H. TAYLOR.

VACUUM PRODUCING DEVICE.

APPLICATION FILED JULY 31, 1911.

1,082,568.

Patented Dec. 30, 1913.

4 SHEETS—SHEET 1.

Fig. 1.

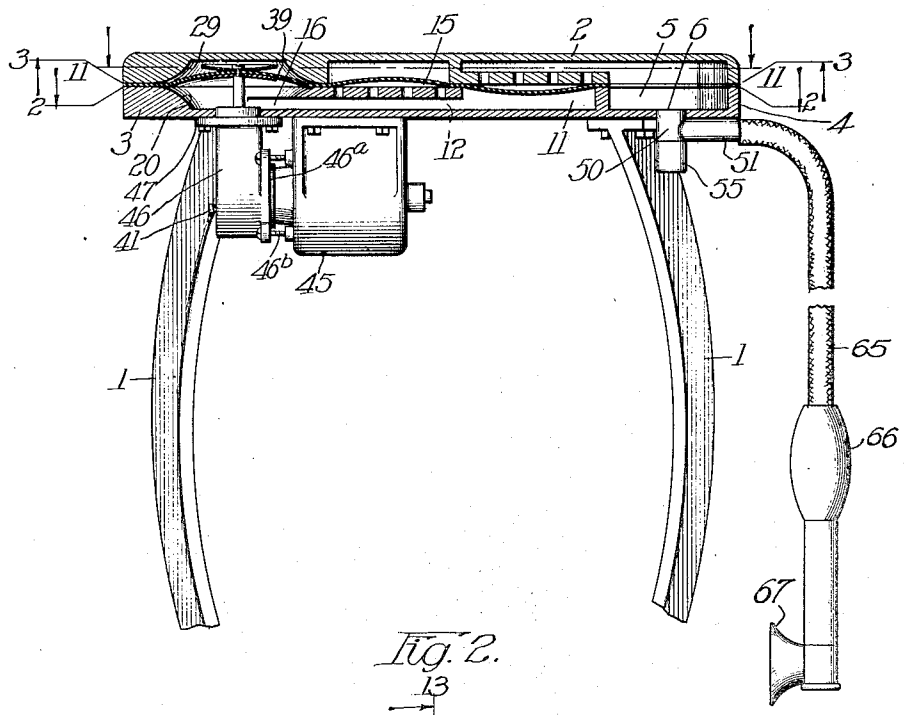
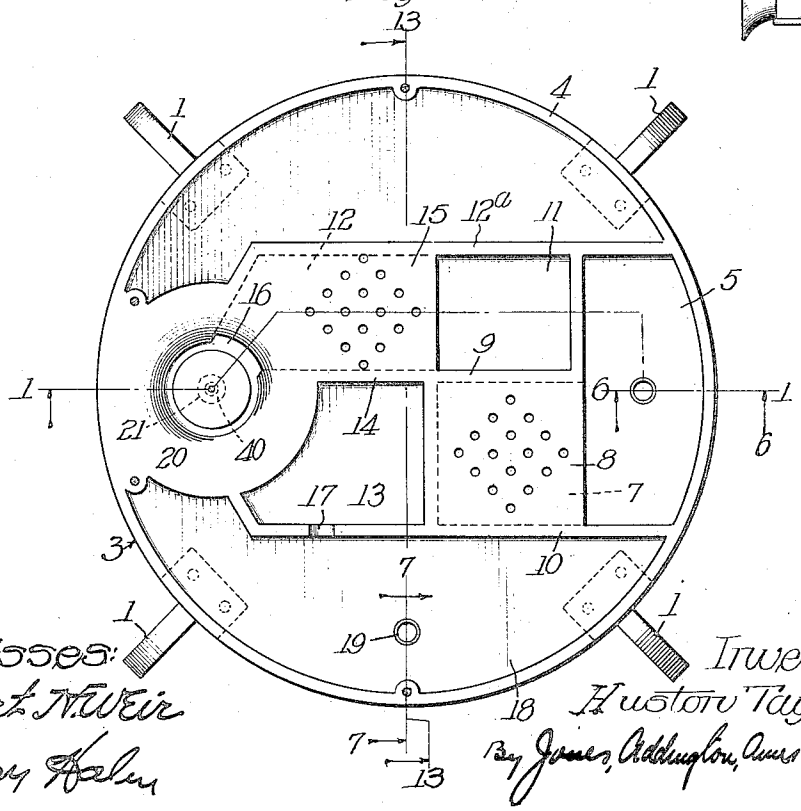


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

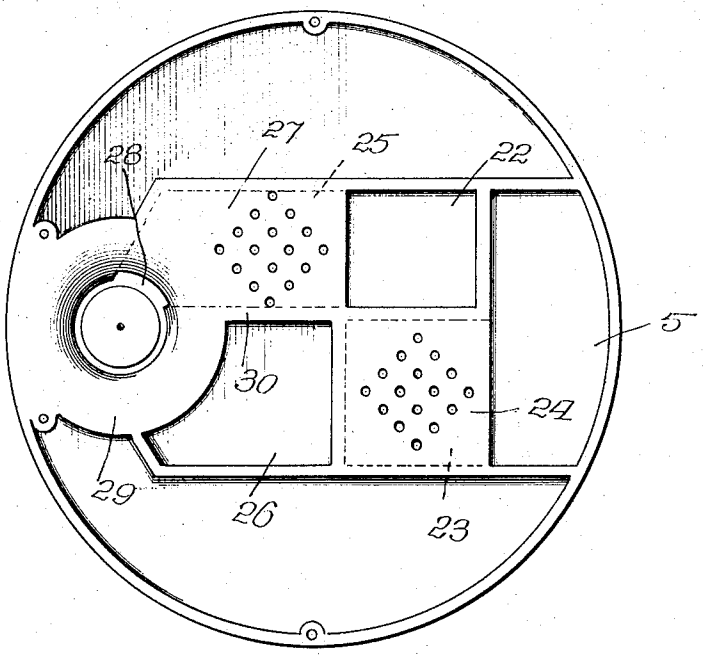


Fig. 4.

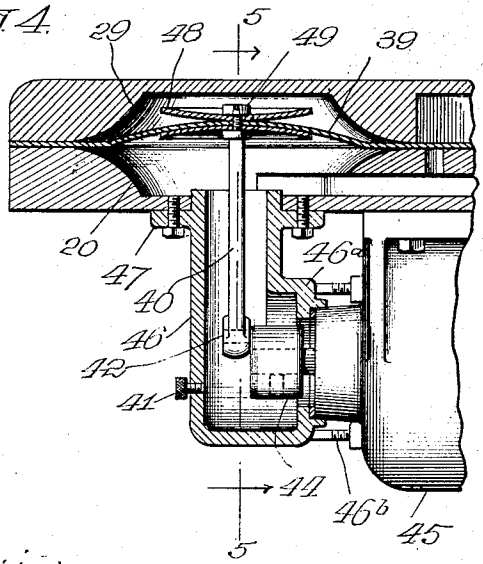
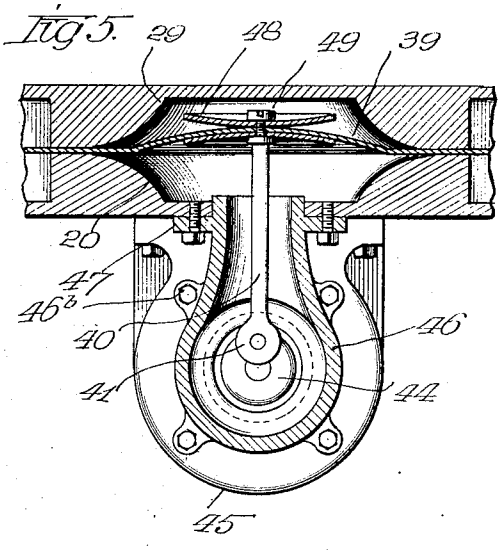


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 6.

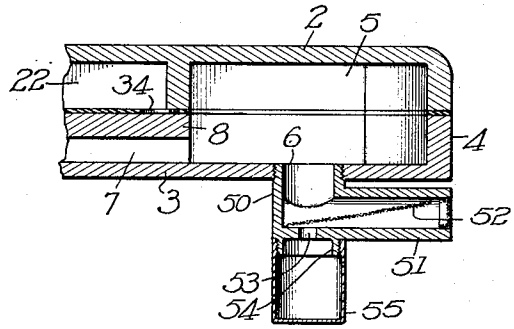


Fig. 7.

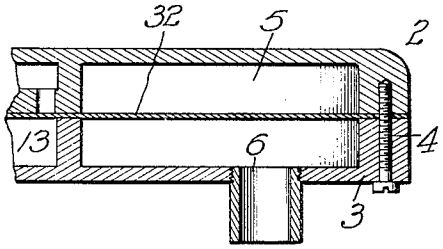


Fig. 8.

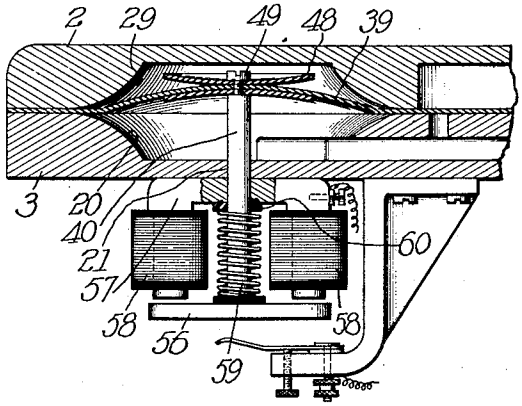


Fig. 9.

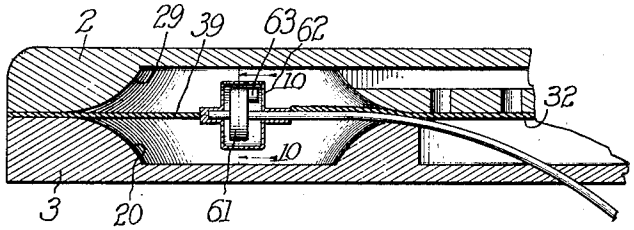
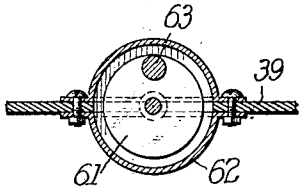


Fig. 10.



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4 SHEETS—SHEET 4.

Fig. 11.

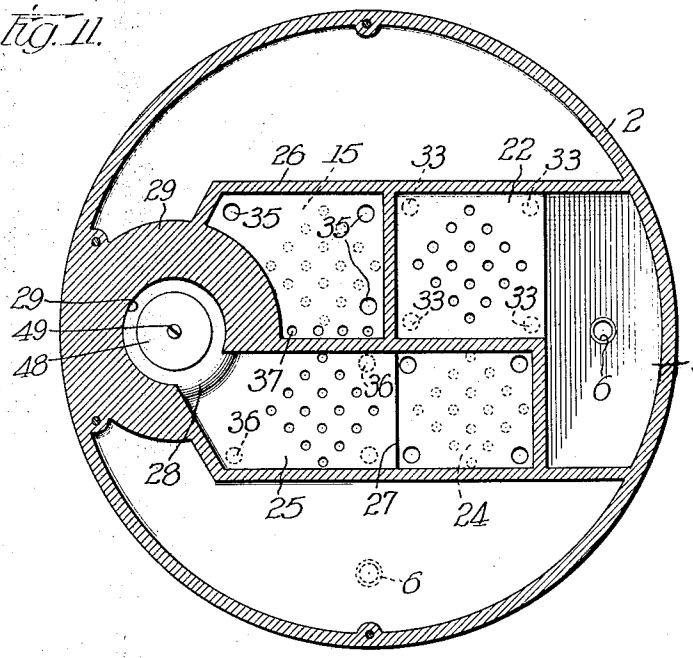


Fig. 14.

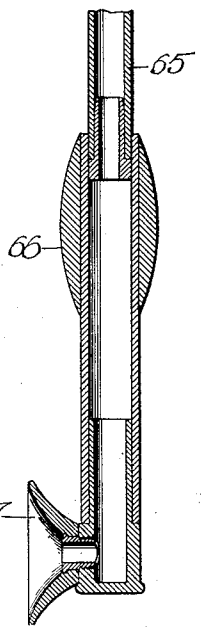


Fig. 12.

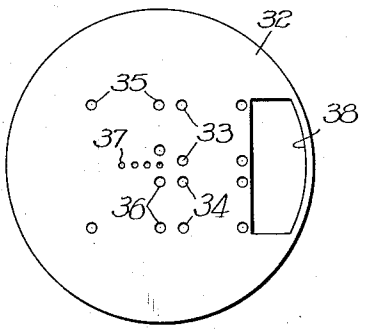
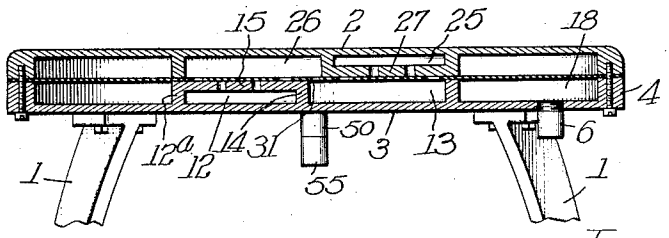


Fig. 13.



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UNITED STATES PATENT OFFICE.

HUSTON TAYLOR, OF ROCHESTER, NEW YORK.

VACUUM-PRODUCING DEVICE.

1,082,568. Specification of Letters Patent. Patented Dec. 30, 1913.

Application filed July 31, 1911. Serial No. 641,456.

To all whom it may concern:

Be it known that I, HUSTON TAYLOR, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Vacuum-Producing Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in vacuum producing devices and is particularly designed for use in barber shops and like places to clean the hair by means of a vacuum device, to dry the hair after shampooing the hair, and to treat the scalp by giving thereto a vibratory massage.

While my invention is particularly designed for the above purpose, it will be understood that it is applicable to various other uses.

I have illustrated in the accompanying drawings certain embodiments of my invention for the purpose of disclosing the same.

In said drawings Figure 1 is a transverse sectional view of a table embodying my invention, taken on the line 1—1 of Fig. 2; Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is an enlarged detail sectional view showing the preferred form of diaphragm operating mechanism; Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 4; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2; Fig. 7 is a sectional view taken on the line 7—7 of Fig. 2; Fig. 8 is a detail sectional view showing modified means of operating the diaphragm; Fig. 9 is a sectional view of still another modification of the means for operating the diaphragm; Fig. 10 is a sectional view on the line 10—10 of Fig. 9; Fig. 11 is a sectional view on the line 11—11 of Fig. 1; Fig. 12 is a plan view of the leather washer forming the diaphragm and valve; Fig. 13 is a sectional view taken on the line 13—13 of Fig. 2; and Fig. 14 is a sectional detail of a suction or vibrator member.

In the embodiment of my invention illustrated I provide a table which has a flat top, supported on suitable legs 1. The table top is preferably formed in two sections, 2 and 3, made from cast metal, which are so constructed on their meeting faces that they form the necessary valve chambers and diaphragm chamber for a vacuum producing apparatus. The meeting face of the bottom section 3 is provided with an annular rim 4. The face of this section is divided into various valve chambers by means of integrally cast ribs. On the face of this section a recess 5 is formed to provide one-half of an intake chamber which communicates with the atmosphere through the opening 6 in the bottom of the table. Connecting with this chamber 5 is a valve chamber 7, the top of which is covered by a foraminous plate 8 which is preferably formed integrally with the two side ribs 9 and 10. A second valve chamber 11 is likewise formed on the face of the table of the section 3 by the ribs 9 and 12^a. Arranged in the rear of the two chambers 7 and 11 are two more valve chambers 12 and 13 formed, respectively, by the ribs 12^a, 14 and 10. The chamber 12 is covered by a foraminous plate 15 and communicates through a suitable connecting opening 16 with the lower half of the diaphragm chamber. The chamber 13 communicates through the opening 17 with the discharge chamber which is provided with a discharge outlet 19. The lower half of the diaphragm chamber is formed by an annular convexly beveled rib 20 and is provided with a suitable central opening 21, through which is adapted to extend the diaphragm-operating stem.

The meeting face of the upper section of the table top is formed similarly to that of the lower section, with the exception that no inlet or discharge openings are provided. In other words, this meeting face is provided with a recess 5 which forms the other half of this intake chamber, and with valve chambers 22 and 23, the chamber 23 being covered by a foraminous plate 24, and a second pair of valve chambers 25 and 26, the chamber 25 being covered by a foraminous plate 27 and connecting with the upper half of the diaphragm chamber through a suitable opening 28. The upper half of the diaphragm chamber is likewise formed by an annular convexly beveled rib 29. When the two plates are laid face to face, it will be noted that the chamber 22 coincides with the chamber 7, the chamber 23 coincides with the chamber 11, the chamber 25 coincides with the chamber 13, and the chamber

26 coincides with the chamber 12. It will be noted that the wall 14 on the lower face and the wall 30 on the upper face do not coincide and an opening 31 (see Fig. 13) is therefore formed connecting the chambers 13 and 26. The purpose of this opening will appear more fully hereinafter in describing the operation of the apparatus. The annular ribs 29 and 20 form a diaphragm chamber having communication with the two outlet chambers, whereby as the diaphragm is vibrated a vacuum will be produced, as will be more fully understood in the description of the operation of the device.

In order to form suitable flap valves for the valve chambers I clamp between the sections 2 and 3 a leather washer 32, which is so constructed that it forms a plurality of flap valves seating on the various openings in the plates 8, 15, 23 and 25. This washer is provided with four sets of openings 33, 34, 35 and 36, which are so arranged relatively to the openings in the plates 8, 15, 25 and 23 that when the washer is pushed away from the face of the plates the openings will permit the escape of air through the washer, but when it is pushed up against the plates the openings will be closed. In addition to the sets of openings above described the washer is provided with a plurality of openings 37, which lie in the space left between the non-meeting edges of the ribs 30 and 14, as illustrated more clearly in Fig. 13. At 38 the washer is cut out to coincide with the receiving chamber formed by the two chamber sections 5, so that free communication may be had between the upper and lower sections of this chamber.

The diaphragm 39 is formed by that portion of the washer fitting between the annular walls 20 and 29 and is connected to an operating stem 40 which extends through the opening 19 in the bottom section of the table. The lower end of this stem is provided with an enlarged head 41 adapted to surround an eccentric pin 42 extending from a collar 44 secured to the shaft of a suitable electric driving motor 45 secured to the bottom of the casing. The stem 40 is inclosed by a housing 46 provided with flanges 47 by which it is secured to the bottom of the casing. The lower end of this housing also incloses the driving connection between the stem and the motor and fits over the casing of the motor, as at 46^a, being bolted to the motor casing by bolts 46^b. It will be noted that this housing, due to its construction and connection with the other parts of the mechanism, constitutes an air tight extension of the diaphragm chamber and that practically no bearings for the stem 40 are required. For securing the diaphragm to the stem 40 I provide a pair of concave washers 48, between which the diaphragm is clamped by means of a screw 49 adapted to fit in the end of the stem 40. It will be noted that due to the convex beveling of the ribs 20 and 29 and to the concave washers, the diaphragm may be operated without the customary snapping noise usually incident to the rapid vibration of a diaphragm.

In order that the operation of my device may be more fully understood, reference may be had to Figs. 1, 11 and 13. Commencing first with the diaphragm down and assuming that it is moving upwardly, the air will be sucked in through the opening 6. It will then pass into the chamber 24, and due to the fact that the pressure is exerted downwardly, the flap valve will close the openings in the plate 7, but the flap valve will move away from the plate 23, permitting the air to pass therethrough. The air therefore will pass down through the openings into the valve chamber 11. As the chamber 11 communicates with the chamber 15 the air will pass on to the valve chamber 15 and also into the under side of the diaphragm. On the downward movement of the diaphragm the openings in the plate 23 will be closed by the flap valve and the openings in the plate 15 will be opened, the air thus passing upwardly into the chamber 25 and thence downwardly through the openings 37, in the diaphragm, the opening 31 into the chamber 13 and out by way of the port 17 and escape opening 19. At the same time on the downward movement of the diaphragm air will be drawn in through the opening 6 into the chamber formed by the chamber sections 5 and will pass into the chamber 7, thence upwardly through the openings in the plate 8, which are opened, and into the chamber 22. As the chamber 22 communicates with the chamber 25 the air will pass to the chamber 25 whence it will be forced on the up stroke of the diaphragm down through the openings in the plate 27 and into the chamber 13, thence out through the opening 17 and the escape port 19. It will thus be seen that there is a continuous operation on the part of the diaphragm and that I have formed a double-acting pump which will suck the air into the device on both the upward and downward stroke of the diaphragm.

As the device is primarily intended for use in connection with shampooing the hair and like treatment of the hair, it is desirable that all dirt, etc., be prevented from entering the valve chambers, and to this end I provide a screening device. The device illustrated in the drawings takes the form of an angle connection for the hose leading to the suction nozzle, one stem 50 of which is adapted to be screwed into the opening 6 and the other stem 51 of which is adapted

to be connected with the hose leading to a suitable comb, brush or other device adapted to be passed through the hair and through which the suds, etc., may be sucked into the vacuum device. Arranged diagonally across the end of the stem 51 is a small screen 52 of very fine meshes which will prevent anything but the smallest particles from passing therethrough. It will be noted that this screen is diagonally arranged so that the suds coming in through the opening 52 in the stem 51 will strike the under side of the screen and will have a tendency to be thrown to the opening 53 in the bottom of the stem 51. Surrounding this opening 53 is an annular screw-threaded ring 54, to which is adapted to be attached a receiving cup 55 into which the dirt, etc., will tend to be deposited and which may be readily unscrewed for the purpose of cleaning. It will, of course, be understood that the discharge opening 19 may be connected with any suitable pipe for carrying off the dirty water, etc.

In Fig. 8 I have shown a modified arrangement of the motor for operating the diaphragm. In this modification the motor takes the form of a reciprocating electric motor rather than a rotary electric motor. The stem 40 is connected at its lower end to an armature 56 which is adapted to coöperate with a horse-shoe magnet 57. The two pole pieces of the magnet are wound with coils 58 connected with a suitable source of electricity, and when the magnet is energized the stem is raised against the influence of a coiled spring 59 interposed between the armature 56 and the stop 60. As soon as the armature is raised suitable switching mechanism will open the circuit through the coils 58 and the stem will be forced downwardly by the spring 59, and as soon as the armature is forced downwardly to its lowermost limit the switching mechanism will again close the circuit of the energizing windings. By this arrangement it will be noted that the circuit through the windings is successively opened and closed to give a reciprocating movement to the diaphragm.

In Fig. 9 I have illustrated still another modification of my operating mechanism which takes the form of an eccentrically weighted wheel. This wheel or rotating member 61 is supported in a suitable framework or inclosing casing 62, between which the diaphragm is clamped, and is provided at one portion of its periphery with an additional weight 63. It is connected by means of a flexible shaft 64 with a suitable driving motor, and it will be seen that as the wheel is rapidly rotated the weight moving from top to bottom will tend to flop the diaphragm up and down.

A flexible tube 65 is connected to the stem 51 and has its opposite end connected to a handle 66 provided with a removable flexible suction or vibratory cup 67. In giving a scalp treatment the cup is passed over the scalp and the action of the pump not only cleans but stimulates the scalp.

While I have shown and described certain constructions embodying my invention, it will be understood that various modifications and changes may be made therein without departing from the spirit thereof as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with a plate having a flat upper surface and a recess on its under side, a second plate secured to the first plate and having a recess in its upper face, coöperating with the first recess, forming a piston chamber, of a diaphragm clamped between said plates over said recesses, said piston chamber having suitable inlet and outlet ports, and means arranged beneath the bottom plate for operating said diaphragm.

2. In a device of the character described, the combination with a flat face formed in two sections and recessed at their meeting faces to form an inlet chamber and an outlet chamber, of a valve mechanism arranged between said chambers, a vacuum producing pump connected through said valves with said chambers, and means beneath said plate for operating said pump.

3. In a device of the character described, the combination with a flat face formed in two sections recessed at their meeting faces to form an inlet chamber and an outlet chamber, of a vacuum producing pump arranged between said sections, a pair of inlet valves and a pair of outlet valves connected respectively with said inlet and outlet chambers, and means beneath said plate for operating said pump.

4. In a device of the character described, the combination with a flat plate formed of two sections, an annular rib formed on the meeting face of each section and having convexly beveled sides, of a diaphragm arranged to be clamped between said ribs when the sections are bolted together, and means beneath said plate for vibrating said diaphragm.

5. In a device of the character described, the combination with a flat plate formed of two sections having annular ribs formed on the meeting faces of each section, the sides of said ribs being convexly beveled, of a diaphragm arranged to be clamped between said ribs, a reciprocating stem for operating said diaphragm and connected to the same by a pair of concave washers between which the center of the diaphragm is clamped, and means beneath said plate for operating said stem.

6. In a device of the character described, the combination with a flat plate formed in two sections recessed at their meeting faces to form a chamber therein provided with inlet and outlet ports, of a vacuum producing mechanism arranged in said chamber and a screen arranged across the inlet port.

7. In a device of the character described, the combination with a flat plate formed in two sections recessed at their meeting faces to form a chamber therein provided with inlet and outlet ports, of a vacuum producing mechanism arranged in said chamber, a hose connecting nipple connected with said inlet port, and a screen arranged in said nipple.

8. In a device of the character described, the combination with a pair of flat plate sections, each section being provided with a recess on its meeting face to form a diaphragm chamber and each plate having on its meeting face valve seats to coöperate with a corresponding recess in the opposite plate, of a diaphragm member arranged to clamp between the meeting faces of the sections to form a vacuum producing diaphragm and valves.

9. In a device of the character described, the combination with a pair of flat plate sections arranged to be fitted together, each section having a recess on its meeting face coöperating with a recess in the meeting face of the opposite section to form a diaphragm chamber, foraminous valve seats arranged to engage over recesses on the meeting face of the opposite plate, of a flexible member arranged to be clamped between the meeting faces of said sections to form a diaphragm and to form flap valves.

10. In a device of the character described, the combination with a pair of flat plate sections, each section being provided with a recess on its meeting face to form a diaphragm chamber and each section having on its meeting face valve seats to coöperate with a corresponding recess in the opposite section, of a diaphragm member arranged to clamp between the meeting faces of the sections to form a vacuum producing diaphragm and valves, and a motor mounted beneath said section and connected with said diaphragm for operating the same.

11. In a device of the character described, the combination with a pair of flat plate sections arranged to be fitted together, each section having a recess on its meeting face coöperating with a recess in the meeting face of the opposite section to form a diaphragm chamber, foraminous valve seats arranged to engage over recesses on the meeting face of the opposite plate, of a flexible member arranged to be clamped between the meeting faces of said sections to form a diaphragm and to form flap valves, and a motor mounted beneath said section and connected with said diaphragm for operating the same.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

HUSTON TAYLOR.

Witnesses:
E. R. KING,
M. PERRY HALEY.