J. A. MITSCH.

VACUUM GENERATOR.

APPLICATION FILED NOV. 16, 1911.

1,206,126.

Patented Nov. 28, 1916.

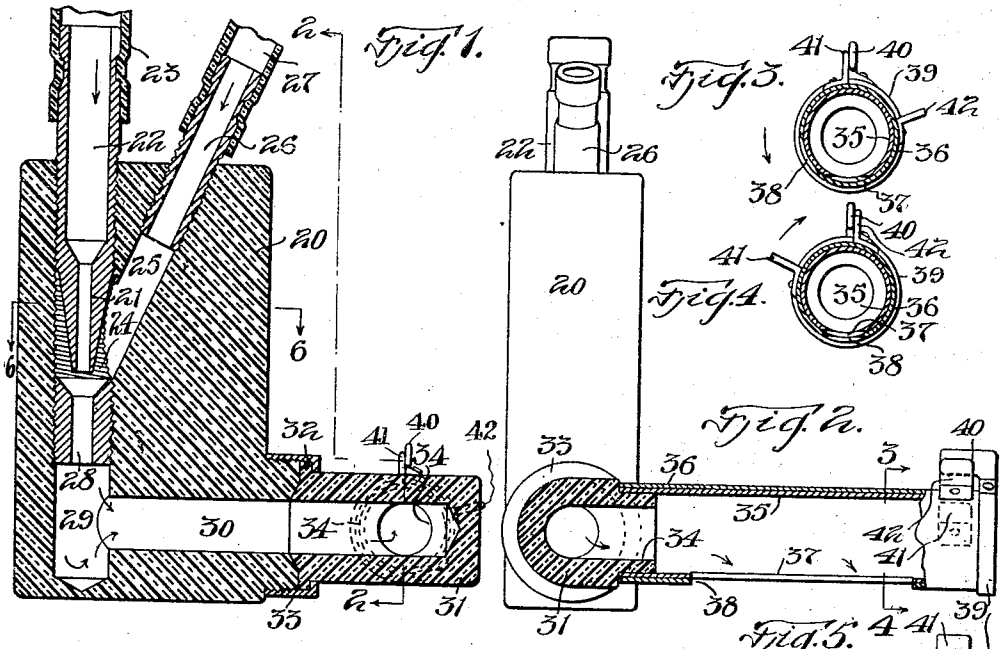


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

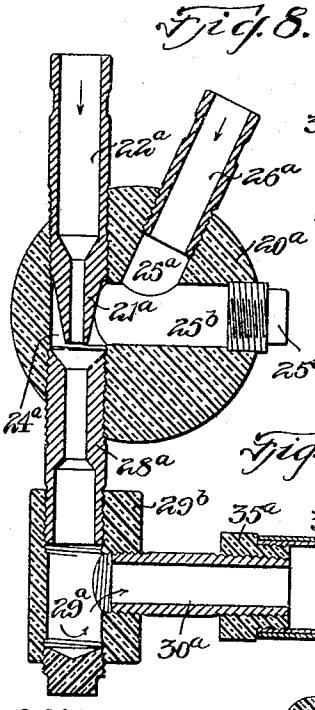


Fig. 8.

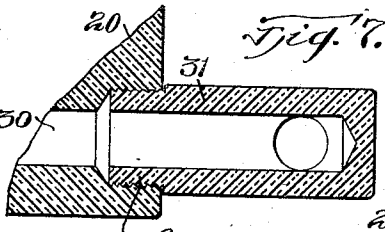


Fig. 7.

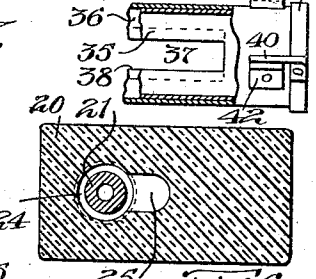


Fig. 6.

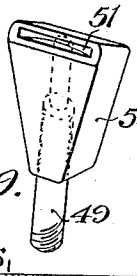


Fig. 9.

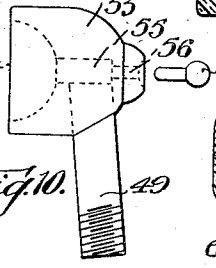


Fig. 10.

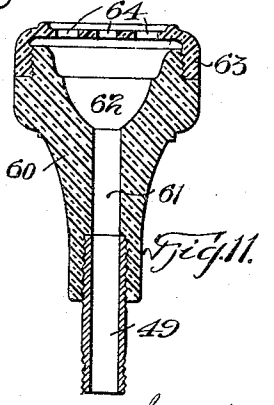


Fig. 11.



Fig. 12.

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UNITED STATES PATENT OFFICE.

JOHN A. MITSCH, OF BOSTON, MASSACHUSETTS.

VACUUM-GENERATOR.

1,206,126. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed November 16, 1911. Serial No. 660,657.

To all whom it may concern:

Be it known that I, JOHN A. MITSCH, a citizen of the United States, and a resident of Mattapan, Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Vacuum-Generators, of which the following is a specification.

This invention relates to apparatus for causing a fluid to flow by means of the velocity of another fluid escaping from a contracted nozzle, and the invention has particular reference to mechanism of the ejector type adapted to massage and syringe purposes, or for ventilating purposes, or the removal of odors, gases, moist air or dust, or the cleaning of fabrics; in fact, wherever it is desired to variably control the force of the exhaust, or to reverse the direction of flow through the pipe connecting with the chamber around the jet nozzle.

One of the objects of the invention is to provide an apparatus of this character having means whereby the location of the seal which is necessary to the effective operation of the ejector will always be at a fixed point relatively to the ejector nozzle regardless of the amount of pressure or velocity of the actuating flow through said nozzle.

Another object is the provision of an improved apparatus of this type having means for regulating or varying the effect obtained from a fixed or certain velocity of flow of the actuating fluid.

To these ends, the invention consists in the connection and combination of parts substantially as herein described and claimed.

Of the accompanying drawings, Figure 1 represents a vertical section through my improved apparatus in one of its embodiments; Fig. 2 represents a section on line 2—2 of Fig. 1, with the adjustable member of the outlet in horizontal position; Figs. 3 and 4 represent a section on line 3—4 of Fig. 2, the discharge slot being closed in Fig. 3 and open in Fig. 4; Fig. 5 is a plan view, partly broken out, of the outer end portion of the adjustable terminal; Fig. 6 represents a section on line 6—6 of Fig. 1; Fig. 7 is a view similar to a portion of Fig. 1, illustrating a modification; Fig. 8 is a view similar to Fig. 1, illustrating a modified embodiment of the invention; Figs. 9, 10, 11 and 12 are detail views of appliances adapted to enable the vacuum generator to be put to various uses.

Similar reference characters indicate the same or similar parts in all of the views.

Referring first to Figs. 1 to 6 inclusive, a block or carrier 20, of suitable material such as hard rubber, holds the parts of the apparatus in their relative positions for use so that they cannot be broken apart or their operative positions disturbed, even when subjected to rather rough handling such as is liable to occur when placed in a wash-stand, basin or sink and connected up to a water faucet. The nozzle 21 at the inner end of a tube 22 is secured, as by screw threading, in a boring of the block, said tube 22 being adapted to be connected by a flexible hose or pipe 23 to a water faucet. The space in the boring around the nozzle provides a chamber 24 with which the air inlet passage 25 connects. By means of a short pipe section 26 and a flexible pipe or hose 27, the air inlet may be connected to massage or irrigating appliances such as shown in Figs. 9, 10, 11 and 12, or to other terminals according to the use to which the apparatus is to be put.

Below the nozzle 21 is a suitable combining tube 28 and below the latter is a chamber 29 with which a lateral passage 30 communicates at a point above the end or bottom of said chamber 29 so that the two fluids (the actuating fluid and the induced fluid) have their course thoroughly broken up. To distinguish the chamber 29 from others, I refer to it as the vortex chamber because in it the fluids have a whirling motion that so completely intermingles the two fluids that they can not lose their combination. And at this fixed and definite distance from the nozzle there is always a seal presented by the vortex to prevent loss of efficiency of the ejector, regardless of the pressure or velocity of the actuating fluid.

The vortex causes the direction of flow to be reversed so as to break up the current to produce a sufficiently solid flow to prevent access of atmospheric pressure at a point between the combining tube of the ejector and the point of final discharge of the combined fluids. In other words, it forms a seal to prevent the effect of atmospheric pressure against the power of the ejector.

A swivel tube 31, having a flange 32 by means of which a coupling 33 connects it to the block 20, is provided with a lateral nipple 34 (Fig. 2) on which is fixedly mounted a tube 35. A tube 36 is rotatively mounted on the tube 35 and said tubes are formed with longitudinal slots 37 and 38 respectively, said slots being adapted to register when full and free escape is desired. A disk 39 closes the end of tube 35 and has a lug or finger piece 40. The rotatable tube 36 has two finger pieces 41, 42, preferably shorter than the finger piece 40. By grasping the finger piece 40 and one or the other of the finger pieces 41, 42, the outer tube can be rotated to open or close the escape passage through the slots, or the outer tube can be left with said passage partially open. When it is desired to retard or shut off the discharge through the slots 37, 38, of the terminal member, the operator simply presses the finger piece 41 toward, or to, the position shown in Figs. 1 and 3. As the escape opening through the slots is contracted, it of course, follows that the flow is retarded and the induced current is reduced to lesser force. When the escape opening is closed, all ejector action ceases and then the water or actuating fluid passes up through pipes 26 and 27. This enables the apparatus to be employed for such uses as internal irrigation. The closing of the escape opening as just explained, causes a reversal of the flow through the passage 26, 27 of the ejector apparatus. For instance, by connecting such an implement as shown at 66 in Fig. 12 to the hose 27, then when the escape opening through slots 37, 38 is closed, fluid entering through pipe 23 will be conducted to the stomach or other organ to be treated. Then by actuating the finger piece 42 to the position shown in Fig. 4, the escape passage will open, and the apparatus will then immediately cause the withdrawal of the injected fluid. In other words, by the construction which enables a quick reversal of flow to be effected through the passage 26, 27, a fluid can be forced into the stomach or other organ to be treated, through said passage, by simply closing the escape or outlet, and then upon opening the latter the fluid which was so forced into the organ will be withdrawn, due to the reversal of the flow through said passage.

The outer tube may be set in an intermediate position to leave the escape passage partially open if the pressure of the actuating fluid is greater than needed for the purpose to which the apparatus is being put. Such pressure has no effect upon the tubes to tend to either enlarge or reduce the escape passage.

The object of swiveling the trap outlet or terminal member is to enable it to be given a horizontal position, or a vertical position at right angles to the position shown by Fig. 2, or an intermediate position, to regulate the induced flow through passageway 25 if desired, according to different degrees of pressure of the actuating flow through nozzle 21. And said member aids in producing the seal below the combining tube 28. It is swung down for light pressures and up for high pressures. When swung up, the escape opening through the slots is vertically elongated so that the level of the combined fluids in this adjustable terminal member of the trap will automatically vary in height according to the volume entering said member. A small volume will result in the level being only slightly above the lower end of the slots. If the volume increases, the level will rise, but the escape will be freer because of the elongation of the slots. More fluid will escape as the level rises. But at all times, regardless of variations in volume, the seal will be preserved. The escape can be restricted at any time by partial rotation of the outer tube.

The slotted escape opening takes care of variable pressures without affecting the seal. If the outlet were adapted only for a given pressure or volume, then excess pressure of actuating fluid would tend to convert the pressure into a backward one through the passage 25.

In Fig. 7 I illustrate a slightly modified form of swiveled connection for the tube 31, said tube simply having a screw-threaded inner end 31^a fitting a threaded opening in block 20.

In Fig. 8, the carrier is shown as a circular block 20^a, in which is mounted the nozzle 21^a and tube 22^a, a chamber 24^a being located between the nozzle and the combining tube 28^a. The passage 25^a has an inlet pipe 26^a mounted in it. The block also has a chamber 25^b closed at its outer end by a plug 25^c. Mounted on the tube 28^a is a block 29^b having a vortex chamber 29^a which communicates with a lateral pipe 30^a. On the latter is secured a nipple 35^a, between which and a cap 35^b are the slotted tubes 35, 36. This structure is similar in operation to that shown in Figs. 1 and 2 excepting that the terminal outlet member can not be swung up parallel with the nozzle. The result, obtained by a vertical positioning of the outlet member, however, can be reached by allowing the apparatus to take a position with the nozzle horizontal and the tubes 35, 36 upright.

Fig. 9 shows a pipe or short tube 49 adapted to be connected to the opposite end of hose 27 from that which is secured to pipe 26, said tube 49 carrying a massage implement 50 having a flesh manipulating slot 51.

In Fig. 10 a similar tube 49 is shown, said tube having a massage implement 53 formed with a cup-shaped recess 54 communicating

with tube 49 by a passage 55. An aperture 56 communicating with passage 55 may be alternately stopped up and opened by the finger of the user to cause an intermittent manipulation of the flesh against which the cup 54 is pressed. The aperture 56 may be closed by a plug 57.

In Fig. 11, the tube 49 carries a massage implement 60 having an aperture 61 extending to a cup-shaped recess 62, over which is removably secured a cap 63 having apertures 64. Manipulation of a plurality of small surfaces of the skin may be effected with the cap in place, and of a larger area when the cap is removed.

I claim:—

1. An apparatus of the character described, comprising an ejector having a terminal member including inner and outer tubes having slots adapted to register, one of said tubes being rotatable relatively to the other.

2. An apparatus of the character described, comprising an ejector having a terminal member including inner and outer tubes having slots adapted to register, one of said tubes being rotatable relatively to the other, and means whereby the tubes may be held with their slots registering with each other.

3. An apparatus of the character described, comprising a block, an ejector nozzle therein, conduits in said block for an actuating fluid and an induced fluid, an outlet through another portion of the block, and a terminal outlet member adjustable to vary the height of the point of discharge relatively to passageways in the block.

4. An apparatus of the character described, comprising a portable member having conveying passages, flexible pipes connected with said passages, one of said passages terminating in a chamber and the other having a nozzle in said chamber to constitute an ejector, and a controllable outlet leading from said chamber, said outlet being closable to cause a reversal of flow through the pipe and passage leading to said chamber.

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

JOHN A. MITSCH.

Witnesses:
A. W. HARRISON,
J. M. MURPHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."