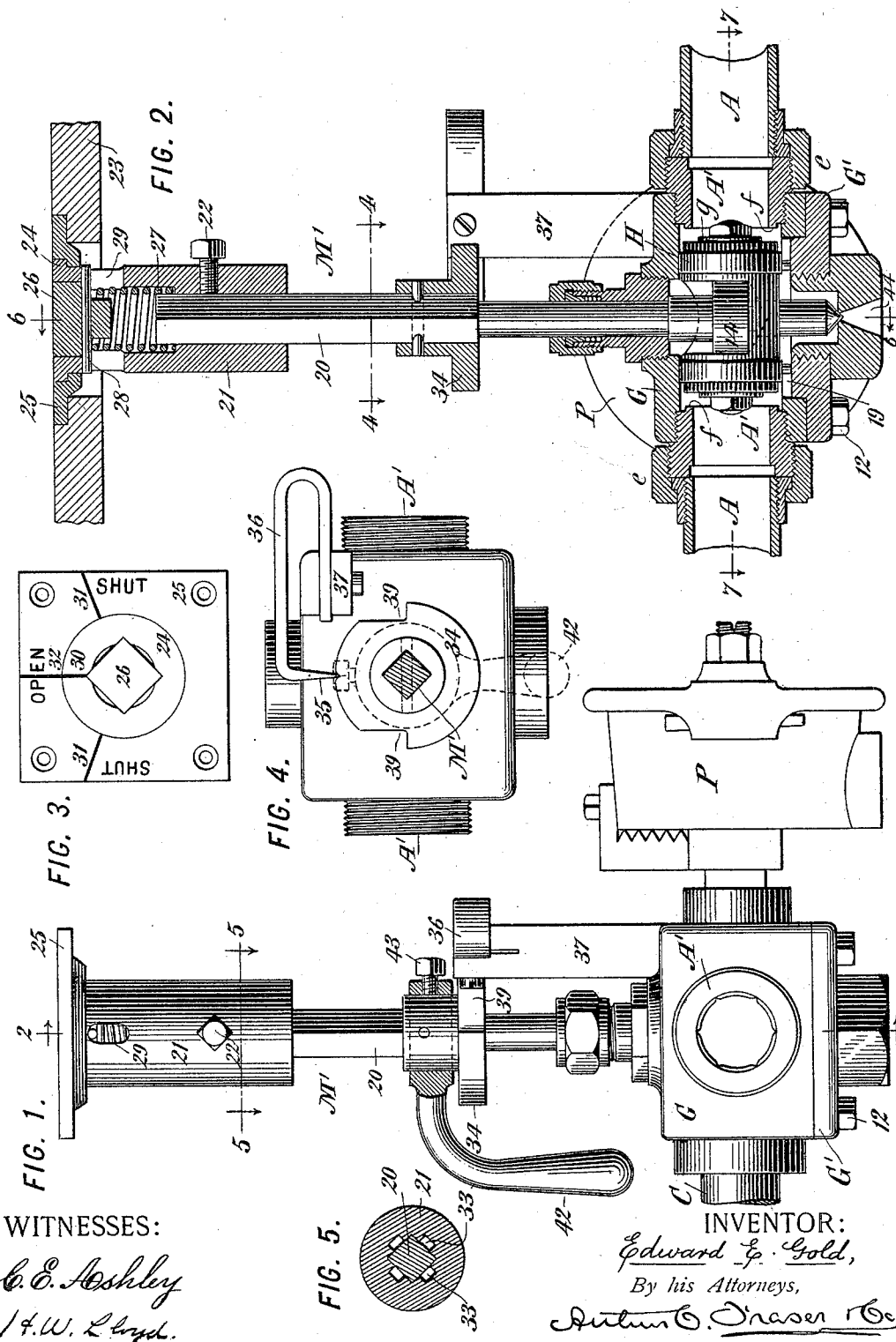


E. E. GOLD.

TRAIN PIPE VALVE FOR STEAM CAR HEATING SYSTEMS.

No. 585,383.

Patented June 29, 1897.



WITNESSES:

C. E. Ashley
W. L. Lloyd.

INVENTOR:

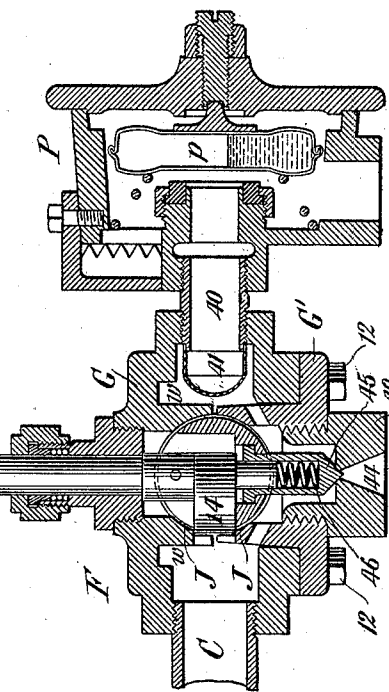
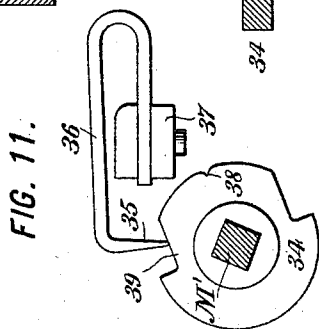
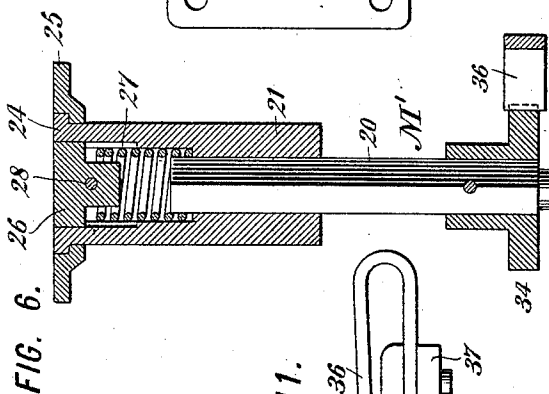
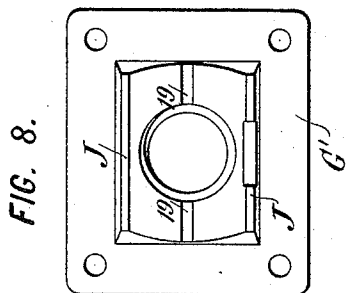
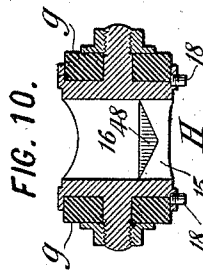
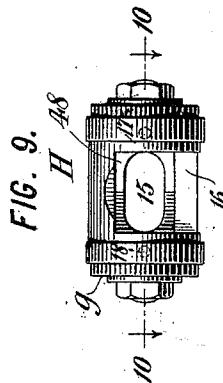
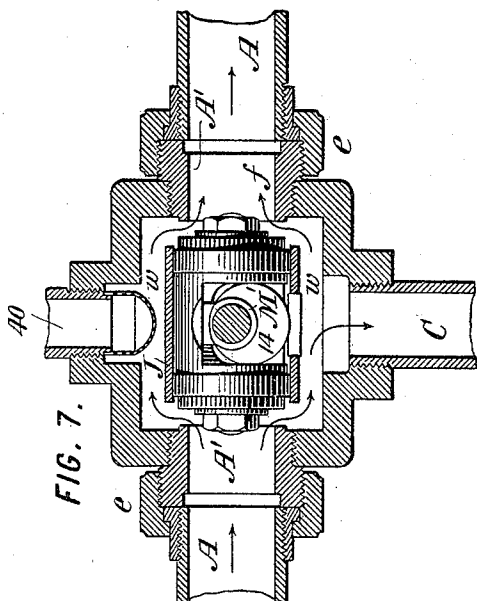
Edward E. Gold,
By his Attorneys,
Arthur C. Orason & Co.

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WITNESSES:

C. E. Ashley
H. W. Lloyd

INVENTOR:

Edward E. Gold,

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Arthur C. Fraser & Co.

(No Model.)

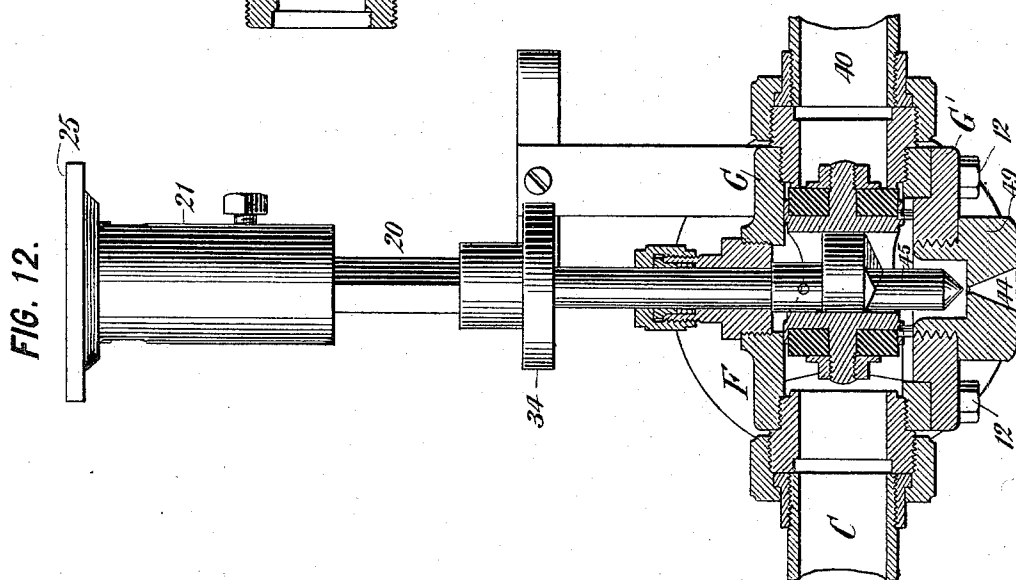
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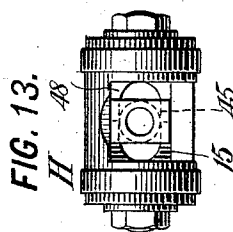
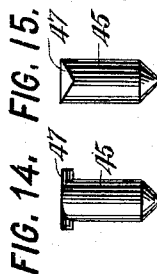
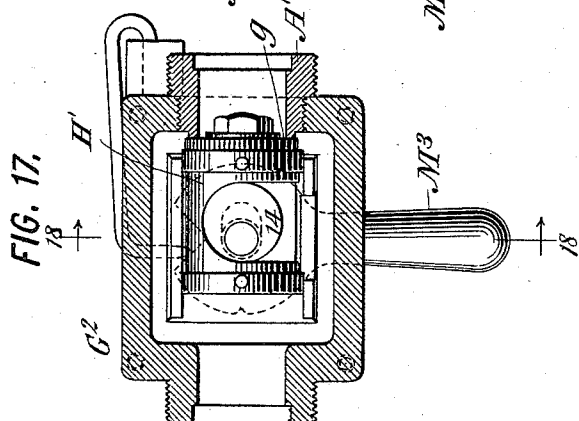
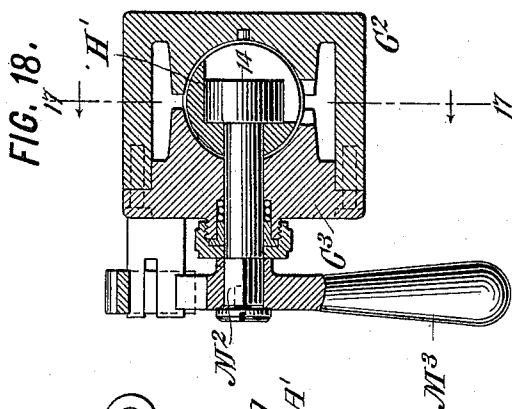


WITNESSES:

C. E. Ashley
Fred White

INVENTOR:

Edward E. Gold,
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UNITED STATES PATENT OFFICE.

EDWARD E. GOLD, OF NEW YORK, N. Y.

TRAIN-PIPE VALVE FOR STEAM CAR-HEATING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 585,383, dated June 29, 1897.

Application filed July 12, 1894. Serial No. 517,274. (No model.)

To all whom it may concern:

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

This invention relates to valves for controlling the main steam-pipes or train-pipes through which steam is distributed from the locomotive for heating the cars of a train.

My present invention introduces certain improvements over the construction of train-pipe valves for car-heating apparatus embodied in my Patent No. 498,545, dated May 30, 1893.

Figure 1 of the accompanying drawings is an elevation of my improved train-pipe valve viewed in direction longitudinally of the car. Fig. 2 is a vertical mid-section thereof cut in a plane extending longitudinally of the car, as denoted by the line 2 2 in Fig. 1. Fig. 3 is a plan of the floor-plate in the car. Fig. 4 is a plan of the valve-casing, the stem being in section on the line 4 4 in Fig. 2. Fig. 5 is a transverse section on the line 5 5 in Fig. 1. Fig. 6 is a vertical mid-section in a plane at right angles to Fig. 2 or transversely of the car. Fig. 7 is a horizontal section through the axis of the steam-pipe cut on the line 7 7 in Fig. 2. Fig. 8 is a plan of the removable bottom piece of the valve-shell. Fig. 9 is a plan of the valve proper removed. Fig. 10 is a longitudinal vertical section of the valve proper. Fig. 11 is a fragmentary plan corresponding to Fig. 4, but showing the parts in a different position. Fig. 12 is an axial vertical section of the valve shown in one of its closed positions. Fig. 13 is a plan view of the main valve and the jet-valve removed. Fig. 14 is a side elevation of the jet-valve alone. Fig. 15 is a side elevation thereof looking at right angles to Fig. 14. Fig. 16 is a bottom plan view thereof. Fig. 17 is a vertical axial section of a modification in which the valve closes against one seat only, the view being cut on the line 17 17 in Fig. 18; and Fig. 18 is a transverse section thereof cut on the line 18 18 in Fig. 17.

For a general description of the purpose and advantages of such a train-pipe valve as

that to which my present invention relates the public is referred to my previous patent, No. 498,545.

Let A A in Figs. 2 and 7 designate the main steam-pipe or train-pipe of the car, and C in Figs. 6 and 7 designate the branch steam-pipe leading from the main pipe and entering the car to supply the heating-pipes or radiators therein. The train-pipe valve as a whole is lettered F and is introduced into the train-pipe A preferably at the middle of the car or wherever the branch pipe C is taken off from the main pipe, so that the valve-casing takes the place of the pipe-fitting or T which would otherwise be introduced at this point.

The valve is constructed with a shell or casing G, formed at its opposite ends with openings for communication with the two sections or portions of the train-pipe A, thimbles A' A' being fitted into these openings, their inner ends forming valve-seats *ff*. The sections of the main pipe A are connected to these thimbles through coupling-unions *e*. This construction of thimbles and unions for connecting the pipes to the valve-shell is convenient and preferable, but is not essential. A movable valve or valve proper, H, (shown separately in Figs. 9 and 10,) is placed within the valve-casing, between the seats *ff*, and is provided with seating-faces or gaskets *g g* at its opposite ends to fit against the opposite seats, the valve being of such length that when standing in the mid-position a clear space is left between its opposite faces and the respective seats for the passage of steam from one section of the train-pipe into the valve-casing and out therefrom unobstructedly into the other section of the train-pipe, as shown by the arrows in Fig. 7. To provide for this flow of the steam, the casing G is formed with passages or ports *ww*, extending along opposite sides. The valve is movable from this mid-position to either side in order to seat itself against either of the seats *ff* in order to close off either section A A of the train-pipe at the rear of the last car on the train. The valve H is preferably made in the form of a short cylinder, the axis of which is coincident with the axes of the pipes A A or thimbles A' and which is guided in its movement by being confined between concave faces or slideways J J, formed within the casing G.

The valve shell or casing G is constructed with a separable bottom portion or piece G', (shown best in Figs. 2, 6, and 8,) which projects up through a hole in the bottom of the main casing and in which is formed part of the slideway J for guiding the movement of the valve proper, H. This enables the valve H to be removed and replaced by simply taking off the bottom piece G' and without disturbing the connections of the pipes A A, the opening in the bottom of the main portion of the valve-shell being sufficiently large to admit of the free passage of the valve proper. The bottom piece G' is formed with a suitable projecting flange which abuts against the flat under face of the main shell and is fastened thereto by four or other suitable number of screws 12 12.

For moving the valve H to either of its three positions a valve stem or spindle M' is provided which extends up through the floor of the car, so that it may be turned from within the car. (My present construction thus resembles that shown in Figs. 10 and 11 of my aforesaid patent, while introducing certain improvements thereover.) The stem M' passes out through a suitable stuffing-box in the top of the shell G and extends upward to a suitable distance. On the stem is secured an eccentric or cam-piece 14, which acts against the valve H. The latter is provided with an open slot 15 and with a deep recess 16, Fig. 9, in which the eccentric may turn and against the opposite walls or faces 17 17 of which the eccentric may act (being loosely confined between them) to throw the valve to either position and to hold it in place in either position. In the mid-position of the valve, as shown in Fig. 7, the eccentric 14 projects laterally from the axis of the stem, and by turning the stem a distance of ninety degrees or less to either side from this position the valve is thrust to either of its extreme positions and seated against either of the seats in order to close off either of the sections of train-pipe, whichever may be at the rear of the train. To prevent any oscillatory displacement of the valve H, it is provided with one or more pins or lugs 18, projecting from it, preferably at the bottom, and entering into one or more longitudinal slots 19, formed in some suitable portion of the guideway J, preferably in the detachable bottom piece G' thereof, as shown in Fig. 8.

The lower portion of the stem M' is made cylindrical to enable it to turn in the stuffing-box. The upper portion, however, is made square, as shown at 20, and this squared portion fits into a sleeve 21, into which it may project a greater or less distance, as may be required to adjust the parts to varying distances of the train-pipe beneath the level of the car-floor. The square 20 on the valve-stem is fixed to the sleeve 21 by a set-screw 22 or other equivalent means. The sleeve 21 has its upper end flush with the car-floor 23, Fig. 2, being there formed with a flange or

head 24, which is circular, and turns in a circular socket in the floor-plate 25, which is laid flush into the floor. The head 24 is formed with a square hole or socket, in which is closely fitted a movable plug 26, which is kept pressed up by a spring 27, housed within the sleeve 21, the upward movement of the plug under the spring-tension being limited by a pin 28, fixed in the plug, and the ends of which may slide in slots 29 in the sleeve. This is in itself a common arrangement in floor-plates for car-valves, the plug 26 serving to close the square socket and keep dirt from working down into it. When it is desired to turn the valve, a key having a square socket is pressed down against the plug 26, thereby pressing the latter down against the tension of its spring, so that the square key is brought into engagement with the square socket, whereupon by turning the key the sleeve 21, and consequently also the stem M', is turned the requisite degree to throw the valve.

The floor-plate is marked with the words "Shut," "Open," "Shut," as shown in Fig. 3, together with indicating-marks, with either of which may register a mark "30" on the hub 24 of the sleeve, by which the position of the valve, whether open or closed to either side, may be determined. The indicating-marks "31," adjacent to the word "Shut," instead of being arranged ninety degrees from the indicating-mark "32" at the word "Open," are placed somewhat nearer than ninety degrees to correspond with the number of degrees of oscillation of the eccentric 14 that are required to close the valve H against either of its seats *f* normally or when the valve-seats and gaskets are new, in order that as the gaskets become worn the valve may be moved farther in order to effect a tight closure by giving to the stem M' an oscillation over a greater number of degrees. Thus the wear may be compensated for until the oscillation reaches ninety degrees from the open position, after which no further compensation is possible and the valve H requires to be newly packed.

In the use of such floor-plates as I have just described it is found that notwithstanding the use of the dirt-excluding plug 26 some dirt or grit will work its way into the socket, so that eventually the plug 26 cannot be forced down sufficiently to give the key a firm hold in the socket. To avoid this difficulty, I provide the sleeve 21 with internal grooves 33, as shown in Fig. 5, through which any dirt, dust, or grit may descend along the square portion 20 of the stem and drop out beneath. This improvement practically overcomes the difficulty referred to.

It is necessary to provide some means for holding the valve-stem and valve in either of the three positions, and for this purpose I provide the construction which I will now describe. On the valve-stem M', and preferably on its squared portion, I fix a notched cam-disk 34. For engaging the notches on this

disk I provide a spring-catch 35, which is preferably constructed as part of a spring-arm 36, the opposite end of which is fixed to a post 37, projecting up from the valve-casing G, or to any other suitable support. Any other construction of spring-catch, however, capable of coöperating in the same manner with the disk 34, may be substituted. In the disk 34 are formed three notches, one of which, 38, is in the position relatively to the catch 35 and to the valve H to be engaged by the catch when the valve is in its open or mid position, as shown in Fig. 4. The other notches, 39 39, are angular, being formed with one side gently inclined and the other side abrupt. The abrupt sides are arranged ninety degrees, or approximately so, from the notch 38, in order to serve as stops for engagement against the catch 35 to prevent the turning of the spindle more than ninety degrees—that is, to the extreme movement which the spindle makes when the valve becomes worn. The inclined sides of these notches 39 are arranged to be engaged by the spring-catch 35 in the manner shown in Fig. 11, forming cam-surfaces with the catch, which acts against them after the manner of a wedge, tending to reach the deepest portion of the notches, and in so doing urging the disk 34, and consequently also the stem M', to turn toward its extreme position, so that the tension of the spring-catch is utilized to keep the valve pressed tightly against that seat *f* upon which it is closed. Any of the several constructions known to mechanics by which a part having moved beyond a certain position has a tension exerted against it to thrust it farther beyond that position may be substituted for the construction shown as its equivalent; but I prefer the construction shown as being the simplest and cheapest for the purpose.

As in my former patent, I provide the train pipe valve with a trap P for discharging any water of condensation that may accumulate in the train-pipe. The trap shown is the well-known Gold thermostatic trap having an inclosed thermo-expansion vessel *p*, which when heated expands and closes against its seat to prevent the escape of steam, but when water of condensation accumulates and cools to a sufficient degree the vessel *p* contracts and permits this water to escape, closing again as soon as sufficiently hot water or steam begins to flow out. The trap is connected to the valve-shell by a short pipe or nipple 40, which screws directly into the side opening in the shell G, Fig. 6, and for protecting the trap against clogging by pieces of scale or other impurities being blown into it a strainer 41, in the form of a perforated metal cap, is fixed on the reduced inner end of the thimble 40, being thus applied before the nipple is screwed in.

It sometimes becomes impossible to operate the train-pipe valve from inside the car through the usual key socket and stem—as, for example, in the case of postal or express

cars, which when temporarily laid off are locked. To provide means for closing the pipe in such cases, it has heretofore been customary to introduce stop-cocks near the ends of the train-pipe. I avoid this necessity by providing the train-pipe valve with an auxiliary handle accessible beneath the floor of the car. A suitable construction of this handle is that shown in Fig. 1 at 42 and also shown in dotted lines in Fig. 4. It is constructed as a bent handle having a ring which fits over the boss of the cam-disk 34 and which is fastened thereto by a set-screw 43 or other means for fastening. The handle projects down beneath the disk 34, where it can easily be reached by a trainman going under the car, its lower end extending above the level of the pipes A and C. It projects radially and in the open position of the valve proper stands as shown in dotted lines in Fig. 4, so that as it is turned to either side it indicates that the valve is closed at the corresponding end. The handle 42 is easily detachable, and for cars which are not locked when laid off it may be omitted, as shown in Fig. 2.

It is frequently desirable, in order to maintain a proper circulation of steam, that at the end of a train there shall be a jet-opening constantly open, so as to permit a jet of condensation water or steam to constantly blow out from the train-pipe. This is desirable because the greater part of the water of condensation that forms within the trap is carried by the circulation to the rear of the train, so that unless some special means is provided for disposing of it the rear car is liable to receive no steam from the train-pipe, but only water of condensation, so that it is insufficiently heated. To provide such a jet-opening, my former patent shows a small hole or bore through the valve-shell which is uncovered by the valve in its closed position. The difficulty of packing such a construction so as to keep it tight is such that I have found it desirable to devise an improved construction, which I will now describe.

Through the bottom of the valve-shell is formed a jet-opening 44, Fig. 6, which normally is closed by a small valve 45, the preferred construction of which is that shown in section in Fig. 6 and in elevation and inverted plan in Figs. 14 and 16. This valve has a slight up-and-down movement, being pressed down by a spring 46, preferably inclosed within it, as shown in Fig. 6, and it presses up against the lower end of the spindle M', as there shown. The valve 45 has a socket formed within it, into which the lower end of the spindle projects, and in which socket the spring is housed. The valve 45 projects through the slot 15 in the main valve H, Fig. 9, the head 47 of the valve, which projects to opposite sides, being received in a recess 48, Figs. 9 and 10, in the valve H. The lower side of this recess consists of a double incline, (shown best in Fig. 10,) while the under side of the head 47

is doubly inclined, as shown best in Fig. 15. When the valve H is at mid-stroke or open, the inclines on the head 47 rest at the bottom of the inclines on the recess 48, the valve 45 consequently being in its lowest position, where it is pressed down by the spring 46 upon its seat to close the outlet 44; but upon the sliding of the valve H to either side to close the rear section of the train-pipe the inclines carried by this valve act against the inclined head of the valve 45 to lift it, thus unseating it, as shown in Fig. 12, so as to permit a jet of steam or condensation-water to blow out. Upon the return of the valve H to the mid-position the valve 45 slides down the inclines and reseats itself. As it closes with the steam-pressure the tension of its spring is not relied upon to keep it closed. Preferably the jet-opening 44 is formed in a separate plug 49, as shown, so that ready access can be got to the valve 45 in case of any stoppage or choking. The details of construction of this feature may be greatly varied, it being only essential that the jet of steam shall be controlled by means of a special or supplementary valve operated in connection with the main valve in such manner as to be closed when the main valve is open and to be open when the main valve is closed in either direction, whether it be operated by inclines on the main valve or by any other construction of cam-surfaces or the like.

My invention must not necessarily be understood as being limited to the exact details of construction shown, as considerable departure therefrom is permissible within the limits of my invention, provided its essential features are not departed from. Those features which are believed to be new and essential to my invention are hereinafter defined in the claims.

Figs. 17 and 18 show a modified construction of train-pipe valve adapted for use where the valve is intended to close in only one direction—as, for example, where two valves are applied at opposite ends of the train-pipe. For such purposes my present invention is greatly superior to any ordinary stop-cock, as such cocks soon wear out by reason of the twisting or rotating of the valve disk or packing against the seat. The valve H (here lettered H') is of the same construction as already described except that it has a packing-gasket *g* at only one end, which seats against a seat formed on a thimble A' at only one end of the valve-shell. The valve-shell is lettered G², and instead of having a removable bottom G', as in the construction previously described, it has a removable side G³. Instead of the spindle lettered M² being passed out upwardly through the valve-shell it is passed out laterally through the removable section G³ thereof, a suitable stuffing-box being provided, as shown, and a handle M³, fixed on the spindle. Substantially the same means for fastening the valve in either position, as already described, is applied. The valve H'

is guided in the shell in the same manner as previously described and operated on by the eccentric 14 in the same way. The jet-valve 45 is omitted in this construction.

I claim as my invention the following-defined novel features, substantially as herein-before set forth, namely:

1. In a train-pipe valve the combination of the valve-shell G having a seat *f*, a valve proper H movable therein against or from said seat, the valve-shell formed with an opening laterally of the valve through which access may be had to the valve, said opening being located opposite the valve so that the latter may without displacing it be removed sidewise through the opening, and a removable plate closing said opening, and longitudinal ways or guiding-faces for said valve formed partly in the valve-shell and partly in said plate.

2. In a train-pipe valve, the combination with a valve-shell having a seat, and a valve proper therein movable from an open position to close against said seat, an oscillatory valve-stem entering said shell and engaging said valve proper for operating it, and means for holding said valve in either open or closed position consisting of a spring device engaging said stem and adapted when the stem is oscillated from the open position toward the closed position of the valve to exert a pressure against it tending to throw it beyond its closed position, and thereby to press the valve firmly against its seat, whereby it compensates for wear.

3. In a train-pipe valve, the combination with a valve-shell having a seat, and a valve proper therein movable against or from said seat, an oscillatory valve-stem entering said shell and engaging said valve proper for operating it, and means for holding said valve proper in either position consisting of a disk fixed on said stem and a spring-catch pressing toward said disk, the disk constructed with a notch coinciding with said catch when the valve is in the open position, and with an inclined side coinciding with said catch when the valve is closed, and inclined in such direction relatively to the catch that the pressure of the latter against the incline tends to turn the stem beyond the closed position of the valve, whereby it holds the valve firmly seated and serves to take up wear.

4. In a train-pipe valve, the combination with a valve-shell having opposite seats, and a valve proper therein, movable from a mid-position to close against either seat, an oscillatory valve-stem entering said shell and engaging said valve proper for operating it, and means for holding said valve in either position consisting of a disk 34 fixed on said stem having a middle notch 38 and two opposite notches 39, the latter formed each with an inclined side, and a spring-catch 35 pressing toward said disk to engage whichever notch is presented to it, whereby said catch by engaging the inclined sides of said notches 39 tends

to turn the stem toward its extreme position and thereby to hold the valve firmly seated in either closed position thereof, and to take up wear.

5 5. In a train-pipe valve, the combination with a valve-shell having opposite seats, and a valve proper therein, movable from a mid-position to close against either seat, an oscillatory valve-stem entering said shell and engaging said valve proper for operating it, and
10 means for holding said valve in either position consisting of a disk 34 fixed on said stem having a middle notch 38 and two opposite notches 39, the latter formed each with an abrupt side and an inclined side, and a spring-catch 35 pressing toward said disk to engage
15 whichever notch is presented to it, whereby said catch by engaging the inclined sides of said notches 39 tends to turn the stem toward its extreme position and thereby to hold the
20 valve firmly seated in either closed position thereof, and by striking the abrupt side of either notch 39 it serves as a stop to limit the movement of the stem.

25 6. The combination with a train-pipe valve having an oscillatory stem adapted to be operated from above the floor of the car by means of a sleeve 21 fixed to said stem and turning in a floor-plate 25, of grooves or channels 33, 33 in said sleeve and around said stem
30 for permitting dirt to descend from the socket in said sleeve to avoid choking said socket.

7. A train-pipe valve consisting of a valve-shell having a jet-orifice leading from the induction side or pressure-chamber to the exterior, and a main valve movable therein
35 from an open position against a seat to close the train-pipe, combined with a separate jet-valve for closing said jet-orifice, constructed
40 and connected to occupy a closed position when said main valve is open, and an open position when said main valve is closed, so that in the latter position it permits a constant minute flow through said jet-orifice.

45 8. A train-pipe valve consisting of a valve-shell and a main valve movable longitudinally therein from an open position against a seat to close the train-pipe, combined with a jet-valve for closing a jet-orifice in the lower
50 part of said shell, movable transversely to

said main valve, and connected directly thereto to be operated by the movement of the main valve, and constructed to occupy a closed position when said main valve is open, and an open position when said main valve
55 is closed.

9. A train-pipe valve consisting of a valve-shell and a main valve movable therein from an open position against a seat to close the train-pipe, combined with a jet-valve for closing a jet-orifice in said shell, having a spring for closing it over said orifice, and connected
60 to said main valve to be unseated thereby when the main valve is moved to the closed position.

10. A train-pipe valve consisting of a valve-shell and a main valve movable therein from an open position to a position against a seat to close the train-pipe, combined with a jet-valve for closing a jet-orifice in said shell,
70 movable transversely to said main valve, and coacting inclines on the main and jet valves respectively, arranged to unseat the jet-valve by the movement of the main valve to the closed position.

11. A train-pipe valve consisting of a valve-shell having opposite seats, and a main valve movable therein from a mid-position against either seat, combined with a jet-valve for closing a jet-orifice in said shell, movable
80 transversely to said main valve, and opposite inclines on the main valve coacting with a projection on the jet-valve to unseat the latter by the movement of the main valve from its open position to either side.

12. The combination with the valve-shell G having a valve-seat and a jet-orifice, of a main valve H movable against said seat, formed with a slot 15 and inclined recess 48, and a jet-valve 45 having a spring pressing
90 it to its seat to close said jet-orifice, and arranged in said slot 15 and having a head 47, engaged by the inclines of recess 48.

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

EDWARD E. GOLD.

Witnesses:

GEORGE H. FRASER,
FRED WHITE.