

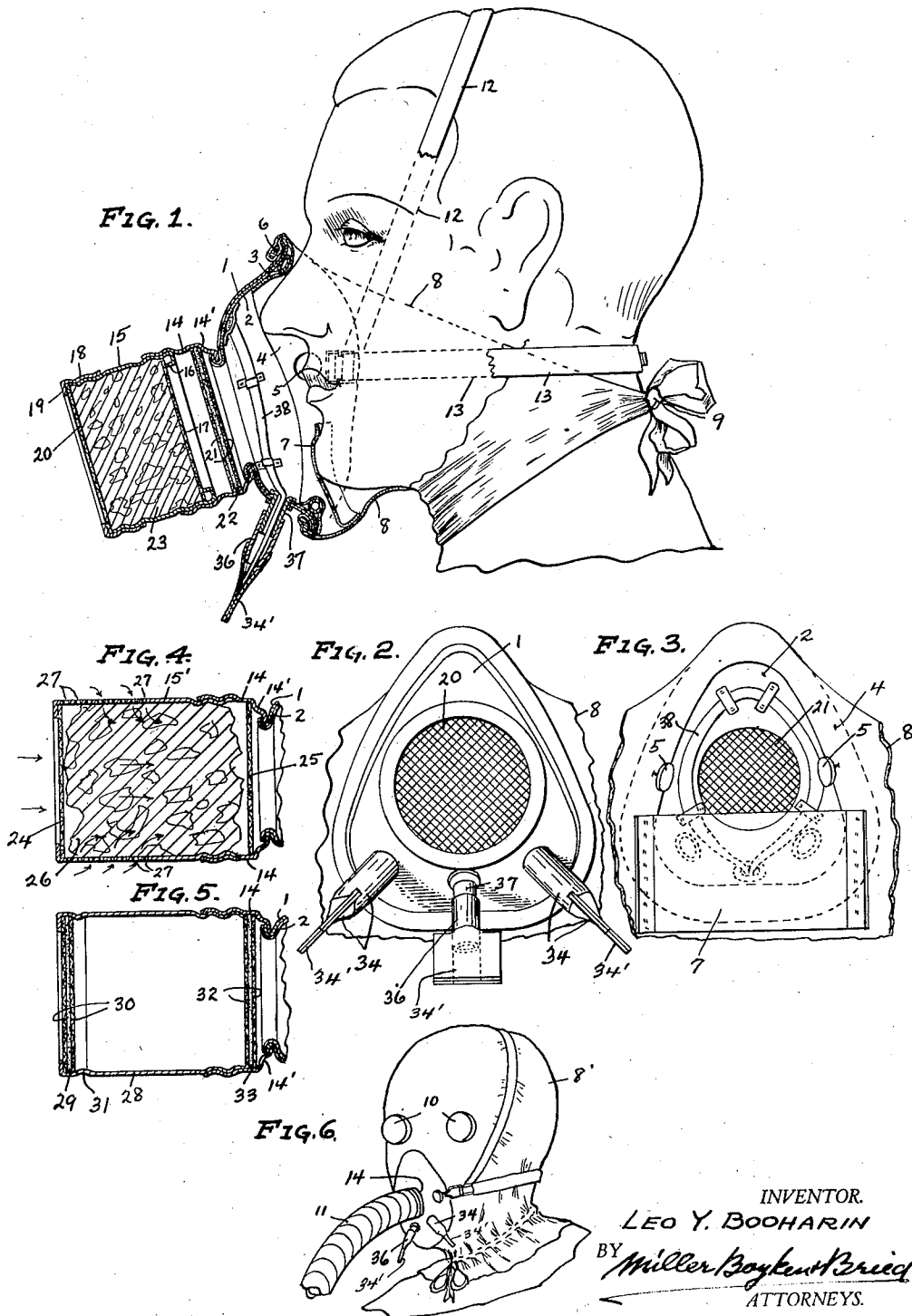
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L. Y. BOOHARIN

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BREATHING MASK

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BREATHING MASK

Leo Y. Booharin, San Francisco, Calif., assignor
of one-third to Bertram Werner and one-third
to Frederick Muller, both of San Francisco,
Calif.

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This invention relates to masks as used to promote healthful breathing in contaminated atmospheres, either dust or chemical-laden, or carrying poisonous gases. The object of the invention is to provide an effective mask for any of the above uses which will be extremely light. Also one which will reduce sweating to the minimum, which will automatically discharge accumulated wet condensations, and which will promote exhalation while maintaining the mask safe against influx of noxious gases or dust-carrying air.

In the drawing accompanying this application Fig. 1 is a side view of a head wearing my improved mask and with the latter shown in vertical section.

Fig. 2 is a front view of the mask with the face cloth broken away.

Fig. 3 is a rear view, or view looking into the interior of the mask.

Fig. 4 is a vertical section of a modified arrangement of the filtering end of the mask.

Fig. 5 is a view similar to that of Fig. 4 but with the sponge removed.

Fig. 6 is a perspective view of a head with my mask in place and the face cloth enlarged to cover the entire head. This also shows the mask connected to a canister pipe as it would be for use in poisonous gas.

While it is evident that in the construction of such masks various materials may be used. I will describe the construction as of certain material which I have found best, and which in certain parts of the mask appear to be indispensable to secure the results sought for.

My improved mask in its preferred form consists of a face-fitting cup-like body formed of an outer aluminum shell 1 which may be perforated to make it still lighter, and an internal lining 2 of rubber, while positioned around the inner margin of the cup is a hollow flexible rubber tube 3, and lying over the tube and extending outwardly around the outer edge of the cup is a layer of heavy canton flannel 4, preferably removably buttoned in place within the mask as at 5 and held over the slightly outwardly turned rim of the body by means of an elastic band 6 bound within the marginal edge of the cloth.

The rubber tube beneath the cloth forms a soft yielding contact edge against the face, though the chin is preferably engaged by a band 7 of heavy cloth such as canton flannel which is sewed at its ends to the cloth lining 4 as well as to a cloth extension 8 also sewed to the cloth lining and adapted to cover the entire lower half of the face and button or tie in back of the neck as indi-

cated at 9. This extension is also of canton flannel (all with the down side turned inwardly against the face of the wearer).

The cloth extension 8 may be in the form of a bag enclosing the whole head of the wearer as at 8' in Fig. 6 and in which case goggles 10 are fitted in the hood in a manner to seal them tight around the edges. This, however, is only necessary in specially noxious or irritating gases and in which case a breathing hose 11 is extended from the mask to a chemical canister not shown.

The mask is held snugly in position by means of elastic straps 12, 13 and when in place will afford a clear space in front of the nose and mouth, and directly in front is a relatively large round opening fitted with a threaded metal fixed collar 14 to which may be screwed various air filtering devices depending on the particular conditions to be guarded against.

In Fig. 1 the air filter comprises a short light aluminum cylinder 15 threaded at both ends and turned inwardly at its inner end at 16 to form a seat for a wire or perforated metal screen disk 17, while screwed to the outer end of the cylinder 15 is a collar 18 with a marginal flange 19 clamping a second screen disk 20 against the outer edge of the cylinder. Collar 14 is formed with an annular shoulder at 14' against which is seated any desired kind of filtering disk, here shown as a pair of wire or perforated metal disks 21, between which is a cloth or paper filter sheet 22, while between disks 17 and 20 is a moist sponge 23, and it should be noted that a relatively large space is maintained between the wet sponge and the dry filtering disk 22 for any moisture getting on the dry filter would be very detrimental and soon cause it to choke.

Fig. 4 shows a longer cylinder 15' screwed to the fixed collar 14 and the outer end of the cylinder turned inwardly to form a retaining flange for a screen disk 24. A simple screen disk is also placed at 25, in place of the dry filter shown in Fig. 1, and between the two screens is a large sponge 26 through which the air must pass on its way to the wearer of the mask. In this figure the outer half of the cylinder is perforated around its diameter as shown at 27 so that the air also enters through the sides of the sponge. The sponge in this case may be dry or damp, depending on the conditions to be met.

In Fig. 5 the cylinder is designated 28, is imperforate on its side walls, but has a return flange on its outer end, and within is a filtering disk 29 of any desired material held between two screen disks 30 pushed tightly in place in the

end of the cylinder and frictionally held from displacement by a slight bead 31. In this arrangement there is also a pair of screen disks 32 and intermediate filtering disk or disks 33 in the collar 14 as indicated.

To care for the exhalations of the wearer I provide two short diverging cylindrical tubes 34 of gum rubber, best attached by slipping their inner ends over light metal ferrules 37 securely crimped to the rubber lining of the mask.

The outer ends of the tubes respectively are provided with a flattened tube portion 34' comprising a pair of sheets of gum rubber of thinner material than the tubes, which sheets are cemented together along two opposite edges leaving an uncemented portion between for slipping over the end of the tube and cementing thereto. The tubes 34 only extend a short distance into the uncemented portion between the sheets 34' thus leaving a length of the uncemented portion lying in close contact to insure proper closing of the tubes against inhalations. This combination of what substantially amounts to a flattened tube of very light gum rubber and a heavier cylindrical tube of heavier gum rubber is very important as the flattened portion will not stick together to prevent free exhalations.

A third similar tube 36 is provided in the lowest central point of the mask cavity to serve as a sump and drain for condensed moisture and for discharging it from the mask. Tubes 34 are arranged in a diverging manner and enter the mask cavity at a point above where any aqueous condensation can accumulate, but the ferrule 37 of tube 36 is as stated at the lowest point and acts as a sump for any moisture. Besides this, a soft cotton or other highly absorbent wick 38 is looped around the interior of the mask and has its ends hanging into the ferrule 37 to drain all accumulated moisture to it.

In use of the mask, the two diverging tubes 34 being disposed substantially beneath the nostrils of the wearer respectively on opposite sides of the mask as indicated in Figs. 1 to 3 readily open independently of the accumulated pressure within the mask to permit exhalation, but close tightly against any inhalation or inward passage of gases or contaminated air. Also during each exhalation the central drainage tube opens slightly and any contained water is forcibly ejected.

In some cases I may dispense with the cloth extension 8, but it is of great value in promoting a tight fit, overcoming chafing, and especially valuable in keeping the chin clean of any poisonous dust in case the mask is slipped off temporarily by pushing it below the nose, a procedure which often results in serious illness with ordinary masks through their gathering poisonous dust from the lower part of the chin, neck, or sides of cheeks and transmitting it to the mouth when slipping the mask back in place.

In some cases where it is desired to make an unusually effective seal to the face as in use with

the most highly poisonous gases, the inner cloth lining 4 may be replaced with a sheet of thin dental rubber as well as head covering 8' in Fig. 6.

My mask will be seen to provide a change to any particular filtering medium desired, or to a chemical container by screwing a hose to collar 14 as shown in Fig. 6, so that it becomes universally applicable for any purpose for which a breathing mask is used, and by the construction shown it is possible for a man to work in an atmosphere heavily laden with poisonous dust all day long as against an hour or two with any other mask which I have been able to obtain.

I therefore claim:—

1. A breathing mask comprising a cup-shaped body formed to fit over the nose and mouth of a wearer and having an air intake opening in front, a moisture-absorbing wick positioned within the mask cavity, and a sump into which said wick extends for draining thereinto.

2. A breathing mask comprising a cup-shaped body formed to fit over the nose and mouth of a wearer and having an air intake opening in front, a moisture-absorbing wick positioned within the mask cavity, a sump into which said wick drains, and an automatic valve operated by pressure of exhalations arranged for ejecting drainage from said sump, said wick arranged and adapted to extend into said sump.

3. A breathing mask comprising a cup-shaped body formed to fit over the nose and mouth of a wearer and having an air intake opening in front, and provided with means for attaching a filtering medium, two exhaust tubes extending from opposite sides of the vertical center line of the mask and in a downwardly diverging direction, each of said tubes comprising a soft rubber tube with its outer end flattened to bring its walls into contact, but free to open from air pressure from within the mask to afford a straight exhaust passage and said tubes each disposed substantially beneath the nostril respectively of the wearer whereby the direct force of the breath of the wearer will tend to open each valve independent of the accumulated pressure of the breath within the cup-shaped body.

4. A breathing mask comprising a cup-shaped body formed to fit over the nose and mouth of the wearer provided with a single air intake opening in front arranged and adapted for attaching to a filtering medium, a pair of exhaust tubes one on either side of the lower portion of the cup-shaped body disposed above the lowermost portion of said body substantially beneath the nostrils respectively of the wearer and a third exhaust tube disposed in the vertical medial line of the body below said pair of tubes arranged and adapted to act as a drain sump for accumulated moisture within the body, all of said tubes being valved to open upon exhalations of the wearer and to close upon inhalations, said third tube being adapted to discharge the accumulated moisture upon exhalations.

LEO Y. BOOHARIN. 65