March 7, 1961 G. Z. EDWARDS ET AL 2,973,522

HEADGEAR ATTACHMENT MECHANISM FOR FACE-PROTECTIVE SHIELDS

Filed July 19, 1957 2 Sheets-Sheet 1

FIG. 1.

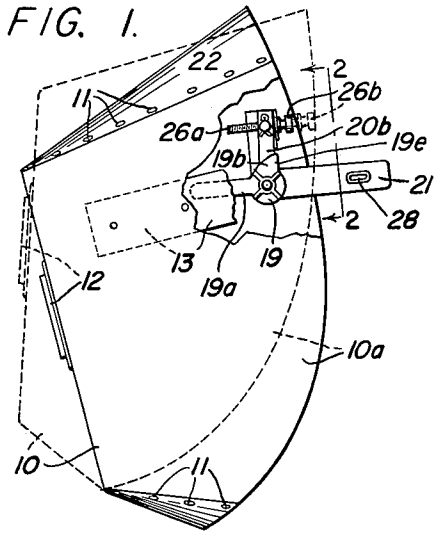



FIG. 2.

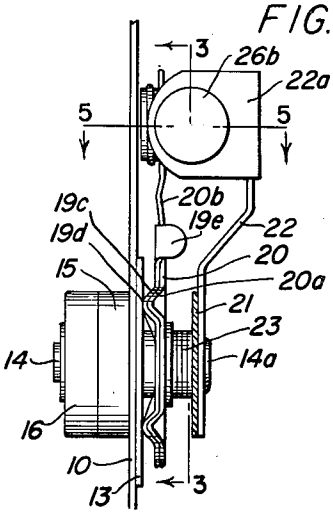



FIG. 3.

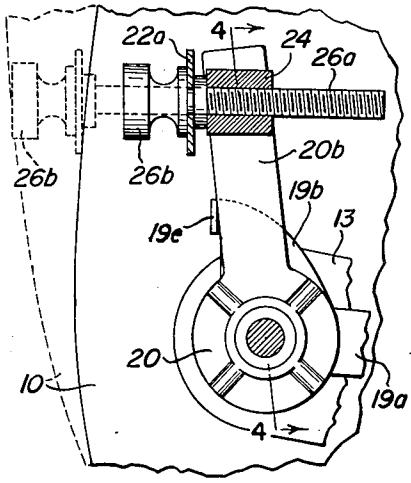



FIG. 4.

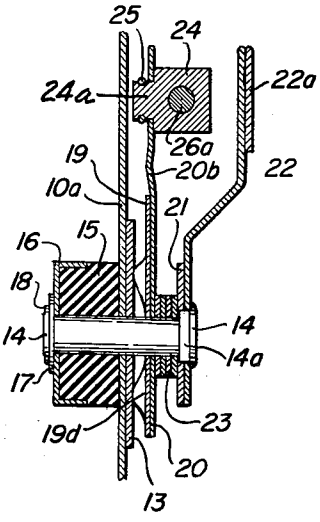
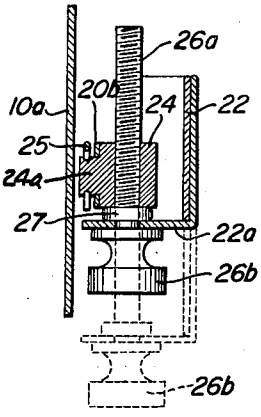



FIG. 5.




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Filed July 19, 1957 2 Sheets-Sheet 2

FIG. 6.

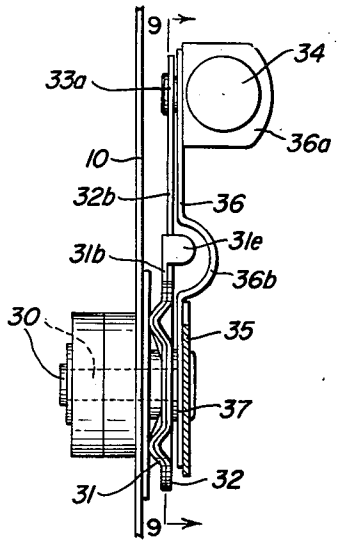



FIG. 7.

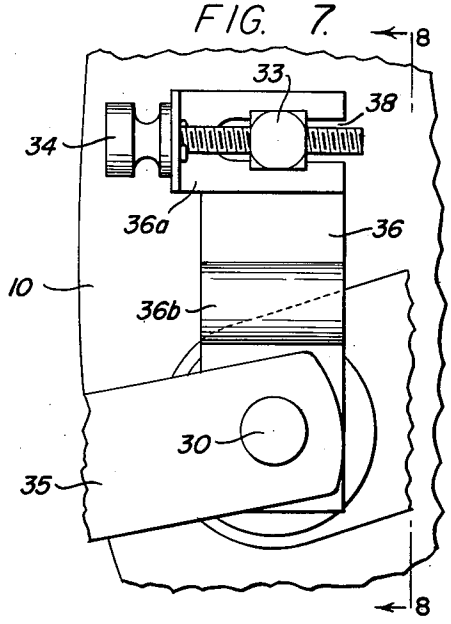



FIG. 8.

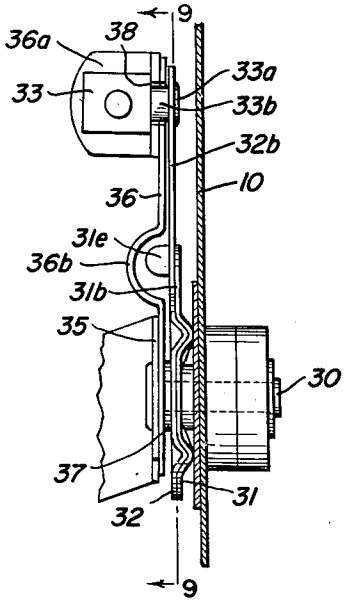
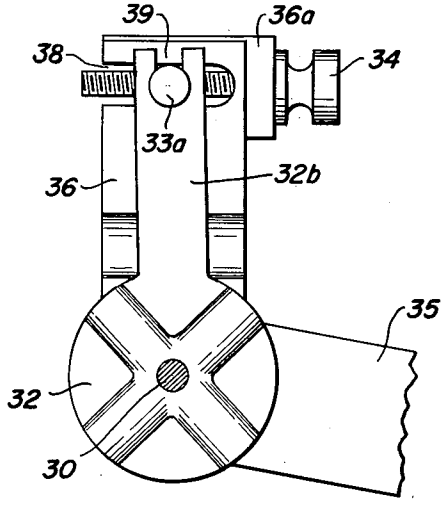



FIG. 9.




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# HEADGEAR ATTACHMENT MECHANISM FOR FACE-PROTECTIVE SHIELDS

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14 Claims. (Cl. 2—8)

This invention relates to face-protective shield and headgear combinations, such as are widely used by industrial welders.

The art of welding brought about the need for special face-protective shields which guard the eyes and faces of welders against injury from the intense glare of welding operations and from flying bits of debris given off thereby. Through the years, the construction of such face-protective shields and of headgear used to support them in working position over welders' faces has, in and of itself, become an important industrial art.

These face-protective shields are usually of helmet formation, being fabricated from thin, tough, and hard fiberboard sheet material folded into proper formation and riveted together to retain such formation. A window of heat and glare resistant glass is provided in the front wall of each such shield or helmet at eye level.

The headgear may be merely a band structure formed to fit upon the head as a support for the shield or helmet, or it may be a so-called "hard hat" to cover and protect the head.

Early in the development of this art, it was found to be essential that provision be made for enabling the welder to push the face-protective shield or helmet away from his face without disturbing its connection with the headgear, and, also, that provision be made to enable him to adjust the position of such shield or helmet vertically with respect to the headgear so that the window thereof always provides the proper line of sight to the work.

The manufacturers of this type of equipment have, in the past, developed a variety of constructions for meeting the above requirements. A very successful one of these has been that disclosed by U.S. Patent No. 2,461,604 granted to F. B Huntsman on February 15, 1949, entitled "Protective Device." It has been produced in great numbers and has been widely used in the welding and related arts.

While the Huntsman construction and various other constructions presently on the market have been highly successful, there has been a continuing urge from welders who use such combination face-protective shields and headgear to make vertical adjustment of the shield relative to the headgear easier and quicker so as to speed up the welding operation.

As manufacturers of the patented Huntsman device, we have now greatly improved that construction to the extent of providing completely new results in this highly developed and highly specialized art.

When using all prior shield and headgear combinations for the welding art, including the aforementioned Huntsman device, it has been necessary for the welder to determine, in advance of placing the combination in position on his head, the particular adjustment best adapted for the work to be done. If he guessed incorrectly, it has been necessary for him to remove the combination from his head and readjust the face-protective shield relative to the headgear. It has often been necessary for a welder to go through this operation several times before being completely satisfied. Consequently, many welders have forced themselves to be satisfied with an approximate adjustment, and have kinked their necks to attain the exact line of sight desired. Moreover, in many welding operations the linear course of the welding has been such as to require kinking of the neck by the welder in order to retain the proper line of sight throughout the welding operation, even though the initial adjustment has been perfect.



Our improved construction makes it unnecessary for the welder to remove the shield and headgear combination from his head for adjustment purposes. Any desired degree of vertical adjustment of the shield relative to the headgear may be made by the welder with the utmost ease and rapidity while the combination is in working position on his head. Moreover, such adjustment may be made both at the beginning of any welding operation and at any and all times throughout the course of the operation.

Accordingly, the principal object of the present invention is to provide an improved headgear attachment mechanism for face-protective shields, whereby a welder may adjust the shield vertically relative to the headgear, in order to properly position the window with respect to his eyes, with maximum ease, speed, and precision, and all without removing the combination from his head.

Another object is to accomplish the above simply, economically, and with a minimum of change in existing attachment mechanisms of the type concerned.

An outstanding feature of the invention in the accomplishment of these objects is the provision of thumbscrew adjustment means between and rigidly interconnecting the shield attachment means and the headgear attachment means of the mechanism.

Further objects and features of the invention will become apparent from the following detailed description of the presently preferred embodiments illustrated in the accompanying drawings.

In the drawings:

Fig. 1 represents a left-side elevation of a typical face-protective shield for welders which embodies headgear attachment mechanism conforming to the invention, a fragmentary portion of the shield being broken away to reveal the attachment mechanism in side elevation;

Fig. 2, a fragmentary rear elevation of the shield of Fig. 1, the view being drawn to a considerably enlarged scale and illustrating the attachment mechanism completely, in rear elevation;

Fig. 3, a vertical section taken on the line 3—3 of Fig. 2;

Fig. 4, a vertical section taken on the line 4—4 of Fig. 3;

Fig. 5, a horizontal section taken on the line 5—5 of Fig. 2, parts in the background being omitted;

Fig. 6, a view corresponding to that of Fig. 2, but illustrating an embodiment of the invention having certain advantages over that of the preceding figures;

Fig. 7, a right side elevation of the structure appearing in Fig. 6;

Fig. 8, a vertical section taken along the line 8—8 of Fig. 7; and

Fig. 9, a vertical section taken along the line 9—9 of Fig. 6.

Referring to the drawings:

The face-protective shield or welders' helmet 10 of Fig. 1 is typical of face-protective shields or helmets being presently produced by many manufacturers for use by welders. It is fabricated from a thin fiberboard material, as aforementioned, which is flexed for formation

and has overlapping edges secured together by means of rivets 11. A metal frame 12 for removably mounting a heat and glare resistant window at eye level is secured in the front wall of such shield or helmet 10 in conventional fashion.

A strip 13 of the same fiberboard material is advantageously fastened, as by riveting, to the inside of the shield or helmet 10 transversely across one of the side walls thereof (here the left side wall 10*a*) as reinforcement for the mounting of the headgear attachment mechanism of the invention.

In its illustrated form, the headgear attachment mechanism is similar in many respects to that illustrated and described in the afore-referred-to Huntsman Patent No. 2,461,604. It comprises a pivot pin 14, which passes completely through reinforcing strip 13 and the contiguous side wall 10*a* of the shield or helmet 10 and has its inside end fixedly secured to headgear attachment means to be described hereinafter.

Pivot pin 14 is rotatable relative to reinforcement strip 13 and shield or helmet side wall 10*a*. It has a highly resilient, soft rubber ring 15 mounted on its outer end between the side wall 10*a* and a rigid end cap 16, the latter being held in position by means of a washer 17 and retaining pin 18.

Rotatably mounted on pivot pin 14 and serving both as a latch keeper and as means for attaching the mechanism to the shield or helmet 10 is a disk 19 having a stem extension 19*a* and an extending arm 19*b*. The stem extension 19*a* is securely riveted to reinforcement strip 13, as indicated in Fig. 1, and, therefore, serves to fixedly attach the disk 19 to the shield or helmet 10.

Disk 19 is provided with radial keeper grooves 19*c*, Fig. 2, on one of its sides, which are advantageously formed by stamping radial ribs 19*d* in such disk. Disk 19 and its extensions 19*a* and 19*b* are conveniently formed as a unitary metal stamping.

For latching co-operation with latch keeper disk 19, a correspondingly formed latch disk 20 is mounted on pivot pin 14, as an axis, in contiguous mating relationship with latch keeper disk 19, the two being normally pressed into mating, latched relationship by means of the resilient rubber ring 15, it being realized that radial latch ribs 20*a* of disk 20 fit snugly into the radial keeper grooves 19*c* of disk 19.

The mating latch disk and latch keeper disk serve as multiple-position latching means for the mechanism, latch keeper disk 19 being rigidly associated with the shield attachment means, here the stem extension 19*a*, and latch disk 20 being rigidly associated with rotatable headgear attachment means described hereinafter. In this way, the shield or helmet and the headgear are swingable relative to each other about the common axis provided by pivot pin 14 and from one latched position to another as provided by the radial latching ribs and grooves of the latch disk and latch keeper disk, respectively. As is usual, there are four sets of such mating ribs and grooves, dividing the disks into quadrants. While these would ordinarily give four latched positions, only two are needed. Accordingly, a limit stop member 19*e* is provided to prevent the shield or helmet from traveling past the customary raised position thereof surmounting the headgear and head of the wearer.

The headgear attachment means in this illustrated embodiment comprises an attachment arm 21 rigidly secured at one of its ends to one of the ends of a bracket arm 22, the two arms extending at right angles to each other and being non-rotatably mounted at their joined ends on a square shoulder portion 14*a*, Fig. 4, of the inner end of pivot pin 14. As so arranged, the two arms 21 and 22 form an attachment unit of bell crank formation having pivot pin 14 as its pivot member. Such bell crank is fixed in position upon pivot pin 14 by upsetting the inner end of the latter as a rivet, thereby squeezing the bell crank against spacing washers 23.

A bracket member 22*a* is secured at the free end of bracket arm 22 and extends angularly therefrom toward latch keeper disk 19.

As has been explained hereinbefore, the principal purpose of this invention is to enable a welder to easily and quickly adjust the vertical position of the face-protective shield or helmet relative to the headgear while the combination of the two remains in working position on his head. To this end, the headgear attachment means which is here represented by the bell crank structure made up of attachment arm 21 and bracket arm 22, is rigidly but adjustably secured to its associated latching means, i.e. latch disk 20, by adjustment-screw mechanism.

In this embodiment, such disk 20 is provided with a stem extension 20*b* which corresponds in length with bracket arm 22 and is disposed in spaced side-by-side relationship therewith. A female-threaded block 24 is pivotally secured to the free end of such stem extension 20*b*, as by means of a stub shaft portion 24*a* thereof passing through a suitable receiving aperture in the stem extension 20*b* and a spring clip retainer 25 applied to such stub shaft portion in conventional fashion, see Figs. 4 and 5.

The threaded shank 26*a* of a knurled thumbscrew 26 is passed through an appropriate receiving aperture in bracket member 22*a*, and is screwed into the female-threaded passage through block 24, thereby rigidly uniting the bell crank structure 21, 22 with latch disk 20.

The knurled head 26*b* of thumbscrew 26 bears against one face of bracket member 22*a*, while a collar 27 affixed to the shank of thumbscrew 26 bears against the other face of such bracket member. Thus, thumbscrew 26 is free to rotate relative to the bracket member, but is not axially displaceable relative thereto.

Turning of the thumbscrew either causes the block to travel along the threading of the thumbscrew shank or such thumbscrew shank to travel along the threading of block 24, depending upon which is positionally fixed relative to the pivot axis in the application of the attachment mechanism, it being noted that the block accommodates itself to arcuate travel about the pivot axis by reason of its own pivot or swivel mounting.

With the bell crank unit 21, 22 being rigidly affixed to the pivot pin 14, as it is here, and with this assembly of mechanism and latch disk 20 and its stem extension 20*b* being rotatable relative to latch keeper disk 19 and face-protective shield or helmet 10 as previously described, rotation of thumbscrew 26 will cause the shank 26*a* of such thumbscrew to travel relative to block 24.

Attachment arm 21 is provided with securement means adjacent its free end, so that the structure illustrated may be attached to whatever headgear is being worn by a welder. Accordingly, rotation of thumbscrew 26 will cause the face-protective shield or helmet 10 to be raised or lowered relative to the headgear worn by the welder, depending upon which direction the thumbscrew is turned, see the dotted line positions of Figs. 1 and 3.

As illustrated, the securement means at the free end of headgear attachment arm 21 is a turn-button receiving opening 28, Fig. 1, for receiving a turn-button of the type of quick-coupling structure forming the subject of our copending application for patent Serial No. 631,731, filed December 31, 1956, now Patent No. 2,926,357, granted March 1, 1960, and entitled "Quick-Coupling Welding Shield and Headgear Combination."

It can be seen that, with the mechanism provided by this invention, a welder need merely reach up and turn thumbscrew 26 in the appropriate direction to adjust the position of face-protective shield or helmet 10 upwardly or downwardly relative to his face. This can be done both at the beginning of a welding operation and during its progress.

A construction having certain advantages over the foregoing is illustrated in Figs. 6–9 as applied to the same face-protective shield or helmet 10. Here, the

mechanism is more compact, affording greater clearance for the headgear within the shield or helmet. Also, the mechanism works more easily, because of the provision of a positive guide for back and forth travel of the adjustment-screw-receiving block.

In this embodiment, the pivot pin **30** is shorter than pivot pin **14**, although in other respects it and much of its associated structure are identical. Latch keeper disk **31** corresponds to latch keeper disk **19**, and latch disk **32** corresponds to latch disk **20**, except for its stem extension **32***b*, which differs from stem extension **20***b* in the nature of its connection with the female-threaded block **33**, as explained hereinafter.

While block **33** corresponds to block **24** and receives knurled thumbscrew **34** in the same manner and for the same purpose as block **24** receives thumbscrew **26**, bell crank **35, 36** is positioned in closely (rather than widely) spaced relationship to latch disk **32** by means of a single washer **37**. This positions the bracket-arm-carrying free extremity of stem extension **32***b* of the latch disk in substantially face-to-face relationship with bell crank arm **36**, and interposes bell crank arm **36** between such stem extension **32***b* and block **33**.

The bracket arm **36***a* is advantageously affixed to bell crank arm **36** in the same manner as bracket arm **22***a* is affixed to its bell crank arm **22**, i. e. by welding, and an elongate slot **38** is provided through and extends transversely of both the free extremity of stem extension **32***b* and the portion of bracket arm **22***a* which is fastened thereto.

Stub shaft portion **33***a* of block **33** extends through such slot **38** to a sliding pivotal connection with the free extremity of latch disk stem extension **32***b*, here provided by a narrower slot **39** in such free extremity, see Fig. 9, and the upsetting of the free end of stub shaft portion **33***a*, as shown. A cylindrical shouldered portion **33***b* of such stub shaft portion fits into and travels freely along slot **38**, which serves as a guide therefor during thumbscrew adjustments of shield or helmet **10** relative to the headgear. Similarly, a corresponding stub shaft portion of reduced diameter fits into and travels freely along slot **39**, which serves as a guide therefor during such thumbscrew adjustments.

The slots **38** and **39** are advantageously open at the free ends of the respective members in which they are formed, so as to provide for easy assembly of the mechanism.

Bell crank arm **36** has an offset portion **36***b* intermediate its length to accommodate limit stop member **31***e* of latch keeper disk extending arm **31***b*, much as in the instance of bell crank arm **22** of the first embodiment.

Whereas this invention is here illustrated and described with respect to specific embodiments thereof, it should be realized that changes may be made within the scope of the following claims, without departing from the essential contributions to the art made by the teachings hereof.

We claim:

1. In a face-protective shield and headgear combination which includes a headgear, an opaque face-protective shield having a front wall provided with a window at eye level and side walls extending rearwardly to define a rear edge margin for the shield, and latching means having coaxial and relatively rotatable, interengaging, latch parts, one of which latch parts has shield attachment means rigidly associated with the shield and another of which parts has headgear attachment means rigidly associated with the headgear, so that the shield and the headgear can be rotated relative to each other from one latched position to another, the combination with said headgear attachment means and said latching means of adjustment-screw mechanism, said mechanism comprising a thumbscrew anchored to said headgear attachment means and having its head exposed and facing rearwardly substantially at the rear edge margin of said shield, where it may be easily grasped and turned in either direction by a wearer of the shield while the headgear is in place on his head, the shank of said thumbscrew extending forwardly within said shield; and means anchored to that said latch part which has said headgear attachment means and receiving said thumbscrew in threaded relationship.

2. The combination defined by claim 1, wherein the adjustment-screw mechanism comprises a female-threaded block rotatably connected to the latching means; a knurled thumbscrew screwed into the threading of said block; and means securing said headgear attachment means to said thumbscrew against relative axial movement but permitting rotation of said thumbscrew.

3. The combination defined by claim 2, wherein there is provided a pivot pin upon which the headgear attachment means and the shield attachment means are mounted in common; the headgear attachment means comprises an attachment arm, having one of its ends mounted on said pivot pin, and a bracket arm extending angularly from said attachment arm at the opposite end of the latter; and the means securing said headgear attachment means to the thumbscrew comprises a bracket member extending angularly from the free end of said bracket arm, said thumbscrew passing through said bracket member and being rotatably anchored thereto.

4. The combination defined by claim 3, wherein the part of the latching means which is associated with the headgear attachment means includes an arm extending similarly to and generally parallel with the bracket arm of the headgear attachment means; and wherein means are provided rotatably connecting the block with such extending arm of the latching means adjacent the free end thereof.

5. The combination defined by claim 4, wherein the bracket arm of the headgear attachment means is disposed between the block and the extending arm of the latching means in face-to-face relationship with the latter, and is transversely slotted to accommodate the means rotatably connecting the block with the extending arm of the latching means and to accommodate longitudinal movement thereof in the thumbscrew adjustment of the mechanism.

6. The combination defined by claim 5, wherein the arm of the latching means is longitudinally slotted to facilitate rotatable connection of the block therewith.

7. The combination defined by claim 6, wherein the attachment arm of the headgear attachment means and the bracket arm thereof are non-rotatably mounted on the pivot pin, and the latch parts of the latching means are rotatably mounted on said pivot pin.

8. A face-protective shield and headgear combination, comprising a headgear; an opaque face-protective shield provided with a window at eye level and side walls extending rearwardly to define a rear edge margin for the shield; latching means having interengaging latch parts; shield attaching means rigidly and articulatively associated with one of said latch parts; headgear attachment means rigidly and articulatively associated with the other of said latch parts, said latch parts being coaxial and rotatable relative to each other so that the shield attachment means and the headgear attachment means can be rotated relative to each other from one latched position to another; and adjustment-screw mechanism rigidly but adjustably securing said headgear attachment means to its associated latch part of the latching means, said adjustment-screw mechanism including a thumbscrew anchored to said headgear attachment means and having its head exposed and facing rearwardly substantially at the rear edge margin of said shield, where it may be easily grasped and turned in either direction by a wearer of the shield while the headgear is in place on his head, the shank of said thumbscrew extending forwardly within said shield; and means anchored to said latching means and receiving said thumbscrew in threaded relationship.

9. The combination defined by claim 8, wherein the

adjustment-screw mechanism comprises a female-threaded block rotatably connected to the latching means; a knurled thumbscrew screwed into the threading of said block; and means securing said headgear attachment means to said thumbscrew against relative axial movement but permitting rotation of said thumbscrew.

10. The combination defined by claim 9, wherein there is provided a pivot pin upon which the headgear attachment means and the shield atachment means are mounted in common; the headgear attachment means comprises an attachment arm, having one of its ends mounted on said pivot pin, a bracket arm extending angularly from said attachment arm at the opposite end of the latter; and the means securing said headgear attachment means to the thumbscrew comprises a bracket member extending angularly from the free end of said bracket arm, said thumbscrew passing through said bracket member and being rotatably anchored thereto.

11. The combination defined by claim 10, wherein the part of the latching means which is associated with the headgear attachment means includes an arm extending similarly to and generally parallel with the bracket arm of the headgear attachment means; and wherein means are provided rotatably connecting the block with such extending arm of the latching means adjacent the free end thereof.



12. The combination defined by claim 11, wherein the bracket arm of the headgear attachment means is disposed between the block and the extending arm of the latching means in face-to-face relationship with the latter, and is transversely slotted to accommodate the means rotatably connecting the block with the etxending arm of the latching means and to accommodate longitudinal movement thereof in the thumbscrew adjustment of the mechanism.

13. The combination defined by claim 12, wherein the arm of the latching means is longitudinally slotted to facilitate rotatable connection of the block therewith.

14. The combination defined by claim 13, wherein the attachment arm of the headgear attachment means and the bracket arm thereof are non-rotatably mounted on the pivot pin, and the latch parts of the latching means are rotatably mounted on said pivot pin.

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