movement of said operating member.

7. In a reversing mechanism for explosive engines, the combination with a fly wheel, of a centrifugal operating member mounted thereon and movable radially thereof, a spring acting on said member in opposition to the centrifugal force developed by said fly wheel, and an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

8. In a reversing mechanism for explosive engines, the combination with a fly wheel, of a centrifugal operating member mounted thereon and movable radially thereof, a spring acting on said member in opposition to the centrifugal force developed by said fly wheel, a shoulder for limiting the movement of said operating member under the influence of said spring, and an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

9. In a reversing mechanism for explosive engines, the combination with a fly wheel, of a centrifugal operating member mounted thereon and movable radially thereof, a spring acting on said member in opposition to the centrifugal force developed by said fly wheel, the latter being provided with means for limiting the outward movement of said operating member, and an ignition circuit including a stationary contact and a movable contact, the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted.

10. In a reversing mechanism for explosive engines, the combination with a fly wheel, and a radially movable operating member carried thereby, of an ignition circuit including a stationary contact and a movable contact the latter being adapted to intercept the path of movement of said operating member, whereby said movable contact may be shifted, said fly wheel being provided with means for limiting the outward movement of said operating member.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN B. MOORE.

Witnesses:
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