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J. M. DORTCH.

SAFETY DEVICE FOR REFRIGERATING SYSTEMS.

(Application filed Dec. 15, 1897.)

(No Model.)

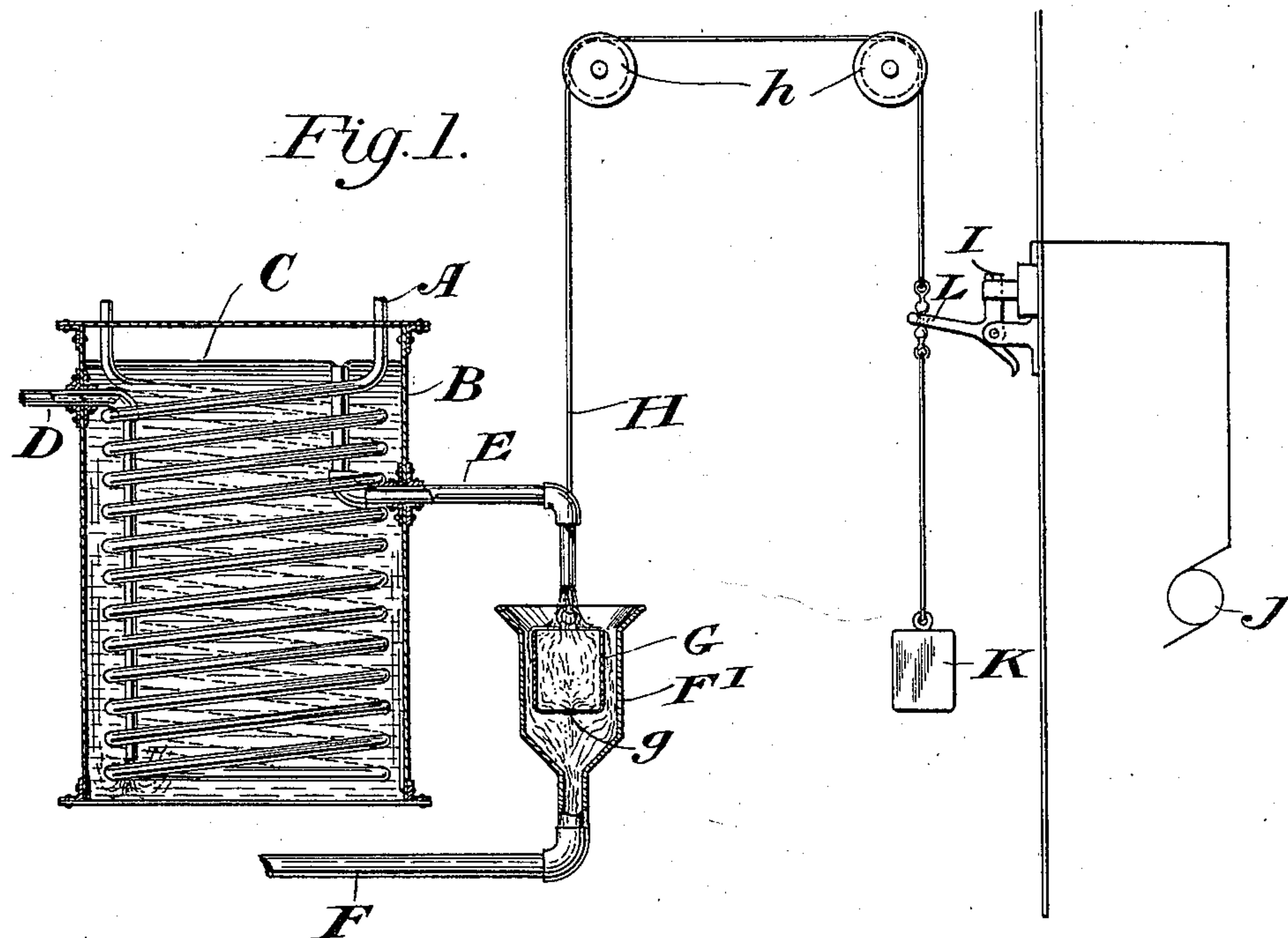
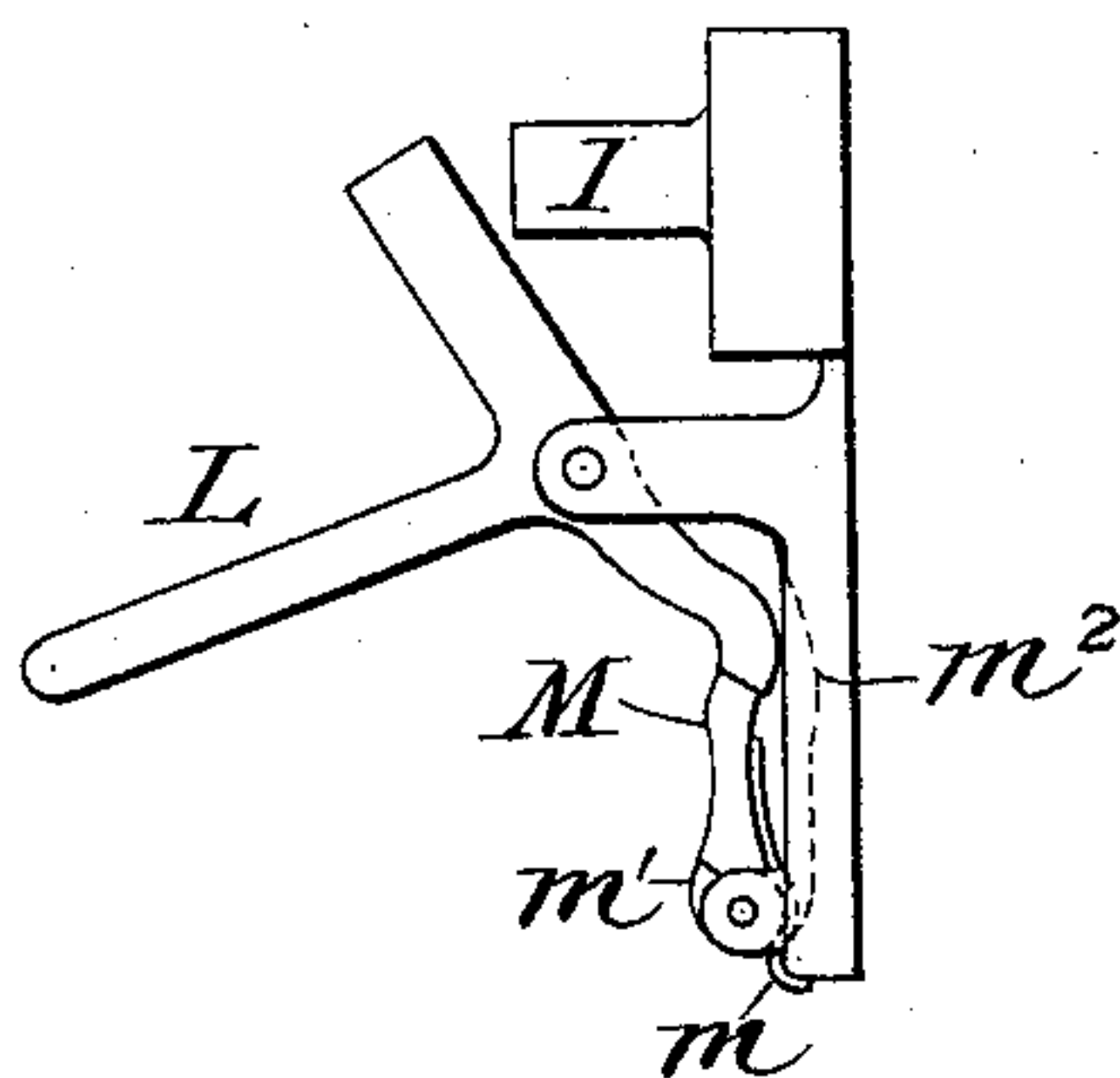


Fig. 2.



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SAFETY DEVICE FOR REFRIGERATING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 610,438, dated September 6, 1898.

Application filed December 15, 1897. Serial No. 661,956. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. DORTCH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Safety Devices for Refrigerating Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to refrigerating apparatus; and the object which I have in view is the provision of a safety device which will automatically shut down the motive power for the gas-compressor in case the supply of water to the condenser fails.

A further object of my invention is to so construct the safety device that the motive power for the compressor may be again put in operation when the water system for the condenser is again passing through the same.

Ordinarily if the water surrounding the condenser-coil ceases to flow and the compressor continues in operation the active element of the system increases in temperature and rapidly increases in pressure. This increase of pressure is liable to continue to such an extent as to burst the weakest part of the system.

My invention is especially applicable to small systems—such as are used in private dwellings, small retail establishments, &c.—for in such cases it is impracticable to keep a watcher in constant attendance to guard against accidents of this nature. Particularly is this increase of pressure extremely deleterious when such an element as carbonic acid is used in the system, for the normal pressure of the carbonic acid in the condenser-coil is usually about one thousand pounds per square inch, and any abnormal increase therein soon brings it to a dangerous figure.

With this object in view my invention consists in the provision of means, controlled by the flow of water from the discharge-pipe of the condenser, for stopping the motive power to the motive apparatus at such times as the water-supply to the condenser fails. I provide as this means a member connected with the starting and stopping device of the mo-

tive apparatus and so constructed and arranged that it receives water from the discharge-pipe and by means of the weight of the water retains the starting and stopping device in its operative position. Also connected with the starting and stopping device is a mechanism, such as a spring or counterweight, which tends to oppose the aforesaid member, so as to retain the starting and stopping device in an inoperative position. The two elements, each secured to the starting and stopping device and each opposing the other, constitute my improved safety device. When water is not flowing from the discharge-pipe, the element which tends to shut down the motive power is in the ascendant. When, however, water is passing over the other element, the ascendancy is reversed.

Referring to the drawings, Figure 1 shows such parts of a refrigerating system provided with the features of my invention as are necessary to fully describe the construction and operation of my safety device. Fig. 2 shows a modified form of starting and stopping device.

A represents the condenser-coil in which the carbonic acid or other active element is cooled after leaving the compressor.

B is the tank in which the condenser-coil is situated, and C is the cooling-water which is contained in this tank and which enters therein from the inlet-pipe D, which may be a part of the regular city water system. The water from the tank overflows through the pipe E.

F represents the drainage-pipe, the end of which carries a vessel or enlarged end F'. The end of the discharge or overflow pipe E is situated above the center of the enlarged opening F'.

G is a vessel having the restricted opening *g* and suspended by means of a rope or chain H within the opening F' in such a manner that the water from the pipe E falls into the vessel. I pass the rope H over suitable pulleys *h* and secure its other end to the handle L of the switch I.

K is a counterweight which is heavier than the weight of the vessel G, but is lighter than the combined weight of the vessel and its contents of water.

The switch I when closed completes the circuit to the motor J, which is mechanically connected in any suitable manner with the gas-compressor, which I have not thought it necessary to show.

The mode of operation of my invention is now clear. If the water is flowing through the condenser, it will, in passing from the end of the pipe E, quickly fill and keep filled the vessel G, for the opening *g* is not large enough to discharge all the water which is discharged from the pipe E. The switch I is therefore kept in the closed position shown, and the motor J is in operation. When, however, the flow of water through the pipe D ceases, in turn stopping the flow of water through the pipe E, the contents of the vessel G are emptied through the opening *g*. In a short time the weight of the water in the vessel so decreases that the counterweight K opens the switch I and stops the operation of the motor. On the other hand, if the water after a temporary cessation again passes to the condenser the vessel G soon fills and thereby closes the switch I, once more starting the motor J.

It is possible that it might be desirable under certain conditions to provide a device which will automatically open the circuit to the motor when the water fails, but which will not automatically close the circuit on a reestablishment of the water. It would need but slight modifications in the construction shown to achieve this object—such, for example, as the provision of a lock which will engage the switch-handle *i* when at its inoperative position and retain it thereat. Such a modification is shown in Fig. 2, in which there is a finger M, engaging the end of the switch-arm and pressed outwardly by spring *m*, but limited in its outward movement by stop *m'*. With such a lock the handle L when pulled downward by the weight is held at this position until the finger M is pressed inwardly into the slot *m*². (Shown in dotted lines.)

I believe that it is clear that in case a steam-engine or other source of motive power should be used my invention, with slight and obvious modifications, could still be used. I do not, therefore, limit myself to the use of my invention with systems in which the compressor is operated by electrical power; neither do I desire to limit myself to the specific embodiment of my invention herein described, for it seems clear to me that detailed modifications might be made therein without departing outside the scope of my invention.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The combination with a starting and stopping device for the motive apparatus of a

refrigeration system and the discharge-pipe for the condenser-cooling water of the said system, mechanism connected with and tending to move said starting and stopping device in one direction, and a member connected with and tending to move said starting and stopping device in an opposite direction, said member receiving the flow of the water from the discharge-pipe and enabled, by means of said flow, to overcome the tendency of the aforesaid mechanism.

2. In combination with a starting and stopping device for the motive apparatus of a refrigerating system and the discharge-pipe of the condenser-cooling water of the said system, mechanism connected with and tending to move the said device in one direction, a vessel having a restricted opening and receiving the water from said overflow-pipe and connections from said vessel to the said device so arranged that the vessel tends to act upon the controlling device in a direction opposite to that of the aforesaid mechanism.

3. In a refrigerating system, the combination of the gas-condenser, the water flowing therethrough, the discharge-pipe, a motor for operating the gas-compressor, a starting-switch for the same, a weight to open said starting-switch, a vessel having a restricted opening, receiving the water from said discharge-pipe and suspended by a connection from the starting-switch so that the weight of the water-filled vessel closes the switch by opposing the tendency of the aforesaid weight.

4. A safety device for refrigerating apparatus comprising, in combination, a starting-switch for the motive power thereof, a vessel suspended from the switch and receiving the discharged water from the condenser, a weight also suspended from the switch and tending to operate the same in opposition to the said vessel, said weight being heavier than the empty vessel but lighter than the combined weight of the vessel and its contents of water.

5. The combination of the discharge-pipe of the condenser, the drain-pipe, the enlarged opening at one end of the drain-pipe and beneath the end of the discharge-pipe, the vessel suspended in said opening by connections with a starting and stopping device, the restricted opening in said vessel, and mechanism tending to act upon the starting and stopping device so as to shut off the motive power of the system.

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

JOHN M. DORTCH.

Witnesses:

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