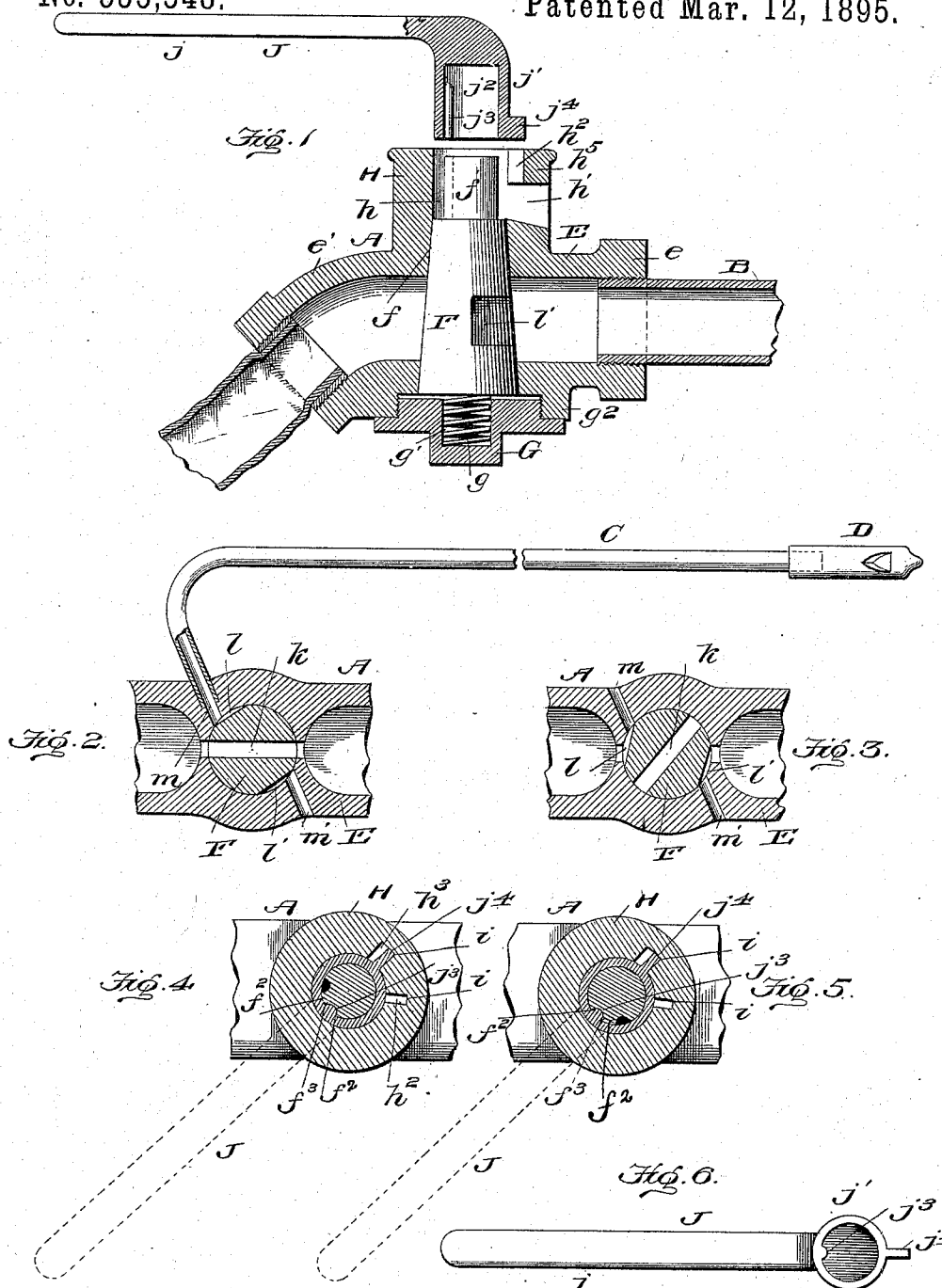


(No Model.)

A. J. MICHEL.
AIR BRAKE VALVE.

No. 535,548.

Patented Mar. 12, 1895.



Witnesses:

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UNITED STATES PATENT OFFICE.

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AIR-BRAKE VALVE.

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To all whom it may concern:

Be it known that I, ALBERT J. MICHEL, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Air-Brake Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in service pipe valves for air brakes of railway cars.

It is well known to those skilled in the art to which this invention relates that the ordinary angle or service cocks commonly used in the air-pressure brake-pipe between the cars and locomotive of a railway train are constructed with permanent handles to enable any one of the trainmen to operate the valve or cock when coupling or uncoupling the cars, and hence it is possible for evil disposed persons to take advantage of an opportunity to turn any one of the service cocks throughout a train to a position where it will cut out one or the entire train of cars from communication with the service pipe of the brake system, with the result that if the service valve of the car next to the engine is turned to cut off the entire train of cars the engineer in the locomotive is not able to operate the brake mechanisms with which the cars are equipped but must rely under such circumstances upon the locomotive brakes to bring the train to a standstill.

The object that I have in view in the present invention is to provide an improved service valve or cock which can be opened only by a properly constructed key or wrench to be supplied to the trainmen engaged in making up the train of cars, and which valve when turned to a position to exhaust the air from the service pipe will set the brakes and supply the air to a pipe leading to the locomotive cab and coupled with a signal mechanism, so that the engineer will be advised and warned of any attempt to turn the service valve on any car of the series forming the train. To insure the proper application of the brake shoes to the wheels when the service valve is operated, and as a further precaution against the quick operation of the

valve in the event of surreptitious tampering with the same by unauthorized persons, I construct the valves so that it cannot be turned by a wrench, pincers or any tool other than the proper key and so that it will require at least two applications of the key of the valve to turn it to the full shut off position, the movement of the key and valve plug on the first application being limited so that the valve will set brakes and admit exhaust air to the signal pipe and the second application of the key serving to turn the valve plug to the position where the escape of air from the service or pressure pipe is fully shut off, thus leaving the brakes on the cars back of the service valve which has been cut out of communication with the train service pipe and applied to the car wheels while the brakes in advance of the cut out service valve will still be under the control of the engineer.

With these ends in view, my invention consists in the construction and combination of parts which will be hereinafter fully described and claimed.

To enable others to understand my invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a sectional elevation of my improved valve for the service pipe of a railway-car air brake. Fig. 2 is a horizontal sectional view through the valve, showing the plug adjusted to permit the air to pass through the service pipe and valve. Fig. 3 is a similar sectional view, but illustrating the valve in its first adjusted position to exhaust the air and to admit it to the signal pipe. Figs. 4 and 5 are detail views partly in horizontal section and partly in plan, of the valve and handle illustrating the valve in its position of first and second adjustments, respectively, and Fig. 6 is a detail view of the key or wrench adapted for service in connection with my improved service valve.

Like letters of reference denote corresponding parts in all the figures of the drawings.

A denotes the angle or service cock of my invention.

B is the service or air pressure pipe of the ordinary air brake apparatus.

C indicates the signal pipe, and D the audible signal-whistle.

The air pressure or service pipe B is simi-

lar to the ordinary pipe of air brakes, and the angle cock A is similar in some respects, as regards its general contour and appearance, to the angle cock now in use on some air brake systems. The shell E of the angle cock has a nipple *e* at one end to connect with the service pipe on a car or locomotive and at its other end it has an elbow *e'* to connect to the brake hose or service pipe on an adjacent car. Between the nipple *e* and elbow *e'*, the valve shell is provided with a tapering seat *f* to receive the conical plug F of the valve, and this plug is normally pressed tightly against the seat *f* by a spring, *g*, the latter being seated in a socket, *g'* of the plug G which is screwed into the lower threaded flange *g*² of the valve shell.

At its upper end, the valve shell and plug are peculiarly constructed to receive the key or wrench, J. The shell is cast with an integral boss, H, which rises vertically a suitable distance above the shell E, and this boss is made hollow to form a chamber *h*, said boss being recessed on one side of the chamber *h*, as at *h'*, to form an offset of the chamber in the boss. This offset, recessed portion *h'*, in the boss extends about a quarter way around the boss and valve shell, and it forms the abutments or chambers *i*, *i'*, which serve to limit the play or movement of the key or wrench J in the chamber *h* and the adjustment of the plug F, access to the recess or offset *h'* for the stop lug on the key or wrench being had by means of the vertical passages *h*², *h*³, formed in the boss at one side of the chamber *h* and opening into the offset or recess at the ends thereof. The boss H over the recess or offset is closed or made solid, as at *h*⁵, to prevent the key from being released from the valve plug at any position between the vertical passages *h*², *h*³, which insures the proper adjustment of the plug in the shell before the key or wrench can be disconnected from the plug.

The key or wrench consists of the handle *j*, and the angular end, *j'*, the latter being provided with a socket, *j*². Inside of this socket, is provided the plug operating teat, *j*³, and on the face of the angular end of the key is provided an outwardly projecting stop lug *j*⁴ which is adapted to operate in the offset or recess *h'* and to pass through the vertical passages *h*², *h*³, in applying the key to or removing it from the valve plug. The upper end of the valve plug is provided with a tenon *f'* which is of less diameter than the chamber *h* into which it is projected and which tenon is also of less height than the depth of the chamber, so that the tenon *f'* of the valve plug is always housed within the chamber while at the same time access can be had thereto for fitting the angular socketed end *j'* of the key or wrench upon the tenon. This tenon of the valve plug is preferably made cylindrical in form, and, as it is housed within the boss H of the valve shell, it cannot be operated by an ordinary wrench, pinchers, or similar tool in the hands of unauthorized persons; but to

enable the valve plug to be operated by the application of the proper wrench or key J, the tenon *f'* of said valve plug is provided with the spaced recesses or sockets *f*², *f*² which are separated by the intervening bridge wall *f*³. As is usual, the valve plug is provided with the transverse port *k*, through which the air under pressure can pass through the service pipe B; and in the faces of the plug F, at diametrically opposite lines therein, are formed the vertical longitudinal exhaust passages *l*, *l'*.

In the valve shell E are formed the diametrically opposite exhaust ports *m*, *m'*, and with one of these exhaust ports, *m*, communicates the signal pipe C, the latter being connected in any suitable way to each of the angle service cocks throughout the train.

This being the construction of my improved service valve, the operation is as follows:—The valve plug, F, when the brake is in service, is adjusted to bring its port *k* in line with the service pipe to permit the air to pass freely through the cock, and in this position the exhaust passages, *l*, *l'*, are out of line with the exhaust ports *m*, *m'* in the shell, so that the signal D will not be sounded nor the brakes applied. The valve cannot be operated by a wrench, pinchers, or other similar tool in the hands of unauthorized persons, but when the trainman desires to operate the valve, the wrench is adjusted so that the socketed end *j'* thereof fits over the tenon *f'*, the stop lug *j*⁴ being passed through the passage *h*² and the operating teat *j*³ being engaged with one of the recesses *f*² in the plug tenon *f'*. The wrench is now given a quarter turn to the right until the stop lug *j*⁴ abuts one of the shoulders at the end of the recess *h'*, in which recess *h'* the stop lug *j*⁴ plays during the adjustment of the plug F, such quarter turn of the plug serving to bring the port *k* out of line with the service pipe to cut off the flow of air through the cock and to bring the exhaust passages *l*, *l'* in the plug into alignment with the exhaust ports *m*, *m'*, whereby the air will be exhausted through the ports *m*, *m'* and be conducted through the signal pipe C to operate the signal whistle D and allow the air to become exhausted from the service pipe to apply the brakes whereby the engineer in the locomotive cab is notified that the service pipe has been cut out from the brake system. It usually requires a short time, about ten seconds, for the brakes to be properly applied against the wheels of the train, and in my valve this time is allowed for setting the brakes because the key J can now and must be removed, the stop lug *j*⁴ being withdrawn through the vertical passage *h*³, after which the wrench is again applied to the tenon *f'* and the plug given another quarter turn to completely shut off the angle cock. In this second application of the key to the plug, the lug *j*³ engages with the other recess *f*² in the tenon *f'* and the stop lug *j*⁴ plays through the offset *h'* until it comes be-

neath the vertical passage h^3 and is limited by the abutment at that end of the offset h' ; and this second turning of the valve plug F adjusts it so that the exhaust passages l, l' are out of communication with the exhaust ports m, m' thus completely shutting off the service valve. It will be understood that the engineer's valve in the ordinary car braking systems now in use are constructed to admit air under pressure, say of seventy pounds to the inch, to the service pipe of the brake system, and that the engineer's valve is constructed to receive air under a greater pressure, ordinarily ninety pounds to the inch, when the brakes are to be released to start the train and to recharge the reservoirs.

Now, when the service valve in the brake system is operated on the front car of the train just in rear of the locomotive, the brakes on all of the cars are cut out from the service pipe on the second, third, or any other car of the train, so that all the brakes on the rear cars will be applied to the wheels, and the signal will be given in the locomotive cab, but the brakes in the front cars, in advance of the shut off service cock, that has been operated will still be in communication with the service pipe and under the control of the engineer so that the front cars can have the brakes applied thereto, to assist in conjunction with the locomotive brake, to arrest the train and bring it to a standstill. To restore the valve to its position for use, it is necessary to twice apply the wrench or key to the valve plug and turn the key and plug in the reverse direction, but this can be easily and quickly effected by a skilled trainman.

I am aware that changes in the form and proportion of parts and in the details of construction of the mechanism herein shown and described as an embodiment of my invention can be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications and alterations as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an air brake signal, the combination with a service pipe, and an audible signal, of a service valve having its shell provided with exhaust passages and its plug formed with a recessed key-receiving tenon, a signal pipe connected to the signal mechanism and to the valve shell to communicate with one of the exhaust passages thereof, and an operating key constructed to fit the recessed plug-tenon of said valve and to be limited in its turning movements by the valve shell, whereby the operating key is required to be applied to the valve plug more than once in order to turn said plug to its full position either to open or

close the service pipe, substantially as and for the purposes described.

2. In an air brake signal, the combination with a service pipe, and an audible signal mechanism, of a service valve shell provided with exhaust passages and with chambered extension, a signal pipe coupled to said valve shell and to the signal mechanism, a valve-plug provided with a tenon which is housed in the chambered extension of the valve shell, and said tenon having a plurality of recesses, a key provided with a lug which is arranged to engage the recesses in the valve-plug-tenon one at a time, and means to limit the turning movement of said key, substantially as and for the purposes described.

3. A service pipe valve for air brake signals comprising a shell provided with a chambered boss and with the recessed offset, a plug having its projecting tenon housed in said boss and provided with duplex recesses, and a key adapted to fit the plug tenon and provided with lugs, one of which is adapted to fit either of the duplex recesses in the plug tenon and the other to fit in the recessed offset of the valve shell, substantially as and for the purposes described.

4. A service valve for air brakes comprising a shell provided with a chambered boss and a segmental recess or offset h' , a plug having its cylindrical tenon projected into and housed within the boss and provided with spaced recesses f^2, f^2 , and a detachable key having its angular end provided with a tenon-receiving-socket and with lugs j^3, j^4 , arranged to fit, respectively, in the recesses of the plug-tenon and in the recess h' of the chambered boss, substantially as and for the purposes described.

5. The combination with a service pipe, of a service valve having its shell provided with exhaust ports and its plug with exhaust passages and a central port, the signal pipe communicating with an exhaust port of the shell, an audible signal mechanism, and a key removably fitted to the valve-plug, said shell and plug of the service valve being constructed with recesses to receive lugs on the key and limit the turning movement of the plug and key to a fractional part of a revolution within the shell, whereby the first adjustment of the plug brings the exhaust passages thereof into connection with the exhaust ports and the signal pipe to notify the engineer and set the brakes and a second adjustment of the plug is required to fully shut off the valve from the service pipe, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT J. MICHEL.

Witnesses:

C. M. DE LONG,
JOHN FITZSIMMONS.