

July 13, 1965

F. P. HALUSKA

3,193,841

EAR MUFF MOUNTING STRUCTURE FOR HEADGEAR

Filed Feb. 3, 1964

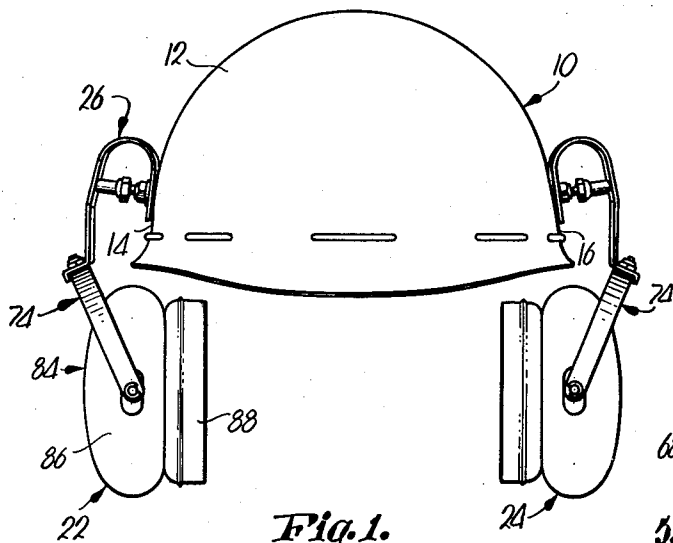


Fig. 1.

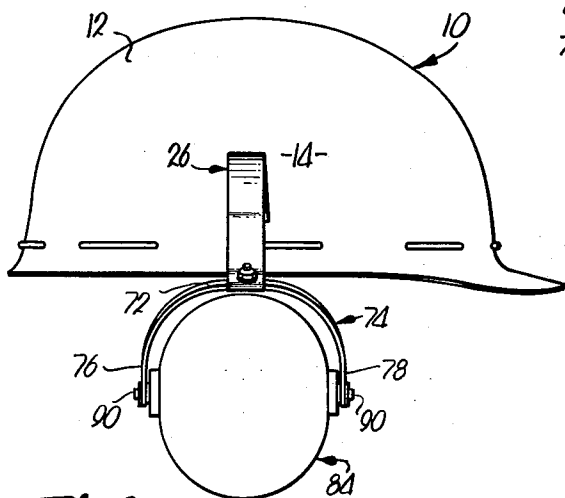


Fig. 2.

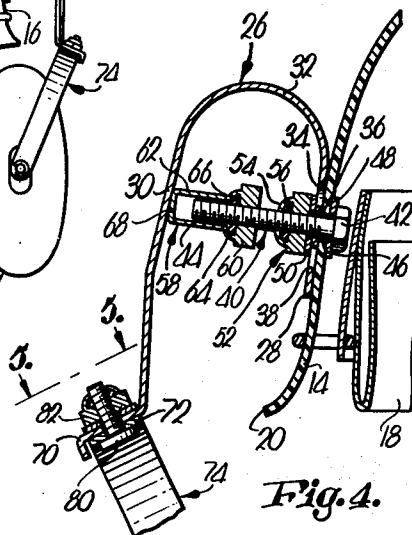


Fig. 3.

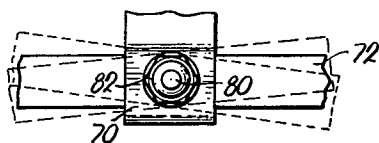
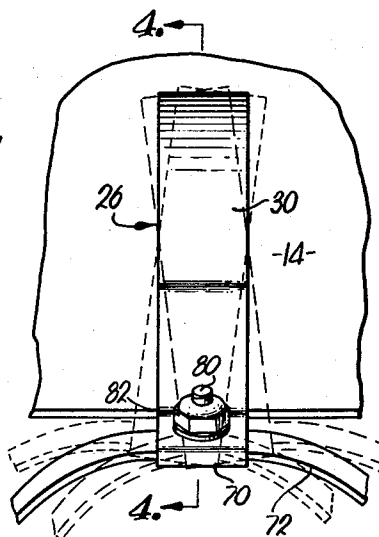


Fig. 4.



INVENTOR.
Frank P. Haluska

BY

Nevef Schmidt, Johnson & Nevef
ATTORNEYS.

1

3,193,841

EAR MUFF MOUNTING STRUCTURE FOR HEADGEAR

Frank P. Haluska, 1857 W. Sprague Road,
Broadview Heights, Ohio

Filed Feb. 3, 1964, Ser. No. 342,181

6 Claims. (Cl. 2—3)

This invention relates generally to the field of safety equipment, and particularly to improved structure for mounting protective ear muffs on opposed side wall segments of a head protecting device such as a hard hat, cap or other type of headgear.

Many types of industrial jobs require that the workers wear protective structure for their heads in the nature of a cap or hard hat, but only in very recent years have safety measures taken the form of protecting worker's ears from hazards such as excessively loud noises, sounds of an ear damaging frequency, heat, "sea-shell" noises, and noise conditions which are oppressive from a physiological or psychological standpoint. Problems are encountered however, in mounting ear protecting units on supporting headgear. For example, in regard to safety hard hats, the outer protective shell of the hat is normally located in spaced relationship from the wearer's head making it difficult to mount ear protecting structure thereon in disposition to effectively cover the person's ears. Also, it is extremely desirable that the ear muffs be mounted on the headgear in a manner so that the same may be easily moved out of ear protecting relationship if the person so desires while at the same time permitting the wearer to selectively adjust the pressure of the muffs against his head. Furthermore, the ear mounting structure should not in any way interfere with the normal protective function of the headgear, or decrease the integrity of the outer shell of a hard hat. Finally, it has heretofore been found difficult to assure that the wearer does not develop dermatitis or other conditions from wearing the ear protecting structure over long periods and which is attributable to excessive pressure of the ear muffs against the wearer's head, or inability to readily adjust the pressure as required.

Among the problems referred to above, one of the most difficult to solve was found to be the requirement of efficient, simple and inexpensive means for permitting the wearer of the headgear to selectively adjust the pressure of the ear muffs against his head and which necessarily varies from individual to individual.

It is therefore the primary object of the invention to provide novel structure for mounting ear muffs on headgear of various types which overcomes the problems mentioned above, and which includes improved components for selectively varying the force under which the ear muffs are biased toward the wearer's head when the muffs are located in normal ear protecting disposition.

It is another very important object of the invention to provide structure for mounting protective ear muffs on headgear wherein the mounting structure for each muff includes a generally U-shaped member of resilient material, adapted to be secured on respective side wall segments of the headgear above the wearer's ears, and including novel extensible means between opposed legs of each of the mounting structures for permitting selective variation of the force under which the outer muff carrying leg of the U-shaped member is biased toward the wearer's head. In this respect, another significant object of the invention is to provide ear muff mounting structure as described, wherein the extensible adjustment means between the resilient legs of the mounting structure for each muff includes an elongated, externally threaded bolt

2

extending through the leg adjacent a corresponding side wall segment of the headgear and toward the outer leg of the support member, and with an adjustable nut being provided over the corresponding bolt and abutting the inner face of the outer leg section so that the wearer of the headgear may selectively adjust the pressure under which a corresponding ear muff is forced toward his head, by the simple expedient of rotating a respective adjustment nut. A further important object is to provide mounting structure for ear muffs carried by suitable headgear, wherein the utilization of extensible means which is carried by the inner leg section of the U-shaped mounting member for each of the ear muffs, and which simply abuts the inner face of the outer leg of the muff carrying structure, presents a much stronger assembly which may be conveniently and easily adjusted as required, and wherein there is no tendency for the muff carrying leg of the support structure to bend or break at the point of engagement of the extensible adjustment means therewith.

A still further important object of the invention is to provide structure for mounting ear muffs on headgear which is especially adapted for mounting of commercially available ear muffs thereon without modification of the muffs being required in any way, and therefore minimizing the cost of the ear protecting assembly. Another important aim of the invention in this connection is to provide mounting structure for ear muffs carried by headgear, which is constructed in a manner to permit mounting thereof on presently existing hats so that persons already in the possession of safety headgear or the like may modify the same to provide ear protection, thereby resulting in a considerable saving and making conversion of the hats attractive from an economic standpoint for maximum safety and comfort under all conditions which the worker may encounter in his job.

Other important objects and details of construction of the present ear muff mounting structure will be explained in greater detail or become obvious as the following specification progresses.

In the drawings:

FIGURE 1 is a front elevational view of a safety hard hat of the cap style and having ear protecting muffs mounted thereon employing the improved mounting structure of the present invention;

FIG. 2 is a side elevational view of the hard hat and ear muff structure as shown in FIG. 1;

FIG. 3 is an enlarged, fragmentary, side elevational view illustrating the mounting structure for securing each of the ear muffs to a corresponding side wall segment of the safety hat, and with the pivoting action of the ear muff mount, as well as the main support member therefor, being illustrated by dash lines of differing lengths;

FIG. 4 is a fragmentary, vertical cross-sectional view taken substantially on the line 4—4 of FIG. 3 and looking in the direction of the arrows; and

FIG. 5 is a fragmentary, end elevational view of the portion of the ear muff mounting structure serving to mount an individual muff on a main support member therefor, and viewing the components along a line indicated generally by the numerals 5—5 in FIG. 4 and looking downwardly in the direction of the arrows.

A safety hat assembly constructed in accordance with one of the preferred concepts of the present invention is broadly denominated 10 in the drawings and includes a hard hat 12 having opposed side wall segments 14 and 16 which are located adjacent and above a person's ears when wearing hat 12. Although a hard hat of the cap style has been shown in the drawings for purposes of

illustrating the type of hat upon which the present ear muff construction of this invention is especially adapted to be mounted, it is to be understood that the ear muffs may in fact, be mounted on various types of caps and head gear.

The flexible liner 18 within the protective cover defining hat 12 shown for illustrative purposes only, normally maintains the cover in spaced relationship from the person's head. In this way, the peripheral margin 20 of hat 12 is maintained a slight distance above the person's ears while wearing hat 12.

A pair of ear muff attachments 22 and 24 are mounted on hat 12 at opposed sides thereof, with attachment 22 being pivotally secured to side wall segment 14 while attachment 24 is pivotally carried by side wall segment 16 of hat 12. Since the ear muff attachments 22 and 24 are of identical construction, only one of the same is described in detail, with it being understood that the same numbers are used for identical parts of the attachments. Thus, referring to ear muff attachment 22, it is to be seen that the same includes a generally U-shaped support member 26 constructed of an elongated strip of resilient material rebent upon itself intermediate the ends thereof to present a first leg section 28 and a second leg section 30 which are interconnected by an intermediate, longitudinally arcuate bight section 32 which is normally bent, during construction of member 26, to cause leg section 30 to be biased toward leg section 28.

The elongated leg section 28 is provided with three openings 34, 36 and 38 therein arranged in alignment longitudinally of the leg section and adapted to receive an elongated securing element 40 in the nature of a bolt having a head 42 within the interior of hat 12, and an externally threaded segment 44 extending through an opening 46 in side wall 14 of hat 12, as well as through the opening 36 in leg section 28. As will be explained hereinafter, the bolt 40 may be positioned in any of the openings 34, 36 or 38 depending upon the dimensions of the head of a particular wearer of hat 12. Washer 48 is located between head 42 of bolt 40 and the inner surface of hat 12, while a similar washer 50 is located over segment 44 of bolt 40 in contact with the outer face of leg section 28. A self-locking, aircraft type nut 52 is threaded over segment 44 of bolt 40 and in engagement with washer 50. It is to be understood that the nut 52 has a dome-shaped hollow head 54 which mounts a threaded, synthetic resin or the like, inner fitting 56 which tightly engages the threads of segment 44 of bolt 40 and makes the nut 52 resistant to rotation on the bolt. In the fabrication of attachment 22, the nut 52 is threaded against washer 50 with only sufficient force to retain member 26 in a normal fixed position on hat 12, but not with sufficient pressure to preclude rotation of member 26 about the axis of bolt 40 as will be explained.

A hollow cap nut 58 threaded over the outer extremity of segment 44 of bolt 40 (which it is to be noted normally spaced from the opposed inner surface of leg section 30) also has a main body 60 threaded over the bolt, as well as a tubular outer housing portion 62 which overlies the outer extremity of segment 44 of bolt 40. The dome-shaped head section 64 of cap nut 58 between housing portion 62 and body 60, receives a synthetic resin, inner fitting 66 similar to fitting 56, and thereby causing the cap nut 58 to be resistant to rotation on bolt 40. As best shown in FIG. 4, the outer end wall 68 of the housing portion 62 of cap nut 58, abuts the inner surface of leg section 30 and the latter is of imperforate construction throughout the entire length thereof engaged by cap nut 58.

The outer extremity 70 of leg section 30 remote from bight section 32, is bent into generally L-shaped configuration as best shown in FIG. 4, to present a flat surface for receiving the bight portion 72 of a U-shaped muff mounting strap 74 having opposed, generally parallel legs 76 and 78. Means for rotatably mounting strap 74 on ex-

trinity 70 of leg section 30 comprises a bolt 80 extending through extremity 70 as well as bight portion 72 of strap 74, and provided with a self-locking nut 82 on the outer threaded extremity thereof. Nut 82 is of the same type as nut 52. Again, it is to be pointed out that the nut 82 is threaded on bolt 80 only to the extent of preventing very free rotation of strap 74 about the axis of the bolt, but not interfering with pivoting motion thereof, as is best shown in FIG. 3. In any event, the downturned outermost end of extremity 70 precludes free rotation of strap 74 about bolt 80.

The ear muff 84 may be of conventional construction and includes a hollow housing 86 adapted to receive sound absorbing material, and provided with a head engaging, ear encircling, resilient pad element 88 on the normally innermost face thereof. Pivot pins 90 projecting outwardly in opposite directions from opposed sides of housing 86 are adapted to be received within corresponding openings therefor in legs 76 and 78 of strap 74, thereby permitting the muff 84 to rotate about a generally horizontal axis when hat 12 is on the wearer's head, as is evident from FIGS. 1 and 2.

In the use of hat assembly 10, the attachments 22 and 24 are normally located in the disposition thereof illustrated in FIGS. 1 and 2, whereby the hat 12 may be simply fitted over the person's head as he holds ear muffs 84 outwardly away from the side of his head sufficiently to cause pad elements 88 to clear the wearer's ears. As the ear muffs 84 are held outwardly, the sections 30 of support members 26 flex against the bias of bight sections 32 and thereby causing the inner faces of leg sections 30 to move out of engagement with cap nuts 58. Thus, upon release of the ear muffs 84 from the person's hands, the bight sections 32 in cooperation with the leg sections 30 of each of the support members 26, bias the pad elements 88 of ear muffs 84 into tight engagement with the wearer's head and in encircling relationship to his ears.

It is to be noted at this juncture that the force under which the ear muffs 84 are biased into engagement with the wearer's head, depends upon the location of respective cap nuts 58 on bolts 40. Since the extensible units presented by bolts 40 and the cap nuts 58 thereon determine the location of leg sections 30 with respect to leg sections 28, the spacing between ear muffs 84 is dependent upon and is governed by the relative locations of cap nuts 58 with respect to outer leg sections 30 of support members 26. The straps 74 carrying ear muffs 84 thereon flex very little longitudinally of legs 76 and 78, because the greatest width of the straps is located in generally parallel relationship to the line of force on which each of the ear muffs 84 is biased toward the wearer's head, and therefore the principal bias applied to each of the ear muffs is attributable to the support members 26 and especially the bight sections 32 thereof. This causes the ear muffs 84 to be forced into the necessary tight engagement with the wearer's head to assure firm adherence of pad elements 88 to the portion of the wearer's head in surrounding relationship to his ears.

If the ear muffs 84 do not engage the person's head with sufficient pressure, or are too tight against his head, the pressure may be readily adjusted by rotation of cap nuts 58 in a proper direction on corresponding bolts 40, to either shift the respective leg sections 30 outwardly relative to adjacent leg sections 28, or to permit the leg sections 30 to move inwardly under the bias of bight sections 32. Although this adjustment may be made easily with a suitable open-end wrench or the like, the construction of cap nuts 58 is such as to normally preclude rotation thereof on segments 44 of bolts 40 during normal use of hat assembly 10. Thus, the adjustment cannot be made with a person's fingers but can easily be accomplished with a tool.

When the wearer of hat 12 desires to use the same without disposition of the ear muff attachments 22 and

24 in overlying relationship to his ears, this may be done by simple rotation of support members 26 about the axes of corresponding bolts 40. Normally, one of the ear muff attachments will be rotated so that the ear muff 84 thereon faces forwardly, while the other ear muff attachment is rotated in a direction to position the ear muff 84 thereon facing rearwardly. This balances the hat assembly 10 and precludes unequal distribution of weight on hat 12. It is believed obvious however, that many rest positions of ear muffs 84 on hat 12 are within the selection of the wearer according to his comfort needs.

The pivotal mounting of mounting straps 74 on members 26 also permits the pad elements 88 of ear muffs 84 to conform very closely to the wearer's head and notwithstanding slight variations in the head sizes of the persons wearing the hat assemblies 10.

The relative position of ear muffs 84 with respect to the margin 20 of hat 12 may also be readily varied by altering the position of bolts 40 in the openings through inner leg section 28 of each of the support members 26. This adjustment may be readily accomplished by simple removal of cap nuts 58 and the fastening nuts 52 on corresponding bolts 40.

The way in which the cap nuts 58 abut the inner surfaces of corresponding leg sections 30, rather than passing through suitable openings therefor in the outer leg of support members 26, is extremely important to the proper operation and longevity of attachments 22 and 24, since there is no tendency for leg sections 30 to be deformed or break at the point of engagement thereof by the extensible units defined by bolts 40 and cap nuts 58. Furthermore, the adjustment of tension of ear muffs 84 against the wearer's head may be easily and readily effected by simple rotation of cap nuts 58.

It is also now apparent that ear muff attachments 22 and 24 may be mounted on headgear such as hat 12 at the time of original production thereof, or they may be secured to headgear already out in the field which require modification for sound damping or hearing conservation purposes. Presently existing hats or other headgear undergoing modification require only a single hole 46 in hat 12 for each of the attachments 22 and 24 and which are preferably drilled about $1\frac{1}{16}$ inches above the rim of the hat and plus or minus 6 inches forward of the back center line of hat 12. It is to be recognized however, that the positioning of holes 46 will obviously vary with the fit of the hat or headgear and the position of the wearer's ears in regard to the back center line of the hat 12 and margin 20 thereof. These holes will also vary to a certain extent depending upon the external configuration of the headgear.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. Structure for mounting an ear muff on headgear comprising:

a generally U-shaped support member of resilient material and having a first leg section adapted to be secured to said headgear, a second leg section spaced outwardly from said first leg section and thereby adapted to be spaced from the headgear, and a bight section interconnecting adjacent extremities of said first and second leg sections and biasing the second leg section inwardly toward said first leg section, said second leg section being adapted to carry an ear muff thereon in a location to engage the head of a wearer of the headgear in overlying relationship to one of his ears; and

selectively extensible means carried by one leg section of the member and engaging the other leg section for varying the spacing therebetween against the bias of said bight section to permit variation of the pressure of the ear muff against said wearer's head.

2. Structure as set forth in claim 1 wherein said extensible means includes an elongated element extending

from said first leg section toward the second leg section, and a component shiftably mounted on said element for movement longitudinally thereof and engaging said second leg section for maintaining the latter spaced outwardly from said first leg section any selected distance within limits against the bias of said bight section.

3. Structure as set forth in claim 2 wherein is provided connector means on said element for securing said first leg section of the member to said headgear, said first leg section being provided with a series of spaced openings therein arranged longitudinally of the first leg section for selectively receiving said element whereby the position of said member on said headgear may be varied by the wearer.

4. A headgear assembly comprising:

headgear having opposed side wall segments each terminating adjacent respective ears of a person wearing the headgear;

a protective muff for each of the wearer's ears;

support structure for each muff including a first section secured to a corresponding side wall segment of the headgear, a second section spaced outwardly from each first section and thereby spaced from an adjacent side wall segment of the headgear, means mounting a corresponding muff on each second section in disposition to overlie a respective ear of the wearer of the headgear, connector means joining the first and second sections of each support structure and biasing the second sections inwardly toward adjacent first sections, and selectively operable means interposed between respective adjacent first and second sections for varying the bias of corresponding second sections toward adjacent first sections to permit change of the pressure of the ear muffs against the wearer's head; and

means pivotally mounting corresponding first sections of the support structures on respective side wall segments of the headgear to permit swinging of the muffs to positions clearing the wearer's ears when the headgear is in the normal position thereof on the person's head.

5. An assembly as set forth in claim 4 wherein said means pivotally mounting the support structures includes bolt means extending through the side wall segments of the headgear, said first sections of the support means each being provided with a series of openings therein for individually receiving corresponding bolt means whereby the location of the ear muffs relative to the person's ears may be varied by shifting the bolt means to a different opening therefor in a corresponding first section of the support structures.

6. A headgear assembly comprising:

headgear having opposed side wall segments each terminating adjacent respective ears of a person wearing the headgear;

support structure for each muff including an elongated band of resilient material bent upon itself to present a U-shaped support comprised of a first section extending upwardly from a corresponding side wall segment, a bight section integral with the first section disposed above the latter and extending outwardly from said first section, and a second section integral with the bight section and depending therefrom, the bight section biasing the second section toward the first section;

an externally threaded bolt for each structure, each bolt extending through the corresponding side wall segment of the headgear, said bolts pivotally mounting respective first sections of the support structures to corresponding side wall segments and extending outwardly therefrom toward the respective second sections;

means mounting a muff on each of said second sections; and

an elongated, internally threaded nut for each bolt re-

7

spectively, said nuts being threadably engaged on corresponding bolts and extending into engagement with corresponding second sections for holding the muffs in preselected relationship with respect to the wearer's ears, the second sections being free from said nuts for manually shifting movement outwardly from the nuts against the bias of the bight sections to permit removal of the muffs from the wearer's ears and pivoting of the support structures on their respective bolts.

5

8

References Cited by the Examiner

UNITED STATES PATENTS

1,225,422	5/17	Feher.	
1,546,566	7/25	Childress	179—156
1,546,567	7/25	Childress	179—156
1,552,593	9/25	Childress	179—156
2,858,544	11/58	Roth	179—156

10 JORDAN FRANKLIN, *Primary Examiner*.