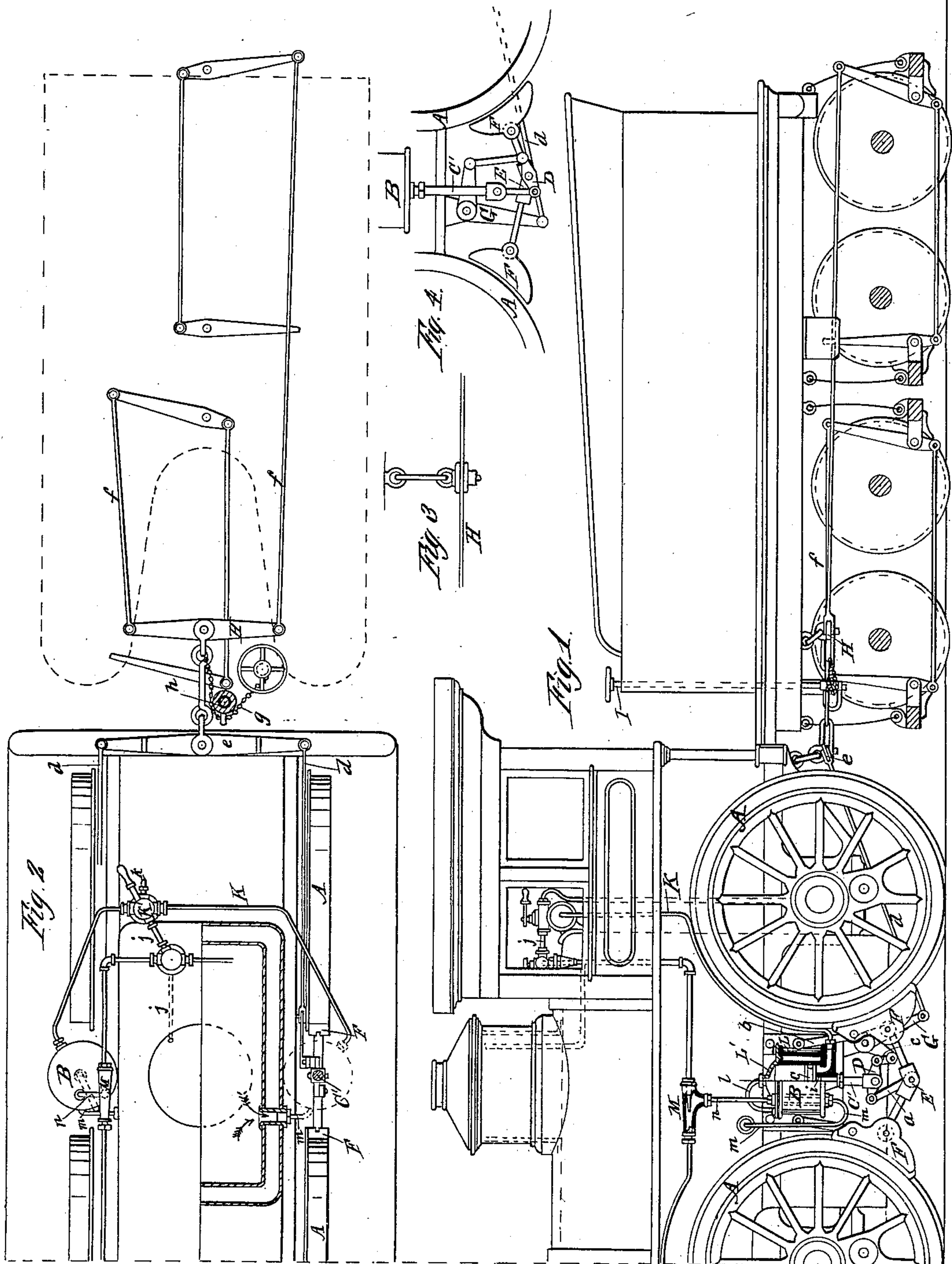


H. I. BEARUP.
Steam or Fluid Brake.

No. 231,143.

Patented Aug. 17, 1880.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY I. BEARUP, OF ELKHART, INDIANA, ASSIGNOR OF ONE-THIRD OF HIS RIGHT TO CHARLES G. MELCHER, OF SAME PLACE.

STEAM OR FLUID BRAKE.

SPECIFICATION forming part of Letters Patent No. 231,143, dated August 17, 1880.

Application filed January 12, 1880.

To all whom it may concern:

Be it known that I, HENRY I. BEARUP, of Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Steam or Fluid Brakes, of which the following is a specification.

The object I have in view is to produce a steam or other fluid brake for locomotive driver and tender wheels, which will be simple, cheap, and strong in construction, will be direct in its action upon the brake-shoes of the locomotive, will act simultaneously both upon the brakes of the locomotive and those of the tender, will automatically distribute its power equally to all the brake-shoes, and will be self-adjusting to compensate for the uneven wear of the different brake-shoes or other parts.

My invention therein consists in the various combinations of the parts and devices, as fully hereinafter pointed out, to accomplish the purposes above set forth, and to provide a simple and certain method of heating the cylinders.

In the accompanying drawings, forming a part hereof, Figure 1 is an elevation of one side of a locomotive and tender with my brake mechanism applied thereto, the same being shown partly in section; Fig. 2, a plan and transverse section of a locomotive with the cab removed, the connection with the brake-levers of the tender being also shown; Fig. 3, an elevation of the flexibly-hung lever of the tender; and Fig. 4, an elevation, showing a modification of the brake mechanism.

Like letters denote corresponding parts in all the figures.

On each side of the locomotive, directly between the drivers A, there is bolted to the engine-frame a vertical cylinder, B, in which moves a piston, C, having its rod C' projecting through the lower head of the cylinder in the ordinary way. Each piston-rod carries on its lower end an equalizing-bar, D, which is pivoted centrally in the forked end of the piston-rod, and is connected at one end, by a link, a, with the toggle-joint E, which works between the brake-shoes F, or is adjusted at its pivot to increase the power of either end over the other end. These brake-shoes are hung from the frame by arms b in the usual manner, and are free to be moved into and out of con-

tact with the faces of the drivers by the toggle-joint.

The other end of the equalizing-bar D is connected by a link, c, with the short arm of a pivoted bell-crank lever, G, which at the end of its long arm is connected by a rod, d, with one end of a transverse horizontal bar, e, flexibly hung beneath the deck-plate of the engine in the ordinary way. This bar e is connected at both ends with the brake mechanism of the locomotive, and at its center with the center of a transverse bar, H, flexibly hung beneath the frame of the tender and connected at its ends, by rods f, with the brake-levers of the tender. The bar H is hung by its center beneath the tender-frame, by two eyebolts and one or more connecting-links, so that it can play laterally, as well as in the direction of its length, to compensate for the uneven wear of the brake-shoes of the tender, and it will assume the right position or adjust itself to transmit the power equally to all the brake-shoes of the tender.

The brakes of the tender can be applied by hand, independently of the steam-brake mechanism, by means of the brake-staff I on the tender, which has its lower end connected by a chain, g, to the flexibly-hung bar H, which chain passes around a wheel, h, to give the right direction to its pull.

Each cylinder is supplied with steam, compressed air, or other fluid by a pipe, K, which enters the lower end of the cylinder on one side. The steam or compressed air passes from such pipe up through an elongated port, which is formed in a raised boss, i, or annular flange, upon which the piston rests when it drops after the steam or air has been shut off, so that the piston will not strike the lower head of the cylinder, but will leave a steam-space beneath it, to increase its activity in starting, and for water of condensation, which may be carried off by suitable valves. When steam is used the two pipes K pass up into the cab, and are connected together by a three-way cock, K', which also connects with a pipe, j, leading to the steam-dome, and with an exhaust-pipe, k, so that by turning such cock in one direction steam will be admitted to both cylinders, while by turning the cock in the

other direction the steam in the cylinders will pass off through the pipe *k*. If compressed air or fluid other than steam were employed to operate the brakes the pipe *j* would be connected with the fluid-reservoir instead of with the dome.

Each of the cylinders is surrounded by a jacket, *L*, and the whole cylinder, including this jacket, is cast in one piece with the lower head of the cylinder in the usual way, the upper end of the cylinder, however, and the space formed by the jacket being left open. The cylinder and this space are covered by a removable cap, *L'*, which can be removed when it is desired to clean out the jacket-space—an advantage not possessed by steam-brakes as heretofore constructed. The cap *L'* of each cylinder has a bent pipe, *l*, with open end, tapped into it to allow the air to pass out above the piston as it moves upwardly, without permitting the admission of dust or dirt into the cylinder.

To heat the cylinders, which is essential when steam is used to work the brakes, I tap a pipe, *m*, into the bottom of the space of each cylinder, formed by the jacket, and from thence lead the pipe, through the side of the fire-box of the locomotive, into the interior of the same. Into the top of the jacket of each cylinder is tapped another pipe, *n*, leading upwardly to a steam-ejector, *M*, which continually draws a portion of the products of combustion from the fire-box into and through the jacket-space, so as to keep the cylinder hot. This ejector could also be used to advantage when hot water is circulated through the jackets of the cylinders, and would make the circulation certain.

Steam or other fluid under pressure being admitted to the cylinders, the pistons will rise, drawing the toggles toward a straight line, and forcing with equal power the brake-shoes of the locomotive against the drivers. At the same time the brake-shoes of the tender will be operated with the same force, the equalizing-bars and the flexibly-hung bars distributing the power evenly.

When the fluid is withdrawn from the cylinders the weight of the parts causes the pistons to drop again upon the raised ports without the necessity of using springs for that purpose; but springs can be employed, if desired.

My brake-mechanism possesses the advantages of being simple, cheap, and strong in construction, direct in its action upon the brake-shoes of the locomotive, economical in its use of steam, simultaneous in its action upon all the brake-shoes of both locomotive and tender, and self-adjusting to the uneven wear of the brake-shoes.

In the modification of my device shown in Fig. 4 the equalizing-bars *D*, instead of being carried by the piston-rods, are pivoted to the

toggle-joints, and are connected at one end to the piston-rods, and at the other end to the bell-cranks *G*, which are reversed laterally, so as to draw upon the rods *d*.

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

1. In a steam or fluid brake, a pair of brake-shoes on each side of the locomotive, between the drivers, connected together by a toggle-joint and the brake mechanism of the tender, in combination with two cylinders situated between the drivers and two equalizing-bars, the power of the piston-rods being applied directly to the toggle-joints of the locomotive brake-shoes through one end of said equalizing-bars, and to the brake mechanism of the tender through the other end of such bars, substantially as described and shown.

2. In a steam or fluid brake, the combination of the brake-shoes *F*, connected by toggle-joints *E*, and the rods *d*, leading to the brake mechanism of the tender, with the two cylinders situated between the drivers, the link and equalizing-bar for connecting the piston-rod of each cylinder to the toggle-joint of the brake-shoes, and the link and bell-crank for connecting the other end of the equalizing-bar with one of the rods *d*, substantially as described and shown.

3. In a steam or fluid brake, the combination, with the tender, of the flexibly-hung bar *H*, connected centrally with the power-brake of the locomotive, and at its ends, by rods *f*, with the brake-levers of the tender, and the hand-brake connected with the center of said flexibly-hung bar, substantially as and for the purposes set forth.

4. In a steam or fluid brake, the combination, with the power-brake of the locomotive having equalizing-bars, of the brake-levers of the tender, connected to such equalizing-bars through the flexibly-hung bars *H* *e*, and suitable rods, chains, and levers, substantially as described and shown.

5. In a steam or fluid brake, the combination, with the cylinders surrounded by jackets, of the hot-air pipes connecting the fire-box of the locomotive with such jackets, for heating the cylinders by the products of combustion, substantially as described and shown.

6. In a steam or fluid brake, the combination, with the cylinders surrounded by jackets, of the ejectors for enforcing a circulation of the heating medium through such jackets, substantially as described and shown.

7. In a steam or fluid brake, substantially as described, the combination, with the cylinders, of the bosses *i* in the bottoms of the same, for the purpose set forth.

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Witnesses:

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