April 8, 1958 H. L. WEBB 2,830,135

DICTATION TYPE MASK WITH VALVE CONTROLLED INHALATION AND EXHALATION

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FIG. 2

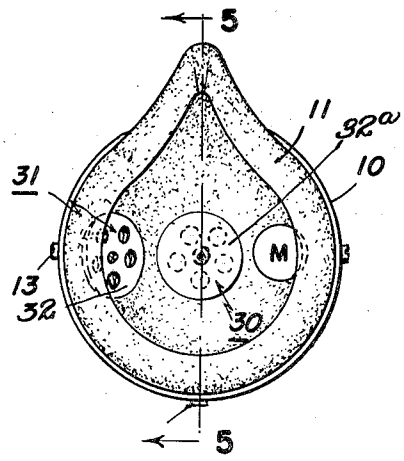
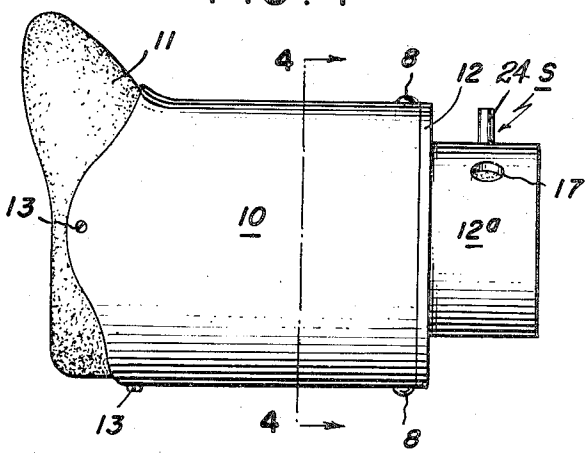


FIG. 1



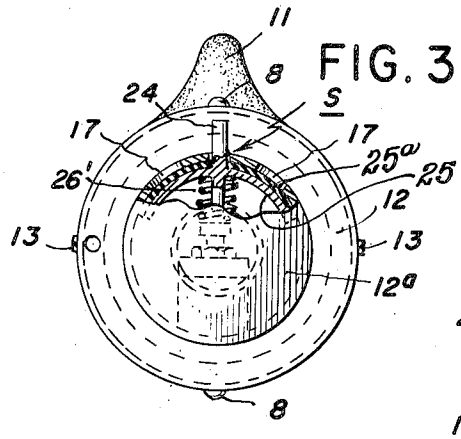


FIG. 3

FIG. 4

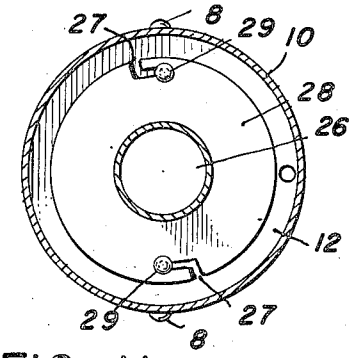


FIG. 9

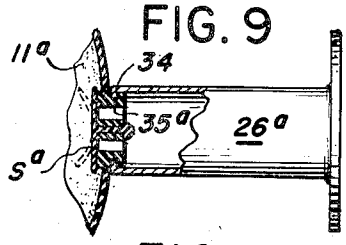


FIG. 10

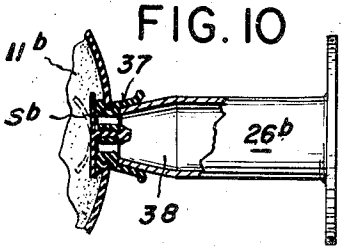


FIG. 11

INVENTOR,
HORACE L. WEBB,

BY

ATTORNEY

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FIG. 5

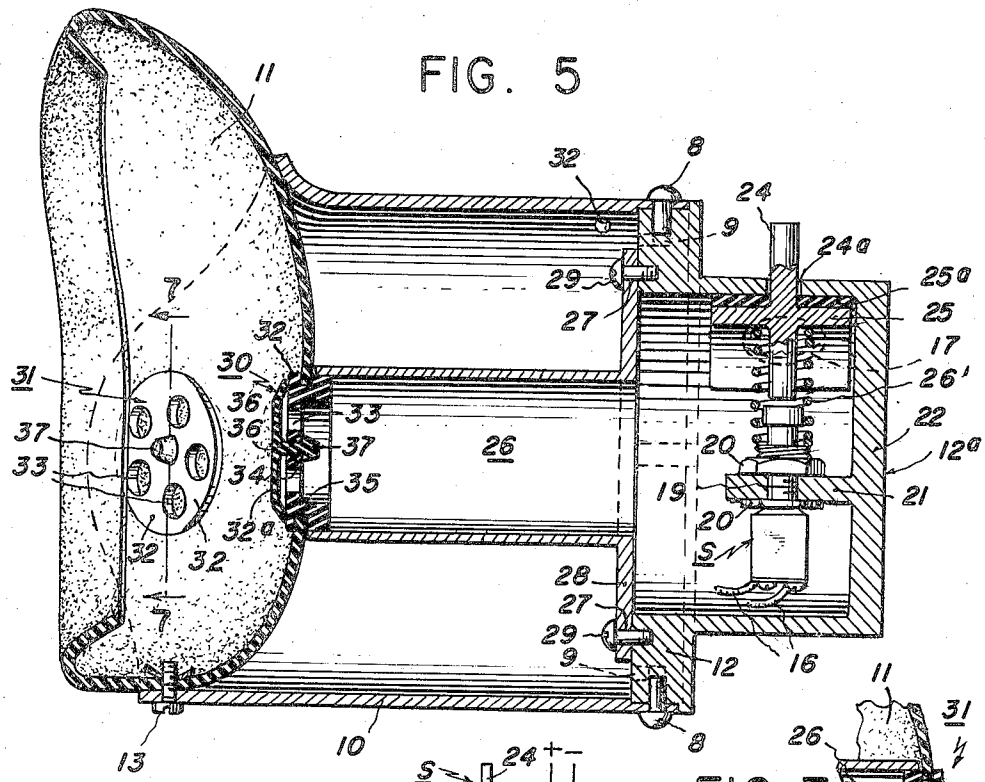


FIG. 8.

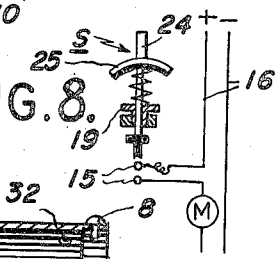


FIG. 7

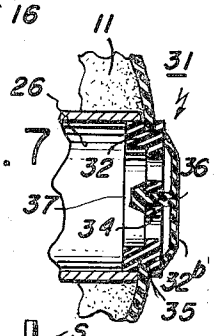


FIG. 6

INVENTOR
HORACE L. WEBB,
BY
ATTORNEY

United States Patent Office

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DICTATION TYPE MASK WITH VALVE CONTROLLED INHALATION AND EXHALATION

Horace L. Webb, Fairfax, Va.

Application December 21, 1953, Serial No. 400,325

4 Claims. (Cl. 179—188)

This invention relates to an ambient sound excluding mask device of the type used for recording speech in electrical dictating machines as for "court reporting."

During inhaling in the existing types of masks of the general character mentioned, stale or spent air is always present about the face of the dictator or reporter and thus in the path which incoming air must travel so that such dictator or reporter must receive during the same and each inhalation an initial quantity of stale or spent air preceding fresh air.

It is the main object of my invention to provide a mask structure in the use of which there is no inhaling of the objectionable stale or spent air and a structure which insures inhalation of fresh air practically exclusively.

Another aim is to accomplish the end stated through reception and discharge of air in appropriate paths controlled by valve means operably influenced by breathing.

A further object is to provide a structure having the advantages stated, having a casing, a separable closure for one end thereof embodying switch and fresh air control, an inhalation duct in separable relation with the closure, and a face fitting mask or diaphragm member for the other end of the closure having valve means, preferably oppositely opening, to control inhalation through the duct and exhalation through the casing exteriorly of the duct.

Still another object is to provide a construction which enables correct breathing generally; while the instant improvements may be employed separately, same may also be advantageously combined with the structure and attain the additional advantages of that disclosed in my application for patent Serial No. 399,383, filed of even date herewith, entitled Dictation Type Mask with Combined Switch and Air Control.

Various additional objects and advantages will be pointed out and otherwise become apparent from a consideration of the description following taken in connection with the accompanying drawings illustrating an operative embodiment.

In said drawings:

Fig. 1 is a side elevation;

Fig. 2 is an end elevation looking to the left of Fig. 1;

Fig. 3 is an end elevation partly broken away looking to the right of Fig. 1;

Fig. 4 is a cross-section taken on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged longitudinal sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is an exploded view of the parts being primarily in side elevation but with the casing partly broken away;

Fig. 7 is a cross-section taken on the line 7—7 of Fig. 5;

Fig. 8 is an electrical diagram of the switch and associated parts;

Fig. 9 is a detail partly in elevation and partly in section showing a modified mounting of the valve for the inhaling duct;

Fig. 10 is a view somewhat similar to Fig. 9 but of another modified form; and

Fig. 11 is a view showing the use of ordinary flap valves for air control.

Referring specifically to the drawings wherein like reference characters designate like or similar parts throughout the different views and first to the form of Figs. 1 to 7, the mask structure may generally take any approved form in carrying out my invention. As shown, it may employ a casing of requisite length comprising a body 10, a face-fitting diaphragm or mask member 11 and a body closure 12 equipped with a knob 12a. Said diaphragm is flexible to adapt itself for fitting over the mouth and nose and for intimate marginal contact with the face, being of rubber or the equivalent and either permanently or removably secured to the body 10. As shown the diaphragm is wedged into body 10 and additionally secured thereto by bolts 13.

Body 10 and closure 12 while shown as separably secured together as by pins 8 and bayonet slots 9 may be made in one piece and in either event are preferably rigid and of metal, rubber, other plastic or any equivalent.

An electrical switch device of any approved form generally designated S and for instance of the construction disclosed in my said application for patent filed of even date herewith, preferably moisture-proof, controls the usual operating circuit at contacts 15 in conductors or feed wires 16 leading from a source of electricity through a microphone M detachably carried by mask 11 to a dictating machine as diagrammatically suggested in Fig. 8. Either in the wall of casing body 10 or closure 12, one or any number of fresh air, breather or "air demand" holes 17 are provided and the casing body and closure are interiorly hollow so that an air path exists through the holes 17, casing body 10 and diaphragm 11, to and from the mouth of the dictator or reporter. While the opening and closing of said holes 17 may be effected independently of switch S, my invention well lends itself to combination therewith.

Said switch S has a movable or operating member 24 which is slidably depressible although the invention may be practiced where the switch operator has an arcuate, universal or other movement.

Said switch device with its conducting parts suitably insulated is mounted by means of a fastening tube 19 and clamping nuts 20 threaded thereon in an opening of a supporting means 21 rigid or integral with and extending rearwardly from a closed front wall 22 of closure 12. Said operating member has a shank 24 extending slidably and exteriorly through an opening 24a in closure 12.

Shank 24 is carried by a valve means for holes 17 shown in the form of an arcuate plate or plates 25 to whose convex surfaces are suitably cemented or otherwise fastened layers or sheets 25a of foam rubber, cloth, cellulose or the equivalent primarily for use as a gasket but as in my application filed of even date herewith is so constructed as to be sound-insulating while preferably porous to the extent of permitting limited passage of air therethrough. A coil spring 26 surrounds part of the switch operator and bears against the switch and plate 25 normally urging the switch operator 24 upwardly or outwardly to the position of Fig. 5 wherein the valve means substantially close holes 17. Said Fig. 5 shows the parts of switch S in the preferred circuit closing position. The arcuity of plates 25 will avoid undue turning of switch operator 24 relative to the casing but any additional or positive means for this purpose may also be employed.

Said closure 12 carries an inhalation duct 26 disposed centrally within casing 10 and it is preferably made of the same material as the casing and closure and separably secured to such closure as by means of interengagement of bayonet slots 27 in an outwardly extending securing flange 28 at one end thereof with pins 29 on the closure. The

fresh air path is through the holes 17, when open, interior of closure 12, duct 26, a valve device 30 into the face mask 11 and from the latter the stale or spent air exhausts through a valve device 31 through the casing 10 exteriorly of duct 26 and then seeps through any sufficiently loose joint of the parts or a hole 32 in the casing or another adjacent part as required.

Valve devices 30 and 31 may be similar and both may be detachably carried by the face mask or diaphragm 11 or mounted in or on any suitable part of the device. Such valve devices may be round bodies 32 of rigid plastic or other material having air perforations 33 and a central perforation 34 therethrough as well as an annular peripheral groove 35. The flexible face mask 11 has openings of slightly less diameter than the bodies 32 at the location therefor so that the mask will dilate about the openings through pressure of the bodies partly therethrough and the face mask 11 about the openings will then contract or snap into grooves 35 and thus detachably mount the bodies. The free end of duct 26 slidably and disengagingly fits over a portion of body 32 as in Fig. 5. Said valve bodies carry flat, round, flexible rubber or other flap valves 32^a and 32^b at the valve devices 30 and 31, respectively, which are preferably removably carried by said bodies as through the medium of integral flexible shanks 36 passed through perforations 34 and which shanks include integral heads 37 normally expanded but compressible for passage through said perforations 34.

Particular attention is called to the fact that the flap valves 32^a and 32^b are disposed on different faces or sides of their respective bodies 32 and normally said flap valves 32^a and 32^b are flat and in contact with said bodies. However, through breathing action said flap valves respectively marginally flex away from the bodies and expose their openings 33 and then flex toward the bodies and close their openings 33 to the end that one can inhale only through duct 26, exhaling serving to close flap valve 33, and one exhales exclusively through valve device 31 past flap valve 33^b into the casing 10 about duct 26 and thence through any loose joint of the parts or hole 32.

Various changes may be resorted to provided they fall within the spirit and scope of the invention, and for instance as shown in Fig. 9, the inhalation control valve S^a which is the same as valve S may be carried by the inhalation duct. In this form said duct 26^a functions like that shown at 26 and it additionally has a flange 34 turned into the groove 35^a, the equivalent of that shown at 35. In this form valve S^a simply projects removably into or occupies an opening 36 in the face mask or diaphragm 11^a like that at 11.

In Fig. 10 inhalation control valve S^b is carried by face mask or diaphragm 11^b in the same manner as the first form. The body 32^b corresponds to body 32 and additionally has a preferably integral flared flange, tube or duct 37 which detachably telescopes or interfits with a duct 26^b like that at 26, but preferably tapered at 38 for better removable centering and interfitting with flange 37. Obviously the flange or tube 37 and duct 26^b may be of any relative length or extent desired.

In Figure 11 the first-mentioned form is modified primarily with respect to the valve control. Here a face mask or diaphragm like that at 11 is identified as 11^c. The inhalation and exhalation openings therein are shown at 39 and 40, respectively. The inhalation duct 26^c is like that employed at 26, the free end extending removably into opening 39. At the face-engaging surface of mask 11^c a flap valve 41 controls inhalation at opening 39 and the inhalation duct, while a flap valve 42 at the outer surface of mask 11^c controls exhalation opening 40. Said flap valves 41 and 42 are preferably of flexible rubber or equivalent, freely flexible under the action of breathing and according to the direction thereof to open and close the valves being anchored to the face mask by a rivet, stitch or otherwise at 43. Said flap valves 41 and 42 function like the valve devices 30 and 31 respectively.

What is claimed is:

1. A sound receiver of the class described having a tubular casing provided at one end with an exteriorly exposed face-engaging portion and associated microphone and at the other end with a closure means open to the atmosphere, an inhalation duct member in the casing open at one end through the closure means, said duct member extending from the closure means to said portion, the casing having an exhalation path therethrough outside of said duct member, said duct member being displaceably carried by said closure means, a valve means for said duct member and a valve means for said path, each valve means being normally urged to closed position and operable through breathing to open and close, the first-mentioned valve means being carried by said portion and being interfitted with the adjacent end of said duct member.

2. A sound receiver of the class described having a casing provided at one end with an exteriorly exposed face-engaging portion and associated microphone and at the other end with closure means open to the atmosphere, an inhalation duct member in the casing on and extending from said closure means to said portion, said inhalation duct member being open through the closure means, and the device having an exhalation path through the casing outside of said duct, breathing controlled valve means for said duct means operable by the breath exteriorly of the receiver adjacent said portion, breathing controlled valve means for said exhalation path operable by the breath exteriorly of the receiver adjacent to said portion, both said valve means being normally urged to closed position, said duct means being displaceably carried by said closure means, the first-mentioned valve means being carried by said portion and interfitted with said duct means, and one of the interfitted parts being tapered.

3. A sound receiver of the class described having a tubular casing open at both ends, an exteriorly exposed face-engaging diaphragm at one of said ends, and closure means for the casing at its other end, said closure having an outwardly extending annular flange engaging the casing, said closure being hollow at a portion thereof and communicating with the atmosphere, an inhalation duct member detachably connected to said flange, said duct member extending into the casing from said closure means to said diaphragm, the casing having an inhalation path therethrough outside of said duct member.

4. A sound receiver according to claim 3 having a valve means for said duct member and a valve means for said path, each valve means being normally urged to closed position and operable through breathing to open and close.

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