W. GRUNDMANN.

PATELLA SPLINT.

APPLICATION FILED MAY 31, 1919.

1,375,507. Patented Apr. 19, 1921.

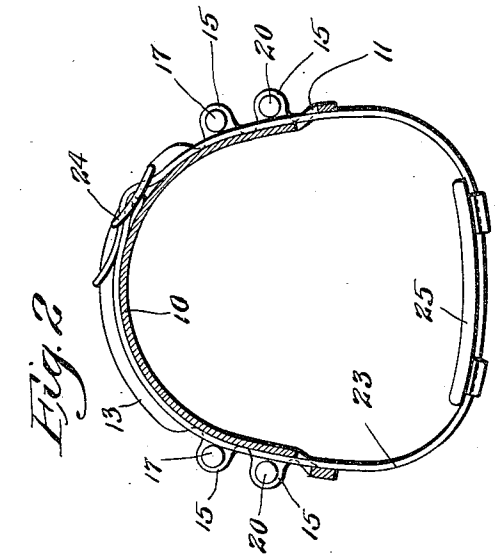


Fig. 2

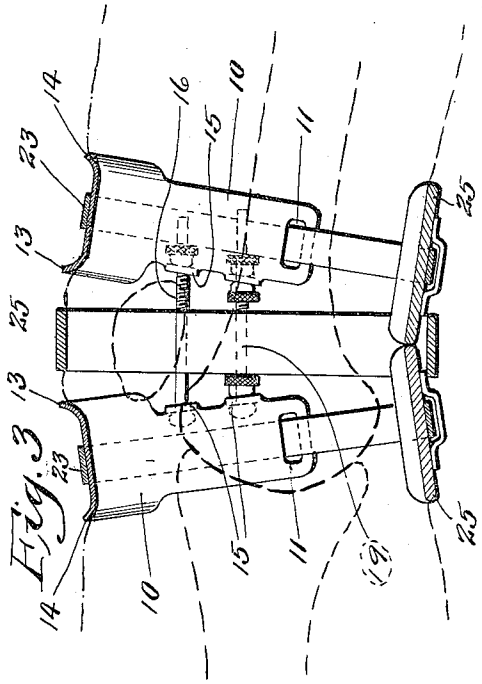


Fig. 3

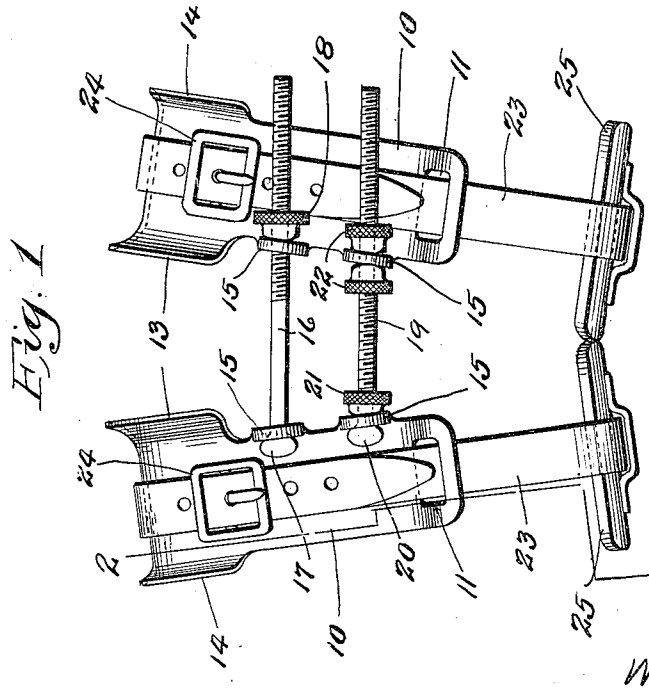


Fig. 1

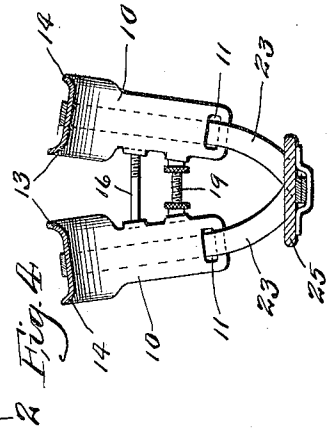


Fig. 4

Inventor

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UNITED STATES PATENT OFFICE.

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PATELLA-SPLINT.

1,375,507. Specification of Letters Patent. Patented Apr. 19, 1921.

Application filed May 31, 1919. Serial No. 300,874.

To all whom it may concern:

Be it known that I, WILLIAM GRUNDMANN, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Patella-Splints, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a surgical appliance in the form of a patella splint and which is particularly designed for use in the treatment of fracture of the patella or knee cap, and the device herein illustrated and described is an improvement on the patella splint disclosed in my Patent No. 1,313,181, issued August 12, 1919.

The principal objects of my present invention are, to generally improve upon and simplify the construction of the device disclosed in my aforesaid patent; to provide simple and easily-operated means for adjusting the positions of the main members of the splint with respect to each other, and retaining said members in fixed spaced relation when applied for use; and further, to provide the main splint members with upturned edges so that said members will rest comfortably upon the limb when secured in proper position thereupon.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevational view of a patella splint of my improved construction.

Fig. 2 is a section taken approximately on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken through the center of the appliance with dotted lines showing the limb to which said appliance is applied.

Fig. 4 is a sectional view taken through the center of the device and showing a modified arrangement of the popliteal pad forming a part of said device.

Referring by numerals to the accompanying drawings, 10, 10 designate strips of resilient metal, preferably aluminum or brass, the same being curved lengthwise so as to fit over a person's limb immediately above and below the knee joint. Formed in the ends of these curved metal strips are transversely disposed openings 11 which are adapted to receive the straps which retain the strips in position upon the limb. The inner edges of the central portions of these strips are provided with upwardly projecting curved flanges 13 and the outer edges of the central portions of said strips are provided with upwardly projecting curved flanges 14. These upturned edges 13 and 14 enable the members 10 to rest with a considerable degree of comfort upon the limb adjacent to the patella under treatment and in the event that the members 10 are drawn into relatively close contact with the limb, the upturned edges of the parts 10 cannot cut into and injure the fleshy parts of the limb adjacent to the patella, nor will said edges press against said parts in such a manner as to create discomfort to the patient.

Formed integral with the inner edges of the members 10 between the ends of the upturned edges 13 and the slots 11 in said members are outwardly projecting pairs of perforated ears 15. Passing through the ears which are adjacent to the ends of the members 10 are screw-threaded rods or bolts 19 having rounded heads 20 and mounted on said rods adjacent to said heads 20 are nuts 21. Mounted on said rods 19 are nuts 22 which are adapted to engage on opposite sides of one of the ears 15 and which last mentioned nuts when properly manipulated are effective in adjusting one of the members 10 toward or away from the other.

The apertures through the ears 15 are preferably reamed or countersunk and this construction, together with the rounding of the heads 20 and nuts 21, provides semi ball and socket joints between the parts which enables the strips 10 to be universally adjusted when being applied for use.

After the members 10 have been properly spaced apart by proper manipulation of the pairs of nuts 22, nuts 18 can be manipulated upon the threaded portions of rods 16 to adjust the angular positions of the members 10 with respect to each other. Positioned upon each member 10 is a strap 23 of leather, rubber, fabric or analogous material, the same passing through the slots 10 in the ends of said member and one end of said strap is provided with a buckle 24 whereby the ends of the strap may be brought together and secured.

In practice, it is desirable that the ends of

the strap when secured be arranged so that the buckles 19 occupy positions on top of the strips 10 at which points they are readily accessible when the straps are to be secured or released.

Arranged to slide freely on each strap between the ends of the member 10 is a substantially rectangular pad 25 of leather, rubber, heavy fabric, or the like, and when the splint is properly applied for use, the two pads are positioned edge to edge and disposed directly over the popliteal space. (See Fig. 3.) These pads provide a substantial and at the same time a yielding support for the straps which pass over the members 10.

In the treatment of fractured patella, an adhesive plaster or bandage may be applied to the injured limb and the latter extended for a limited time upon a posterior splint of wire, felt, or plaster of Paris, such posterior splint being held by a bandage or adhesive plaster so as to completely immobilize the knee joint. In the event of a compound fracture of the patella, it may be advisable to draw the parts of the patella together and unite the same with suitable sutures, but for a simple fracture, the use of sutures is usually not required.

The members 10 of my improved splint are now applied to the front portion of the limb immediately above and below the patella, and the ends of the straps 23 are secured to the buckles 24 and the pads 25 on said straps are adjusted so as to occupy positions immediately beneath the popliteal space. The straps should be drawn sufficiently tight to maintain the splint in its adjusted position upon the limb, but, at the same time, said straps should be sufficiently loose to permit free circulation of blood through the limb.

The members 10 are adjusted in spaced relationship by proper manipulation of the nuts 22 upon the threaded members 19 and the angular positions of the members 10 with respect to each other can be regulated by proper manipulation of the nuts 18 on the threaded portions of the rods 16. The threaded rods 19 which connect the end portions of the members 10 constitute adjustable fixation members in that they determine the spaced relation between the splint members 10 and at the same time the nuts on said members can be adjusted so as to change the positions of said splint members.

Obviously, when the splint is applied, the members 10 will be adjusted toward each other so as to bring the fragments of the broken patella together and both the leather straps and the members 10 of the splint will require repeated adjustment as the swelling around the injured joint decreases. The splint should not be tightened to such an extent as to cause the quadriceps tendon to exert leverage, which latter action will cause the edges of the fragments of the broken patella to rise and separate.

In the event that there is any tendency of the edges of the fragments of the patella to rise and separate, a separate strap 25 of suitable flexible material is passed around the knee between the splint members 10 and this strap will bear directly upon the limb over the injured patella, with the result that the fragments thereof will be maintained in proper relative positions until united. (See Fig. 3.)

In some instances and particularly when the period of advanced passive motion is reached, it may be found desirable to use a single pad 25 beneath the popliteal space and when this is done, both straps 23 are passed beneath the pad, as illustrated in Fig. 4.

My improved splint, when applied for use occupies comparatively little space upon the limb adjacent to the patella and therefore that portion of the limb adjacent to the injured patella can be readily massaged and which action it has been found in practice is very helpful in effecting a knitting together or union of the parts.

A surgical appliance of my improved construction is comparatively simple, can be easily applied for use, is readily adjustable and very effective in the use for which it is intended, namely, the treatment of fractured patella.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved patella splint can be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

What I claim is:

1. A patella splint comprising a pair of strips of resilient material which are curved lengthwise and adapted to fit over the limb immediately above and below the knee joint, both edges of the central portion of each strip being curved upwardly, a flexible member associated with each strip and adapted to pass beneath the limb for retaining the strip in position for use, rods connecting the end portions of said strips, adjustable means on said rods for retaining said strips in spaced relationship, and adjustable means connecting said strips for determining the angular positions of said strips with respect to each other.

2. A patella splint comprising a pair of strips of resilient metal which are curved lengthwise and adapted to fit over the limb immediately above and below the knee joint,

a strap associated with each strip and adapted to pass beneath the limb for retaining the strip in position thereupon, a pair of perforated ears on each end portion of each strip, rods passing through the corresponding members of the pairs of ears, and adjustable members on said rods, one pair of said rods and its adjustable members being adapted to retain the metal strips in spaced relationship and the other pair of rods and their adjustable members being adapted to determine the angular positions of the strips with respect to each other while in use.

In testimony whereof I hereunto affix my signature this 23d day of May, 1919.

WILLIAM GRUNDMANN.