No. 827,823. PATENTED AUG. 7, 1906.

G. L. STARR.

FLUID PRESSURE BRAKE.

APPLICATION FILED FEB. 26, 1906.

Fig. 1.

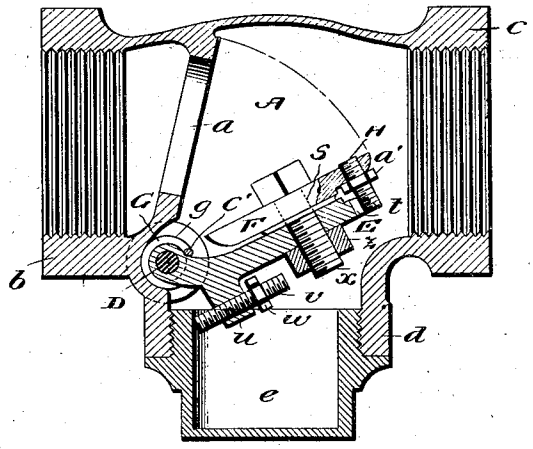


Fig. 2.

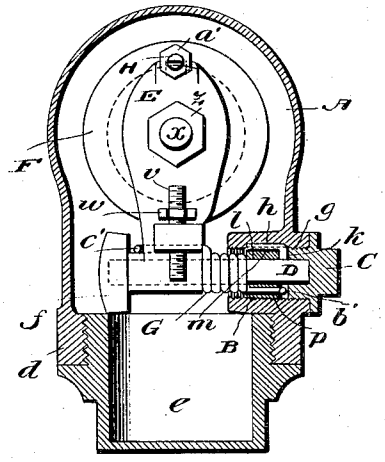


Fig. 3.

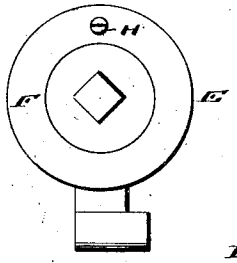
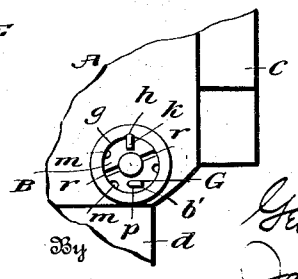


Fig. 4.



Witnesses

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FLUID-PRESSURE BRAKE.

No. 827,823. Specification of Letters Patent. Patented Aug. 7, 1906.

Application filed February 26, 1906. Serial No. 303,030.

To all whom it may concern:

Be it known that I, GEORGE L. STARR, a citizen of the United States, residing at Otego, in the county of Otsego and State of New York, have invented new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

My invention pertains to automatic fluid-pressure brakes.

It frequently happens in the operation of railway-trains equipped with brakes of the type stated that the hose-couplings of the brakes are disconnected or the hose is ruptured by cars pulling apart, whereupon the air escaping freely from the train-pipe to the atmosphere applies the brakes with great suddenness, and thereby gives rise to shock and discomfort to passengers or else causes injury to the rolling-stock and in many cases disastrous wrecks.

The object of my invention is the provision of a simple and practical automatic valve which without interfering in any measure with the free circulation of compressed air in the train-pipe necessary to proper working of the brakes may be depended on to effect a gradual discharge of air from the train-pipe in the event of disconnection of the hose-couplings or a break in the hose, and thereby cause the cars to make a slow stop and obviate the danger of subjecting the passengers to discomfort or the rolling-stock to injury.

With the foregoing in mind the invention will be fully understood from the following description and claims when the same are read in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of the automatic valve constituting the present and preferred embodiment of my invention, the valve-disk being shown in the position it occupies when the brake system of which it forms a part is in proper working order. Fig. 2 is a section taken at right angles to Fig. 1 and in rear of the valve-disk, which is shown in a raised position. Fig. 3 is a front elevation of the valve-disk removed, and Fig. 4 is a detail side elevation illustrating the screw-plug through the medium of which the tension of the valve-spring is regulated and the means for locking or holding the said plug against casual loosening when in service.

Similar letters designate corresponding parts in all of the views of the drawings, referring to which—

A is the casing of the automatic valve. The said casing may be of any construction compatible with the purpose of my invention without involving a departure from the scope thereof, though I prefer to construct it as best shown in Fig. 1—that is to say, with an interior valve-seat *a*, arms *b* and *c*, reaching in opposite directions and interiorly threaded or otherwise adapted for the connection of sections of train-pipe, and an interiorly-threaded depending arm *d*, which permits of access being readily gained to the interior of the valve and is normally closed by a plug *e*, as illustrated. The valve-seat *a* is preferably, though not necessarily, pitched at a slight angle of inclination, and at a point below the said valve-seat and in the inner side of the casing A is provided a horizontal socket *f*. This socket *f* is disposed at one side of the longitudinal center of the casing, Fig. 2, and in the opposite side of the casing is formed a transverse threaded bore *g*, which is alined with said socket *f* and is provided with a longitudinal groove *h*, designed to receive a locking-key *k*, hereinafter more fully referred to.

B is a screw-plug adjustably arranged in the transverse bore *g* of casing A and having a longitudinal central bore *l* and a plurality of longitudinal key-seating grooves *m* and also having a longitudinal passage *p* to receive one end of the spring, presently described, and recesses *r* in its outer end. The recesses *r* are for the engagement of a spanner, through the medium of which the plug B is turned to regulate the tension of the spring, and when the said plug is positioned as desired the key *k* is arranged in the groove *h* and the particular groove *m* registered therewith, when, as will be readily apparent, casual loosening of the screw-plug under the vibration incident to the operation of a train is precluded.

C is a closure-screw which is removably arranged in the outer portion of the bore *g* and is designed to protect the screw-plug B and its appurtenances against moisture and dirt.

D is a pintle extending through the bore *l* of the screw-plug B and arranged between the socket *f* and the closure-screw C, by which latter it is held against casual displacement.

E is a swinging valve-body mounted on the pintle D, so as to oscillate in the direction of the length of the casing A—*i. e.*, the direc-

tion in which the compressed air circulates in the train-pipe.

F is a disk carried by the oscillating body E and opposed to the valve-seat *a*, and G is a spring the purpose of which is to yieldingly retain the valve-body in the position shown in Fig. 1 notwithstanding the pressure of the air in the train-pipe.

The valve-body E is provided at an intermediate point of its length with a plain transverse aperture *s*, and it is also provided in its upper end with a notch or bifurcation *t* and at a point adjacent to its lower or pivoted end with a threaded lug *u*. This latter is for the engagement of a stop-screw *v*, which is adjustable with respect to the valve-body according to the position in which it is desired the valve to rest while the brake system is in proper working order and is equipped above the lug with a jam-nut *w*. Said stop-screw *v* is arranged to bring up and normally rest against the inner side of the plug *e* of the casing A, as shown in Fig. 1, and be held, under normal conditions, in such position by the spring G. The valve-disk F is arranged on the side of the body E adjacent to the seat *a* and is loosely connected to the said body, preferably through the medium of the bolt *x*, which extends loosely through the aperture *s* and is equipped with a securing-nut *z*. Being loosely connected to the body E, as stated, the disk F is obviously adapted to accommodate itself to inequalities of the seat *a* or to any particles of dust or dirt that may be caught between it and the said valve-seat, this in order to enable it when placed in operation to effect a substantial closing of the passage through the valve-casing. At its upper end the disk F is provided with an adjustable screw H, which extends slightly beyond its face and is designed to serve as a projection, the purpose of which is to hold the disk at a slight distance from the seat *a* and in that way permit the compressed air to gradually or slowly pass the closed valve. At this point it will be appreciated that the projection H will effectually hold the closed valve at a slight distance from the seat *a* and that its efficiency is not liable to be affected by the presence of foreign substance, such as dirt or moisture, in the casing. From this it follows that the said projection H on the face of the disk F constitutes an important feature of my invention. The screw which, as stated, is preferably employed to form the projection H is preferably equipped with a nut *a'* to hold it against casual loosening and has its rear portion disposed in the notch *t* of the valve-body E, this latter in order to assure the projection H being at a point remote from the center of movement of the valve. The spring G is coiled about the pintle D, as illustrated, and it is provided at its inner end with an arm *b'* and at its outer end with an arm *c'*. The inner arm *b'* is so arranged relative to the valve-body E as to normally hold the valve in the position shown in Fig. 1, while the outer arm is arranged in the longitudinal passage of the screw-plug B. From this it follows that the tension of the spring G may be readily regulated by turning the screw-plug B, and in that way the valve may be made to normally rest in the proper position irrespective of the pressure in the train-pipe. In other words, the valve may be made to rest idle during the circulation of the compressed air incident to the usual working of the brakes, which is an important desideratum, inasmuch as it precludes the valve interfering in the slightest degree with the free circulation of air. When, however, the pressure is materially reduced in front of the valve, as is the case when the hose-couplings are disconnected or the hose is ruptured, it will be seen that the pressure back of the valve will immediately throw the same against the seat *a* and the subsequent escape of the compressed air past the valve will be slow and gradual, as is desirable.

In the practical installation of my invention one of the automatic valves will be arranged in the train-pipe at one end of a car and another of the valves will be arranged in the train-pipe at the opposite end of the car, the said valves being identical in construction, but being so arranged that the disk of one will close toward the left, while the disk of the other will close toward the right. With this understanding it will be apparent that in the event of the hose-couplings at either end of the car being disconnected the pressure of compressed air in the pipe will immediately move the disk of the adjacent valve to its closed position and hold it in such position, with the result that the escape of air through the break will be slow and gradual. From this it follows that the brakes of the car will be applied in much the same manner as when a service stop is made in the ordinary operation of a train, and hence shock and jar to the passengers will be avoided, as well as injury to the rolling-stock.

In addition to the practical advantages which I have hereinbefore ascribed to my novel automatic valve it will be seen that the same is simple and compact in construction, is susceptible of being readily installed in air-brake apparatus such as at present in general use, and is well adapted to withstand the usage to which air-brake apparatus is ordinarily subjected.

I have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention with a view of imparting a definite understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative ar-

rangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my claimed invention.

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

1. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, and a valve contained in the train-pipe and arranged to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and to automatically close on the removal of pressure in the train-pipe at one side of the valve, and also arranged when closed to permit fluid-pressure to slowly or gradually pass between it and its seat in the train-pipe.

2. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe having a valve-seat therein, and a valve contained in the train-pipe and arranged to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and to automatically close on the removal of pressure in the train-pipe at one side of the valve, and a projection between the valve and the valve-seat arranged to impinge against one of the same when the valve is closed to assure the provision of a contracted passage intermediate the valve and the valve-seat.

3. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe having a valve-seat therein, and a valve contained in the train-pipe and arranged to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and to automatically close on the removal of pressure in the train-pipe at one side of the valve; said valve having a projection on its face arranged to impinge against the valve-seat when the valve is closed.

4. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, a valve arranged to swing in the train-pipe and having a stop arranged to bring up against a complementary abutment, a spring exerting pressure against the valve, whereby the valve is caused to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and yet is free to automatically close on the removal of pressure in the train-pipe at one side of the valve, and means for permitting fluid-pressure to slowly or gradually pass the valve when the same is in its closed position.

5. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, a valve contained in the train-pipe, a spring exerting pressure against the valve, whereby the valve is caused to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and yet is free to automatically close on the removal of pressure in the train-pipe at one side of the valve, means for regulating the tension of the spring to suit the valve to the amount of pressure in the train-pipe, and means for permitting fluid-pressure to slowly or gradually pass the valve when the same is in its closed position.

6. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, a valve arranged to swing in the train-pipe and having an adjustable stop arranged to bring up against the complementary abutment, a spring exerting pressure against the valve whereby the valve is caused to rest in an open position during the maintenance of pressure in the train-pipe at opposite sides of the valve and yet is free to automatically close on the removal of pressure in the train-pipe at one side of the valve, means for regulating the tension of the spring to suit the valve to the amount of pressure in the train-pipe, and means for permitting fluid-pressure to slowly or gradually pass the valve when the same is in its closed position.

7. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, a swinging valve contained in the train-pipe, a pintle on which the valve is mounted, a screw-plug adjustable in the train-pipe, and a spring coiled about the pintle and having one end arranged to exert pressure against the valve and its other end attached to the screw-plug.

8. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe, a swinging valve contained in the train-pipe, a pintle on which the valve is mounted, a screw-plug adjustable in the train-pipe, a spring coiled about the pintle and having one end arranged to exert pressure against the valve and its other end attached to the screw-plug, and a removable device coöperating with the train-pipe and the screw-plug for holding the latter against casual movement.

9. The combination in an automatic fluid-pressure brake apparatus, of a train-pipe comprising a casing having a socket in one side and a threaded bore alined with the socket, a screw-plug disposed in the threaded bore and having a bore of its own, a pintle extending through the latter bore and having its inner end disposed in the socket, a removable device coöperating with the casing and the plug for holding the latter against casual movement, a swinging valve mounted on the pintle, a spring coiled about the pintle and having one end arranged to press the valve and its other end attached to the screw-plug, and a closure plug or screw removably arranged in the outer end of the threaded bore in the casing.

10. The combination in an automatic fluid-pressure brake apparatus, of a casing containing a valve-seat, and a valve movable from and toward the seat and having a screw-bearing in it and extending beyond its face so as

to constitute a projection adapted to impinge against the valve-seat when the valve is closed.

11. The combination in an automatic fluid-pressure brake apparatus, of a casing containing a valve-seat, and a valve arranged to swing in the casing and comprising a body, a disk loosely mounted on the body, and a screw-bearing in the disk and projecting beyond the face thereof and having a portion arranged in engagement with the body whereby the disk is prevented from changing its position on the body.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE L. STARR.

Witnesses:
GEORGE H. GOODMAN,
THOMAS E. TURPIN.