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W. BAUER.

AUTOMATIC SPRINKLER SYSTEM.

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Fig. 1.

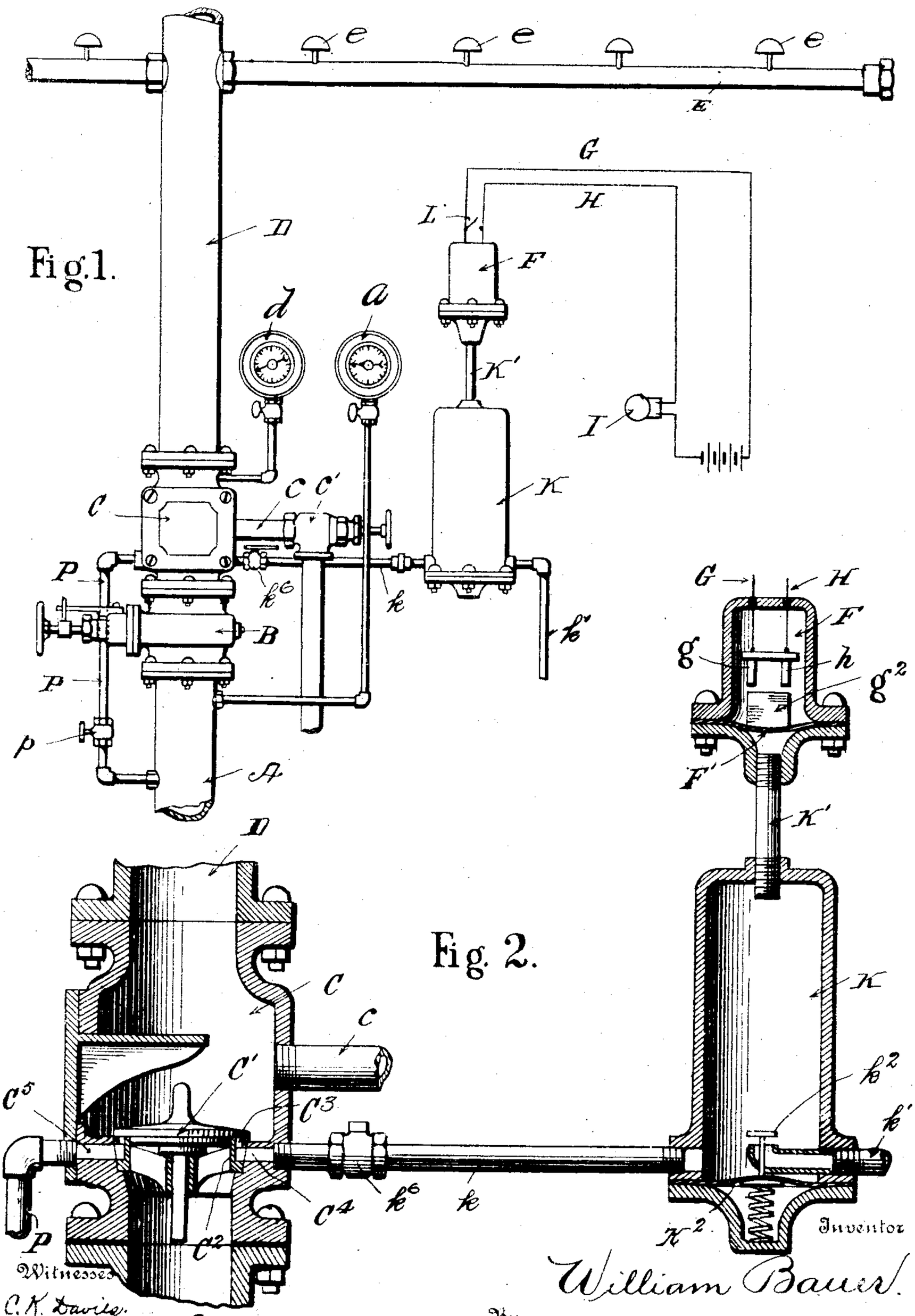

Fig. 2.

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AUTOMATIC SPRINKLER SYSTEM.

No. 868,624. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed April 24, 1907. Serial No. 369,929.

To all whom it may concern:

Be it known that I, WILLIAM BAUER, of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Automatic Sprinkler Systems; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in automatic sprinkler systems for extinguishing fires in buildings, in which systems piping is distributed throughout the building and equipped with a series of sprinkler heads which are closed with some material fusible at a comparatively low temperature, so that if a fire occurs in the vicinity of the sprinkler heads the seals are fused and water is admitted into the apartment.

Such apparatus are customarily provided with some means intended to close an electrical circuit and transmit notice of a fire to some distant point,—as to a fire department,—in case the seals are fused or the sprinkler heads leak so that unnecessary loss by flooding water can be prevented, or the work of the apparatus in extinguishing fires can be supplemented by the work of the fire department. The most usual means of closing the circuit is to employ a plunger or diaphragm in the drip-cylinder, which plunger or diaphragm is moved outward by the inrush of water which occurs when the main valve is automatically opened, and which plunger or diaphragm operates an electrical switch which closes the alarm circuit.

Where such systems are installed the rate of premium on fire insurance is reduced, but the underwriters and casualty insurance companies require that such alarm systems be tested at intervals in order to maintain the risks in force, and to insure that the apparatus is in proper working order; but when making such tests it is very desirable that the water system be not seriously disturbed.

The present invention, therefore, is designed to enable such tests to be mad whenever desired without disturbing the system, and this invention in particular is an improvement upon the testing devices for such systems disclosed in my Patent No. 831207, dated September 18, 1906, as will be hereinafter more fully explained. In order to test the electrical circuit in the apparatus as ordinarily constructed, a short-circuiting switch is installed in the alarm system and by closing this switch the alarm will be sounded if the electrical connections are in proper condition, but this short-circuiting switch merely tests the electrical part of the system and does not show whether or not any part of the hydraulic system is out of order. The improvement covered in my said patent enables any one to determine whether or not the water operated plunger or diaphragm for closing the main switch, through which the electric signals are transmitted, is in working order; and by that improvement the necessity of putting the hydraulic system temporarily out of action, during the time while such tests are being made, is entirely obviated. In my said patented invention such tests are made by short-circuiting water from the main supply pipe to the switch operating device under the automatically controlled pressure valve and accomplishes its purpose effectively and thoroughly, but in practice I have found that it is desirable to see that the passage leading from under said valve to the signal operating devices, is free and undisturbed. By the present invention I not only test the electrical signal operating devices as in my said patent—but I also test the condition of the ports and passages leading to and under the said pressure valve C′ to the electric-switch operating devices. By this invention, therefore, not only can the operativeness of the entire electric-alarm part of the system be tested at will without disturbing the sprinkler system,—and the short-circuiting switch can be dispensed with if desired,—but I also simultaneously test the condition of the ports, passages and pipe connections under said pressure valves and the electric-switch operating devices, and with my present invention such tests can be made simultaneously without disturbing the hydraulic system at all, and as conveniently as it has heretofore been possible to merely test the electrical part of the system.

In the accompanying drawing I have illustrated my invention as applied to one of the present known acceptable and satisfactorily working sprinkler systems, and the invention will be fully understood from the following description in connection with the said drawings and summarized in the claims.

In the drawings—Figure 1 is a side elevation of so much of the entire apparatus as is necessary to impart a clear understanding of the present invention; and Fig. 2 is an enlarged sectional view through the pressure controlled valve and the drip chamber.

The main water supply pipe A is connected to a main or tank containing a constant supply of water. The distributing pipe D is connected to pipe A through the pressure-valve-chamber C, which as shown in Fig. 2, is located between pipes A and D, but communication with pipe A is normally closed by a valve C′ which is of ordinary construction and which is adapted to seat upon an annular ring C^2, in the lower part of chamber C, and when seated will effectively close communication between the pipes A and D. In

the upper face of seat C′ is an annular channel C³ which is normally closed on its upper side by the valve C′, but which connects by a passage C⁴ with a pipe *k* leading to the drip-cylinder K hereinafter referred to. The pipe *k* may be provided with a turn-plug *k*⁶ which should be normally kept in open position.

Below valve chamber C is a manually operated valve B, in pipe A, by which water can be manually cut off from the distributing system D whenever it is desired, as for instance, when removing or renewing the sprinkle heads. Valve B, however, is normally secured in open position.

Connected to pipe D are a series of ordinary distributing pipes E, which are merely diagrammatically illustrated in the drawings, and which are customarily arranged along the ceiling of the apartment in which they are located, and are provided with a series of sprinkler heads *e* which are sealed by a material fusible at a low temperature. The pipe D may be provided with an indicator gage *d*, and the pipe A with an indicator gage *a*.

The pipes D, E, can be filled with water, or air and water, under a sufficient pressure to keep the valve C′ closed against the pressure of water in pipe A until the pressure in pipe D is reduced by the opening of one or more of the sprinkler heads. The distributing system above valve C may be drained by a pipe *c* having a valve *c*′.

In order to send the alarm automatically when the sprinkler system is put into operation by the fusing of some of the sprinkler head seals, an electric circuit is provided, which ordinarily comprises a main switch located in a casing F into which are led the opposite terminals *g*, *h*, connected to conductors G, H, which lead to an alarm or indicator I located at any desired point. The circuit can be closed by a movable contact piece *g*² attached to a diaphragm F′ secured in the casing F below the terminals *g*, *h*, and which piece *g*² is normally held by the diaphragm out of contact with the terminals *g*, *h*. The casing F is connected below the diaphragm F′ by a pipe K′ with the drip-cylinder K. This drip-cylinder K is connected with a port C⁴ in the casing C by means of a pipe *k*, port C⁴ communicating with the channel C³ in the valve seat C². The drip-cylinder K is also provided with a drain pipe *k*′ which is closable, within the cylinder, by a small valve *k*² which is connected to a diaphragm K² in the lower end of the drip-cylinder (below pipe *k*,) and which diaphragm normally holds valve *k*² in open position, see Fig. 2; the cylinder K is, therefore, normally empty; and the plunger or diaphragm F′ normally holds piece *g*² out of contact with the terminals *g*, *h*, so that there is no electrical communication between conductors G, H, through the switch, which normally stands open, as indicated in Fig. 2. But if the sprinkler heads are unsealed and valve C′ unseated by the inflow of water from pipe A, water immediately flows through annular channel C³, through port C⁴, and pipe *k* into cylinder K and causes diaphragm K² to close valve *k*² and, rising in the drip-cylinder, forces the diaphragm F′ in casing F upward so as to cause piece *g*² to contact with the terminals *g*, *h*, thereby closing the electric circuit through the conductors G, H, and transmitting an alarm to the signal I.

The parts thus far described are constructed and arranged substantially as in the ordinary apparatus. Customarily a short-circuiting switch L is also placed near switch F so that the electrical alarm circuit can be readily tested, but obviously the closing of this switch would not indicate at all whether or not the plunger or diaphragm F′ and drip cylinder K were in operative condition, nor whether the pipe *k*, port C⁴, or channel C³ were clear and unobstructed; and in these apparatus, heretofore, in order to test such parts it was necessary to open the drain valve *c*′ to allow the water to be drawn out of the distributing system, and also to permit the inrush of water from pipe A into pipe *k* and drip-cylinder K and to actuate the diaphragm F′ and close the alarm circuit. All of this necessitated the temporary disablement of the entire system, required a great deal of time, and was very troublesome.

In my aforesaid patent, I provided a short-circuiting pipe M whereby water could be conducted from the pipe A into drip-cylinder K so as to test the operativeness of the latter and of the electric switch operating devices without disturbing the hydraulic system or the connections between the electrical and hydraulic systems.

In the present invention, instead of employing the said pipe M connected direct to the drip-cylinder, I employ a pipe P connected with the pipe A below valve B and with a port C⁵ in the lower part of the chamber C, which port connects with the annular channel C³, and thus, through said channel and the port C⁴ with pipe *k*, and through the latter with the drip-cylinder K. Pipe P is provided with a valve *p* which is normally closed, but when it is desired to test the electrical system, valve *p* is opened and water flows from pipe A through pipe P, port C⁵, channel C³, port C⁴, and pipe *k*, into drip-cylinder K closing the valve *k*² therein, under the head of water, and rising through pipe K′ into the casing F and forcing diaphragm or plunger F′ to close the circuit between the terminals *g*, *h*, thereby sending the alarm to the indicator I. It will be observed that the alarm could not be closed unless the port C⁵, channel C³, port C⁴, and pipe *k* are clear and unobstructed, and the cylinder and switch in proper operative condition, so that by this invention I not only test the electrical part of the apparatus but I test the ports and passages connecting the main valve C′ with the switch operating devices. Thus when the valve *p* is opened, if the signal is transmitted to indicator I it is certain that the parts are all in thorough proper working condition, and the test can be made as often as desired and very quickly without any disturbance of the distributing system or placing the same out of commission for even a short period of time.

The utility of the invention is obvious from the foregoing description; it removes a great many practical objections to such fire extinguishing systems; it facilitates testing of the apparatus; does not disturb the electrical or hydraulic systems at all, while demonstrating and testing the practical working and efficiency of the entire system simply and thoroughly. After the test is made the valve *p* is closed and the drip-cylinder K drained through pipe *k*′ and remains empty until another test is made, or the hydraulic system comes into play automatically.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In an automatic fire extinguishing sprinkler system, the combination of a water suppy pipe, a distributing pipe, a main pressure controlled valve interposed between the supply pipe and distributing pipe, a channel in the valve seat communicating with the said distributing pipe and normally closed by said valve, an outlet from said channel, a signal communicating with the outlet, and a valved pipe connecting the main water supply pipe to the said channel whereby the water may be passed through said channel while the valve is closed.

2. In an automatic fire extinguishing sprinkler system, the combination of a water supply pipe, a distributing pipe, a main pressure controlled valve interposed between the supply pipe and distributing pipe, a channel in the valve seat communicating with said distributing pipe and normally closed by said valve, an outlet from said channel, and a valved pipe connecting the main water supply pipe to the said channel whereby the water may be passed through said channel while the valve is closed; with an electrical alarm system, a hydraulically controlled switch for closing the electric circuit through said system, and connections between said switch and the outlet of said channel whereby the switch is operated when water is admitted into the channel.

3. In an automatic fire extinguishing system, the combination of a water supply pipe, a distributing pipe, an electric alarm system, a switch for closing the electric alarm, a drip-cylinder and connections for operating said switch, whereby the circuit is closed when water is admitted into the cylinder; with a main pressure-controlled valve interposed between the supply pipe and distributing pipe, a channel in the valve seat communicating with said distributing pipe and normally closed by said valve, connections between said channel and the said drip-cylinder, and a valved pipe connecting the main water supply pipe to the said channel, whereby water may be passed through said channel to the drip-cylinder to test the alarm system while the main pressure-controlled valve is closed.

4. In an automatic sprinkling apparatus for extinguishing fires, the combination of distributing pipes, a water supply pipe, a pressure controlled valve interposed between the supply and distributing pipes and normally closed, a channel in the seat of said valve having its upper side communicating with said distributing pipe and normally closed by the valve, a drip-cylinder, and a pipe connecting the said channel with said cylinder; with an electric alarm system, a switch for said system connected with said drip-cylinder whereby the switch is closed when water is admitted into the said cylinder, and a valved pipe connecting with the supply pipe below the main pressure controlled valve, and with the channel in the valve seat whereby water may be passed through said channel to the said cylinder to test the alarm system without disturbing the main pressure controlled valve.

5. In an automatic fire extinguishing sprinkler system, the combination of a main water supply pipe, distributing pipes, a pressure controlled valve between said pipes having an annular channel in its seat communicating with said distributing pipes and normally closed by said valve, sprinkler heads connected with said distributing pipes, an electric alarm circuit, a hydraulic switch for closing the circuit, a drip-cylinder connected with said switch, and a pipe connecting said drip-cylinder with the channel in the pressure controlled valve seat; with a valved pipe connecting the water supply pipe with the said annular channel and adapted to admit water to said channel and through the latter to said drip-cylinder independently of the pressure valve or distributing pipe system, whereby the connections between the valve seat and the drip cylinder and the operativeness of the electrical circuit can be tested without disturbing the distributing system.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

WILLIAM BAUER.

Witnesses:

IDA L. GRANT,
CHAS. G. MAZZONI.