May 31, 1927. 1,631,024

S. G. FISHER

ELECTRIC CIRCUIT CONTROLLING APPARATUS

Filed Dec. 27, 1924

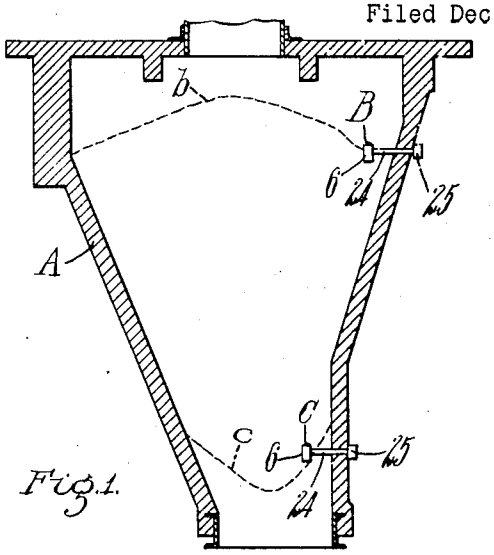



Fig. 1.

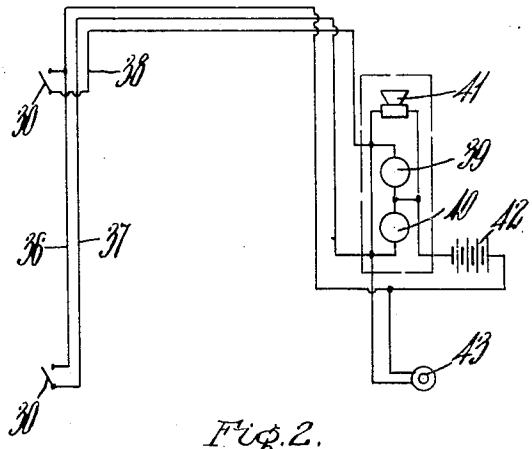



Fig. 2.

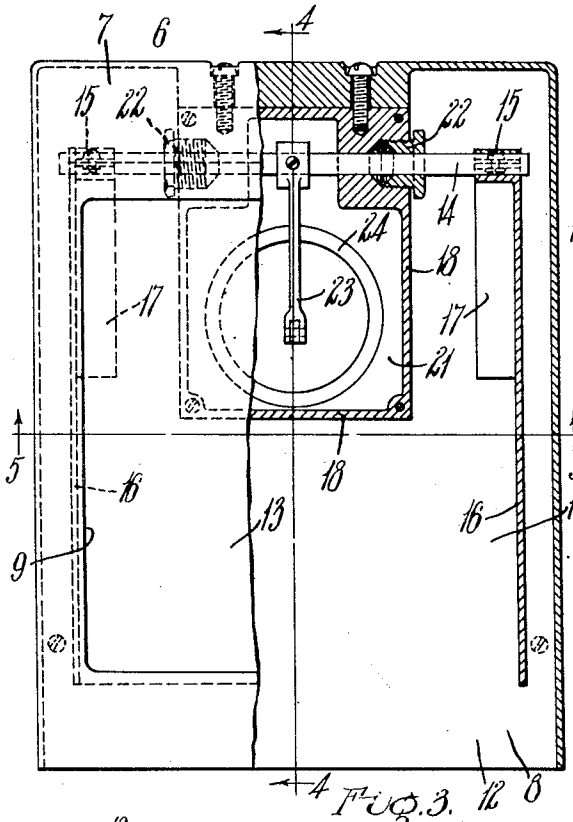



Fig. 3.

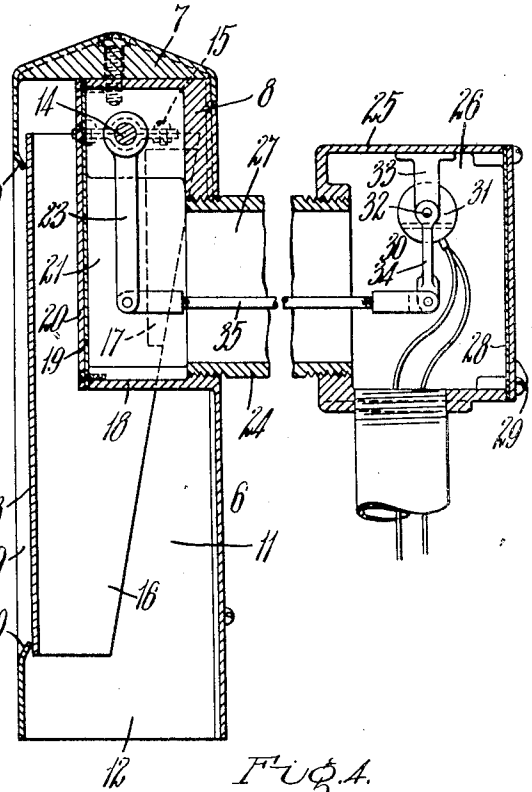



Fig. 4.

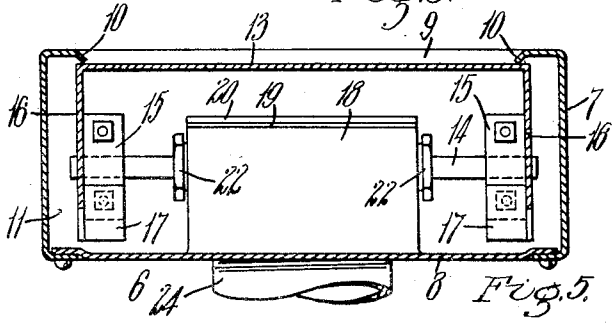



Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC-CIRCUIT-CONTROLLING APPARATUS.

Application filed December 27, 1924. Serial No. 758,356.

This invention relates to an apparatus for controlling an electric circuit and has for its object to provide a mechanism of the character set forth for use in connection with an apparatus for indicating certain predetermined bin or bunker levels of semi-solid materials, such as pulverized or crushed coal, flour, grain and the like.

Other objects of the invention are to provide an apparatus that will not have a tendency to become choked with the material located within the bunker, thereby preventing its operation, and that will act easily and quickly when the level of the material within the bunker reaches the actuating member and which will be proof against explosive and fire hazards.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly as pointed out in the claims.

Referring to the drawings:

Figure 1 is a vertical section through a bunker illustrating actuating mechanisms for an apparatus embodying my invention mounted at predetermined high and low levels for material stored in said bunker.

Fig. 2 is a wiring diagram for the apparatus illustrating the electric connections from the actuating mechanisms to the audible and visible signals.

Fig. 3 is a front elevation of an actuating mechanism for the apparatus, a portion thereof being broken away and illustrated in section.

Fig. 4 is a central vertical section taken on the line 4—4 of Fig. 3.

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 3 looking upwardly in said figure.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, A represents a bunker of any suitable form and construction, and used for the purpose of storing such semi-solid materials as crushed or powdered coal, flour, grain and the like. Mounted in the bunker A at a point adjacent to the top thereof is an actuating mechanism B which forms a portion of the indicating apparatus of this invention, said actuating mechanism being located at a level *b* within the bunker which is a predetermined high level at which it is desired that the material within said bunker shall accumulate. Another actuating mechanism C is mounted in the bunker A at a level *c* which is a predetermined low level for the material within said bunker.

The actuating mechanisms B and C are identical in construction, each embodying therein a main casing 6 consisting of members 7 and 8 which are fastened together in any suitable manner. The main casing 6 is preferably located at a distance from the inside wall of the bunker A for the reason that in most cases when the material within the bunker is withdrawn, its center falls away rapidly leaving steep sides, the slope of which depends upon the shape of the bunker and the moisture contents of the material, and as the device of this invention is dependent for satisfactory operation upon the changing pressure upon an actuating member hereinafter to be described, it is preferable that said casing shall be positioned at such a distance from said inside wall that it will be located in the normal path of the flow of the material at all times.

The casing 6 has an opening 9 provided in the front wall of the member 7 thereof, and said front wall has a rearwardly bent flange 10 formed thereon which extends entirely around said opening. Within the casing 6 is an enclosure 11, and the entire under side of said casing is open at 12 to permit the material from the bunker which enters the casing through the opening 9 to pass downwardly and out of said casing as soon as the level of the material within the bin is again lowered.

Located within the enclosure 11 is a door 13 constituting an actuating member and the latter is pivotally mounted upon the member 8 of the casing 6, being rigidly secured to a rock shaft 14 by a pair of suitable clamping members 15.

In its normal position the door, or actuating member 13, engages the inner edge of the flange 10 and completely closes the opening 9 in the front wall of the casing 6. The actuating member 13 at each side thereof has a rearwardly projecting side flange 16 preferably formed integral therewith, and secured to the flanges 16 adjacent to the rear edges thereof are weights 17 which act to counterbalance said actuating

member and aid in returning the same to its normal closed position against the inner edge of the flange 10.

Formed integral with the member 8 of the casing 6 and projecting forwardly therefrom is a flanged portion 18 at the front of which a gasket 19 and plate 20 are secured in a manner to form a dust tight compartment 21. The rock shaft 14 is mounted within the flanged portion 18 of the casing member 8 in such a manner that the end portions of said shaft will be located within the enclosure 11, while the central portion of said shaft will extend through the compartment 21. Stuffing boxes 22 are provided for the purpose of preventing dirt from entering the compartment 21 around the periphery of the shaft 14. An arm 23 is rigidly secured to the portion of the rock shaft 14 that is located within the compartment 21.

A tube 24 has screw-threaded engagement with the member 8 of the casing 6 at the rear of the latter, and at the rear end of said tube an auxiliary casing 25 is mounted, said casing having screw-threaded engagement with said tube. The tube 24 projects through the wall of the bunker A, the main casing 6 being located within said bunker and the auxiliary casing 25 being located upon the exterior thereof as illustrated in Fig. 1. The auxiliary casing 25 has a dust tight compartment 26 upon the interior thereof, which communicates with the compartment 21 of the main casing 6 through a passageway 27 extending through the tube 24. A gasket 28 and cover plate 29 are provided for the auxiliary casing 25.

Mounted within the auxiliary casing 25 is an electric switch 30, and in order to eliminate the fire and explosion hazard, said switch 30 is preferably of a mercury type, well known to those skilled in the art, in which the mercury is contained within an enclosed cylindrical casing 31 having trunnions 32 that are mounted to rock in brackets 33 fast to the casing 25. In electric switches of this type the circuit is opened and closed by separating the mercury, the latter being accomplished by rocking the cylindrical mercury container 31, and to accomplish this result, an arm 34 is rigidly secured at one end thereof to a trunnion 32, while the other end of said arm is operatively connected by a rod 35 with the arm 23, said connecting rod 35 extending from the compartment 26 through the passageway 27 to the compartment 21.

The switches 30 of the actuating mechanisms B and C are connected by wires 36, 37 and 38 with indicating lights 39 and 40, and an audible signal 41 as illustrated in Fig. 2, the light 39 being operated by the actuating mechanism B and the light 40 being operated by the actuating mechanism C. The audible signal 41 is operated by each of the actuating mechanisms. The electric circuit also embodies therein a suitable source of power 42 and test button 43, the latter normally being open.

The general operation of the apparatus hereinbefore specifically described is as follows:—Assuming that the level of the material within the bunker A is above the level represented at *c* in Fig. 1, and said bunker is being refilled, as the material rises within said bunker and reaches the level illustrated at *b*, the weight of the material will exert a side pressure against the actuating member 13 of the mechanism B rocking said actuating member rearwardly, and thereby operating the electric switch 30 in a manner to complete an electric circuit to the visible signal 39 and audible signal 41, and said signals will indicate to the proper persons that the predetermined high level of the material within the bunker has been reached.

On the other hand, when the bunker is being emptied, the material therein will be lowered until it reaches the level *c* at which time the material in withdrawing from in front of the actuating member 13 of the mechanism C will allow said actuating member to rock forwardly, in this instance completing the electric circuit at the switch 30 thereof and indicating at both the visible signal 40 and audible signal 41 that the material has reached the low level *c* and it is not desired to have any more material removed from said bunker.

It will be evident that other actuating mechanisms may be located at other levels within the bunker A and the proper signals incorporated in the electric circuit for the purpose of indicating other levels within said bunker if it is so desired.

It will be particularly noted that the construction of that portion of the mechanism of this apparatus that is located adjacent to the bunker A is such that the danger from fire and explosions is eliminated.

I claim:

1. An apparatus of the class described comprising, in combination, a casing provided with an opening in one of the walls thereof and also having a dust tight compartment located therein having an enclosed passageway communicating therewith, an actuating member pivotally mounted within said casing at the rear of said opening, and means connected to said actuating member and extending through said compartment and passageway and adapted to operate a signal.

2. An apparatus of the class described comprising, in combination, a main casing provided with a dust tight compartment therein having an enclosed passageway communicating therewith, an auxiliary casing communicating with said passageway,

an actuating member pivotally mounted within said main casing, a switch located within said auxiliary casing and adapted to operate a signal, and means connected to said actuating member and extending through said compartment and passageway and adapted to operate said switch.

3. An apparatus of the class described comprising, in combination, a main casing provided with an opening in one of the walls thereof and also having a dust tight compartment located therein having an enclosed passageway communicating therewith, a rock shaft mounted in said main casing, an actuating member fast to said rock shaft and located within said main casing at the rear of said opening, an arm fast to said rock shaft and located within said dust tight compartment, an auxiliary casing communicating with said passageway, a switch located within said auxiliary casing adapted to operate a signal, and means extending through said passageway and operatively connecting said arm to said switch.

4. In combination, a main casing provided with an opening in one of the walls thereof and also having a dust tight compartment located therein, a tube fast at one end thereof in said main casing, an auxiliary casing mounted upon the other end of said tube, the interior of said tube communicating with both of said casings, an actuating member pivotally mounted within said main casing, a switch located within said auxiliary casing and adapted to operate a signal, and means extending through said dust tight compartment and passageway and operatively connecting said actuating member to said switch.

In testimony whereof I have hereunto set my hand.

SAMUEL G. FISHER.