(Model.)

# D. W. MAGEE.

## EJECTOR.

No. 284,453. Patented Sept. 4, 1883.

Fig 1.

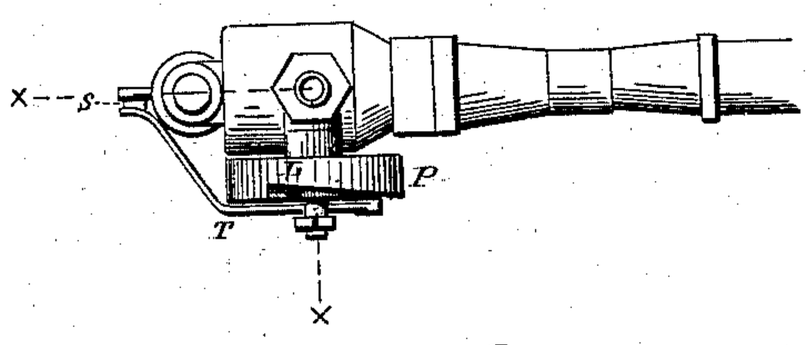


Fig. 3.

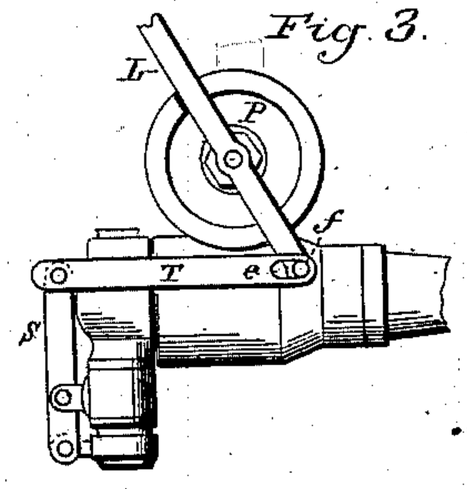


Fig 2

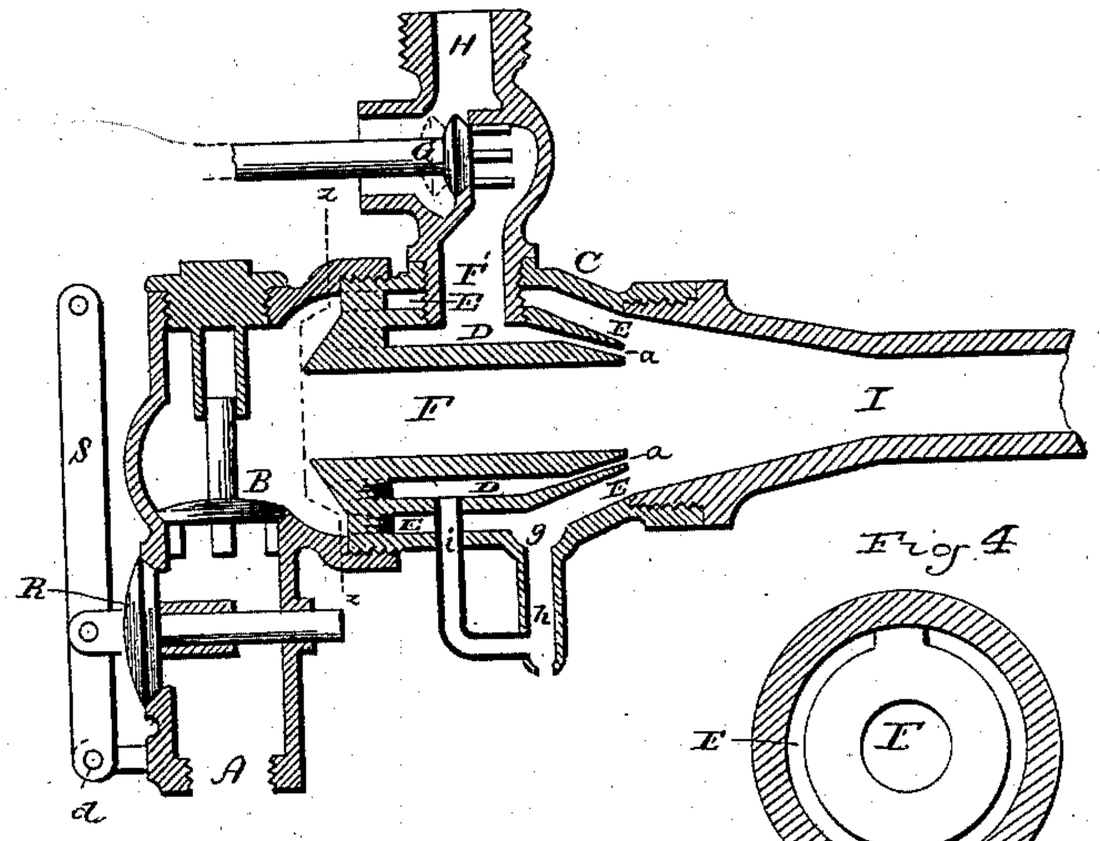


Fig 4




Witnesses,
L. N. Shumway
Jos. C. Earle

Dan'l W. Magee.
Inventor.
By atty
Jno C Earle

# UNITED STATES PATENT OFFICE.

DANIEL W. MAGEE, OF NEW YORK, N. Y., ASSIGNOR TO EBENEZER P. MINER, OF HARTFORD, CONNECTICUT.

## EJECTOR.

SPECIFICATION forming part of Letters Patent No. 284,453, dated September 4, 1883.

Application filed June 11, 1883. (Model.)

*To all whom it may concern:*

Be it known that I, DANIEL W. MAGEE, of New York, in the county of New York and State of New York, have invented a new Improvement in Ejectors; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view; Fig. 2, a vertical central section on line *x x*, enlarged; Fig. 3, a side view; Fig. 4, a transverse section on line *z z* of Fig. 3.

This invention relates to an improvement in apparatus for producing the vacuum required in the operation of brakes on railways, and for like purposes, and in which steam under high pressure is employed as the medium for producing such vacuum, the apparatus being commonly called an "ejector."

The object of the invention is to increase the utility of the apparatus; and it consists in the construction, as hereinafter described, and more particularly recited in the claims.

A represents the inlet to the apparatus, which communicates with the cylinder, chamber, or whatever it may be where the vacuum is to be produced. It will be understood that from such chamber suitable tubes lead to this inlet.

B is a check-valve arranged near this inlet, and closing toward the inlet. It is a common valve, and arranged to be guided in its movement toward and from its seat in the usual manner of puppet-valves.

C represents the shell of the ejector. This is preferably cylindrical in shape, the inlet A opening through the valve B directly into this shell. Concentrically in this shell the steam-chamber D is arranged. This steam-chamber consists of a hollow shell, its axis concentric with the axis of the shell and supported in the shell, as shown, so as to leave a space, E, between it and the shell, and also has a central passage, F, through it. The chamber in the shell C is contracted toward its outlet end, and the exterior of the steam-chamber shell correspondingly contracted, so that the space E is continued to the extreme forward end of the steam-chamber shell. From the forward end of the steam-chamber shell is a thin opening, *a*, extending around the passage F. The passage from the chamber D to the opening *a* is inclined toward the center, as shown.

F′ is the steam-inlet passage, which communicates with the steam-chamber D.

G is a valve opening from the passage F′, and communicating with the steam-passage H from the boiler, the valve G opening against the pressure of the steam of the boiler, and so that if the valve G be opened, as seen in broken lines, it will permit steam under pressure to flow into the chamber D, and under such pressure the steam will be ejected through the circular opening *a*, and by the conical shape of the passage leading to said opening the steam will be concentrated over the passage F, as shown. The ejection of the steam in this manner around the passage F and within the surrounding passage E produces a strong draft through the passages F and E, and drives the air forward into the contracted space I, the valve B opening to permit the air to flow from the vacuum-chamber into the passages E and F, and the draft upon the air through the passage A will continue so long as the pressure and force of steam are continued, exhausting the air to the fullest extent possible by such draft of the steam, and holding it under such draft so long as the pressure and force of steam are continued. This taking of the air from the vacuum-chamber so reduces the air within the chamber as to produce substantially a vacuum, or give to that chamber a power sufficient for the purposes required. By making the air-passage E around the current of steam, as well as the passage F within that tubular current of steam, the steam is forced to act directly upon the air without contact with the surface of the surrounding chamber, and thus I employ both the inner and outer surface of the tubular jet of steam as a means for exhausting the air from the vacuum-chamber and increase the power of the steam to the extent that I use the outer surface of that jet over what would be accomplished were the inner surface only employed. As a further illustration of this operation, it will be seen that were there no air-passage outside the

tubular jet of steam, the power of the jet could be exerted only on the air which came through the central passage, F, the outer surface of the jet producing no substantial drawing effect. Again, if the passage E be open and the passage F closed, then the draft would be only that produced by the outer surface of the hollow or tubular jet; but by employing the two passages I obtain the advantage of the draft upon both the outer and inner surface of the jet.

The ejector is arranged on the locomotive in convenient position for the engineer to operate it; and that he may so conveniently operate it, a lever, L, is attached to the stem of the valve G and extends across the face of an annular cam, P, the surface or face of this cam being shaped as shown, and so that when the valve is closed, if the lever is turned up the incline of the cam, it will draw the valve G from its seat and permit the steam to enter. The inclination of the cam is so slight that the pressure of the steam upon the valve does not tend to self-close the valve; hence the valve will stand at any position to which the lever may be turned on the cam, leaving the valve open; or when the lever is returned the pressure of the steam upon the valve will force the valve to its seat. After the ejection of steam has been cut off it is necessary to resupply the vacuum-chamber with air. To this end I arrange a valve, R, as here represented, directly below the check-valve B. This valve opens outward, and so that when it is opened air will readily pass through the valve-opening and inlet-passage A to the vacuum-chamber. To the valve R a lever, S, is hung, the fulcrum of the lever below, as at *d*. The other arm of the lever extends upward, and from this upper arm a rod, T, extends toward the lower arm of the lever L. That end of the arm T is slotted, as at *e*, and in that slot a stud, *f*, on the lower end of the lever L works, and so that when the lever L is turned into the position closing the valve G the stud *f* will strike the end of the slot *e* in the rod T and turn the lever S to open the valve R. This opening of the valve may occur simultaneously with the closing of the valve G, so that the inlet-passage to the vacuum-chamber will be opened so soon as the steam is shut off; or it may be produced by a continued movement of the lever after the steam-valve is closed, and so that, if desired, the vacuum-chamber may be held in its exhausted condition, and at any time supplied with air by simply turning the lever L to open the valve R.

As more or less condensation will occur from the steam, I construct the shell C with a depression, *g*, at its lower side, from which a small opening, *h*, leads, and so that the water which may arise from condensation, and would otherwise remain in the shell, will pass through the drip *h* and escape.

To remove the condensation which may arise in the steam-chamber D, I also provide a small passage, *i*, which will lead therefrom—say to the drip *h*—and so that whatever condensation may occur in the steam-chamber the water will pass off through the drip *h*.

I do not wish to be understood as broadly claiming an ejector having a steam-valve for the admission of steam and a check-valve for the air-passage, as such, I am aware, is not new. Neither do I claim, broadly, two concentric air-passages with an intermediate concentric steam-inlet.

I claim—

1. The combination of the shell C, the annular steam-chamber D arranged therein, and constructed with the concentric discharge-opening *a*, the concentric air-passage E outside said steam-chamber, and the central air-passage, F, through said steam-chamber, the air-inlet passage provided with the check-valve B, and the steam-passage leading through said outside passage, E, to said annular steam-chamber, provided with a valve, G, substantially as described.

2. The combination of the shell C, the annular steam-chamber D arranged therein, and constructed with the concentric discharge-opening *a*, the concentric air-passage E outside said steam-chamber, and the central air-passage, F, through said steam-chamber, the air-inlet passage provided with the check-valve B, and the steam-passage leading through said outside passage, E, to said annular steam-chamber, provided with a valve, G, and the air-inlet valve R, substantially as described.

3. The combination of the shell C, the annular steam-chamber D arranged therein, and constructed with the concentric discharge-opening *a*, the concentric air-passage E outside said steam-chamber, and the central air-passage, F, through said steam-chamber, the air-inlet passage provided with the check-valve B, and the steam-passage leading to said annular steam-chamber, provided with a valve G, the lever L, hung upon the spindle of the steam-valve G, the air-inlet valve R, and connection, substantially such as described, between said inlet-valve R and the lever L, whereby both the steam-valve and the inlet-valve are operated by said lever L, substantially as described.

4. The combination of the shell C, the annular steam-chamber D arranged therein, and constructed with the concentric discharge-opening *a*, the concentric air-passage E outside said steam-chamber, and the central air-passage, F, through said steam-chamber, the air-inlet passage provided with the check-valve B, and the steam-passage leading through said outside passage, E, to said annular steam-chamber, provided with a valve, G, with the drip *h* from the air-passage, substantially as described.

5. The combination of the shell C, the annular steam-chamber D arranged therein, and constructed with the concentric discharge-opening *a*, the concentric air-passage E out-

side said steam-chamber, and the central air-passage, F, through said steam-chamber, the air-inlet passage provided with the check-valve B, and the steam-passage leading through said outside passage, E, to said annular steam-chamber, provided with a valve, G, with the passage *i*, for condensation, leading from the annular steam-chamber, substantially as described.

DANIEL W. MAGEE.

Witnesses:
SHERMAN W. ADAMS,
THOMAS MCMANUS.