

E. H. GOLD.

HEATING SYSTEM.

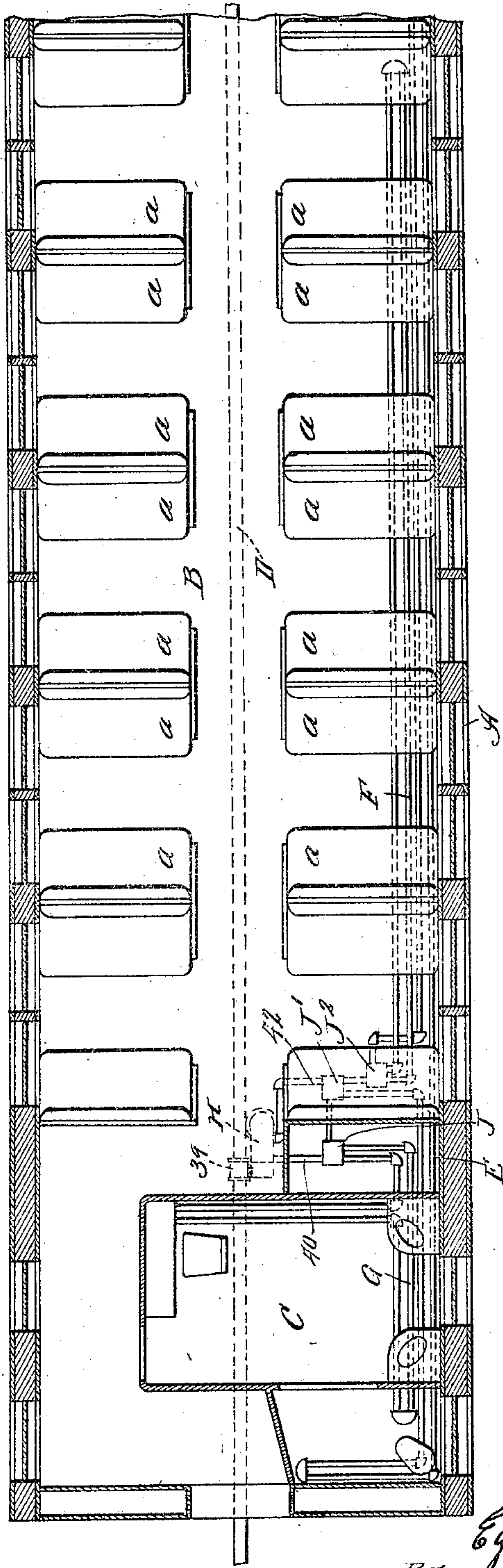
APPLICATION FILED JUNE 7, 1909.

987,568.

Patented Mar. 21, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Edw. D. Perry
Clarence J. Lunsford

Inventor:

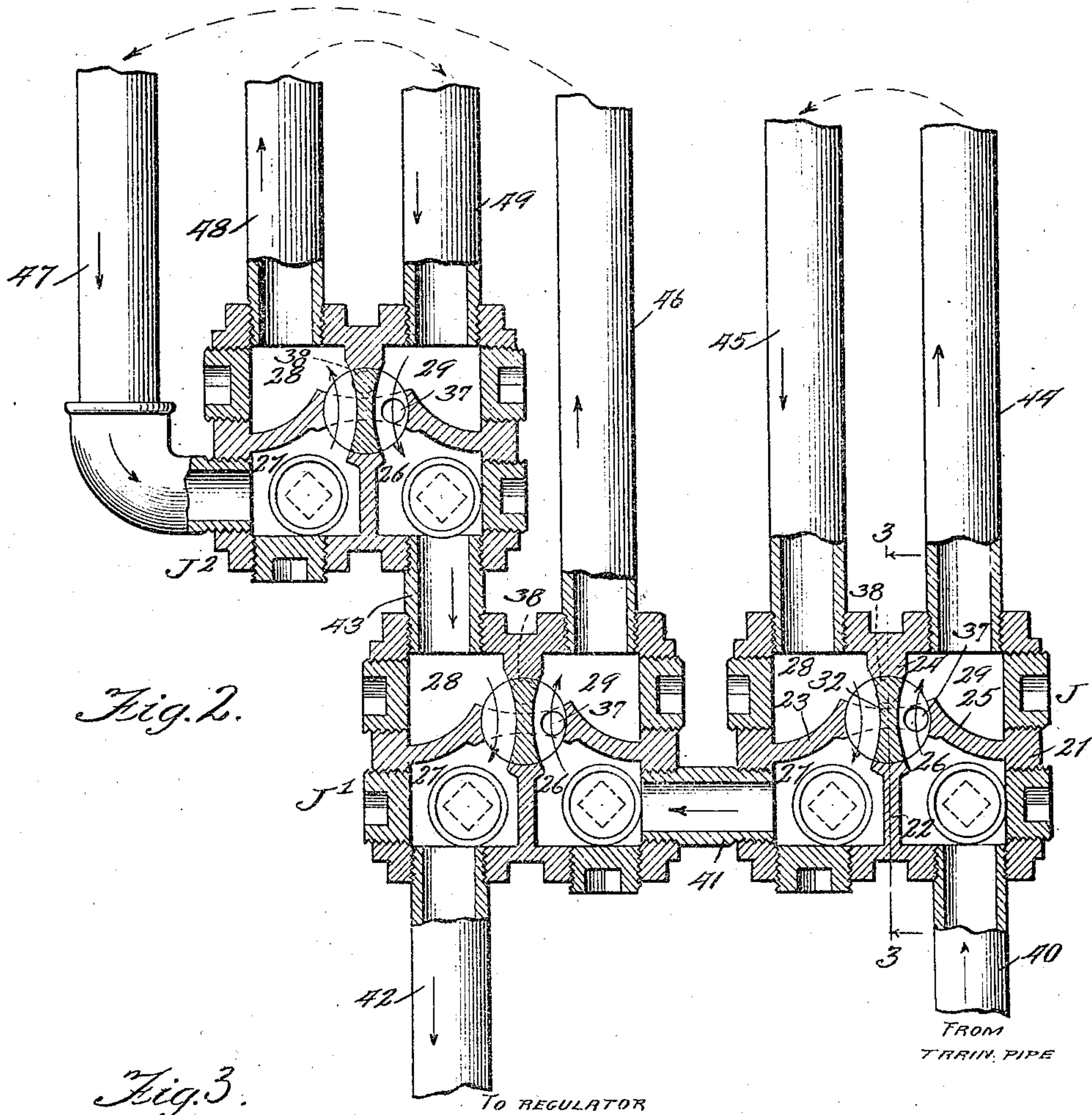
Egbert H. Gold
By *T. R. Barnett*
Atty.

E. H. GOLD.
HEATING SYSTEM.
APPLICATION FILED JUNE 7, 1909.

987,568.

Patented Mar. 21, 1911.

3 SHEETS-SHEET 2.



Witnesses:

Edw. Perry
Albert J. Lueder

Inventor:

E. H. Gold
By R. A. Barnett
Att'y.

E. H. GOLD.
HEATING SYSTEM.
APPLICATION FILED JUNE 7, 1909.

987,568.

Patented Mar. 21, 1911.

3 SHEETS—SHEET 3.

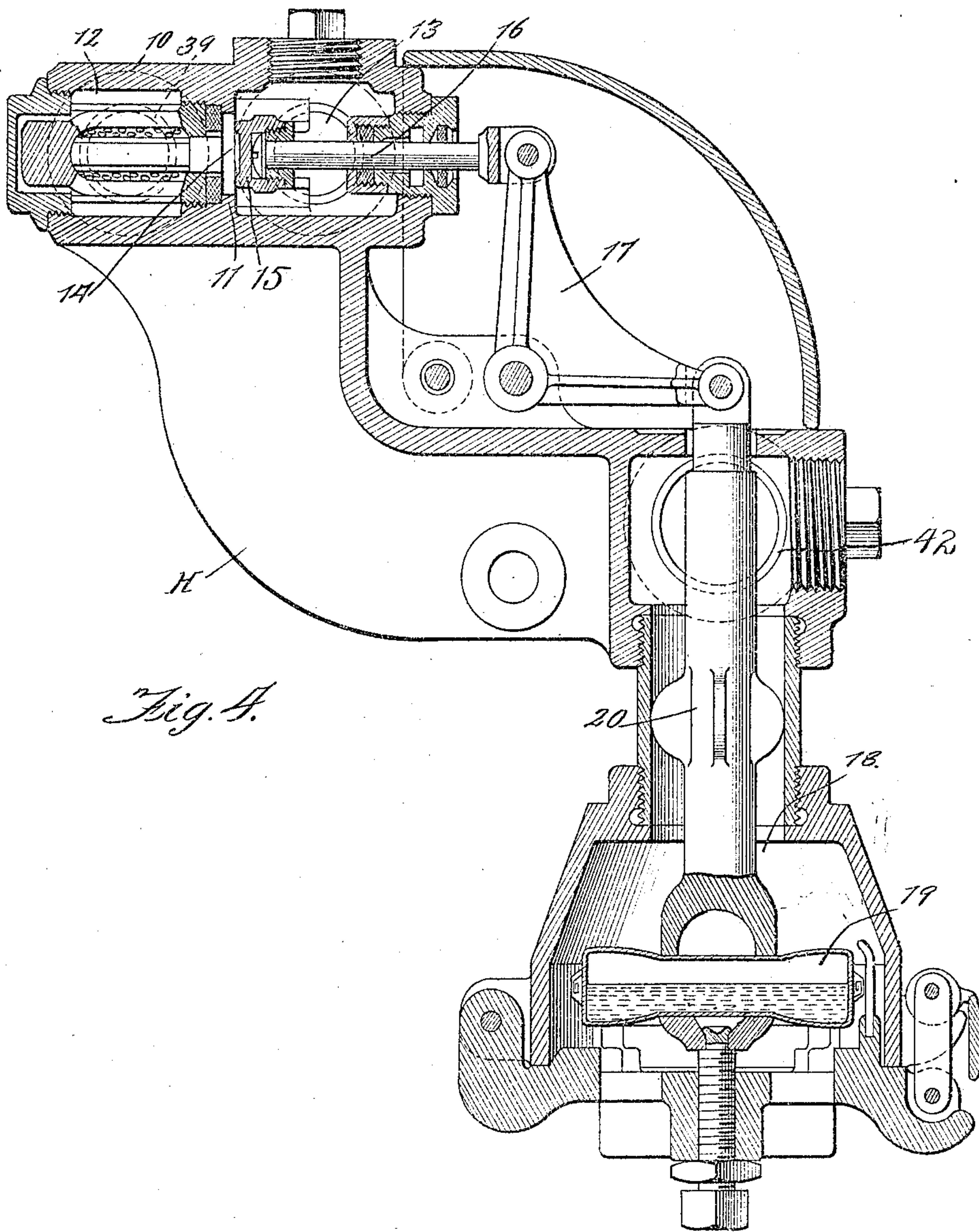


Fig. 4.

Witnesses:
J. D. Perry
C. J. Lunsford

Inventor:
Egbert H. Gold
By R. B. Barnett

UNITED STATES PATENT OFFICE.

EGBERT H. GOLD, OF CHICAGO, ILLINOIS.

HEATING SYSTEM.

987,568.

Specification of Letters Patent.

Patented Mar. 21, 1911.

Application filed June 7, 1909. Serial No. 500,479.

To all whom it may concern:

Be it known that I, EGBERT H. GOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heating Systems, of which the following is a specification.

My invention relates to heating systems particularly adapted for heating railway cars, and has for its object to provide a heating system employing several radiating coils or radiators which may be controlled by a single automatic controller, if such controller be used, which coils are provided with switching devices, whereby certain of the coils may be put into service singly, when desired, or in conjunction with other coils, one or more of these other coils being of a strictly secondary or supplemental character, that is, receiving steam only when the first-mentioned or primary coils are in service.

While the arrangement of radiators, valves and controlling devices which forms the subject-matter of this application might be employed in various heating systems of different description, this arrangement is particularly designed and intended for an atmospheric pressure or vapor system of heating and, more especially, for a vapor system when used to heat a sleeping car or the like, and in this regard it is one of the objects of my invention to adapt and modify the well-known vapor system of car heating to meet certain requirements of sleeping cars.

In my application Serial No. 500,477, filed June 7, 1909, I have shown two coils, a main coil and a supplemental coil, controlled by a single automatic controlling device and provided with valves whereby steam may be circulated through the main coil or through the main coil and the supplemental coil in succession; and in my application Serial No. 500,478, filed June 7, 1909, I have shown and claimed a parallel arrangement of coils, also controlled by a single controller, in which the several coils are capable of being supplied with steam independently, but which coils may be so connected as to receive the steam serially in combination with certain other devices and arranged so as to provide a suitable system for heating apartment cars. The present invention combines the arrangements of the two aforementioned applications, thereby providing an arrangement of three coils, all of which may be con-

trolled by a single automatic controller, two of which can be used independently of each other and of the third, the third being a secondary or supplemental coil which is fed from and discharges into one of the first-mentioned coils. Obviously, the coils might be multiplied to any desired extent upon the same principles. The arrangement is preferably such that the steam, of necessity, flows in series through such of the coils as are open, thereby obviating the danger of short circuiting and insuring a full supply to the open coils.

The invention is illustrated as applied to heating a sleeping car divided into a main seating section and a compartment, for example, the women's lavatory; and it is one of the objects of my invention to provide a suitable heating system which shall adequately meet the exigencies of this and similar situations. The invention might, however, be employed in other connections.

The invention has for further objects such other new and improved constructions, devices and arrangements in heating systems as will be described in this specification and particularly set forth in the claims appended hereto.

The invention in the preferred embodiment is illustrated in the accompanying drawings, wherein—

Figure 1 is a fragmentary, sectional plan of a sleeping car of familiar construction, the arrangement of the heating coils being, however, diagrammatic for the purpose of clearness of illustration. Fig. 2 is a sectional plan view through the three related four-way valves and their connecting pipes. Fig. 3 is a section taken on line 3—3 of Fig. 2, looking in the direction of the arrows; and Fig. 4 is a vertical, sectional view of a form of vapor regulator suitable for use in this connection.

Like characters of reference indicate like parts in the several figures of the drawings. Referring to the drawings, reference letter A designates a sleeping car of ordinary construction divided into the seating section B and a compartment C, the latter forming the women's lavatory.

Reference letter *a* designates the seats.

D is the train pipe, which runs the length of the train and is kept filled with steam from the locomotive at relatively high but variable pressures.

I preferably provide a main radiating coil E, which runs the length of the car, through the seating portion B and also the lavatory C, being arranged adjacent to the water pipes and the like, so as to keep the latter from freezing. This coil is shown in horizontal position in Fig. 1, in order that all of the devices constituting the heating system may be clearly shown in a single view. In practice, these pipes will be arranged in the customary place along the sides of the car. The radiator E is calculated to afford sufficient radiating surface to keep the car or the side of the car on which it is located heated to a normal temperature in moderate weather and to impart sufficient heat to prevent the water pipes in the car from freezing up in any weather. This radiator is intended to be kept in service all the time, day and night, in winter time, while the car is in service. For supplying additional heat to the seating section of the car, in case of cold weather, and particularly in the day time, I provide a supplemental coil F which is so connected with the main coil E that it receives steam only when the main coil is in service. For heating the women's lavatory, I provide an additional coil G, which is so connected with the other coils that it may be put under steam in conjunction with the main coils E, F or independently of the same.

H represents the vapor regulator, by means of which steam is maintained at substantially atmospheric pressure in such of the coils as may be in service; and J, J', J² four-way valves interposed between the radiators and the controller in the manner which will be hereafter described.

A suitable form of vapor regulator is shown in Fig. 4, although any other device might be employed for controlling the inflow to the radiating pipes in accordance with thermostatic conditions adjacent their common outlet. A casing 10 is divided by a partition 11, so as to form a high pressure chamber 12 and a low pressure chamber 13, these chambers being in communication by means of a port 14 closed by a valve 15 arranged on a stem 16, which is pivoted to a bell crank 17. Arranged in a thermostat chamber 18 is a thermostat 19 upon which rests a rod 20, pivoted to the other end of bell crank 17.

Figs. 2 and 3 show the construction and arrangement of the four-way valves. These valves are identical in construction, so that but one needs to be described. A casing 21 is divided by webs 22, 23, 24, 25 into compartments 26, 27, 28 and 29. Between the webs is arranged a valve-piece consisting of the upper disk 30 and the lower disk 31, connected by a vertical web 32. These parts are arranged on a stem 33 provided with a handle 34, a spring 35 being interposed be-

tween the bonnet 36 and the upper disk 30. The lower disk is perforated at 37, which perforation registers with a perforation 38 in the bottom of the casing when the web 32 is in the dotted line position of Fig. 2.

A short pipe section 39 connects the train pipe with the high pressure chamber 12. The low pressure chamber 13 is connected by pipe 40 with compartment 26 of valve J. Compartments 27 of valve J and 26 of valve J' are connected by a pipe 41. A pipe 42 leads from compartment 27 of J' to the thermostat chamber 18 of thermostat H. A short pipe 43 connects compartments 28 of J' and 26 of J². The inlet and return ends 44 and 45 of coil G lead respectively from and to compartments 29 and 28 of valve J. The inlet and return ends 46 and 47 of coil E lead respectively from and to compartments 29 of J' and 27 of J². The inlet and return ends 48 and 49 of coil F lead respectively from and to compartments 28 and 29 of J².

The operation of the heating system when constructed as above described is as follows: Coil E will be kept filled with steam at atmospheric pressure whenever the car is in service and requires heat. In moderate weather this coil will suffice to heat the car even in the day time. During the sleeping hours, it will be used alone, even in quite cold weather. It is a source of complaint that, as sleeping cars are now heated, the temperature is too high during the night and particularly during the first hours of the night. This results from that fact that there is no way of putting out of service a part of the heating coils. I obviate this objection by dividing the radiator into subdivisions which can be used separately or serially, as desired, and I bring about this result without the undue multiplication of the controlling devices. In cold weather, and particularly in the day time, the heat in the car may be increased by putting coil F into service. When desired, coil G may also be used to supply additional heat to the women's lavatory; or, as is often desirable heat may be supplied to the lavatory through this coil even when the main coil E is cut out, and the coil F is in use. When steam is supplied to coil E alone, it will pass from pipe 40 through compartments 26 and 27 of valve J, compartment 26 of valve J' to coil E and from coil E through compartments 27 and 26 of valve J², compartments 28 and 27 of valve J' and thence through pipe 42 to the thermostat chamber 18 of the controller. Valves J and J² will be set in the position shown by the dotted lines in Fig. 2, short circuiting coils G and F. By shifting the position of the valve-piece of J², the steam, after passing through coil E, will be forced to pass through coil F before it can reach the thermostat chamber. Coil

G may be cut into the circuit by shifting the valve-piece of valve J to the position shown in full lines in Fig. 2. It will be seen that the arrangement of coils G and E is such that steam may be supplied to coil G even when E is cut out.

The vapor regulator H operates to maintain steam at atmospheric pressure in such of the radiators as may be in service. The steam entering chamber 12 passes valve 15, so long as the same is open, and then goes through chamber 13, through such of the radiating coils as may be open and afterward reaches the thermostat chamber 18 by means of the common discharge pipe 42 leading from valve J'. The contact of the steam with the thermostat expands the same, causing port 14 to be either closed entirely or throttled. As a result, only so much steam passes valve 15 as will suffice for keeping the radiating coils in service full of steam at substantially atmospheric pressure.

It will be noted that the supplemental radiator F, that is the supplemental coil which runs through the berth section of the car, can not by any possible manipulation be used alone, therefore it is impossible for an ignorant or careless porter to heat the berth section of the car without employing the main or long coil E which is preferably so arranged as to protect the water pipes, drips, basins, etc., which would be likely to become frozen up in very cold weather. On the other hand, the supplemental coil G can be used independently of the main coil E, this being necessary when, for example, the supplemental coil G is employed for heating a woman's lavatory which may require heat very early in the morning even when no heat is needed in the berth section.

I do not limit myself to the particular devices, constructions and arrangements shown and described, as modifications might be devised which would come within the scope of my invention as defined by the claims.

Following the customary practice, the heating described for one side of a car will ordinarily be duplicated on the other side of a car.

I do not claim specifically in this specification the parallel arrangement of the four-way valves J, J' and their respective coils G and E, nor do I claim specifically the serial arrangement of the valves J' J² and their respective coils E and F, as similar arrangements are shown and claimed in my co-pending application, Serial No. 500,477, filed June 7, 1909.

I claim:

1. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and com-

partment, means for directing the steam from the train pipe into the main radiator alone or into one of the supplemental radiators alone or into the main radiator and one or both of the supplemental radiators in series, as desired, and a single automatic controller for controlling the supply of steam to such of the radiators as are in service.

2. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing the steam from the train pipe into the main radiator alone or into the main radiator and the supplemental radiators, as desired, one of said supplemental radiators being arranged so as to receive steam independently of the main radiator, and the other supplemental radiator only when the main radiator is supplied, and a single automatic controller for controlling the supply of steam to such of said radiators as are in service.

3. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing the steam from the train pipe into the main radiator and one or both of the supplemental radiators, as desired, the supplemental radiator for the seating section being arranged so as to receive steam only when the main radiator is supplied, and a single automatic controller for controlling the supply of steam to such of the radiators as are in service.

4. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing steam from the train pipe into the main radiator alone or into the main radiator and one or both of the supplemental radiators, as desired, one of said supplemental radiators arranged so as to receive steam independently of said main radiator or in conjunction therewith, and a single automatic controller for controlling the supply of steam to such of said radiators as are in service.

5. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing the steam from the train pipe either into the main

radiator alone or into the main radiator and one or both of said supplemental radiators, as desired, the supplemental radiator for the seating section being arranged so as to receive steam only when the main radiator is in service and the supplemental radiator for the compartment being arranged to receive steam either independently of or in conjunction with the main radiator, and a single automatic controller for controlling the supply of steam to such of said radiators as are in service.

6. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing the steam from the train pipe at will, either through the main radiator alone, or through the main radiator and the supplemental radiator of the seating section, or through the main radiator and the supplemental radiator for the compartment, or through the supplemental radiator for the compartment alone, or through all of these radiators, and automatic controlling means for controlling the supply of steam to such of said radiators as are in service.

7. The combination with a railway car divided into a seating section and a compartment, of a train pipe, a main radiator extending through both the seating section and the compartment, separate supplemental radiators in said seating section and compartment, means for directing the steam from the train pipe at will, either through the main radiator alone, or through the main radiator and the supplemental radiator of the seating section, or through the main radiator and the supplemental radiator for the compartment, or through the supplemental radiator for the compartment alone, or through all of these radiators.

8. A heating system comprising a source of supply of steam, three radiators and valves for the said several radiators adapted either to put said radiators respectively into communication with the source of supply or to shut off said radiators from said source of supply; said radiators and valves being arranged so that the steam may be circulated through either one of two of said radiators alone or through both of said radiators, but can be circulated through the third radiator only when steam is supplied to one of the other radiators.

9. A heating system comprising a source of supply of steam, three radiators and valves for the several radiators adapted either to put said radiators respectively into communication with the source of supply in series with such other of said radiators, if any, as are in communication with said

source of supply, or to shut off their respective radiators from said source of supply; said radiators and valves being arranged so that the steam may be circulated through either one of two of said radiators alone or through both of said radiators, but can be circulated through the third radiator only when steam is supplied to one of the other radiators.

10. A heating system comprising a source of supply of steam, three radiators, a common discharge pipe and valves for the said several radiators adapted either to put the inlet and return ends of said radiators respectively in communication with said source of supply and discharge pipe, or to close communication between said radiators severally and said source of supply and discharge pipe; said radiators and valves being arranged so that the steam may be circulated through either one of two of said radiators alone or through both of said radiators, but can be circulated through the third radiator only when steam is supplied to one of the other radiators.

11. A heating system comprising a source of supply of steam, three radiators, a common discharge pipe and valves for the said several radiators adapted either to put the inlet and return ends of said radiators respectively in communication with said source of supply and discharge pipe in series with the inlet and return ends of such other of said radiators, if any, as are in communication with said source of supply and discharge pipe, or to close communication between their respective radiators and said source of supply and discharge pipe; said radiators and valves being arranged so that the steam may be circulated through either one of two of said radiators alone or through both of said radiators, but can be circulated through the third radiator only when steam is supplied to one of the other radiators.

12. A heating system comprising a source of supply of steam, three radiators, a common discharge pipe and valves for the said several radiators adapted either to put the inlet and return ends of said radiators respectively in communication with said source of supply and discharge pipe in series with the inlet and return ends of such other of said radiators, if any, as are in communication with said source of supply and discharge pipe, or to close communication between their respective radiators and said source of supply and discharge pipe; said radiators and valves being arranged so that the steam may be circulated through either one of two of said radiators alone or through both of said radiators, but can be circulated through the third radiator only when steam is supplied to one of the other radiators, a thermostat in communication with said common outlet pipe and a valve

operated by said thermostat which controls the flow of steam from said source of supply to said radiators.

13. A heating system comprising in combination three heating coils, a common supply pipe for the same, and means for directing the steam from the supply pipe through either of two of said coils independently or through one or both of said two coils, and the third coil in series as desired, said third coil being arranged in communication with one of the other coils so that it receives steam only when the latter is supplied with steam.

14. A heating system comprising in combination three heating coils, a common supply pipe for the same, a source of supply of steam, means for directing the steam from the supply pipe through either of two of said coils independently or through one or both of said two coils and the third coil in series, as desired, said third coil being arranged in communication with one of the other coils so that it receives steam only when the latter is supplied with steam, a common outlet pipe for said coils, and means for automatically controlling the flow of the steam through such of said coils as are supplied therewith, in accordance with thermostatic conditions in said common outlet.

15. A heating system comprising in combination three heating coils, a common supply pipe for the same, a source of supply of steam, means for directing the steam from the supply pipe through either of two of said coils independently or through one or both of said two coils and the third coil in series, as desired, said third coil being arranged in communication with one of the other coils so that it receives steam only when the latter is supplied with steam, a common outlet pipe for said coils, means for automatically controlling the flow of the steam through such of said coils as are supplied therewith, in accordance with thermostatic conditions in said common outlet, and means for directing the steam immediately from the common supply pipe to the common outlet pipe without passing through said coils.

16. The combination with supply and discharge pipes, of two circulating conduits, two four-way valve devices having each four ports, one port of one of said devices communicating with a port of the other such device, the supply pipe communicating with a port of one of said devices and the discharge pipe with a port of the other of said devices, and each said circulating conduit

having its ends in communication with severally the other two ports of one of said devices; a third circulating conduit and a third such four-way valve device, the ends of the third circulating conduit communicating severally with two ports of said third device, and said device being interposed in one of the first mentioned circulating conduits with its other two ports in communication therewith.

17. A heating system comprising a source of supply of heating medium, two heating coils, supply and outlet pipes common to the same, two four-way valves in communication with each other and interposed between the common supply and outlet pipes with which the inlet and return ends of said coils, respectively, communicate, a third coil, and a four-way valve interposed in one of the first mentioned coils with which valve the inlet and return ends of the third coil are in communication.

18. A heating system comprising a source of supply of heating medium, two heating coils, supply and outlet pipes common to the same, two four-way valves in communication with each other and interposed between the common supply and outlet pipes with which the inlet and return ends of said coils, respectively, communicate, a third coil, a four-way valve interposed in one of the first mentioned coils with which valve the inlet and return ends of the third coil are in communication, a valve in the common supply pipe and a thermostat in the common outlet pipe for actuating said valve in the supply pipe.

19. A heating system comprising a source of supply of heating medium, two heating coils, supply and outlet pipes common to the same, two four-way valves in communication with each other and interposed between the common supply and outlet pipes with which the inlet and return ends of said coils, respectively, communicate, a third coil, and a four-way valve interposed in one of the first mentioned coils with which valve the inlet and return ends of the third coil are in communication; said valves provided with drip ports and with means whereby said drip ports are opened so as to drain their respective coils when communication is closed between the latter and the source of supply of heating medium.

EGBERT H. GOLD.

Witnesses:

P. H. TRUMAN,
H. L. PECK.