

No. 732,775.

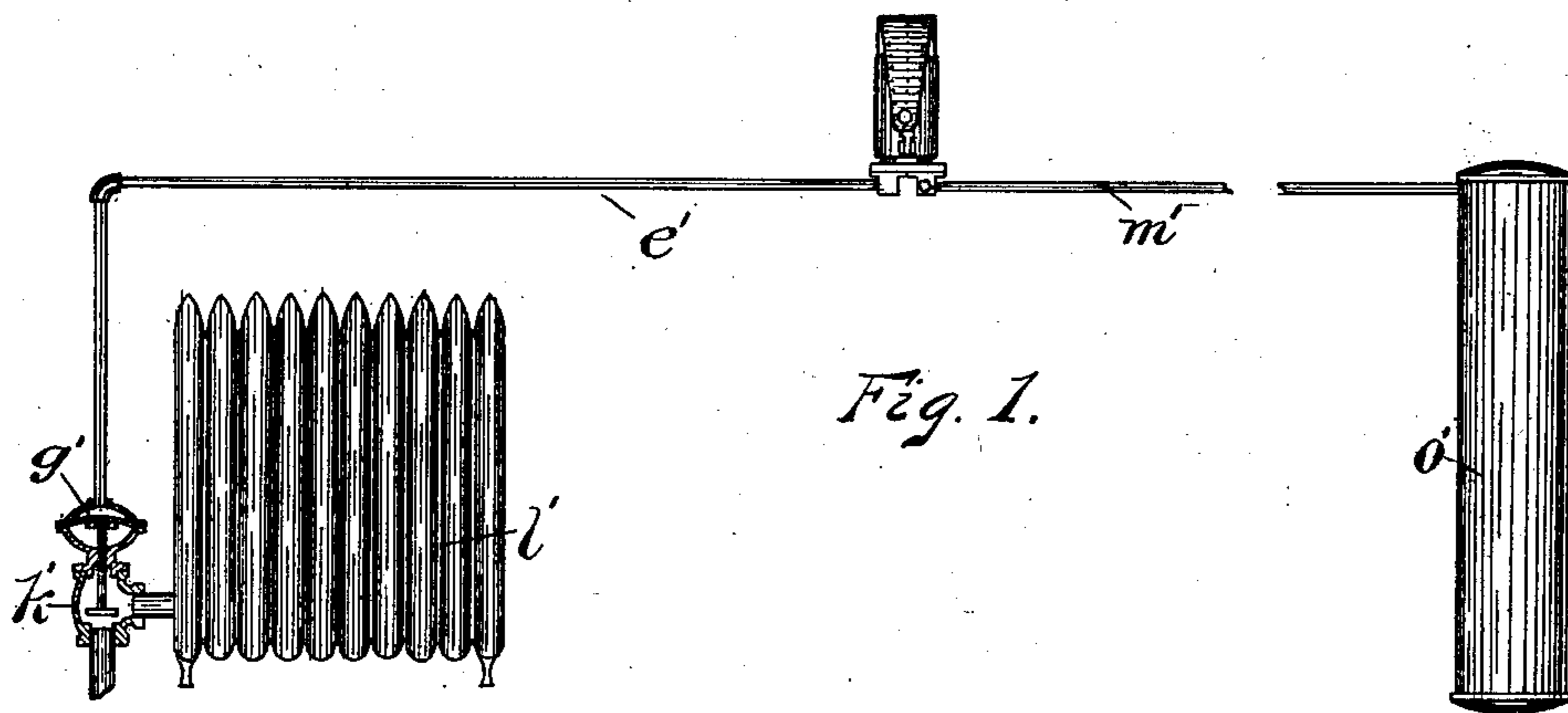
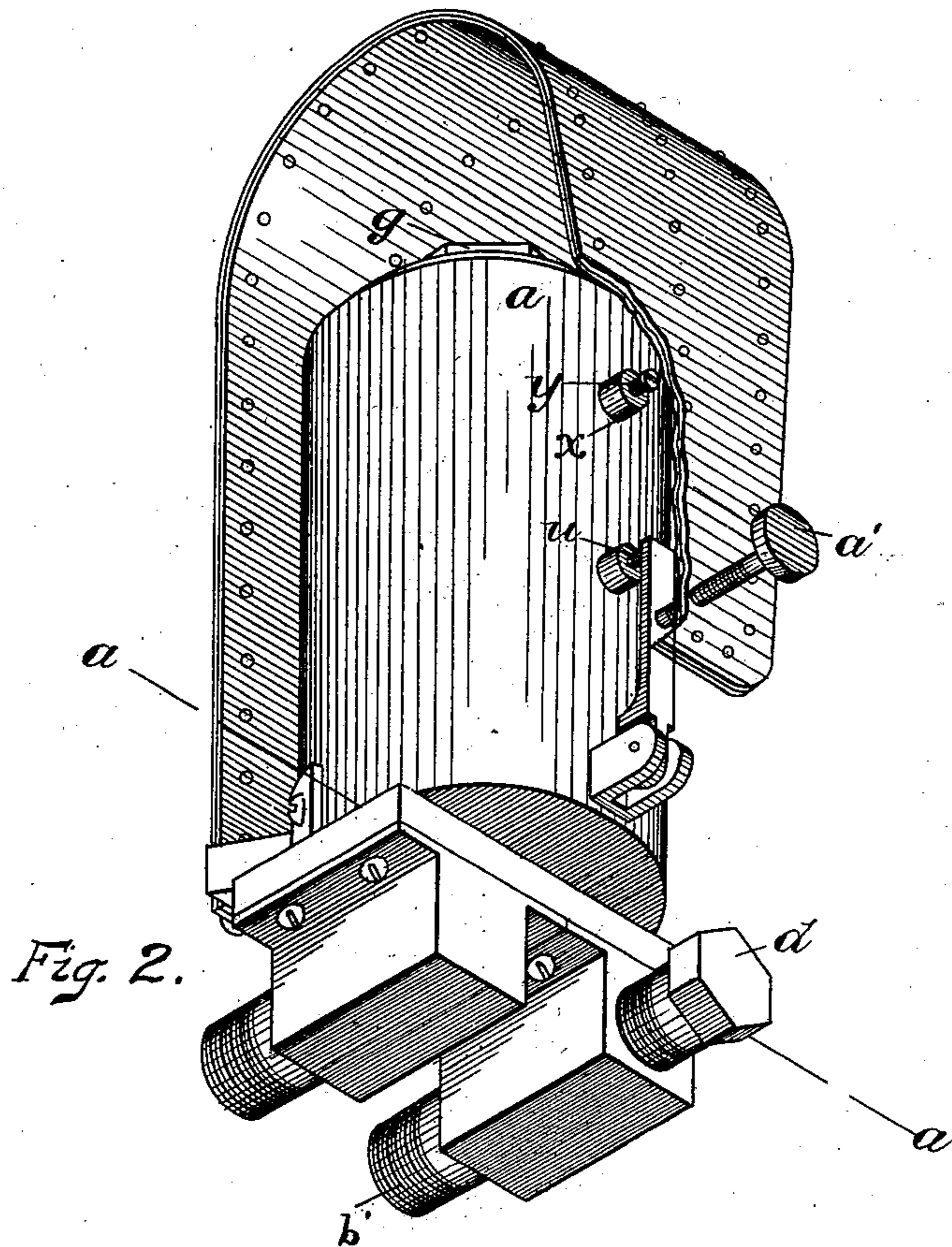
PATENTED JULY 7, 1903.

N. E. NASH.
TEMPERATURE REGULATING APPLIANCE.

APPLICATION FILED JULY 20, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

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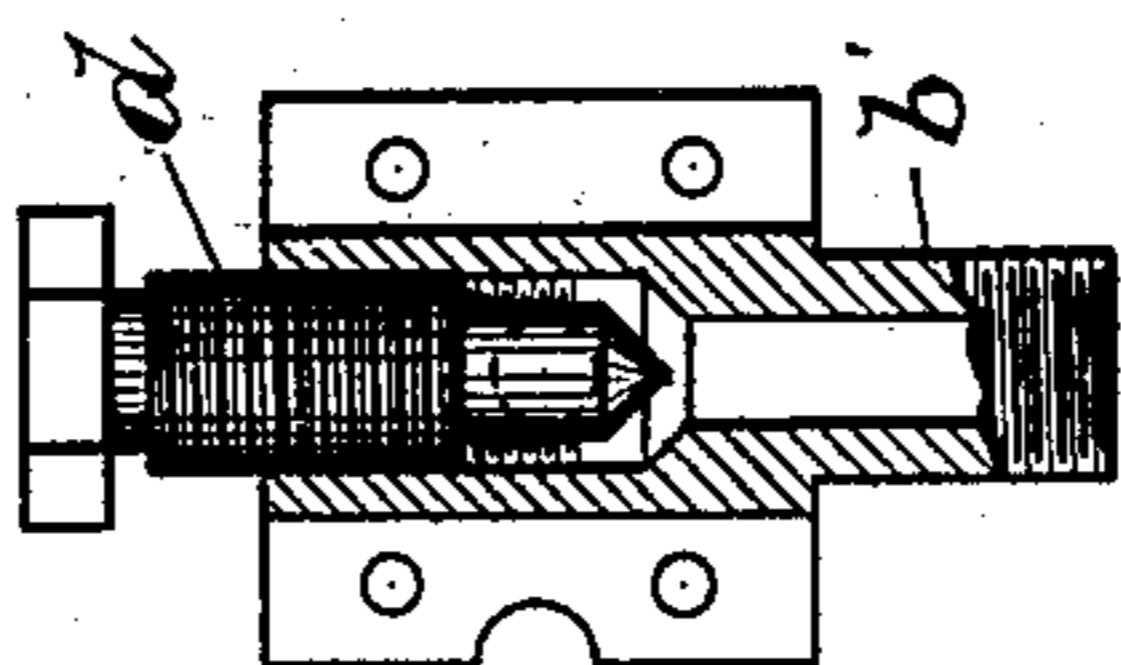
N. E. NASH.

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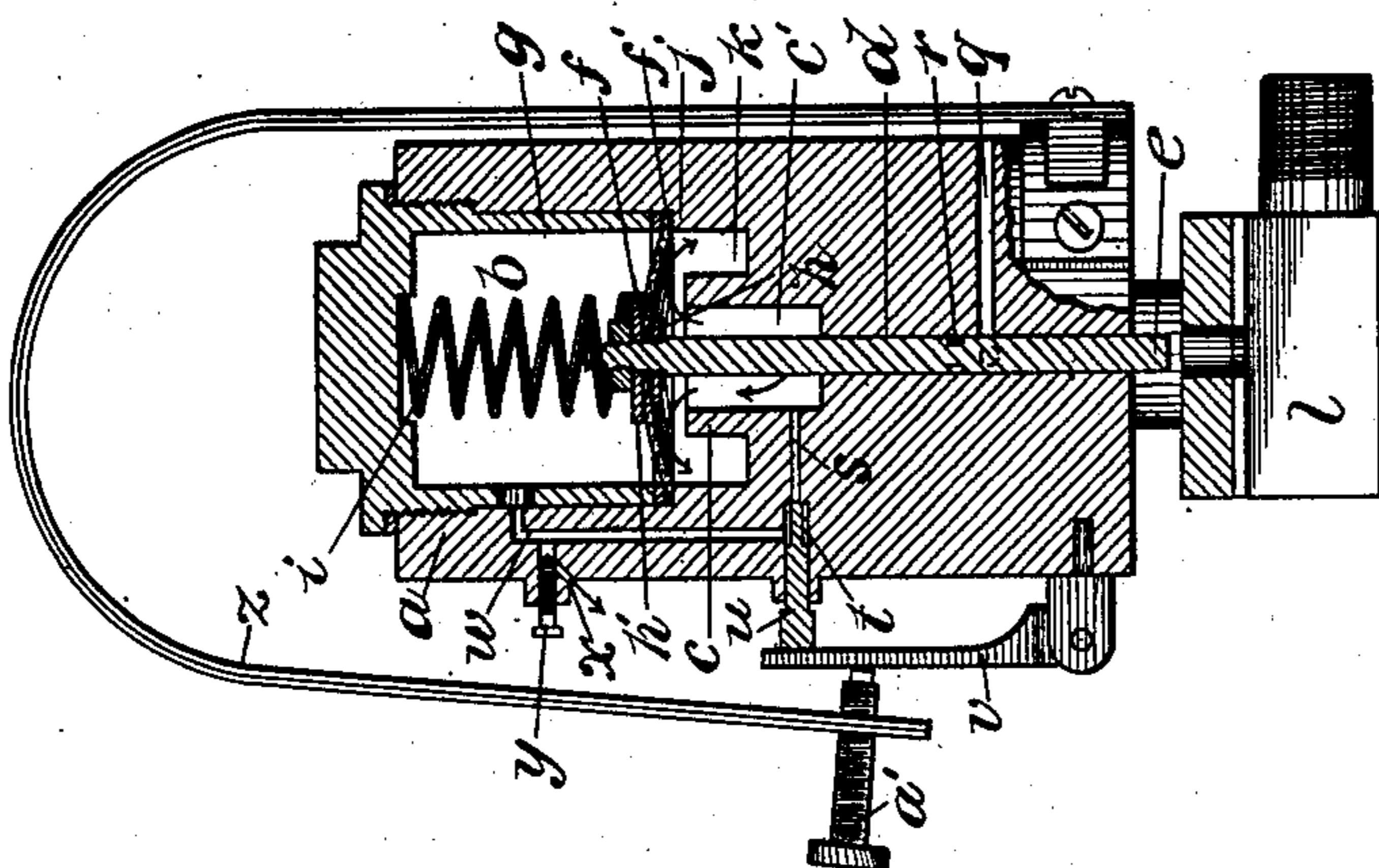
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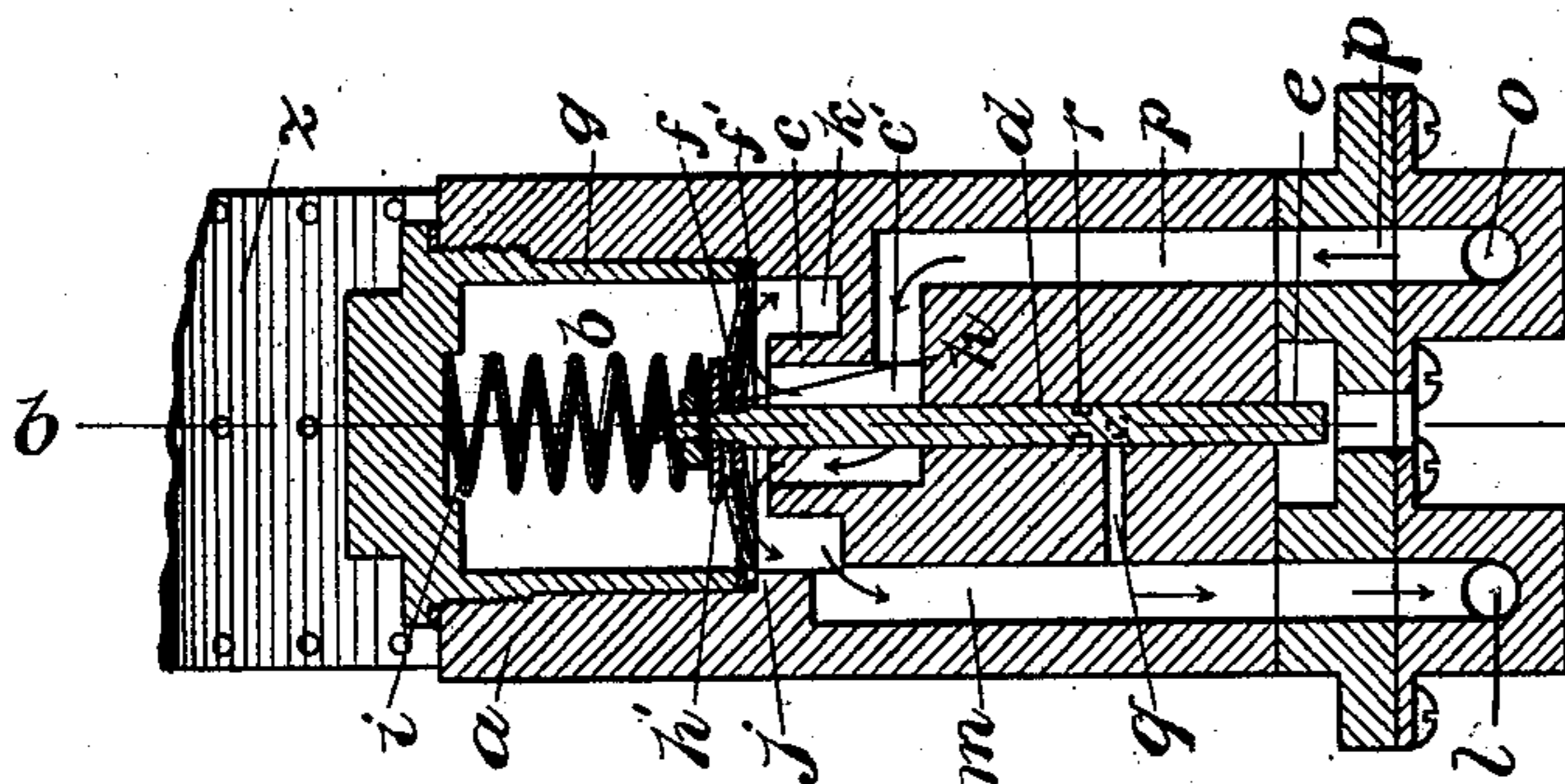
2 SHEETS--SHEET 2.



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Witnesses

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UNITED STATES PATENT OFFICE.

NATHAN E. NASH, OF TORONTO, CANADA, ASSIGNOR OF ONE-HALF TO
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TEMPERATURE-REGULATING APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 732,775, dated July 7, 1903.

Application filed July 20, 1901. Serial No. 69,149. (No model.)

To all whom it may concern:

Be it known that I, NATHAN E. NASH, of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Regulating-Valves; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful improvements in that class of regulating appliances employing a thermostatically-operated valve to control the flow of a pressure fluid to a pressure-operated valve; and the object of the invention is to provide the regulating-valve with a motor-valve actuated by the accumulation of the operating fluid under thermostatic influence; and the invention consists, essentially, of the device hereinafter more fully set forth, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation showing the regulating-valve used in connection with a radiator. Fig. 2 is a perspective view, partly in section, of the regulating-valve. Fig. 3 is a sectional view through the same on the lines *a a* of Fig. 2. Fig. 4 is a longitudinal sectional view on the lines *b b* of Fig. 3. Fig. 5 is a sectional view of the throttle-valve.

Like letters of reference refer to like parts throughout the specification and drawings.

a represents the casing of the regulating-valve, in one end of which is formed an accumulating-chamber *b*. Intergrally formed with the bottom of the chamber *b* is a centrally-located annular flange *c*, and formed through the body of the casing *a* is a longitudinal bore *d*, in which is contained a longitudinally-movable valve-stem *e*. The valve-stem *e* extends into the chamber *b*, and fitted to the valve-stem *e* within the accumulating-chamber *b* is a motor-valve *f*. The flange *c* is opposed to the motor-valve *f* and forms a seat for it when the motor-valve is actuated to cut off the flow of the pressure fluid. Contained in the accumulating-chamber *b* is a hollow plug *g*. The valve-stem is provided with two washers *h* and *h'*, bearing, respectively, against the inner and outer sides of the motor-valve *f*, and contained within the hollow plug *g* is a coiled spring *i*, which bears

against the inner face of the plug *g* and against the washer *h'*. Formed on the internal face of the accumulating-chamber *b* is a shoulder *j*, slightly above the top of the flange *c*, and mounted upon the shoulder *j* is the edge *f'* of the motor-valve *f*. The inner end of the plug *g* normally engages the edge *f'* of the motor-valve *f* and holds it securely between itself and the shoulder *j*. Surrounding the flange *c* is an annular chamber *k*, connected with the outlet-port *l* by means of the outlet-channel *m*. Entering the casing *a* is an inlet-port *o*, and connecting the inlet-port *o* with the bore *c'* of the flange *c* is the inlet-channel *p*. When the motor-valve *f* is on the seat of the flange *c*, the flow of the pressure fluid from the inlet-port *o* through the inlet-channel *p* and bore *c'* to the annular chamber *k* is cut off, and when the motor-valve *f* is raised from its seat the pressure fluid passes from the bore *c'* to the outlet-channel *m* and outlet-port *l*.

Within the casing *a* is an exhaust-channel *q*, extending from the outlet-channel *m* through the bore *d* to the exterior of the casing. Formed in the valve-stem *e* is an annular groove *r*, which normally registers with the exhaust-channel *q* when the motor-valve *f* is on its seat. Formed in the casing *a* is a diminutive duct *s*, communicating with the bore *c'*, and contained in the casing *a* at the end of the duct *s* is a valve-chamber *t*. Working longitudinally in the valve-chamber *t* is a puppet-valve *u*, the outer end of which is connected to an arm *v*, pivoted to the outer face of the casing *a*. Connected with the valve-chamber *t* is a duct *w*, which discharges into the accumulating-chamber *b* above the motor-valve *f*. When the puppet-valve *u* is away from its seat, a small volume of the pressure fluid passes through the duct *s* to the valve-chamber *t* and through the duct *w* to the accumulating-chamber *b*, which acts as a reservoir for the accumulation of the pressure fluid against the motor-valve *f*. Connected with the duct *w* is an outlet-duct *x*, regulated by an adjustable screw *y*. The accumulation of the pressure fluid in the reservoir-chamber *b* must be in excess of the waste through the outlet-duct *x* to allow of the operation of the motor-valve *f*.

Connected to the outer face of the casing *a* is a thermostatic blade *z*, fitted with a set-screw *a'*, the point of which is adapted to engage the pivoted arm *v*. The inlet-port *o* is
 5 connected with the pressure-fluid chest *b'*, fitted with a throttle-valve *d*. The thermostatic blade *z* is arranged to contract by the decrease and expand by the increase in temperature. The set-screw *a'* is set to engage
 10 the pivoted arm *v* at a predetermined degree of heat. The pressure fluid enters the controller through the inlet-port *o* and passes through the inlet-channel *p* to the bore *c'*.
 When the temperature of the room is at or
 15 below the predetermined degree of heat, the set-screw *a'* is free from contact with the pivoted arm *v*. The pressure fluid in the bore *c'* then passes into the duct *s* and forces the puppet-valve *u* away from its seat to permit
 20 of the discharge of the pressure fluid into the valve-chamber *t*. The pressure fluid passes from the valve-chamber *t* through the duct *w* to the accumulating-chamber *b*, and its accumulation in the accumulating-chamber
 25 holds the motor-valve on its seat to close the passage from the bore *c'* to the annular chamber *k*. When the motor-valve *f* is on its seat, the annular groove *r* is in alinement with the duct *q* and establishes a passage or duct from
 30 the outlet-channel *m* to the exterior of the casing to relieve the pressure in the outlet-channel *m*. When the temperature has risen above the predetermined degree, the thermostatic blade *z* expands and causes the set-
 35 screw *a'* to engage the pivoted arm *v* to move the puppet-valve to cut off the communication between the ducts *s* and *w* and prevent the pressure fluid passing to the accumulating-chamber *b*. The waste of the
 40 pressure fluid through the waste-outlet being continuous, the pressure of the fluid in the reservoir-chamber *b* on the motor-valve *f* is relieved immediately the puppet-valve cuts off the flow of the pressure fluid
 45 through the diminutive ducts, and when relieved the force of the pressure fluid against the under side of the motor-valve *f* raises it from its seat and establishes a communication between the bore *c'* and annular cham-
 50 ber *k*, from which it passes through the outlet-channel *m* to the outlet-port *l*. When the temperature has fallen below the set degree, the thermostatic blade *z* contracts, relieving the pivoted arm *v* of the pressure of
 55 the set-screw and allows the pressure fluid in the diminutive duct *s* to force the puppet-valve from its seat and open the communication from the bore *c'* to the accumulating-chamber *b* through the valve-chamber *t* and
 60 duct *w*. The accumulation of the pressure fluid in the accumulating-chamber *b* replaces the motor-valve *f* on its seat and cuts off the communication between the bore *c'* and annular chamber *k*, the replacement of the
 65 motor-valve being accelerated by the spring *i*, this action being repeated automatically by the variation of the temperature of the

room from the degree at which the apparatus has been set to operate. Connected with the
 outlet-port *l* is a pipe *e'*, leading to the dia- 70
 phragm *g'* of the plunger-valve *k'* of the radiator *l'*, and connected to the outlet-port *o*
 is a pipe *m'*, leading to the reservoir *o'* of the pressure fluid. The pressure fluid is adapt-
 ed to normally flow from the reservoir *o'* 75
 through the pipe *m'* to the regulating-valve and through the regulating-valve to the pipe
e' to actuate the plunger-valve *k'* to cut off the flow of the heating agent to the radiator.
 When the flow of the pressure fluid through 80
 the pipe *e'* has been cut off by the action of the motor-valve *f*, the pressure of the fluid on the diaphragm *g'* of the plunger-valve *k'* is relieved by the escape of the pressure fluid
 85 from the outlet-channel *m* through the duct *q*, which in its escape passes around the annular groove *r* in the valve-stem.

It will be understood that I may vary the details of the construction of the apparatus without departing from the nature of the in- 90
 vention, and one variation which I might specify being the omission of the pivoted arm *v*, the plunger-valve *u* in this case being actuated directly by the thermostatic
 blade, and that I may use the regulating- 95
 valve in connection with any pressure-operated valve.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is— 100

1. A regulating-valve, comprising a valve-casing having an accumulating-chamber formed therein, and intercommunicating inlet and outlet channels formed therethrough, a motor-valve to control the communication 105
 between the inlet and outlet channels actuated by the pressure of the fluid in the accumulating-chamber, said casing also having a duct leading from the inlet-channel to the
 accumulating-chamber and an outlet for the 110
 accumulating-chamber, a puppet-valve to control the passage through the duct and a thermostatically-actuated means for actuating the puppet-valve, substantially as specified. 115

2. A regulating-valve, comprising a valve-casing having an accumulating-chamber formed therein and having intercommunicating inlet and outlet channels formed there- 120
 through, a motor-valve to control the communication between the inlet and outlet channels actuated by the pressure of the fluid in the accumulating-chamber, said casing also
 having a duct leading from the inlet-channel 125
 to the accumulating-chamber and an outlet for the accumulating-chamber, a puppet-valve to control the passage through the duct, an arm pivoted to the exterior of the casing to actuate the puppet-valve and a thermostatic
 blade arranged to actuate the pivoted arm, 130
 substantially as specified.

3. A regulating-valve, comprising a valve-casing having an accumulating-chamber formed therein and having intercommunicat-

ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan-
nels actuated by the pressure of the fluid in
5 the accumulating-chamber, said casing also
having a duct leading from the inlet-channel
to the accumulating-chamber and an outlet
for the accumulating-chamber, a puppet-valve
to control the passage through the duct and
10 a thermostatic blade to actuate the puppet-
valve, substantially as specified.

4. A regulating-valve comprising a valve-
casing having an accumulating - chamber
formed therein and having intercommunicat-
15 ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan-
nels actuated by the pressure of the fluid in
the accumulating-chamber, said casing also
20 having a duct leading from the inlet-channel
to the accumulating-chamber and an outlet
for the accumulating - chamber, a puppet-
valve to control the passage through the duct,
a thermostatic blade to actuate the puppet-
25 valve, and adjustable means carried by the
thermostatic blade to operate the puppet-
valve at different degrees of heat, substan-
tially as specified.

5. A regulating-valve, comprising a valve-
30 casing having an accumulating - chamber
formed therein and having intercommunicat-
ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan-
35 nels actuated by the pressure of the fluid in
the accumulating-chamber, said casing also
having a duct leading from the inlet-channel
to the accumulating-chamber and an outlet
for the accumulating - chamber, a puppet-
40 valve to control the passage through the duct,
an arm pivoted to the exterior of the casing
to actuate the puppet-valve, a thermostatic
blade arranged to actuate the pivoted arm,
and means for adjusting the thermostatic
45 blade to operate the puppet-valve at differ-
ent degrees of heat, substantially set forth.

6. A regulating-valve, comprising a valve-
casing having an accumulating - chamber
formed therein and having intercommunicat-
50 ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan-
nels actuated by the pressure of the fluid in
the accumulating-chamber, a spring in the
55 accumulating-chamber bearing against the
motor-valve to accelerate the closing thereof,
said casing also having a duct leading from
the inlet-channel to the accumulating-cham-
ber and an outlet for the accumulating-cham-
60 ber, a puppet-valve to control the passage
through the duct, an arm pivoted to the ex-

terior of the casing to actuate the puppet-
valve, and a thermostatic blade to actuate
the pivoted arm, substantially as specified.

7. A regulating-valve, comprising a valve- 65
casing having an accumulating - chamber
formed therein and having intercommunicat-
ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan- 70
nels actuated by the pressure of the fluid in
the accumulating-chamber, a spring in the
accumulating-chamber bearing against the
valve to accelerate the closing pressure there-
of, said casing also having a duct leading 75
from the inlet-channel to the accumulating-
chamber and an outlet for the accumulating-
chamber, a puppet-valve to control the pas-
sage through the duct, and a thermostatic
blade to actuate the puppet-valve, substan- 80
tially as specified.

8. A regulating-valve, comprising a valve-
casing having intercommunicating inlet and
outlet channels formed therethrough, a mo- 85
tor-valve to control the communication be-
tween the inlet and outlet channels, a spring
bearing against the motor-valve to accelerate
the closing thereof, said casing also having a
duct leading from the inlet-channel to the
motor-valve and an outlet for the same, a 90
puppet-valve to control the passage through
the duct, a thermostatic blade to actuate the
puppet-valve and means for adjusting the
thermostatic blade to operate the puppet-
valve at different degrees of heat, substan- 95
tially as specified.

9. A regulating-valve, comprising a valve-
casing having an accumulating - chamber
formed therein and having intercommunicat- 100
ing inlet and outlet channels formed there-
through, a motor-valve to control the com-
munication between the inlet and outlet chan-
nels actuated by the pressure of the fluid in
the accumulating-chamber, a spring in the
accumulating-chamber bearing against the 105
motor-valve to accelerate the closing thereof,
said casing also having a duct leading from
the inlet-channel to the accumulating-cham-
ber and an outlet for the accumulating-cham-
ber, a puppet-valve to control the passage 110
through the duct, an arm pivoted to the ex-
terior of the casing to actuate the puppet-
valve, a thermostatic blade to actuate the
pivoted arm, and means for adjusting the
thermostatic blade to operate the pivoted arm 115
at different degrees of heat, substantially as
specified.

Toronto, July 17, 1901.

NATHAN E. NASH.

In presence of—

C. H. RICHES,

J. O'KEEFE.