May 29, 1956 G. R. HOFFMASTER 2,747,191

ADJUSTABLE MEANS FOR FACE PROTECTIVE DEVICE

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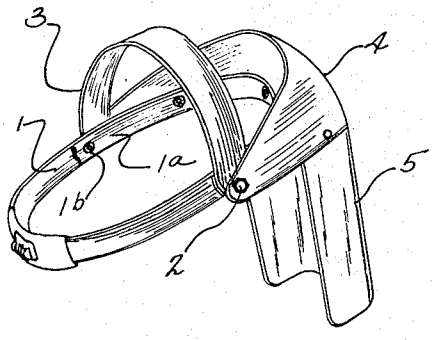


FIG 1

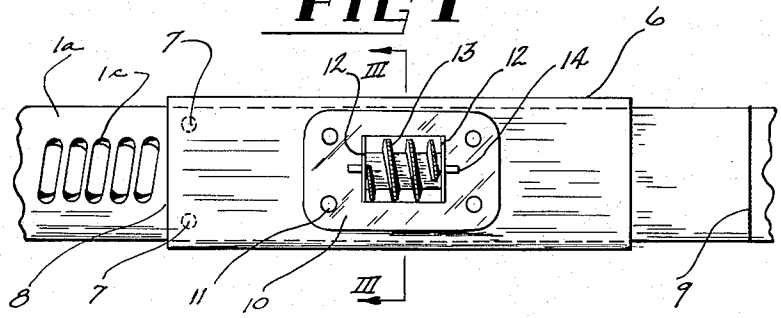


FIG 2

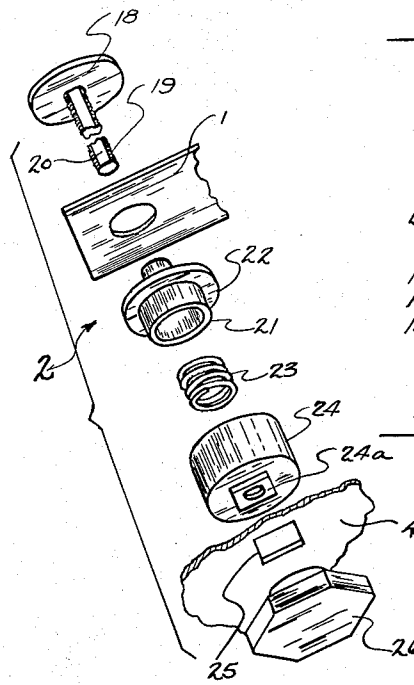


FIG 4

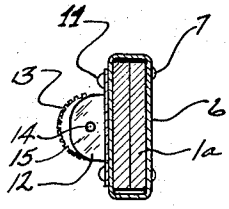


FIG 3

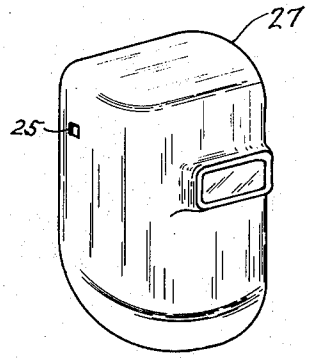


FIG 5

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ADJUSTABLE MEANS FOR FACE PROTECTIVE DEVICE

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2 Claims. (Cl. 2—8)

This invention relates to an adjustable headgear construction for protective equipment, and more particularly, to adjustable means for selectively varying the girth or effective length of a headband forming part of the headgear and adjustable pivotal means for holding a protective element, such as a face shield or welding helmet, at any desired angular position with respect to the headband.

It is well known in the art to provide a headgear of the type comprising a headband of a single strip of molded or plastic material having overlapping ends at the rear of the head of the wearer which ends are provided with adjusting means for varying the degree of overlap and thus the girth or effective perimeter of the headband. Such headbands also usually have a crosspiece fitting over the head of the wearer with its extremities attached to the headband. Protective equipment, such as face shields and helmets, may be supported by such a headband.

An outstanding disadvantage of headband and adjusting means conventionally used, is that such means are usually complicated in construction, including numerous parts which add considerably to the manufacturing costs, and which often times become inoperable due to wear or misalignment of one or more of the parts. Moreover, such adjusting means as conventionally used generally provides only coarse adjustment and is not susceptible to very small or vernier adjustment, such as required to obtain a close and accurate fit on the head of the wearer.

A still further disadvantage of conventional headgear for protective equipment is that such equipment, including face shields and welding helmets, is generally not susceptible of selective angular adjustment with respect to the headband, and instead, allows merely adjustment in any one of several positions. Also, the means for adjustably positioning such protective piece or equipment to different angular positions is time consuming and does not permit quick and easy adjustment.

An object of the present invention is to provide a headband adjusting means in a headgear for protective equipment which adjusting means comprises relatively simple parts and which enables a wide range of adjustment, as well as vernier adjustment, to permit precise or extremely small adjusting movements such as will permit accurate adjustment of the girth of the headband so as to accurately fit the contour of the wearer's head.

A more specific object of the present invention is to provide a headband adjusting means which is relatively fool-proof and which permits easy and quick adjustment by simply turning a threaded element by means of the fingers.

A further object of the invention is to provide a novel pivotal means for adjustably supporting a face shield, welding helmet or other protective element, with respect to the headgear at any selective angular position, over a wide range of arcuate movement, and including adjusting means to enable easy and quick adjustable positioning of the protective piece at any desired angle relative to the face of the wearer, to permit either covering or uncovering of the wearer's face, which adjustment can be made by hand turning of an adjusting element or by a mere shaking of the head of the wearer.

Other objects and advantages of the invention will become more apparent from a study of the following specification taken with the accompany drawing wherein:

Figure 1 is a perspective view of a face shield and headband assembly including the headband adjusting means and the face shield pivotal adjusting means embodying the principles of the invention;

Figure 2 is an enlarged fragmentary rear view of the adjustable portion of the headband shown in Figure 1, and more clearly showing the headband adjusting means;

Figure 3 is a cross-sectional view taken along line III—III of Figure 2;

Figure 4 is an enlarged, exploded view of the pivotal assembly 2 to more clearly show the face shield or welding helmet pivotal adjusting means for obtaining selective angular positions thereof relative the headband; and

Figure 5 is a perspective view showing a welding helmet, which may be substituted for the face shield 5 and forehead covering part 4 in Figure 1.

Referring more particularly to Figures 1 and 2 of the drawing 1 denotes a headband which is made of suitable molded fibrous or plastic material which is bent into oval shape to conform with the contour of the head of the wearer. A felt liner 1*a* may be attached by snap fasteners 1*b* to the forward inner half of the headband to provide a comfortable fit over the forehead. Bridging the central portion of the headband 1 is a cross piece 3 also of fibrous or plastic material having extremities rigidly fastened to opposite side portions of the headband. By means of pivotal assemblies 2, to be described in detail hereinafter, the forehead covering part 4 is adapted to be pivoted and adjustably held in any desired angular position relative the headband. Part 4 carries a shield element 5 of transparent plastic or other suitable material.

An important feature of the invention is the particular construction of the adjusting means for varying the girth of the headband 1 and which is located at the rear portion of the headband. The headband 1 is made up of a single strip of material having lapped end portions which are encircled and held together by a flattened tubular element 6 made of moldable fibrous or plastic material. By means of rivets 7, or other suitable fastening means, the flattened tubular element 6 is rigidly secured to one end portion of headband 1 so that one end 8 of the headband is flush with one end of the flattened tube 6 although this is not necessary since the tubular element may extend beyond end 8. The other end 9 of the headband is adapted to eventually project outwardly of tube 6 for the smallest girth adjustment of the headband.

Rigidly mounted on the outer portion of tube 6 is a base plate 10 of any suitable metal, such as brass, fastened to tube 6 by means of rivets 11 or other suitable fastening means, and having an apertured central portion from the ends of which project outwardly extending integral semicircular ears 12. The ears 12 have holes in which an adjusting worm wheel 13, serrated as shown at 15, is pivotally mounted by means of integral shafts 14 extending from the ends of worm wheel 13 rotatably mounted in said holes.

Adjacent the end portion of headband 1 which terminates with end 9, there are disposed a plurality of substantially vertically extending but somewhat inclined apertures 1*c* which have the same pitch as the worm wheel 13 so that the worm wheel threads will fit the holes and effect a driving engagement therewith. In other words, when worm wheel 13 is turned in one direction by the thumb or fingers of the wearer, a portion 1*a* of the headband will be moved to the right as viewed

in Figure 2, thereby shortening the circumference or girth of the headband inasmuch as the end 9 will also be moved to the right to increase the amount of overlap of the end portions of the headband. When worm wheel 12 is rotated in an opposite direction, the headband portion 1*a* and the end 9 thereof will move to the left, as viewed in Figure 2, so as to enlarge the circumference or girth of the headband by shortening the amount of overlap of the end portions of the headband.

An important feature of the invention resides in the simplicity and ease of adjustment, and the vernier type of adjustment that is obtainable by very slight rotation of the worm wheel 13 since exceedingly small variations may thus be readily made. On the other hand, by rapid rotation of the worm wheel 13, quick variations of the girth of the headband are readily obtainable.

Thus, when considerable adjustment is to be made in the girth or perimeter of the headband, the worm wheel 13 is rotated at high speed. But when a fit is approached, worm-wheel 13 may be rotated very slowly, to get very small changes in girth or overall effective perimeter of the headband and thus obtain precise and accurate fit with the head of the wearer and provide a stable support for the face protective element.

The protective element may take the form of a face shield 5 and forehead covering part 4, shown in Figure 1, or may be in the form of a helmet 27, shown in Figure 5 and is pivotally supported on the extremities of the cross piece 3 by means of pivotal assemblies 2. The face protecting element may be selectively adjusted to any angular position with respect to the headband.

One of the pivotal assemblies 2 is shown in Figure 4 with the parts thereof enlarged and exploded to clearly illustrate the parts thereof. A cap element 18 has integrally formed thereon a threaded shank of semi-circular cross section 19, that is, with a flattened side 20, which shank projects through an aperture in headband 1 and through a semi-circular aperture formed in the boss 21 in which it is snugly fitted to prevent turning movement of the shank relative the boss. Boss 21 has a base 22 which is substantially integrally fastened about the aperture in headband 1 but which may be rotated therewith upon exertion of force. A spring 23 is contained within boss 21 and is surrounded by a cup-shaped housing 24 whose cylindrical wall is slip fitted about boss 21. The closed end wall of housing 24 has a central semi-circular shaped aperture through which threaded shank 19 snugly extends and has a square shaped projection 24*a* which projects into the corresponding shaped square opening 25 formed in the protective element 4, thereby preventing rotary movement of housing 24 relative the protection element 4, which is a face shield or helmet or other face protecting piece. The threaded end portion of shank 19 extends into a screw threaded opening formed in the center of adjusting element 26 (not shown) which adjusting element may have a hexagonal contour or other desired shape.

In operation, as adjusting element 26 is turned by the operator's thumb and fingers in one direction so as to cause shank 19 to be screw threaded inwardly thereof, there will be a greater degree of frictional gripping between the surface of the hub portion of adjusting element 26 which engages the outer surface of element 4, at the same time increasing the frictional contact between the end surface of housing 24 and the inner surface of element 4 with which it is in contact. This frictional gripping on opposite surfaces of element 4 is aided by the tension of spring 23.

When it is desired to change the angular position of the face piece 5 (or of the helmet 27) with respect to the headband, adjusting element 26 is unscrewed to lessen the frictional grip with element 4 and thus permit free pivotal movement of the protective element 4 above the axis of shank 19. When the protective element 4 has been moved to the desired angular position relative the

headband, perhaps to place the protective element above the head instead of forwardly of the face, adjusting element 26 is tightened again to increase its frictional engagement with the protective element 4 and thus clamp the element in the desired angular position. As element 4 is pivotally turned there will be relative rotational movement between boss 21, which is rotatably secured to the headband, and housing 24 which is non-rotatably secured to element 4. If adjusting element 26 is tightened by a predetermined amount, the mere shaking or nodding of the operator's head may be sufficient to move it to the desired angular position and once having obtained such position the element may remain therein so long as there is no further violent nodding of the operator's head. This is a particularly convenient mode of covering or uncovering the operator's face with the protective element when the operator's hands are engaged in work of some kind, such as welding, grinding, etc.

Thus, it will be seen that I have provided an efficient and relatively simple and inexpensive adjusting means for a headband for supporting a protective element such as a face piece or helmet and whereby either coarse or very fine adjustment of the girth of the headband may be easily and quickly obtained; furthermore I have provided a novel pivotal assembly for enabling pivotal movement of the protective face piece over a wide range of angular movement, to enable locking of the face piece in any desired angular position relative the headband, and which includes a frictional adjusting means for effecting such pivotal adjusting movement of the protective piece either by hand or by mere nodding of operator's head.

While I have illustrated and described certain specific embodiments of my invention, it will be understood that these are by way of illustration only, and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. A headgear for supporting a safety protective element, said headgear including a headband comprising a strip of flexible material bent into substantially oval shape with overlapping end portions, girth adjusting means rearwardly of said headband, comprising a thin flattened tubular element of flexible material closely surrounding said overlapping end portions and secured to one of them and conforming to the curvature of said end portions in the longitudinal direction of said oval shaped strip, a pair of pedestal type bearings supported on a thin base element secured to the outer surface of said tubular element, a worm wheel mounted on a shaft, said shaft being journaled in said bearings and extending longitudinally in spaced, substantially parallel relationship with said tubular element, and the threads of the worm wheel being exposed so that they may be grasped by the fingers of the wearer and easily turned, the other of said end portions having cut out thereof a plurality of slots arranged in spaced parallel relationship at a small angle with respect to the transverse axis of said end portions and engaging said threads so as to provide substantially tangential driving relationship between the threads of said worm wheel and said slots, whereby rotation of said worm wheel in one direction will increase the girth, and in an opposite direction, will decrease the girth of said headband.

2. In combination with a face protecting element, a headgear including a headband comprising a strip of flexible material bent into substantially oval shape with overlapping end portions, girth adjusting means rearwardly of said headband, comprising a thin flattened tubular element of flexible material closely surrounding said overlapping end portions and secured to one of them and conforming to the curvature of said end portions in the longitudinal direction of said oval shaped strip, a pair of pedestal type bearings supported on a thin flexible base element secured to the outer surface of said tubular ele-

ment, a worm wheel mounted on a shaft, said shaft being journaled in said bearings and extending longitudinally in spaced, substantially parallel relationship with said tubular element, and the threads of the worm wheel being exposed so that they may be grasped by the fingers of the wearer and easily turned, the other of said end portions having cut out thereof a plurality of slots arranged in spaced parallel relationship at a small angle with respect to the transverse axis of said end portions and engaging said threads so as to provide substantially tangential driving relationship between the threads of said worm wheel and said slots, whereby rotation of said worm wheel in one direction will increase the girth, and in an opposite direction, will decrease the girth of said headband, said base element being a strip of metal having

an opening centrally thereof through which said worm wheel projects, the teeth of said worm wheel being serrated in the longitudinal direction of said shaft to provide frictional resistance so as to facilitate manual turning movement of the worm wheel.

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