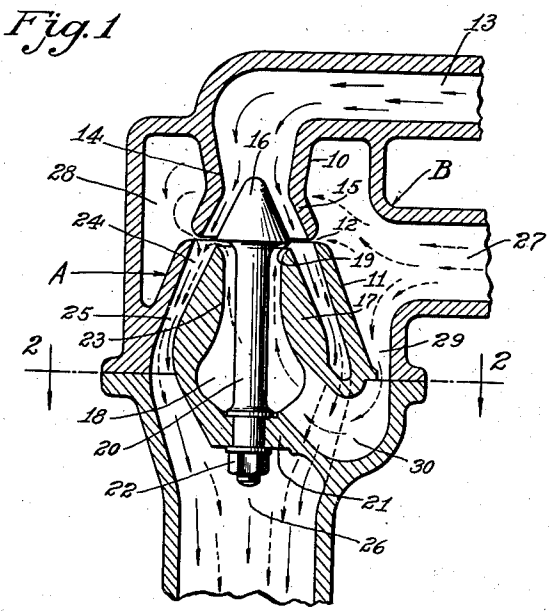
June 11, 1935. J. O. FINK 2,004,277

EJECTOR

Filed Sept. 12, 1932

Fig. 1



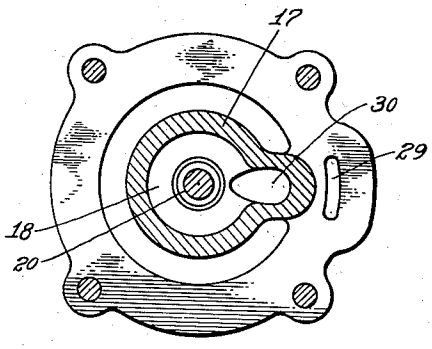


Fig. 2

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EJECTOR

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Application September 12, 1932, Serial No. 632,647

2 Claims. (Cl. 103—262)

This invention relates to ejectors and has among its objects the provision of an ejector of increased efficiency, lesser cost, and more compact arrangement.

My invention relates particularly to the high efficiency types of ejectors wherein the primary or driving fluid is passed through a nozzle construction so as to entrain the secondary or driven fluid, the latter passing inwardly to the nozzle from the outside and also from the inside of the annular primary fluid stream. Heretofore in ejectors of this general type, the fluid stream has been directed so as to move approximately at right angles on entraining the secondary fluid and the mixture has been collected in a circumferential chamber. Such construction is objectionable from the standpoint that considerable energy is lost by reason of the right angle bend which the fluid makes, giving rise to inefficiencies, eddy losses and the like, and is also objectionable from the standpoint that the annular collecting chamber takes up a relatively large amount of space, giving rise to difficult installation and providing for relatively high cost.

It is a further object of my invention to overcome the aforesaid objectionable characteristics by providing an ejector wherein the fluid stream passes substantially axially of the nozzle structure, the stream curving only slightly from a true axial path in order to accommodate entraining the secondary fluid within the annular primary fluid stream. By reason of my construction the fluid stream passes generally axially of the ejector so as to avoid the aforesaid right angle bend as well as the annular collecting ring heretofore employed.

Further objects and advantages of my invention reside in the particular combination and arrangement of parts more particularly hereinafter described and claimed, reference being had to the accompanying drawing illustrating one embodiment of my invention, in which:

Fig. 1 is a sectional elevation view through the ejector, and

Fig. 2 is a sectional view along the line 2—2 of Fig. 1.

In the drawing, reference character A represents the ejector nozzle having a primary annular nozzle portion 10 and a secondary annular nozzle portion 11, these portions being spaced to provide an annular opening 12 for passage of the secondary fluid inwardly to the nozzle as hereinafter described.

The primary nozzle portion 10 is formed with a suitable inlet 13 for the primary fluid under pressure, this nozzle portion having a throat 14 adapted to increase the velocity of the primary fluid passing therethrough. Below the throat 14 the nozzle portion 10 is provided with an expanding part 15 adapted to expand the primary fluid and increase its velocity in the opening 12. Associated with the expanding part 15 is a nozzle projection 16 located concentrically therewithin, this projection causing the primary fluid stream to form a jet of fluid substantially in the form of an annulus between the nozzle projection 16 and the inner walls of the expanding nozzle part 15.

The secondary nozzle portion 11 cooperates with portion 10 so as to receive the fluid stream therefrom, the portion 11 having a central tube or core 17, the inner walls of which provide a passage 18 for conducting the secondary fluid to the outlet 19. The outlet 19 is formed between the nozzle projection 16 and the upper end of core 17, the outlet 19 being associated within and adjacent to the outlet 12. The projection 16 may be formed with a stem 20 extending axially within core 17 and secured to the bottom wall 21 thereof by a suitable fastener 22. If desired, for greater efficiency, the passage 18 may be nozzle shaped as indicated at 23 in order to facilitate the flow of the secondary fluid to the outlet 19.

The outer wall of the core 17 is spaced within the inner wall of nozzle portion 11 so as to provide the annular conduit 24 for passage of the primary and secondary fluids and this annular conduit is preferably provided with a throat 25 adapted to increase the efficiency of flow of the fluid mixture through the secondary nozzle portion 11. Below the throat 25 the fluid flow unites in the discharge conduit 26 and it will be noted that the fluid flow through the nozzle A is generally axial in its direction, the fluid moving only slightly outwardly and again inwardly around the core 17. The nozzle passages are further formed with smooth walls without abrupt changes in direction whereby to reduce eddy losses and increase the efficiency of fluid flow.

Surrounding nozzle A is a casing B having an inlet 27 for the secondary or driven fluid, the casing B having a chamber 28 around opening 12 so as to supply the secondary fluid through opening 12 for entrainment with the primary fluid discharged at high velocity and therefore with high suction effect from the primary nozzle portion 10 into the secondary portion 11.

Casing B is formed with a fluid outlet 29 communicating with the conduit 30 leading to passage 18 and by referring to Fig. 2 it will be noted that the conduit 30 extends across a relatively small part of the annular passage 24 of nozzle portion 11. It will be noted from the foregoing that the nozzle portions 10 and 11 are provided with registering substantially frusto-conical annular passages providing for fluid flow therethrough substantially axially of the nozzle.

My ejector is adapted for use with many fluids, one of which may be termed a primary or driving fluid and enters the nozzle through the inlet 13 and the other fluid which may be termed the driven or secondary fluid is supplied to the nozzle through a suitable inlet 27 whence the secondary fluid is directed to the primary fluid stream inwardly at opening 12 and outwardly thereto by opening 19. By reason of such arrangement I have provided an ejector of increased efficiency, there being a relatively great amount of working area between the primary and secondary fluids. I have also provided for eliminating the discharge from the primary nozzle portion at right angles as referred to hereinbefore. My invention is especially useful in connection with gases or liquids of any type desired to be subjected to the pumping action of the ejector.

What I claim as my invention is:

1. In an ejector, a nozzle having cooperating primary and secondary portions, said nozzle having an inlet for a secondary fluid intermediate said nozzle portions, a casing about said secondary fluid inlet forming a chamber for a secondary fluid open to said inlet, a conduit spaced within said secondary nozzle portion, said conduit communicating with said chamber and discharging secondary fluid to said nozzle adjacent said inlet, said secondary nozzle portion having an annular passage around said conduit extending generally axially of said primary nozzle portion, a nozzle projection within the discharge end of said primary nozzle portion, said projection providing an annular passage within said primary nozzle portion, and a stem carrying said projection and extending within said conduit.

2. In an ejector, a nozzle having cooperating spaced primary and secondary portions each having a frusto-conical annular fluid accelerating passage, said passage being in communication to provide substantially continuous axial flow of a primary fluid through said nozzle, a core within said secondary nozzle portion, means for supplying a secondary fluid laterally inwardly and outwardly to the space between said nozzle portions, and an axially disposed discharge conduit below said core merging outwardly thereabout with the frusto-conical passage of said secondary nozzle portion.

JAMES O. FINK.