

J. C. WIGHTMAN.

Improvement in Steam or Power-Brakes.

No. 130,095.

Patented July 30, 1872.

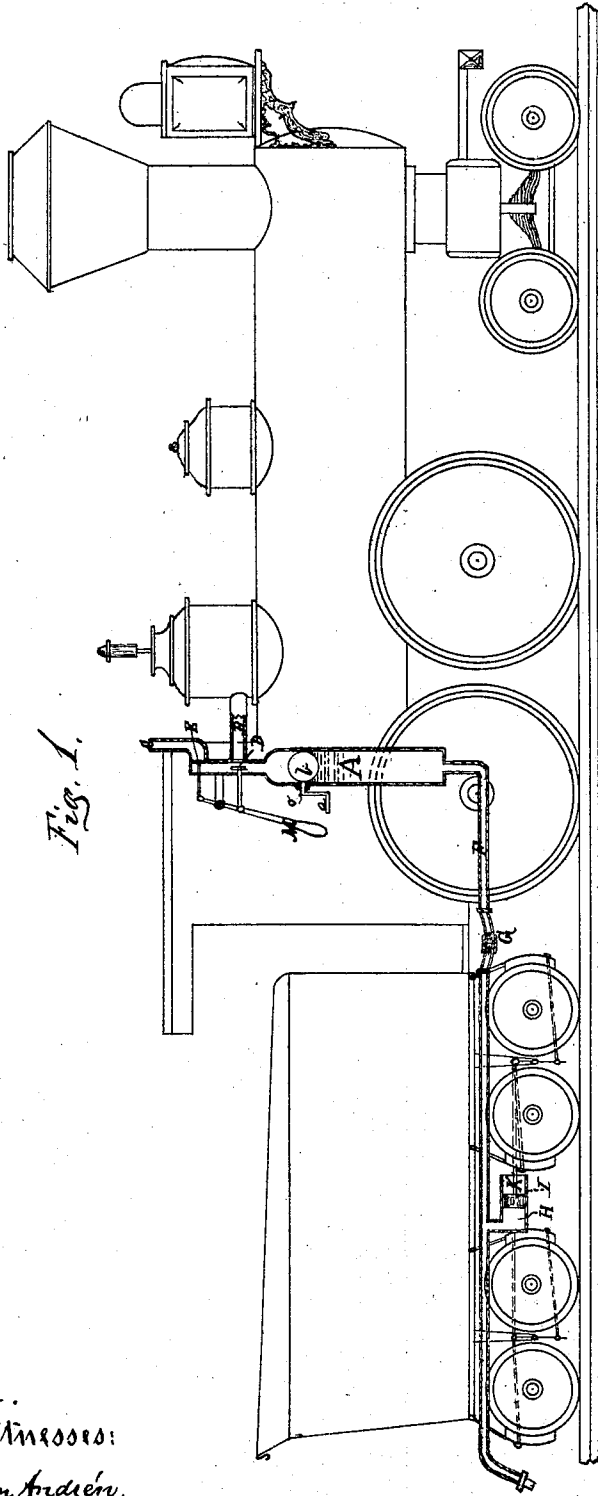


Fig. 1.

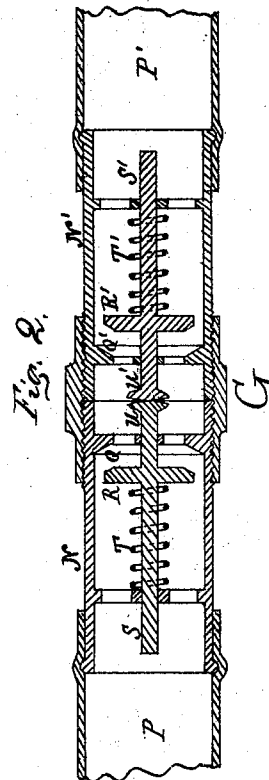


Fig. 2.

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IMPROVEMENT IN STEAM OR POWER BRAKES.

Specification forming part of Letters Patent No. 130,095, dated July 30, 1872.

Specification describing certain Improvements in Steam or Power Brakes for use on locomotives and cars, invented by JOSEPH C. WIGHTMAN, of Newton, Middlesex county, Massachusetts.

The object of my invention is to utilize and employ the pressure of steam in the locomotive-boiler when connected to a train of cars, to check the speed or entirely stop said train when in motion. The invention mainly consists in a method of actuating the brakes of the car or cars for the purpose of "braking up" or pressing the brakes against the wheels of the car or cars, by means of steam-pressure exercised through the medium of a column of water or other suitable liquid to actuate the brake mechanism. This result may be attained in various ways without departure from the principle of my invention. In the accompanying drawing I have represented one manner of carrying the invention into effect.

Figure 1 represents an elevation of a locomotive engine and tender with a brake mechanism operating in accordance with my invention. Fig. 2 is a longitudinal central section of the coupling which connects the sections of pipes between different cars.

I place on the locomotive or tender a small tank, A, which may be filled with water in summer, or in winter with any liquid which will not freeze, such as a mixture of glycerine and water, or oil, or a solution of some of the salts in water to prevent freezing. From the top of the tank A are two connections, B and C, both closed by gates or valves D and E. The connection B and gate D open a passage directly to the boiler of the locomotive above the water-line into the steam, and the connection C and gate E open a passage to the air. From the bottom of the tank A a pipe, F, passes under each car, connected between the cars by flexible tubes, allowing motion between the cars, and suitable couplings G, said couplings G, when disconnected, leaving each car with its pipes, &c., entirely free from the remainder of the apparatus. Under each car, and fastened to the floor of the car, is a cylinder, H, and piston I, with which the tube F is connected, and from the piston I is run, horizontally, a rod, K, connected to and operating by any suitable system of mechan-

ism, the ordinary brake applied to the wheels of a car to check its speed or to stop it. In the couplings G are spring-valves, as shown in Fig. 2, which, when the couplings are separated, close all egress from the pipes and connections, retaining in the pipes F and connections and cylinders H the liquid used to operate them; and when the couplings G are opened the valves are closed by the spring, and when the couplings are connected the valves are forced open by contact and open a passage from one car to the other for the flow of the liquid from the tank A at the locomotive. The valves or gates E and D are connected with and operated by a lever, M, and the operation of the lever M is to open one valve at the same time that it closes the other by one motion.

The operation of braking up the train is as follows: The train being all connected by the coupling G between the cars to the tank A, and the tank A and pipes F and cylinders H having been previously filled with liquid, the springs connected with the brakes will keep the pistons I pushed back and the brakes off the wheels. To stop or check the train it is only necessary to move the lever M in such a direction and to such a degree that the valve D will open a passage from the tank A at the same time that it closes the valve E and passage C leading to the air. This will allow a part or the whole of the pressure of the steam in the boiler to be exerted upon the liquid in the tank A, forcing it through the tubes F and couplings G into the cylinders H, operating against the pistons I contained in them, and forcing the pistons I and the piston-rods K out, which will force the brake against the car-wheel. To relieve the pressure and unbrake the train it is only necessary to force the lever M in the opposite direction, closing the valve D and passage B to the boiler, and at the same time opening the valve E and passage to the air, by which the steam, which is the operating force upon the brake, will instantly escape. To facilitate the rapid escape or relief of the brake from the car-wheels, the lever M may be used to open the valve D and passage B only, and the valve E may be kept closed, and into the tank A may be inserted a rod, O, operating from the outside of the tank A by a crank, a, on the rod O; and in

the tank should be placed fans *b*, or some other device, for operating to agitate the water, so that when access to the boiler is cut off by closing the valve *D* the agitation of the liquid in the tank *A* by turning the crank *a* and fans *b* will condense the steam, causing a vacuum, which vacuum in the tank *A* will produce on the outside of the pistons *I* an atmospheric pressure of from thirteen to fifteen pounds per square inch, instantly forcing them back and against the water in the cylinders *H*, from which it will flow to the tank *A* through pipes *F*. A simpler method of operating the pistons *I* may be had by connecting the pipe *F* with the boiler below the water-line and dispensing with tank *A*. By opening a valve the water will be forced from the boiler through the pipes *F* and into the cylinders *H*, operating, as before described, the pistons *I* and brakes. To relieve the pressure on the brakes under this plan all that is necessary to do is to close the connection with the boiler and open a passage to the air to allow the water to be forced out to the ground by the forcing back by the brake-springs of the pistons *I*. This plan necessitates the use of hot water from the boiler, and the wastage at each operation of the brakes of the water necessary to force out the pistons *I* for setting the brakes. The spring-coupling *G* is shown in section in Fig. 2, and consists of metallic tubes *N N'*, to the rear ends of which are secured the flexible connecting-pipes *P P'*, as shown. The tubes *N N'* may be connected in any suitable way where they join together. Valve-seats *Q Q'* are made in each of the tubes *N N'*, the exit of which can be closed by means of the valves *R R'*, that are attached to the spindles *S S'*, that are movable in bearings attached to the tubes *N N'*. On the rear of each valve *R R'* is held a spiral spring, *T T'*, surrounding the valve-spindles *S S'* in the manner shown in Fig. 2, by which arrangement the valves *R R'* are pressed against their seats *Q Q'* as soon as the tubes *N N'* are detached from one another. The outer end of each of the valves *R R'* is provided with an operating-rod, *U U'*, as shown, by which arrangement the valves *R R'* are opened automatically by pressing the rods *U U'* against each other as soon as the tubes *N N'* are coupled together; but as soon as they are uncoupled the springs *T T'* or their equivalent force the valves *R R'* back on their

seats again, by which arrangement the liquid contained in pipe *F* and its connections is retained permanently therein.

With this invention the whole pressure per square inch of the steam in the boiler of the locomotive, varying from one hundred to one hundred and thirty pounds, is forced upon a piston of sufficiently large area to give tons of pressure upon the brakes. This is also accomplished with the wastage of a very small amount of steam at the time of "setting" the brakes, and at no other time; and as the steam never passes through pipes or other extended surface, the loss from condensation, either in power or steam, is not appreciable. Any slight leak in any of the pipes or connections can be readily detected; and there is no complicated or delicate machinery with the device; and the liquid in the tank *A* can be constantly used with but little loss in quantity, as it is simply forced back and forth from the tank *A* to the cylinders *H* through closed pipes *F*.

Having thus fully described the nature, construction, and arrangements of my invention, I wish to secure by Letters Patent, and claim—

1. The method of operating the brakes of a car or cars by means of steam-pressure, exercised upon the brake mechanism through the medium of a column of water or other suitable liquid, substantially in the manner and for the purposes herein set forth.

2. The reservoir or pipe *A*, communicating with the boiler of the engine, as described, in combination with the connecting-pipes *F*, communicating with one or more cylinders, *H*, to contain water or other suitable liquid, by which the pressure from the steam in the boiler will be caused to operate one or more pistons, *I*, to which the brake-rod is attached in a suitable manner, substantially as and for the purposes shown and set forth.

3. In combination with the above, the valves or cut-offs *D E*, arranged and operating, in connection with the reservoir or pipe *A*, substantially as and for the purposes set forth.

4. In a brake-operating mechanism, substantially such as described, the fan *b*, combined and operating, in conjunction with the reservoir *A*, substantially as set forth.

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Witnesses:

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