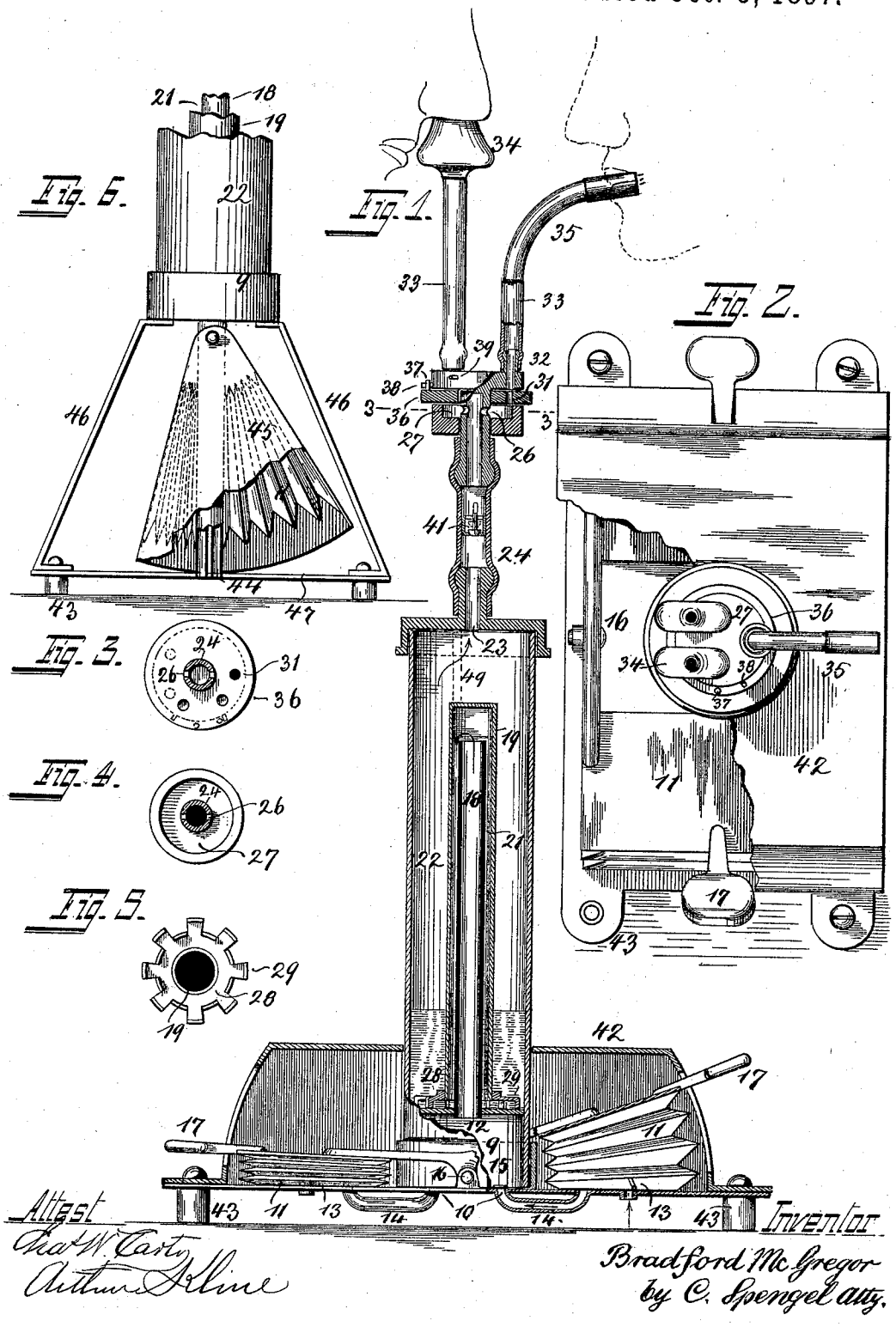
(No Model.)

B. McGREGOR.

INHALER.

No. 591,052. Patented Oct. 5, 1897.



Attest
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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INHALER.

SPECIFICATION forming part of Letters Patent No. 591,052, dated October 5, 1897.

Application filed January 18, 1897. Serial No. 619,607. (No model.)

To all whom it may concern:

Be it known that I, BRADFORD McGREGOR, a citizen of the United States, residing at Covington, Kenton county, State of Kentucky, have invented certain new and useful Improvements in Air Injectors and Mixers; and I do declare the following to be a clear, full, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to improvements in devices for applying air, pure or medicated, to certain orifices and ducts of the human body, particularly to those mediating respiration—as, for instance, nasal and bronchial ducts.

It consists of four principal parts, of which the first is the air-compressor, which is of a nature that an uninterrupted outflow or exhaust of air is obtained.

The second is a receiver and mixer whereby the air may be mixed and more or less saturated with chemicals or other matter having medicinal and therapeutical properties and which matter becomes then mixed with the air entering the device and is expelled by it.

The third are those parts which are specifically fitted to permit application to the outer openings of the particular ducts through which the air is to be introduced—as, for instance, nostrils and mouth.

The fourth is a cut-off device whereby the discharging air may be directed so as to discharge only out of certain outlets to enter certain openings only, being then prevented from discharging out of other outlets.

Minor parts relating to features of construction in general and in detail will be mentioned more specifically hereinafter, and pointed out in the claims.

In the following specification is found a full description of the invention, its operation, use, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a sectional side elevation of the device complete. Fig. 2 is a top view of the same with parts broken away. Figs. 3 and 4 are views of opposite surfaces, resulting from a section taken on line 3 3 of Fig. 1. Fig. 5 is an under side view of the mixer detached, and Fig. 6 shows in a side elevation a modified arrangement of the air-compressor.

9 is the air-chamber, receiving its charge alternately through one of two air-inlets 10 from a double-acting air-compressor, which in this case consists of two bellows 11 11, so connected that when one receives the other discharges, so that a continuous and uninterrupted current of air leaves the outlet 12 of the air-chamber 9.

Each of the bellows has an inlet-valve 13, and is connected by an air-conduit 14 with air-chamber 9, additional valves 15 being provided at 10, where these conduits enter chamber 9. These valves open and close alternately in this way, that when valve 13 of one of the bellows closes on depression of the latter its corresponding discharge-valve 15 is open, so that chamber 9 is always receiving air through one of valves 15.

The swinging flaps of the bellows are pivoted at 16, and the means whereby they are connected to said pivots are also connected to each other or form integral members, so that operation of one of the bellows causes also operation of the other, only in reverse order. Handles 17 are provided at the outer ends of the swinging flaps for convenient operation.

The air-outlet 12 from chamber 9 is continued upwardly in form of a tube 18, leaving which it enters a larger tube 19, the upper end of which is closed, and descends within the annular space 21 between the two tubes. It discharges from the lower end of the outer tube 19 into a mixing-chamber 22, which it leaves at 23, passing out through neck 24 and through a lateral opening 26 therein into distributing-chamber 27.

If the air is to be charged with any substance or medicine, the same, preferably in liquid form, is contained in said chamber 22, so that the air while rising through the latter passes through the solution and becomes more or less saturated therewith. To obtain a thorough intermingling of the air, the same is caused to spread in leaving the lower end of tube 19, so as to discharge in jets there-

from. This is accomplished by providing a circular flange 28 around the lower end of tube 19, from which a number of lugs 29, all of even height, project downwardly, resting with their lower ends upon the bottom of chamber 22, thereby keeping the lower end of tube 19 sufficiently elevated to make discharge from it possible. These lugs are furthermore arranged in two circular rows, the spaces of one row alternating with the lugs of the other, whereby the air while passing out between said rows of lugs is cut up and divided, as may be readily understood.

From the top of distributing-chamber 27 the air may leave through openings 31, each terminating on the outside in a nipple 32, upon which the lower end of the rubber discharge-tubes 33 may be stripped. Since the medicated air is to be injected, not inhaled, it is essential that close connection is made with the orifices receiving the charge and the ends of these tubes. For such purpose two of them are provided with nozzles 34, so fitted as to entirely close the nostrils when introduced thereinto, so that when in position none of the air issuing from them may escape.

The remaining tube, when the device is also to be used for mouth-injection, is fitted with a mouthpiece 35 to be inserted between the lips when the air is to be injected through the mouth. Nipples 32 are so located as to bring the tubes with nozzles 34 and the mouthpiece in the most convenient position for use, for which purpose those for nozzles 34 are close together on one side, while the one for the mouthpiece is on the other side about diametrically opposite thereto.

Below the top of distributing-chamber 27 and closely fitted against the inside thereof is a plate 36, which is supported in a manner to be capable of rotation, the upper end of neck 24 being preferably utilized to form the supporting center thereof. This plate has holes corresponding with the inner terminals of nipples 32, but so located that when two of these openings register with those nipples which lead to nozzles 34 the remaining opening does not register with the nipple leading to the mouthpiece, so that by means of this plate, which acts as a cut-off valve, the air may be directed according to whether it is to be injected into the nostrils or into the mouth. This plate projects beyond the outside of chamber 27, carrying a pin 37 on its projecting part, which when brought up against either one of two stops 38 indicates open communication either for nasal or mouth injection, while an intermediate position (indicated by a suitable mark 39) closes all three of the outlet-openings. In addition to this means for closure a check-valve 41 is provided within neck 24, which during use prevents reaction and after use acts as a stopple, closing automatically and preventing evaporation of the medicine.

All parts above air-chamber 9 are preferably of hard rubber, with the exception of tubes 24 33, which should be of rubber having a certain degree of elasticity sustaining them in their upright position, but permitting them at the same time to yield for convenient insertion and to accommodate inadvertent movements of the head, preventing also transmission of any motions or jars to mouth or nose.

The flange and lugs at the lower end of tube 19, as well as valve-plate 36, may be metal, preferably aluminium. The bellows are inclosed by a metal casing 42, resting on feet 43, and having slots through which handles 17 project.

In Fig. 6 the construction is modified to the extent of changing the position of the bellows, which is upright, with a space between to receive air-inlet pipes 44. Valves and all other parts, as to operation, are the same. The bellows are completely incased, the sides 45 of the casing connecting the outer or swinging flap of the bellows, thereby causing them to work together. They are operated by taking the device in hand and alternately pressing first against one side and then against the other.

46 are simply braces connecting base-plate 47 with the lower end of the cylindrical body containing the air and mixing chambers.

To prevent tube 19 from being lifted by the air-pressure, which might cause it to rattle, a suitable extension 49, and shown in dotted lines in Fig. 1, is provided between the upper end of tube 19 and the top of chamber 22.

The device is preferably intended, for individual and domestic use, to be operated without the aid of any machinery, and is therefore constructed of a size and weight to permit it to be set upon a table in front of the person using it, or it may be held in the hand while the bellows are operated by the thumbs.

Having described my invention, I claim as new—

1. In an air-injector, the combination of an air-chamber, a double-acting air-compressor supplying it with air in a manner that a continuous current of it is caused to leave therefrom, a mixing-chamber which the air so compressed is caused to enter and in which it is brought in contact with certain substances which it is adapted to take up, said two chambers connected by a conduit which has an ascending and descending branch and air-discharge pipes having their outer ends provided with suitable nozzles fitted for insertion into the outer openings of the respiratory ducts.

2. In an air-injector, the combination of an air-chamber, a double-acting air-compressor supplying air in a manner that a continuous current of it is caused to leave the former, a distributing-chamber receiving the compressed air from the air-chamber first mentioned, air-discharge pipes communicating with said distributing-chamber and a cut-off

device controlling all air-outlets and whereby the air may be entirely cut off from the discharge-pipes or be permitted to pass out through certain ones only.

3. In an air-injector, the combination of an air-chamber, an air-compressor supplying air to it, a mixing-chamber 22, a connecting-conduit through which it receives the air from the air-chamber, said conduit having an ascending and descending branch whereby the air is caused to enter the mixing-chamber near the bottom thereof, the outlet thereat being constructed to cause the air to discharge in jets and air-discharge pipes having their outer ends provided with suitable nozzles adapted for insertion into the parts and openings where the air is to be applied.

4. In an air-injector, the combination of an air-chamber, an air-compressor supplying air to it, a mixing-chamber 22, a connecting-conduit through which it receives the air from the air-chamber, which conduit is formed by a tube 18 extending upwardly from the outlet of the air-chamber and a tube 19 of larger diameter, closed at its upper end, surrounding tube 18, the air passing up in the latter and down in the space between the tubes, the outer tube having a flange 28 around its lower end with downwardly-extending lugs whereby such end is elevated to permit the air to pass out, dividing it at the same time in numerous jets, and air-discharge pipes having their outer ends provided with suitable nozzles adapted for insertion into the parts and openings where the air is to be applied.

5. In an air-injector, the combination of an air-compressor, an air-chamber receiving air from it, a mixing-chamber superimposed upon and in communication with the air-chamber from which it receives the compressed air, a distributing-chamber above the mixing-chamber which receives the compressed and medicated air after it has passed through the two chambers first mentioned, a neck 24 provided with a check-valve connecting it with the mixing-chamber, air-discharge pipes communicating with said distributing-chamber and a cut-off device whereby the air may be entirely cut off from the discharge-pipes or be permitted to pass out through certain ones only.

6. In an air-injector, the combination of an air-compressor, an air-chamber receiving air from it, a distributing-chamber receiving the air from the air-chamber, air-discharge pipes mounted upon the top of the latter and communicating with the interior thereof, a pivotally-supported cut-off plate with openings controlling the outlet from the distributing-chamber through said air-discharge pipes and capable of adjustment to cut off such outlet entirely or limit it, and stops indicating certain positions of said cut-off plate for certain purposes.

7. In an air-injector, the combination of an air-chamber, two bellows connected to each other in a manner which causes them to act simultaneously, one for receiving, the other for discharging air, so that one is always supplying air to the air-chamber whereby an uninterrupted current is caused to leave the latter, air-conduits 14 connecting the bellows with the air-chamber, receiving and discharge valves for both, a mixing-chamber 22, a connecting-conduit through which it receives the air from the air-chamber, said conduit having an ascending and a descending branch whereby the air is caused to enter the mixing-chamber near the bottom thereof, the outlet thereat being constructed to cause the air to discharge in jets, a distributing-chamber receiving the air from the mixing-chamber, three air-discharge pipes mounted upon the top of the distributing-chamber and having their ends fitted with suitable nozzles for application and a pivotally-supported cut-off plate with openings controlling the outlet from the distributing-chamber through said air-discharge pipes and capable of adjustment to cut off such outlet entirely or limit it, and stops indicating certain positions of said cut-off plate for certain purposes.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

BRADFORD McGREGOR.

Witnesses:
CHAS. W. CARTY,
ARTHUR KLINE.