Aug. 24, 1954 E. F. SHIPMAN 2,686,912

IMPACT MASK

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Fig. 1.

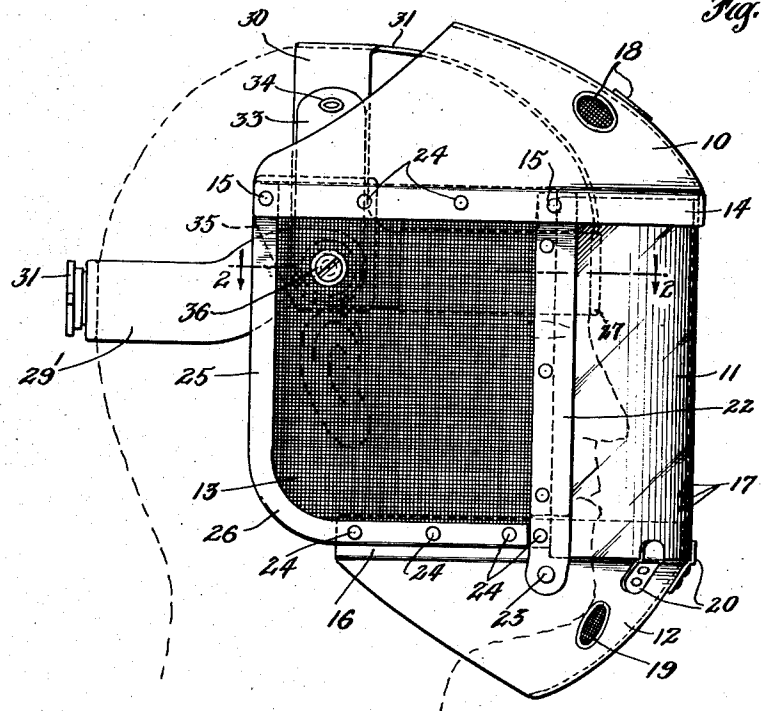
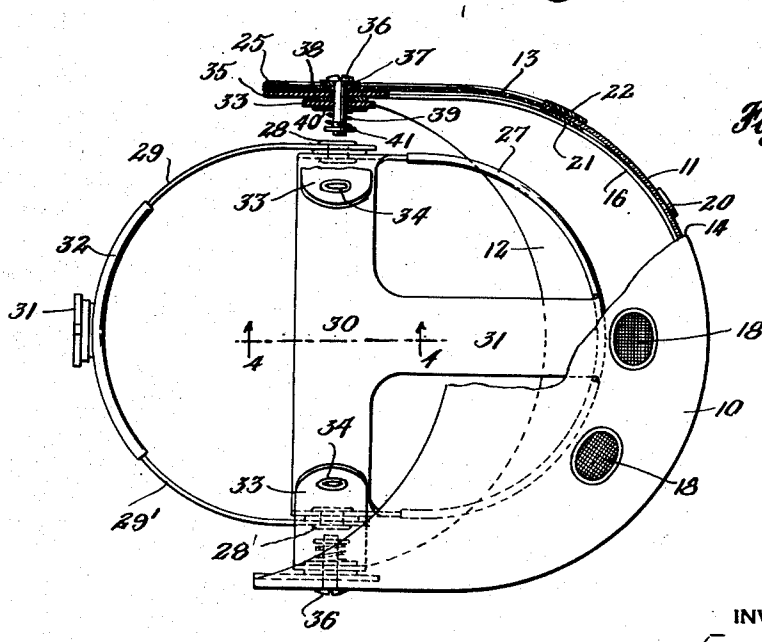


Fig. 2.



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Fig. 3.

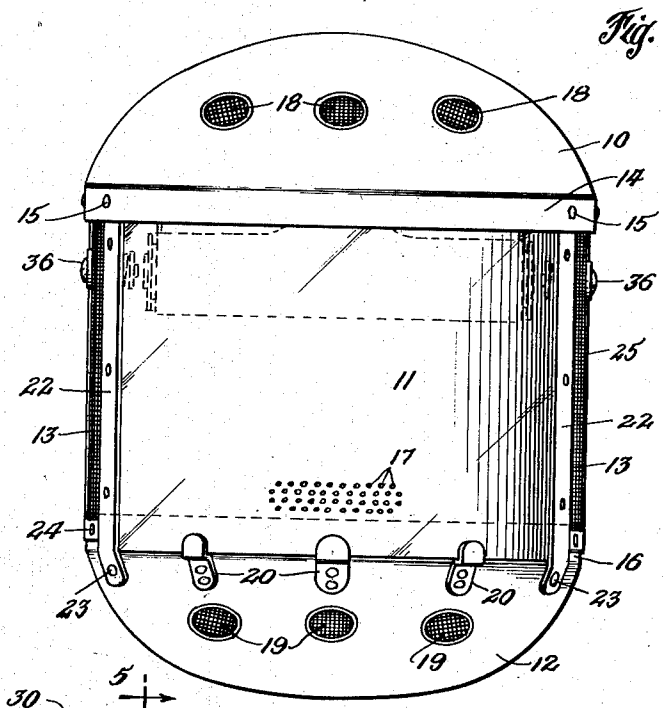


Fig. 4

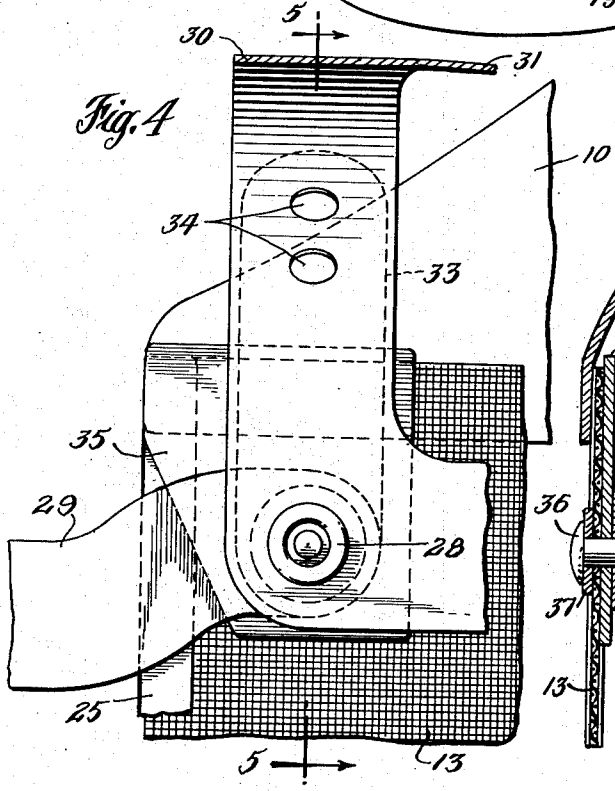
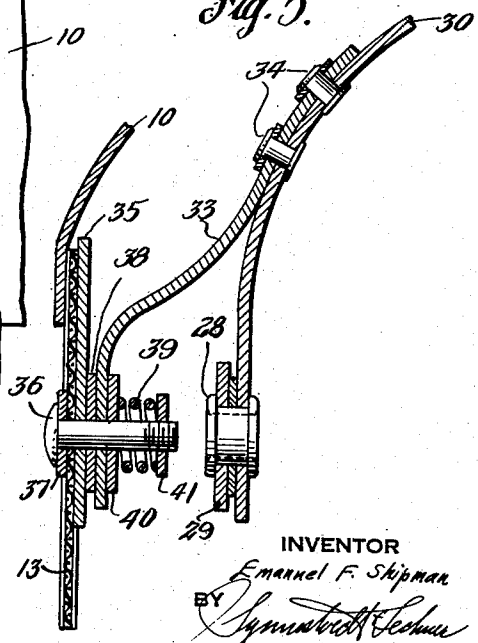


Fig. 5.



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IMPACT MASK

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5 Claims. (Cl. 2—9)

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This invention relates to safety masks intended to protect a workman's face from flying particles. Masks of this type are commonly referred to as impact masks.

Among the objects of the invention is the provision of a mask which affords a greater area of protection than has heretofore been provided, while minimizing interference with transmission of the user's voice, and without reducing the field of vision, interfering with hearing, or substantially increasing the weight. The device of the present invention aims to provide an impact mask attaining these objects, which is at the same time very rugged and strong, yet inexpensive to manufacture and maintain, and which, despite extension of the protective shield, is still relatively free of "fogging"—that is, condensation of moisture from the user's exhalations on the inner surface of the transparent face-shield. How these and other objects which are incident to the invention may be obtained will become apparent from the description which follows, taken together with the accompanying drawings which illustrate a preferred embodiment of the present invention.

In the drawings:

Fig. 1 is a side view of the mask in elevation, the wearer's head being indicated in dotted outline.

Fig. 2 is a plan view partly in section, and with a portion of the device broken away to show structure lying beneath.

Fig. 3 is a front elevational view.

Fig. 4 is a detail in elevation on an enlarged scale (taken along the line 4—4 of Fig. 2), of the mounting elements for positioning the mask on the head of the wearer.

Fig. 5 is a section taken on the line 5—5 of Fig. 4.

Referring now to Figs. 1 and 2:

The mask proper constitutes a forehead shield 10, a translucent face window 11, a chin protector 12, and right and left-hand ear guards 13. The forehead shield 10 and the chin protector 12 are formed of a material known as "vulcanized fiber." This material is shaped in a molding press to the desired contour. The upper shield 10 is formed with a peripheral flange 14 along its lower edge, to which components of the mask may be attached as by rivets 15. Similarly, the chin protector 12 is provided with a peripheral flange 16 which is secured, as by riveting, to other components of the mask.

Vent-holes 17 may be provided in the window 11, both to facilitate voice transmission through

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the mask and to improve ventilation within it, to reduce fogging.

Gauze-screened ventilation ports 18 are provided in the upper head shield 10, and similar gauze-screened apertures 19 are provided in the chin protector 12. These also play an important part in preventing fogging of the inner face of the translucent window 11.

It will be seen that the transparent window 11 is curved so as to afford maximum vision to the user. This window is preferably made of a synthetic resin material, such as that commonly sold under the names of "Plexiglas," "Lucite," or "Crystalyte." These are acrylic resins. Other strong translucent plastics may, of course, be substituted such as "Plastacele" (a cellulose acetate). Such materials are safer than glass, because they are not as likely to shatter under impact, and are quite tough and, particularly when used in a parti-cylindrical shape, highly rigid.

The transparent window 11 fits inside the flange 14 of the forehead shield 10. It lies outside of the lower flange 16 of the chin protector 12 and is fastened to the last-named element by clips 20 which are riveted to the chin protector in appropriate positions just below the flange around its periphery, to receive the lower edge portion of the window unit.

The lateral edges of the front window 11 are secured between inner and outer vertical metallic strips 21 and 22, respectively. The outer strip 22 terminates short of the lower edge of the upper flange 14, but the lower end of this strip 22 extends beyond the lower flange 16 and is bent inwardly and riveted as at 23 to the chin protector 12. The position of the strips 22, 23 is approximately opposite to the eyes of the wearer.

The inner strip 21 extends above the lower edge of the upper flange 14 to a point where it is engaged by one of the rivets 15. It terminates short of the upper edge of the lower flange 16.

Inside the upper flange 14 and outside the lower flange 16 a woven wire screen is mounted, this being held in place as by the rivets 24. The rear edge of this screen is bound by a channel strip 25 which is fastened inside of the upper flange 14 by the rearmost of the rivets 15. This channel strip is curved in its own plane, as at 26, so as to avoid the formation of a sharply angled corner which might otherwise dig into the neck of the user on sudden turning of the head. The channel strip is extended forwardly to a point just short of the vertical strip 22, and is riveted to the flange 16 at intervals along its length. The forward vertical edge of the wire screen is

received and held between the inner vertical strip 21 and the outer vertical strip 22 as is more clearly seen in Fig. 2.

By this means, protection for the ears and jaws of the wearer is afforded without in the least impairing the ability of the user to hear. It has uniformly been the practice in manufacturing masks of this type in the past to terminate the face-protecting section at a point some distance in advance of the ear area, because, first, a rearward extension of the mask seriously interfered with hearing, and second, substantially increased the over-all weight of the device. Hearing is particularly important, because impact masks are customarily worn in situations where the noise level is unavoidably high, and it is sufficiently difficult to hear orders or commands without interposing any obstruction to the free access of sound. Weight is almost equally important, because workmen will disregard regulations and omit the mask entirely if it is so heavy as to be burdensome to the wearer.

The mask is secured to the head of the wearer by the use of a harness mounting incorporating an adjustable head strap. The strap itself does not constitute a part of the present invention, being available on the open market for various types of head gear. Details of the mounting mechanism are most clearly seen in Figs. 2, 4 and 5.

Essentially, the mounting unit comprises a head band 27, preferably provided with a leather cover, which is secured by matching eyelets 28, 28′ to an adjustable head strap 29, 29′, so that the head strap may have pivotal movement about the rear ends of the harness member 27. A bridge strap 30 spans the top of the wearer's head, this being secured, at its lower ends, in fixed relation to the harness member 27. The bridge piece 30, as will be seen in Fig. 2, has a forwardly extending portion 31 which lies over the fore part of the wearer's head and is united to the harness 27 at its extreme forward position. The entire forward harness, 27, 30, 31 may be die-stamped out of a single piece of vulcanized fiber.

The nut 31 affords adjustability to the head strap 29, 29′ the ends of which slide over each other within the casing 32. This adjusting mechanism is merely indicated, as it is a stock item in the trade.

The harness as a whole is connected to the mask by way of a pair of bridging pieces 33 (see Fig. 5) which are secured to the bridge strap 30 by eyelets or rivets 34. A gusset plate 35 is mounted at each of the rear upper corners of the mask. This fits inside the screen 13 and the channel strip 25, and is held by the rearmost rivet 15 and the adjacent rivet 24 (see Fig. 1). A pivot stud 36 extends through the screen, through the gusset piece 35 towards the eyelets 28. Damage to the screen is prevented by installing a washer 37 between the head of the pivot stud 36 and the screen itself. Freedom of pivotal movement for the bridge strap 33 is assured by interposing a washer 38 between its outer surface and the inner face of the gusset piece 35.

It will be seen that the pivot pin 36 extends well inwards from the inner edge of the bridging piece 33. Between that point and the end of the pivot pin a compression spring 39 is mounted. Abutments are provided for this spring, one of these marked 40 being positioned in contact with the inner face of the bridging strip 33 and the other one marked 41 being peened or shrunk-fit to the inner end of the pivot pin 36.

The axis of the pivot pin 36 is in alignment with the pivotal axis of the eyelet 28, so that the mask will pivot about the same axis as is afforded by the eyelets in the head strap 29, 29′. This arrangement assures that the mask may be tilted to any desired position with reference to the head of the wearer, without causing the head band 27 or the head straps 29, 29′ to bind, loosen, or shift. The mask may be swung upwardly, entirely clear of the worker's face, when desired. No matter in what position it is set, it will remain in that position until manually shifted to a different position, because of the frictional restraint imposed by the pivot and spring mechanism just described.

It will be seen that the structure just described greatly extends the area of protection afforded by impact masks heretofore known. This is of considerable importance, inasmuch as many industrial accidents involve injury to the temple, cheek, or ear of a workman, and some quite serious accidents involve injury to the area underneath the jaw. It has long been recognized that an impact mask which would extend protection in this way would be highly desirable. Until the making of the present invention, however, no practical solution to the problem seems to have been presented, since prior impact masks were frequently of metallic construction and therefore were objectionably heavy. Any increase in the size of a metallic mask would involve prohibitive increase in weight, and would impair the hearing of the user.

It will be seen that the present invention avoids these drawbacks, by employing an extremely light-weight screen section to afford protection over the cheek and ear area, by utilizing shaped vulcanized fiber upper and lower segments (while at the same time providing cross ventilation to reduce fogging which would otherwise result) and by employing a semi-cylindrical vision shield of transparent plastic. All of these features, taken together with the full floating mounting which provides for ready adjustability of the mask into any angular position with respect to the head of the wearer, combine to present a safety device of considerably increased effectiveness which is at least as light as the less extensive masks heretofore manufactured out of metallic sheeting.

If it should happen that damage to the curved glass safety shield should occur, this component of the mask may readily be removed by simply forcing it upwards under the flange 14 of the upper hood for a distance sufficient to permit the lower edge of the window to clear the upper tips of the clips 20. Yet when the transparent window is properly in place, it is very firmly retained in that position by the mechanism shown. This is a feature of considerable importance, because the transparent plastic shield is not as hard as glass, and is therefore more likely to be scratched during service.

I claim:

1. In an impact mask of the type comprising a parti-cylindrical face-shielding member of translucent material and harness means connected thereto for supporting the mask on the wearer's head; an upper, rigid, forehead-protecting shield of lunate configuration, shaped to a contour roughly symmetrical with the human head, the horns of which lunate shield extend rearwardly to a zone adjacent the ears of the

wearer; a lower rigid chin-protector of lunate configuration, shaped to a contour roughly symmetrical with the human chin, the horns of which extend rearwardly to a zone adjacent the ears of the wearer; and at least two rigid spacing strips interconnecting the upper and lower lunate elements, each in a zone well forward of the ear position, adapted to receive and secure lateral edge portions of the face-shielding member, together with a pair of screen elements, each mounted between said rearwardly extending horns and secured to and extending rearwardly from a spacing member, to overlie the ears of the wearer.

2. A mask according to claim 1, wherein an edge portion at the rear of each of the screen elements is bound by a rigid metallic strip which is secured to said upper and lower lunar elements.

3. A mask according to claim 2, wherein the lower rearmost corner of each of said screen elements is cut to a rounded shape, and the metallic strip is bent in its own plane about said corner.

4. An impact mask having upper and lower head-protecting shields of vulcanized fiber, said shields being flanged along their opposed edges to constitute upper and lower frame members, a synthetic resin shield of transparent material, extending between upper and lower frame members and bent to parti-cylindrical form, said

shield being positioned to protect that portion of the wearer's face which lies forward of the eyes; a pair of screen elements mounted one on each side of the mask between said frame members and positioned rearwardly of said shield so as to extend to and behind the wearer's ears and mounting means for said mask comprising a head harness pivotally connected to said mask to afford a pivot axis approximately radially equidistant from the profile of the wearer's head, said pivot axis lying well forward of the rearmost edges of said screen elements.

5. A device according to claim 4, wherein a downwardly extending gusset plate is secured towards the rear ends of the upper frame members, adjacent said screen elements, and a pivot pin is journalled in said gusset members on the pivot axis of the mask.

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