(No Model.) 2 Sheets—Sheet 1.

E. J. COSGROVE.

AUTOMATIC AIR AND STEAM BRAKE.

No. 343,230. Patented June 8, 1886.

Fig. 1.

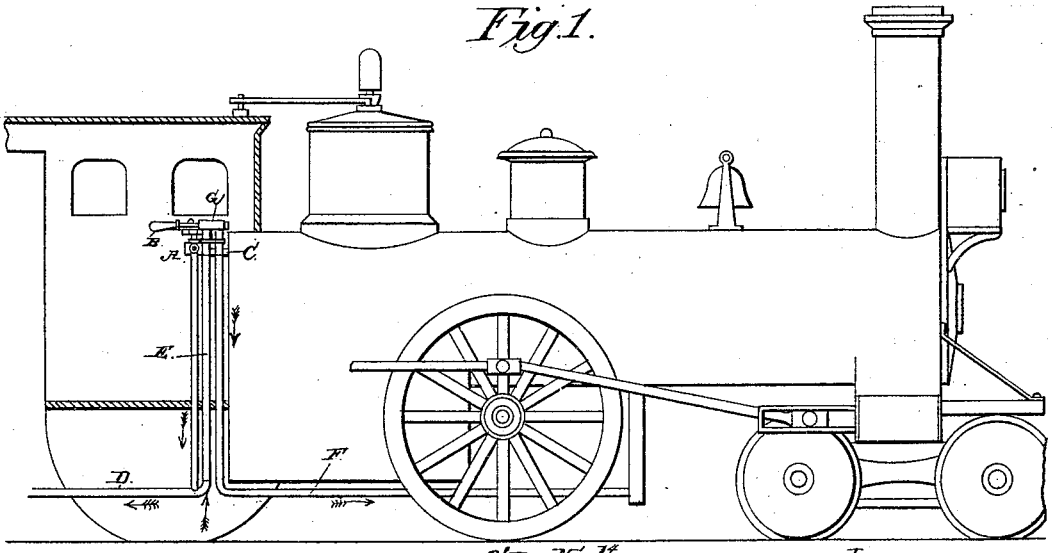


Fig. 2.

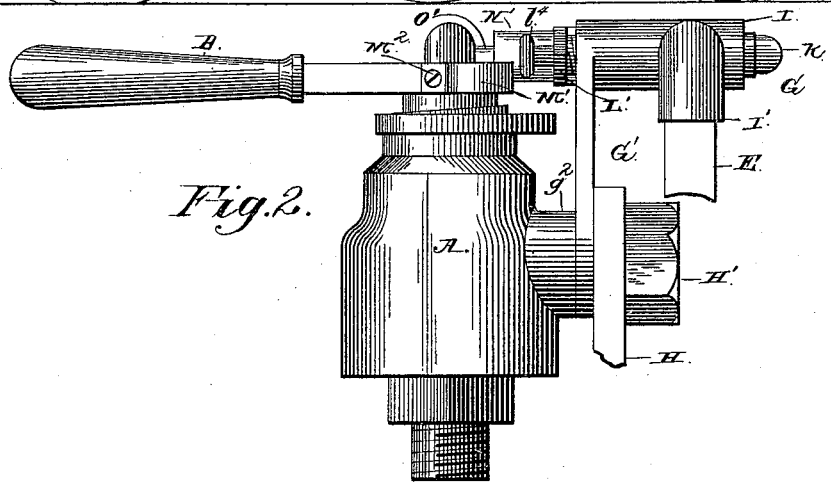


Fig. 6.

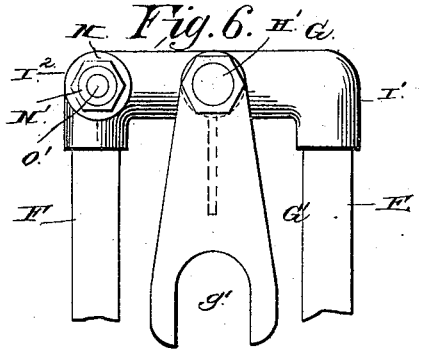
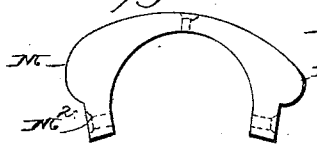


Fig. 7.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

E. J. COSGROVE.

AUTOMATIC AIR AND STEAM BRAKE.

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Fig. 3.

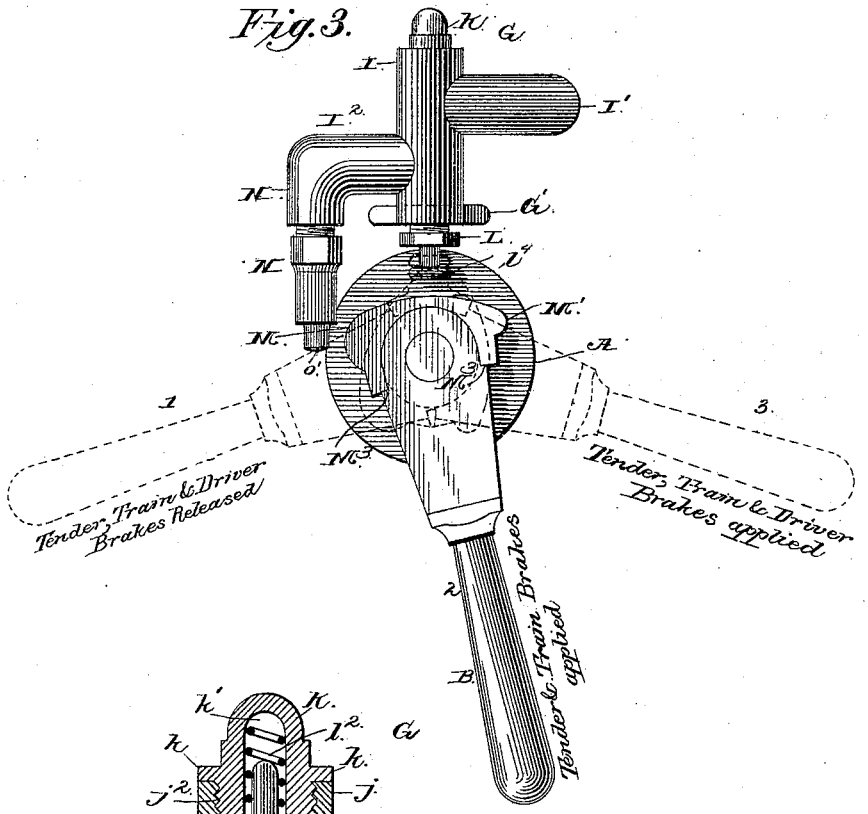


Fig. 4.

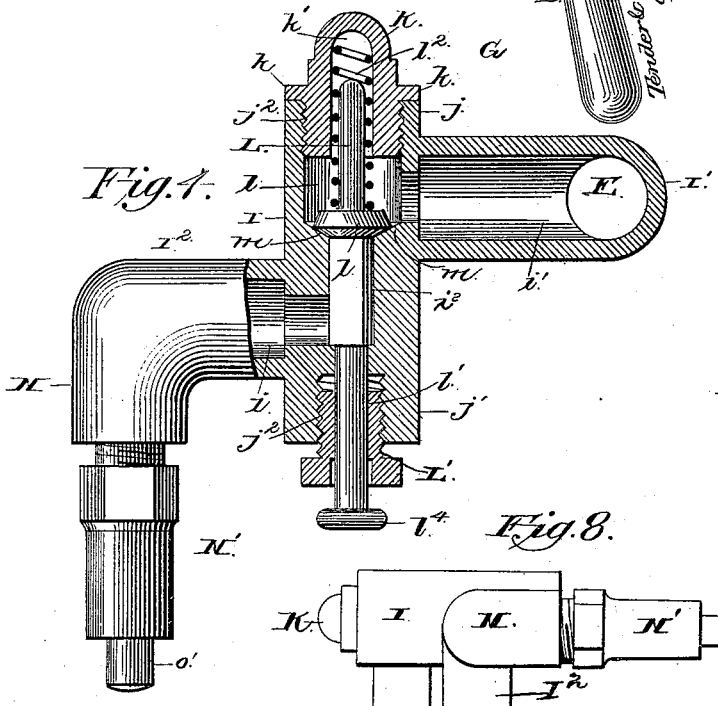


Fig. 5.

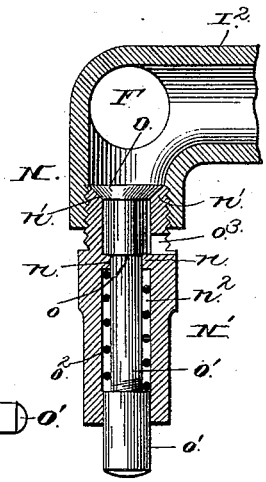
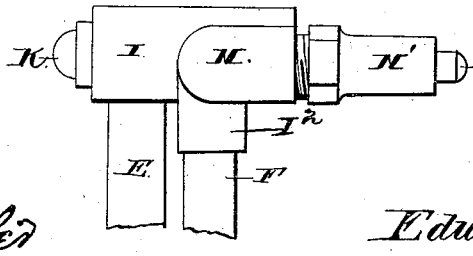


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD JAMES COSGROVE, OF AUGUSTA, GEORGIA.

AUTOMATIC AIR AND STEAM BRAKE.

SPECIFICATION forming part of Letters Patent No. 343,230, dated June 8, 1886.

Application filed October 13, 1885. Serial No. 179,809. (No model.)

To all whom it may concern:

Be it known that I, EDWARD JAMES COSGROVE, a citizen of the United States, residing at Augusta, in the county of Richmond and State of Georgia, have invented a new and useful Improvement in Automatic Air and Steam Brakes, of which the following is a specification, reference being had to the accompanying drawings.

My invention has relation to improvements in automatic air or steam brakes; and the novelty consists in the peculiar construction and combination, arrangement, and adaptation of the various parts for service, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

The invention is particularly designed as an improvement upon the device patented to me on the 14th day of July, 1885, and numbered 322,042; and it has for its objects, among other things, to provide a regulator which shall apply the brakes to the tender and cars and to the drive-wheels of the locomotive independently of each other or simultaneously, as may be required; to provide means for automatically operating the brakes by keeping the connection between the driver and train brakes open; to provide for the escape of the air from the cylinders and connections from the driver-brakes when they are released, and to improve the device covered by the hereinbefore-mentioned patent in minor details of construction.

In the drawings hereto annexed, Figure 1 is an elevation, partly in section, showing the relative arrangements of the valves, my improved regulator, and the various supply-pipes. Fig. 2 is a side elevation of the "engineer's valve" having my improved regulator applied. Fig. 3 is a top plan view of Fig. 2. Fig. 4 is an enlarged view of my invention, partly in section, to more clearly show the construction and relative arrangement of parts. Figs. 5, 6, and 7 are detail views of parts of my improvements detached from the regulator and engineer's valve. Fig. 8 is an end elevation of my improvement detached from the ordinary engineer's valve.

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

Referring by letter to the drawings, A designates the ordinary engineer's valve of the class known to the art as the "Westinghouse Engineer's Valve."

As in the patent hereinbefore referred to, B designates the operating handle or lever to the valve A.

C designates the pipe connecting with the reservoir (not shown) of compressed air or steam and with one of the ports with the valve A. D designates a pipe that leads from said valve A and supplies air or steam to the pipe leading to the braking apparatus of the tender and cars.

E designates a pipe connecting at one end with the pipe D and at its other end with one of the ports of my improved regulator, and this pipe conveys air or steam from the pipe D to the said regulator, and F is a supply-pipe which connects at one end with the other port of my improved regulator and leads to the braking-cylinders of the locomotive drive-wheels to supply air or steam to the latter from the regulator.

G designates my improved regulator having an arm, G′, said arm being cut away or bifurcated at its lower end, as at g', to fit upon a stud or shoulder, g^2, of the engineer's valve A. This arm G′ is held in position on the valve A by a standard, H, which supports said valve, and a nut, H′, which is screwed on the outer threaded end of the shoulder g^2. (Not shown.)

My improved regulator G comprises a middle or body portion, I, and two arms, I′ I², arranged on each side thereof and having passages or ports $i\,i'$, respectively, which communicate with the opening or passage i^2 of the body I. (See Fig. 4.) The arms I′ I² are bent or formed into elbow shape, and have connected thereto the pipes E F, respectively, to receive and supply the air or steam from the pipe D to the cylinders of the drive-wheel-braking apparatus, as will be very readily understood.

The body of my improved regulator is provided at each end with tubes or thimbles $j\,j'$, which are provided with interior screw-threaded portions, j^2.

K designates a nut or plug having a threaded portion adapted to be screwed into the tube

j and having a shoulder, k, adapted to bear against the face of the tube, as shown. The plug or nut is provided with a bore or passage, k', in which the end of a valve-stem, L, is adapted to fit.

L′ designates a stuffing-box having an exterior threaded portion adapted to fit in tube j' and having a central passage, l', through which passes the stem of the valve l.

The body I of the regulator is provided with a valve-seat, m, for the valve l of a rod, L, the forward end of which is reduced. This reduced portion of the valve-rod has a coiled spring, l^2, which bears against the valve l and the inner wall of the passage or bore of the plug K, thus forcing the valve-rod outwardly and keeping the valve on the seat in the body I, the extreme outer end of the valve-rod passing through the stuffing-box and having a head, l^4, screwed or otherwise affixed thereon in any suitable manner and adapted to be operated upon by the lever of the valve A to open or close the communication between the driver and train brakes to operate or shut them off simultaneously, as will more fully appear hereinafter. The head of the handle or lever B is preferably enlarged, and it is rigidly connected to the stem of the valve A to operate the same, and in my improved device I provide said lever with two cam-surfaces, M M′, adapted to operate or bear against the head or knob of the valve-stem L.

If desired, the cams may be cast or formed in one piece with the lever; but I prefer to make the cams in one piece and independent of the lever, to which they are detachably secured by means of screws or bolts M^2, adapted to pass through said cams and into threaded sockets in the vertical faces of the lever, said lever being cut away to provide shoulders M^3, and rounded, as shown, against which said cams fit snugly and securely and without danger of movement or play, as will be readily understood.

When the cam-lever is in the position shown in Fig. 3 at 1, the cam M bears against the head of the valve l and forces it inwardly, as shown in dotted lines, thus releasing the brakes of the tender, train, or cars, and driving-wheel brakes. When it is in the position shown in full lines in Fig. 3 at 2, the cams are drawn away from the valve-rod, which is automatically returned to its seat and permits the air or steam to pass to the tender and train braking apparatus only, the valve l automatically cutting off the air from the drive-wheel-braking cylinders when the pressure of the cam M is removed, and the coiled spring, in connection with the pressure of the air or steam, forces the valve to its seat; and when the cam lever or handle B is thrown to the position indicated at 3 in dotted lines in Fig. 3, the cam M′ is brought to bear against the valve-rod head, and forces the valve from its seat and permits the air or steam to pass through the regulator to the arm I^2 thereof, and thence by the pipe F to the cylinders of the drive-wheel brakes, thus simultaneously operating to force the brake-shoes of the tender, the train of cars, and the locomotive drive-wheels into contact with the wheels, as will be very readily understood, this latter-described operation taking place only when the pressure of steam or air increases in the pipes. The arm I^2 of the regulator has a tube or elbow, N, at an angle to its end, with which the pipe F connects, and said elbow N has a threaded end in which fits the case of an escape-valve, N′. The inner end of the casing or shell N′ of the escape-valve is reduced and threaded to screw into the threaded socket of the elbow I^2, and said case N′ has a valve-seat, n', at its extreme inner end, and a shoulder, n, at a short distance from said valve-seat. The valve-rod O′ has a valve, O, at its inner end, which rests on the seat n' to cut off the escape of air or steam, and a short distance below the valve the said rod has a reduced portion which works in the central passage, n^2, of the casing N′, a shoulder, o, being provided by such reduced portion of the valve-rod, and which rests on the shoulder n of the casing when the valve O is on its seat. At its outer end the valve-rod O′ is threaded to receive a cap, o', against which cap and the shoulder n is adapted to bear a coiled or spiral spring, o^2, to keep the valve normally in engagement with its seat. The threaded end of the valve shell or casing is provided with an escape-port, o^3, which is kept normally closed by the valve O. When the handle B of the valve A is turned to the position shown at 1 in Fig. 3, to release the tender, train, and drive brakes, the cam M forces the valve l from its seat, and permits the steam or air from the pipe E to flow into the elbow I^2, and simultaneously with the operation of the valve l the lever B strikes the valve rod O′ and forces its valve O from the seat n', thus permitting the steam or air from the pipes E and F to escape through the port o^3 of the escape-valve shell N′, said pipes E F leading from the cylinders of the braking apparatus of the train and tender and locomotive drive-wheels, as will be very readily understood.

When steam-brakes are used in connection with my improved regulator, the escape-port o^3 has an escape-pipe fitted or connected thereto to convey the steam from the various parts of the apparatus and the cab into the open air. In the use of compressed-air braking apparatus this educt-pipe is not essential or necessary; but it may be employed, if desired.

In my former patent hereinbefore referred to, the valve-rod of the escape-valve N′ was required to be operated by hand, independently of the operating-lever of the engineer's valve; but this construction I find to be objectionable for various reasons, and unnecessary.

In my improved regulator the valve shell and rod are arranged in such juxtaposition to the operating-handle B of the engineer's valve, so that when said handle occupies the position shown in dotted lines in Fig. 3, at 1,

to release the brakes of the cars, tender, and drive-wheels, it will also come in contact with the valve-rod of the escape-valve N′, and force the same inwardly and the valve from engagement with its seat, thus permitting the compressed air or steam from the cylinders of the braking apparatus to escape through their connecting-pipes and the escape exit or port o^3 of the escape-valve N′, as will be very readily understood. It will be also understood that when the handle or lever B is turned, as at 1, Fig. 3, to release the brakes of the tender, cars, and drive-wheels, and to force the valve O from its seat to permit the air to escape from the cylinders, the valve A is operated simultaneously with the turning of the handle to release all the brakes.

From the foregoing description, taken in connection with the drawings, it will be seen that by my improved devices the braking apparatus of the drive-wheels is under direct control of the engineer, and that they can be applied independently of the brakes of the tender and cars; and, further, the brakes of the cars, tender, and drive-wheels can be applied simultaneously, when desired or required, by merely turning the handle or lever of the engineer's valve, as is usual in this class of devices; and, further, that when the brakes of the various parts of the train are released, the air or steam from the cylinders thereof is permitted to escape, the devices for controlling or permitting such air or steam to escape being operated simultaneously with the turning of the lever or handle B of the ordinary engineer's valve.

If the locomotive is provided with steam-brakes, and the tender and train with air-brakes, the locomotive steam-brakes would operate to apply the air-brakes of the tender and train were the devices arranged so as to simultaneously release all the brakes of the locomotive, tender, and train; and to obviate this difficulty I propose to dispense with or omit the cam M, so that when the tender and train air-brakes are released the locomotive steam-brakes are applied or remain inert, and vice versa.

I attach especial importance to simultaneously opening the escape-valve when the lever B is operated to release all the brakes, whereby the air or steam from the cylinders of the braking apparatus throughout the entire train is permitted to escape through the port of the escape-valve and the braking apparatus is put in condition for instant use.

Various changes in the form and proportion of parts and details of construction may be made without departing from the principle or sacrificing the advantages of my invention, the essential features of which will be readily understood from the foregoing description taken in connection with the drawings.

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

1. In an automatic or direct air or steam braking apparatus, the combination, with an engineer's valve and a supply-pipe connected thereto, of a regulator connected to the supply-pipe leading to driver-brake cylinders and connected thereto direct, and having a spring-actuated valve adapted to be operated simultaneously with the engineer's valve, and to be automatically returned to its seat when pressure from the operating-handle is released, to cut off the supply of air or steam to one part of the train-braking apparatus, substantially as and for the purpose described.

2. In a direct air or steam braking apparatus, the combination, with an engineer's valve, of a regulator and an escape-valve connected to the regulator and arranged in the path of movement of the lever or handle of the engineer's valve, and adapted to be operated by said lever simultaneously with the regulator and engineer's valve when the lever is turned to release the brakes, whereby the air or steam from the cylinders is permitted to escape through the port of the escape-valve, substantially as described.

3. In an automatic air or direct steam braking apparatus, the combination, with an engineer's valve and a supply-pipe, of a regulator connected to the supply-pipe, and having a second or auxiliary escape-valve, said valve having a spring-actuated valve-rod arranged in the path of movement of the operating-handle of the engineer's valve, whereby when said lever is turned to release the brakes of the train it will force the valve of the escape-valve off its seat and permit the air or steam from the cylinders to escape, substantially as and for the purpose set forth.

4. In an automatic air or steam braking apparatus, the combination of an engineer's valve, a supply-pipe, a regulator mounted thereon, and an operating handle or lever to said valve, having detachable cams adapted to operate the regulator, substantially as described.

5. In an automatic air or steam braking apparatus, the combination of an engineer's valve, an operating-handle having cams, a supply-pipe, a regulator having a spring-actuated valve and connected to the supply-pipe, an auxiliary or escape valve shell having a port in communication with the regulator and provided with an automatically-returned valve-stem arranged in the path of the operating handle or lever of the engineer's valve, substantially as described.

6. The combination, with an air-brake regulator, of an escape-valve shell detachably secured thereto and provided with an outlet-port, and a valve-stem in said shell normally held on the seat therein to cut off communication between the regulator and the escape-valve shell, substantially as described.

7. In an automatic or direct air or steam braking apparatus, the combination of an engineer's valve, an operating-lever thereto having detachable cams, a supply-pipe con-

nected thereto, a regulator mounted on said valve and connected to the supply-pipe, said regulator comprising a shell, inlet and outlet elbow-arms, a valve-seat, and a spring-actuated valve-rod, and an auxiliary or escape valve-shell secured upon one of the arms of the regulator, and having a spring-actuated valve-stem arranged in the path of the operating cam-lever and adapted to be forced from its seat by said lever when turned to release the brakes, all arranged and adapted to serve substantially as and for the purpose described and in the manner set forth.

8. The combination of an engineer's valve, a regulator or valve on supply-pipe to driver-brake cylinders, and a release-valve for driver-brakes, said regulator and release valve being operated by the lever of the engineer's valve, and capable of being operated independent of it, and yet being located so that engineer will apply and release driver-brake without any additional movement or effort.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

EDWARD JAMES COSGROVE.

Witnesses:
A. H. VONDERLIETH,
HENRY C. GOODRICH.