

March 24, 1942.

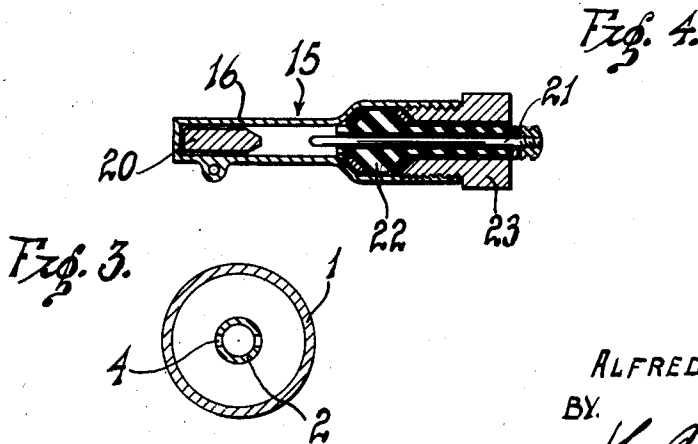
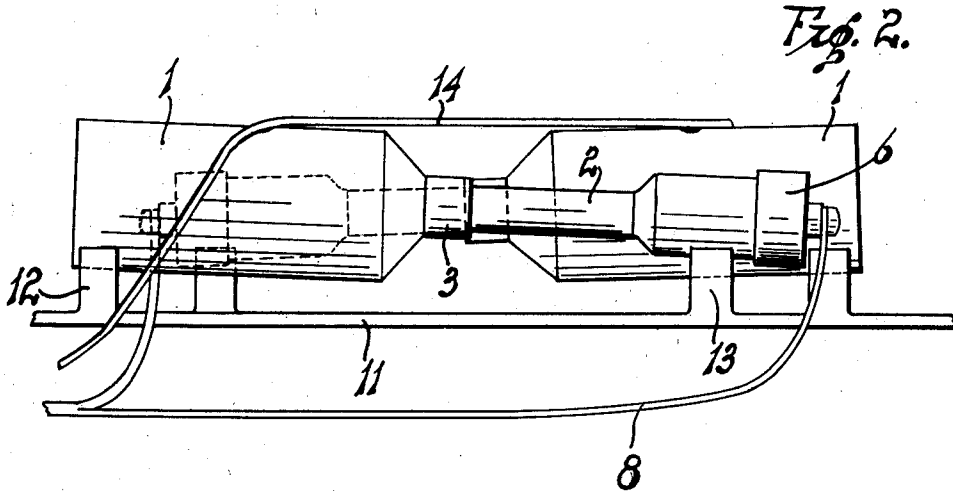
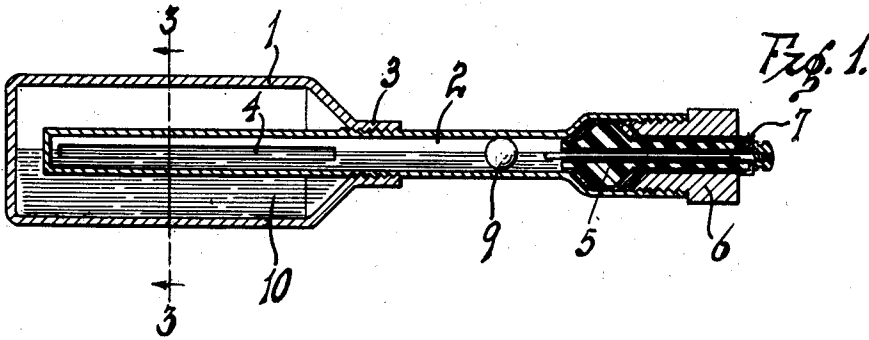
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2,277,352

OSCILLATORY POWER CONTROL SWITCH

Filed May 15, 1940

2 Sheets-Sheet 1



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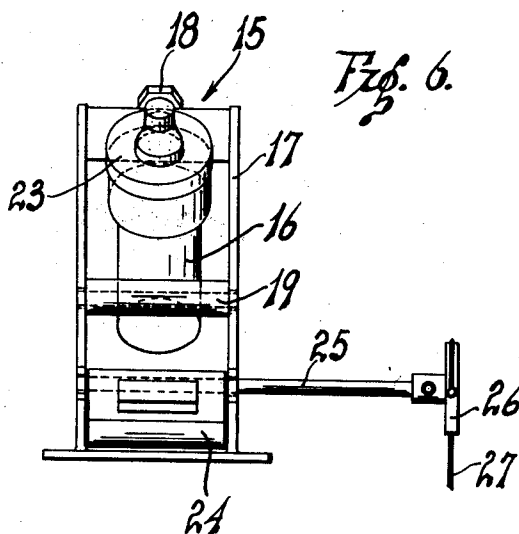
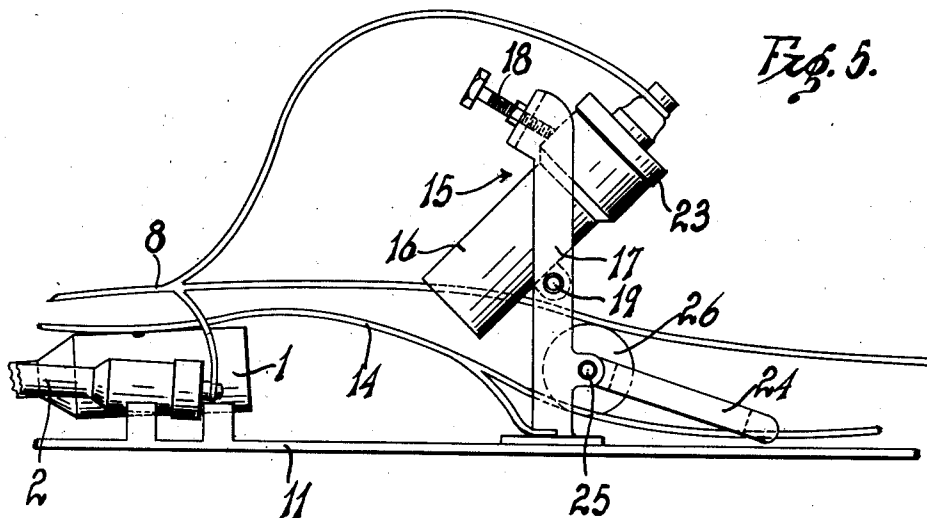
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UNITED STATES PATENT OFFICE

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OSCILLATORY POWER CONTROL SWITCH

Alfred W. Posey, Long Beach, Calif.

Application May 15, 1940, Serial No. 335,251

5 Claims. (Cl. 200—52)

This invention relates to an oscillating or rocking power control switch, particularly applicable to the walking beam of a pumping oil well although my control switch may be applied to various other devices or structures.

An object of my invention is to provide a novel control switch for a power driven oscillating or rocking motion, in which the power unit is stopped if the oscillating or rocking mechanism should either stop or travel at an excessive speed, or if the complete oscillating or rocking stroke is not continuously completed.

Another object of my invention is to provide a novel power control switch of the character stated, which is simple in construction, fire proof, automatic in its action, and effective in operation.

My control switch is particularly useful under the following conditions:

If parts carried by the oscillating or rocking mechanism should break, thus materially lightening the load on the power drive, causing the power unit and the operating mechanism to move at high speeds, my control switch will automatically stop the power unit. Also, if due to slipping of belts or other driving units, the oscillating or rocking mechanism should partly move and then slip back to a lowered position, resulting in dangerous slipping of the belts or other driving mechanism, with the resultant possibility of fire, my power control switch will stop the driving motor. Also, if there is an overload on the oscillating or rocking mechanism, causing the driving motor to slow down to a dangerous extent, my control switch will automatically stop the motor under these conditions.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description, and the appended claims.

In the drawing—

Figure 1 is a longitudinal, sectional view of a power control unit embodying my invention.

Figure 2 is a side elevation of one form of assembling the control units.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is a longitudinal sectional view on a reduced scale of the overspeed control switch.

Figure 5 is a side elevation of the overspeed control switch mounted adjacent to the oscillating control switch.

Figure 6 is an end view of the overspeed control switch.

Referring more particularly to the drawings,

the numeral 1 indicates a hollow body somewhat bottle-shaped, in that one end is closed and the other end is restricted in diameter, and receives a hollow tube 2. The tube 2 may be threaded into the neck 3 of the body or it may be otherwise fixedly attached in the body by suitable means which will prevent the leakage of fluid between the neck 3 of the body and the outside of the tube 2.

The tube 2 extends into the body 1, substantially as shown in Figure 1, and also projects somewhat from this body, the length of this tube varying under different conditions, as will be subsequently described. The inner end of the tube 2 is closed, and one or more slots 4 are formed in the tube and lie within the body 1. The slot or slots 4 are preferably of considerable length for the purpose of effectively admitting fluid to the outer portion of the tube, as will be further described.

An insulating core 5 is fixedly mounted in the outer end of the tube 2, and is held in position by a lock nut 6 or other suitable means. A contact pin 7 extends longitudinally through the insulating core 5, and projects slightly into the tube 2. A wire 8 is attached to the pin 7 and is commonly termed a hot wire, and extends to the magneto, distributor, or other electrical system of the power unit. A ball 9, which is metallic, is mounted in the tube 2, and the clearance between the periphery of this ball and the inside of the tube varies with the different conditions of installation and on the desired time before the ball will move through the tube and contact the inner end of the contact pin 7. The body 1 is filled with a suitable liquid, as shown at 10, and the character and viscosity of this liquid can be varied to comply with various operating conditions.

When my control switch is mounted on an oscillating or rocking unit, such as the walking beam of a pumping well, I prefer to use two or more switch units, substantially as shown in Figure 2. It is to be noted that these switch units are mounted on a suitable base 11, and supported on blocks 12 and 13, which rise from the base. The outer end of the tube 2 is lower than the center line of the body 1, substantially as shown in Figure 2, so that when the base 11 is horizontal, the ball 9 will roll towards and contact the pin 7. The two switch units are oppositely arranged so that if the beam, for example, should stop in any position, one or the other of the switch units will be so positioned that the ball 9 will contact the pin 7 and stop the power

unit. The live wire 8 is connected to both of the contact pins of the switch units, in parallel, substantially as shown in Figure 2. A ground wire 14 is attached to the body 1, and as soon as the ball 9 contacts the tube 2 when the pin 7 is engaged by the ball, the live wire will be grounded through the lead 14, thus stopping the power unit.

In operation, the oscillating or rocking mechanism upon which the switch unit is mounted rocks or oscillates back and forth, causing the body 1 and tube 2 to oscillate or rock in a substantially vertical plane. When the body 1 is lowered, the fluid will readily rush through the openings 4, and the ball 9 will roll freely towards the closed end of the tube 2. When the body and tube are tilted in the opposite direction, fluid will pour through the opening 4, and will fill the tube 2 at the end closed by the insulator 5. As soon as the ball 9 rolls into the part of the tube beyond the opening 4, its movement will be slowed down, since the fluid must by-pass the ball 9 in order to enable the ball to move towards the contact pin 7. It will be evident that the viscosity of the fluid and also the clearance between the ball and the inside of the tube will determine the rapidity with which the ball 9 moves toward the contact pin 7. In normal operation, before the ball 9 can engage the inner end of the pin 7, the oscillating or rocking motion will be reversed, and the ball will again roll towards the closed inner end of the tube.

If the oscillating or rocking mechanism should overspeed, due to breakage of parts, or the like, I provide a tumble switch 15, consisting of a tubular body 16, which is pivotally mounted in a frame 17 rising from the base 11. A set screw 18 extends through the frame 17 and bears against the body 16 to hold the tumble switch in the position shown in Figures 5 and 6, but so balanced that any jerk caused by overspeeding will permit the tumble switch to swing downwardly on its pivot 19, and thus stop the power mechanism. The switch mechanism in the body 16 consists of a slidable contact element 20, which may be a block or a ball, and this contact element engages a contact pin 21, which extends into the upper end of the body 16 through an insulating plug 22. A nut or the like 23 screws into the open end of the body 16, and bears against the insulator 22 to hold the insulator securely in position. A jerk such as that caused by overspeeding of the oscillating or rocking mechanism will cause the outer end of the tumble switch 15 to swing downwardly, at which time the contact element 20 will engage the inner end of the pin 21. The live wire 8 extends to the pin 21, as shown in Figure 5, and the ground wire 14 may be attached to the frame 17 or to the body 16, as desired. A trip setting yoke 24 is pivotally mounted

in the frame 17 below the tumble switch 15. This setting yoke is attached to a shaft 25, on the outer end of which a disk, pulley or sprocket 26 is attached. A chain, cord or cable 27 is mounted on the pulley or sprocket 26, thus enabling a workman to rotate the shaft 25, thereby swinging the yoke 24 upwardly and resetting the tumble switch 15 to the position shown in Figures 5 and 6. The operation of the tumble switch will be evident from the foregoing description.

Having described my invention I claim:

1. An oscillatory power control switch comprising a hollow body, a tube in said body, an electrical contact in the outer end of said tube, and a contact element in the tube, said element being movable longitudinally of said tube, said body having a fluid therein and said tube having an opening at the inner end thereof, said tube being solid adjacent the contact end thereof.

2. An oscillatory power control switch comprising a hollow body, a tube mounted in the body, one end of said tube projecting from the body, the inner end of said tube being closed, a contact mounted in the outer end of said tube, and a contact element movable longitudinally in said tube, said body and tube having a fluid therein to retard the movement of the contact element in the tube.

3. An oscillatory power control switch comprising a hollow body, a tube mounted in the body, one end of said tube projecting from the body, the inner end of said tube being closed, a contact mounted in the outer end of said tube, and a contact element movable longitudinally in said tube, said tube having an opening therein within the body, said body having a fluid therein, the fluid moving through said opening as the switch oscillates, the end of said tube adjacent the contact being solid.

4. An oscillatory power control switch comprising a hollow body, a tube mounted in the body, one end of said tube projecting from the body, the inner end of said tube being closed, a contact ball in the tube, and a contact pin mounted in the outer end of said tube, said body and tube having a fluid therein to retard the movement of the contact ball in the tube.

5. An oscillatory power control switch comprising a hollow body, a tube mounted in the body, one end of said tube projecting from the body, the inner end of said tube being closed, a contact ball in the tube, and a contact pin mounted in the outer end of said tube, said tube having an opening therein within the body, said body containing fluid, the fluid being movable through the opening into the tube as the switch oscillates, the outer end of said tube adjacent the contact pin being solid.

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