

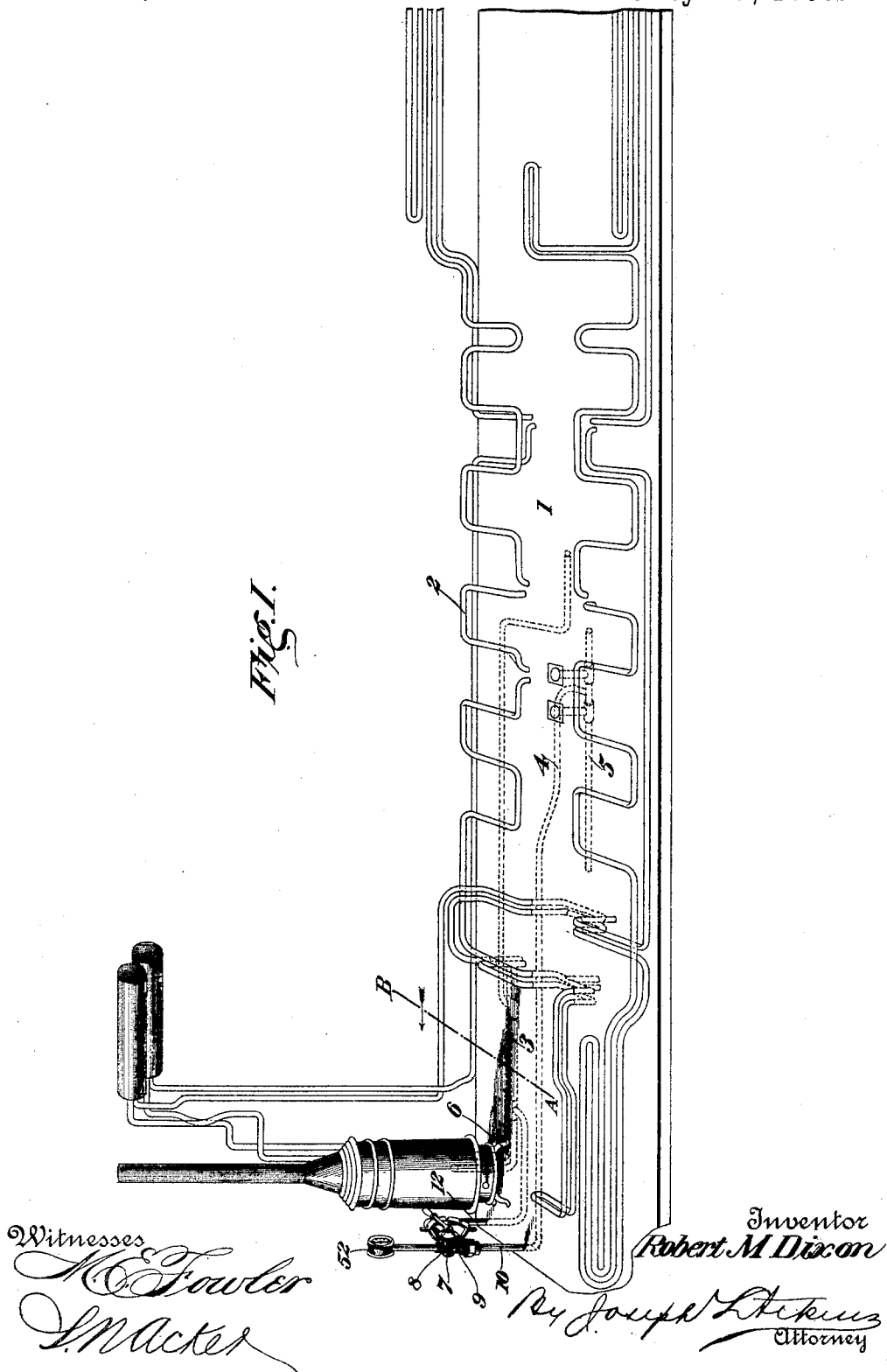
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3 Sheets—Sheet 1.

R. M. DIXON.
STEAM HEATING APPARATUS.

No. 586,761.

Patented July 20, 1897.



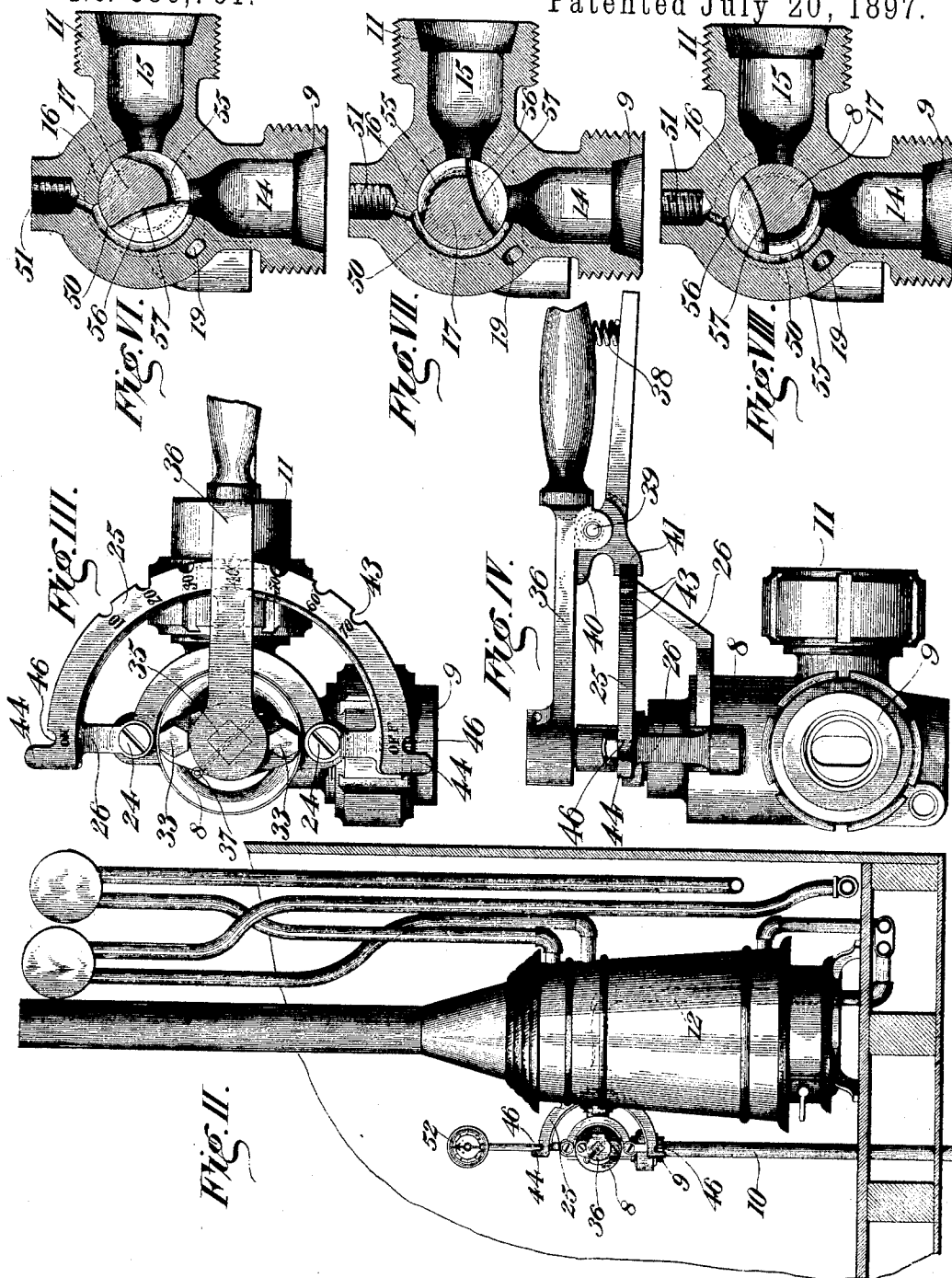
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Witnesses

*M. E. Fowler
Snakes*

Inventor

Robert M. Dixon

By James L. Atkins Attorney

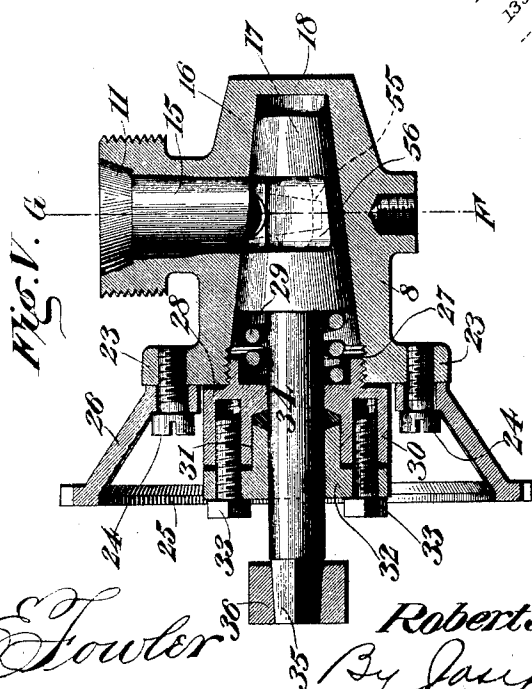
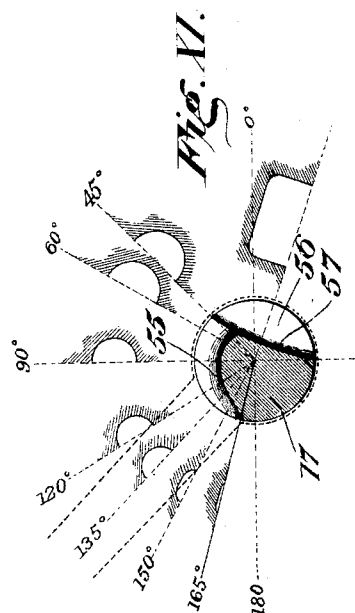
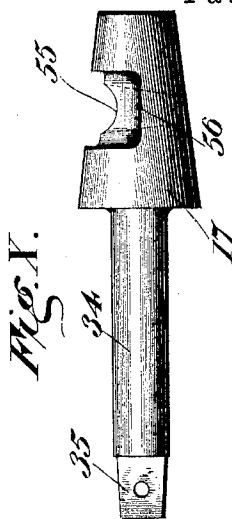
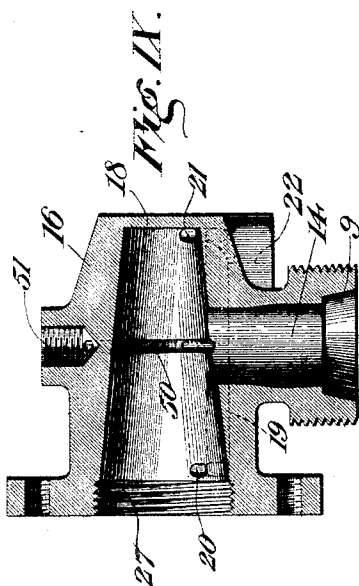
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UNITED STATES PATENT OFFICE.

ROBERT MUNN DIXON, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE
SAFETY CAR HEATING AND LIGHTING COMPANY, OF NEW YORK, N. Y.

STEAM HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 586,761, dated July 20, 1897.

Application filed June 1, 1896. Serial No. 593,921. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MUNN DIXON, of East Orange, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Steam Heating Apparatus, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to provide in steam heating apparatus, especially in apparatus for heating railway-cars in which the steam-pressure, particularly in the train-pipe, is subject to considerable variation under different conditions which affect it in practice, means for preserving within the circulatory system of each car a constant steam-pressure.

The means which I employ for preserving a constant pressure within the steam-pipes of a circulatory system consist of valve mechanism provided with indicating mechanism for setting it, the required position of the valve mechanism being determinable by the steam-pressure within the main steam-supply pipe, such pressure being indicated to the operator by a gage communicating with the steam-supply pipe.

Although it is not my purpose to limit myself in any wise to particular details, I have invented and hereinafter describe and claim as subordinate to the present embodiment of my invention a preferred form of valve construction designed to accomplish the object of my invention.

In order to explain the relation of my invention to the art of steam-heating and to more fully disclose the object sought to be accomplished by it, I will state that it is found in practice in the employment, for example, of a car-heating system in which a circulating medium—as, for example, water—is designed to be circulated within a local circulatory system of the car through steam derivable from a remote source—as, for example, a locomotive—or from a local heater on the car that if the steam-pressure be admitted suddenly to the heating jackets or cells which make operative contact with the circulatory system of the car the circulation of the water does not proceed smoothly. Moreover, if such circulatory system embody heating jackets or cells designed for a low

steam-pressure they are found to operate imperfectly or disadvantageously when relatively high pressures are used. If the heating jackets or cells are designed for high pressure, they are found to be ineffectual for lower pressures. By my invention such means for adjusting the steam-supply passage is provided as to afford smaller openings for high pressures, respectively, and larger openings for low pressures, respectively, whereby the steam-pressure within the heating jackets or cells is kept or may be maintained at that degree best suited to the operation of the system.

In the accompanying drawings, Figure I is a perspective view of a car-floor and heating system with my invention attached. Fig. II is a sectional view on the line A B of Fig. I, showing in elevation the relation of the local heater and my valve mechanism. Fig. III is a side elevation of my preferred form of valve mechanism detached. Fig. IV is a top plan view of the same. Fig. V is a vertical section of Fig. III. Fig. VI is a complete transverse section taken as upon the line G F of Fig. V, showing the valve-plug in the position which it occupies when its handle is in the horizontal position as shown in Fig. III. Fig. VII is a similar view showing the position of the valve-plug when its handle is turned to the upper vertical position. Fig. VIII is a similar view showing such valve-plug when its handle is turned to the lower vertical position. Fig. IX is a central longitudinal section of the valve-casing stripped. Fig. X is an elevation of the valve-plug detached. Fig. XI illustrates diagrammatically the details of construction of the valve-plug groove.

Referring in the first place to Figs. I and II of the drawings, 1 indicates the outlines of a car-floor; 2, the local circulatory system thereon.

3 indicates the heating jackets or cells by which the circulating medium within the heating system 2 is designed to be kept heated and in motion either through steam derived from a branch pipe 4, that communicates with the main steam-supply or train pipe 5, or by an auxiliary or emergency heater 6.

The details of construction of the car-heat-

ing system are well understood in the art and do not require explanation here.

It is the pipes 4 and 5 within which in practice the steam-pressure is found to be subject to such variations as render the application of my device a necessity. Accordingly in the steam-supply branch pipe 4 at some point of easy access—for example, at 7—I locate my device, which consists of some variety of valve mechanism which enables an operator to regulate the size of the steam-supply passage between the pipes 4 and the jackets 3 to correspond to the degree of pressure within the pipe 4, so that the pressure within the jacket 3 will remain practically stationary.

The construction of the preferred embodiment of my invention with respect to the valve mechanism above referred to is illustrated in Figs. III to XI, inclusive. Referring, therefore, to those figures, 8 indicates the shell or casing of my valve, that is provided with a branch 9, which preferably communicates directly with and may be supported by an upright portion 10 of the pipe 4. (See Fig. I.) It is provided also with a second branch 11, preferably located at right angles to the first and communicating directly with the branch 12 of the pipe 4. (See, also, Fig. I.) The branches 9 and 10 preferably communicate through reduced mouths 14 and 15, respectively, with the barrel 16 of the shell, which is preferably tapered to receive a tapered plug 17. The shell 8 preferably incloses the lower end of the barrel 16, as indicated at 18, and the valve preferably follows that form of construction in which a duct 19 communicates through orifices 20 and 21, respectively, above and below the plug, with a drain-opening 22 in the shell 8, but this feature forms no part of my present invention.

I prefer to construct the shell with a flange 23, to which is secured, as by screws 24, an indicator—as, for example, an arch 25—supported at a distance from the flange 23, as by inclined legs 26. The interior of the larger end of the barrel 16 is preferably screw-threaded, as indicated at 27, to accommodate a screw-collar 28, which confines between it and the head of the plug 17 a coiled spring 30, the resiliency of which serves to compel a close union between the plug and its barrel. The head of the collar 28 is enlarged to accommodate a stuffing-box 31, within which fits a packing-ring 32, that is confined, as by screws 33. The stem 34 of the plug 17 extends through suitable apertures in the collar 28 and the ring 32, respectively, and is provided upon its outer extremity with a square end 35, upon which fits a handle 36, that may be secured in place, as by a cotter-key 37. The position of the handle 36 is such as to enable it to move freely across the face of the arc 25, and it is provided with a spring-actuated pawl, whose movement under the impulse of its spring 38 upon its pivot 39 is limited by a stop-piece 40. The tooth 41 of the pawl is opposite to the edge of the arc 25

and is adapted to engage, when actuated by its spring 38, any one of a series of notches 43, formed in the face of the arc 25. The opposite extremities of the arc are preferably provided with ears 44, which limit the movement of the handle to the length of the arc. Adjacent to each of the ears is a notch 46, with which the tooth 41 may engage to hold the handle fixed in either of those positions, as required, one of the positions being that in which the valve is entirely closed and the other in which it is fully open, for which reason opposite to one of the notches 46, as shown in the drawings the upper one, the word "On" is exhibited upon the face of the arc. Opposite the other one the word "Off" is exhibited. Between the notches 46 the notches 43 are located in regular order and, as illustrated, are numbered "10" to "70" in consecutive order.

Referring particularly to Figs. VI to IX, inclusive, 50 indicates a passage formed, preferably, in the inner wall of the barrel 16 and extending from the mouth 14 of the branch 9 to an internally-screw-threaded orifice 51 upon the opposite or upper side of the shell 8. This orifice 51 in practice receives a pressure-gage 52. (See Figs. I and II.) By this means in use the pressure within the pipe 4, that communicates with the branch 9, is at all times indicated by the gage 52, irrespective of the position in which the plug 17 of the valve may be.

The numerals upon the arc 25 should correspond to those upon the face of the gage 52 and indicate to the operator that if the gage reads "10," for example, the handle 36 should be locked by the tooth 41 of its pawl 37 to the notch marked "10" of the arc. If the gage reads "20" the handle should be locked to the notch 20, and so on. The arc 25 and gage 52 together constitute, broadly, indicating mechanism.

When the handle is locked to the notch whose number agrees with the pressure indicated upon the gage, the pressure within the branch 11 or, in other words, the pipe 12 and jacket 3 is that at which the jackets are designed to operate. Consequently, an operator of the most ordinary intelligence is able by comparing the position of the handle 36 upon the arc 25 with the pressure indicated upon the gage to determine that the heating apparatus is in proper working order.

To accomplish the above result, I provide in the plug 17 a tapered groove 55 of constantly increasing depth, which merges into a segmental cleft 56, preferably defined by a curved bottom 57. The dimensions of the groove and its cleft must be constructed with such mathematical exactitude, the respective size of the shell and of the mouths 14 and 15 being taken into consideration, as will insure a passage of required size from the mouth 14 to the mouth 15 at certain predetermined positions of the plug 17. These positions of the plug are determinable by the number of

notches in the arc 25, and the size of the respective passages produced by setting the plug in those respective positions is such as to maintain within the branch 11 a constant pressure, notwithstanding the variation of the pressure within the branch 9 or the pipes which connect with it. In Fig. XI, I illustrate, diagrammatically, the details of such construction.

It is not my purpose to limit myself to the employment of a plug-cock or the particular kind of groove therein, inasmuch as a needle-valve, a slide-valve, or the like might be employed in place of a plug-cock, and a series of orifices might be used instead of the groove specified.

What I claim is—

1. In steam heating apparatus, the combination with a main steam-supply pipe and local circulatory system with which the former makes operative contact, a valve-shell provided with two branches inserted into the steam-supply pipe, one branch communicating with the main line of the steam-supply pipe and the other with that part which makes contact with the circulatory system, of a valve working in the shell, a variable opening in the valve adapted to increase and diminish the size of the passage between the two branch pipes, in proportion to the pressure contained within the main steam-supply pipe, an indicator for setting the valve, and a pressure-gage communicating with the main steam-supply pipe, and adapted to designate the position at which the valve is to be set, substantially as set forth.

2. In valve mechanism, the combination with a shell, a plurality of branches, and a movable valve adapted to increase or diminish the size of the opening between the branches in proportion to the pressure exerted within one of the branches, of a steam-gage communicating with that branch, and an indicator graduated to conform to the numbers on the steam-gage, whereby the valve may be set as required to accommo-

date the pressure indicated by the gage, substantially as set forth.

3. The combination with a shell, plurality of branches, and a revoluble plug in the shell, of a tapered groove in the plug designed to establish communication between the branches and to increase and diminish the size of the opening between the same throughout a variety of graduations, an indicator upon the shell graduated to conform to the groove in the plug, and means for fastening the plug opposite to any one of the series of graduations upon the indicator, as required, substantially as set forth.

4. The combination with a shell provided with a plurality of branches and a revoluble plug within the shell, of a tapered groove in the plug, and a segmental cleft into which the groove merges, both located opposite to the branches and adapted to increase and diminish the size of the opening between the branches in conformity to a graduated scale, substantially as set forth.

5. The combination with a shell, and plurality of branches, of a plug-valve located within the shell and adapted to establish and cut off communication between the branches, and a passage extending through the shell and communicating with one of the branches independently of the plug, substantially as set forth.

6. The combination with a shell and plurality of branches, of a plug-valve operatively secured within the shell, a pressure-gage aperture in the shell opposite to one of the branches, and a passage communicating between the last-named branch and the pressure-gage aperture, independently of the plug, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

ROBERT MUNN DIXON.

Witnesses:

O. C. GAYLEY,
E. W. BULKLEY.