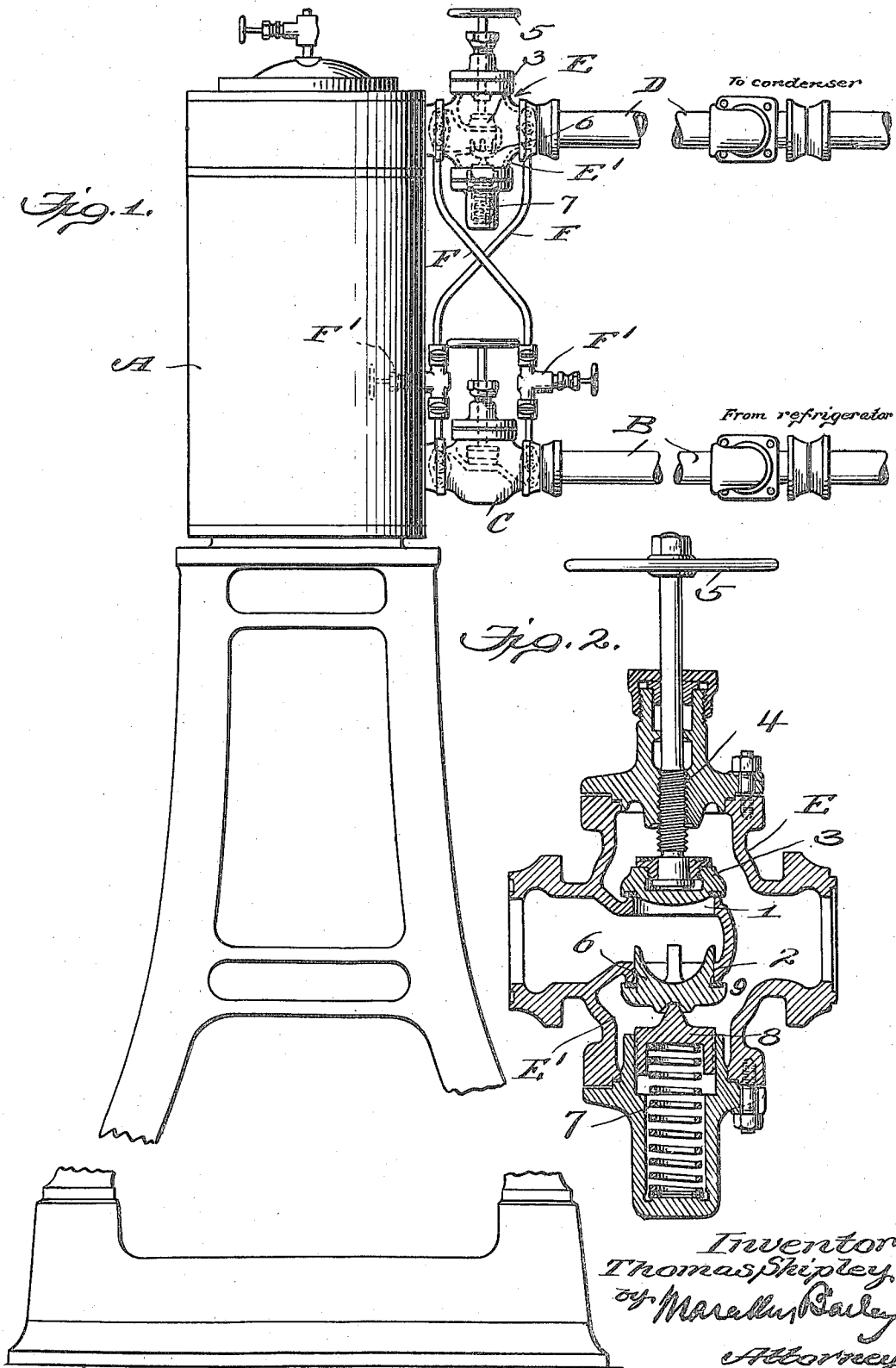


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REFRIGERATING OR ICE MAKING APPARATUS.
APPLICATION FILED APR. 27, 1915.

1,158,321.

Patented Oct. 26, 1915.



UNITED STATES PATENT OFFICE.

THOMAS SHIPLEY, OF YORK, PENNSYLVANIA.

REFRIGERATING OR ICE-MAKING APPARATUS.

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Specification of Letters Patent.

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Application filed April 27, 1915. Serial No. 24,260.

To all whom it may concern:

Be it known that I, THOMAS SHIPLEY, of York, in the county of York and State of Pennsylvania, have invented a certain new and useful Improvement in Refrigerating or Ice-Making Apparatus, of which the following is a specification.

My invention has to do with a refrigerating or ice making apparatus of the kind in which a compressor pump is used to keep in circulation the refrigerating agent. And its object is to provide automatic means for preventing excessive pressure from being produced in the compressor in case the engine should be started up while the shut-off hand valve at the discharge end of the compressor should still be closed. Serious injury to life and property is likely to occur in these circumstances owing to the bursting of the compressor or its valve.

It is the object of my invention to entirely eliminate this danger; and this object I effect by providing, in the line between the compressor and condenser and around said shut-off valve, an automatically-valve-controlled by-pass which remains closed under normal conditions, but automatically opens to relieve undue pressure in the compressor cylinder when the shut-off valve is closed.

The nature of my invention and the manner in which it is or may be carried into effect will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of so much of a refrigerating apparatus as needed for the purposes of explanation; Fig. 2 is a vertical central section, on enlarged scale, of a combined stop and relief valve adapted to be used in carrying my improvement into practical effect.

In Fig. 1 is represented in side elevation a single acting vertical ammonia compressor cylinder (of which in practice there are two to a compression machine), with so much of its connections to the high and low pressure sides—or in other words the condenser side and the refrigerator side—respectively, of the apparatus as needed for the purposes of explanation.

A is the compressor cylinder.

B is the pipe leading from the refrigerator or low pressure side of the apparatus to the suction end of the compressor cylinder.

C is the hand operated shut-off globe valve on the suction pipe B.

D is the pipe leading from the discharge end of the compressor to the condenser or high pressure side of the apparatus.

E is a hand operated shut-off globe valve on the discharge pipe D—to which extent it is similar to the suction shut-off C; but it has the further provision of an automatically-valve-controlled by-pass in the valve case (indicated by dotted lines in the lower part E' in Fig. 1) which is not found in the suction shut-off globe valve C.

F F are the usual by-pass pipe lines communicating with the casings of valves E, C, at points on opposite sides of the valves proper, and leading in criss cross paths from one valve casing to the other; and F', F', are the controlling valves in the by-pass lines. These by-pass lines are used in case it becomes necessary to reverse the action of the compressor, or, in other words, to pump from the high pressure side and discharge into the low pressure side of the apparatus; in which event the shut-off valves C, E, would be closed, and the valves F', F', would be opened. Under normal conditions of operation the by-pass line controlling valves F', F', are shut.

Thus far the apparatus does not differ essentially from others now in use—excepting of course as to the provision for an automatically valve-controlled by-pass around the shut-off valve at the discharge end of the compressor, which I shall now proceed to describe more in detail by reference to Fig. 2, which shows on enlarged scale and in sectional detail the combined shut-off and relief globe valve generally indicated at E E', Fig. 1.

As seen in Fig. 2, the casing of the main globe valve E has in its diaphragm two openings 1, 2, the opening 1 for the ordinary hand operated stop or shut-off valve proper 3, whose screw threaded stem and operating handle are shown at 4 and 5 respectively; and the other opening 2—leading to by-pass 9—for an outwardly opening check or puppet valve 6, which is held up with yielding pressure to its seat by spring 7 and follower 8 contained in the exterior E' of the valve case.

Under normal conditions of operation the check valve 6 remains closed. In starting up the machine after it has been temporarily shut down, the operator must make sure that

the valves C, E, are open, all other valves being closed. Should, however, the operator forget to open the shut-off discharge valve E, the compressor, after it has pumped 5 up to a sufficiently high pressure, will open the spring held relief puppet valve 6, thus opening the by-pass 9 in the valve casing around the hand operated shut-off valve E, and thereby permitting the compressor to 10 discharge into discharge line pipe D.

Heretofore ammonia compressors for ice and refrigerating plants have been provided at their discharge ends with common hand operated shut-off valves similar to the shut-off valves C at the suction ends of the compressors. Should the operator neglect to 15 open this discharge shut-off valve, there would always be the liability of bursting the compressor or the valves. This accident, as a matter of fact, is of not infrequent occurrence, and it is generally attended with 20 great loss of life and property. By my invention this danger is entirely eliminated, and the apparatus in this respect and to this 25 extent is proof against all carelessness or forgetfulness on the part of the operator.

Manifestly my invention is equally applicable to double acting ammonia compressors.

Having described my improvement and the best way now known to me of carrying the 30 same into practical effect, what I claim herein as new and of my own invention, and desire to secure by Letters Patent, is—

In a refrigerating apparatus, the combination with the ammonia compressor, the discharge line leading from the compressor to the high pressure or condenser side of the apparatus and the hand operated shut-off valve at the discharge end of the compressor controlling communication between the said 40 compressor and discharge line, of a normally closed, automatically-valve-controlled by-pass, between said compressor and discharge line, around the said shut-off valve, adapted to open communication between said compressor and discharge line to relieve undue 45 pressure in the compressor in case the latter should be at any time in operation while shut-off valve is closed, substantially as and for the purposes hereinbefore set forth. 50

In testimony whereof I affix my signature.

THOMAS SHIPLEY.