Aug. 28, 1945. L. G. FEMAN 2,383,597

PROTECTIVE HELMET

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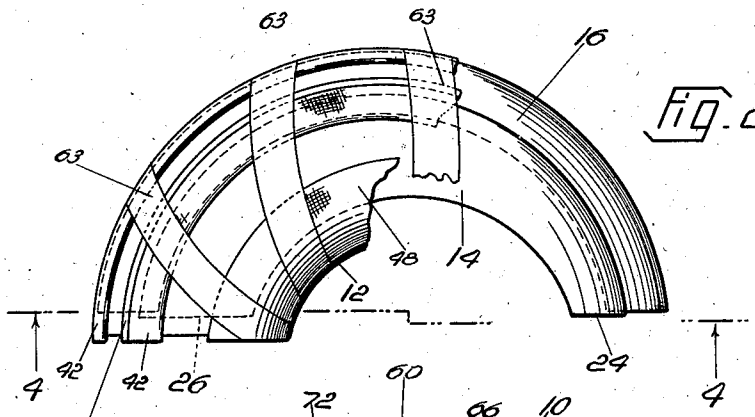


Fig. 2.

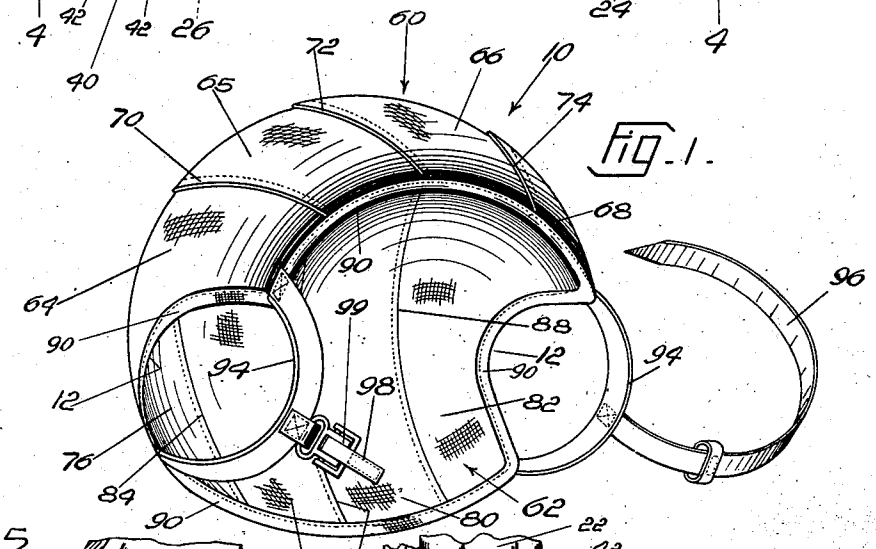


Fig. 1.

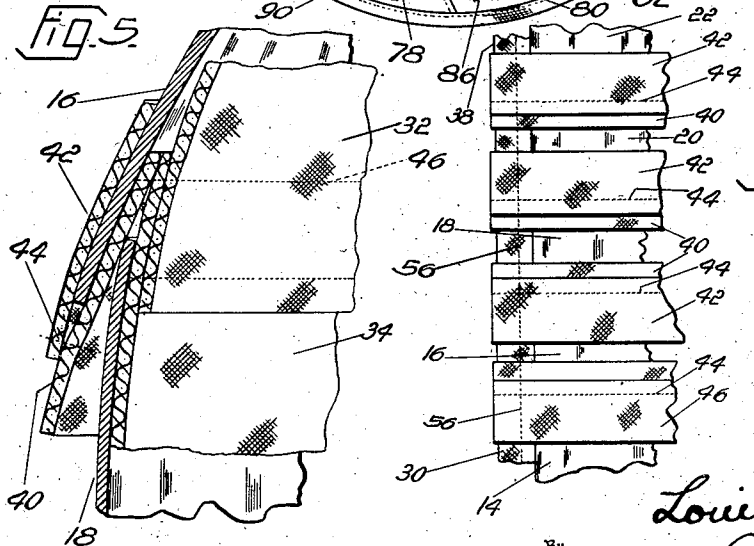


Fig. 5.

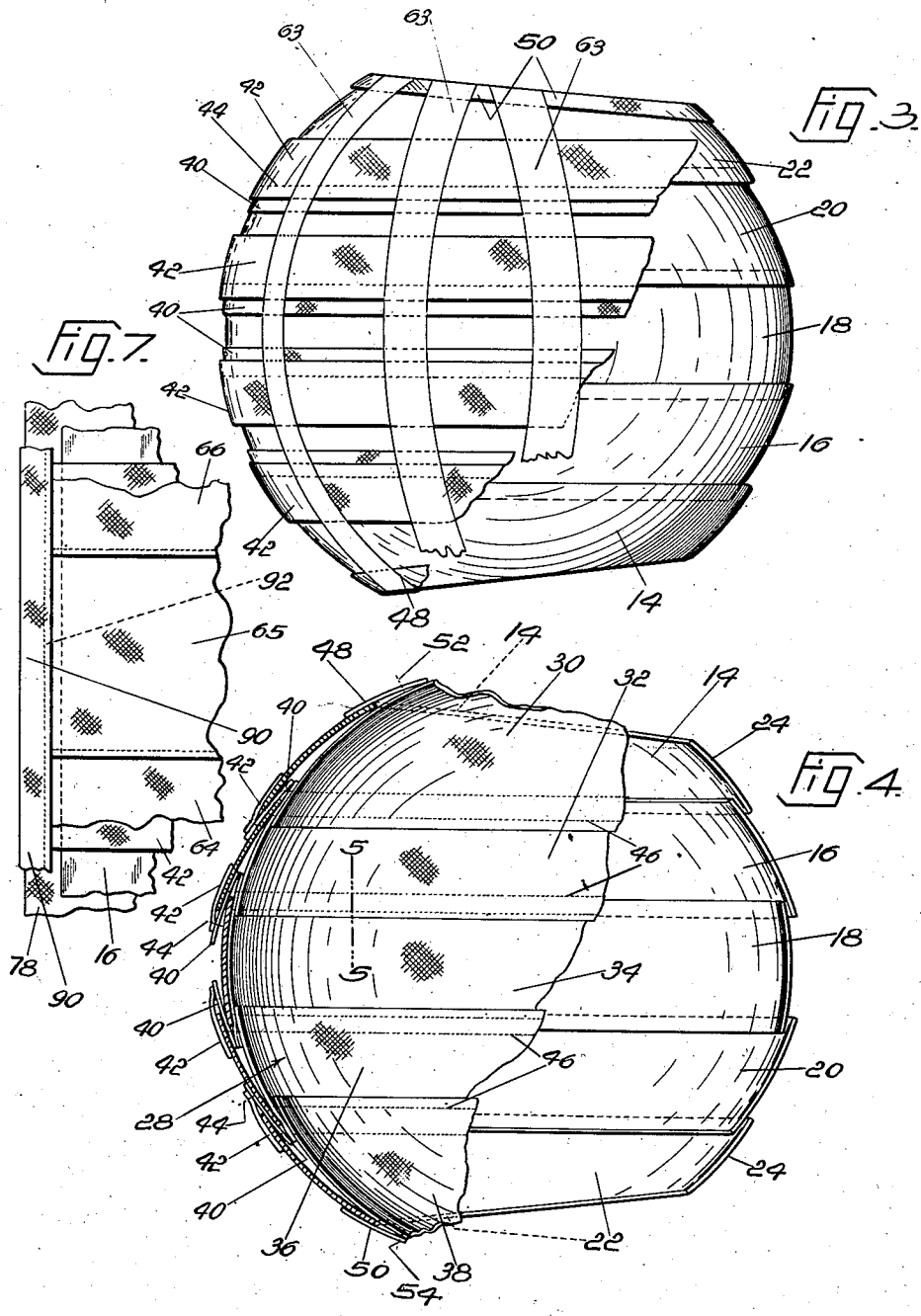
Fig. 6.

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PROTECTIVE HELMET

Filed March 6, 1944 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PROTECTIVE HELMET

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Application March 6, 1944, Serial No. 525,177

10 Claims. (Cl. 2—6)

This invention relates to helmets.

One object of the invention is to provide a helmet having a head-protective member formed of a plurality of projectile-proof or resistant plates and means of improved construction for holding said plates in cooperative relation.

Another object is the provision of a projectile-proof or resistant helmet which is well adapted to be worn by the crew of a war plane over the helmets which they usually wear to keep their heads warm, said projectile-proof or resistant helmet comprising a head-protective member formed of a plurality of projectile-proof or resistant plates and means of improved construction for holding said plates in cooperative relation.

A further object is to provide a helmet of such construction as to afford the wearer excellent protection against projectiles, missiles, impact, etc., and of such construction that the manufacture of the helmet with a head-protective member formed of a plurality of projectile-proof or resistant plates is facilitated.

A yet further object is generally to improve the construction and to facilitate the manufacture of helmets of the above designated type.

The above and other objects, features and advantages of the invention will be fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Figure 1 is a perspective view of a helmet embodying the present invention;

Figure 2 is a side view of the helmet, the outer cover being removed and with other parts being cut away for purpose of illustration;

Figure 3 is a top plan view of the helmet, the outer cover being removed and with other parts cut away for the purpose of illustration;

Figure 4 is a sectional view, partly in elevation, on the line 4—4 of Figure 2;

Figure 5 is a fragmentary sectional view on a larger scale on the line 5—5 of Figure 4;

Figure 6 is a fragmentary view in elevation of the lower marginal edge portion of the helmet without its cover, as seen looking from the left of Figure 2; and

Figure 7 is a view similar to Figure 6 but with the cover of the helmet applied.

Referring now to the drawings in detail, the helmet 10, here shown as a soldier's helmet, is shaped to enclose the wearer's head and with portions of the bottom edge of the helmet at the opposite sides thereof recessed as indicated at 12 so as not to cover the wearer's ears or ear phones. The main protective portion or head protective member of the helmet is preferably formed of Hatfield steel and as here shown is constituted by a plurality of sheet steel plates 14, 16, 18, 20, 22 which as shown in Figures 2 to 4 are curved laterally and from front to rear so that in the assembled relation of said plates they define the shape of the helmet. It will be observed by reference to Figures 3 and 4 that the helmet is wider at the back than at the front thereof and that this is accomplished by providing the side plates 14 and 22 of such shape that they progressively increase in width from their front ends 24 to their rear ends 26. The helmets 10 are particularly well adapted to be worn by the crew of a war plane over the usual leather helmets which are worn by the members of the crew to keep their heads warm.

The helmet 10 is of such construction that it possesses a desirable degree of resiliency in all directions so that it is better able to resist impact, shock, and penetration of projectiles, missiles, etc. For this purpose the steel plates 14 to 22 are disposed in such relation and are so held with respect to each other as to be relatively movable to a limited extent. More specifically, steel plates 14 to 22 inclusive are disposed with their adjacent marginal side edge portions in overlapping relation, as illustrated in Figure 4, for the full lengths thereof. These steel plates are held in this relation by a jacket 28 formed of a strong fabric, preferably a fabric such as canvas. Said jacket comprises a plurality of strips 30, 32, 34, 36 and 38 stitched to each other with their adjacent side edges in overlapping relation. Said fabric strips are cut to shape at their side edges so that when they are stitched together they form a concavo-convex inner lining conforming to the concave surface of the assembly of steel plates. As illustrated more clearly in Figure 5, the adjacent steel plates disposed with their marginal side edge portions in overlapping relation as described above are not in contact with each other but are received in pockets provided for that purpose. Some of said pockets are formed by inner and outer fabric strips 40 and 42, which are stitched to each other as indicated at 44, the inner strip 40 being stitched to the overlapped marginal edge portions of the adjacent lining strips of the jacket 28 by a line of stitching as indicated at 46 in Figures 4 and 5. Pockets are also provided between the inner strips 40 and the adjacent lining strips. Thus, as shown in Fig. 5 adjacent edge portions of the overlapping steel plates 16 and 18 are received, respectively, in the pocket formed be-

tween strips 40 and 42 and in the pocket formed between strip 40 and the adjacent lining strip 34.

In the construction shown, there are four intermediate pairs of strips 40, 42 and at the side ends of the helmet there are single strips 48, 50 which are stitched to the lining strips 30 and 38 respectively inwardly of the side edges thereof by lines of stitching 52 and 54 respectively providing end pockets which receive the lower marginal edge portions of the steel plates 14 and 22 respectively. The jacket 28 is thus constituted by the lining strips 30 to 38, by a plurality of strips 40, 42, which are stitched to each other and to said lining strips as described above and by said side end strips 48 and 50 which are stitched to the lining strips 30 and 38 respectively. Describing more specifically the overlapped relation of plates 14, 16, 18, 20 and 22 and the arrangement of the edges of said plates in the pockets therefor, it will be noted by reference to Fig. 4 that one side edge of plate 16 is received in the pocket provided by one pair of strips 40, 42 and that the opposite side edge of plate 16 is received in the pocket provided by a strip 40 and the lining strip 32. Plate 18 has one of its side edges in a pocket provided by a strip 40 and one side edge portion of the lining strip 34, and said plate 18 has its opposite side edge in the pocket provided by a strip 40 and the other side edge portion of lining strip 34. Plate 20 has one side edge thereof received in the pocket provided by a pair of strips 40 and 42 while its opposite side edge is received in a pocket provided by a strip 40 and the lining strip 36. End plate 22 has one side edge thereof received in the pocket provided by a pair of strips 40 and 42 while its opposite side edge is received in the pocket provided by end strip 50 and lining strip 38. The other end plate 14 has one side edge thereof received in the pocket provided by a pair of strips 40 and 42 while the opposite side edge of said plate is received in the pocket provided by end strip 48 and the adjacent lining strip 30. The outer ends of strips 40, 42, 48 and 50 project beyond the front and rear ends of the steel plates, as illustrated more clearly in Figure 6 and said strips 40, 42, 48 and 50 are secured to the projecting end portions of the adjacent lining strips 30 to 38 by lines of stitching 56 at the front and back of the helmet. As the strips 48 and 50 are stitched to the strips 30 and 38 respectively beyond the adjacent lower edges of said plates 24 and 22, the jacket 28 has a line of stitching completely around the lower edge of the helmet outwardly of the edges of the steel plates and the jacket has a lower marginal edge portion projecting beyond the edges of the steel plate assembly to which the helmet cover 60 and the lining 62 hereinafter described are stitched. Before the cover 60 is applied, the plates 14 to 22 are held against separation from the jacket 28 by a plurality of adhesive tapes 63 such as strips of "Scotch" tape which can remain permanently in the helmet. More specifically, as illustrated in Figs. 2 and 3, the adhesive tapes 63 extend from one side of the helmet to the other side edge thereof and are adhered at their ends to the end strips 48 and 50 which are stitched to lining strips 30 and 38, respectively, and said adhesive strips are adhered to the other surfaces of strips 42 and the outer surface portions of the metal plates. Thus, tapes 63 hold the plates in assembled relation, with their edges disposed in the pockets as described above, it being understood that after the cover 60 is applied said cover and lining 62 maintain the plates in position in the helmet.

The helmet cover 60 comprises a plurality of fabric strips 64, 65, 66 and 68 shaped at their side edges so that when they are stitched together the cover is concavo-convex to conform to the convex curvature of the steel plate assembly, said strips being stitched together at the seams 70, 72, and 74 which extend from the front end of the helmet to the back end thereof. Similarly the lining 62 of the helmet comprises a plurality of fabric strips 76, 78, 80 and 82, shaped at their side edges so that when they are stitched together the lining is concavo-convex to conform to the concave curvature of the steel plate assembly and of the fabric jacket 28, said lining strips being stitched to each other by the seams 84, 86 and 88, extending from the front of the helmet to the back thereof. The front and rear ends of the cover and lining strips extend beyond the front and rear ends of the metal plates and the outer edges of the cover strips 64 and 68 and of the lining strips 76 and 82 extend beyond the lower or outer edges of the side metal plates 14 and 22 respectively. The projecting portions of said cover and lining strips are covered by a folded edging strip 90 which extends completely around the edge of the helmet and which is secured to the projecting portions of said cover and lining strips and to the projecting portions of the strips of the jacket 28 by a line of stitch 92 illustrated in Figure 7, said line of stitching 92 also serving to secure the adjacent projecting end portions of the cover and lining strips to each other and to the adjacent projecting edge portions of the strips of the jacket 28.

As illustrated in Figure 1 suitable means are provided for fastening the helmet on the wearer's head. For this purpose strips 94 of leather or other suitable material are secured at their ends to the fabric edge of the helmet at the opposite ends of the adjacent recessed portion 12 of the helmet. A chin strap 96 formed of leather is secured to one of the strips 94 and a companion buckled strap 98 is secured to the other strip 94, straps 96 and 98 being adjustably securable to each other by the engagement of strap 96 in the buckle 99 of strap 98.

It will be understood that while the helmet 10 has been described in reference to its use for military purposes and is constructed and arranged to afford protection against bullets and other projectiles or missiles, said helmet can also be utilized for other purposes, for example, as the head gear of foot-ball players, polo players, and other athletes, and in general as a protective helmet for military or civilian use. Also it will be understood that while I have shown and described the preferred embodiment of my invention, the latter may be embodied otherwise than as herein specifically illustrated or described, and that in the illustrated embodiment certain changes in the details of construction and in the arrangement of parts may be made without departing from the underlying idea of the invention within the scope of the appended claims.

I claim:

1. A helmet having a head-protective member comprising a plurality of concavo-convex plates formed of impact-resisting material and assembled in side by side position in head covering relation, said plates being relatively movable and having their adjacent marginal edge portions in overlapped relation for substantially the full lengths thereof, and means formed of flexible sheet material for holding said plates in said relatively movable overlapped relation.

2. A helmet comprising a plurality of sheet metal projectile-resistant plates of concavo-convex form disposed in side by side relation in relatively movable relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, and means securing said plates in said relation comprising means having recesses in which opposite side edge portions of said plates, respectively, are received and which hold said plates against outward lateral movement relatively to each other.

3. A helmet comprising a plurality of relatively movable plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, and means securing said plates in said relatively movable relation comprising means having recesses in which opposite side edge portions of said plates, respectively, are received and which hold said plates against outward lateral movement relatively to each other, and means for limiting other movement of said plates relatively to each other.

4. A helmet comprising a plurality of relatively movable plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covring relation thereto, and means securing said plates in said relatively movable relation comprising means having recesses in which opposite side edge portions of said plates, respectively, are received and which hold said plates against outward lateral movement relatively to each other, and covers disposed at and conforming to the convex and concave surfaces, respectively, of said head-protective member, said covers extending outwardly beyond the peripheral edge of said head-protective member, and secured to each other peripherally of the helmet beyond said peripheral edge of the head-protective member.

5. A helmet comprising a plurality of relatively movable plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, adjacent marginal edge portions of adjacent plates being disposed in overlapping relatively movable relation, a jacket having a body portion overlying and conforming to said inner concave surface of said head-protective member and having a plurality of strips attached thereto and forming recesses in which opposite side edge portions of said plates, respectively, are received and which hold said plates against outward lateral movement relatively to each other, and means for limiting other movement of said plates relatively to each other, said last mentioned means comprising means overlapping the outer surface of said head-protective member and secured in fixed relation to said jacket.

6. A helmet comprising a plurality of sheet metal plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, adjacent marginal edge portions of adjacent plates being disposed in overlapping relation for the full lengths of said adjacent parts, and means engaging said adjacent overlapped marginal edge portions and holding said plates in said relation.

7. A helmet comprising a plurality of relatively movable plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, adjacent marginal edge portions of adjacent plates being disposed in overlapping relation for the full lengths of said adjacent parts, and a fabric casing enclosing said head-covering member and including portions engaging said adjacent overlapped marginal edge portions and limiting the movement laterally of each other and portions limiting other movement of said plates relatively to each other.

8. A helmet comprising a plurality of relatively movable plates of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, adjacent marginal edge portions of adjacent plates being disposed in overlapping relation, a jacket having a body portion overlying and conforming to said inner concave surface of said head-protective member and having a plurality of strips attached thereto and forming recesses in which opposite side edge portions of said plates, respectively, are received and which hold said plates against outward lateral movement relatively to each other, certain of said strips being disposed between the overlapped surfaces of said marginal edge portions of adjacent plates, respectively, and others of said strips being disposed over the upper surfaces of the uppermost marginal edge portions, respectively, of adjacent plates, and means for holding said marginal edge portions in overlapped relation in said recesses, respectively.

9. A helmet comprising a plurality of relatively movable sheet metal parts of concavo-convex form disposed in side by side relation and extending from one edge of the helmet to the opposite edge thereof and forming in combination a head-protective member having a concave inner surface adapted to conform generally to the wearer's head in covering relation thereto, adjacent marginal edge portions of adjacent plates being disposed in overlapping relation, a jacket having a body portion overlying and conforming to said concave inner surface, a plurality of strips disposed in laterally spaced relation on and secured to said body portion and forming a plurality of recesses therewith, certain of said metal plates having marginal edge portions thereof positioned in said recesses, respectively, and overlapped by said strips, respectively, and a plurality of strips disposed in laterally spaced relation and secured to said first mentioned strips, respectively, and forming therewith a plurality of recesses, certain of said metal plates having marginal edge portions thereof positioned in said last mentioned

recesses, respectively, and means for holding said marginal edge portions in said recesses.

10. A helmet having a head-protective member comprising a plurality of curved plates formed of impact-resisting material and assembled in side by side position in head covering relation, said plates being relatively movable and having adjacent marginal edge portions thereof in overlapped relation, said overlapped portions being relatively movable, means formed of flexible sheet material disposed between the overlapped surface portions of said plates, and means including said first mentioned means for holding said plates in said overlapped relation.

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