(No Model.)

2 Sheets—Sheet 1.

A. G. SARGENT.

THERMOSTAT.

No. 441,856.

Patented Dec. 2, 1890.

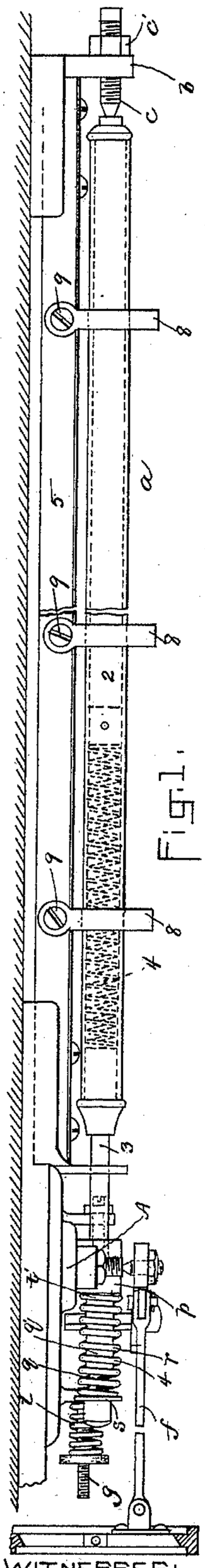

Fig. 1.

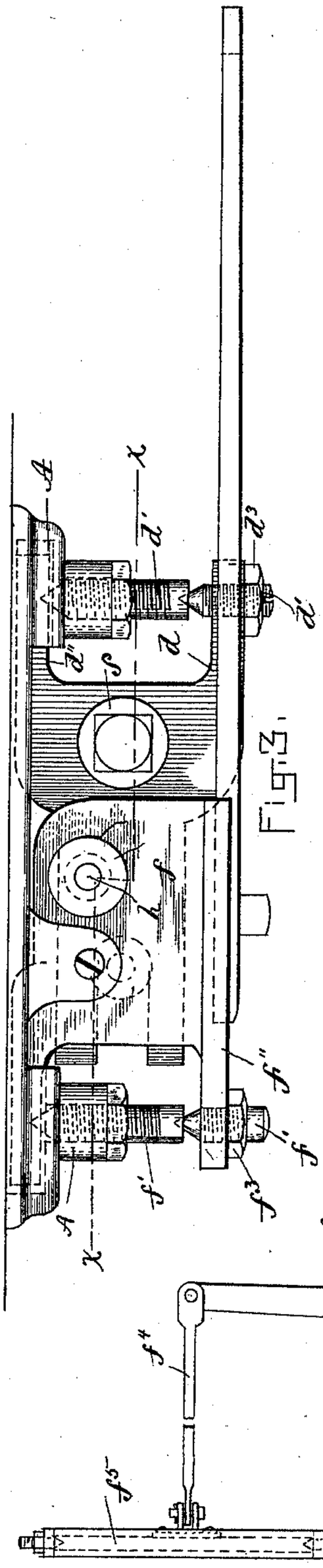

Fig. 3.

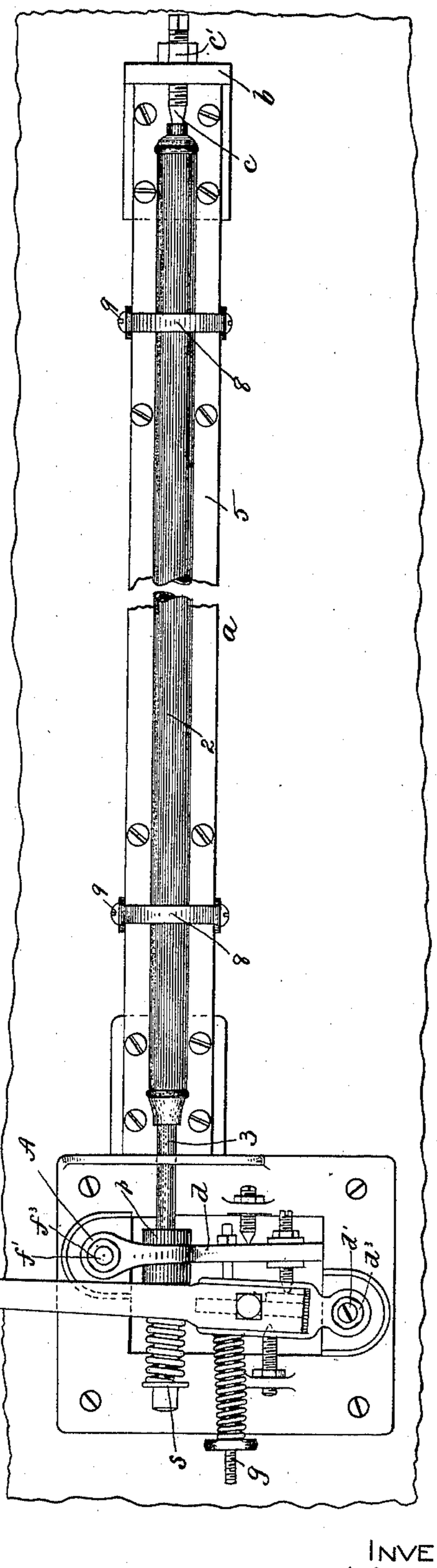

Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. G. SARGENT.

THERMOSTAT.

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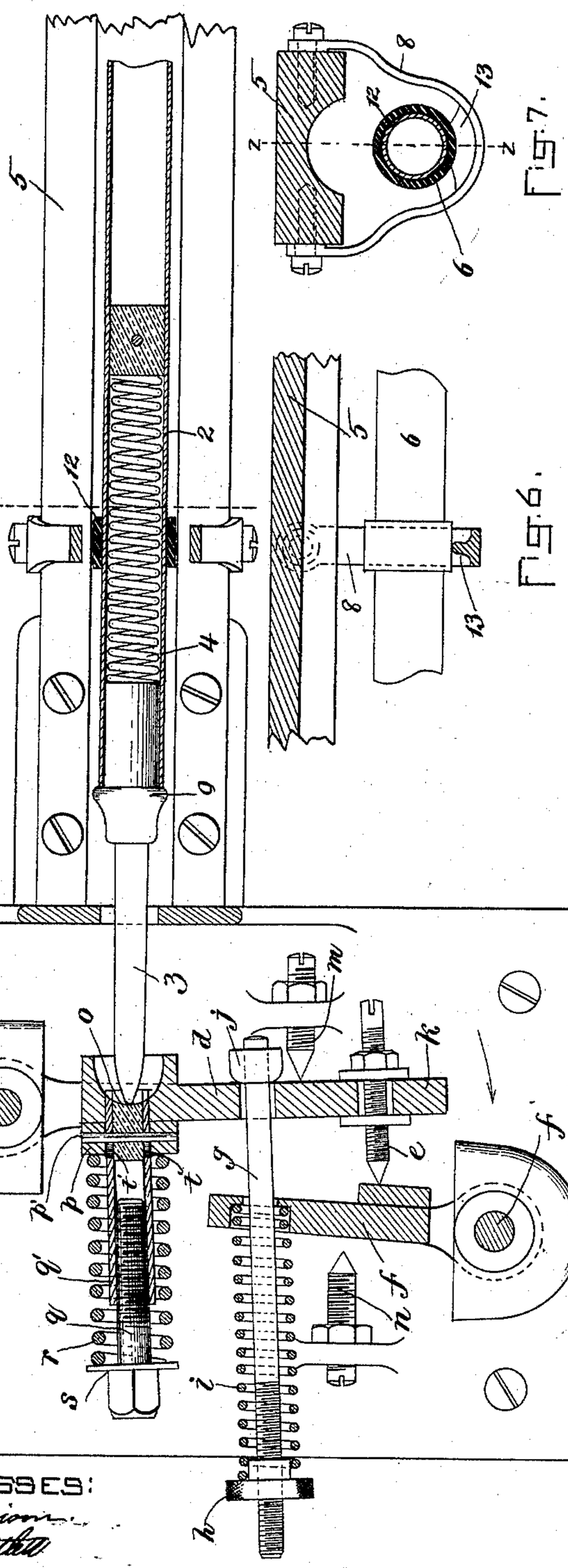

Fig. 4.

Fig. 7.

Fig. 6.

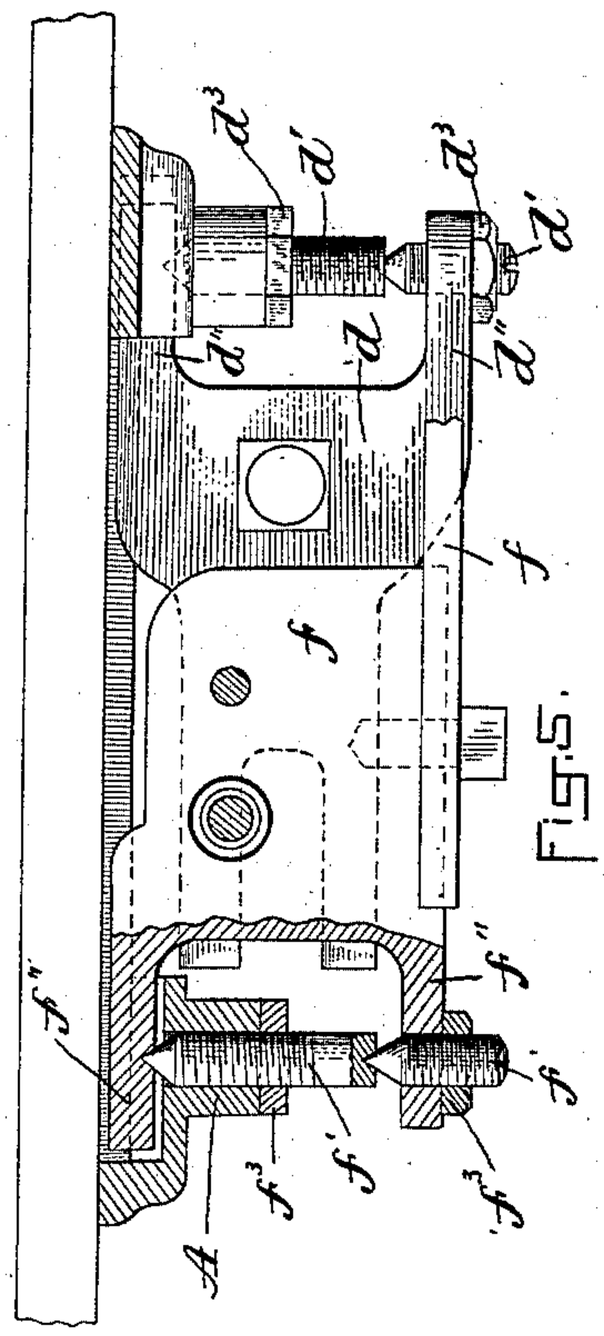

Fig. 5.

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UNITED STATES PATENT OFFICE.

ARTHUR G. SARGENT, OF EAST TILTON, ASSIGNOR OF ONE-HALF TO THE LACONIA CAR COMPANY, OF LACONIA, NEW HAMPSHIRE.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 441,856, dated December 2, 1890.

Application filed April 24, 1890. Serial No. 349,291. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR G. SARGENT, of East Tilton, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

This invention has for its object to provide a thermostat especially adapted for use in railway passenger-cars and arranged to open a ventilator or valve at one end of the car.

The invention consists in a thermostat comprising an elongated expansion member and valve-operating devices adapted to be operated by the expansion and contraction of said member, as I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved thermostat. Fig. 2 represents a bottom view of the same. Fig. 3 represents an end view on a larger scale than Figs. 1 and 2. Fig. 4 represents a section on line *x x*, Fig. 3. Fig. 5 represents an end view like Fig. 3, with parts broken away and shown in section. Fig. 6 represents a section on line *z z*, Fig. 7. Fig. 7 represents a section on line *y y*, Fig. 4.

The same letters and numerals of reference indicate the same parts in all of the figures.

In the drawings, *a* represents the expansion member, which is composed of an elongated thin-walled tube 2, of any metal having a suitable coefficient of expansion, and a rod or terminal 3, inserted and adapted to slide in one end of the tube, said terminal being normally pressed outwardly by a spring 4 within the tube and provided with a shoulder 9, which when the member *a* is expanding bears on the end of the tube, and when said member has contracted to a given extent separates from the end of the tube, so that the member elongates automatically in the event of further contraction of the metal composing it, the member being thus kept in operative engagement with its supports, as hereinafter described. One end of the member *a* bears on a fixed support *c*, which is here shown as a screw inserted in a fixed bracket *b* and rigidly held by a jam-nut *c'*. The other end, comprising the terminal 3, is in contact with a lever *d*, which is pivoted at *d'* to a fixed support.

Attached to the lever *d* near its swinging end is a stud *e*, which is adjustable in a longitudinal slot *k* in said lever. Said stud bears against a valve-operating lever *f*, which is pivoted at *f'* to the fixed support, and is pressed by a spring *i* toward the lever *d*. The pressure of said spring is imparted through the stud *e* to the lever *d*, and the latter is thus held with a yielding pressure against the expansion member, so that as said member expands the lever *d* moves in the direction indicated by the arrow in Fig. 4, the lever *f* moving at the same time in the same direction and imparting a movement through a rod f^4 to a ventilator f^5 or any other suitable heat-controlling device. When the expansion member contracts, the spring *i* forces the levers *f d* in the opposite direction, the lever *f* being thus caused to give an opposite movement to the valve. The spring *i* is preferably supported by a rod *g*, which is attached to the lever *d*, and has at one end a head *j*, bearing on said lever, and at the other end a nut *h*, supporting one end of the spring *i*, said rod passing through a hole in the lever *f*, as shown in Fig. 4.

m and *n* represent stops arranged to limit the movements of the levers *d f*, the stop *n* limiting the movement of said levers caused by the expansion of the member *a*, while the stop *m* limits the opposite movement caused by the spring *i*.

To prevent injury to the apparatus by a continuation of the expansion of the member *a* after the levers have been arrested by the stop *n*, I provide the lever *d* with an independently-movable bearing *o*, against which the terminal 3 rests, as shown in Fig. 4. Said bearing has a collar *p* attached to it, and said collar is pressed against the lever *d* by a spring *r*, which is supported by a rod *q*, affixed to a sleeve *q'*, which is attached to the lever *d*, said rod having a nut *s* at its outer end, supporting the outer end of the spring *r*. The bearing *o* and collar *p* are adapted to slide, respectively, in and on the sleeve *q'*, said sleeve having slots *t' t'* to permit the

play of the pin p', that connects the collar to the bearing. (See Fig. 4.) It will be seen that the bearing o is adapted to yield to the expansion of the member a after the movement of the lever $d\,f$ has been arrested, provision being thus made for absorbing any excess of movement of said member without injury to the apparatus. The spring r is of sufficient strength to prevent it from yielding so long as the levers $d\,f$ are free to be moved by the expansion of the member a. The lever f is provided with ears f'' f'', which receive the screw-threaded pivots f' f'. One of said pivots passes through a socket A on the fixed support, and is held by a jam-nut f^3 at any position to which it may be adjusted. The outer pivot f' passes through the outer ear f'' and bears on the inner pivot, said outer pivot being also provided with a jam-nut f^3. By these devices the lever f is made adjustable edgewise. The lever d is supported by a like arrangement of adjustable pivots d' d', having jam-nuts d^3 d^3. The expansion member a is supported at points between its ends by yokes 8, hung from a cleat or strip 5, which is attached to the roof of the car or to a y other suitable support. The tubular portion of the member a is provided with rubber rings 12, which bear on seats 13 on the lower portions of said yokes, Fig. 7. Said rubber rings prevent rattling contact between the member a and the supporting-yokes. It will be observed that the lever d is arranged so that it multiplies the expanding movement of the member a, while the lever f multiplies the movement of the lever d. Hence the expansion of one member a is sufficient for all practical purposes.

I claim—

1. In a thermostat, the combination of an elongated expansion member, a rigid support for one end thereof, a pivoted lever d, having an independently-movable bearing o, supporting the opposite end of said member, and a spring r, yieldingly supporting said bearing, a pivoted valve-operating lever f, arranged in suitable proximity to the lever d, a spring i, whereby the valve-operating lever is held with a yielding pressure against a stud or projection on the swinging end of the lever d and the latter is held with a yielding pressure against the end of the expansion member which it supports, the spring r being stronger than the spring i, whereby the bearing o is prevented from yielding, while the levers $d\,f$ are free to be moved by the elongation of the expansion member, as set forth.

2. In a thermostat, the combination of an elongated expansion member, a rigid support for one end thereof, a pivoted lever d, arranged at the opposite end of said member, a spring i, holding said lever with a yielding pressure against the movable end of the expansion member, said lever being movable by the expansion of said member, a stop which limits said movement of the lever, a valve-controlling device operated by the lever d, an independently-movable bearing o for the movable end of the expansion member, supported by and movable with said lever d, and a stronger spring r, also supported by the lever d and arranged to yieldingly support the bearing o and permit its yielding movement after the movement of the lever has been arrested, whereby expansion of the expansion member occurring after the arrest of the movement of the lever is absorbed without injury to the thermostat, as set forth.

3. In a thermostat, the combination of the pivoted levers $d\,f$, extending in opposite directions, a stud between said levers, whereby movement is communicated from one to the other, a spring i, which presses the lever f toward the lever d, a stop m, which limits the movement of the levers by the spring i, an independently-movable bearing o on the lever f, a spring r, of greater strength than the spring i, arranged to yieldingly support the bearing o, and an elongated expansion member bearing at one end against the bearing o on the lever d, said member consisting of a tubular body 2 and a terminal 3, adapted to slide in one end thereof, said terminal being pressed outwardly by a spring 4 and provided with a shoulder 9, which when the member is expanding bears on the end of the tube and when the member has contracted within a given length is separated by the spring 4 from the end of the tube, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 11th day of April, A. D. 1890.

ARTHUR G. SARGENT.

Witnesses:

N. A. PLUMMER,

DEW. C. HOWE.