

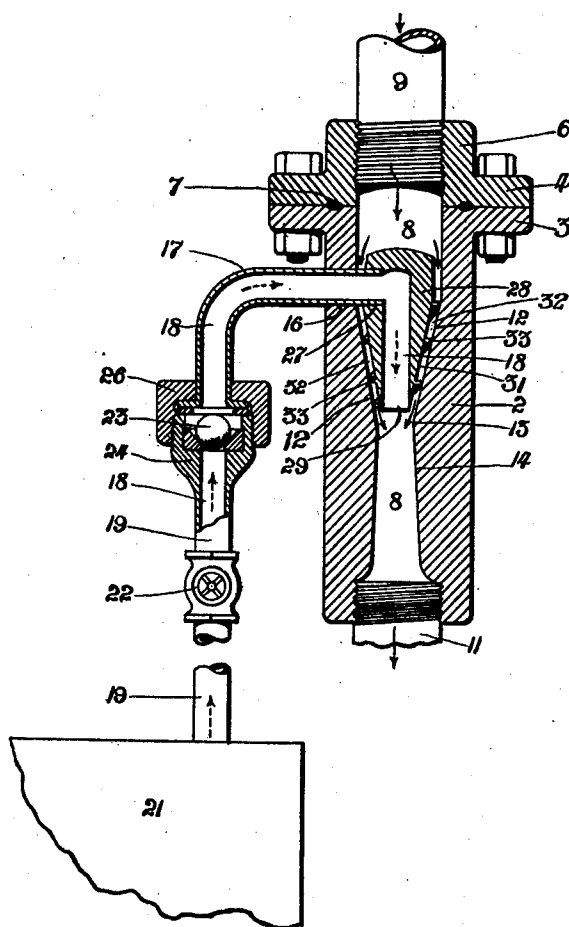
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VACUUM PRODUCING APPARATUS

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# UNITED STATES PATENT OFFICE.

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## VACUUM-PRODUCING APPARATUS.

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This invention relates to an apparatus for exhausting air and other gases from vessels or the like in which it is desired to create a vacuum for any purpose, such for example as in vacuum cleaning; the manufacture of electric lamps, the preservation of foodstuffs and numerous other processes.

The object of the invention is to provide a simple, inexpensive and highly efficient apparatus of the above character which is devoid of moving parts, may be readily applied to the desired purpose and will exhaust air or other gases more rapidly and economically than vacuum pumps and like devices at present commonly employed for such purposes.

The salient feature embodied in this invention comprises means in the pressure fluid pipe whereby centrifugal motion is imparted to the fluid to cause it to form a hollow whirling jet or vortex into the hollow of which the air is drawn from the chamber being exhausted.

But in order that this invention may be better understood reference will now be made to the accompanying sheet of drawings which are to be taken as part of this specification and read herewith:—

The drawing illustrates a part sectional view of the improved apparatus which is shown applied to a vacuum chamber from which it is desired to exhaust air. The dotted arrows indicate the course of the exhausted air whilst the unbroken arrows denote the course taken by the pressure fluid which creates the vacuum.

The invention includes a pressure fluid pipe or cylinder 2 which may be flanged at one end as at 3 this flange being bolted to a similar flange 4 on an extension or cap 6 of the pipe or cylinder 2. A jointing ring is inserted in grooves in the opposite end faces of the elements 2 and 6 as shown. Said cap and jointing means may however be dispensed with in some cases.

A pressure fluid passage 8 extends longitudinally through the pipe or cylinder 2, pressure water, steam or other fluid being introduced at one end of this passage through an inlet pipe 9 and escaping at the other end thereof by way of an outlet pipe 11.

The intermediate portion of the passage 8 converges forwardly as at 12 to a point 13 from which it diverges forwardly as at 14 to

the outlet pipe 11. Passing through an opening 16 in one side of the pipe or cylinder 2 at the rear of the forwardly converging portion 12 is a branch pipe 17 through which passes an induction passage 18.

The induction passage 18 communicates by way of a pipe 19 with a vacuum chamber 21 or the like from which the air or other gas is to be exhausted. This pipe 19 is preferably provided with a hand operated control valve 22 whilst a non return valve 23 is also fitted in the induction passage. This non-return valve may be accommodated as shown in the enlarged upper end 24 of the pipe 19 where the latter is connected by a union or the like 26 to the branch pipe 17.

The inner end of the branch pipe 17 is threaded as at 27 to a nozzle 28 through which the induction passage 18 also passes to the mouth 29 of the nozzle. In assembling the various parts the nozzle is first introduced into the pressure fluid passage 8 the branch pipe 17 being then passed through the opening 16 and screwed into the nozzle after which the opening 16 is sealed by welding or other suitable means.

The nozzle is located as shown within the converging portion 12 of the pressure fluid passage 8 the exterior of the nozzle being provided with a forwardly converging portion 31 between which and the converging surface 12 a narrow annular passage 32 for the pressure fluid is formed.

Extending across the annular passage 32 are one or more outstanding helical ribs or baffles 33. These ribs are preferably formed on the converging portion of the nozzle as shown and cause the pressure fluid passing through the annular passage 32 to be whirled centrifugally so that it issues around the mouth of the nozzle in the form of a hollow annular whirling jet or vortex into the hollow of which the air or fluid is induced through the induction passage 18 such air or fluid being thus carried away within the jet of pressure fluid, through the outlet pipe 11 to any desired destination.

By the above means a powerful suction is set up in the induction passage and a high degree of efficiency is obtained from a comparatively simple and inexpensive apparatus which calls for a minimum of energy in its operation and owing to the absence of moving parts is not liable to disorder.

I desire it to be understood that various

improvements and modifications may be embodied without departing from the spirit and scope of the invention for instance the baffles 33 may be formed on the pipe 8 or  
5 any other suitable means may be embodied to perform the same function.

What I claim as my invention and desire to secure by Letters Patent is:—

10 An ejector comprising a pressure fluid conduit having a part reversely flared from an intermediate point forming a passage of maximum constriction at that point, a nozzle in the flared part of said conduit on that  
15 side adjacent the source of pressure, communicating with the body of fluid to be

ejected, said nozzle having an external shape corresponding substantially to that of the flared wall by which it is surrounded and terminating adjacent that part of the passage of maximum constriction, and a spiral  
20 rib between said nozzle and conduit forming a spiral passage for the pressure fluid whereby centrifugal force is imparted to the pressure fluid, effective to hold said  
25 fluid against the wall of the oppositely flared part, producing a vacuous central space in advance of said nozzle.

Signed at Melbourne, Victoria, Australia, this 20th day of September, 1922.

ADOLPH MARTIN KOBIOŁKE.