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1,879,366

EJECTOR

Filed April 21, 1930

Fig. 1.

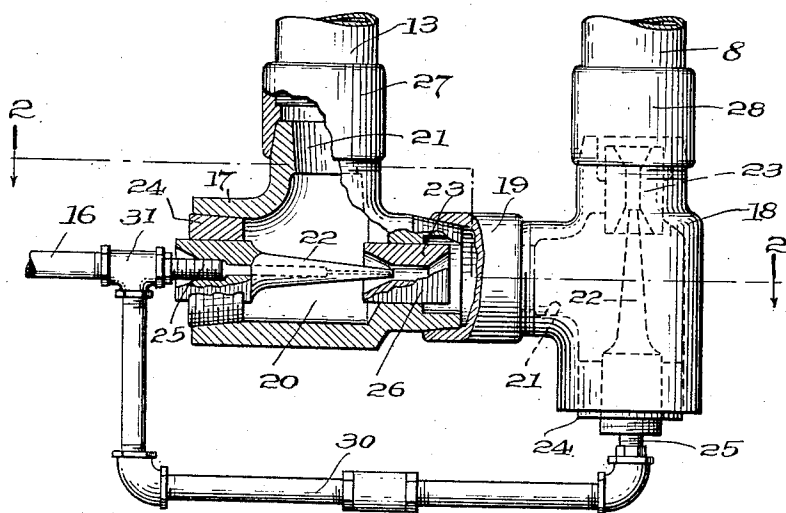
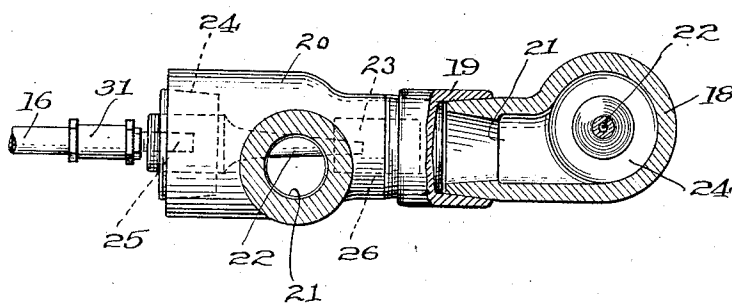


Fig. 2.



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EJECTOR

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This invention is an ejector, the present application being a division of my copending application Ser. No. 371,908, filed June 18, 1929; and it is the object of the invention to provide novel means for pumping a relatively large volume of any fluid at an appreciable pressure by means of a high pressure jet.

It is a further object of the invention to provide an ejector wherein a high pressure jet of small volume is adapted to discharge a larger volume of fluid at only a slightly reduced pressure, and to preferably arrange the ejector as a multiple-stage jet wherein the initial jet is adapted to draw in a large volume of fluid and the succeeding jet provides for discharge of the large volume of fluid at a but slightly reduced pressure which will insure desired compression of the fluid.

It is a still further object of the invention to arrange the plurality of jets as interchangeable units adapted for convenient assembly for providing any desired multiple-stage ejection, thereby making for economy in manufacture and convenience in assembling units so as to produce any desired compression of a fluid.

It is a still further object of the invention to adapt the ejector for drawing in a relatively large volume of a fluid so that the fluid moves circumferentially around the pressure jet for setting up a whirling action which will increase the efficiency of the ejector as the relatively large volume of fluid is discharged axially of the pressure jet.

Further objects of the invention will be readily understood from the following description of the accompanying drawing showing a preferred apparatus, and in which:

Fig. 1 is a plain view of the ejector, partly in axial section.

Fig. 2 is a transverse section on the line 2-2 of Fig. 1.

The ejector is preferably a multiple-stage ejector comprising interchangeable ejector elements 17-18 detachably connected by a coupling 19 so as to form a two-stage ejector. Each of the ejector elements comprises a casing having an axial bore 20 and a lateral inlet 21, with a nozzle 22 extending into one

end of bore 20, and a Venturi tube 23 preferably mounted in the opposite discharge end of bore 20 and surrounding the end of the nozzle. The nozzle is connected to a supply conduit 16 for a gas at relatively high pressure, so that a comparatively small volume of said high pressure gas is discharged from the nozzle into Venturi tube 23, thereby drawing in a relatively large volume of any desired fluid through inlet 21 and discharging the same through the Venturi tube at only slightly less pressure than that in the nozzle.

The inlet 21 is preferably arranged with its longitudinal axis to one side of the axis of its nozzle 22 as shown in Fig. 2, so that the induced fluid will move circumferentially around the nozzle for setting up a whirling action in the Venturi tube and thereby increasing the efficiency of the jet. The nozzle is preferably longitudinally adjustable with relation to its Venturi tube so that it may be regulated for maximum efficiency in accordance with the pressure of the jet, and for this purpose the nozzle may be threaded into a reduction plug 24 mounted in the end of the ejector casing, with the adjustable nozzle connected to the fixed conduit 16 by a nipple 25 having threaded engagement with the nozzle. The Venturi tube 23 is preferably also axially adjustable for regulating the jet in accordance with the available pressure, and for this purpose the Venturi tube may be threaded into the bore of the ejector element as shown at 26.

The ejector elements 17-18 which comprise the two-stage ejector are assembled with the inlet 21 of element 18 connected by coupling 19 to the discharge end of the casing of element 17, and a pipe 13 through which the induced flow is supplied to the ejector is connected to the inlet 21 of ejector element 17, as for example by coupling 27, and the discharge end of ejector element 18 is connected by a similar coupling 28 to a discharge pipe 8. The nozzles 22 for the two elements of the multiple-stage ejector may be connected by a branch conduit 30 which is coupled to conduit 16 by a union 31, and the jet of ejector element 17 is thus adapted to draw in a large volume of gas through its inlet 21 and discharge

the same into element 18 at appreciable pressure, and the jet of element 18 will discharge this large volume of gas at an increased pressure determined by the pressure of the jet, so that the large volume of gas delivered through pipe 8 will have a pressure only slightly less than that of the pressure of the jet.

I have thus provided an ejector adapted for whirling movement of the induced flow whereby a relatively large volume of fluid may be discharged at a pressure only slightly less than that of the high pressure supplied through a jet of relatively small volume, and I have also adapted the jets for convenient assembly so as to provide for any desired multiple-stage ejection, in order that a relatively large volume of fluid may be delivered at an appreciable pressure which need be but slightly less than the high pressure of the jets.

I claim:

1. An ejector comprising a plurality of identical interchangeable elements; each including a casing having an axial bore and a lateral inlet, one end of the axial bore being a supply end and the opposite end of the axial bore being a discharge end, a nozzle projecting into the supply end of the axial bore and longitudinally adjustable relative to the casing, and a Venturi tube mounted in the discharge end of the axial bore, the nozzle forming a jet inducing flow through the lateral inlet and discharging said flow under pressure through the Venturi tube, and the lateral inlet being at one side of the axis of the nozzle whereby the induced flow is moved circumferentially around the nozzle for whirling discharge through the Venturi tube; a straight coupling sleeve connecting the discharge end of one of said interchangeable elements with the lateral inlet of a succeeding element, an inlet pipe connected to the lateral inlet of the first element, an outlet pipe connected to the discharge end of the succeeding element, and pipes longitudinally adjustably connected to the outer ends of the nozzles which project outwardly through the supply ends of the elements, said pipes supplying fluid under pressure to the nozzles.

2. An ejector comprising a plurality of identical interchangeable elements; each including a casing having an axial bore and a lateral inlet, one end of the axial bore being a supply end and the opposite end of the axial bore being a discharge end, and a nozzle projecting into the supply end of the axial bore, the nozzle forming a jet inducing flow through the lateral inlet and discharging said flow under pressure through the discharge end of the casing; and a straight coupling sleeve connecting the discharge end of one of said interchangeable elements with the lateral inlet of a succeeding element.

3. An ejector comprising a plurality of

identical interchangeable elements; each including a casing having an axial bore and a lateral inlet, one end of the axial bore being a supply end and the opposite end of the axial bore being a discharge end, and a nozzle projecting into the supply end of the axial bore, the nozzle forming a jet inducing flow through the lateral inlet and discharging said flow under pressure through the discharge end of the casing, and the lateral inlet being at one side of the axis of the nozzle whereby the induced flow is moved circumferentially around the nozzle for whirling discharge through the discharge end of the casing; and a straight coupling sleeve connecting the discharge end of one end of said interchangeable elements with the lateral inlet of a succeeding element.

In testimony whereof I have affixed my signature.

DAVID G. LORRAINE.