

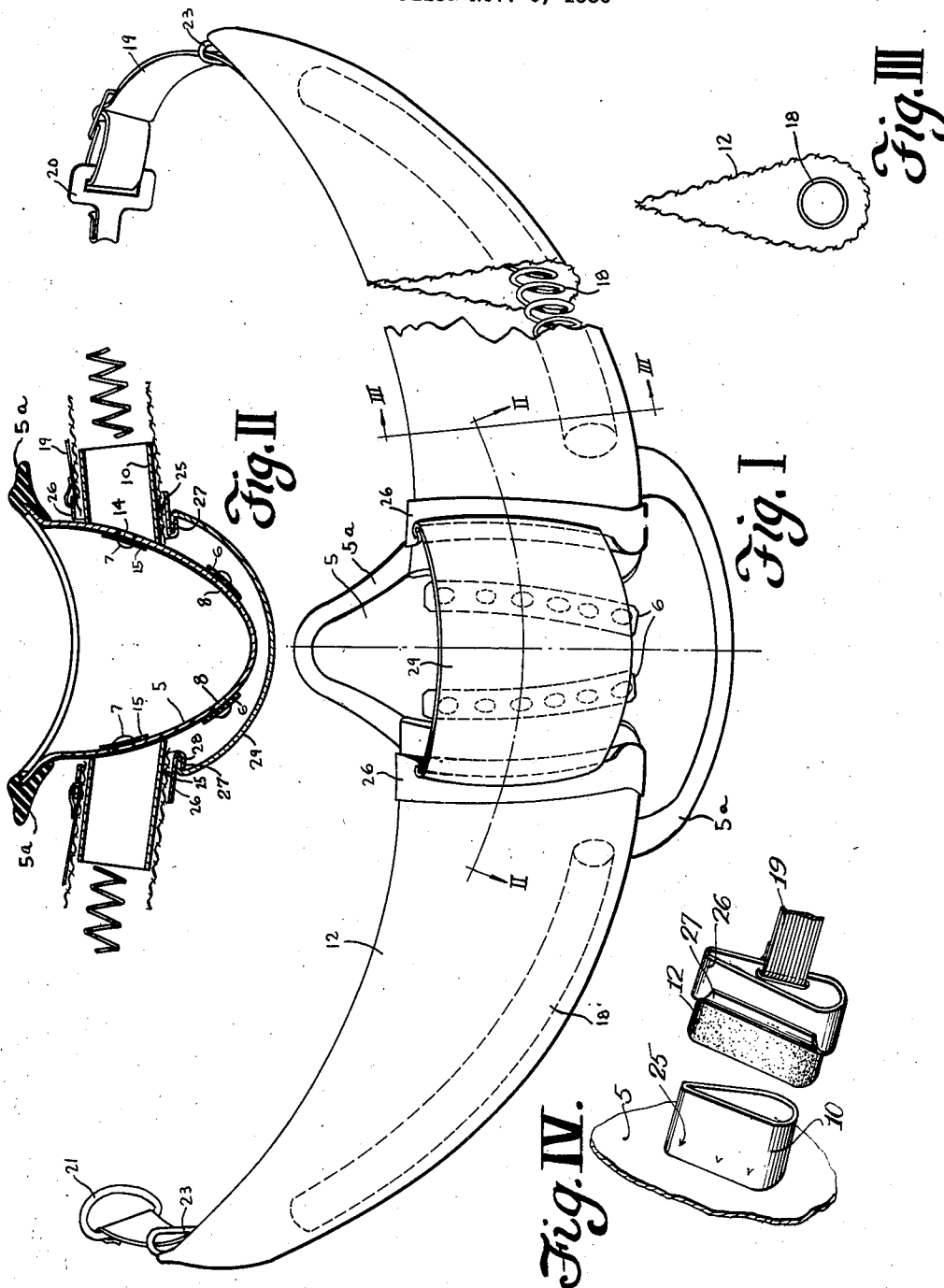
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RESPIRATOR

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RESPIRATOR

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10 Claims. (Cl. 128—146)

This invention relates to respirators and more particularly to respirators fitting the face and comprising a filter for removing particles of dust or the like from the air supplied to the user.

5 An object of the present invention is to so dispose the parts of the respirator with relation to the head of the user that there is minimum interference with vision.

In the accompanying drawing illustrating the invention, Fig. I is a perspective view of one of the various forms which the invention may assume, partly broken away to illustrate details;

Fig. II is a sectional view on line II—II of Fig. I;

15 Fig. III is a sectional view on the line III—III of Fig. I; and Fig. IV is a developed view in perspective of the assembling of the inner end of a filter with an inlet to the face piece, all but the inner end of the filter being broken away and only a fragment of the face piece proper being shown.

The type of respirator to which the present invention particularly appertains is intended to remove from the air being breathed such particles as lodge in a porous felt material through which the air is passed. A particularly troublesome problem with this type of respirator is the disposition of the filtering material so as not to interfere with the vision of the user. This problem arises out of the necessity for providing a filter or filters having relatively extensive superficial area in order that the required volume of air may be passed and filtered without making the user uncomfortable due to difficulty in drawing in the air through the respirator.

In accordance with the present invention a relatively large area of filtering material is disposed in such a way as to offer but slight obstruction to the view of the user. The filtering material is made up into filtering means arranged to substantially encircle the head of the user, this filtering means being in communication with a face piece for supplying filtered air. For the convenience and comfort of the user, the filtering means may be arranged so as to extend in opposite directions along the device, such as a strip, which is placed about the head of the user to maintain the face piece of the respirator in place.

Referring to the particular embodiment of the invention illustrated in the drawing, it will be noted that the face piece 5 is of such shape and contour as to fit over the nose and mouth of the user and provide air-tight contact with the face, without overlying the eye cavities. As shown,

the body portion of the face piece is of metal such as aluminum, and sealing engagement with the face is afforded by a rubber flange 5a mounted on the rim of the body portion. One or more exhalation valves 6 are provided on the front of the face piece 5. The valve proper of the exhalation valve is a relatively thin flexible strip of rubber secured to the face piece at its two ends, as indicated at 7. Perforations 8 through the face piece permit the discharge of air; and as will be apparent, the valve will lift to permit such discharge and will be reseated after such discharge so as to prevent air being drawn in through the perforations 8.

The inlets 10 to the face piece may be formed integrally therewith, or may be separate elements secured in any suitable manner to the face piece 5. Each inlet 10 is so shaped as to fit the open end of the filter 12 which supplies filtered air thereto. In the illustrated embodiment each inlet 10 is relatively narrow, tapering from a rounded end at the bottom towards the top so that the side walls substantially meet at the top edge.

From the inlets 10 air is admitted to the interior of the face piece 5 through perforations 14. An inhalation valve 15 overlies the perforations 14 for each inlet, each valve 15 being secured at its opposite ends, as indicated at 16. The inhalation valves 15 function in similar manner to the exhalation valves 6, except that they admit air instead of permitting the discharge of used air.

While the particular filtering material employed forms no part of the present invention, I find that a relatively dense felt is a suitable material for this purpose. This felt may be formed into elongate filters 12 having substantially the cross section shown in Fig. III of the drawing. A light coil spring 18 extending along the bottom portion of each filter 12, as illustrated in Figs. I and III, helps to keep these filters in expanded condition, even while the user is breathing in.

The filters extend laterally in opposite directions from the face piece like wings; and because of their length, the comfort of the user of the respirator is promoted by supporting the two filters from the device 19 which encircles the head for maintaining the face piece 5 in place. The device 19 may take the form of a band or strap having catch elements 20 and 21 suitable for fastening the device 19 about the head. The outer portions of the filters 12 may be supported from the device 19 in any suitable manner. As

illustrated in Fig. 1, the ends of the filters 12 are connected to the strap by slides 23 which permit sufficient relative movement between the strap and the filters to permit the strap to accommodate itself to the head in use.

In case the filters 12 become fouled, or are otherwise rendered unfit for further service, they may be quickly replaced due to the arrangement for attaching them to the inlets 10. Each inlet carries a series of prongs 25, which are so directed as to hook into the material of the respective filters. In addition, a clamp 26 is slidable along each filter so as to overlie the inlets 10, and more particularly, the prongs 25. Each clamp 26 has a reversely bent edge 27, which is adapted to engage with the inturned edge 28 of a coupling 29. When the two clamps 26 have been moved inwardly so as to hold the two filters 12 to the two inlets 10, the coupling 29 may be slid downwardly in interlocked engagement with the reversely bent edges 27, thus firmly positioning the inner ends of the two filters on the two inlets 10. The coupling 29, when in position, overlies and shields the inhalation valve or valves 6.

A respirator embodying the present invention has the advantage of compactness without necessitating a reduction in the extent of superficial area of the filter material; the filters are quickly detachable, so that it is not a cumbersome operation to replace them; and the arrangement of the filters in winged fashion disposes them in such a way as to interfere to a minimum extent with the vision of the user. Moreover, there is no looseness or flapping of the parts, since the filters are supported in compact fashion from the strap or other device which maintains the face piece in place. The cross section of each wing of the filtering means affords the further advantage that the taper is from the bottom to the top, so that the outer side slopes away from the eye, thus giving greater freedom of vision.

While I have illustrated and described the embodiment of my invention which I at present prefer, it will be understood that the invention may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. A respirator comprising a face piece having a pair of opposed inlets, filters telescoping with said inlets, clamps slidable along said filters each to clamping position over the respective inlet, and a coupling for connecting said clamps together in clamping position.

2. A respirator comprising a face piece having a pair of opposed inlets, filters telescoping with said inlets, clamps slidable along said filters each to clamping position over the respective inlet, a coupling for connecting said clamps together in clamping position, and an exhalation valve shielded by said coupling.

3. A respirator comprising a face piece having inlets on opposite sides thereof, filtering means movable relative to said inlets for telescoping therewith, and means including a common locking member for securing said filtering means in telescoping relation with said inlets of the face piece.

4. In a device of the character described a cup-like face piece having an edge portion shaped to engage the face and having respiratory openings in the opposed side walls thereof, relatively long and slender horn-like filter means of filter material having filtering characteristics substantially throughout the entire area thereof, said

horn-like filter means each having a relatively free closed end and an opening in the opposed end thereof with each of said ends having an opening therein being fitted about one of the respiratory openings of the face piece, means for holding said filter means on said face piece over said respiratory openings and supporting means for engaging the head and for holding the face piece on the face, said filter means each having a connection adjacent the closed end thereof with said supporting means whereby the filter means is held in relatively close relation with the face.

5. In a device of the character described a cup-like face piece having an edge portion shaped to engage the face and having respiratory openings in the opposed side walls thereof, relatively long and slender horn-like filter means of filter material having filtering characteristics substantially throughout the entire area thereof, said horn-like filter means each having a relatively free closed end and an opening in the opposed end thereof with each of said ends having an opening therein being fitted about one of the respiratory openings of the face piece, means for holding said filter means on said face piece over said respiratory openings and supporting means for engaging the head and for holding the face piece on the face, said filter means each having a connection adjacent the closed end thereof with said supporting means whereby the filter means is held in relatively close relation with the face and flexible means extending lengthwise of the filter means for normally tending to retain them in extended relation with the face piece.

6. In a device of the character described a face piece adapted to overlie the nose and mouth of the wearer and having an edge portion for engaging the face, said face piece having a respiratory opening therein, relatively long and narrow filter means having an open end overlying said respiratory opening and having its opposite end closed, said filter means being formed of relatively flexible filtering material having a filtering function substantially throughout the entire area thereof, connection means for holding said filter means on said face piece over said respiratory opening and band-like means encircling the head for holding said face piece on the face, said filter means having a connection with the band-like means adjacent the closed end thereof for holding the filter means in relatively close relation with the face.

7. In a device of the character described a face piece adapted to overlie the nose and mouth of the wearer and having an edge portion for engaging the face, said face piece having a respiratory opening therein, relatively long and narrow filter means having an open end overlying said respiratory opening and having its opposite end closed, said filter means being formed of relatively flexible filtering material having a filtering function substantially throughout the entire area thereof, connection means for holding said filter means on said face piece over said respiratory opening and band-like means encircling the head for holding said face piece on the face, said filter means having a connection with the band-like means adjacent the closed end thereof for holding the filter means in relatively close relation with the face, and resilient supporting means secured to the face piece adjacent the respiratory opening and extending longitudinally of the filter means for normally holding it in extended relation with the face piece.

8. In a device of the character described, a face

piece adapted to overlie the nose and mouth of the wearer and having an edge portion for engaging the face, said face piece having a respiratory opening therein, relatively long and narrow horn-like filter means having an open end overlying the respiratory opening and having its opposite end closed, said filter means being formed of filtering material having a filtering function substantially throughout the entire area thereof, and supporting means for holding said filter means in relatively close relation with the face with the said filter means having a relatively flat surface for engaging the side of the face and being extended substantially along the line of said supporting means with a connection adjacent the closed end thereof with said supporting means.

9. In a device of the character described, a face piece shaped to fit about the nose and mouth of the wearer and having an edge portion for engaging the face, said face piece having respiratory openings therein, horn-like filter means each having an open end portion fitting about one of said respiratory openings and each having its opposite end closed, said filter means having a filtering function substantially throughout the entire area thereof, common connection means for holding said filter means on said face piece over said respiratory openings and band-like sup-

porting means encircling the head of the wearer for securing the face piece to the face, said filter means extending substantially along the line of said band-like means and each having a connection with said band-like means adjacent the closed ends thereof.

10. In a device of the character described, a face piece shaped to fit about the nose and mouth of the wearer and having an edge portion for engaging the face, said face piece having respiratory openings therein, horn-like filter means each having an open end portion fitting about one of said respiratory openings and each having its opposite end closed, said filter means having a filtering function substantially throughout the entire area thereof, common connection means for holding said filter means on said face piece over said respiratory openings and band-like supporting means encircling the head of the wearer for securing the face piece to the face, said filter means extending substantially along the line of said band-like means and each having a connection with said band-like means adjacent the closed ends thereof and resilient means extending longitudinally of said filter means for normally holding said filter means in extended relation with said face piece.

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