E. E. GOLD.

VALVE FOR STEAM HEATING SYSTEMS.

APPLICATION FILED DEC. 15, 1909.

1,024,723. Patented Apr. 30, 1912.

2 SHEETS—SHEET 1.

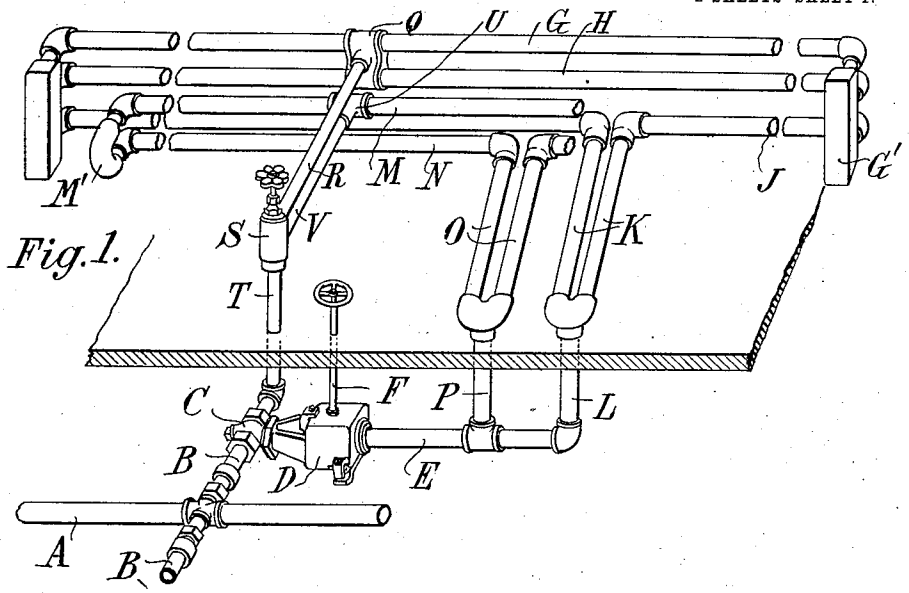

Fig. 1.

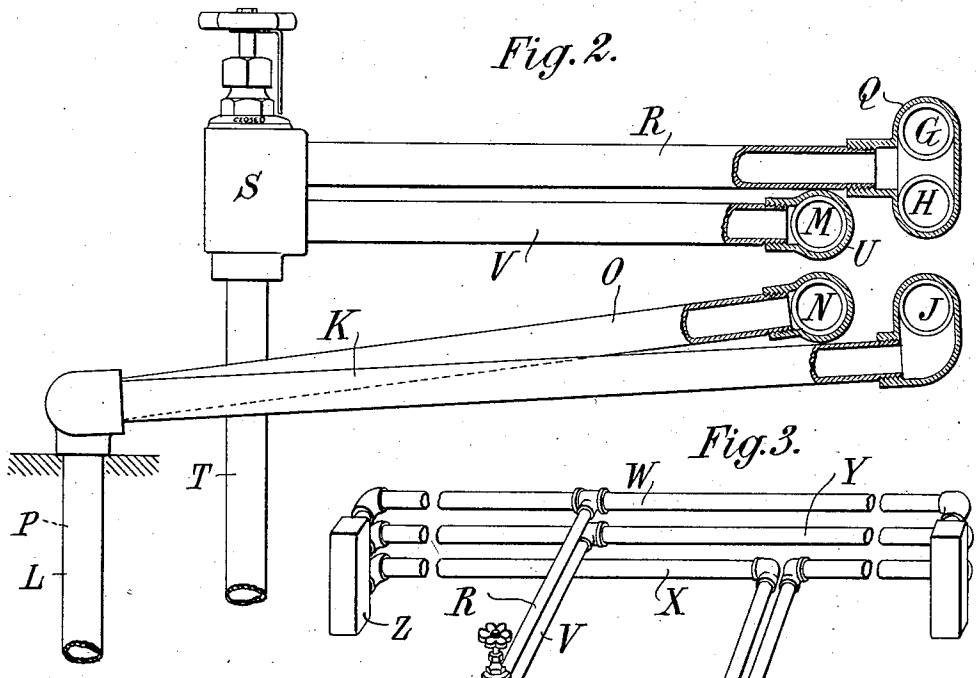

Fig. 2.

Fig. 3.

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Fig. 4.

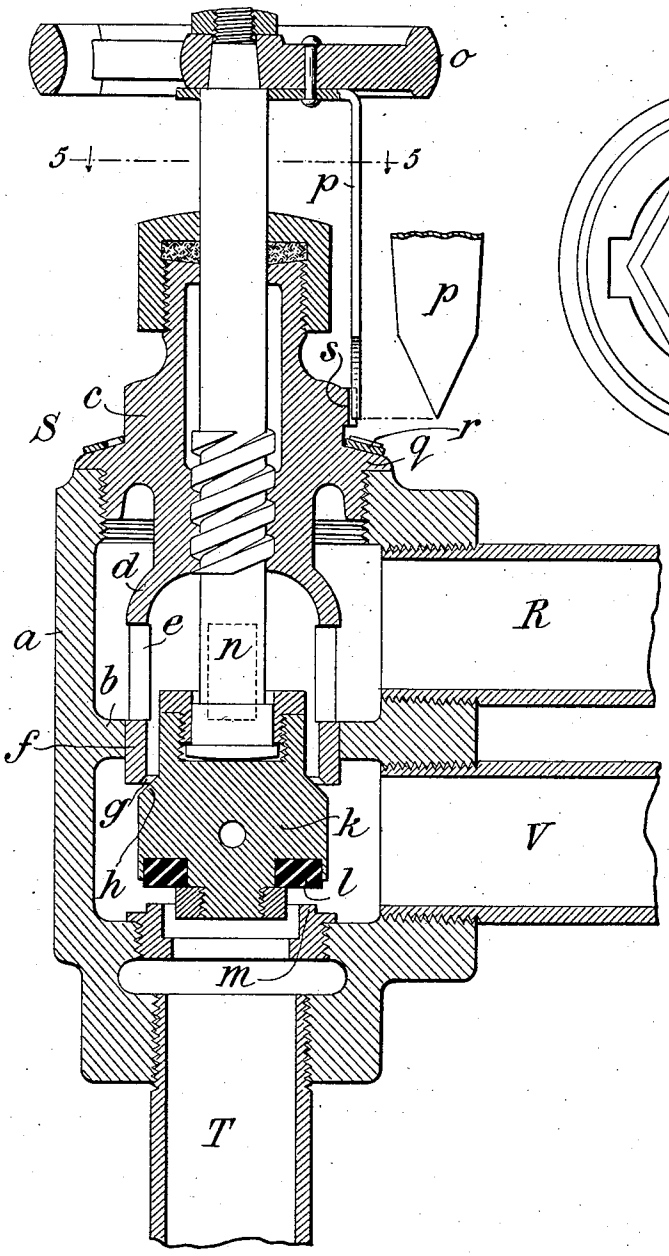
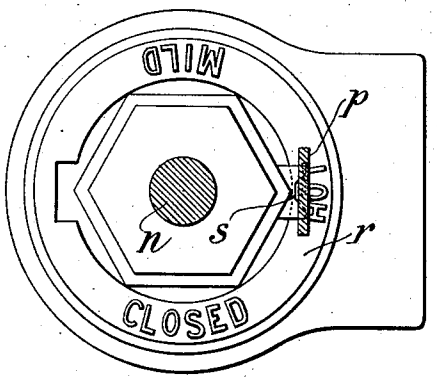


Fig. 5.



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VALVE FOR STEAM-HEATING SYSTEMS.

1,024,723. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed December 15, 1909. Serial No. 533,249.

To all whom it may concern:

Be it known that I, EDWARD E. GOLD, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Valves for Steam-Heating Systems, of which the following is a specification.

This invention aims to provide a special valve for heating systems using a plurality of radiator units for securing different degrees of heat.

The accompanying drawings illustrate a valve embodying the invention and certain modes of applying it to heating systems.

Figure 1 is a perspective view of a portion of a steam heating system for railway cars. Fig. 2 is a transverse section of the portion of Fig. 1 which is located above the floor of the car; Fig. 3 is a view similar to Fig. 1 of that part of another system which is above the floor of the car; Figs. 4 and 5 are respectively a vertical section and a horizontal section (on the line 5—5 in Fig. 4) of the admission valve and the connections.

Referring to the embodiments of the invention illustrated, Fig. 1 shows a train-pipe A which runs under the cars for the length of the train and carries steam from the locomotive boiler reduced to a pressure of 40 to 80 pounds. Branches B run from the train-pipe, one to each side of the car. The radiating pipes at only one side of the car are illustrated. The steam passes through an admission valve within the car to the radiator, and the water of condensation passes through a discharge pipe which runs through the floor of the car so as to discharge below the floor. Various means may be provided below the floor of the car for controlling the discharge of the water of condensation or for controlling the admission of steam. In the example illustrated, an automatic admission valve is interposed between the train-pipe and the hand-valve within the car, this automatic admission valve being indicated at C, and being controlled by an apparatus D into which also the discharge pipe E of the system passes. An adjusting shaft F passes from the apparatus D through the floor of the car.

The apparatus D and adjacent parts are not described more fully here, being described and claimed in my previous application for Patent No. 532,369.

The radiator is composed of a plurality of units, two in the present case, the first comprising a pair of pipes G and H which run the length of the car, and at their ends are connected by a header G′ with a return pipe J, the latter being connected by a pair of inclined pipes K with the vertical pipe L which leads to the horizontal discharge pipe E below the floor. The second unit comprises a single pipe M connected by return bends M′ at the ends with the return pipe N which is connected by a pair of pipes O with a vertical pipe P passing through the floor of the car to the horizontal discharge pipe E. The steam and water of condensation from both units of the radiator are therefore conveyed to the thermostatic mechanism D, so that this mechanism brings the control of the automatic admission valve C under each of the radiator units. For the sake of clearness, Fig. 1 shows only one of the return bends M′. It will be understood, however, that these are duplicated at the two ends of the radiator units, the admission being at an intermediate point of each unit.

The admission of steam to the one radiator unit comprising the pipes G, H and J, is through a duplex fitting Q, into opposite ends of which the pipes G and H are screwed, and into the side of which is screwed a pipe R connecting with the hand-operated admission valve indicated as a whole by the letter S, this valve being connected through a vertical pipe T passing through the floor of a car with the branch B from the train-pipe. The other radiator unit is connected by a simple T-fitting U with a pipe V connected to another port of the valve S.

The valve is designed to connect its admission branch T with one or with both of its discharge branches R and V or to cut off the steam entirely. By turning it to one position it will cause the steam to pass through only one of the radiator units, thus giving a mild heat. By turning the valve to another position the steam will be introduced into both radiator units, so as to give a large quantity of heat. Such a valve is especially adapted for so-called vapor systems in which the steam is used at no-pressure (above atmospheric), permit-

ting such systems to be used most economically when the slightest quantity of heat is required, and to be used with a large radiating surface when a greater quantity of heat is required. The utility of the valve, however, is not confined to such no-pressure systems. In using this valve with a pressure system and with only one radiator unit connected to the admission pipe T, the tendency of the steam under pressure passing through one of the pipes L, P, to back up through the other and so fill both radiator units, is resisted by the air which is confined in the unit to which steam is not directly admitted. In a no-pressure system this backing up tendency of the steam is even more effectively resisted because of the free discharge of the steam into the atmosphere from the radiator unit which is in use.

The valve is likewise applicable to a duplex radiator of other types, such for example as that shown in Fig. 3. Here one radiator unit consists of a single admission pipe W combined with a common return pipe X, and the other unit consists of a single admission pipe Y combined with the same return pipe X. The three pipes are connected by open headers Z at the ends, so that both the pipes W and Y can discharge into the return pipe X. The other parts of the system may be arranged in any usual or suitable way, as for example in the way shown in Fig. 1. Steam is admitted from the hand admission valve S either through the pipe V alone or through both pipes R and V. When steam is admitted to the branch Y of the radiator only, the air in the branch W and pipe R oppose the backing up of the steam thereinto.

The valve, according to Figs. 4 and 5, has a casing *a* with a diaphragm *b* between its two outlets, and has a bonnet *c* which screws into the top of the casing, and which is provided with a cylindrical extension *d* the upper part of which is provided with lateral openings *e*, and the lower part of which is a ring *f* fitting closely into the diaphragm *b* and providing a seat *g* for an upper shoulder *h* on the valve proper *k*. The lower portion of the valve *k* is provided with a packing *l* adapted to engage a seat *m* surrounding the lower admission port, or may be of any usual or suitable construction to effect a tight closure when the valve is turned to the position to cut off the steam entirely. The fit of the ring *f* in the diaphragm *b*, and of the upper shoulder or valve *h* and its seat *g*, are not necessarily so perfect as that required for the lower closure, since this upper valve is closed only when the lower one is already open to admit steam into the lower radiator unit, under which circumstances a slight leakage of steam through the upper valve is not serious. The valve proper *k* is mounted on a stem *n* with a thread of rapid pitch, so that by a half turn the valve may be moved from its lowest position, in which it cuts off the steam entirely from the radiator units to its highest position in which it cuts off steam from the branch R, although permitting it to pass from the admission pipe T to the branch V. In the intermediate position the passages are open to both the lower branch V and the upper branch R; that is, to both units of the radiator.

The valve stem is provided at its upper end with a handle *o*, to which is attached a pointer *p* extending nearly to a horizontal shoulder *q* on the bonnet *c*, and on which shoulder is located a ring *r* with raised words indicating the positions of the valve which correspond to the three important positions of the handle; as for example the words "Closed", "Hot" and "Mild" (Fig. 5). The pointer *p* serves also as an impositive lock or stop to hold the valve in the intermediate position, being adapted to spring into a notch *s* on the adjacent vertical face of the bonnet. This serves to hold the valve proper in its middle position, from which it might otherwise be moved by the jarring of the train. In the extreme positions the valve proper is jammed against its seat, so that no further precaution is necessary to prevent accidental movement.

This construction of valve has all the advantages in simplicity, durability and use, accessibility for renewal of packings, seats, &c., which the ordinary globe or angle valve has, the lower valve proper seating on a transverse seat from which it rises clear when opened.

The nature of the use for which the valve is specially designed, is taken advantage of to make the upper closure of extreme simplicity.

What I claim is:—

1. A valve for steam heating systems having a pair of radiator units and a single supply pipe, said valve comprising a casing having side openings at different heights adapted for connection to the respective radiator units and having a bottom opening adapted for connection with said supply pipe and provided with a valve seat, a bonnet in the top of said casing, a cylindrical extension of said bonnet having lateral openings and the lower part of which constitutes a ring fitting the casing and providing an upper valve seat, a valve proper having a stem screwing through said bonnet and having an upper face adapted to engage said upper seat and close the passage to the upper side opening when the valve proper is raised and having a lower face adapted to engage the seat in the bottom of the casing and close the supply passage when the valve proper is lowered.

2. A valve for steam heating systems having a pair of radiator units and a single supply pipe, said valve comprising a casing having side openings at different heights adapted for connection to the respective radiator units and having a bottom opening adapted for connection with said supply pipe and provided with a valve seat, a bonnet in the top of said casing, a cylindrical extension of said bonnet having lateral openings and the lower part of which constitutes a ring fitting the casing and providing an upper valve seat, a valve proper having a stem screwing through said bonnet and having an upper face adapted to engage said upper seat and close the passage to the upper side opening when the valve proper is raised and having a lower face adapted to engage the seat in the bottom of the casing and close the supply passage when the valve proper is lowered, the thread of said stem being of a rapid pitch so that by less than a complete turn of the stem the valve proper is shifted from its highest to its lowest position, whereby the angular position of the stem indicates the position of the valve proper.

3. A valve for steam heating systems having a pair of radiator units and a single supply pipe, said valve comprising a casing having side openings at different heights adapted for connection to the respective radiator units and having a bottom opening adapted for connection with said supply pipe and provided with a valve seat, a bonnet in the top of said casing, a cylindrical extension of said bonnet having lateral openings and the lower part of which constitutes a ring fitting the casing and providing an upper valve seat, a valve proper having a stem screwing through said bonnet and having an upper face adapted to engage said upper seat and close the passage to the upper side opening when the valve proper is raised and having a lower face adapted to engage the seat in the bottom of the casing and close the supply passage when the valve proper is lowered, and means for impositively locking said stem in its intermediate position.

4. A valve for steam heating systems having a pair of radiator units and a single supply pipe, said valve comprising a casing having side openings at different heights adapted for connection to the respective radiator units and having a bottom opening adapted for connection with said supply pipe and provided with a valve seat, a bonnet in the top of said casing, a cylindrical extension of said bonnet having lateral openings and the lower part of which constitutes a ring fitting the casing and providing an upper valve seat, a valve proper having a stem screwing through said bonnet and having an upper face adapted to engage said upper seat and close the passage to the upper side opening when the valve proper is raised and having a lower face adapted to engage the seat in the bottom of the casing and close the supply passage when the valve proper is lowered, the thread of said stem being of a rapid pitch so that by less than a complete turn of the stem the valve proper is shifted from its highest to its lowest position, whereby the angular position of the stem indicates the position of the valve proper, and an indicator for marking the angular positions of the stem corresponding to the raised, intermediate and lowered positions of the valve proper.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD E. GOLD.

Witnesses:
D. ANTHONY USINA,
FRED WHITE.