H. C. HENLEY & A. B. CROWDER.

AUTOMATIC ALARM DEVICE FOR FIRE EXTINGUISHING APPARATUS.

APPLICATION FILED NOV. 9, 1908.

936,889. Patented Oct. 12, 1909.

3 SHEETS—SHEET 1.

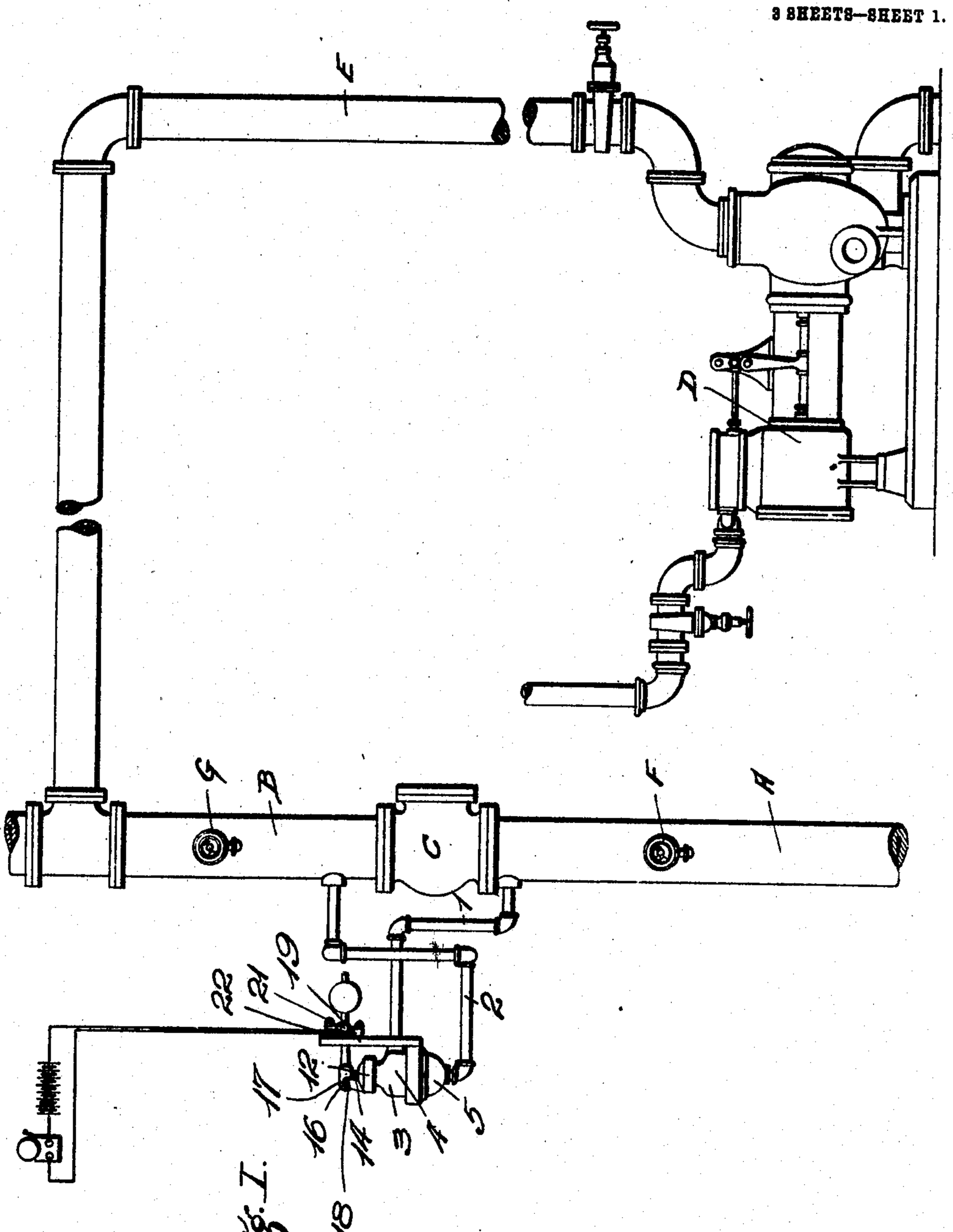

Fig. 1.

ATTEST.

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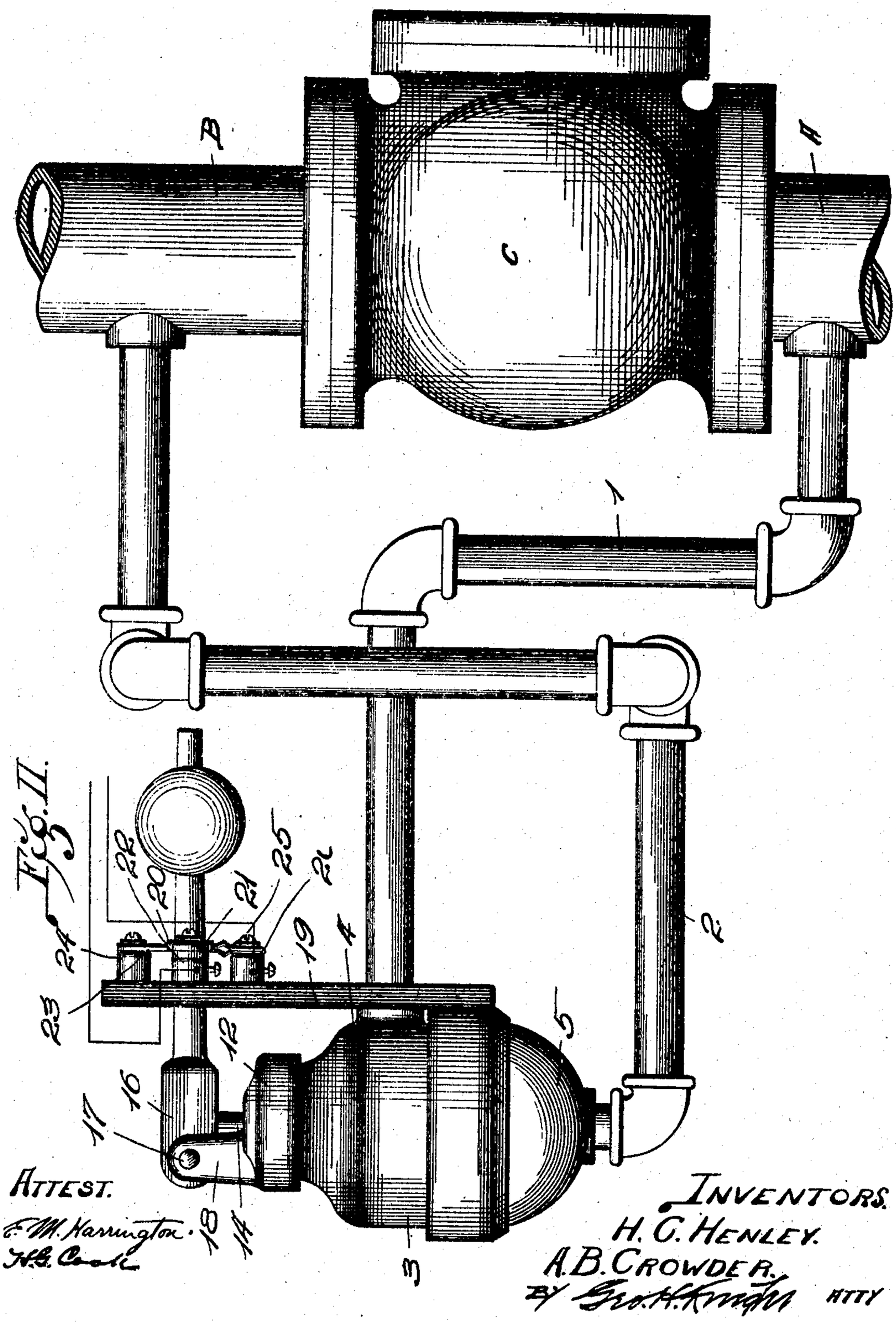

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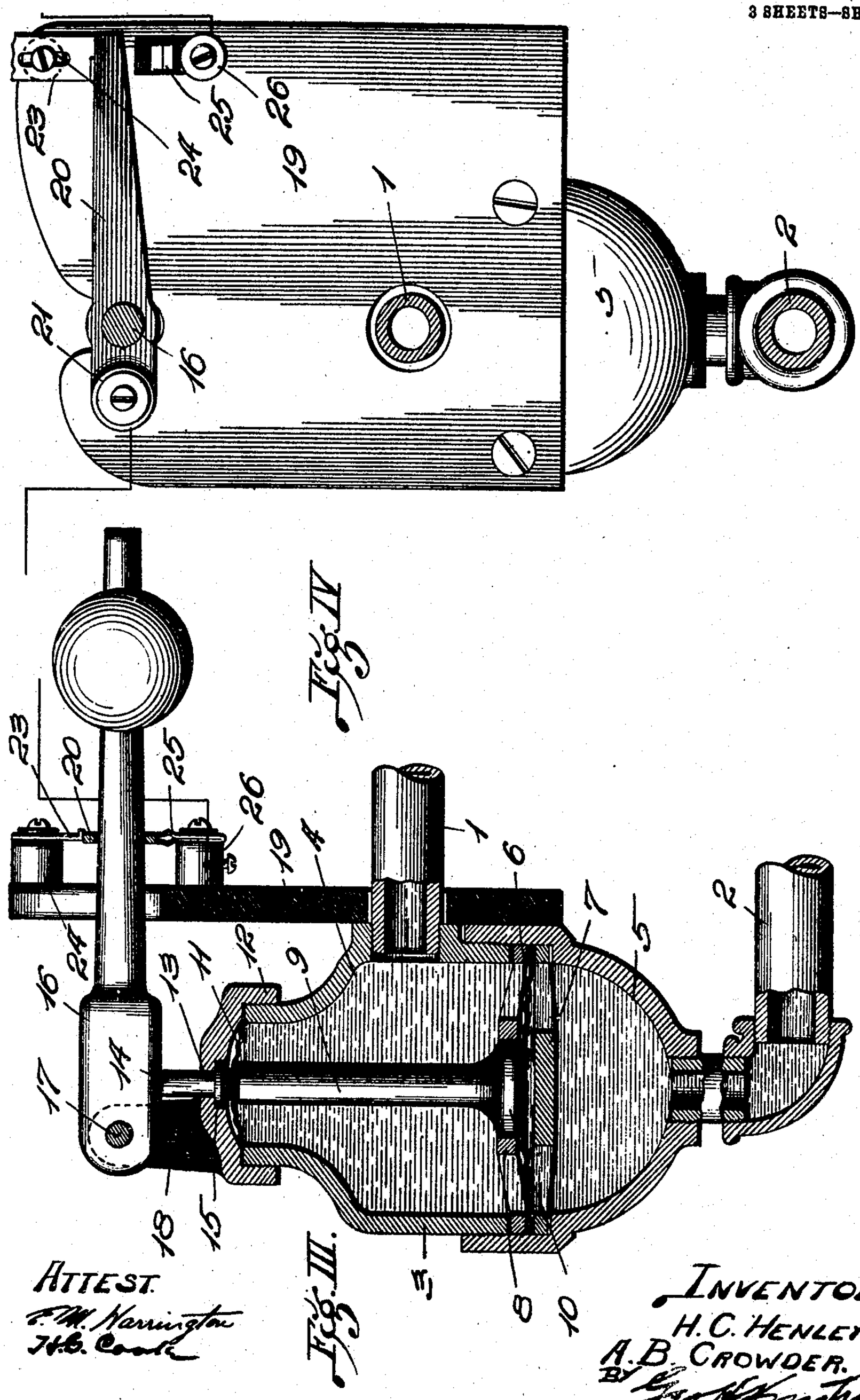

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UNITED STATES PATENT OFFICE.

HENRY C. HENLEY AND ALBERT B. CROWDER, OF ST. LOUIS, MISSOURI.

AUTOMATIC ALARM DEVICE FOR FIRE-EXTINGUISHING APPARATUS.

936,889. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed November 9, 1908. Serial No. 461,657.

To all whom it may concern:

Be it known that we, HENRY C. HENLEY and ALBERT B. CROWDER, citizens of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Automatic Alarm Devices for Fire-Extinguishing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to an automatic alarm device for use in connection with fire extinguishing apparatus to indicate the escape of water from the distribution pipe of the apparatus, due either to the opening of an outlet in the distribution pipe occasioned by a fire or to leakage at any point in the distribution pipe.

The alarm device to which our invention relates is one utilized in a fire extinguishing apparatus comprising a supply pipe or main, and a distribution pipe with which any desired number of branch pipes may be associated and in which provision is made for the maintenance of a pressure in the distribution pipe in excess of the pressure maintained in the supply pipe.

Figure I is an elevation of our alarm device associated with a fire extinguishing apparatus. Fig. II is a side elevation of our alarm device connected to the supply and distribution pipes of a fire extinguishing apparatus. Fig. III is a vertical section through the alarm device. Fig. IV is a rear view of the alarm device.

In the accompanying drawings: A designates the supply pipe or main of a fire extinguishing apparatus and B the distribution pipe of said apparatus.

C is a controlling valve interposed between the supply and distribution pipes and which may be of any preferred construction.

The distribution pipe B is designed to have maintained therein a pressure in excess of the pressure in the supply pipe or main A and which may be produced in any desired manner, such as by the employment of a suitable pump D connected to the distribution pipe by a conducting pipe E through which fluid subjected to pressure by the pump may be conducted to the distribution pipe to increase the pressure therein. The supply and distribution pipes are equipped with suitable pressure gages F and G.

1 and 2 designate conducting pipes leading respectively from the supply and distribution pipes A and B and to which our alarm device is attached.

3 designates the casing of our alarm device, containing an upper low-pressure chamber 4 with which the conducting pipe 1 communicates, and a lower high-pressure chamber 5 with which the conducting pipe 2 communicates. The chambers 4 and 5 are separated from each other by a dividing diaphragm 6 that is located between a lower spider or guard 7 and an upper spider or guard 8 suitably mounted in the casing intermediate of the top and bottom thereof.

9 is a push rod in the chamber 4 of the casing 3 and which is provided at its lower end with a head 10 that is movably fitted in the upper guard 8. The head of this push rod is seated upon the diaphragm 6, thereby providing for vertical movement of the rod when the diaphragm beneath it is flexed upwardly by pressure in the lower chamber 5 against its lower side in excess of the pressure present in the upper chamber 4.

11 is an upper diaphragm at the top of the upper low-pressure chamber 4 and located above the upper end of the push rod 9, this diaphragm being preferably held between the upper end of the casing 3 and a cap 12 secured to and forming a part of the casing. In the cap 12, immediately above the push rod 9 and the central portion of the second diaphragm 11, is an opening 13.

14 is a lift rod that is operable in the opening 13 in the cap 12, and which is provided at its lower end with a head 15 that serves to limit the upward movement of the rod.

16 designates a weighted arm that is pivoted at 17 to posts 18 extending upwardly from the cap 12 of the casing 3 and which is adapted to rest upon the upper end of the lift rod 14.

19 designates a bracket secured to the casing 3 and extending at an angle or transversely relative to the weighted arm 16.

20 is a contact arm through which the weighted arm 16 extends, (see Figs. II and III,) and one end of which is pivotally connected at 21 to a binding post 22 supported by the bracket 19, (see Figs. I and III.) The contact arm 20 is adapted to operate between an upper stop 23 attached to a post 24 supported by the bracket 19 and a contact 25 attached to a binding post 26. The binding post 22 to which the con-

tact arm 20 is fitted and the binding post 26 that supports the contact 25 are adapted to be placed in circuit with a suitable indicator, such as an electric bell, by the attachment of connecting wires to said binding posts and which lead to the indicator.

It should be here stated that the purpose in providing the two low and high pressure chambers 4 and 5 and separating them by the dividing diaphragm 6 is to provide initially for the presence of equal or balancing pressures in the two chambers when the supply and distribution pipes A and B are first filled, in order that the dividing diaphragm will be balanced or subjected to approximately even pressure at both sides thereof. Then when a pressure of greater degree is established in the distribution pipe A, and the high-pressure chamber 5 in communication therewith, the greater degree of pressure is only required to overcome the normal pressure in the low-pressure chamber 4 in order that the movable parts of the alarm device may be carried to their normal positions, ready to move to alarm producing positions in the event of leakage from the distribution pipe or any of its branches. An important advantage in the provision of the low-pressure chamber 4, in communication with the supply pipe, lies in the fact that the pressure medium in this chamber acts to prevent buckling of the diaphragm under the pressure in the high-pressure chamber 5 as would be liable to occur in the absence of counteracting pressure opposing that in the chamber 5.

In the practical use of our alarm device, a pressure in excess of the pressure in the supply pipe or main of the fire extinguishing apparatus is established in the distribution pipe of said apparatus. As a consequence of the unequal pressure in the supply and distribution pipes, there is caused to exist in the lower chamber 5 of our alarm device a pressure in excess of the pressure in the upper chamber 4 of said device, due to the communication between the distribution pipe, in which excess pressure is present, and the chamber 5, provided by the conducting pipe 2, while the other conducting pipe 1 leading from the supply pipe of the fire extinguishing apparatus furnishes communication between said supply pipe, containing the lesser pressure, and the chamber 4 of the alarm device. By the production and maintenance of a pressure in the chamber 5 in excess of that in the chamber 4, the diaphragm 6 separating said chambers is forced upwardly and held in an uplifted position between the guards 7, whereby it acts upon the push rod 9 to elevate it and support it in an elevated position. This push rod in turn acts upon the upper diaphragm 11 in the casing of the alarm device, and the upper diaphragm in turn acts upon the lift rod 14 to hold it in the elevated position in Fig. II. The lift rod 14 at such times serves as a support for the weighted arm 16, and as a consequence said weighted arm is so upheld as to cause it to support the contact arm 20 against the stop 23 above it.

The positions of the parts of the alarm device that have been recited are those maintained as long as normal conditions exist in a fire extinguishing apparatus with which our alarm device is associated. In the event of the escape of fluid from the distribution pipe of the apparatus, there is a resultant diminishment in the excess pressure in said distribution pipe and the degree of pressure in the high-pressure chamber 5 beneath the dividing diaphragm 6 becomes lessened to a sufficient extent to permit the downward movement of said diaphragm under the influence of the weighted arm 16 and the members interposed between said weighted arm and dividing diaphragm.

When the pressure becomes lessened in the high-pressure chamber 5 of the alarm device and the diaphragm 6 descends, the weighted arm 16 is permitted to move downwardly from the position illustrated in the drawings; and as it so moves, it carries with it the contact arm 20 with the result of causing said contact arm to be lowered to the contact 25 beneath it. An electric circuit is thereby established between said contact and its binding post 26, the contact arm 20 and its binding post 22, and the indicator, such as the bell illustrated in Fig. I, whereby an alarm is given that serves as a notification of escape of fluid from the distribution pipe of the fire extinguishing apparatus, whether said escape be due to the opening of an outlet as a consequence of a fire, or due to leakage at any point throughout the distribution pipe or any of its branches.

We claim:—

1. The combination with a fire extinguishing apparatus having a supply pipe, a distribution pipe, and means for providing a higher degree of pressure in said distribution pipe than that in said supply pipe; of an alarm device comprising a casing, a dividing diaphragm in said casing subdividing it into high and low pressure chambers, free of communication with each other, the high pressure chamber having communication with said distribution pipe and the low pressure chamber having communication with said supply pipe, a second diaphragm exposed to the pressure medium in said low pressure chamber, an indicator controlling member controlled by said second diaphragm, and means in said low pressure chamber interposed between said dividing diaphragm and said second diaphragm providing for the transfer of force from said dividing diaphragm to said second diaphragm to hold

said indicator controlling member in an inactive position pending a reduction of pressure in said distribution pipe and the high pressure chamber in communication therewith.

2. The combination with a fire extinguishing apparatus having a supply pipe, a distribution pipe, and means for providing a higher degree of pressure in said distribution pipe than that in said supply pipe; of an alarm device comprising a casing, a dividing diaphragm in said casing subdividing it into high and low pressure chambers, free of communication with each other, the high pressure chamber having communication with said distribution pipe and the low pressure chamber having communication with said supply pipe, a second diaphragm exposed to the pressure medium in said low pressure chamber, an indicator controlling member controlled by said second diaphragm, and a rod in said low pressure chamber interposed between said dividing diaphragm and said second diaphragm providing for the transfer of force from said dividing diaphragm to said second diaphragm to hold said indicator controlling member in an inactive position pending a reduction of pressure in said distribution pipe and the high pressure chamber in communication therewith.

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ALBERT B. CROWDER.

In the presence of:
H. G. Cook,
E. M. Harrington.