No. 891,627. PATENTED JUNE 23, 1908.

G. W. MacKENZIE.

ALARM DEVICE.

APPLICATION FILED NOV. 30, 1907.

Fig. 1.

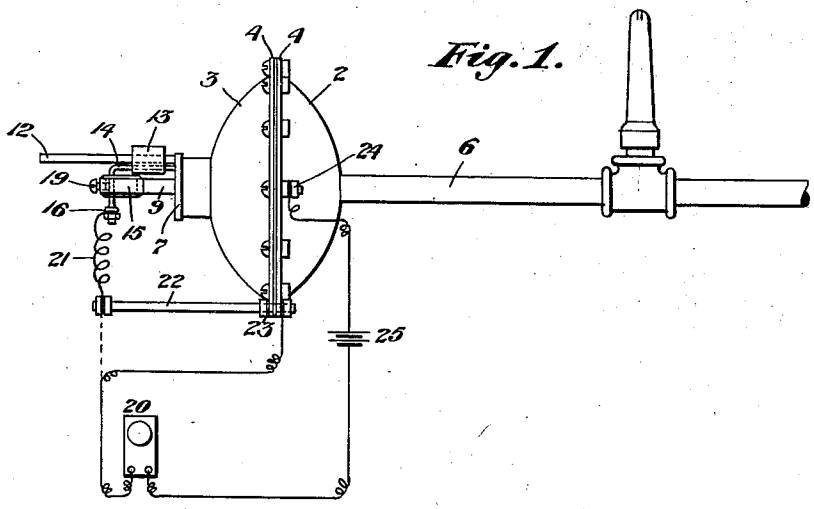


Fig. 2.

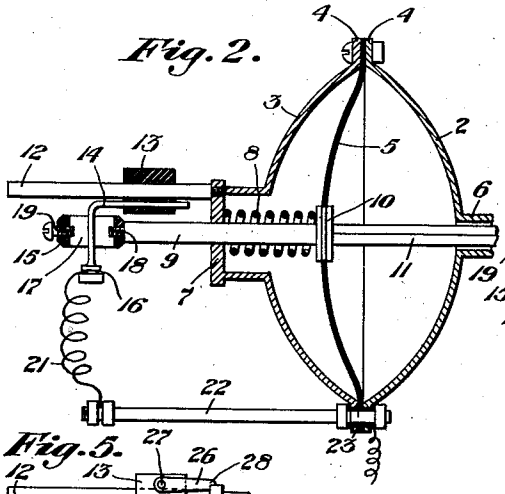


Fig. 3.

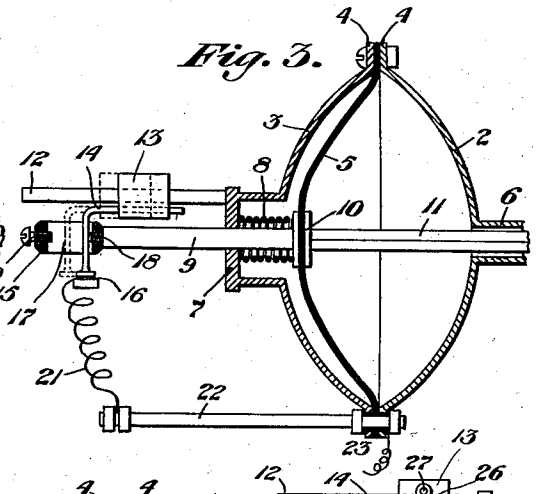


Fig. 5.

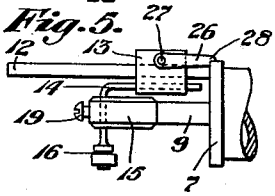


Fig. 4.

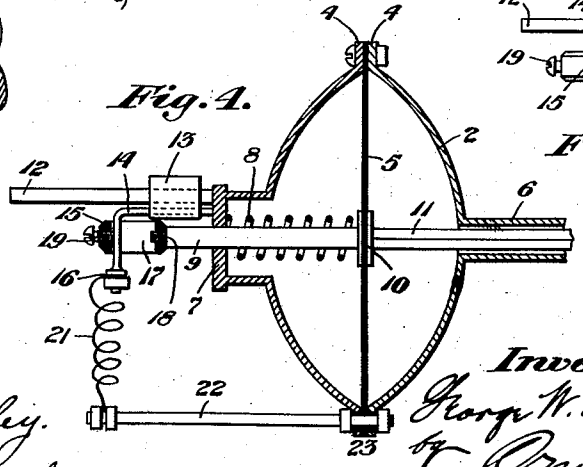


Fig. 6.

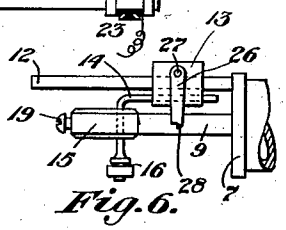
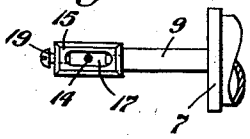


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ALARM DEVICE.

No. 891,627. Specification of Letters Patent. Patented June 23, 1908.

Application filed November 30, 1907. Serial No. 404,616.

To all whom it may concern:

Be it known that I, GEORGE W. MacKENZIE, a citizen of the United States, residing at Ben Avon, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Alarm Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention refers to an improvement in alarm devices for the purpose of indicating either high or low pressure, or the absence of any pressure, in a gas main, by means of mechanism actuated directly by the pressure of the gas from the main or any distributing connection, and is constructed and adapted to operate in the manner hereinafter described.

Referring to the drawings—Figure 1 is a view in side elevation showing the apparatus in position for operation in connection with the gas-distributing pipe. Fig. 2 is a longitudinal sectional view showing the device in normal position. Fig. 3 is a similar view showing the effect of the high gas pressure to make the contact with the terminals establishing the alarm circuit. Fig. 4 is a similar view showing the effect of low pressure or lack of any pressure to effect the same result. Figs. 5 and 6 are detail views showing a modified construction employing a temporary lock for breaking the alarm circuit. Fig. 7 is a detail plan view of the slotted insulating block on the end of the abutment stem.

The invention has in view to provide means whereby gas pressure, acting upon a movable dam or diaphragm, operates to establish electrical communication with any suitable alarm, as a bell, when the diaphragm is abnormally extended, and to effect the same result when the diaphragm is abnormally retracted.

The device consists generally of a casing composed of two oppositely disposed inclosing shells 2 and 3, preferably circular and engaging between their flanges 4, a movable dam of any suitable type, which may conveniently be in the form of a rubber diaphragm 5.

At its inner or pressure side, the device is connected with the pipe system or main by a connection 6 attached to shell 2 whereby gas pressure is communicated to the interior and against the opposing face of the diaphragm 5. At the other side case 3 is provided with a bearing extension 7 between which and the diaphragm is interposed a compression spring 8, preferably a coiled spring, surrounding stem 9. Said stem 9 is connected with the diaphragm at its center in any suitable manner as indicated at 10 and extends beyond the opposite side as indicated at 11 into the pipe 6, in which it has a sliding bearing, with free clearance for the gas. By this construction stems 9 and 11 support and centralize the mechanism and stem 9 is provided with means for making the electrical contact with the other elements.

12 is a rigid guide stem extending outwardly beyond the bearing 7, into which it may be secured as shown, upon which stem is slidingly mounted an insulating block 13 having frictional engagement with the stem, in which is mounted a contact member 14 adapted by its inner end to make electrical contact with the shell 3 or with its extension 7 when retracted as shown in Fig. 4. Stem 14 at its outer portion is bent downwardly as shown, extending through a slotted insulating block 15 mounted on the other end of stem 9, and is provided at its terminal with the binding post 16 for attachment of one of the alarm circuits.

Insulating block 15 is provided with a longitudinal slot 17 through which passes stem 14 and which slot is of sufficient length to permit of considerable movement of the diaphragm 5 without making contact with the desired limitations, defined by the ends of slot 17 or by the contacting devices set in said ends. Stem 9 extends by contact terminal 18 through the end of block 15 and projects terminal 18 into contact with stem 14 when the diaphragm is unduly extended, as shown in Fig. 3, and block 15 is preferably provided at its outer end with a temper screw 19 whereby inward range of movement of diaphragm 5 before stem 14 is also drawn in by contact of screw 19 to actuate the alarm may be adjusted.

20 is the alarm, as a bell, with which communicates the circuit wire 21, either directly as indicated in dotted lines in Fig. 1, but preferably through a supporting post 22 having an insulated mounting at 23 in the flanges 4 of shells 2 and 3, from any portion of which stem 22 as the outer end, and by a binding nut, connection may be made to the bell 20 as clearly shown. Such connection, by reason of the insulation, is entirely inde-

pendent of the casing shells 2 and 3, and for the purpose of establishing the circuit in any other way, attachment may be made at any suitable portion of either shell, as by a binding nut connection 24 through battery 25 and to the bell 20, as shown in Fig. 1.

The operation of the device as thus constructed is as follows: The desired normal pressure of gas being determined, block 13 carrying stem 14 is moved outwardly from contact as in Fig. 2, and so long as the pressure behind the diaphragm remains normal the device will remain inoperative. Should the pressure become excessive the diaphragm will be extended as in Fig. 3, making contact by terminal 18 with stem 14, whereupon current will be established therethrough to bell 20, battery 25 and either shell 2 or 3 to stem 9, resulting in ringing the alarm.

In case of a decrease in pressure or the absence of any pressure whatever, spring 8 will retract diaphragm 5, whereupon stem 14 will be engaged by binding screw 19 or the outer end of slotted bar 15, throwing stem 14 and its supporting block 13 backwardly along guiding stem 12, making contact by the inner end of stem 14 with casing 7, thus establishing an alarm circuit through the casing 3, connection 24, battery 25, to bell 20 and its connection 21 to stem 14.

In Figs. 5 and 6 I have shown a modified construction for the purpose of holding stem 14 temporarily away from contact with bearing 7 of casing 3, after an alarm has been sounded upon a reduction of pressure so as to temporarily break the alarm circuit and stop the ringing of the bell, it being assumed that all gas connections have, upon notification by the alarm, been shut off. Such temporary locking device consists of an arm 26 pivotally mounted at 27 to insulating block 13 and having a shouldered lip 28 at its inner end adapted to engage the upper edge of extension 7 or any other suitable element, to hold pin 14 away from contact. The same result may be secured upon the alarm being sounded due to excess pressure by merely moving insulating block 13 and stem 14 outwardly away from contact with terminal 18, as indicated in dotted lines in Fig. 3, and with either construction it will be seen that the alarm having sounded, and the ordinary precautions having been taken against accident by shutting off the gas, the device may be set to arrest the sounding of the alarm until normal conditions are again established.

In event of the pressure of the gas being reduced from the abnormally high pressure, the stem 19 will merely travel backwardly, due to the action of spring 8 and will push stem 14 inwardly to a position for operation for again sounding the alarm due to either cause, and in the event of abnormally low pressure and the reëstablishment of normal pressure, causing the diaphragm and stem 9 to again travel outwardly, pivoted arm 26 will become detached and will fall downwardly by gravity as shown in Fig. 6. With either construction the device will become automatically operative upon reëstablishment of normal conditions of pressure.

The construction and operation of the device will be readily understood from the foregoing description. It provides a convenient and simple means for the object in view, it is capable of reliable operation under the various conditions assumed, and in use has given highly satisfactory results.

It may be changed or varied in various features by the skilled mechanic without departure from the scope of the invention, and all such changes are to be understood as being included within the scope of the following claims.

What I claim is:

1. An alarm device for fluid pressures consisting of an inclosing case provided with a fluid connection and a movable dam having a stem provided with spaced terminal contacts, a relatively movable contact element adapted to be engaged by either of said stem contacts, an alarm device, and an electrical connection from the movable contact element to the alarm, and from the alarm to the case, substantially as set forth.

2. An inclosing casing having a movable dam, a stem connected with the movable dam provided with opposing contact terminals, a slidingly movable insulated contact arranged to engage the movable dam stem and casing respectively, an alarm device, a connection thereto from the insulated contact, and a connection between the alarm device and the shell with an intervening source of energy, substantially as set forth.

3. An inclosing casing having a movable dam, a spring-controlled stem connected with the movable dam provided with opposing contact terminals, a slidingly movable insulated contact arranged to engage the contact terminals of the movable dam stem and casing respectively, an alarm device, a connection thereto from the insulated contact, and a connection between the alarm device and the shell with an intervening source of energy, substantially as set forth.

4. The combination with a shell in electrical connection with an alarm device and having a supporting stem, and a relatively movable contact member slidingly mounted by an insulating block frictionally engaging said stem and also connected with the alarm device; of a movable fluid-actuated dam within the shell provided with a stem contacting with the shell and having a terminal adapted to engage said contact member, substantially as set forth.

5. The combination with a shell in electrical connection with an alarm device and

a relatively movable insulating contact member 14 also connected with said alarm device, of a spring-retracted movable dam within the shell provided with a stem in electrical connection with the shell and having a contacting terminal 18 and a slotted insulating terminal extension embracing said contact-member 14, arranged to make electrical contact therewith in one direction of said terminal 18 and to engage and shift it in the other direction and cause said contact member 14 to engage the shell, for the purpose described.

6. The combination with a shell and an alarm device electrically connected therewith, of a supporting stem, a movable contact member mounted by an insulating block on said stem, and a movable dam within the shell provided with a sliding stem in electrical connection with the shell, said stem having a slotted terminal adapted to electrically engage the movable contact member on outward travel, and to draw it backwardly into contact with the shell on inward travel, substantially as set forth.

7. In a device of the class described, the combination with an inclosing shell having a fluid connection, a fluid-actuated movable dam within the shell having a movable contacting portion, and an insulating block slidably supported with relation to the shell and having a contact member arranged to co-act with said movable contacting portion; of a locking arm pivoted to the insulating block adapted to hold it outwardly from the shell, and to fall by gravity when disengaged therefrom upon outward travel of the movable contacting portion of the movable dam, substantially as set forth.

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

GEORGE W. MacKENZIE.

Witnesses:
C. M. Clarke,
Chas. S. Lepley.