2 Sheets--Sheet 1.

S. S. LINNELL & W. H. INGRAHAM.

Steam-Car Brakes.

No. 157,407. Patented Dec. 1, 1874.

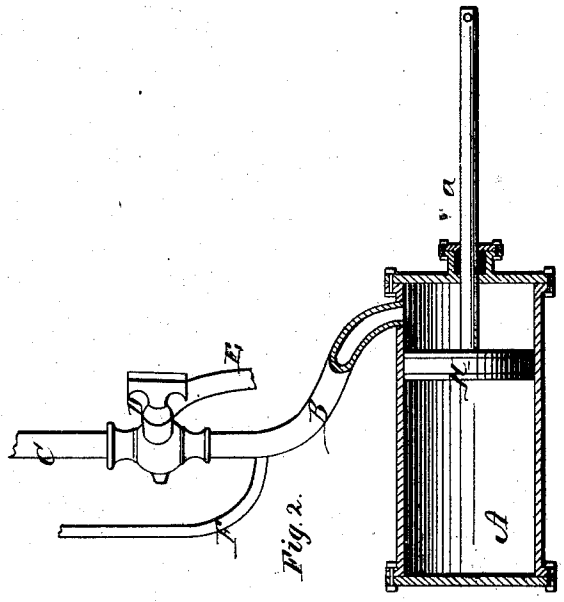

Fig. 2.

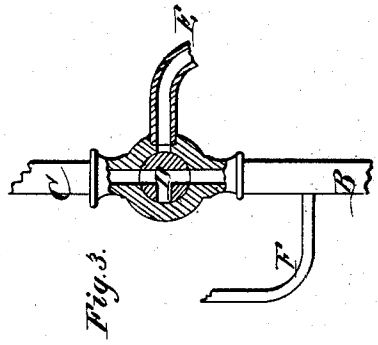

Fig. 3.

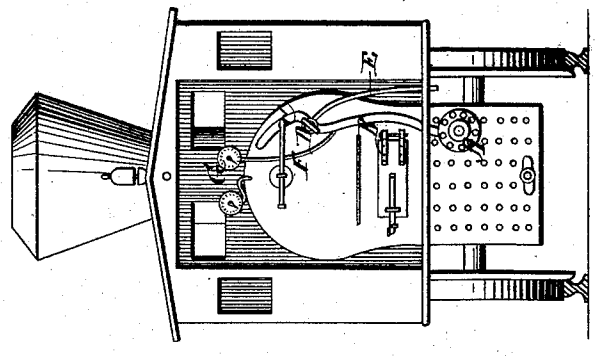

Fig. 1.

WITNESSES

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THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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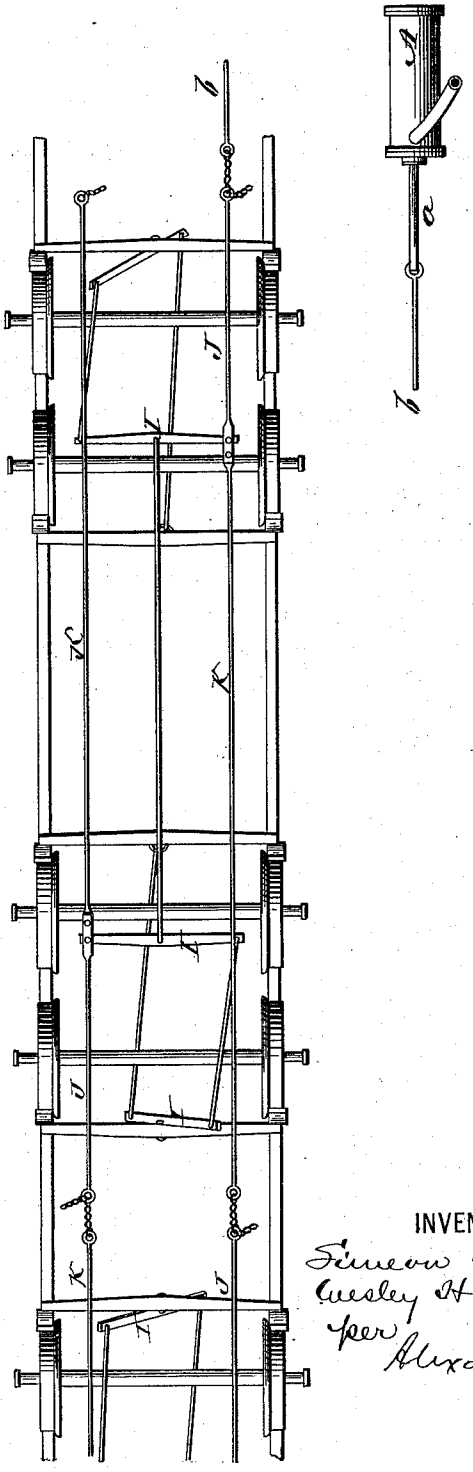

Fig. 4.

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UNITED STATES PATENT OFFICE.

SIMEON S. LINNELL AND WESLEY H. INGRAHAM, OF KALAMAZOO, MICH.

IMPROVEMENT IN STEAM-CAR BRAKES.

Specification forming part of Letters Patent No. **157,407**, dated December 1, 1874; application filed October 12, 1874.

To all whom it may concern:

Be it known that we, SIMEON S. LINNELL and WESLEY H. INGRAHAM, of Kalamazoo, in the county of Kalamazoo and in the State of Michigan, have invented certain new and useful improvements in the manner of applying steam as a power for controlling the brakes on passenger-trains; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

The nature of our invention consists in the construction of a car-brake and device for using steam as brake-power, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawings which fully illustrate our invention.

Under the deck or foot-board of the engine is placed a cylinder, A, into which steam is admitted through the steam-pipe B and supply-pipe C, by means of a three-way cock, D. A pipe, F, leads from the steam-pipe B to the steam-gage G. H is the piston in the cylinder A, and *a* is the piston-rod which is connected directly to the brake-rod of the first car, and the brakes of all the cars in the train are connected together, as hereinafter described.

Suppose the cylinder to be ten inches in diameter—we have an area of piston of seventy-five square inches. By turning the three-way cock to the position shown in Fig. 3 communication is opened between the pipes B and C, and steam passes directly from the boiler into the cylinder A, and also through the pipe F to the gage G. When the gage shows a pressure of ten pounds we have seven hundred and fifty pounds pressure on the piston. When the gage shows twenty pounds we have a pressure on the piston of one thousand five hundred pounds transmitted directly to the brakes. These, being connected directly one with another, give the same purchase throughout the train.

After admitting steam to the cylinder, the three-way cock D is returned to its original position, thereby closing the supply-pipe and allowing the steam in the cylinder to escape through the exhaust-pipe E.

In Fig. 4 we have shown the running-gear of a railroad-car with the usual arrangement of levers I I. The piston-rod *a* is by a rod, *b*, connected with the usual hand-brake rod J. This rod has a continuation, K, passing from the cross-lever of the brake to the rear of the car, and there connecting with the brake-rod J of the next car, and so on the whole length of the train.

This arrangement does not in any way interfere with the hand-brake, but can be used the same as if there was no hand-brake, and the hand-brake can be used the same as if there was nothing else.

We are aware that it is not new to operate the brakes of a car by steam admitted with a cylinder, and operating on a piston therein which has a rod connected with the braking mechanism.

It will be seen that, by our construction of parts, the cylinder is placed directly under the cab, and in close proximity to the fire-box and only short steam-induction pipe is needed, and hence there is possibility of the steam condensing within the pipe.

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

The pipe C, three-way cock D, escape-pipe E, and pipe F, with gage G, all arranged at the rear of the boiler, and within the locomotive-cab, in combination with the locomotive-boiler and the cylinder A, with piston H and rod *a*, as and for the purposes set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 30th day of July, 1874.

SIMEON S. LINNELL.

WESLEY H. INGRAHAM.

Witnesses:
JAMES M. DAVIS,
F. C. BOSTWICK.