March 19, 1957 F. A. RAPPLEYEA ET AL 2,785,406

TUBULAR FACE GUARD

Filed Jan. 30, 1956 2 Sheets-Sheet 1

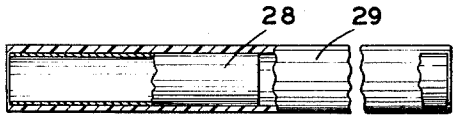

fig. 7

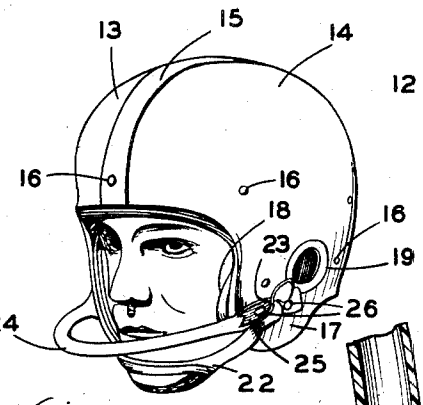

fig. 1

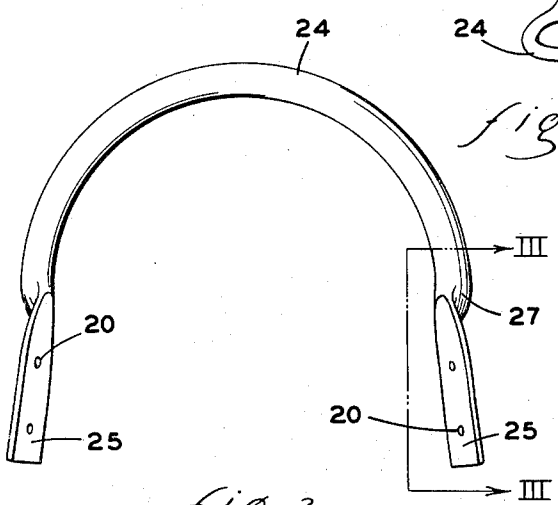

fig. 2

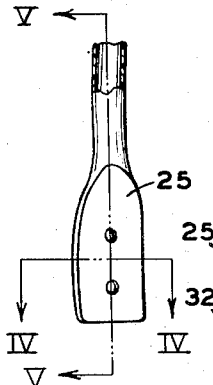

fig. 3

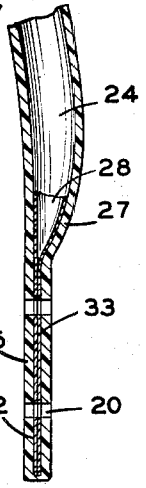

fig. 5

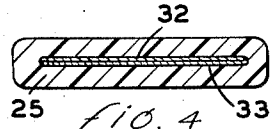

fig. 4

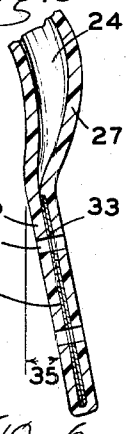

fig. 6

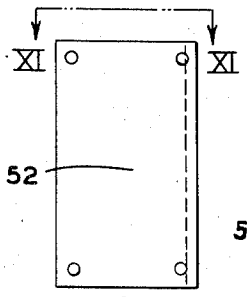

fig. 10

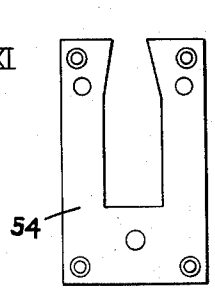

fig. 12

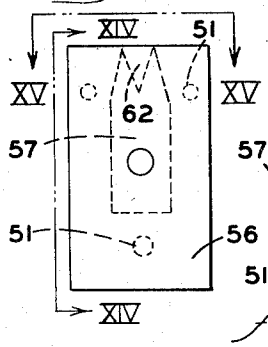

fig. 13

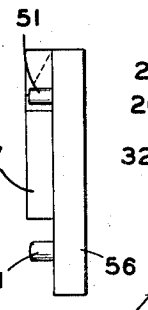

fig. 14

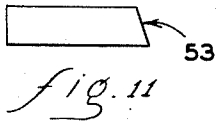

fig. 11

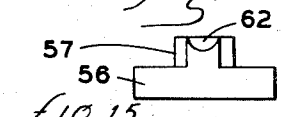

fig. 15

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TUBULAR FACE GUARD

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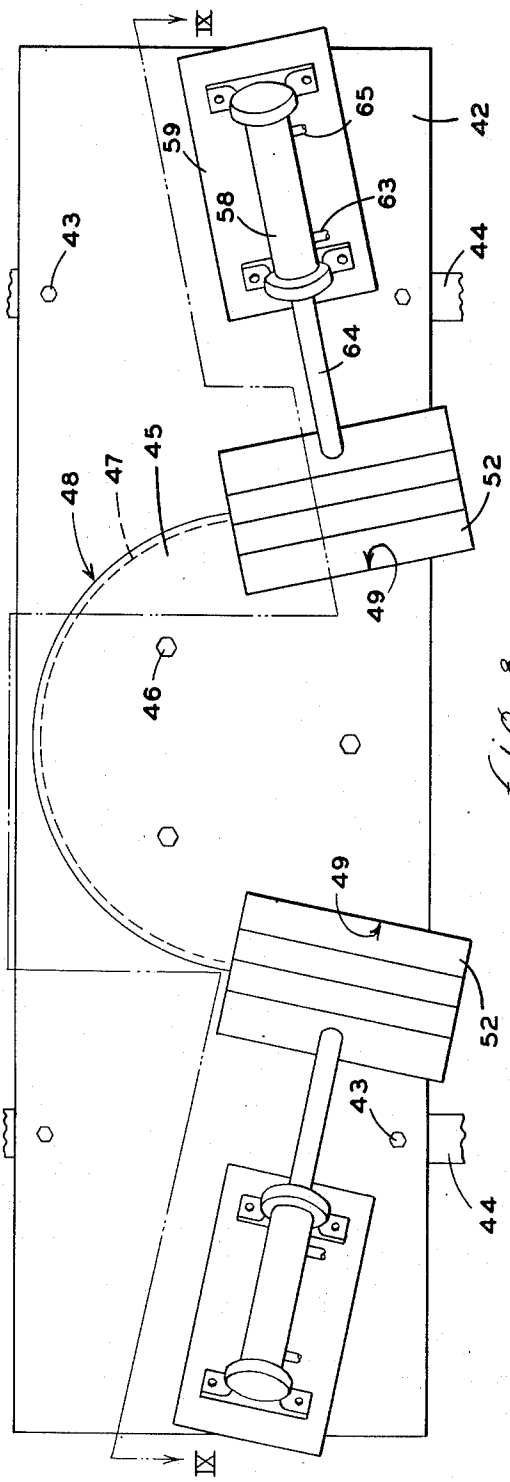

Fig. 8

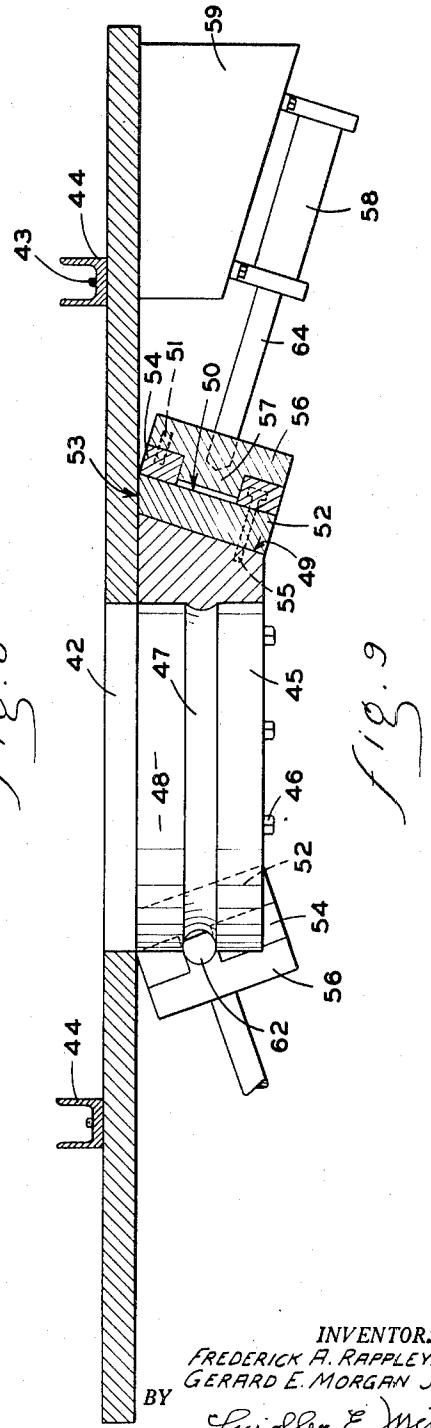

Fig. 9

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TUBULAR FACE GUARD

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Application January 30, 1956, Serial No. 562,130

2 Claims. (Cl. 2—9)

This invention relates to a protective device, particularly to a face guard for use in conjunction with a helmet made of synthetic resin, and to a method and apparatus useful in making it.

It has long been the custom for athletes to wear protecting devices of one form or another to prevent accidental head and face injuries. The conventional baseball catcher's mask is a well known example. Until fairly recently such protective devices were generally made with a metal framework and little or no difficulty was encountered in providing members for protecting the face adequately or in securing them to the head portion of the mask or helmet. More recently, however, helmet-type head protectors have been devised, the shells of which are made from a suitable synthetic resin. These resinous helmets generally encompass the head of the wearer almost completely except for the face, a large lobe or "jaw" section extending from the crown down over the wearer's ears and rear part of the jaws and cheeks. Such helmets generally contain internal means, such as webbing or padding, conforming to the wearer's head which absorbs the shock of a blow on the helmet. The actual shell of the helmet is generally spaced at a considerable distance away from the head. Helmets of the type just mentioned are usually equipped with a chin strap which passes around the wearer's chin and which can be secured with a buckle or other convenient means to each of the jaw sections of the shell to anchor the helmet securely on the wearer's head. Resinous helmets of the type just described have proved highly satisfactory and in certain sports, notably in football, have replaced other types of masks and helmets almost completely.

One disadvantage of such resinous helmets, however, is the fact that the wearer's face is virtually unprotected and many football players have suffered serious injury to the chin, mouth or nose by upwardly directed accidental blows. It has thus been realized that some type of protection is needed in addition to the plastic shell of the helmet itself. However, this has presented difficulties not present in the case of masks or helmets made of metal. Although metal face-protecting members of any desired shape or kind can be formed easily and welded to the framework of a metal mask, metal guards cannot, of course, be welded to a resinous helmet.

An additional problem is posed in the provision of face guards to be used with resinous helmets because of the general configuration of the helmets and because of the highly flexible nature of the resins used as compared with metal. The effectiveness of a resinous helmet in protecting the wearer is due in considerable measure to the very fact that the shell has considerable flexibility and that it may deform elastically under a blow and absorb a considerable proportion of the shock without breaking. Any appreciable interference with the overall flexibility of the helmet is undesirable since this would tend to reduce its effectiveness accordingly. At the same time the matter of weight is of extreme importancce and any face guard

attached to the helmet which increases the weight appreciably cannot be tolerated.

Many attempts have been made to overcome these difficulties encountered in the use of resinous helmets. It has been proposed to provide a metal bar which encircles the face of a wearer of the helmet at a suitable distance and which is secured, e. g. with rivets, at approximately the level of the nose or mouth of the wearer to each of the downwardly extending jaw sections of the helmet. Such guards as heretofore devised have been unsatisfactory chiefly because of the difficulty of producing a guard of suitable stiffness and resiliency without increasing its weight to such an extent that it occasions the wearer a great deal of discomfort. In addition, the securing of the ends of a highly rigid metal guard to the thin jaw sections of a resinous helmet in such a manner that the force of a vigorous blow on the guard is not transmitted sharply to the jaw sections causing them to break has not been effected satisfactorily.

It has also been proposed to bend a flat, rectangular strap or bar of synthetic resin, such as polystyrene, polymethacrylate and the like, into roughly semi-circular form and to attach the ends of the bent bar to the jaw sections of a resinous helmet. Such guards have been used to some extent but are not as satisfactory as desired for several reasons. Such resinous flat bars, even though they are formed and mounted on the helmet with their widest dimension located vertically must, to resist shocks adequately without breaking, be so heavy that their use is tiring to the wearer. Furthermore, they must be so wide that they interfere seriously with the wearer's vision. Many players refuse to wear them for these reasons. In addition, they present difficulties in the way of securing them to the helmet. The jaw sections of helmets are not generally parallel with one another but are drawn toward one another at their forward lower corners to give them an outside surface which is often of compound and varying degrees of curvature. It is practcially impossible to secure the ends of a curved flat bar of the type just mentioned, the inner surfaces of which lie, of course, in essentially vertical planes, to a resinous helmet without setting up strains in the helmet sufficient to weaken it and cause it to break easily under a sharp blow.

Because such a heavy curved resinous bar has very little flexibility and is essentially rigid, the shock of a blow received by it is transmitted to the helmet without appreciable diminution. This causes breakage of the latter in the region of joining of the bar and helmet unless the helmet is also strengthened by making the wall thicker over this region. This cannot be tolerated because of the still greater increase in weight involved. It is apparent that the provision of a face guard for resinous helmets, and of a method and apparatus for making it, whereby the above-mentioned difficulties could be overcome easily and economically would be of great value in promoting the safety of athletes and of persons engaged in certain other occupations.

According to the present invention there is provided a face guard, herein first described, which is particularly adapted to use with a resinous helmet and which overcomes substantially completely the difficulties of face guards devised heretofore for use with such helmets. The face guard of the invention comprises a tubular section fashioned of a synthetic resin having a high resistance to impact and a high ratio of rigidity to weight, which is curved so as to encircle at a suitable distance the face of a wearer of the resinous helmet to which the guard is secured. The tubular section of the face guard is flattened at its ends to provide guard anchor plates integral with the tubular section for use in securing the guard to the helmet. The anchor plates are flared and contoured on

their inner surfaces so as to bear evenly over substantially their entire areas on the jaw sections of the helmet at the region of attachment. The anchor plates and the jaw sections of the helmet are drilled or punched to form registering holes through which suitable bolts or other fastening means are passed to anchor the guard securely to the helmet.

The helmet and the guard thus become an integral structure essentially free of strain over the regions where they are joined together. The employment of a tubular curved member as the impact-receiving section of the face guard permits the utilization of a guard of much less weight than has hereofore been possible with other types of guards without sacrifice of strength and without liability of breakage when subjected to a sharp blow. The fabrication of the guard from a resin having a high ratio of rigidity to weight provides a guard of adequate stiffness without undue increase in weight of the helmet. Since the face guard and the body of the helmet are both made of synthetic resin, the entire assembled structure remains flexible to a marked degree and preserves the desirable characteristics of such construction. The contouring of the inner surfaces of the guard anchor plates and their flaring in such manner that they contact smoothly and without strain a considerable area of the outer surface of the jaw section of the helmet body transmits any shock from the guard to a correspondingly large area of the helmet body and thus overcomes any tendency toward breakage of the latter in this area.

In certain instances it may be desirable to reinforce the guard anchor plates to overcome any weakness in them caused by their conversion from a tubular to a flat body without increase in the weight of resin per unit length, as is done according to a preferred procedure for making the guard. This can be accomplished readily in accordance with a preferred modification of the invention by inserting a snugly fitting thin metal tube in the end sections of the tube from which the guard is made before it is flattened to form the anchor plates. The anchor plates are thus provided with internal metal reinforcements of two thicknesses of metal which terminate laterally short of the edges of the plates and which extend lonigtudinally therein for any desired distance. As will be described later, this method of forming an internally reinforced flat resinous plate is of general application.

A preferred method for forming the face guard of the invention comprises first cutting a suitable length of a suitable resinous tube and heating it in an oven to a temperature such that it can be bent and deformed easily but insufficiently to cause it to soften and lose its form-stability or to decrease appreciably its strength characteristics when again allowed to cool. The degree of heating is, of course, dependent upon the particular resin of which the tube is composed. The heated tube is then bent around a suitable form to give its central section the desired degree of curvature and its ends are collapsed and compressed in suitably located and shaped mold cavities to form the guard anchor plates properly flared and contoured on their inner surfaces. The formed guard is then left until it has cooled and the resinous material of which it is composed has regained its rigidity and strength characteristics, after which it can be removed from the apparatus. In the event reinforcement of the guard anchor plates with metal in the manner mentioned previously is desired, the metal tubes are inserted in the ends of the resinous tube prior to the heating and forming operations. The metal tube employed is generally long enough to reinforce the guard anchor plate throughout its entire length. It can, if desired, be longer than this so as to extend in the finished guard into the partially collapsed or totally uncollapsed sections of the tubular section of the guard.

The invention can be understood readily by reference to the accompanying drawing wherein, in the interest of clarity, certain features are shown on a somewhat exaggerated scale and wherein:

Figure 1 is an oblique side elevation of a resinous helmet equipped with a face guard embodying features of the invention;

Figure 2 is a plan view of a face guard similar to that of Figure 1;

Figure 3 is an elevation, partially in section, taken along the line III—III of Figure 2;

Figure 4 is an enlarged sectional view, slightly rotated, taken along the line IV—IV of Figure 3;

Figure 5 is an enlarged sectional view, slightly rotated, taken along the line V—V of Figure 3;

Figure 6 is a sectional view similar to that of Figure 5 but showing a somewhat different angular configuration of the parts;

Figure 7 is an elevation, partially in section of a resinous tube ready for forming into a face guard of the invention showing a metal tube in place for forming a reinforcement for a part of the guard;

Figure 8 is a side elevation of apparatus suitable for making the face guard of the invention;

Figure 9 is an elevation, partly in section, taken along the line IX—IX of Figure 8;

Figure 10 is a plan view of a mold base plate of the apparatus of Figures 8 and 9;

Figure 11 is an end elevation taken along the line XI—XI of Figure 10;

Figure 12 is a plan view of a cavity plate of the apparatus of Figures 8 and 9;

Figure 13 is a plan view of a male mold member of the apparatus of Figures 8 and 9;

Figure 14 is an elevation taken along the line XIV—XIV of Figure 13; and

Figure 15 is an end elevation taken along XV—XV of Figure 13.

Referring to Figure 1, there is represented a conventional resinous helmet shown generally at 12. Such conventional helmets may be formed of two molded halves 13 and 14 joined along the center of the helmet, e. g. with an adhesive, or they may be molded in a single piece. The helmet generally has a resinous strip or raised section 15 extending over the center of the helmet from the front to the back partly for decorative purposes and partly for reinforcement and, when the helmet is formed by adhering two halves together, to cover the cemented joint. The helmet is equipped in conventional fashion with internal padding or webbing, not shown, secured in place, e. g. by rivets 16 or in any other convenient way. The resinous body of the helmet 12 extends downwardly at the side to form a pair of jaw sections 17 which cover the ears and a part of the jaws and cheeks of the wearer. Internal cheek pads 18 are usually provided to fit against the wearer's jaws as well as holes 19 in the lower part of the helmet approximately opposite the ears of the wearer to facilitate hearing. A conventional chin strap 22 is also illustrated in Figure 1, the strap being in this instance secured to the jaw sections of the helmet by buckles 23 thereon.

The face guard of the invention, as shown in Figure 1 and in more detail in Figures 2, 3, 4 and 5, comprises a curved tubular section 24, which encircles the face of a wearer of the helmet 12, which is flattened at each of its ends to provide a pair of guard anchor plates 25 integral with the tubular section 24. The anchor plates 25 are secured to the jaw sections of the helmet, e. g. by bolts 26 passing through holes 20 suitably located in the anchor plates and holes in the helmet body in register therewith. The face guard is usually located so that it extends roughly in a horizontal direction or in a slightly downwardly sloping direction forward from the helmet body at about the level of the wearer's mouth. As illustrated more particularly in Figure 2, the curved tubular section 24 of the face guard is preferably roughly semicircular in form although its exact configuration is sub-

ject to considerable variation to satisfy different requirements of style, comfort and utility.

The anchor plates 25 extend from the ends of the curved section 24 of the guard in a suitable direction and are contoured on their inner surfaces and flared, e. g. outwardly both backwardly and upwardly, so that when the guard is located with the anchor plates in their desired position on the surface of the helmet the inner surfaces of the plates rest on and contact the jaw sections 17 of the helmet smoothly and without strain over essentially the entire inner surfaces of the plates. The angular direction at which each anchor plate extends from the end of the tubular section and the direction and extent to which it is flared depends upon the particular helmet to which it is to be secured. In the guard illustrated in Figure 2 the inner surfaces of the anchor plates 25 are essentially planar because the outer surface of the jaw section 17 of the particular helmet on which this particular guard is to be mounted is essentially planar over the region of mounting. Each anchor plate 25 is flared so that its inner surface slopes outwardly both backwardly and upwardly with respect to the forward edge of the guard. In other instances the anchor plates 25 may extend with their inner surfaces essentially parallel with one another when the configuration of the jaw sections of the helmet require. Furthermore, the inner surfaces of the anchor plates 25 can, since they are contoured to fit the surfaces of the jaw sections of the helmet, be in a form other than planar and may be formed with simple or compound curvature as occasion demands.

It is to be noted in Figure 2 that the inner surface of each anchor plate 25 is essentially a continuation at its forward end of the inner edge of the tubular section of the guard except for any angular irregularity necessitated by the degree of flaring of the anchor plate required. This preferred configuration of the guard, shown more in detail in Figures 3, 4 and 5, is advantageous in that it provides a very strong construction in the region where the tubular section merges into the anchor plate. This is shown especially clearly in Figure 5 wherein the inner surface of the tubular section 24 extends smoothly and practically without angularity forming the center line of the inner surface of the anchor plate 25 wherein the end of the curved section 24 is rounded so as to merge smoothly, as at 27, into the outer surface of the anchor plate 25. This provides a strong construction and furnishes a guard which is not likely to be broken when subjected to sharp heavy blows. The modification of Figure 6 is similar except for the fact that the anchor plate is flared differently with respect to the tubular section, the center line of its inner surface making a small angle 35 with the inner surface of the curved section.

As mentioned previously, it may sometimes be advisable to reinforce the anchor plates 25 with internally located metal reinforcements. One convenient way of accomplishing this is illustrated in Figures 4, 5, 6 and 7. According to this procedure a short length of thin metal tube, 28 of Figure 7, is slipped into each end of a straight section of resinous tube 29 which is to be used subsequently in forming the face guard. The metal tube 28 employed preferably fits inside the resinous tube 29 snugly to prevent it from slipping endwise easily and becoming dislocated during subsequent manipulation of the assembly. The metal tube 28 can be of brass or of any other easily malleable metal which can be flattened on itself by crushing, preferably without cracking or breaking along the edges. It should have thin walls so as not to cause uneven displacement of the resin during the formation of the anchor plates. The tube 29 containing the metal tube 28 is then heated and its ends flattened as before to form the anchor plates 25. During this process the tube 28 is flattened into a single reinforcement consisting of two sheets of metal, 32 and 33 of Figures 4, 5 and 6, which are joined along their edges and which are centrally enclosed within the resinous anchor plate 25. The length of the metal tube 28 may be such that the reinforcement extends only for the length of the anchor plate, as in Figure 6, and does not extend into the incompletely flattened section of the guard or it may extend, as in Figure 5, well into the incompletely collapsed section. As mentioned previously, this general method for forming a resinous structure reinforced internally with a metal reinforcement is of general application and is of wide utility in the formation of such articles from hollow resinous bodies.

Although the face guard of the invention can be made using any suitable apparatus, the apparatus illustrated in Figures 8 to 15 is preferred as being simple and economical to construct and operate. The apparatus is mounted on a suitable support, e. g. on a rigid support plate 42 secured as by bolts 43 to permanently rigid members 44, preferably mounted in a vertical position. A forming member or block 45 is secured to the front side of the support plate 42 as by bolts 46. The forming member 45 is in the form of a suitably thick plate, the upper surface 48 of which is curved to provide the contour of the curved section 24 of the face guard. A groove 47 is formed in the upper curved surface 48 of the forming member, usually parallel with the support 42. The groove 47, which is essentially semi-circular in cross-sectional outline, is dimensioned so that the resinous tube from which the face guard is being formed will lie snugly in it. The apparatus as illustrated and described is positioned so that the axis of the groove 47 lies in a vertical plane. This is of some advantage in the bending of the heated resinous tube into the groove 47 because it permits the ends of the tube to be bent directly downward with no tendency for the tube to fall or roll out of the groove 47. However, the apparatus can be positioned otherwise, if desired, and suitable means provided to prevent accidental dislocation of the resinous tube from the groove 47.

The lower corners of the forming block 45 are cut away to provide a pair of suitably sloped recessed shoulders, 49 of Figure 9, on which are mounted mold base plates 52 which, as will be apparent later, form the bottom surfaces of a pair of mold cavities in which the anchor plates 25 of the face guard are formed. The direction and degree of slope of the shoulders 49 are dependent to a considerable degree upon the particular configuration desired of the guard anchor plates 25. In the modification illustrated in Figures 8 and 9, the shoulders 49 are formed with flat surfaces which diverge from one another both downwardly and rearwardly of the apparatus. The rest of the apparatus will be described with respect to such sloping shoulders, it being understood, however, that this is only by way of illustration and that the configuration and degrees and directions of slopes of the shoulders 49 are not limiting except insofar as these factors are determined by the particular face guard which it is desired to form.

The mold base plate 52, shown in detail in Figures 10 and 11, is of generally rectangular form, preferably with one sloping edge 53 so that the plate fits accurately into the angle between the shoulder 49 and the support plate 42. The mold base plate 52 is secured on the shoulder 49 as will be described presently. The outer surface 50 of the mold base plate 52 is contoured over its central region to conform to the desired contour of the inner surface of the anchor plate 25. It has been mentioned previously that in the illustration given of the face guard each anchor plate 25 is formed with a flat inner surface. For this reason the outer surface 50 of the block 52 is illustrated as being flat, it being understood, however, that the surface can be contoured in any desirable manner to produce a correspondingly contoured inner surface of the anchor plate 25.

A cavity plate 54 is secured to the outer surface of the mold base plate 52, e. g. by bolts 55 which extend through the plate 52 and engage the shoulder 49 thereby securing both plates firmly in place. The cavity plate 54, shown more particularly in Figure 12, forms with the mold base

plate 52 a female mold member in which the anchor plate 25 of the face guard is molded. The cavity in the cavity plate 54 is shaped to give the anchor plate 25 its desired form. It is to be noted that the parts so far mentioned are dimensioned and located so that the center of the upper edge of the outer surface of the mold base plate 52 adjoins the bottom of the groove 47 at its termination at the upper end of the plate 52. A formable resinous tube can thus be bent over the forming block 45 in the groove 47 with each of its ends projecting into the mold cavity with essentially no discontinuity in the surfaces supporting its side of shortest radius. This insures there being no roughened section or step where the inner surface of the anchor plate 25 joins and merges with the inner side of the curved tubular sections 24 of the finished face guard even though they may be located angularly with respect to one another. This is illustrated clearly in Figures 5 and 6 previously referred to.

The male member of the mold comprises a reciprocal member 56, shown in more detail in Figures 13, 14 and 15, which is in the form of a generally flat plate having on its inner surface, i. e. on its surface facing the mold base plate 52, a formed, raised member 57 dimensioned and shaped so as to fit slidably the cavity in the cavity plate 54. The thickness of the raised member 57 is somewhat less than the thickness of the cavity plate 54, the difference determining the thickness of the anchor plate 25. Suitable guide pins 51 are also preferably provided to insure proper functioning of the mold. The male mold member is reciprocated in any convenient way in a direction normal to the outer surface 50 of the mold base block 52. In the illustration given this is effected with a conventional hydraulic cylinder 58 fitted with a piston and a piston rod 64 which is mounted securely on a block 59 which is in turn secured, e. g. by welding, on the surface of the support plate 42. The block 59 is dimensioned and located and its upper surface is sloped in suitable manner to provide proper reciprocatory motion of the male mold member, which is secured at the end of the piston 64. It is understood, however, that operation of the male mold member can be effected in any other suitable way, either by hand or mechanically.

The upper end of the raised member 57 adjacent the end of the groove 47 is contoured on its inner surface so as to have a cavity 62 which faces the mold base plate 52 and which at its extreme upper end is essentially semicircular so as to contact the outer surface of the resinous tube without deforming it appreciably when the mold is closed. The cavity 62 decreases in both thickness and width in a direction toward the center of the raised member 57, preferably forming a smoothly curved surface, so that when the mold is closed the end of the curved tubular section of the face guard is reduced gradually in thickness and broadened to provide a smooth widening and merging of the tube into the flat anchor plate, e. g. as illustrated in Figures 2 to 6.

In operation of the apparatus of Figures 8 and 9, hydraulic fluid is first admitted under pressure to the hydraulic cylinder 58 through a conduit 63. This retracts the cylinder piston rod 64 and the male mold member 56, thus opening the mold. A section of a suitable resinous tube of appropriate diameter and wall thickness is then cut carefully to length. If metal reinforcement of the anchor plates of the face guard which is to be formed is desired, suitable metal tubes are inserted in the ends of the resinous tube, preferably with the resinous tube projecting slightly beyond the end of the metal tube. The resinous tube is then heated, e. g. in an oven, to a suitable working temperature at which it can be deformed easily but at which it exhibits essentially no form-instability without the exertion of external force upon it.

One end of the heated tube is then inserted downward into the open mold at one side of the apparatus and the mold closed by admitting hydraulic fluid under pressure through the other conduit 65 of the adjacent hydraulic cylinder 58. During this operation one of the anchor plates is formed and the resinous tube immediately above the upper end of the cavity plate 54 is pressed snugly without deforming into the groove 47 in the block 45. The resinous tube is then bent around the forming block 45 so that it lies in the groove 47 and its other end extends into the open cavity of the mold at the opposite side of the apparatus. The second mold is then closed forming the other anchor plate. The thus formed face guard is left in the apparatus with the molds closed until it has cooled. The molds are then opened and the completely formed face guard is removed and punched or drilled to form suitable holes by means of which it can be attached to a resinous helmet.

Although the face guard of the invention can be made of any suitable resinous material, it has been found that certain resinous materials are preferred because of the high ratio of rigidity to weight which a guard made from them possesses. An especially preferred resinous material is obtained by blending together a polyvinyl formal resin, an acrylate resin and natural or synthetic rubber. A tube of this blend having an internal diameter of ¼ inch and an external diameter of ½ inch had a rigidity factor (EI) of 594 square inch pounds. A face guard prepared from a length of this tube weighing 1.52 ounces was non-tiring to the wearer of a helmet to which it was attached and was of more than adequate strength. The ratio of the rigidity factor of the tube to the weight in ounces of the guard formed from it was 390. Similar ratios obtained in the case of other guards of nontubular character as well as guards made from other resinous materials are a great deal lower than this and the guards are of an unsatisfactory nature.

Impact tests were made on face guards prepared as herein described and on other resinous face guards proposed for use with resinous helmets. The test was performed by mounting the guard on a resinous helmet and then mounting the helmet on a form corresponding closely to the shape and weight of the human head. The form with the helmet mounted on it was then stood on a flat table below the fulcrum of a pendulum having a heavy metal weight at its lower end. The arrangement was such that when the pendulum was drawn back and allowed to swing free the weight struck the front center of the face guard while traveling essentially in the plane of the curved tubular section of the guard. The impact in foot pounds was calculated from the known mass of the pendulum and weight and from the distance through which the weight traveled before striking the guard. In repeated tests using a face guard formed as herein described from the preferred polyvinyl formal-acrylate-rubber blend, whitening of the forward surface of the guard occurred after repeated blows of 16 foot pounds each by the pendulum weight and was particularly noticeable after about 40 such blows. After a total of about 80 such blows, the guard usually failed by breaking in the center at the point of impact. Other face guards made in the same form using one of several other resinous materials and still others made in different forms using the same resinous material invariably fail after a very few blows of the pendulum weight.

We claim:

1. A helmet for protecting the head and face of a wearer comprising a helmet body of synthetic resin adapted to cover a wearer's head except for the face, said helmet body having integral dependent jaw sections having opposed non-parallel outer surfaces converging downwardly and forwardly of said helmet; and a face guard comprising a tubular, arcuate, substantially rigid member of synthetic resin having flattened opposed end portions constituting anchor plates secured rigidly to a respective one of said non-parallel outer surfaces of said jaw sections, said tubular member extending forwardly of said helmet so as to encircle the face of the wearer at approximately mouth level when in wearing position, and

said anchor plates being formed to define inner surfaces converging downwardly and forwardly of said helmet and bearing in unstrained relationship in face to face contact with said opposed outer surfaces of said jaw sections.

2. The helmet of claim 1 in which each of said anchor plates has a metal reinforcing plate embedded therein.

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