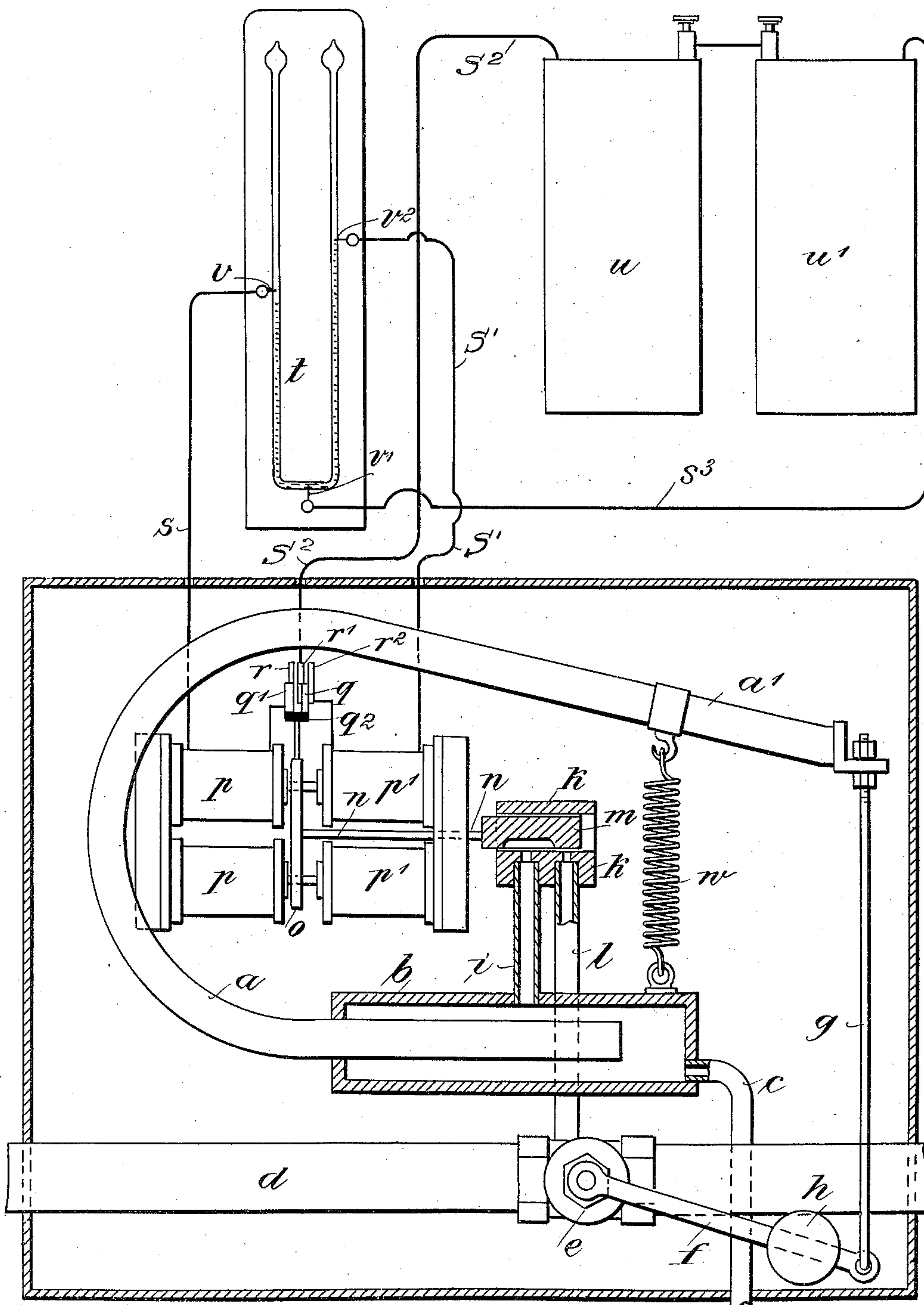


No. 865,862.

PATENTED SEPT. 10, 1907.

R. BRUKENHAUS.
THERMOSTAT FOR CENTRALLY HEATED PLANTS.

APPLICATION FILED JAN. 22, 1904.



WITNESSES :

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ROBERT BRUKENHAUS, OF HASPE, NEAR HAGEN, GERMANY.

THERMOSTAT FOR CENTRALLY-HEATED PLANTS.

No. 865,862.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed January 22, 1904. Serial No. 190,153.

To all whom it may concern:

Be it known that I, ROBERT BRUKENHAUS, a subject of the King of Prussia, residing in Haspe, near Hagen, in the Province of Westphalia, German Empire, have invented certain new and useful Improvements in Thermostats for Centrally-Heated Plants, of which the following is a full, clear, and exact specification.

This invention relates to thermostats, especially adapted for use in centrally heated plants, stationary steam-boilers or the like.

The peculiarity of the new thermostat consists in the arrangement of a compensating tube which is temporarily passed by the heating medium and closes the main valve or cock at the very moment, when the highest predetermined temperature in the room in question is obtained by means of the movement of the expansion tube or pipe, caused by its lengthening through the heat. When the temperature in the respective room is lowered, until a certain minimum is reached, the expansion tube is again cooled and by its shortening the steam cock is opened again.

The invention is shown in the annexed drawing forming a part of this specification, the improvement illustrated in the figure being preferably employed in cases where heating by low pressure steam is preferred.

The compensating tube *a*, filled with naphtha or the like, is inclosed in its lower part by a casing *b*, forming a steam shell; the casing *b* being in communication with the small pipe *c* of the condensation-conduit. A spiral spring *w* is provided between the upper end *a'* of the pipe *a* and the upper part of the casing *b*. The steam cock *e* is inserted into the steam conduit *d*, serving for the introduction of steam into the heating bodies. The said steam cock is rigidly connected with the compensating tube by means of the lever *f* and the rod *g* and normally kept in its original position by means of a counterweight *h*. The casing *b* is connected with the valve chest *k* by means of a small pipe *i*, being in communication with the main steam conduit *d* by the pipe *l*. The slide valve *m* of the valve chest is provided with a rod *n*, supporting the armature *o* which freely moves between the electromagnets *p* and *p'*. The armature *o* is provided at its upper parts with a forked tongue *q*, *q'*, being fastened to the india rubber plate *q''*, thereby insulating the electric current from the armature *o*. There are three separate springs *r*, *r'* and *r''*. The two electromagnets *p* and *p'* are connected by the wire-conductor *s*, *s'*, *s''*, *s'''* with the maximum and minimum thermometer *t*, and finally with the galvanic battery *u*, *u'*. At the points *v*, *v'*, *v''* of the thermometer platina wires are embedded.

The thermometer *t* consists of a U-shaped tube of glass the ends of which are enlarged. The leg having

the platinum wire *v''* is the maximum leg, the other leg having the platinum wire *v* being the minimum leg. The tube contains mercury, the platinum wires *v* and *v''* being above the surface or level of the mercury. At the upper part of the maximum leg over the surface of the mercury is atmospheric air and in the minimum leg of the tube is spirit of wine or alcohol. The pressure of the alcohol is such that the surface or level of the mercury in the maximum leg stands higher than the surface of the mercury in the minimum leg. When the temperature rises to a certain degree the alcohol expands and presses on the mercury forcing it out of the minimum leg and causing it to rise in the maximum leg and come in contact with the platinum wire *v''*. When the temperature falls the pressure of the alcohol is reduced and the mercury rises in the minimum leg, owing to the weight of the mercury in the maximum leg, and contacts with the platinum wire *v*.

The function of the thermostat is as follows: Should the mercury column of the thermometer rise to the point *v''* the circuit will be closed and the current will flow from the cells *u'* *u* through the conductor *s''* and contacts *r'*, *q*, *r''* and further through the electro magnet *p'*, conductor *s'*, contact *v''*, mercury column, contact *v'* and conductor *s''*, back to the cell *u'*. The circuit is therefore closed, so that the electromagnet is energized and moves the armature to the right hand side. Hereby the current is immediately interrupted again, as the tongue *q* is no longer in contact with *r'*; the tongues *r* and *r'* being now in electrical connection with each other. By the before-mentioned action of the electromagnet *p'* the slide valve *m* of the valve chest *k* has been likewise brought to the right hand side. Therefore steam is admitted to enter through the channel of the slide valve *m* and the pipe *i* into the casing *b*. By the entering steam the compensating pipe *a* is heated and the free end *a'* of it is moved upwardly, whereby the steam cock is closed. The further supplying of the heating bodies with steam is therefore interrupted and the temperature in the respective room can go no higher, but will soon be lowered by the outer atmospheric influences. When the temperature is lowered so far, that the column of mercury touches the point *v*, the current will flow through the conductor *s''*, the electromagnet *p*, and the conductor *s*, whereby the armature is moved to the left hand side. The valve is thereby brought into its original position and the steam supply to the pipe *a* is again interrupted. The compensating pipe *a* is then cooled and brought into its normal position opening the steam cock again.

Having now described my said invention, I declare what I claim is:

1. In a thermostatic apparatus, in combination, a steam pipe, a steam chamber having an outlet, a bent compensation pipe the one end of which enters the chamber, a valve

controlling the steam pipe connected with the other end of the compensation pipe, a branch conducting steam to the chamber, a valve controlling said branch, a maximum and minimum thermometer having electric contacts, and electro magnetic apparatus controlled by the thermometer and actuating the branch valve, substantially as described.

2. In a thermostatic apparatus, in combination, a steam pipe, a steam chamber having an outlet, a bent compensation pipe, the one end of which enters the chamber, a valve controlling the steam pipe connected with the other end of the compensation pipe, a branch conducting steam to the chamber, a valve controlling the said branch, a maximum and minimum thermometer having electric contacts, electromagnets one pole of each of which is connected respectively with the maximum and minimum thermometer-

contacts, a source of electricity connected to the third thermometer-contact, an armature for the electromagnets carrying a double contact and connected with the said branch valve, and a triple contact over which the double contact slides and whose members are connected respectively with the second poles of the two electromagnets and the source of electricity, substantially as described.

In witness whereof I have hereunto signed my name this 30th day of December 1903, in the presence of two subscribing witnesses.

ROBERT BRUKENIAUS.

Witnesses:

OTTO KÖNIG,

J. A. RITTERSHAUS.