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(54) Knee support

(57) A support for a person who suffers from knock knees (valgus displacement) or bandy legs (varus displacement) comprises a telescoping assembly 3 and a sling portion 2. The sling portion consists of a sling pad 8 from which extend three straps. The upper end of the assembly 3, and one of the straps 10, is joined to an upper pad 16; the lower end of the assembly 3 and a strap 12, join onto a lower pad 18.

The support is fixed about a knee by binding straps 20 and 22, with the assembly 3 on the side from which the knee has been displaced. The third strap is clipped onto the assembly 3, with the knee bent and the sling portion bound tightly around the knee. When the leg is straightened the knee is supported on its weak side by the sling pad 8.

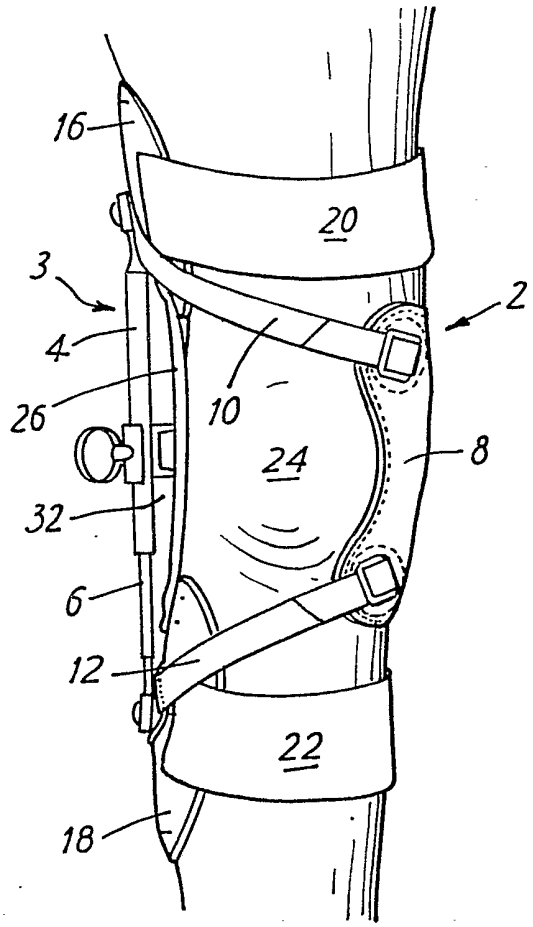


FIG. 2

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

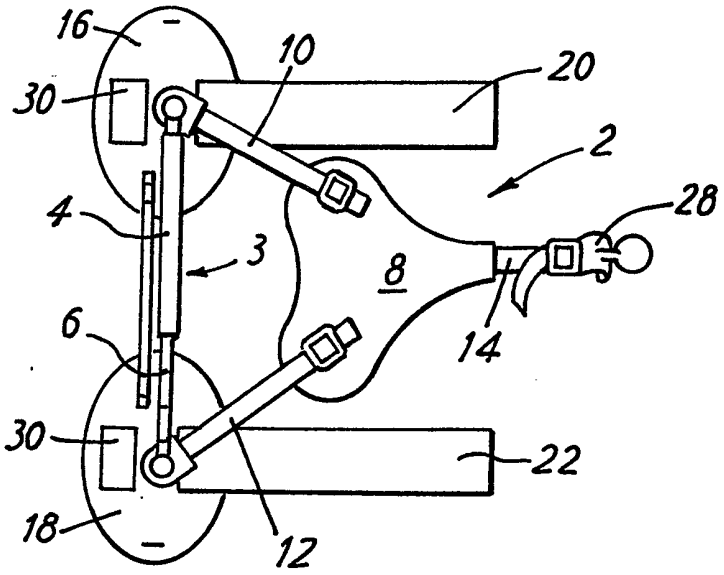


FIG. 1

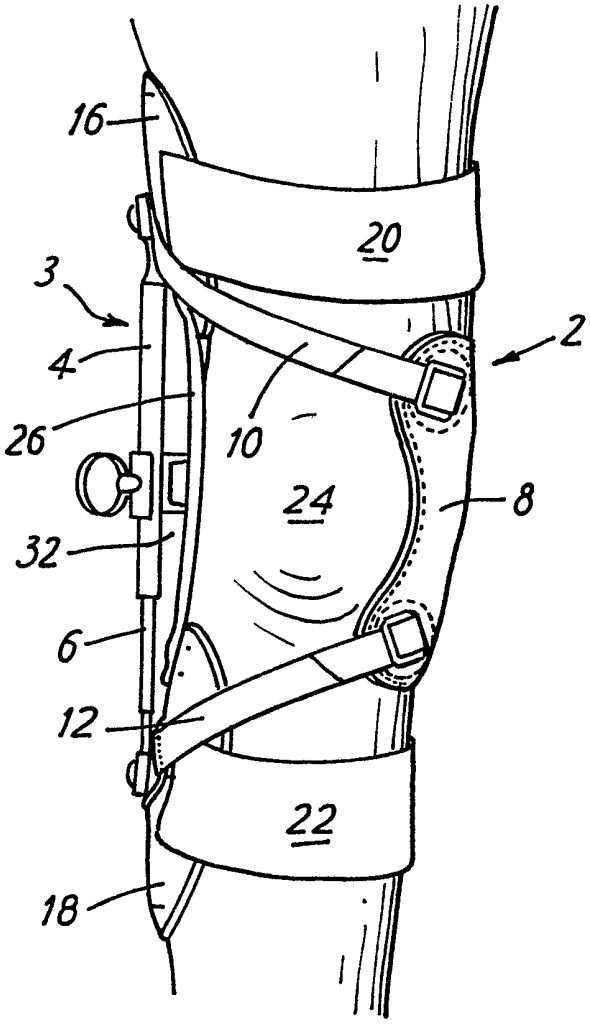


FIG. 2

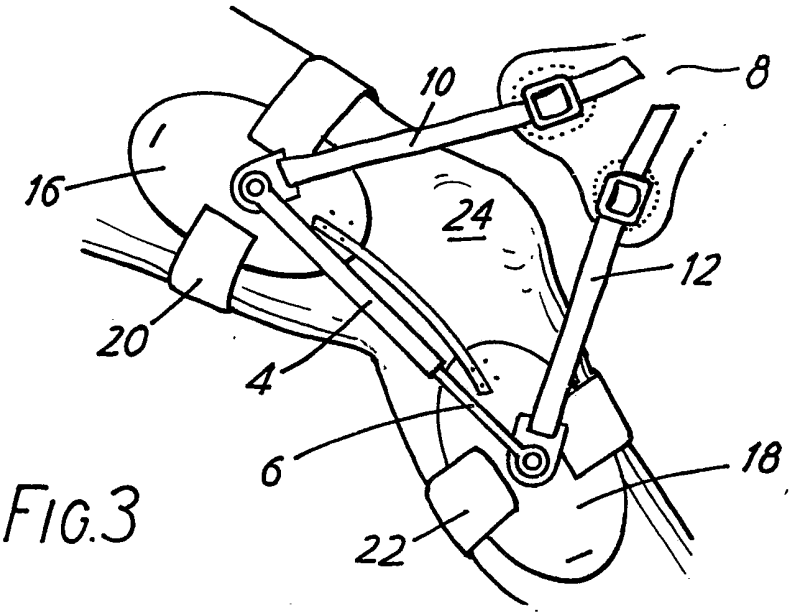


FIG.3

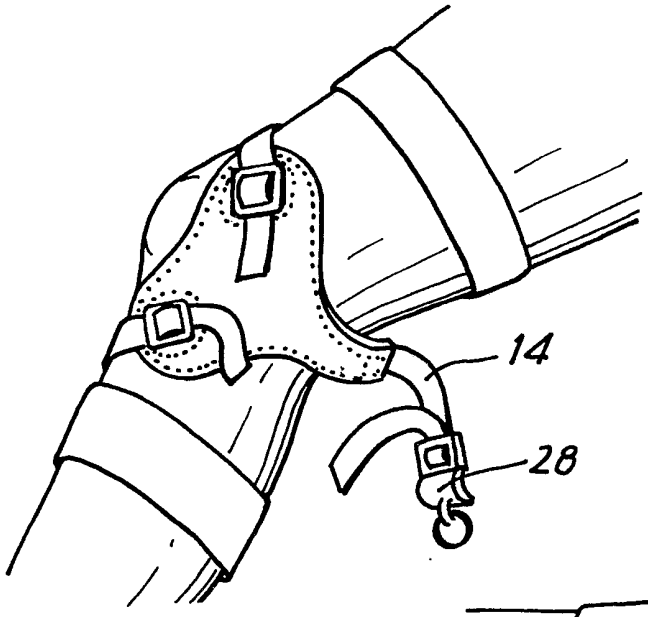


FIG.4

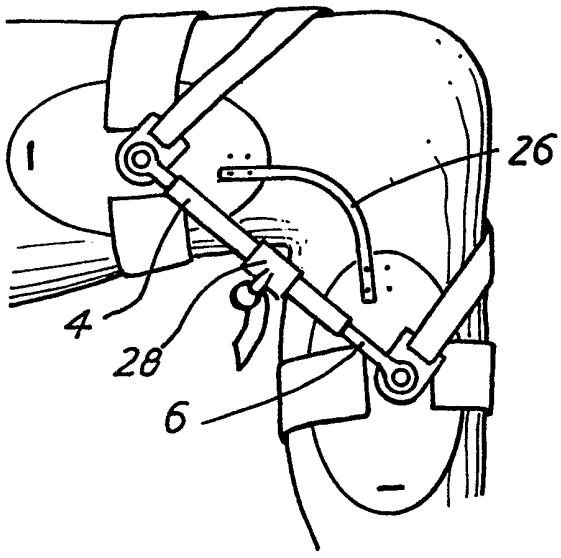


FIG.5

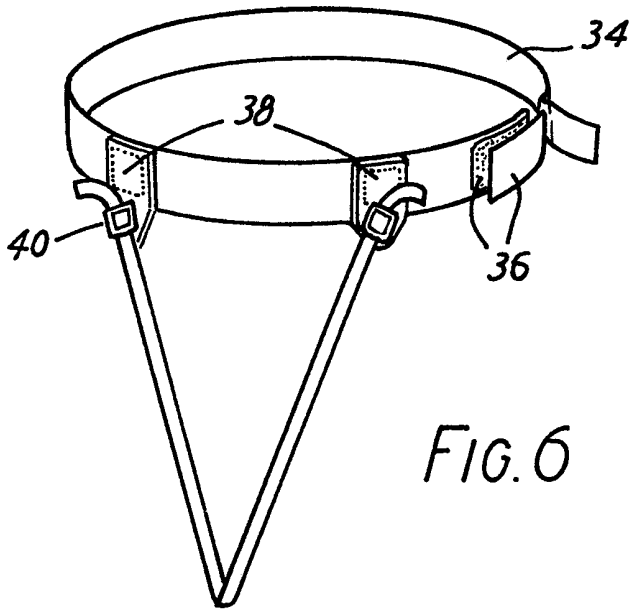


FIG. 6

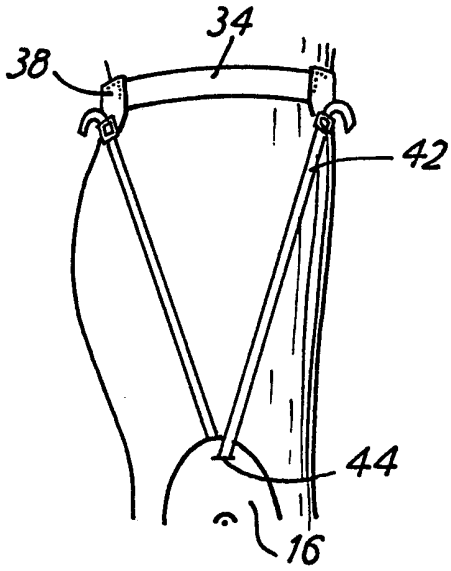


FIG. 7

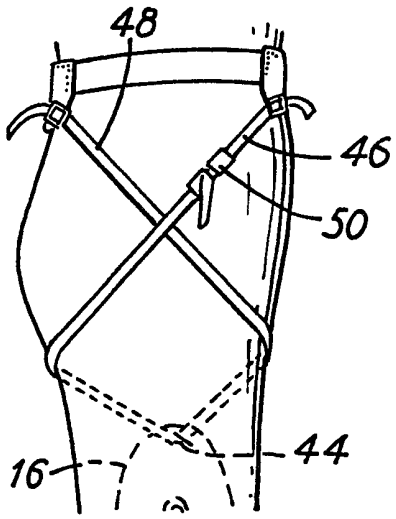


FIG. 8

SPECIFICATION

Knee support

This invention relates to a support for use on varus or valgus knees. Varus knees are laterally outwardly displaced or deformed, the sufferer thus being bandy-legged. Valgus knees are inwardly displaced, the sufferer being knock-kneed.

In this specification the terms 'displaced' or 'deformed' refer to the lateral displacements of the knee referred to above and the term 'bent' refers to the normal flexion of a knee.

According to the present invention there is provided a support for supporting a valgus or varus knee, comprising;

a telescoping assembly;

means for holding the assembly in position on that side of the knee from which the knee has been displaced or deformed, such that portions of the assembly telescope together when the knee is bent;

and a sling portion, the sling portion being linked to the assembly at or near the ends of the assembly and further being fixable to the telescoping assembly such that the sling portion can bind around a knee,

so that with the assembly held in position on that side of the knee from which the knee has been displaced or deformed, the sling portion may be tightly bound around the bent knee, so that on straightening the knee the sling portion provides a force acting on the knee towards the telescoping assembly.

Preferably the telescoping assembly consists of a tube and a rod, the sling portion being fixable to the tube.

The support prevents further displacement of a varus or valgus knee, and thus the pain and debilitating effects of such further displacement.

The invention will now be further described, by way of example with reference to the accompanying drawings, in which:

Fig. 1 shows a knee support;

Fig. 2 shows the knee support attached to a leg;

Figs. 3 to 5 show three stages of fixing the support to a leg;

Fig. 6 shows a waist band for holding the support in place;

and Figs. 7 and 8 show the support attached to the waist band in the case of a valgus and a varus knee, respectively.

With reference firstly to Figs. 1 and 2, the support comprises a sling portion generally indicated as 2 and a telescoping assembly 3. The assembly 3 is formed by an upper tube 4 and a lower rod 6, the rod 6 being slidable within the bore of the tube 4. The sling portion 2 comprises a generally three-cornered sling pad 8 and three straps 10, 12 and 14, one strap extending from each corner portion of the sling pad 8.

The support also comprises upper and lower plastic pads 16 and 18. The upper end of the tube 4 and the end of the first strap 10 remote from the sling pad 8 are fixed to the centre of the upper pad 16. Likewise, the lower end of the rod 6 and the end of the second strap 12 remote from the sling pad 8 are fixed to the centre of the lower pad 18. The straps 10 and 12 thus extend generally from one side of the sling pad 8 and are linked respectively to the tube 4 and rod 6 of the telescoping assembly 3. The angle between the straps 10, 12 and the telescoping assembly is about 60°, with the support laid on a flat surface or in its position when supporting a knee. The third strap 14 extends from the side of the sling pad 8 which is generally opposite to the side from which the straps 10 and 12 extend, and, with the support laid flat or bound around a knee, is perpendicular to the assembly 3.

Other features of the support are: binding straps 20 and 22, one extending from each pad 16 and 18 at right angles to the assembly 3 to bind around the leg respectively above and below the knee 24, to thereby locate the support about the knee; a flexible rod 26 fixed to and extending between the pads 16, 18 and a spring clip 28 fixed to the third strap 14, the clip 28 being of arcuate section and being fixable to the tube 4 so that the sling position 2 defines a loop 24, the knee inside the loop being supported on its weak side, i.e. the side to which it is displaced, by the sling pad 8.

One convenient method of fitting the support to a left varus knee will now be described, with reference to figures 3 to 5.

The telescoping assembly 3 is placed on the inner side of the knee 24 and, with the knee slightly bent, the pads 16 and 18 are affixed to the leg, equally spaced above and below the knee, by means of the binding straps, 20 and 22, which have velcro hook portions enabling them to fix onto velcro eye portions 30 on the pads. When the support is so affixed the flexible rod 26 is slightly curved, as shown in figure 3, and the rod 6 is partly telescoped in the tube 4, so that the leg can be strightened without the straps 20, 22 and pads 16, 18 being drawn towards one another.

The straps 10 and 12 between the sling pad 8 and the pads 16, 18 may be adjusted so that the sling pad 8 is located against the weak side of the knee 24. The third strap 14 may then be adjusted so that, with the leg straight the sling portion can not quite extend around the knee to enable the clip 28 to reach and clip onto the tube 4. The knee is then bent (Fig. 5) and the clip 28 is clipped onto the tube. When the knee is subsequently straightened the rod and tube assembly 3 lengthens and it will be apparent that the sling pad then acts on the knee to support it on its weak side (Fig. 2).

The support is fixed in placed on the leg with the telescoping assembly 3 and the flexible rod 26 arranged such that when the knee is bent and straightened, the flexible rod passes through the gap 32 (Fig. 2) between the telescoping assembly 3 and the knee. If this gap is too narrow for the flexible rod 26 to pass through it, the support should be inverted so that the flexible rod 26 can bend with the knee, e.g. as shown in Fig. 5,

without having to pass behind the assembly 3.

If may be desired to flare the edges of the pads 16 and 18, to prevent any discomfort. If a thermoplastic material such as ABS plastic is used the edges may be softened with a hot air gun and then shaped as required. The user may also wish to pad the straps, in particular the straps of the sling portion 2.

The fitting of the support has been described with reference to a left varus knee. Obviously the telescoping assembly 3 is placed on the inner side of the leg for varus knees and the outer side of the leg for valgus knees.

For the majority of users the support stays in position, with the upper binding strap 20 on the femoral condyle and the lower strap 22 on the curve of the calf. However, if the shape of the leg is such that the support slips down, the support may be retained in place by means of a waist belt.

The waist belt 34, as shown in figures 6 to 8, is maintained in position around the waist by means of velcro pads 36. Two leather fobs 38 are fixed to the waist belt. When the waist belt is fitted these are positioned one in front of and one behind the user's hip on the same side of his body as the displaced leg to be supported. Thus the leg to be supported in Figures 6 to 8 is the right leg.

Both leather fobs 38 are fitted with a buckle 40 for receiving a strap. When the support is used for a valgus knee, as shown in Figure 7, one long strap 42 is used, one end of the strap being fixed to one buckle, the strap then passing down the outside of the thigh, through a horizontal slot 44 in the upper part of the upper pad 16, then passing up the outside of the thigh and being fixed to the other buckle. The waist belt thus holds the knee support in place via this looped strap 42. Once the waist belt and knee support have been so linked, and the length of the strap 42 has been adjusted to suspend the support in the correct position, the apparatus may be put on and removed as one unit.

When the support is used for a varus knee, as shown in Figure 8, the waist belt 34 is fitted as before but the strap 42 passes around the thigh before returning to the waist belt.

The lowest point the loop reaches is on the inside of the thigh, at the point where the strap 42 passes through the slit 44 of the pad 16. The apparatus, consisting of support, belt and strap, may be removed by undoing the belt 34 and sliding the apparatus down the leg and over the foot. Alternatively the loop defined by the strap 42 may be broken, and the apparatus removed after releasing the strap 42 from one of the buckles 40. This has the disadvantage that the strap length may need to be adjusted each time the support is used. It may be preferred to use two straps 46 and 48, one fixed to each buckle, and join them by means of a clip 50 to define one loop. Thus, once the length of the strap 42 has been adjusted that length remains the same even though the loop is broken each time the assembly is removed.

The waist belt 34 may be provided with two fobs and two buckles or four fobs and four buckles, depending on whether the user requires one or two knee supports to be suspended from the waist belt.

CLAIMS.

1. A support for supporting a valgus or varus knee, comprising:

a telescoping assembly;

means for holding the assembly in position on that side of the knee from which the knee has been displaced or deformed, such that portions of the assembly telescope together when the knee is bent;

and a sling portion, the sling portion being linked to the assembly at or near the ends of the assembly and further being fixable to the telescoping assembly such that the sling portion can bind around a knee, so that with the assembly held in position on that side of the knee from which the knee has been displaced or deformed, the sling portion may be tightly bound around the bent knee, so that on straightening the knee the sling portion provides a force acting on the knee towards the telescoping assembly.

2. A support according to claim 1 wherein the telescoping assembly consists of a tube and a rod, the sling portion being fixable to the tube.

3. A support according to claim 1 and 2 and further comprising straps at or near the top and bottom of the support, the straps being bindable around the leg above and below the knee to locate the support about the knee.

4. A support according to any previous claim, further comprising two pads to be positioned on the side of the leg, respectively above and below the knee, wherein the upper end of the upper telescoping portion is mounted on the upper pad and the lower end of the lower telescoping portion is mounted on the lower pad.

5. A support according to claim 5 and further comprising a flexible rod fixed to and extending between the pads.

6. A support according to any previous claim, wherein the sling portion comprises a sling pad for supporting the knee on the side to which the knee has been displaced or deformed, and three straps extending therefrom, two of the straps being linked at their ends remote from the sling pad to the upper end of upper telescoping portion and to the lower end of the lower telescoping portion respectively and the third strap having a clip on its end remote from the sling pad, the clip being fixable to the larger diameter telescoping portion.

7. A support according to any of the preceding claims, a waist belt, and a strap extending between the belt and the support.

8. A support substantially as hereinbefore described with reference to the accompanying drawings.

9. A support, waist belt and strap assembly as hereinbefore described with reference to the Figs. 6 to 8 of the accompanying drawings.

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