Sept. 4, 1956 E. F. SHIPMAN 2,761,144

PROTECTIVE MASK

Filed March 14, 1955

2 Sheets-Sheet 1

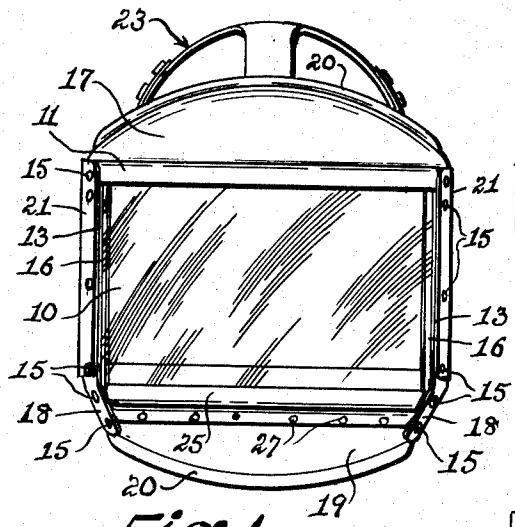


Fig. 1.

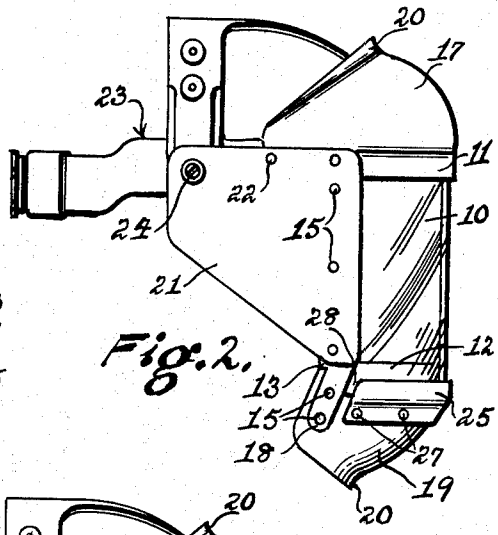


Fig. 2.

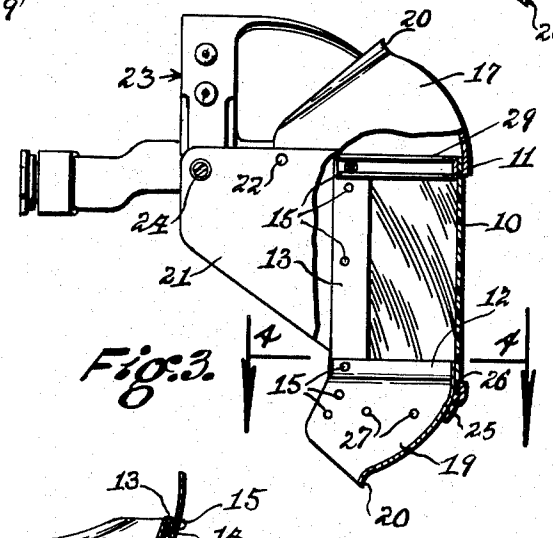


Fig. 3.

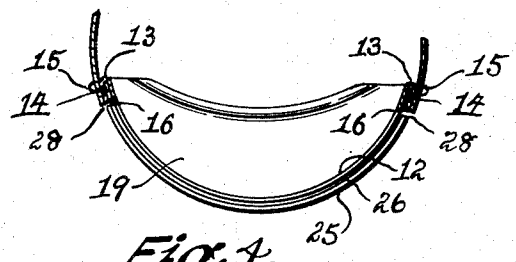


Fig. 4.

INVENTOR.
Emanuel F. Shipman
BY
W. W. Williamson
ATTORNEY

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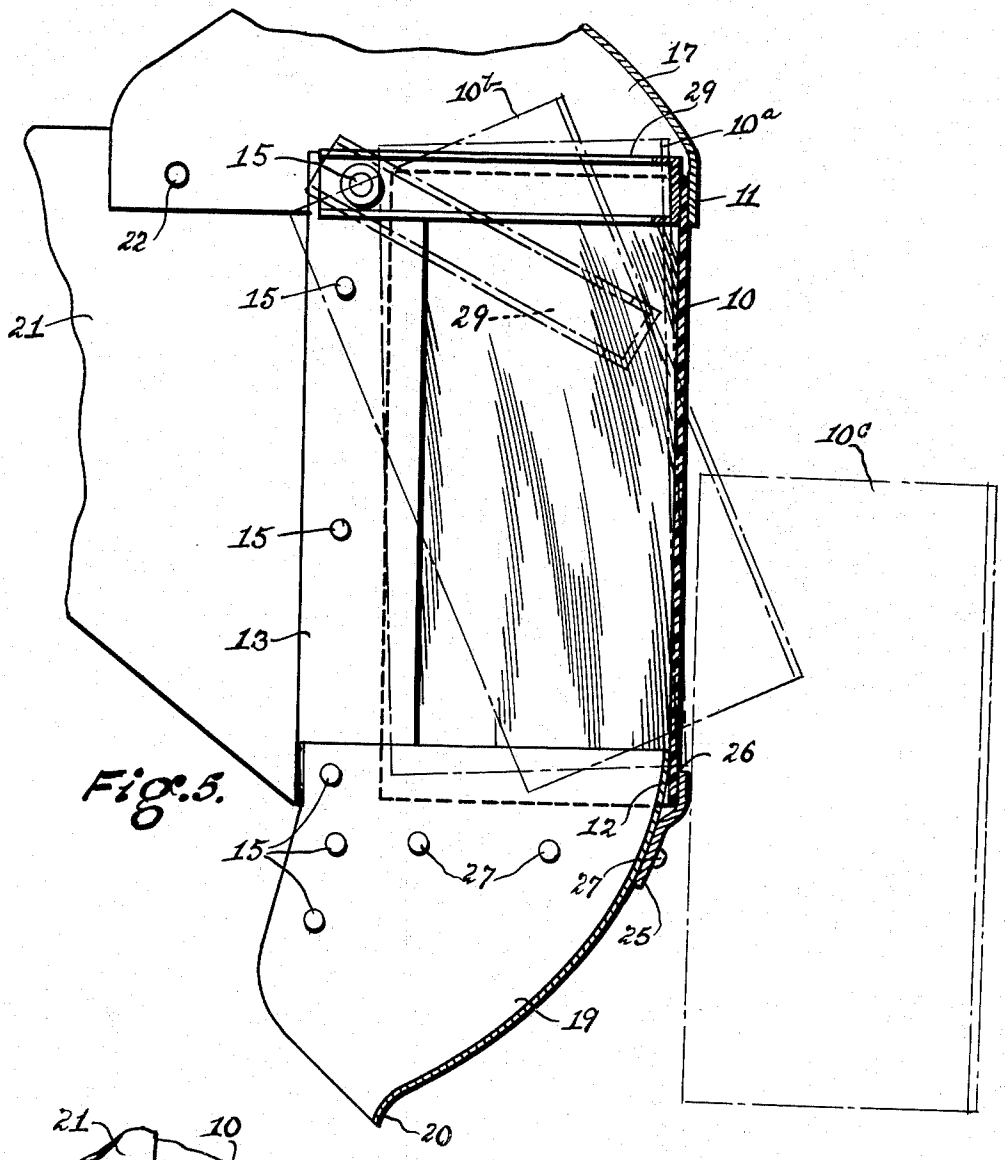


Fig. 5.

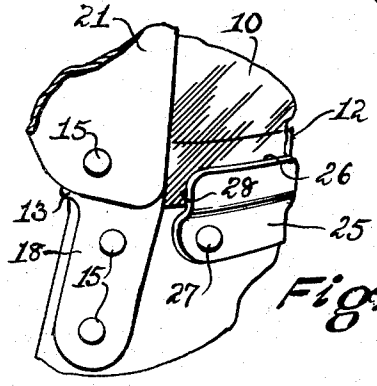


Fig. 6.

INVENTOR.
Emanuel F. Shipman
BY
W. W. Williamson
ATTORNEY

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2,761,144

PROTECTIVE MASK

Emanuel F. Shipman, Elkins Park, Pa.

Application March 14, 1955, Serial No. 493,861

3 Claims. (Cl. 2—9)

My invention relates to a new and useful protective mask disclosed in my patent dated August 15, 1939, No. 2,169,745.

While the mask is primarily designed for the chemical industry to protect chemists using nitrometers it has been found practical for many other industrial operations such as grinding, bottling operations, buffing and polishing, spot welding, wire brushing and cleaning, metal band sawing and wood working. The general purpose of the device is to provide adequate protection to the eyes and face from sprays of acid, fragments of glass or other foreign materials and, therefore, one particular object of the present improvement is to provide an extra high degree of protective joint closure between the window and frame of the mask structure to prevent entrance of corrosive liquids and powders.

Another object of this invention is to provide means for effectively substantially sealing the top and bottom as well as the side edges of the window which is removably mounted in the mask frame.

Another object of the invention is to provide channel elements to receive certain edges of the removably mounted preshaped window in combination with a clamping retaining bar.

Another object of the invention is to construct the mask frame in such manner as to provide a bottom channel all the way across the front of the mask to receive the bottom edge of the window with a tight sliding fit and thereby substantially seal said bottom edge of the window to prevent the entrance of foreign substances to the interior of the mask beneath the window.

Another object of the invention is to construct the bottom channel with restricted end openings to cause any accidentally splashed material that enters said bottom channel to run off outside of the mask at the sides thereof.

Another object of the invention is to provide a retaining or clamping bar arranged to hold the top of the window tightly against the inner face of the mask frame thereby, in effect, sealing the joint between the coacting elements to reduce to a minimum the likelihood of entrance of corrosive liquids, powders and other foreign substances into the interior of the mask which would result in injury to the wearer.

A further object of the invention is to so arrange the retaining or clamping bar with relation to the window that the latter will be efficiently supported and braced for impact resistance as well as assisting in effectively holding said window in position on the mask.

A still further object of this invention is to provide a protective mask including a frame portion having a sight opening across which is removably mounted a flexible preshaped plastic window which sometimes is subject to warpage on extreme heat operations, said frame portion including side and bottom channels to receive corresponding edges of the window and the upper edge of said window being temporarily clamped in place by a top retaining bar, said bottom channel, in particular, in combination with the retaining bar restricting buckling

of the window while continuing to maintain tight joint closures and prolonging the protective life of said window.

With the above and other objects in view this invention consists of the details of construction and combination of elements hereinafter set forth and then designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same I will describe its construction in detail referring by numerals to the accompanying drawings forming a part hereof, in which:

Fig. 1 is a front elevation of a mask constructed in accordance with the present invention.

Fig. 2 is a side view thereof.

Fig. 3 is a somewhat similar view with a portion broken out and the remainder shown as a vertical section.

Fig. 4 is a cross sectional view of the lower part of the mask at the line 4—4 of Fig. 3 without the window.

Fig. 5 is an enlarged fragmentary vertical sectional view of the mask and showing in dot and dash lines several positions of the window during the operations for removal thereof prior to replacement.

Fig. 6 is an enlarged fragmentary elevation at one side of the mask to illustrate one of the exit openings at an end of the bottom channel.

In carrying out my invention as herein embodied the mask has means for framing a flexible plastic window **10** preshaped to arcuate configuration in cross section. This framing means comprises an upper arcuate flange strip or member **11**, a lower arcuate flange strip or member **12** and vertical side members **13**, one at each side of the mask, and said upper, lower and side members are appropriately spaced to provide a sight opening of large area to give broad vision, both in height and width, to the wearer. This sight opening is of generally rectangular configuration although bowed outwardly in conformity with the arcuate formation of the upper and lower flange strips **11** and **12** as plainly shown in Fig. 4.

Each of the side members **13** is channel shaped and has a filler strip **14** within the bight thereof retained by rivets **15** and providing a channel **16** running the entire length of the side member and opening towards the front of the mask, Fig. 4. The side edges of the window enter and are retained in the channels. The inner web of each channel side member is in the same plane as the lower flange strip or member **12** and spaced inside of the upper flange strip or member **11** while the outer web of each channel side member is in the same plane as the upper flange strip or member **11** and spaced outside of the lower flange strip or member **12**. This arrangement provides for the upper edge of the window to be inside of the upper flange strip or member **11** and the lower edge of said window to be outside of the lower flange strip or member **12** when the side edges of said window are inserted in the channel side members **13**. The side members have their upper ends secured to the upper flange strip or member **11** by certain of the rivets **15** and said upper flange strip terminates in a dome segment **17** as a covering for the frontal portion of the wearer's head. The lower ends of said members **13** are fixed to the lower flange strip or member **12** also by some of the rivets **15** and, preferably, the outer web portions of said side members are extended as strap sections **18** which project down unto the inverted dome segment **19** of the lower flange strip or member **12** to shield the chin and throat of the wearer. The upper edge of the upright dome segment **17** and the lower edge of the inverted dome segment **19** are turned outward to form deflector lips **20**. Brackets **21**, which may be large enough to function as side face shields, extend rearwardly from the window framing means and are fastened to the side mem-

bers 13 by some of the rivets 15 and, if separate from the upper flange strip or member 11, may be fastened by additional rivets 22 to said upper flange strip or member 11.

An appropriate headgear 23 is suitably attached to the mask preferably to the brackets 21, as by bolts 24, Figs. 2 and 3.

The elements above described are substantially the same as those disclosed in my aforementioned Patent No. 2,169,745. The present improvement includes a companion flange strip or member 25 cooperating with the lower flange strip or member 12 to provide a bottom channel 26 open at the top, Fig. 5, to receive and temporarily retain the lower edge of the window 10. The companion flange strip 25 actually is a distinctly individual piece of material secured to the outer surface of the lower part of the window framing means by rivets 27 and has an offset portion spaced outwardly from the lower flange strip to form the channel 26 and the ends of said companion flange strip terminate short of the side members 13 to provide exits 28 from the channel at both ends to allow any foreign substances which might accidentally enter the channel 26 to run therefrom.

In addition to the bottom channel there is provided a top retaining bar 29 swingingly pivoted at its ends to the opposed uppermost rivets 15 in the side members 13, within the mask and normally engaging the inner surface of the window 10 contiguous the upper edge of the latter to press said window snugly against the upper portion of the framing means, particularly the upper flange strip 11. This top retaining bar 29 consists, preferably, of a bowed strip of channel material with the toes projecting rearwardly leaving the forward face of the web portion smooth for engagement with the inner surface of the window. The bow is of substantially the same curvature as the upper flange strip 11 and has some resiliency to retain the window firmly and snugly against said upper flange strip to provide a tight joint between the window and upper portion of the framing means.

From the foregoing it is believed apparent that with the lower edge of the window snugly fitted into the bottom channel 26, the side edges thereof likewise snugly fitted in the channels 16 of the side members 13 and the top retaining bar 29 in clamping position, as shown in full lines in Fig. 5, the window will be securely held in place and all points between said window and the framing means will, for practical purposes, be effectively closed and substantially sealed to prevent the passage of foreign substances into the interior of the mask. Particular attention is called to the fact that the joint at the bottom of the window is completely closed from one side to the oher of the mask because of the uninterrupted or continuous solid formation of the companion flange strip 25 and therefore the entrance of foreign substances to the interior of the mask at this location is effectively prevented. Also the joint at the top of the window is made exceedingly tight to exclude foreign substances because of the face to face contact of the window and the upper portion of the framing means throughout the width of said window.

To remove the window for replacement or other purposes the top retaining bar 29 is swung downwardly to some suitable position, as suggested by the dot and dash line location in Fig. 5, which will partially release the window. Thereafter the window can be forced upwardly until the lower edge thereof is withdrawn from the bottom channel 26 at which time the upper portion of said window will project into the upper dome segment 17 as indicated at 10*a*. Next the side edges of the window are withdrawn from the channels 16 by flexing said window and tilting the upper portion thereof into the mask as shown at 10*b* and finally said window is completely disunited from the mask as depicted at 10*c*. By reversing the above operations a window can be assembled on the mask.

Of course I do not wish to be limited to the exact details of construction herein shown and described as these may be varied within the scope of the appended claims without departing from the spirit of my invention.

Having described my invention what I claim as new and useful is:

1. In a protective mask, a pair of generally forwardly facing vertically disposed side channel members, an upwardly facing forwardly bowed lower channel member extending substantially rigidly between the lower ends of said side channel members, a forwardly bowed upper strip extending between the upper ends of said side channel members in substantially coplanar relation with the outer wall of said lower channel member and fixed to said side channel members, a protective dome segment fixed to and extending upwardly and rearwardly from said upper strip to rigidify the latter, said upper strip combining with said lower and side channel members to define an open frame, a forwardly bowed window removably arranged in closing relation with respect to said frame with its lower and side margins received in said lower and side channel members and its upper margin disposed on the rearward concave side of and in surface engagement with said upper strip, and a bowed clamping strip disposed on the rearward concave side of said window and having its end portions pivoted to the respective upper end regions of said side channel members for swinging movement about a generally horizontal axis between an upper position directly behind said upper strip and the upper margin of said window and a downward position below said upper strip and spaced rearwardly from said window, said clamping strip being of a bowed configuration conforming to that of said upper strip and spaced just sufficiently behind the latter in its upper position to engage with and tightly press the upper margin of said window forward against said upper strip, whereby a seal is effected along the upper margin of said window to prevent the passage of foreign matter.

2. A protective mask according to claim 1, wherein the end portions of said lower channel member open forwardly to provide fluid exits from said lower channel.

3. A protective mask comprising a substantially rigid forwardly bowed frame provided with a window opening, a forwardly bowed window sheet arranged in closing relation with respect to said frame opening and having one bowed margin located in facing engagement with the concave surface of one bowed portion of said frame bounding said opening, and a bowed clamping strip arranged on the concave side of and extending in generally parallel spaced adjacent relation with respect to said one portion of said frame bounding said opening, pivot means connecting each end of said clamping strip to the adjacent region of said frame and mounting said clamping strip for swinging movement between its position in parallelism with said one frame portion and a position remote from said window sheet and said one frame portion, said clamping strip being spaced just sufficiently from said one frame portion when in said parallel relation to engage with and tightly press said one window sheet margin against said one frame portion, swinging movement of said clamping strip toward its remote position serving to release said window sheet from its tightly pressed condition.

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