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Patented Jan. 8, 1901.

C. O. METZLER.
SALIVA EJECTOR.

(Application filed June 15, 1900.)

(No Model.)

2 Sheets—Sheet 1.

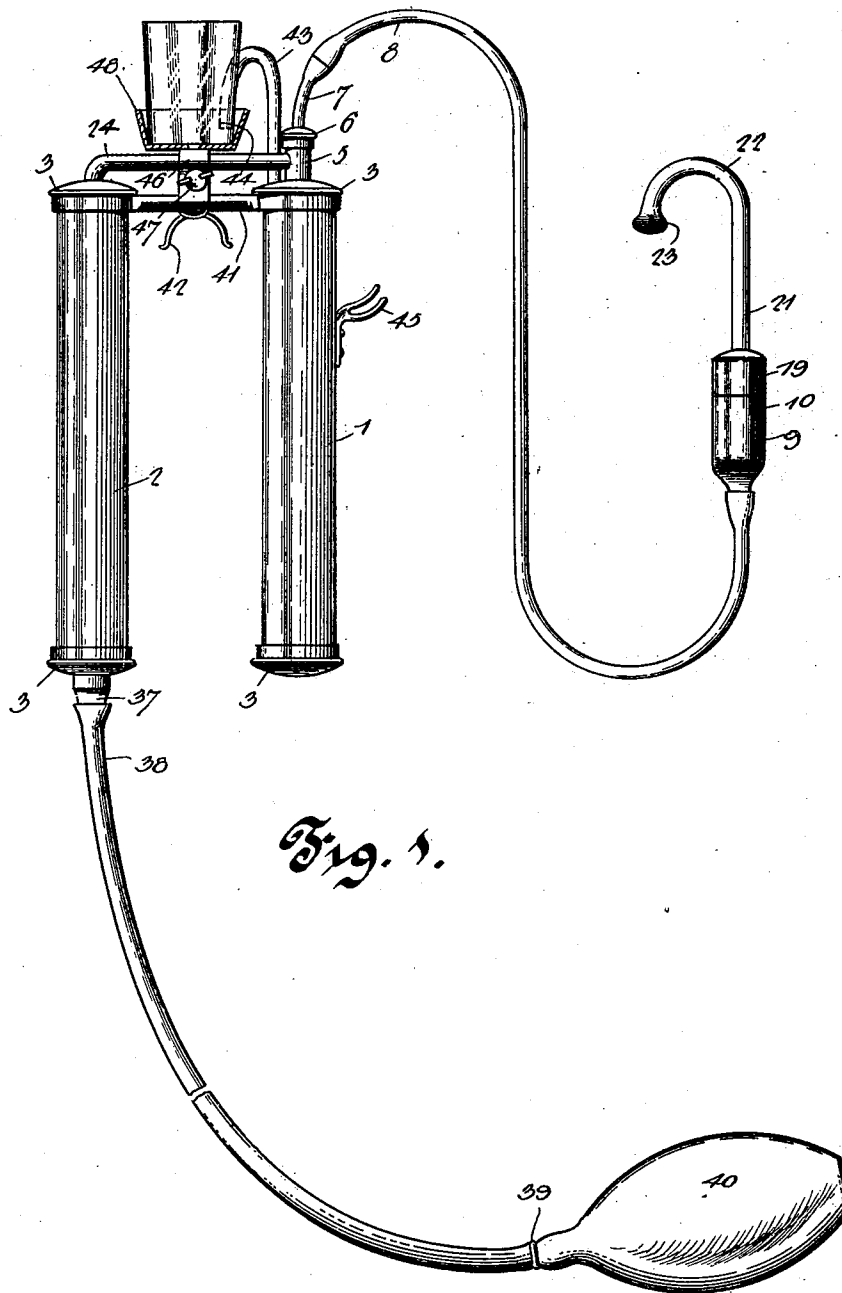


Fig. 1.

Witnesses

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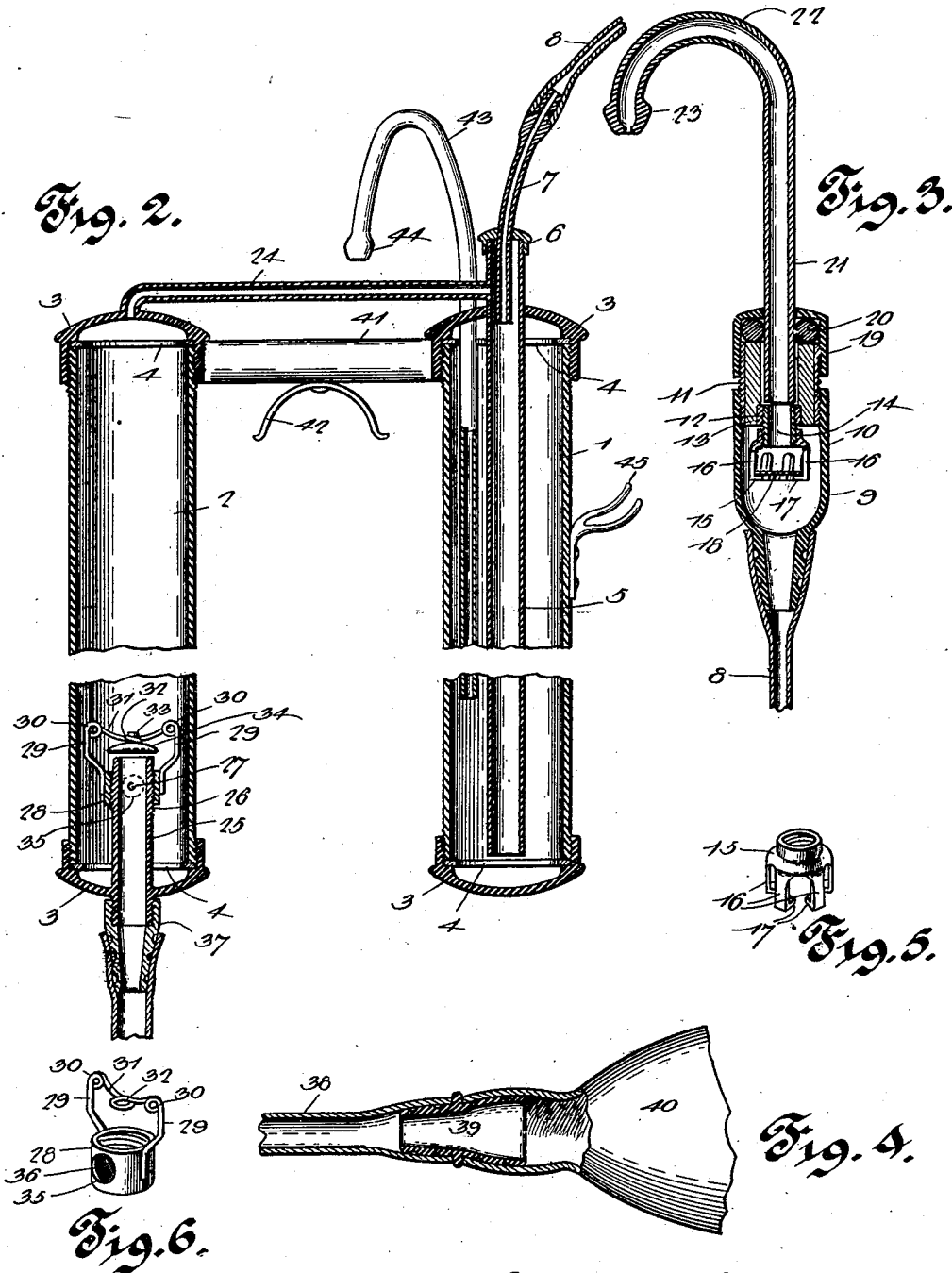
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UNITED STATES PATENT OFFICE.

CHARLES O. METZLER, OF OMAHA, NEBRASKA.

SALIVA-EJECTOR.

SPECIFICATION forming part of Letters Patent No. 665,571, dated January 8, 1901.

Application filed June 15, 1900. Serial No. 20,485. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. METZLER, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented a new and useful Saliva-Ejector, of which the following is a specification.

This invention relates to saliva-ejectors; and the object of the same is to provide simple and effective means for removing saliva from the mouth of a patient while undergoing a dental operation or treatment without annoyance or inconvenience and by an easy manipulation of the mechanism by the operator with material advantage, particularly when filling teeth and during the use of a rubber dam to avoid any tendency to introduction of moisture to the cavity or during the pursuit of other operations.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of a saliva-ejector embodying the features of the invention. Fig. 2 is an enlarged sectional view of the operating-cylinders, broken through to show them on a larger scale. Fig. 3 is an enlarged sectional view of the mouthpiece and retainer therefor. Fig. 4 is an enlarged sectional elevation of a portion of the bulb and connection therefor. Fig. 5 is a detail perspective view of a valve-seat. Fig. 6 is a detail perspective view of a valve-supporting sleeve located in one of the cylinders.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numerals 1 and 2 designate elongated cylinders which contain and include devices for rendering the entire ejector effective in a manner fully hereinafter set forth. The ends of both cylinders are closed by caps 3, which are screwed thereon, and between the same and the ends of the cylinders packing-rings 4 are interposed to form a tight joint, as clearly shown in Fig. 2. Within the cylinder 1 a vertical tube 5 is fixed and has its lower open end near the bottom of the said cylinder and upper extremity projected through the top cap and of itself provided with a cap 6, through which extends a curved ingress-nozzle 7, and to the upper end of the latter one

terminal of a rubber or other flexible conveyer 8 is firmly attached. The opposite terminal of the conveyer 8 is secured to the lower end of a retainer 9, which comprises a cup 10, having internal screw-threads at the upper portion thereof to receive the lower portion of an exteriorly-screw-threaded cylindrical union 11, having a central bore there-through. The lower extremity of the bore of the union is screw-threaded, as at 12, the said threads being formed in a space-sleeve 13, snugly fitted therein to receive the upper portion of a tubular nipple 14, the said nipple, like the union, being screw-threaded exteriorly its full length and has on its lower end, below said union, a cage-valve seat 15, comprising a plurality of depending arms 16, with lower inturned ends 17 to operatively support a gravitating mica valve 18, which is adapted to close against the lower end of said nipple. On the upper extremity of the said union a cap 19 is mounted and has a central opening through the top thereof, which aligns with the bore of the union, and between the top of the latter and the upper end of said union a rubber gasket 20 is interposed, preferably of the form shown, to produce a tight joint. Fitted in the cap 19 and the bore of the union 11 is the lower end of the vertical stem of a tubular mouthpiece 21, which has an upper crooked end 22, provided with a terminal enlarged tip 23, with a reduced opening there-through for convenience in inserting in the mouth of the patient and effectiveness in the extraction of the saliva. It will be observed that back pressure will be prevented from affecting the patient through the mouthpiece 21 by the valve 18, and also that all the joints of the retainer are tight and will obstruct interference of the suction by entrance of the surrounding air.

A connecting-pipe 24 extends from the tube 5 above the cap at the top of the cylinder 1 to the top cap of the cylinder 2, and rigidly disposed in the lower end of the latter and extending upwardly from the lower cap thereof is a valve-tube 25, which depends below the said cap and is exteriorly screw-threaded and also has screw-threads 26 on the exterior thereof near the upper end. The upper extremity of the tube 25 is formed with a small opening 27, and on the threads 26 a valve-supporting sleeve 28 is run and has upstanding

outwardly-deflected yielding or wire arms 29, having coils 30, from which continues a cross-connection 31 with a central loop-seat 32 to receive and firmly hold the short stem 33 of a valve 34, yieldingly supported by and close to the upper end of the said tube 25, as clearly shown by Fig. 2. As shown by Fig. 6 and indicated by dotted lines in Fig. 2, the sleeve 28 is formed with an opening 35, having a wire-gauze covering 36, and when the sleeve is in position on the tube 25 the said wire-gauze covering comes over the opening 27 to prevent obstruction of the same by breaking up any clogging matter. The depending screw-threaded end of the tube 25 below the lower cap of the cylinder 2 has a coupling 37 connected thereto for the attachment of the upper end of a rubber tube 38 of suitable length and also connecting with the coupling 39 of a bulb 40, which is disposed on the floor within convenient reaching distance of the foot of the operator or dentist and may be actuated at will by the foot, and thereby permit the operator to use both hands.

The improved device is applied directly to a dental chair when in operative position, and to effect this preferred mounting the upper portions of the cylinders 1 and 2 are connected by an arm 41 to hold them in rigid relation, and from the center of said arm a clip 42 depends and is adapted to fit over the bracket or support of the usual cuspidor, forming a part of the equipment of the chair, or said clip may be brought to bear on any other part of the chair, and, if used independent of the latter, it can be used in supporting the device on any other rest. Egress of the saliva from the cylinder 1 is obtained through an outlet-pipe 43, extending well down into the said cylinder and also provided with an upper projected end which is curved or crooked for direction of the nozzle 44 thereof over or into the cuspidor of the chair or other receptacle.

When the mouthpiece 21 and retainer are not in use, they are intended to be suspended from or held by another portion of the apparatus or device, and one convenient form of arriving at this result is by means of a forked hook 45, secured on the cylinder 1. This hook will be useful for its intended purpose when a temporary suspension only is desired, but when the mouthpiece is to remain in disuse for a length of time, then a cleansing attachment will be used and will now be described. Surrounding the connecting-pipe 24 is a clamp 46, which is fastened by an intermediate clamping-screw 47, and secured to the upper portion of the said clamp is a receptacle 48, in which is placed a glass or vessel to contain water or some harmless aseptic fluid. The mouthpiece is immersed in the contents of the said glass or vessel and becomes cleansed, so that when subsequently used it will be free of danger from poisonous transmissions. This cleansing attachment is shown applied in Fig. 1 and is detached from the connecting-pipe in Fig. 2 to avoid obscuring the parts of the lat-

ter figure. Wherever the flexible tubes or rubber pipes are attached, it will be seen that the connecting parts are threaded to obtain a secure joint and overcome liability to leakage. The parts are also easily separated for cleansing purposes, and the material used in the manufacture of the several parts will be of a character best adapted to serve the purpose.

In the operation of the device water is placed in the cylinder 1 until the lower extremity of the vertical tube 5 is well covered or immersed and having a vertical extent to and slightly over the lower end of the outlet-pipe 43. The tube 38 and bulb 40 are also filled with water, and likewise the cylinder 2, to a point above the valve 34. This filling operation can be accomplished by detaching the several parts in the most convenient manner, and when the water has been disposed as set forth the device is ready for actuation and need not be replenished with water for a considerable length of time. Before inserting the mouthpiece 21 in the mouth of the patient the bulb 40 is compressed by the foot of the operator, to thereby exclude the water or force it upwardly through the tube 38 into the cylinder 2. The mouthpiece is then inserted in the mouth of the patient with the tip 23 thereof under the tongue, and as soon as it is so positioned the bulb is permitted to resume its normal shape, and in so operating it creates a suction by the flow of the water therein to and closes the valve 34 against the upper end of the pipe or tube 25, and thereafter the water in the cylinder 2 is slowly drawn through the opening 27 in said tube 25. The movement of the water into the bulb ensues very slowly, and by the downward draw of the water the air is drawn into the cylinder 2 from the cylinder 1 and sets up a vacuum in the latter and creates a suction through the tube 5, the flexible conveyer 8, and the mouthpiece, which is sufficiently strong to relieve the mouth of the patient of saliva and convey the latter into the cylinder 1, and it will be understood that the saliva carries more or less air with it when it enters the said cylinder 1. This suction continues until the bulb 40 will have become filled with water, and after said bulb is filled the operator again steps thereon and compresses it, forcing the water therefrom into the cylinder 2, and also simultaneously forces the air in the said latter cylinder through the connecting-pipe 24 into the cylinder 1, and as the back pressure thus produced cannot be effective in or be released through the mouthpiece, in view of the valve in the retainer heretofore explained, the pressure is caused to become concentrated on the column of water in the cylinder 1 first through the tube 5 to force the saliva out from the bottom of the latter up through the water-column in cylinder 1 and then out the pipe 43 into the cuspidor. This outflow ensues until the excess filling in the cylinder produced by the inflow thereto of the saliva is relieved and when the water

has been fully expelled from the bulb 40. The saliva cannot possibly pass through the pipe 24 unless the cylinder 2 becomes completely filled with saliva, which would never happen in view of the fact that the said cylinder is relieved of saliva every time the bulb is compressed. This operation is successively repeated without removing the mouthpiece from the mouth of the patient, and it will be observed that the operation is purely automatic after the initial preparation.

The use of the rubber gasket in the retainer around the inserted portion of the mouthpiece is very effective in preventing leakage or in forming an air-tight union, and it will be observed that the parts carrying the valves may be adjusted to vary the time of their operation as may be desired.

One of the main advantages of the improved device is that it can be used on any ordinary dental chair without changing or rearranging the parts of the latter and without utilizing running water or a connection to a sewer. It can also be adjusted in a moment's time, and also reduced to compact form and carried from place to place. The same quantity of water initially placed therein can be used over and over again, and the saliva is prevented from being forced back into the mouth of the patient after deposit in the cylinder designed to receive the same in the manner specified. Many other advantages will appear from time to time to those using the ejector, and while the preferred form of the same has been shown and descriptively disclosed, it is obviously apparent that changes in the form, size, proportions, and minor details may be resorted to without departing from the principle of the invention.

Having thus described the invention, what is claimed as new is—

1. In an ejector of the character set forth, the combination of a mouthpiece, connected cylinders, the mouthpiece being attached to the upper portion of one of said cylinders, and a bulb attached to the lower portion of the other cylinder, the one cylinder having an outlet.

2. In an ejector of the character set forth, the combination of a mouthpiece, connected cylinders, a tube extending downwardly into one cylinder and having the mouthpiece attached thereto, an outlet for the same cylinder, and a bulb attached to the lower portion of the other cylinder.

3. In an ejector of the character set forth, the combination of two cylinders, one having an inlet-tube extending downwardly thereinto and an outlet-pipe leading therefrom, and the other connected at the top with the inlet-tube and having a valve-tube in the lower portion thereof supporting an automatically-operating valve, a mouthpiece connected to the inlet-tube, and a bulb attached to the valve-tube.

4. In an ejector of the character set forth, the combination of suction and compression

cylinders, a mouthpiece connected to one cylinder, and a bulb or compressor attached to the other cylinder.

5. In an ejector of the character set forth, the combination with connected cylinders, the one having an inlet and an outlet, a bulb attached to the other cylinder, a retainer connected to the cylinder having the inlet, a valve in the said retainer, and a mouthpiece attached to the retainer and closed by the action of the valve to prevent return of saliva to the mouth of the patient and release of the compressing force.

6. In an ejector of the character set forth, the combination of cylinders in communication, the one cylinder having an inlet and an outlet, the other cylinder having a valved attachment in the lower portion, a bulb having a connection attached to the said valved attachment and adapted to have water placed therein, and a mouthpiece connected to the inlet of the first-named cylinder.

7. In an ejector of the character set forth, the combination of two cylinders, the one having an inlet-tube extending downwardly thereinto and an outlet projecting therefrom, and the other provided with a lower valve-pipe with a small opening therethrough in addition to the upper open end, a valve-supporting sleeve applied on the upper portion of the valve-pipe and having a gauze-covered opening to fit over the said small opening, a valve yieldingly supported above the end of the valve-pipe, a bulb connected to the said valve-pipe, and a mouthpiece device connected to the said inlet-tube.

8. In an ejector of the character set forth, the combination of cylinders, a bulb attachment for one cylinder, a mouthpiece device flexibly connected to the other cylinder, and a hook on one cylinder for supporting the mouthpiece device when not in use.

9. In an ejector of the character set forth, the combination of cylinders, a mouthpiece device attached to one cylinder, a bulb connected to the other cylinder, a connecting-arm between the cylinders, and a clip depending from the said arm to support the ejector on a part of a dental chair.

10. In an ejector of the character set forth, the combination of cylinders in communication with each other, the one having inlet and outlet devices, a bulb attachment connected to the other cylinder, a mouthpiece having a retainer attached to the inlet of the one cylinder, and a receptacle removably supported on a portion of the cylinders to receive liquid for cleansing the mouthpiece which is placed therein when in disuse.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES O. METZLER.

Witnesses:

C. W. SAMPLE,
M. L. KING.