This invention relates to knee protectors, elbow guards and the like such as are used for example by miners.

Hitherto it has been customary to make these protectors, guards or the like of a single piece of crepe rubber, leather or equivalent, or several pieces of such material united rigidly together. With this single-piece or rigid construction, however, the protector, guard or the like does not embrace or accommodate itself closely to the parts of the leg or arm in every position. For example, when the wearer kneels, or bends his arm, a portion of the protector, guard or the like, and the part of the leg or arm adjacent thereto, move apart and dust, loose stones or the like enter the intervening space and may lodge between the protector, guard or the like and the leg or arm, producing discomfort or irritation.

The object of the present invention is to reduce or eliminate this disadvantage and provide a protector, guard or the like which will both allow freedom of movement and be proof against the entrance of dust, stones or the like as aforesaid.

According to the invention, we provide a knee protector, elbow guard or the like which is made in two or more portions connected together in such a manner that sliding, hinging and/or flexure of these portions relatively to each other is permitted, without either or any portion moving away from or out of contact with the part of the leg or arm adjacent thereto.

More specifically, the invention consists in a knee protector, elbow guard or the like which comprises a pair of crepe rubber or like members shaped where necessary to accommodate the knee or elbow, whereby each member can be strapped or otherwise secured closely to the parts of the leg or arm above and below the knee or elbow, and means whereby the members are pivotally or flexibly connected together so that whilst permitting necessary movement of the knee or elbow, the pivotal or flexing joint between them is closed, to the exclusion of dust, small stones and the like in all positions.

A combined knee pad and shin guard embodying the invention will now be described, by way of example, with reference to the accompanying drawing in which:

Fig. 1 is a view of the pad and guard in front elevation.

Fig. 2 is a corresponding view in side elevation, with the pad and guard shown detached from each other.

Fig. 3 is a side view in vertical half-section of the pad and guard, taken on the line 3—3 (Fig. 1).

Fig. 4 is a cross-sectional plan view taken on the line 4—4 (Fig. 1).

Fig. 5 is an enlarged sectional view showing the flexed position of the guard member.

Referring to the drawing:

The knee pad 1 is made out of a piece of sheet rubber which is of the concave shape illustrated so as to accommodate the knee cap. The shin guard 2 is formed at the top with a thickened concave cap 3, and has an arcuate bottom edge 4. The pad 1 and the cap 3 of the guard 2 are formed respectively with holes 5 and 6 (see Fig. 2) and are adapted to be assembled together with the holes 5, 6 at the respective sides in register with each other. A stud or rivet 7 is adapted to be passed through each pair of holes 5, 6, the pad 1 being then pivotally secured to the cap 3 so that these parts may hinge about each other.

The knee pad 1 is provided at the top with a rubber or other strap 8 at one side and with a buckle 9 at the other side. By this means, the pad 1 can be secured to the leg above the knee. The shin guard 2 is provided with rubber or other straps 10 at one side and buckles 11 at the other side, by which means the guard 2 can be secured to the leg below the knee.

With the combined pad and guard described, when the wearer bends his knee, as in walking, sitting or kneeling, the pad 1 and cap 3 hinge about each other, their adjacent surfaces always remaining in close contact, at least in part, e.g. at the lower edge of the knee pad. In this manner, the entry of dust, loose stones or the like between these parts, into the interior of the pad and guard, is prevented, whilst ensuring to the wearer freedom of movement. Entrance of dust or small stones between the knee pad 1 and the wearer's knee during kneeling or squatting is also prevented by reason of the strapping of the pad to the leg above the knee by the strap 3 and buckle 9 already referred to.

As will be seen from Fig. 3, the upper strap 10 of the shin guard 2 is vulcanised or otherwise secured to the interior of the guard a short distance below the termination of the thickened cap 3. The material of the guard lying within this area, i.e. between the cap 3 and upper strap 10, constitutes a relatively flexible zone, about which flexure of the cap 3 relatively to the main body of the guard 2 may take place.

Various modifications may be made in the knee pad and shin guard described without departing from the scope of the invention. For example, wire gauze or other reinforcement may be embedded in the rubber or other constituent mate-
rial. Moreover, the said material may be lined interiorly with fabric, or may have its outer surface hard in relation to its inner surface, which is soft so as to enhance the comfort of the user.

While the knee pad and shin guard illustrated have been shown to consist of two parts, a knee protector, elbow guard or the like made according to the invention may comprise more than two portions, e.g. three portions, viz. a central portion dished or shaped to accommodate the knee or elbow, and upper and lower portions hingely or flexibly connected to the centre portion.

While the straps may be secured to the knee pad and shin guard aforesaid in any suitable manner, there are advantages in securing the upper and lower straps of the shin guard in the manner following, viz. so that each of the straps is vulcanised or otherwise secured to the interior of the guard at points spaced apart on each side of the middle of the guard, the intervening portion of the strap being made of shorter span than the intervening portion of the shin guard. In this manner, when the strap is tightened about the leg, there remains a certain space between it and the guard, which obviates undue creasing and restriction of movement, of the guard. This is particularly advantageous in the case of the strap located just below the knee where undue buckling or deformation of the guard is otherwise apt to take place. In addition, the space between the leg and guard permits of a convenient degree of ventilation.

For the sake of conciseness the term "protector" is used in the appended claims to include knee protectors, elbow guards and the like.

We claim:
1. A protector, including upper and lower guard members shaped to accommodate a limb above and below the joint thereof, the lower member accommodating the joint and a portion of the limb below the joint, a fastening member to secure the lower member in place, the upper portion of the lower member being formed to provide a definite length of greater rigidity than the remaining length of such member, that portion of the lower member between the fastening member and the lower end of the portion of greater rigidity being of increased flexibility relative to such rigid portion, the upper member having a lower arcuate edge to bear upon the portion of greater rigidity of the lower member, and means for swingingly connecting the members to permit play of the members in joint movement of the limb, whereby in such limb movement the lower arcuate edge of the upper member exerts a pressure on the portion of greater rigidity of the lower member and flexes the lower member at the flexible area to permit relative movement of such section of greater rigidity to maintain substantial contact between the lower edge of the upper member and that portion of greater rigidity of the lower member during limb movement.

2. A construction as defined in claim 1, wherein there is provided a single limb-securmg means for the upper member, including a strap connected to the upper member immediately adjacent to and extended in line with the upper edge of the upper member and remote from the lower edge of the upper member, the upper member being otherwise free of connection with the limb.

3. A construction as defined in claim 1, wherein the upper and lower members are each provided on one longitudinal edge with a strap and adjacent the other longitudinal edge with a cooperating buckle, the buckles being connected to the members inwardly of the adjacent edge of the member to cause the material of the member to fully underlie the buckle in any position of the latter and act as a cushion to protect the limb from buckle contact and pressure.

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