

No. 642,545.

Patented Jan. 30, 1900.

J. L. CHAPMAN.  
EJECTOR.

(Application filed Nov. 7, 1899.)

(No Model.)

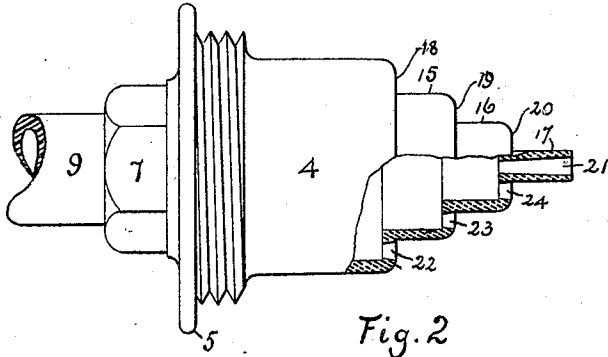


Fig. 2

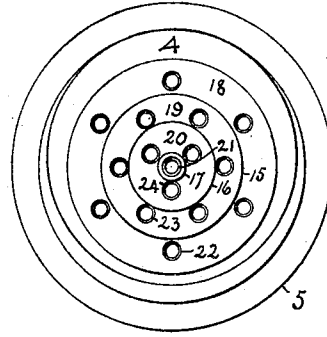


Fig. 3

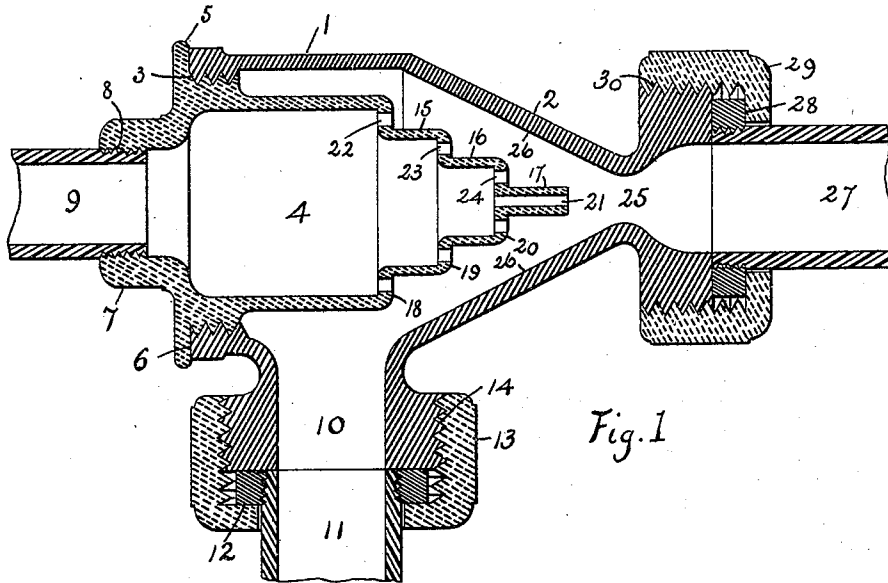


Fig. 1

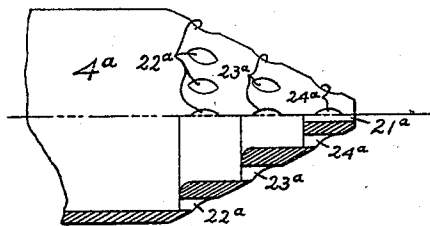


Fig. 4

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# UNITED STATES PATENT OFFICE.

JOSEPH L. CHAPMAN, OF HADDONFIELD, NEW JERSEY.

## EJECTOR.

SPECIFICATION forming part of Letters Patent No. 642,545, dated January 30, 1900.

Application filed November 7, 1899. Serial No. 736,100. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH L. CHAPMAN, a citizen of the United States, residing at Haddonfield, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Ejectors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

The object of my invention is to construct an ejector of few parts to lift and force fluids and wherein the parts are simple in construction in order to lessen the first cost and also to lessen any liability to obstruction or derangement, while almost wholly eliminating the friction of the pressure fluid through the instrument, owing to the short distance the pressure must be exerted in passing from the pressure chamber and tube before acting upon the liquid to be forced, thereby adding greatly to its efficiency; also, to present the pressure to the fluid to be ejected at different points in its passage and by multiple discharge-orifices within and directed against the coned and contracting case to impel first the air and then the fluid by successive jets of pressure. The outer case of the ejector is cylindrical or parallel-sided at its fluid-feeding end and thereafter coned or tapered toward its delivery end, thus contracting it at the point of delivery.

It will be obvious that the instrument may be so set and connected that the fluid to be acted upon may flow to it by gravity or be drawn into it by suction.

I attain the objects of my invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section. Fig. 2 is an elevation, partly in section, of the pressure chamber and tube. Fig. 3 is an end view of Fig. 2. Fig. 4 is a view, partly in elevation and partly in section, of a part of the pressure tube and chamber, showing a modification.

Similar figures of reference indicate similar parts throughout all the views.

The outer case is cylindrical or parallel-sided at its receiving end 1, and thereafter its

part 2 is coned or tapered toward its delivery end. The receiving end 1 of the outer case is interiorly screw-threaded at 3, and screwed therein is the pressure chamber and tube 4, it being provided with a flange 5 to make a tight joint against end 6. It also has a hexagonal projection 7 by which to screw and unscrew it, and the projection is tapped at 8 to receive pressure-pipe 9. The case is provided with a feeding or suction opening 10, which may be either, as here shown, at the lower side of the case, as used for suction, or the case may be turned to have opening 10 at the top or at either side when fed by gravity. Opening 10 has a feed or suction pipe 11 secured to it by ring 12, screwed thereon, held by coupling-nut 13 on thread 14. Instead of the coupling-nut the pipe might be secured by a thread tapped into the case.

The pressure chamber and tube 4 is parallel-sided or cylindrical at its receiving end, and at its delivery end is stepped in decreasing diameters 15 16 17, having connecting-walls 18 19 20. The small central step 17 is pierced with a single pressure-orifice 21, wall 18 has multiple pressure-orifices 22, wall 19 has multiple pressure-orifices 23, and wall 20 has multiple pressure-orifices 24. Orifice 21 delivers its pressure centrally within delivery-outlet 25, while orifices 22 23 24 are directed against the inner coned wall 26 of the coned part 2 of the outer case and in lines parallel to orifice 21, while encircling it, and each group or series of orifices delivers its pressure upon the body of air or fluid within the coned or tapered part of the case at a different point from any other.

The number of orifices may increase in number from 21 backward, so that each group or series will be multiplied in ratio to the increased diameter of the tapered or coned wall 26, against which they are directed in lines parallel to the center, and also the increased capacity of the cone as it recedes from outlet 25.

It will readily be understood that the number of steps of tube 4 may be more or less than shown and that the relative diameters of the steps, the tube 4, and the inclosing case may also be varied from what I have shown. At delivery end 25 is delivery-pipe 27, attached by ring 28 in coupling-nut 29 on thread 30,

and, as with pipe 11, this pipe may be attached by screw-thread and no coupling-nut used.

In Fig. 4 I show a modification of the delivery end of pressure chamber and tube 4<sup>a</sup>, cone-shaped, wherein pressure-apertures 21<sup>a</sup>, 22<sup>a</sup>, 23<sup>a</sup>, 24<sup>a</sup> are pierced through the cone parallel to its center line, and in the section of Fig. 2 and in Fig. 3 I show bell-mouthed apertures larger in diameter at the delivery than at the receiving side of the wall they pierce, which is done to better facilitate the passage of any obstruction which may be carried by the pressure fluid and be forced to the aperture.

15 The ejector which I now show and describe is an improvement on the one for which I was granted Patent No. 636,953, dated November 14, 1899, wherein I employed multiple tubes. In the case of ejectors of very small size and 20 necessarily using small tubes if the pressure fluid takes up and carries along scale or other obstructive matter there is a liability of the foreign matter becoming lodged in its passage along the small tube, obstructing the passage 25 and rendering it inoperative. Therefore I have made the improvement herein shown and described to overcome the objection to the use of the small tubes, and wherein I use the single pressure chamber and tube herein described, and wherein any obstruction is 30 subjected to the full pressure within the single tube to within a very much lessened distance to its point of delivery, and therefore less liable to stop the aperture than in my previous 35 form.

I claim—

1. In an ejector, a case partly in cylindrical or parallel-sided form, partly in conical or tapered form; a feeding-inlet thereto, a delivery-outlet therefrom, and inserted and secured 40 within the case a single pressure chamber and tube cylindrical or parallel-sided at its receiving end, having a pressure-inlet thereto at this end, and at the opposite or delivery end 45 multiple different-diameter steps, each step having multiple pressure-delivery orifices, in concentric arrangement around a central orifice, each series of orifices being at a different 50 distance back from the central orifice and formed to discharge in lines parallel to the central orifice and against the interior coned wall of the outer case, substantially as set forth.

2. In an ejector, an inclosing case partly 55 cylindrical and partly coned in form, having inlet and outlet passages for fluid flowing, a central pressure chamber and tube within the case, a pressure-inlet thereto, the pressure

chamber and tube being cylindrical at its pressure end and at its delivery end formed 60 in multiple steps of different diameters, connected by end walls, and terminating in a central tube, and within the connecting end walls multiple pressure-orifices concentrically arranged around the central tube and formed 65 to discharge in lines parallel to the central tube and against the inner coned wall of the outer case, substantially as shown and described.

3. In an ejector, an inclosing case partly 70 cylindrical and partly conical in form, an inlet to the cylindrical part, an outlet from the conical part, a pressure chamber and tube parallel-sided or cylindrical at its receiving end secured within the case, having a pressure-inlet thereto at its receiving end, and at 75 its opposite or discharge end a central discharge-orifice and concentrically surrounding the same, in gradation, groups of multiple discharge-orifices, each group delivering its 80 discharge within and against the inner conical wall of the inclosing case, at a different point from any other group, and in lines parallel to the central discharge, substantially as set forth. 85

4. In an ejector, a case partly cylindrical and partly cone-shaped, an inlet and an outlet therefor, a cylindrical pressure-chamber and tube therein, having a pressure-entrance thereto, and oppositely located, multiple bell-mouthed discharge-orifices, one being central 90 and the others in graduated groups concentric to the center of the pressure chamber and tube, and discharging in lines parallel to the center of the ejector and against the coned 95 part of the outer case, substantially as described.

5. In an ejector, an inclosing body part, partly cylindrical and partly conical in form, inlet and outlet passages therefor, a cylindrical or parallel-sided pressure-chamber and tube inserted and secured therein, having at 100 its cylindrical end a pressure-inlet, and its opposite end being coned, and placed within the coned body part and foraminated to discharge 105 concentrically and in lines parallel to the center of the pressure chamber and tube, at different points, against the inner conical wall of the inclosing body, and also into its outlet-passage, substantially as described. 110

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH L. CHAPMAN.

Witnesses:

W. H. ALCOCK,  
R. C. WRIGHT.