W. S. BATE.

AUTOMATIC ALARM FOR STEAM GAGES.

APPLICATION FILED OCT. 3, 1913.

1,200,454.

Patented Oct. 10, 1916.

2 SHEETS—SHEET 1.

Fig. 3.

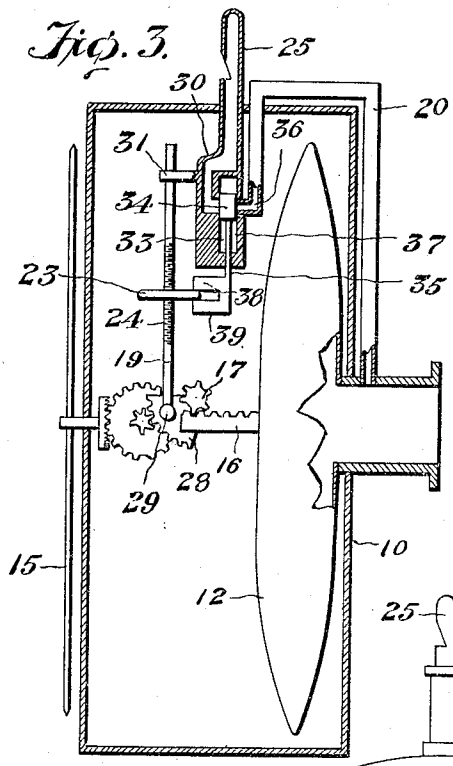
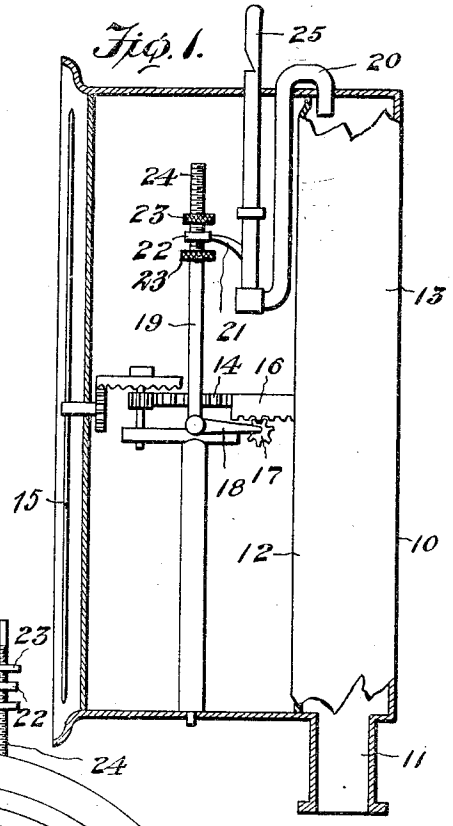


Fig. 1.



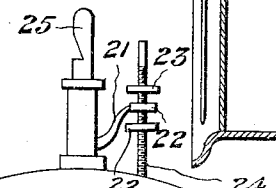
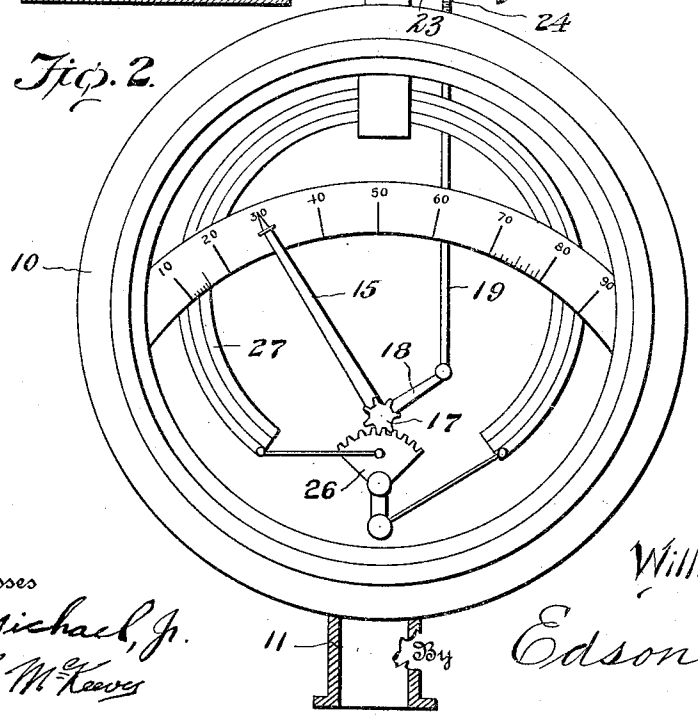


Fig. 2.



Witnesses

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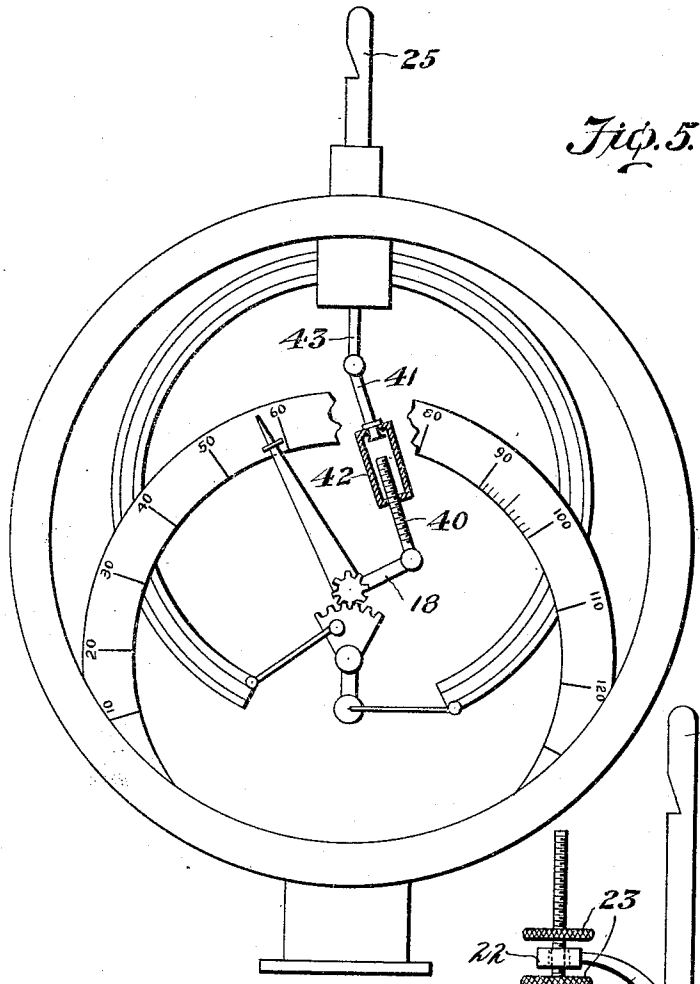


Fig. 5.

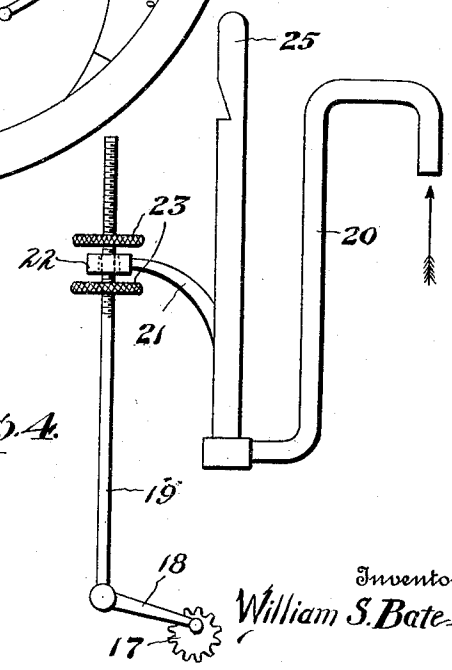


Fig. 4.

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AUTOMATIC ALARM FOR STEAM-GAGES.

1,200,454. Specification of Letters Patent. Patented Oct. 10, 1916.

Application filed October 3, 1913. Serial No. 793,201.

To all whom it may concern:

Be it known that I, WILLIAM S. BATE, a citizen of the United States, residing at Elizabeth, in the State of New Jersey, have invented certain new and useful Improvements in Automatic Alarms for Steam Gages; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is a signal device designed for employment in connection with pressure indicators, and is adapted more particularly for use on steam gages.

In steam operated devices it is frequently desirable that the pressure should not be permitted to exceed a given maximum or fall below a specified minimum.

A purpose of this invention is to give audible, or visible, warning to an operator when the pressure shall have deviated from a given maximum or minimum.

The invention contemplates, also, the provision of simple, inexpensive means whereby the device may be applied to various fluid pressure regulators commonly in use. Furthermore, the device aims to provide simple and efficient means whereby the warning or signal device may be operated simultaneously with the mechanism of the pressure indicator, when the latter denotes the pressure to be too low or too high for a given class of work, the signal operating mechanism having means to adjust its parts whereby the signal may be operated at a predetermined point or points to be designated by the indicator. The signal may be set to indicate too low a pressure or too high a pressure, or both.

In accomplishing the foregoing objects, the invention embodies a signal device adapted to be connected with a suitable type of pressure indicator. The mechanism of the signal device consists, primarily, of an actuating rod adapted to be reciprocated in any suitable manner by the movement of the pressure indicating mechanism. Upon this rod is mounted an adjustable signal actuating device which may be set at any predetermined position to register with a similar position of the pressure indicating mechanism. A valve, controlled by the adjustable device on the rod, operates to govern the action of the signal device, which latter is preferably supplied with the fluid fed to the indicator, whereby, when the valve is opened by the actuating device, fluid will be admitted through the valve to the signal for operating the latter.

The invention consists, also, in the combination, construction and arrangement of parts as hereinafter set forth and specified in the appended claims.

As illustrating an embodiment of the invention—Figure 1, is a vertical sectional view through parts of a pressure indicator disclosing an adjustable nut to sound a whistle when the indicator reaches a predetermined point. Fig. 2, is a front elevation illustrating the invention applied to another type of pressure indicator, and wherein a whistle is sounded when pressure reaches a minimum point. Fig. 3, is a vertical sectional view of another embodiment of the invention applied to still another type of pressure indicator wherein the signal is operated when pressure reaches predetermined minimum and maximum points on the indicator. Fig. 4, is an enlarged detail view, partly in section, of the signal operating mechanism and valve of Fig. 1. Fig. 5 nection of the signal on an indicator of the nection of the signal on an indicator of the Bourdon type.

In the embodiment of the invention illustrated in Fig. 1, the signal device is shown applied to a fluid or steam pressure indicator having a casing 10 having suitable means for admitting fluid under pressure, at 11. Within the casing 10 is mounted a suitable diaphragm 12, forming a chamber 13 between the diaphragm and wall of the casing 10. This diaphragm 12, serves, through the medium of the rack 14 and other suitable mechanism, to move the indicator hand 15 over the dial to denote the pressure of fluid in the system. This rack 14, or a similar rack, indicated at 16, is operated by the diaphragm to rotate a spur gear 17 and move the crank-arm 18. The crank-arm 18 is connected in a suitable manner to a rod 19 to impart reciprocating motion thereto simultaneously with the movement of the indicator hand 15 over the dial. The upper end of this rod 19 is shown in parallel relation to a suitable fluid conductor 20 connected with the casing 10 and opening into the chamber 13. This conductor is provided with a suitable valve, actuated by a lever 21, one end of said lever provided with a collar 22 loosely mounted on the rod 19.

Suitable means are employed to open the valve when the indicator hand 15 has arrived at a predetermined point on the dial. One means for accomplishing this result is shown at 23 wherein a threaded nut is mounted on a screw threaded portion 24 of the rod, whereby the nut may be moved to various desired positions on the rod 19, to correspond with various positions of the indicator hand 15 on the dial. This nut 23 is adapted to engage the collar 22 and move the lever 21 to a position to open the valve for the purpose of admitting the fluid to a suitable signal device to be operated by fluid pressure. One type of signal device is shown in the form of a whistle 25, although any other signal device, may be employed. The structure disclosed in Fig. 1 shows the signal actuating device 23 positioned above the collar 22 to signal maximum pressure.

In Fig. 2 the device 23 is positioned above and below the collar 22 to operate the signal when the indicator hand 15 reaches a point below the desired minimum or above the desired maximum.

In Fig. 2 the structure is shown applied to an indicator of the Bourdon type, a rod 19 is connected by the crank arm 18 mounted upon the gear 17 which is shown operated by a sector 26 when the actuating member 27 of the indicator expands or contracts under the action of the fluid pressure.

In Fig. 3, as well as in Fig. 1, the signal is illustrated as the whistle 25 protruding above the casing, while the rest of the device, except the portion of the conductor 20, is inclosed within the casing 10. This is found advantageous after the adjustment of the element 23 to its proper position upon the head 19, as the casing may be locked against interference by unauthorized persons.

In the construction illustrated in Fig. 3 the diaphragm 12 is shown provided with a rack 16 which operates the pinion 17 upon a suitable shaft to which is secured a sector 28. This sector through suitable connections, operates the indicator hand 15 before the dial, and at the same time pivotally supports one end of the rod 19 at 29. At the upper end of the casing 10 is provided a suitable frame 30 for the signal device, shown as a whistle 25, and extending from this frame as a bracket 31 which is adapted to engage the upper or free end of the rod 19 to maintain the same in proper vertical alinement. In the construction shown in Figs. 1 and 2, the lever 21 having the collar 22, retains the rod in its vertical alinement. Within the casing is formed a valve comprising an elongated chamber 33 in which operates the piston 34 having a piston rod 35 connected thereto and extending beyond the casing. Suitable packing is employed around the rod to render the connection fluid tight. The inlet port 36 connects the conductor 20 with the chamber at a point intermediate the ends thereof, and a suitable outlet port 37 is shown opposite to said inlet port 36. To the free end of the piston rod 35 is connected a stop member 38, which may be rigidly secured to the rod, and positioned adjacent to said stop member 38, is another stop-device 39 which is mounted upon the rod 35. The adjustable signal actuating device 23, shown in the form of a valve nut engaging the threaded portion 24 of the rod 19 is adapted to be positioned between the stop members 38 and 39, the parts 38 and 39 being spaced just sufficiently to permit the part 23 to be placed between them, thereby permitting the range of the device to be controlled by the length of the piston 34.

In the structure disclosed in Fig. 5, the crank arm 18 is shown connected to a rod of two members 40, 41, which are connected by a turn buckle 42 permitting adjustment of the length of the rod. The upper end of rod 41 is pivotally connected with a valve actuating rod 43, which latter rod controls the action of the valve to the signal device 25.

In the operation of the device illustrated in Fig. 3, the signal can be said to be sounded when the indicator hand 15 reaches a maximum or minimum point. When the hand has reached a predetermined maximum point, the sector 28 will be moved to lift the rod 19 until the nut 23 engages stop 38. This contact of the parts 23, 38, causes piston 34 to move to a position to open port 37, permitting fluid to pass below the piston to the signal device 25. When the hand reaches its minimum predetermined point, nut 23 will engage stop 39 to withdraw piston 34 from its normal position across the path of the port to the pressure supply and to permit the pressure fluid to pass above the piston to the signal 25.

The right is reserved to make such changes and alterations in the form and proportion of the parts as clearly fall within the scope of the invention as set forth in the appended claims.

Having thus described my invention, what I claim is:

1. In a signal device of the character described, the combination with a pressure indicator and means to supply pressure thereto, of a signal, a signal rod connecting the indicator mechanism with the signal to govern the action of the signal when the indicator assumes a predetermined position, and adjustable means on the signal rod to regulate said predetermined position of the signal mechanism.

2. In a signal device of the character described, the combination with a pressure indicator and means to supply pressure thereto, of a signal, means to connect said signal with a source of pressure supply, a signal

rod hingedly connected with the mechanism of the pressure indicator, and adjustable means to connect the rod with the signal whereby the signal may be operated when the indicator mechanism assumes a predetermined position.

3. In a signal device of the character described, the combination with a pressure indicator and means to supply pressure thereto, of a signal, means to connect said signal with a source of fluid supply, a signal rod coupling the mechanism of the pressure indicator with the control means of the signal to actuate the signal when the indicator assumes a predetermined position, and adjustable means carried by said signal rod to vary the actuation of said signal corresponding to predetermined positions of said indicator.

4. In a signal device of the character described, the combination with a fluid pressure indicator and means to supply fluid thereto, of a signal, means connecting the signal with a source of fluid supply, a signal valve having an operating device, a signal rod connecting the indicator mechanism to the valve operating device, and means adjustably mounted on the signal rod whereby the movement of the fluid pressure indicator will operate the signal when the pressure indicator assumes a predetermined position.

5. A signal device for fluid pressure indicators comprising a rod adapted to be pivotally connected with the indicator mechanism, a signal device, a valve to operate the signal, said valve being provided with a piston adapted to operate said signal device in two predetermined positions of the piston, and an adjustable nut carried by said rod to control the operation of the valve piston and signal device.

6. In a device of the character described, the combination with an indicator mechanism, of a signal element and an adjustable signal rod member to couple said indicator mechanism to said signal element for the positive control and actuation of said element by said mechanism.

7. In a device of the character described, the combination with a pressure indicator, of a signal element and an adjustable signal rod member to couple said signal element with the indicating portion of said indicator to produce a positive and synchronous operation of said signal at predetermined positions of said indicating portion.

8. In a device of the character described, the combination with a pressure indicator and means to supply pressure thereto, of a signal element, geared elements, and adjustable means to directly connect a portion of said geared elements to said signal element for the purpose of directly and positively operating said signal element in predetermined positions corresponding to the pressure for those positions.

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

WILLIAM S. BATE.

Witnesses:
JAMES P. SHEA,
A. J. TILLMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."