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UNITED STATES PATENT OFFICE.

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TEMPERATURE-REGULATOR.

934,632.

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To all whom it may concern:

Be it known that I, HERMANN SANDVOSS, a citizen of Germany, residing at Dusseldorf, Germany, have invented new and useful Improvements in Temperature-Regulators, of which the following is a specification.

This invention relates to an improved temperature regulator which is so constructed that the flow of the heating medium is automatically regulated in a simple and effective manner.

In the accompanying drawing: Figure 1 is an elevation, partly in section, of my improved temperature regulator; Fig. 2 an enlarged longitudinal section through part thereof, and Fig. 3 a similar section through a modification.

The letter *a*, indicates a coupling interposed between the heat supply, (not shown), and the heat radiator, (not shown) the heating medium entering through muff *a'*, and escaping through muff *a''*. To coupling *a*, is secured, by nut *b''*, an upright tube *b*, containing at its top a perforated plug *b'''*. Plug *b''*, is tapped into a perforated coupling *n*, provided with an upper annular recess or groove *n'*, forming a central neck *n''*. Within recess *n'*, is seated an upright pipe or cylinder *b''*, communicating near its upper end through heads *c'*, and *c''*, with a cluster of tubes *c*, surrounding pipe *b''*. Through the central perforation of plug *b'''*, and coupling *n*, extends a spindle *e*, provided at its top with a head *d*, of less diameter than the bore of pipe *b''*. Head *d*, and neck *n''*, are connected by a flexible tube or hose *m*, which incloses a spring *o*, interposed between head and neck. Tubes *c*, heads *c'*, *c''*, and the space between hose *m*, and tube *b''*, are filled with mercury or other substance adapted to contract and expand with the fall and rise of the temperature. Spindle *e*, rests with its foot upon a stem *f*, provided at its bottom with a valve *g*, which controls the flow of the heating medium through coupling *a*. To the upper end of stem *f*, is secured a collar *h*, provided with a peripheral groove *h'*. Collar *h*, and the upper reduced neck *b''*, of nut *b''*, are connected by a flexible tube or hose *j*, inclosing a spring *i*, interposed between collar *h*, and nut *b''*, said spring serving to hold stem *f*, in permanent engagement with spindle *e*. Groove *h'*, is engaged by the tail *k'*, of a pointer *k*, passing through a

lateral opening *b'*, of pipe *b*. Pointer *k*, playing upon a dial *l*, is pivoted at *k''*, to a collar *l'*, adjustably mounted upon pipe *b*, and adapted to be clamped thereto by set screw *l''*.

It will be seen that with the rise of the temperature, the mercury contained in the upper part of the apparatus will expand, thereby depressing plunger *d*, against the action of spring *o*. This downward movement of plunger *d*, is, by spindle *e*, and stem *f* transmitted to valve *g*, which is thus partly closed to reduce the supply of the heating medium, while pointer *k*, simultaneously registers the temperature upon dial *l*. A lowering of the temperature will cause a contraction of the mercury, thus permitting spring *o*, to partly raise plunger *d*, and spindle *e*, which upward movement will be followed by stem *f*, so that valve *g*, is opened and pointer *k*, is set correspondingly.

In the modification shown in Fig. 3, there is provided within the upper end of tube *b''*, an additional plunger *p*, of less diameter than the width of tube *b''*. This plunger is, by hose *u*, connected to head *c''*, a spring *v*, being interposed between plunger and head. Plunger *p*, is by spindle *q*, connected to a collar *r*, provided with a peripheral groove *r'*, which is engaged by the tail of a resilient pointer *s*, which is adapted to engage recesses *z*, of a dial *t*.

It will be seen that by setting pointer *s*, to different temperatures, plunger *p*, will be either projected into or retracted from tube *b''*, which movement is, by the mercury, transmitted to plunger *d*. It is thus possible to limit the upward movement of valve *g*, to any desired point, by correspondingly setting plunger *p*, so that the heat radiated from the heater, (not shown), may also be limited to any desired maximum temperature.

I claim:

1. A temperature regulator, comprising a valve, a stem secured thereto, a tube inclosing the stem, a plug carried by the tube and having a neck, a cylinder secured to the plug, a headed spindle movable within the cylinder and engaging the stem, an expansible liquid within the cylinder, and a flexible hose between the neck and spindle head, such hose inclosing the spindle and excluding the liquid therefrom.

2. A temperature regulator, comprising a valve, a spring-influenced stem secured thereto, a tube inclosing the stem, a plug secured to the tube and having a neck, a cylinder secured to the plug, a headed spindle movable in the cylinder and engaging the stem, a flexible hose connecting the neck and spindle head, a plunger projecting into the

cylinder, means for setting said plunger, and an expansible liquid within the cylinder. 10

Signed by me at Dusseldorf, Germany,
this 11th day of December 1907.

HERMANN SANDVOSS.

Witnesses:

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