J. F. McELROY.

STEAM HEATING APPARATUS.

APPLICATION FILED AUG. 9, 1910.

990,760.

Patented Apr. 25, 1911.

3 SHEETS—SHEET 1.

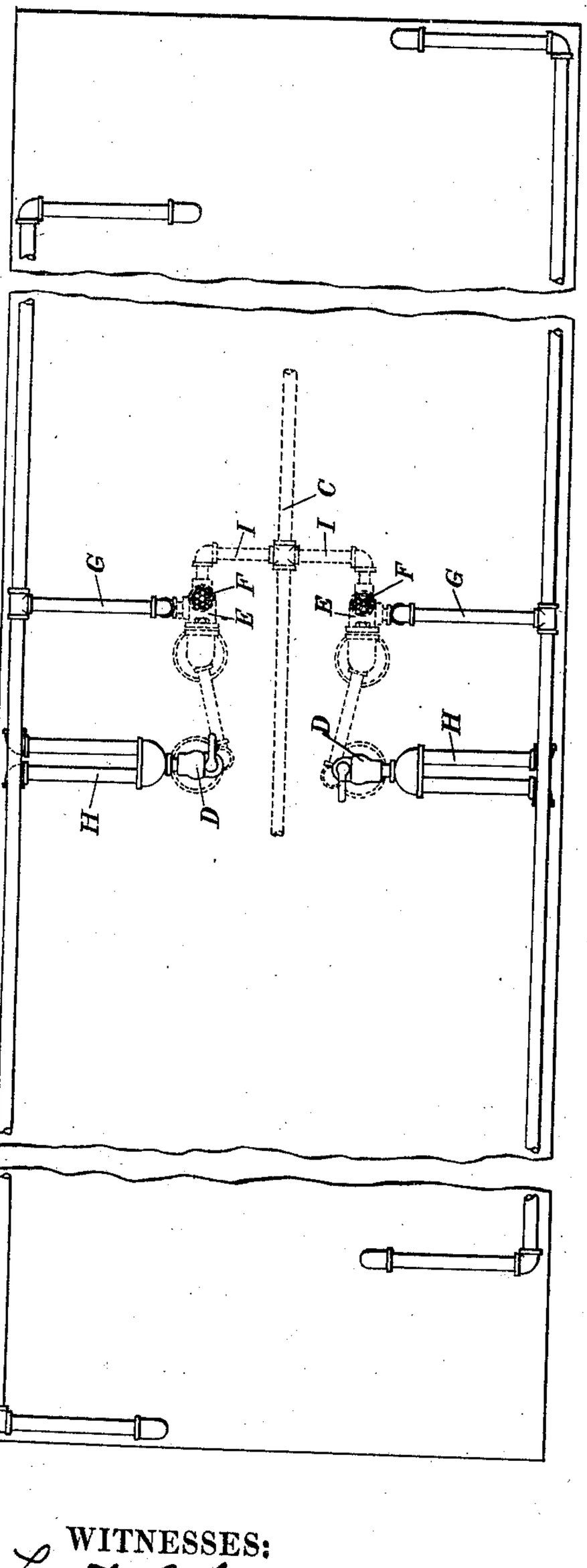

Fig. 1.

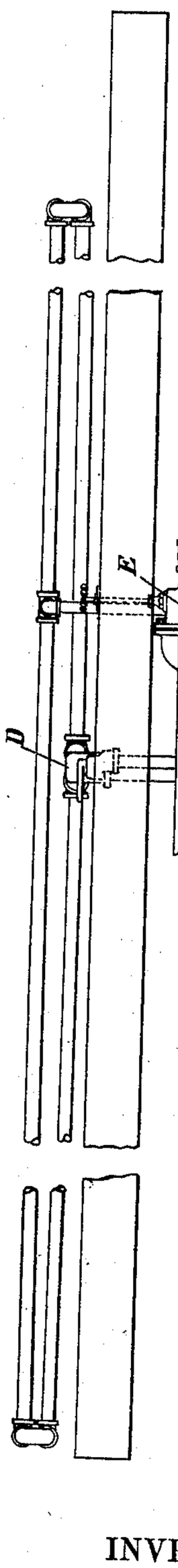

Fig. 2.

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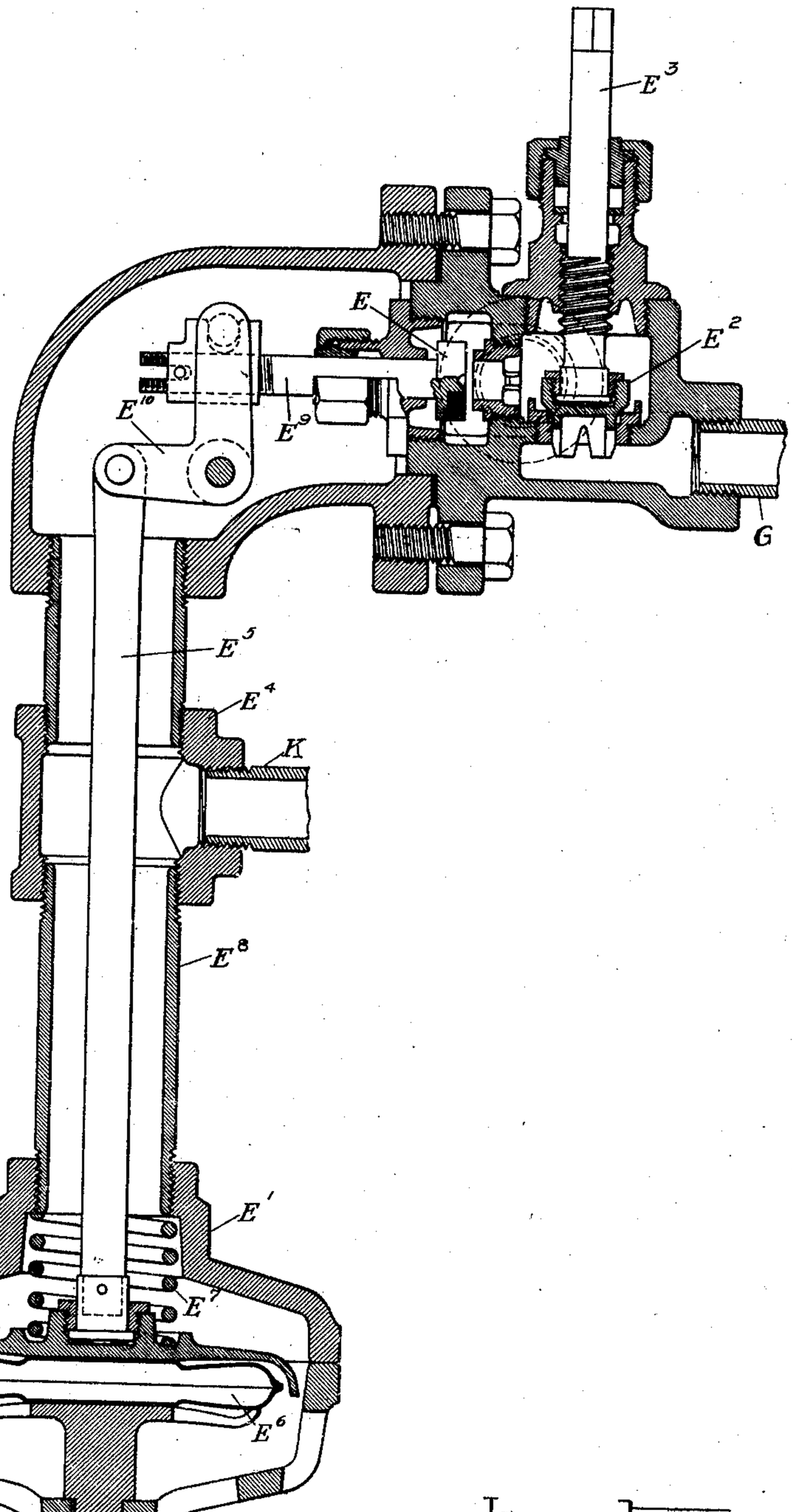

Fig. 3.

Witnesses.

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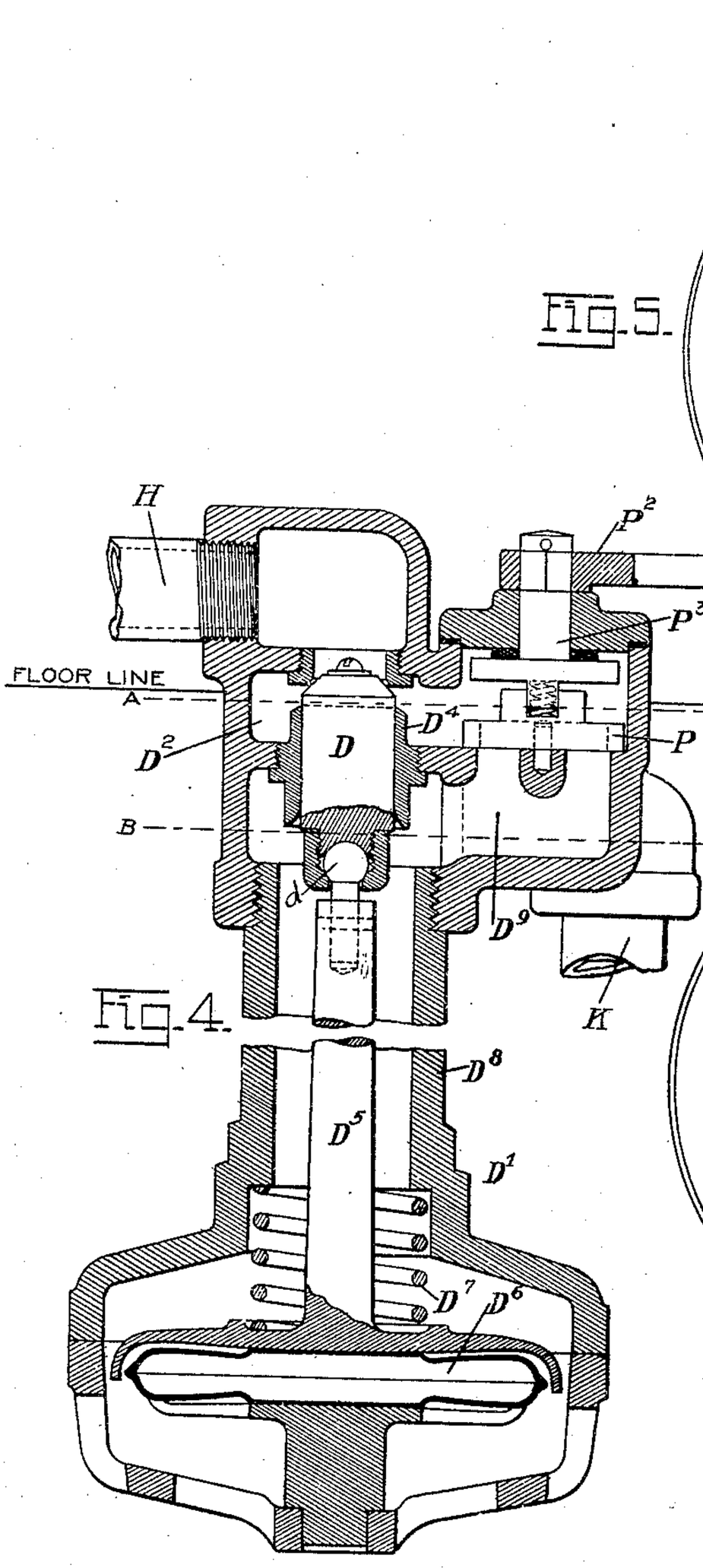

Fig. 4.

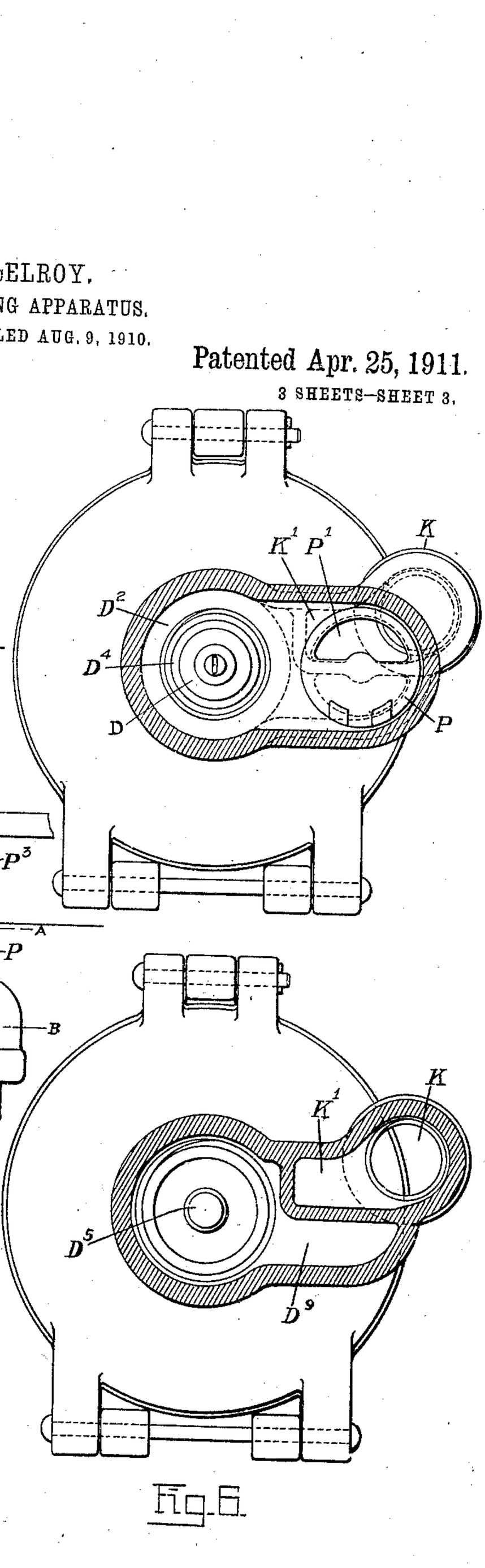

Fig. 5.

Fig. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR TO CONSOLIDATED CAR HEATING COMPANY, A CORPORATION OF WEST VIRGINIA.

STEAM-HEATING APPARATUS.

990,760. Specification of Letters Patent. Patented Apr. 25, 1911.

Application filed August 9, 1910. Serial No. 576,381.

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing at Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Steam-Heating Apparatus, the following being a full, clear, and exact disclosure of the one form of my invention which I at present deem preferable.

For a detailed description of the present form of my invention, reference may be had to the following specification and the accompanying drawings forming a part hereof, in which—

Figure 1 is a plan view of the heating pipes of a railway car with my invention applied thereto; Fig. 2 is a side view of Fig. 1; Fig. 3 is a vertical section of the inlet valve and thermostatic governor therefor; Fig. 4 is a vertical section of the outlet valve and thermostatic governor therefor; Fig. 5 is a horizontal section of Fig. 4 on the line A—A; Fig. 6 is a horizontal section of Fig. 4 on the line B—B, the valve D being removed from its stem D^5.

My invention relates to a steam heating apparatus, such, for example, as that employed for railway cars and comprises a heat-radiator, such as the heating pipes within the car, inlet and outlet valves therefor, each controlled by a thermostatic governor, and means whereby the discharge of hot water and steam from the outlet valve may be diverted to either of the two thermostatic controllers, or divided between them in any desired ratio.

When the discharge is delivered to the controller of the outlet valve, the inlet valve will remain wide open, its controller being cold. This will give a high-pressure system suitable for service in winter or in cold weather, the outlet valve being open to a degree determined only by the temperature of the discharged water and steam. When the discharge is delivered to the controller of the inlet-valve, the outlet valve will remain wide open, its controller being cold. This will give a low pressure or vapor system, suitable for service in moderate weather, the inlet valve being open to a degree determined only by the temperature of the discharge from the outlet valve. When the discharge is delivered partly to one controller and partly to the other, an intermediate condition is produced with an intermediate temperature and pressure in the radiator.

Turning to Fig. 1 of the drawing, C represents the train pipe of a car heating system supplying steam to the several cars. On the car shown in the figure a branch pipe I leads to the inlet valve E controlling inlet pipe G of the heating pipes or radiator within the car. From the radiator pipes at the respective ends of the car the return pipes H lead to the outlet valve D which is located adjacent to the inlet valve E. As appears in Fig. 2, the outlet valve D is above the floor level and the inlet valve E is below it. The two valves are each provided with a thermostatic controller, that for the inlet valve being designated E′ and that for the outlet valve D′. A pipe K leads from valve D to the controller E′ by means of which the discharge from the outlet valve may be applied to the controller of the inlet valve as will be hereinafter described.

Turning to Fig. 4, which shows the details of the outlet valve, H indicates the point of admission of the discharge from the radiator. D is the valve itself which is cylindrical and is adapted to slide up and down through a bushing D^4 in a partition which forms the floor of a chamber D^2 into which the discharge from the radiator enters when the valve D is drawn downward away from its seat. The thermostatic controller D′ is of well known construction comprising an expansible vessel D^6 containing a substance which at a specified degree of temperature will vaporize and exert an expanding pressure against the diaphragms which compose the vessel D^6. Such expansion lifts the rod D^5 against the force of spring D^7 and closes the valve, the valve D being preferably connected to said rod by a universal joint *d*. Conversely on a decrease of temperature, vessel D^6 will tend to collapse, thereby lowering rod D^5 and opening the valve. The aforesaid chamber D^2 on the discharge side

of the outlet valve has two ducts (see Fig. 6) leading therefrom one the passage D^9 leading to the interior of the casing D^8, and the other the passage, K′ leading to pipe K, which, as I have heretofore said, leads, in turn to the thermostatic controller of the inlet valve. The entrance to these two ducts is controlled by the determining valve P, which, as appears in Fig. 5, is a circular disk with a semi-circular opening P′ occupying nearly one half the area of the disk. The disk is seated on the division wall between the ducts K′ and D^9 and is spring pressed downward to cover the entrances into the two ducts. It may be rotated on its seat by the rotary stem P^3 having a lever handle P^2. Obviously when the opening P′ in the disk valve is over duct K′, the opening into duct D^9 is closed, and, conversely, when the opening is over duct D^9, the opening into K′ will be closed. Thus the discharge from the outlet valve entering chamber D^2 will be delivered into either duct D^9 leading through casing D^8 to the thermostatic controller of the outlet valve, or into duct K′ leading by pipe K to the thermostatic controller of the inlet valve. When the disk is turned part way so that the opening P′ therein covers both ducts K′ and D^9, then the discharge will be divided between the two ducts in proportion to the area of opening P′ which is over the respective ducts.

The inlet valve is shown in detail in Fig. 3 together with its thermostatic controller. The valve E is mounted on one end of a horizontally sliding stem or rod E^9 and this rod is reciprocated by an angle lever E^{10} which is worked by rod E^5, which, like the rod D^5 of the outlet structure, is governed by the expansion of a vessel E^6 acting against the force of a spring E^7. The rod E^5 is inclosed in a casing E^8 at one point in which is a section E^4 into which enters the terminal of pipe K, so that any discharge from the outlet valve which may be directed into pipe K will be delivered thereby to the thermostatic controller of the inlet valve. A hand-operated valve E^2 is also provided operated by a rotating stem or rod E^3 with a squared end to which a wrench or handle may be applied.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic controller for each valve, and means for delivering the discharge from the outlet valve to the thermostatic controller of either or both of said valves.

2. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic controller for each valve and means for delivering the discharge from the outlet valve to either or both of said thermostatic controllers.

3. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic controller for each valve, pipes leading from the discharge side of the outlet valve to the thermostatic controllers of the inlet and outlet valves respectively and means for diverting the discharge either to the thermostatic controller of the outlet valve or to the thermostatic controller of the inlet valve, or simultaneously to both controllers.

4. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic controller for each valve, means for conducting the discharge to the respective thermostatic controllers and a determining valve for selectively diverting the discharge from the outlet valve to the thermostatic controller of either the inlet or the outlet valve, or simultaneously to both controllers.

5. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic controller for each valve, a chamber on the discharge side of the outlet valve for receiving the discharge therefrom, ducts leading from said chamber to each of the thermostatic controllers, and means for diverting the contents of said chamber into either of said ducts, or simultaneously into both ducts.

6. The combination with a steam radiator of inlet and outlet valves, a thermostatic controller for each valve and means for dividing the discharge from the outlet valve between the two controllers aforesaid.

7. The combination with a steam radiator of inlet and outlet valves therefor placed adjacent to each other, a thermostatic controller for each valve, independent conduits leading from the outlet valve to the controllers of both valves, and means for controlling said conduits.

8. The combination with a steam radiator of inlet and outlet valves therefor, a thermostatic governor for each valve, a chamber on the discharge side of said outlet valve, independent ducts from said chamber to the governors of both valves, and a determining valve controlling the ratio of capacity of said ducts.

9. The combination with a railway car of a train pipe, radiating pipes within the car, an inlet valve between the train and radiating pipes, a thermostatic controller for said inlet valve, an outlet valve for the radiating pipes, a thermostatic controller for said outlet valve, and a determining valve for controlling the discharge from the outlet valve to either one of the said controllers or simultaneously to both controllers.

10. The combination with a railway car of a train pipe, a radiating pipe in the car, an inlet valve below the car floor and between said pipes, a thermostatic controller for said valve, an outlet valve for the radiating pipes located above the car floor, a

thermostatic controller for said outlet valve located below the car floor, a chamber on the discharge side of said outlet valve, ducts leading from said chamber to each of the two thermostatic controllers respectively and a determining valve for connecting said chamber with either one of said ducts or simultaneously with both ducts.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 14th day of July, 1910.

JAMES F. McELROY.

Witnesses:
ERNEST D. JANSEN,
ROBERT McCOCHRANE.