Jan. 7, 1969 C. ZAHN 3,419,907

PIVOTABLE STRUCTURE

Filed Nov. 2, 1966

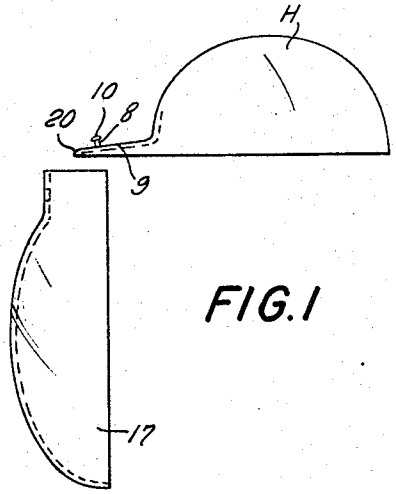
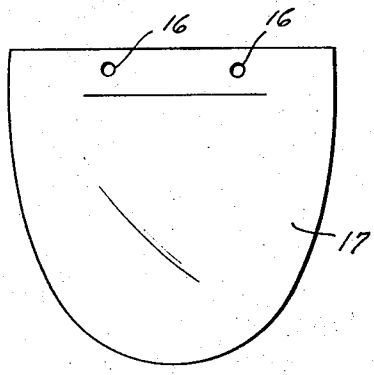


FIG. 1

FIG. 2



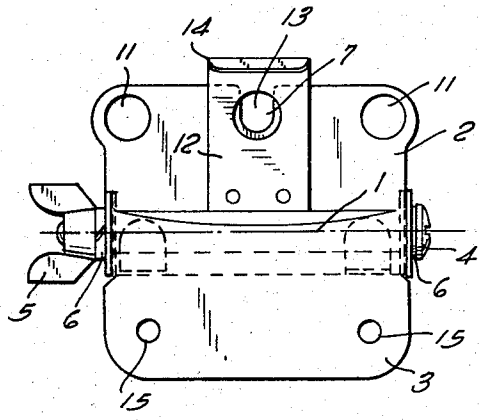


FIG. 3

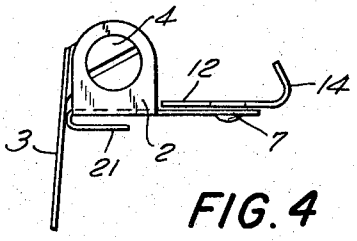


FIG. 4

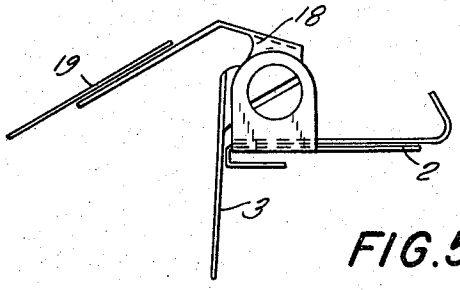


FIG. 5

INVENTOR
Christian Zahn
BY
Michael S. Striker
ATTORNEY

United States Patent Office 3,419,907 Patented Jan. 7, 1969

3,419,907

PIVOTABLE STRUCTURE

Christian Zahn, Braunschweig, Germany, assignor to Schuberth-Werk K.G., Braunschweig, Germany

Filed Nov. 2, 1966, Ser. No. 591,620
U.S. Cl. 2—10 10 Claims
Int. Cl. A61f 9/04

ABSTRACT OF THE DISCLOSURE

A safety helmet comprises a helmet member and a face shield. A hinge includes two pivotably connected hinge portions. One of the hinge portions is permanently connected to the face shield. The other of the hinge portions is provided with a cutout and the helmet member is provided with a projection having a narrow neck and a wider head, the latter being receivable in the cutout. A spring member provided on the other hinge portion engages the head of the projection and prevents the unintentional withdrawal of the head from the cutout so that the hinge, and thereby the face shield, are connected to the helmet member.

The present invention relates to a pivotable structure. More specifically, it relates to a hinge arrangement for securing two members to one another for relative pivotable movement and for simple connection and disconnection. Still more specifically, the present invention relates to a hinge arrangement for securing a face shield to a helmet or the like.

Safety helmets, such as are worn for instance by machine operators engaged in the welding of materials or in grinding or sandblasting operations, are provided with face shields to protect the eyes and the skin of the operator. Such shields may consist of a mesh-type material, they may consist of clear or tinted transparent plastic, or they may consist of various other materials whose composition is of no importance in the present context. The problem with all such helmets heretofore has been that the protective face shield either has not been removable from the helmet, thus necessitating that the shield simply be tilted upwardly away from the face of the wearer but in this position undesirably influencing the balance of the helmet, or else that the shield could be removed from the helmet only in a very difficult manner. In the former case, obviously, a rather unnecessary expenditure of funds was required since a separate helmet with attached shield had to be provided for each operation instead of it being possible to exchange various shields on a single helmet depending on the type of operation to be carried out. In the other case, where this is in theory possible, the difficulty of detaching the shield has in actual practice always militated against any such attempt at exchanging the shield.

In view of what has been said just above, it is a general object of the present invention to provide a hinge structure which secures two members to one another for relative pivotable movement, but permits quick detachment of one member from the other.

A more specific object of the invention is to provide such a structure which permits detachment of the two members from one another in a single, simple and foolproof operation.

An additional object of the invention is to provide such a structure which is also capable of carrying at least one additional member which is also to be pivotably movable relative to the other members.

In accordance with the invention and with the objects set forth above as well as with others which will become apparent hereafter, I provide an arrangement of the

type outlined above which comprises a helmet member and a shield member for shielding the face of a person wearing the helmet member. My arrangement further comprises hinge means including two hinge portions which engage one another and which are movable with reference to one another. There is also provided means connecting one of the hinge portions to one of the members, and quick-release means which releasably connect the other of the hinge portions to the other of the members.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a schematic orientation view;

FIG. 2 is a front view of one of the members shown in FIG. 1;

FIG. 3 is a somewhat schematic top plan view of a hinge arrangement in accordance with the invention;

FIG. 4 is a side-elevation of FIG. 3; and

FIG. 5 is a view similar to FIG. 4, but showing a further embodiment.

Discussing now the drawing in detail, and firstly FIG. 1 thereof, it will be seen that the helmet is generally designated with the symbol H. A face shield is designated with reference numeral **17** and the illustration in FIG. 1 shows how the face shield is to be secured to the helmet H. It is to be noted that FIG. 1 shows the helmet H and the face shield **17** in their proper relative position without, however, showing the structure which secures them to one another.

For greater clarity FIG. 2 shows a front-view of the face shield **17** illustrating the latter as it would appear when seen from the left in FIG. 1.

Coming now to FIG. 3 the hinge structure which secures the shield **17** to the helmet H is there illustrated in one possible embodiment. It will be seen that a pivot pin **1** is provided on which the hinge portions **2** and **3** are secured for pivotal movement relative to one another. FIG. 3 and FIG. 4 show that the hinge portions **2**, **3** each consist of a substantially flat section which is provided at two spaced points with lugs **2'**—and, in the case of hinge portion **3**, with lugs **3'**—which extend to one side of the substantially flat section. The lugs of one section are spaced from one another by a somewhat smaller distance than the lugs of the other; in the present case, the lugs **3'** are spaced from one another by a slightly smaller distance than the lugs **2'** so that the lugs **3'** will fit intermediate the lugs **2'**. All of the lugs **2'**, **3'** are provided with openings which, when the lugs **3'** are located intermediate the lugs **2'**, are aligned with one another and the pivot pin **1** extends through all such openings. Pivot pin **1** is provided with a head **4** which in the embodiment illustrated engages an outer surface of one of the lugs **2'**. As is particularly evident from FIG. 3 a spring ring **6** or a similar element is located intermediate the head **4** and the outer surface of the lug **2** against which the head **4** is adapted to bear. The other end of the pivot pin **1** is screw threaded and carries a nut, in the illustrated embodiment a wing nut **5**, and again it should be understood that a spring ring **6** is placed between the wing nut **5** and the respective lug **2'** associated with it. The provision of the wing nut **5** and of the spring rings **6** of course constitutes a so-called "brake," that is when the wing nut **5** is tightened it will compress the spring rings **6** so that the same bear more tightly against the respective lugs **2'** which in turn frictionally engage the respective lugs **3'** so that pivoting action of the hinge portions **2**, **3** relative to one

another can by this expedient be made as easy or as hard as is desired, and can actually be completely prevented if the wing nut **5** is sufficiently tightened.

One of the hinge portions, in the illustrated embodiment the hinge portion **2**, is provided at its outer free edge which extends substantially parallel to the pivot axis defined by the pivot pin **1**, with an inwardly extending slot or cutout **7**, as is particularly evident from FIGS. 3 and 5.

The visor **9** of the helmet H is provided with a projection, for instance a screw, comprising a neck portion **8** and a wider head **10** which is carried by the neck portion and spaced from the visor **9**. The cutout **7** in the hinge portion **2**, which cutout has the form of a slot open at one end thereof, has a width corresponding to or just slightly exceeding the thickness of the neck portion **8** of the projection so that the neck portion **8** can be received in the cutout **7**. A springy member or tongue **12** is secured to one of the major surfaces of the hinge portion **2** and it is preferred that this surface be the one which is located in upward direction when the structure is in use. The tongue **12** is provided with an opening **13** which is just slightly larger than the head **10** of the projection so that this head can be received in the opening **13**. This will also be evident from FIG. 3 since it is there shown that the opening **13** is also slightly larger than the width of the cutout **7**. A free end portion **14** projects outwardly beyond that edge of the hinge portion **2** in which the cutout **7** is provided and the end **14** of the tongue **12** serves as an engagement portion by which an operator can engage the tongue **12** to manipulate it.

It will now be obvious that simple pressure on the free end portion **14** of tongue **12** in upward direction—as seen in FIG. 4—is sufficient to free the head **10** from the opening **13** so that the head **10** and the neck **8** can be withdrawn from the cutout **7**, thus permitting removal of the helmet H from the hinge portion **2**. This is a quick-release operation which, of course, is reversible and permits equally quick connection of one of the members to the other.

As is evident from FIG. 3—in broken lines—and FIG. 4—in solid lines—that edge portion of the hinge portion **2** which is located opposite the edge portion provided with the cutout **7**, is configurated so as to define one or more hooks **21** into which the leading edge **20** of the helmet visor **9** is inserted when the neck portion **8** is inserted into the cutout **7**. This arrangement serves to further stabilize the connection beween helmet H and shield **17**.

In the embodiment illustrated in FIGS. 1–4 the hinge portion **2** is provided with two projections **11** on that side of the hinge portion which, in the assembled condition of the arrangement, will face the visor **9** of the helmet H. These portions frictionally engage the visor **9** so that a tension is thus established against the head **10**, tending to pull the same against the upper surface of hinge portion **2** and serving to make the connection more secure.

The hinge portion **3** is provided, in the embodiment shown in FIGS. 1–4, with two apertures **15** through which screws or other suitable fastening means **16** extend which in turn engage the shield **17** to thereby secure the same to the hinge portion **3**.

Coming, finally, to the embodiment shown in FIG. 5 there will be seen that this constitutes a modification of that illustrated in FIGS. 1–4. The hinge portions **2** and **3** as well as the tongue **12** are identical with the arrangement in FIGS. 1–4. However, an additional hinge portion **18** is provided which is secured to the hinge portions **2** and **3** in the same manner as these are secured to one another. In other words, it is provided with lugs through which the pivot pin **1** extends. Thus, the third hinge portion **18** is pivotable relative to the hinge portions **2** and **3** and its purpose is to accept an additional member, for instance an additional shield, which is designated with reference numeral **19** and which may be required for certain operations. For instance, in an application for which the operator needs a tinted face shield to protect his eyes against glare it may also be necessary to simultaneously provide another shield, for example of wire mesh, to guard against flying particles. The tinted face shield itself may not be adequate to protect the operator against such particles since for instance the material of the shield may not be entirely shatterproof. In such applications an additional shield can be fastened to the third hinge portion **18** and can be pivoted relative to the helmet H as well as to the face shield **17**. It will be obvious, of course, that the braking arrangement provided by the combination of the pivot pin **1** and the wing nut **5** will also serve to regulate the ease with which the additional hinge portion **18** and thereby an additional shield **19** can be pivoted, and to prevent such pivoting entirely if this should be desirable.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a hinge arrangement, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. An arrangement of the character described, comprising a helmet member; a shield member for shielding the face of a person wearing said helmet member; hinge means, including a pair of pivotably connected hinge portions one of which is secured to said shield member; and releasable connecting means provided on said helmet member and the other of said hinge portions, respectively, for connecting the former to the latter and thereby to said shield member, said connecting means comprising a projection provided on said helmet member, recess means provided in said other hinge portion and adapted to receive said projection therein, and disengageable blocking means provided on said other hinge portion and arranged for engaging said projection and blocking withdrawal thereof from said recess means unless disengaged therefrom.

2. An arrangement as defined in claim **1**, wherein said recess means is an elongated cutout provided in said other hinge portion.

3. An arrangement as defined in claim **1**, wherein said projection comprises a neck portion provided on said helmet member and having a free end, and a head provided on said free end and being wider than said neck portion, and wherein said cutout has a width greater than said neck portion but smaller than said head.

4. An arrangement as defined in claim **3**, wherein said blocking means is associated with said other hinge portion and comprises an element movable between an operative portion in which it engages said projection and prevents withdrawal thereof from said cutout, and a release position in which it releases said projection.

5. An arrangement as defined in claim **3**, wherein said blocking means comprises a strip of springy material overlying a part of said other hinge portion, including said recess means provided in the latter and movable between an operative position in which it engages said projection and prevents withdrawal thereof from said cutout, and a release position in which it releases said projection, said strip being provided with an opening slightly

larger than said head so that, when said neck portion is located in said recess and said strip is in said operative position, said head is located in said opening and said helmet member is fastened to said other hinge portion and thereby to said shield member.

6. An arrangement as defined in claim 5, wherein said other hinge portion has an edge, and wherein said strip has an end portion extending outwardly beyond said edge so as to be readily accessible to the hand of an operator.

7. An arrangement as defined in claim 1; and further comprising a visor provided on said helmet member, said projection being provided on said visor and including a neck portion connected therewith and a head portion carried by said neck portion; and engaging means provided on said other hinge portion and adapted to engage said visor for exerting tension on said head portion in a sense preventing withdrawal of said head portion from said recess means for thereby providing a secure connection between said other hinge portion and said helmet member, said engaging means being provided on said other hinge portion spaced from said recess means for engaging said visor of said helmet member at a location spaced from said projection.

8. An arrangement as defined in claim 7, wherein said recess means is provided in the region of one edge portion of said other hinge portion, and wherein said engaging means comprises a further edge portion of said other hinge portion spaced from said one edge portion,

said further edge portion constituting at least one hook element for engaging said visor of said helmet member.

9. An arrangement as defined in claim 1, wherein said hinge portions are turnable relative to one another about a pivot axis common to both; and further comprising a third hinge portion engaging said two hinge portions and turnable relative thereto about said pivot axis, said third hinge portion being adapted to have an additional shield member connected thereto.

10. An arrangement as defined in claim 1, wherein said hinge portions are secured to and turnable about a pivot member; and further comprising adjustable braking means for braking the turning movement of said hinge portions relative to one another.

References Cited

UNITED STATES PATENTS

1,228,341	5/1917	Maynard	2—10
1,693,505	11/1928	Fisher	2—10
1,890,865	12/1932	Scherz	2—14.21 X
2,619,641	12/1952	Vaca	2—10

FOREIGN PATENTS

1,418,411	10/1965	France.

HERBERT F. ROSS, *Primary Examiner.*

U.S. Cl. X.R.

2—8