

(No Model.)

3 Sheets—Sheet 1.

W. A. THACHER.
ENGINEER'S VALVE.

No. 521,425.

Patented June 12, 1894.

Fig. 1.

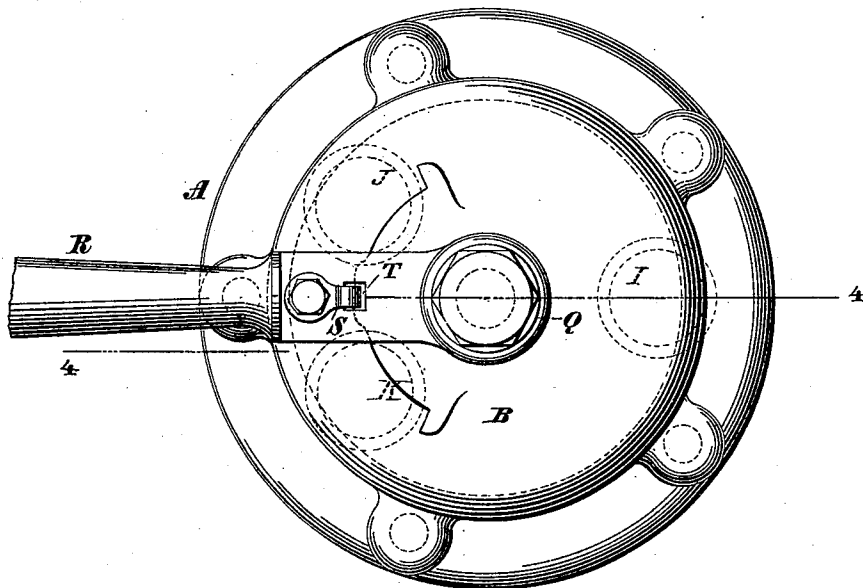
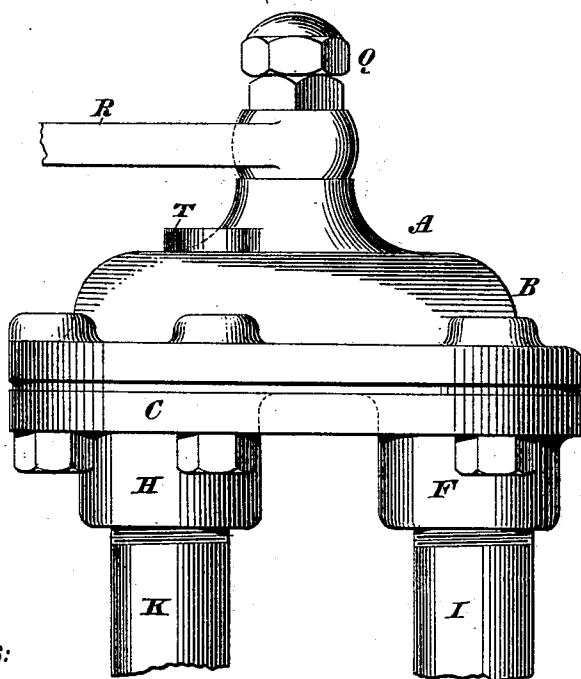


Fig. 2.



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Fig. 3.

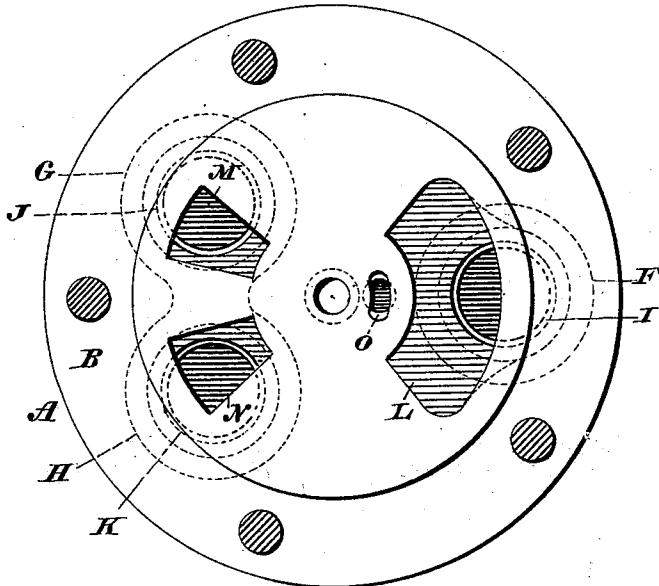
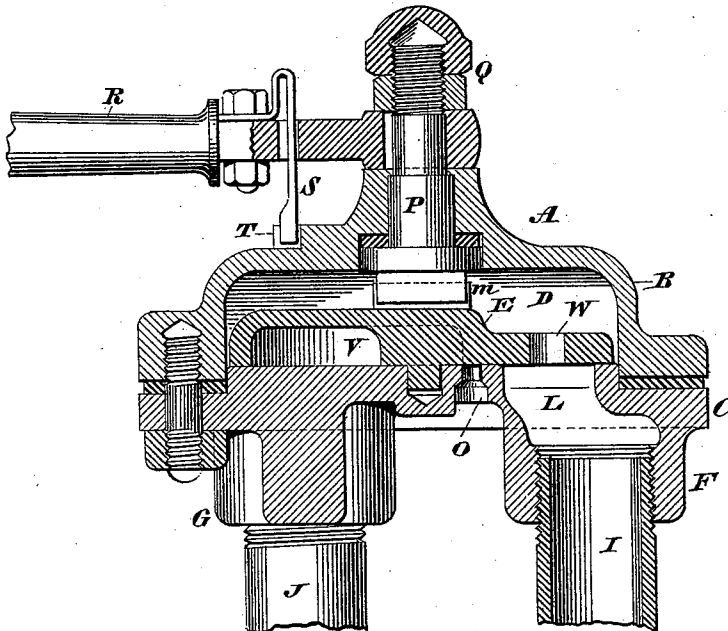


Fig. 4.



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Fig. 5.

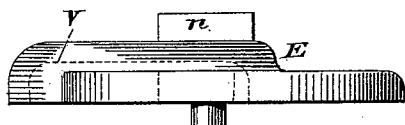


Fig. 6.

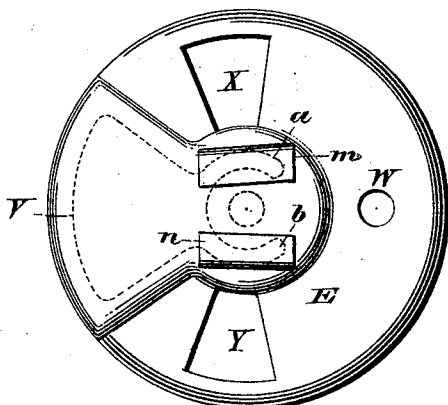


Fig. 7.

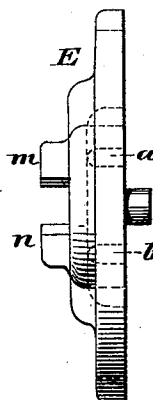


Fig. 9.

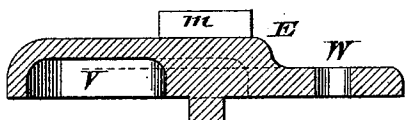


Fig. 10.

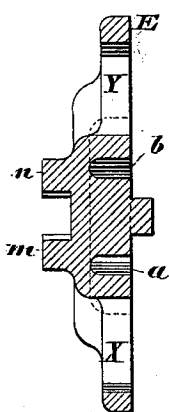
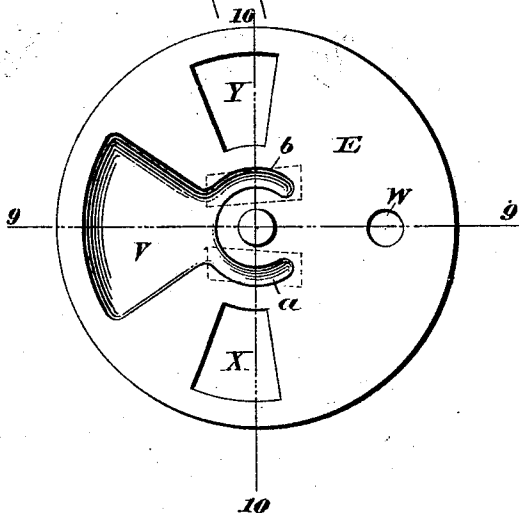


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. THACHER, OF NEW YORK, N. Y., ASSIGNOR TO THE THACHER
CAR AND CONSTRUCTION COMPANY, OF SAME PLACE.

ENGINEER'S VALVE.

SPECIFICATION forming part of Letters Patent No. 521,425, dated June 12, 1894.

Application filed February 6, 1893. Serial No. 461,144. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. THACHER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Engineers' Valves, of which the following is a specification.

The invention relates to improvements in engineers' valves for use more particularly on the locomotive of a train of dumping cars in which the car sections are tilted to dump their load by means of compressed air.

In Letters Patent of the United States numbered 489,242 and 489,243 granted to William A. Thacher January 3, 1893, are shown and described certain dumping cars in which the car sections are pivotally mounted and provided with compressed air cylinders having inlets at each end connected with main pipe lines leading from a reservoir of compressed air located on the locomotive and in the said Letters Patent it is described that the piston rods of the cylinders are connected with the pivoted car sections in such manner that when the air is admitted to one end of the cylinders the said rods will tilt the sections to dump their load, and when admitted to the other end of said cylinders the car sections will be returned to position.

The invention made the subject hereof pertains to the valve intermediate the reservoir of compressed air and the main pipe lines leading to the air cylinders of the train, and this valve is under the control of the engineer who by turning the same may direct the air into either pipe line at will. The said valve is illustrated in the accompanying drawings, in which—

Figure 1 is a top view of a valve constructed in accordance with and embodying the invention. Fig. 2 is a side elevation of same. Fig. 3 is a top view of the lower section of the valve casing, the bolts being in section. Fig. 4 is a vertical section of the valve on the dotted line 4—4 of Fig. 1. Fig. 5 is an edge view of the valve proper withdrawn from its casing. Fig. 6 is a top view of same. Fig. 7 is a further edge view of same. Fig. 8 is a bottom view of same. Fig. 9 is a vertical sec-

tion of same on the dotted line 9—9 of Fig. 8; and Fig. 10 is a vertical section of same on the dotted line 10—10 of Fig. 8.

In the drawings A designates the valve casing which is composed of the upper and lower sections B, C, bolted together and forming between them the air-tight chamber D, in which is pivotally mounted the valve proper E. The upper surface of the lower section C of the casing A forms the seat for the valve E, and at the lower side of the section C are the nozzles F, G, H, receiving the ends of the pipes I, J, K, the pipe I leading from a reservoir, not shown, of compressed air and the pipes J, K, respectively leading to the main pipe-lines extending to the air cylinders of the train. The lower section C is provided at one side with an elongated or segmental inlet port L in direct communication with the inlet or supply pipe I, and at its opposite side the said section C has formed in it the ports M, N, leading respectively to the pipes J, K, as shown more clearly in Fig. 3. The lower section C is also provided with an exhaust port O, illustrated in Figs. 3 and 4.

The valve E is in the form of a disk and is adapted to be rotated axially on its seat by means of a key P, held in the upper section B of the casing by a nut Q and connected with the handle R, the movement of the latter in the hand of the engineer serving to rotate the key P and with it the disk or valve E. The handle R is provided with an engaging spring S whose lower end when the handle is in its central or normal position enters a recess T on the upper surface of the section B. The walls of the recess T are so formed that the engineer when moving the handle R may cause the spring to pass from the recess, thus the handle may be moved by the engineer to either the right or left from its central position shown in Figs. 1 and 4, but when moved to its central position the handle will be there retained by the spring S until under the direct action of the engineer the force of the spring is overcome. The valve E on its lower surface at one side is formed with the recess V of a size adapted to cover or connect the ports M, N, and having the segmental extensions a, b, which during the move-

ment of the valve come into communication with the exhaust port O, as hereinafter explained. At the side of the valve E opposite to the recess V is an aperture W, and between
 5 said recess and aperture at opposite sides of the center of the valve are the ports X, Y. When the valve E is in the position shown in Figs. 4 and 6, its aperture W will be centrally
 10 over and in communication with the recess L formed in the lower section C of the valve casing, and at such time the recess V of the valve will cover or connect the ports M, N, the latter communicating with each other
 15 through the recess. While the recess V is over the ports M, N, the ports X, Y, of the valve will be closed by resting over the solid upper surface of the lower section C of the valve casing. The position of the valve E
 20 above described is the one in which it will be placed when the valve is not in use or when it is desired after the compressed air apparatus has been used, to connect the pipes J, K, for the purpose of equalizing the air pressure therein. The aperture W never entirely
 25 leaves its communication with the recess L and pipe I, and hence at all times there will be an air pressure in the chamber D which will press upon the valve E and maintain it firmly upon its seat. The object of the aperture W is to permit at all times the entrance
 30 of the air to the upper side of the valve E in order that the air pressure may be obtained thereon for the purpose of preserving it firmly against its seat and insuring a reliable operation. The normal position of the valve E is, as above described, that illustrated in Figs.
 35 4 and 6, and in explaining the further operation of the valve it may be assumed that the train of dumping cars have reached the point at which their body sections are to be tilted
 40 by means of the compressed air mechanism, and at such time the engineer will move the handle R to the right, thus causing the port X of the valve to pass over and in line with
 45 the port M of the lower section C and the port Y to pass over and into communication with the recess L communicating with the supply pipe I. At this time the port N will be closed, the extension b of the recess V will pass
 50 into communication with the exhaust port O and the compressed air will pass upward from the pipe I and port L through the port Y and downward through the port X and port M into
 55 the pipe J leading to the lower end of the compressed air cylinders throughout the train, the result being that the air entering the cylinders will force the pistons therein and their rods upward to tilt the car sections whereby the latter may be enabled to dump their contents.
 60 After the car sections have been tilted to dump their contents, the handle R will be moved back to its central or normal position, thus closing the ports X, Y, and connecting the ports M, N, through the recess V, the purpose
 65 of thus connecting the ports M, N, at this

time being to permit the air filling the pipe J to exhaust or escape into the port N and pipe K, thereby equalizing the pressure in the pipes J, K, and filling or partly filling the pipe K with the air which was used for dumping
 70 the car sections and which unless turned into the pipe K would be wasted. The handle R is only permitted to remain in its normal or central position at this point in the operation a few moments when it will be pushed to the
 75 left preparatory to directing the air from the reservoir through the pipe K for the purpose of restoring the tilted car sections to their former horizontal position. When the handle R is pushed to the left the port X of the valve
 80 will appear over the recess L, the port Y will pass directly over the port N, and the port M will be closed, and thus air entering through the pipe I and port L will pass upward through the port X and downward through
 85 the ports Y, N, into the pipe K whence it will be conducted through the main pipe line connected with the upper ends of the air cylinders connected with the car bodies composing the train, the result being that the pressure
 90 of the air upon the upper side of the pistons in said air cylinders will operate to return the car sections to their former horizontal position while admitting the air to the upper ends of the dumping cylinders for the purpose of
 95 returning the car bodies to their horizontal position, the air at the lower side of the pistons in said cylinders will be exhausted through the aperture O as hereinafter described. The relation of the port L and aperture W is such that the aperture never
 100 passes entirely from the port L, and hence there will always be an opening from the pipe I through said aperture to the upper side of the valve E. When the handle R is in its
 105 middle or normal position shown in Figs. 1 and 4, the exhaust O is closed. But when the valve E is moved to the right in order to bring the port L and port M into communication, through the ports Y and X the
 110 extension b of the recess V will pass into communication with the port O, and thus there will be a means of exhausting the air from the pipe K through the port M, recess V and extension b; and when the handle
 115 R is turned to the left to throw the port L and port N into communication through the ports X and Y, the extension a of the recess V will pass into communication with the exhaust port O and thus whatever air may have
 120 remained in the pipe J and its connections may exhaust through the recess V, extension a and aperture O. Thus with each full stroke of the handle R the exhaust O is brought into
 125 communication with the recess V and hence the pipe line which is at the time in connection with the said recess may exhaust through the same and the aperture O. It is desirable when the air is turned into the pipe J to elevate the pistons and dump the car sections, 130

that the air above said pistons and in the pipe line communicating with the upper ends of the air cylinders, shall be permitted to exhaust; and it is likewise desirable when air is admitted to the upper ends of the cylinders that the air below the pistons and in the pipe line connected with the lower ends of the cylinders may exhaust, so as not to interfere with the free action of the pistons, and it is for this reason that with each full stroke of the handle R the recess V places the pipe line then not in use into communication with the exhaust O. In order to obtain the greatest economy in the use of the compressed air the handle R before being moved to the extreme of its stroke is allowed to remain a moment at its middle position so that the air in the line connected with the pipe J may exhaust into the line connected with the pipe K or vice versa, thereby as above described equalizing the pressure in the two pipes and utilizing a part of the air employed to dump the car sections for the purpose of aiding in the return of said sections to their horizontal position. The air which exhausts into the pipe K from the pipe J will not alone probably be sufficient to operate the car sections, but with some additional pressure from the pipe I the air in the pipe K will be enabled to move the said sections.

In the use of the valve the handle R is first pulled to the right to direct the air downward through the pipe J to the lower ends of the air cylinders, and after the car sections have been tilted the handle is moved to its middle position in order to place the pipes J, K, into communication with each other and to permit the air in the pipe J to enter the pipe K, after which the handle R is moved to the left for the purpose of directing the air from the reservoir downward through the pipe K and to connect the exhaust O with the pipe J. After the car sections have been returned to their horizontal position by the air entering the upper ends of the dumping cylinders, the handle R is returned to its middle or normal position, at which time the valve will be at rest and the train may move onward.

It will be observed on reference to Figs. 6 and 7 that the upper surface of the valve E is provided with lugs *m, n*, which form between them a tapered space adapted to receive the tapered lower end of the key P; the object of forming the tapered space between the lugs *m, n*, is to insure the proper placing of the valve E upon the lower section C. If by any mistake the workman should in connecting the parts of the valve, place the valve E in an opposite position to that shown in Fig. 6, so that the recess V would not be over the ports M, N, the mistake would be discovered by the fact that the lower end of the key P would not at such time enter the said tapered

space. It is necessary at all times in the first placing of the valve that the aperture W be over the port L and the recess V over the ports M, N, and hence the space between the lugs *m, n*, has been tapered to correspond with the taper on the lower end of the key P as a safe-guard against the valve being wrongly placed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The valve casing having the inlet for compressed air and two outlets therefor, and the two train pipes connected with said outlets, combined with the rotary disk valve E seated within the interior chamber of said casing over the inlet and delivery ports and having in its lower face the recess V and being provided with means of communication from said inlet to either one of said outlets, the said recess V being sufficient in extent to connect the said outlets together when the communication of the latter with the supply inlet is cut-off by said valve and permit the air in one of said train pipes to exhaust into the other thereof, substantially as set forth.

2. The valve casing having in one section the elongated inlet port L and the delivery ports M, N, combined with the valve E resting on said section over said ports and having the ports X, Y, and recess V, the latter being sufficient in extent to connect the ports M, N, and the port L being sufficient in extent to communicate with the port Y while the port X registers with the port M, and to communicate with the port X while the port Y registers with the port N; substantially as and for the purposes set forth.

3. The valve casing, having in one section the elongated inlet port L, the delivery ports M, N, and exhaust port O, combined with the valve E resting on said section over said ports and having the ports X, Y and recess V, the latter having the extensions *a, b*, adapted when the valve is turned to its extreme position to the right or left to communicate with the exhaust port O, the said port L being sufficient in extent to communicate with the port Y while the port X registers with the port M, and communicate with the port X while the port Y registers with the port N, and the recess V being sufficient in extent to connect the ports M, N, to permit the air from the port N to exhaust into the aperture O while communication is established between the ports L, Y, X, M, and to permit the air from the port M to exhaust into the aperture O while communication is established between the ports L, X, Y, N; substantially as set forth.

4. The valve casing having in one section the elongated inlet port L, and the delivery ports M, N, combined with the valve E seated on said section over said ports and having the ports X, Y, recess V and aperture W, the said recess being sufficient in extent to connect

the ports M, N, and the inlet port L being
sufficient in extent to at all times remain in
communication with the aperture W and to
communicate with the port Y while the port
5 X registers with the port M, and communi-
cate with the port X while the port Y regis-
ters with the port N; substantially as and for
the purposes set forth.

Signed at New York, in the county of New
York and State of New York, this 3d day of 10
February, A. D. 1893.

WILLIAM A. THACHER.

Witnesses:

CHAS. C. GILL,
ED. D. MILLER.