

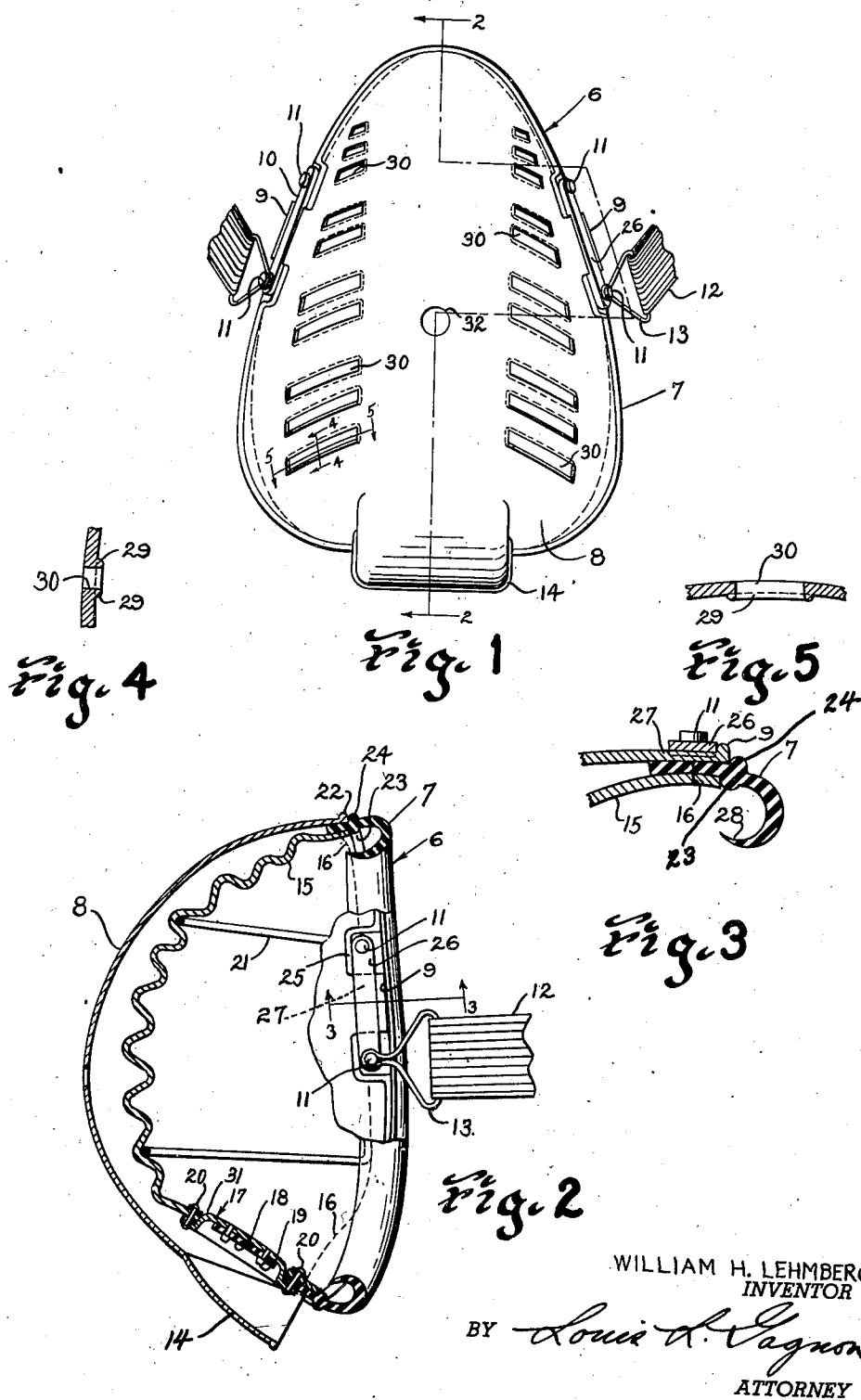
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RESPIRATOR

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RESPIRATOR

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4 Claims. (Cl. 128-146)

This invention pertains to improvements in respirators and has particular reference to a novel construction and method of making the same. This application pertains to respirators of the general type set forth in the co-pending application of W. H. Lehmborg, Serial No. 328,073, filed April 5, 1940, now Patent No. 2,290,885, granted July 28, 1942.

One of the primary objects of the invention is to provide a simple, comfortable and efficient respirator for general use as protective means for individuals exposed to relatively non-injurious dust particles, etc., and has particular reference to a novel inexpensive construction and method of making the same.

Another object of the invention is to provide a respirator of the type set forth herein having a portion shaped to fit the contour of the face so as to surround the nose and mouth of the wearer and having new and improved filter shielding means to reduce the possibility of physical injury to the filter portion of the respirator.

A further object of the invention is to provide a perforated shield or filter cover having means for interlocking the filter cover with its housing or supporting structure.

A further object of the invention is to provide a novel respirator and means of making same having a cover with apertures therein to permit ingress and egress of the air.

A further object of the invention is to provide means for prolonging the life of the respirator, by preventing a portion of dust and foreign particles which might ordinarily engage the outer filter surface of the housing or protective shield, from reaching the filter per se.

A further object of the invention is to provide a housing or shielding means for a respirator filter which will permit handling of the respirator without physically contacting the filter per se.

Another object of the invention is to provide a novel means for securing the filter shield to the supporting structure of the respirator.

A still further object of the invention is to provide novel means and method of supporting and sealing the filter means within a supporting housing.

A still further object is to provide a relatively simple and inexpensive shield type of respirator and method of making the same.

Other objects and advantages of the invention may be and may become apparent from the following description considered in combination with the accompanying drawing. Many changes

may be made in the details of construction, arrangement of parts, and method of making the same without departing from the spirit of the invention as expressed in the subjoined claims. The present disclosure is by way of illustration only and is not intended that the exact details of construction shown and described be considered as limitations, as arrangements of parts and the method shown and described is a preferred illustration only.

Referring to the drawing:

Fig. 1 is a front view of a respirator embodying the invention.

Fig. 2 is a fragmentary side sectional view of the assembled respirator, said view being taken substantially along lines 2-2 of Fig. 1, with a portion shown in elevation.

Fig. 3 is a sectional view taken along lines 3-3 of Fig. 2 to show the locking relation of the respirator shield to the respirator supporting structure.

Figs. 4 and 5 are partial sectional views taken substantially along lines 4-4 and 5-5 respectively, of Fig. 1, to show the thickened portion of the shield in the area of the shield apertures.

Devices of the type presented herein are used for protecting individuals from inhaling small particles of dust and other foreign matter which may be in circulation in the air and might readily be breathed into the system of a human being under ordinary conditions. Factory workers, miners, and others who are subjected to the presence of obnoxious dust particles frequently wear filters for the purpose of creating more suitable working conditions and for preserving health which might otherwise be impaired and result in occupational diseases of the respiratory organs of the body.

Individuals who wear respirators of the type to which this invention pertains, frequently handle the respirator with hands or gloves which are soiled, oily and greasy. In handling the respirator having an exposed filter, the oil, grease, and dirt is transmitted to the outer surface of the filter which may make the filter ineffective prematurely. The oil and grease moisten the fibers and permit dust particles to pass through the fibers of the filter, so that the filter may become ineffective to do the task for which it was intended.

Further, dust particles may readily lodge on the outer surfaces of the filter, so that the inhalation process of breathing through the filter becomes laborious. To eliminate this undesirable

condition, the protective shielding is provided, as set out in the present application.

When the filter is removed it is frequently rested upon surfaces which may have foreign matter thereon, which, after engaging the surface of the filter, adhere thereto to reduce the filter efficiency. The filter protective shield or cover is provided to prevent this condition of collecting dust particles and other foreign matter, when the filter is not in use.

The shielding for the filter may be made of any suitable material such as a transparent plastic, and may be substantially rigid or semi-rigid so that the shape thereof is retained through normal usage.

Referring to the drawing, particularly to Fig. 1, the respirator 6 has a supporting structure or base 7 which has connected thereto a cup-like shield 8, said shield having tongues or lips 27 each provided with a beaded end 9 which slide under a link 26 and are connected to the supporting structure or base 7 by means of screws or pins 11. A headband 12 has a loop 13 which secures opposing ends of the headband 12 to pins, such as 11. A shield air outlet cover 14 is provided adjacent a valve in the filter, said valve air outlet cover being spaced from the valve so as not to interfere with normal operation of the valve parts when the respirator is in use.

Fig. 2 shows the base or supporting structure 7 having a filter 15 which is sewed to the inner end of the rubber structure, said sewing being represented by stitches 16, shown as a dotted line. The filter per se may be also cemented to the rubber supported structure or base member 7, or either one of the securing means such as sewing or cementing may be used. The stitching augments the cementing when both features are used but it is to be understood that either one or both of the methods may be sufficient to definitely fix the filter per se to the supporting base 7. The valve 17 is explained in the co-pending application referred to herein, but briefly consists of a flexible material such as rubber 18 which acts as a valve, said valve rubber being secured to a metallic member having apertures therein, said securing means being, in the present instance, pins 19. The valve 17 may have a metallic cupped shell 31 which is secured by means of pins 20 to the edges of the hole in the filter per se.

A supporting wire 21 constitutes a loop which is fastened to the pins 11 on the inside thereof, said supporting wire being used for the purpose of adding rigidity to the filter, and also to act as filter shape retaining means.

The filter shield 8 has a beaded portion 22 around the peripheral edge thereof on the outer surface. This beaded portion strengthens the shield and causes the same to be more shape retaining. The supporting base 7 may be of any resilient material such as rubber, and in forming said base the rubber has acquired a bead around the inside and outside thereof, said beads being shown as 23 and 24 respectively.

In ordinary assembly, the bead 22 of the shield engages the bead 24 on the outside of the supporting base while the peripheral edge of the filter 15 engages the bead 23 on the inside of the rubber supporting base. The abutting shoulders 23 and 24 of the rubber against the peripheral edge of the filter 15 and the bead 22 of the shield act as limiting means against each other and also provide a somewhat increased area for the joining portion of the rubber supporting base 7 with the filter 15 and the shield 8.

The beaded portion 22 of the shield 8 in the area of the link 26 is shaped around the edge of a cut-out portion so that the shaped beaded portion 25 substantially engages the link 26. The lip 27 (Fig. 3) has a beaded portion 9 thereon, which lip and beaded portion slip under the link 26 to hold the shield 8 in fixed relation to the supporting base 7.

A large view shown in Fig. 3 discloses the lip 27 in operative position on the supporting base 7 with the lip extending through an undercut portion of the link 26 beneath said link while the bead 9, which has been extended through the undercut portion, engages and latches with the rear edge of the link 26, which link is held in place on the supporting base by pins 11. The stitching 16 is shown securing the filter 15 to the supporting base 7. The inwardly turned end 28 is explained more in detail in the co-pending application referred to herein before, but briefly is a shaped rubber portion that provides a form fit for the face when the respirator is in use by an individual.

Fig. 3 shows an enlarged section of the portion of Fig. 2 shown in elevation and taken as on line 3-3 through said portion. The superimposed partial side view also shows the relation of the means 13 for securing the headband 12 to a pin 11.

Figs. 4 and 5 are respective sectional views as heretofore explained, for the purpose of showing the beaded portion 29, which beaded portion is placed around the openings 30 to add rigidity to the area of the cut-out portions 30. The aperture 32 may or may not be used since the aperture 32 results from cutting out the tip from the protective shield, which tip results in one form of molding the plastic protective shield. The aperture is not necessary for proper operation of the filter.

The openings 30 in the shield or cover 8 have a combined area which is sufficient to provide free passage of air through the filter or shield 8 under normal range of breathing rates without introducing any resistance to inhalation. The shape, size, and placement of the openings 30 can be varied from the exact proportional area placement of the openings as shown in the drawing, since the showing is only illustrated. Any suitable arrangements of parts may be made depending on the particular encountered conditions.

The respirator may or may not be used with the protective shield, depending on the particular conditions that will be present when the respirator is worn. The filter per se may be used with the supporting structure and will operate effectively without the protective shield, a primary purpose of the filter cover or protective shield being to resist destruction of the filter per se, prolong the life of the respirator, increase the time interval between cleanings of the respirator and generally prolong its efficiency.

It will be noted that the respirator cover 8 is definitely spaced from the filter per se and is not touching the filter material at any point throughout the assembly. The filter material is connected on the inner portion of the rubber supporting structure while the cover is contiguous with the outer surface of the supporting structure. The filter is not dependent upon the cover for support, but the cover acts as a protective means and its shape adds to the structural strength of the respirator unit as well as prolonging the life and efficiency of the invention.

It is particularly pointed out that the cover 8, in the vicinity of the link members 26, is so cut out as to have portions straddling the connection members or pins 11 with the lip 27 so dimensioned as to extend through the undercut portion of the link 26 as illustrated in Figs. 1, 2, and 3. When the cover 8 is being located in position of use over the filter member, the beaded end 9 of the lip 27 is pressed inwardly thereby causing the flange-like portion of the base member 7 lying between the filter 15 and the link 11 to be compressed through the inherent resiliency of said flange-like portion until the said beaded end 9 engages the bead 24 on the said base member 7. Said bead 24 functions cooperatively with the beaded portions 25 surrounding the contour cut away portions which straddle the pins 11 to locate said cover in proper position over the filter member. The beads 23 and 24 thereby provide locating or positional means for aid in assembling the parts in proper relation with each other. The inherent resiliency of the flange-like portion beneath the link members 26 causes the said lips 27 to be resiliently held in interlocked relation with said link member 26. This arrangement provides simple means whereby the cover may be quickly and easily detached from the filter assembly. It is to be understood that when the filter members become so soiled or deficient from use as to render them impractical for further use, the covers may be retained and assembled with new filter members.

When attaching the head band 12 to the filter members either of the attachment pins may be used as desired.

Having described the invention, what is claimed is:

1. In a respirator, means for detachably connecting a cup-like shield member to a filter supporting base member, said means comprising a wall portion of resilient material on one of said members, said wall portion having a plate-like link portion of relatively rigid material secured thereto with the inner surface of said plate-like portion having a portion in adjacent spaced relation with a side surface of said wall portion of resilient material and tongue-like means on the other of said members having an end portion of increased thickness, which thickness is greater than the width of the space between said adjacent surfaces, adapted to be extended inwardly between said surfaces and to be held in binding relation with an edge of said plate-like member through a binding pressure introduced by the resiliency of said resilient wall portion.

2. In a respirator, means for detachably connecting a cup-like shield member to a filter supporting base member, said means comprising a wall portion of resilient material on one of said members, said wall portion having a plate-like link portion of relatively rigid material secured

thereto with the inner surface of said plate-like portion having a portion in adjacent spaced relation with a side surface of said wall portion of resilient material and tongue-like means on the other of said members having an end portion of increased thickness, which thickness is greater than the width of the space between said adjacent surfaces, adapted to be extended inwardly between said surfaces and to be held in binding relation with an edge of said plate-like link portion through a binding pressure introduced by the resiliency of said resilient wall portion, one of said members having abutment means thereon and the other of said members having a portion adapted to engage said abutment means for limiting the movement of the tongue-like means inwardly of said adjustment surfaces.

3. In a respirator, means for detachably connecting a cup-like shield member to a filter supporting base member, said means comprising a wall portion of resilient material on one of said members having a relatively long and narrow plate-like link portion secured adjacent its opposed ends to said wall portion with its inner surface having a portion in adjacent spaced relation with a side surface of said wall portion and having a longitudinal edge and tongue-like means on the other of said members adapted to extend inwardly between said spaced surfaces and having an enlarged beaded end adapted to engage the longitudinal edge of said plate-like link portion with the resiliency of the material of said wall portion being adapted to retain said beaded end in anchored relation with said plate-like link portion.

4. In a respirator, means for detachably connecting a cup-like shield member to a filter supporting base member, said means comprising a wall portion of resilient material, on one of said members having a relatively long and narrow plate-like link portion secured adjacent its opposed ends to said wall portion with its inner surface having a portion in adjacent spaced relation with a side surface of said wall portion and having a longitudinal edge and tongue-like means on the other of said members adapted to extend inwardly between said spaced surfaces and having an enlarged beaded end adapted to engage the longitudinal edge of said plate-like link portion with the resiliency of the material of said wall portion being adapted to retain said beaded end in anchored relation with said plate-like link portion, said wall portion of resilient material having a bead thereon spaced from the longitudinal edge of the plate-like link portion adapted to engage the beaded end of the tongue-like means to limit the movement of said tongue-like means inwardly of said adjacent spaced surfaces.

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