

[54] KNEE GUARD

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[22] Filed: **March 24, 1971**

[21] Appl. No.: **127,706**

[52] U.S. Cl. 128/80 C, 2/24
[51] Int. Cl. A61f 3/00
[58] Field of Search 128/80, 165, 88, 87; 2/24

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Primary Examiner—Richard A. Gaudet

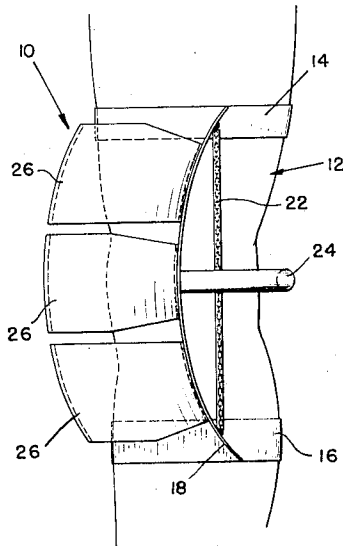
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[57] ABSTRACT

A protective knee guard includes first and second spaced members adapted to be secured to the tibial and femur portions of a knee joint. The members are interconnected by elongated relatively rigid members maintained in an arched condition by safety chains. A plurality of guard members extend forwardly of and interconnect the elongated members.

10 Claims, 4 Drawing Figures



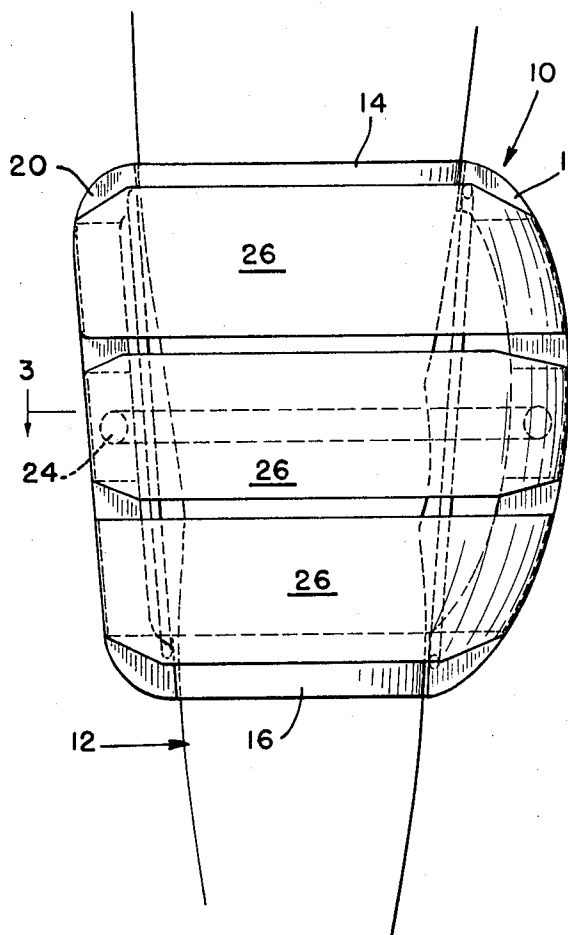


FIG. 1

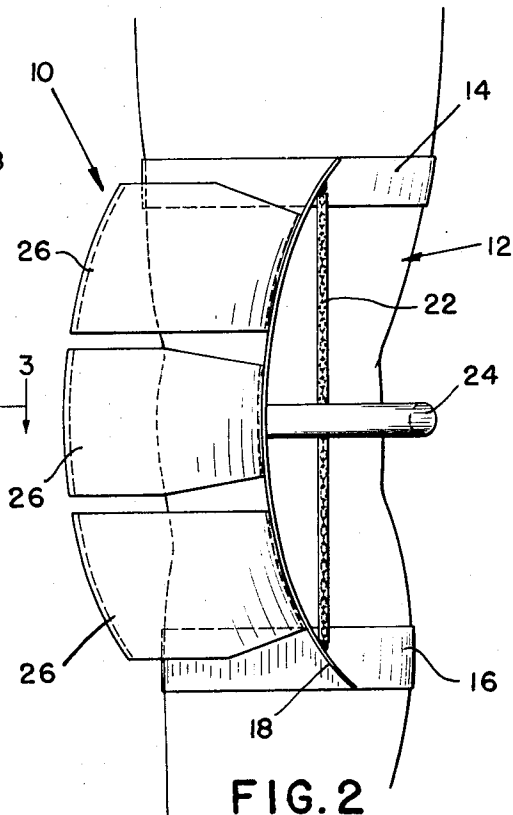


FIG. 2

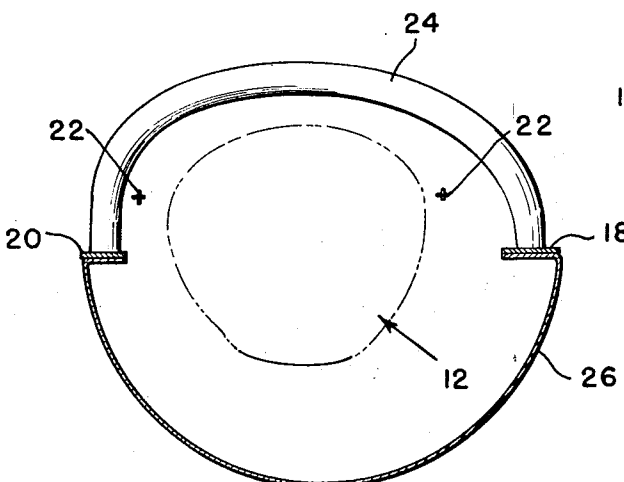


FIG. 3

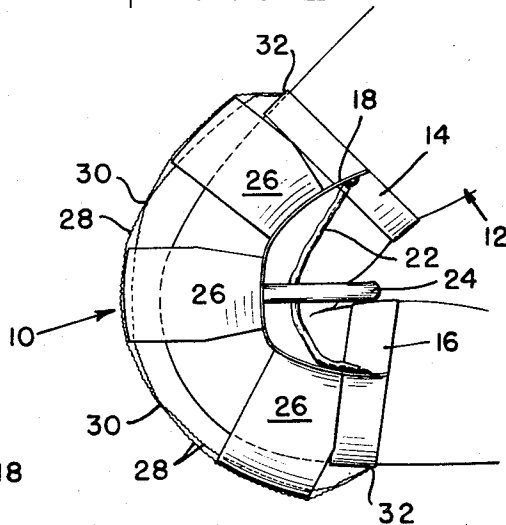


FIG. 4

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KNEE GUARD

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

The invention relates to a novel knee guard suitable for wear by a participant in sports events and the like.

In various sports such as football, hockey, etc., there has been a need for a practical and effective protective structure for various joints, particularly knee joints, where heavy body contact between participants is involved. It has been found that during such sports contests, the knee joint linking the femur and the tibial bones has been highly vulnerable to injury or damage. One form of common injury is over-extension of the knee joint caused by directly applied impact forces to either side of the knee joint.

Briefly, this invention is directed to a novel guarding structure adapted to protect a joint in contact sports, and includes a pair of spaced leg straps adapted to be positioned just above and below a joint. The straps are coupled to elongated spring steel members provided on each side of the joint and maintained in a bowed condition by flexible chain members. A series of guards, coupled to the spring steel members, extends forwardly of the joints for protection.

One of the primary objects of the invention is the provision of a knee guard for preventing injury to a knee.

Another object of the invention is the provision of a knee guard which is adapted to protect the joint in contact sports and which permits complete flexibility of the knee.

A further object of the invention is the provision of a knee guard for transmitting and distributing forces directed towards the knee to the upper and lower leg.

An important feature of the invention is a knee guard which is relatively simple in construction and reliable and highly effective for its intended purpose.

Other objects and advantages of the invention will be come apparent during the course of the following detailed description.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a front elevational view of the novel knee guard operatively positioned on a wearer's leg;

FIG. 2 is a side elevational view of the knee brace of FIG. 1;

FIG. 3 is a cross-sectional view taken along line 3—3 of FIG. 1; and

FIG. 4 is a side elevational view of the knee guard of FIG. 1 illustrating the wearer's knee and the knee guard in its flexed condition.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawing, FIG. 1 shows a knee guard 10, constructed in accordance with the principles of the present invention and applied to the knee 12 of a wearer in open condition. However, it is to be understood that the guard of the present invention may be applicable for guarding elbow joints, as well. Therefore, while the specific embodiment will be referred to as a knee guard and will be described in conjunction with the knee joint, it is to be understood that the device may be equally as effective for guarding other joints such as an elbow joint.

The knee guard 10 includes generally parallel, vertically spaced leg straps 14 and 16 which embrace and are made secure to the leg both above and below the knee joint. Each leg strap 14, 16 is provided with suitable separable connectors, not shown, for fastening the knee guard about a wearer's leg or its removal therefrom. The straps 14, 16 may be formed of various elastic, leather, or other suitable materials with the separable connections being adjustable so as not to unduly bind the wearer's leg and cause stoppage of circulation.

Suitably secured to and interconnecting the leg straps 14, 16 are a pair of elongated members 18 and 20, one member being located on each side of the knee joint. Preferably, the elongated members 18, 20 are formed of spring steel arranged so as to give support to the knee and yet not interfere with the movements of the wearer's leg and the knee joint. When the knee is flexed, the spring steel bends with the same motions as the knee. The spring steel members 18 and 20 are maintained in an arched or bowed condition, as shown by FIG. 2, which assist and augment the action of the knee joint when running or arising. The spring steel members 18, 20 are confined in an arched configuration by chains 22, 22. Each chain 22, which is shorter in length than the elongated members 18, 20, has the end portions suitably secured to the members 18 or 20 adjacent the end portions thereof and preferably adjacent the upper and lower leg straps 14 and 16 in such a manner as to prevent the elongated members 18 and 20 from going over center during movement of the leg. It is to be understood that flexible members, other than the chains, may be utilized for maintaining the members 18, 20 bowed. As can be observed from FIG. 1, the elongated spring steel member 20 positioned on the inside of the knee joint is relatively close to but spaced from the knee so as not to interfere with knee and leg movements while the spring steel member 18, on the outside of the knee, is bowed or arched so as to be spaced a substantial distance from the knee joint. The end portions of the members 18 and 20 contact the tibial and femur portions of the leg in the vicinity of leg straps 14 and 16. Thus the joint is protected against injury by sharp blows towards the knee joint since the arched steel members 18 and 20 transmit the forces away from the knee to the upper and lower leg. Therefore, the leg can absorb forces that would normally do extensive damage to the knee joint. The elongated spring steel members 18 and 20 are connected intermediate their longitudinal lengths by a back brace 24 which extends rearwardly of and is positioned at the back of the knee joint. The back brace is large enough so as not to interfere with the knee when it is completely flexed. The back brace, which is generally rounded in cross-sectional configuration, may be formed of various suitable materials and is conveniently secured at the ends to the members 18 and 20.

A series of elongated guard members 26, preferably made of metal although they may be made from other suitable materials, are located forwardly and partially to the sides of the knee joint having the ends thereof suitably secured to the arched spring members 18 and 20. The guard members are curved and spaced a substantial distance from the knee in a relaxed condition, as shown by FIGS. 2 and 3. The guard members 26 will

absorb a blow directed to the front of the knee and transmit the blow through spring members 18 and 20 to the femur and tibial portions of the knee joint. The guard members 26 and spring members 18, 20 are flexible enough to permit normal movements but rigid enough to prevent knee injuries.

FIG. 4 discloses a slightly modified embodiment of the knee guard wherein the curved outer guards 26 are covered at least partially by an elastic fabric 28. The fabric is sewed at 30 between the guards 26 and attached at the ends 32 to the upper and lower leg straps 14 and 16.

The curved guard members 26 and the bowed, elongated members 18, 20 may be provided with padded material on the inner and/or outer surfaces thereof.

I claim:

1. A protective structure for a joint of a body limb comprising first and second spaced band members adapted to be circumferentially secured to a limb in generally parallel relation at opposite ends of a body joint, a pair of elongated members secured to said first and second spaced band members, an elongated member being located at each side of a joint when the structure is positioned upon a limb of a wearer, each elongated member being of relatively rigid, integral construction and capable of being flexed to a bowed condition with and in response to movements of a body limb of a wearer, means secured adjacent opposed ends of each elongated member for confining said elongated members in an arched condition, and guard means secured to the bowed, elongated members and extending generally normal with respect to the elongated members and forwardly of a joint.

2. A protective structure for a joint as recited in claim 1, wherein said protective structure comprises a knee guard and said first and second spaced members

being circumferentially secured to the femur and the tibial portions of a knee joint, respectively.

3. A protective structure for a joint as recited in claim 2, said elongated members being sufficiently resilient to allow substantially unimpeded flexibility of the knee joint of a wearer.

4. A protective structure for a joint as recited in claim 3, said elongated members being formed of spring steel and extending generally longitudinally of a wearer's leg at the inner and outer sides of a knee joint.

5. A protective structure for a joint as recited in claim 4, wherein said means for confining said elongated members in an arched condition includes elongated flexible members.

6. A protective structure for a joint as recited in claim 5, said guard means comprising at least one curved guard member extending forwardly of a knee joint and having end portions secured to said bowed, elongated members.

7. A protective structure for a joint as recited in claim 6, and further including a back brace secured to said elongated members and positioned rearwardly of said guard member behind a knee joint.

8. A protective structure for a joint as recited in claim 7, wherein a plurality of such curved guard members are secured to said elongated members in spaced relation, said guard members being positioned intermediate said first and second spaced members.

9. A protective structure for a joint as recited in claim 8, and further including an elastic covering for encompassing at least a portion of said plurality of curved guards.

10. A protective structure for a joint as recited in claim 1, wherein said means for confining said elongated members in an arched condition includes elongated flexible members.

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