Sept. 30, 1924. 1,510,408

R. A. LYCHOU

KNEE BRACE

Filed June 5, 1922

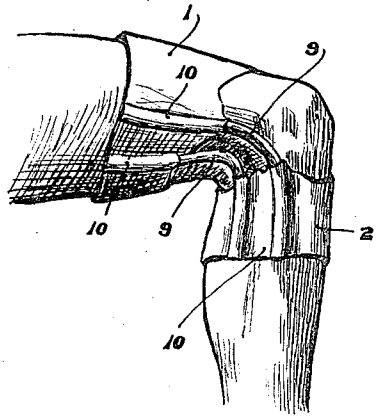


Fig. 1.

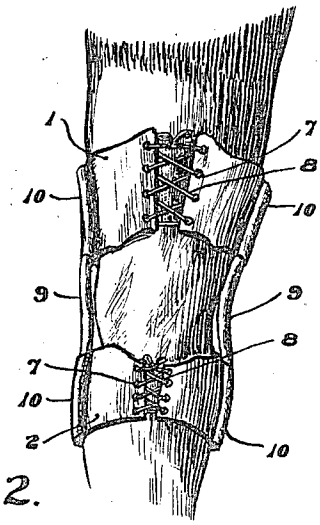


Fig. 2.

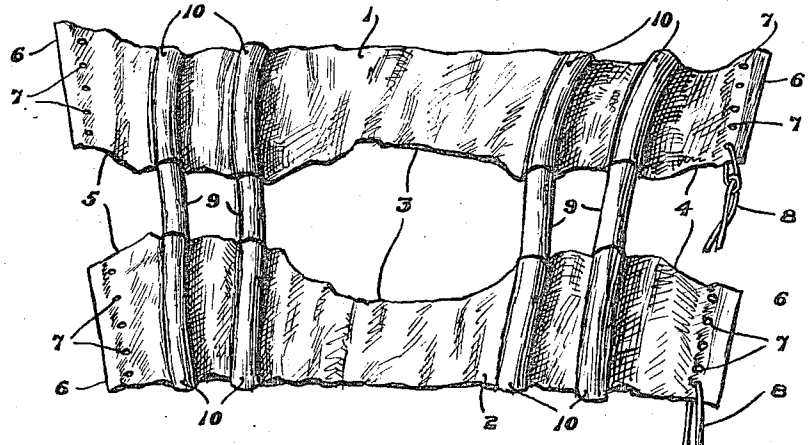


Fig. 3.

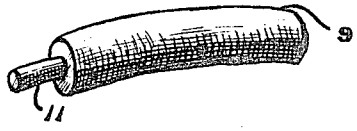


Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT A. LYCHOU, OF CHESTER, PENNSYLVANIA.

KNEE BRACE.

Application filed June 5, 1922. Serial No. 565,860.

To all whom it may concern:

Be it known that I, ROBERT A. LYCHOU, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented new and useful Improvements in Knee Braces, of which the following is a specification.

This invention relates to braces and supports such as are used by those in the surgical profession for bracing and supporting an injured or weakened limb or joint of the human body, and it has more particular reference to braces of the knee or elbow joints which can be conveniently attached or detached therefrom, whilst permitting movement of said joints, and in turn, providing a flexible supporting brace therefor.

The object of my invention is to provide a device of the foregoing character which is formed with upper and lower bandage members that substantially encircle the limb of the wearer, and having means interposed between said bandage members that are of a resilient nature, the same being of a character to properly support the joint while at the same time permitting of a comfortable bending thereof.

Another object of this invention is to provide a device of the foregoing character which is light in weight, strong and durable, and at the same time not so cumbersome as to be for that reason objectionable.

With the foregoing and other objects in view as will be more apparent from the following description my invention essentially comprises upper and lower bandage members, each of which is provided with appropriate fastening means, said bandage members being connected together in spaced relation by means of resilient tubular members appropriately reinforced with solid inserts having a less degree of resiliency than the tubular members.

In the further disclosure of the invention reference is to be had to the accompanying sheet of explanatory drawings constituting a part of this specification and in which like characters of reference designate the same or corresponding parts in all the views.

Figure 1 is a perspective view illustrating the application of one embodiment of my invention to the human knee with the knee joint bent.

Figure 2 is a perspective view illustrative of the application of my brace to a human knee with the leg portions in extended relation.

Figure 3 is a perspective view of my novel brace looking at the outside thereof; and,

Figure 4 is a fragmentary perspective view in detail of a convenient form of the resilient supporting members which connect together the upper and lower bandages of my device.

Referring more particularly to the drawings, my novel brace comprises an upper bandage member 1 and lower bandage member 2 which are provided with substantially straight longitudinal edges on one side and with their inner adjacent longitudinal edges suitably curved or cut-out at 3, 4 and 5.

These cut-out portions 3, 4, and 5 will allow the projection of a joint, such as a knee or elbow through the opening in the brace formed by the cut-out portion 3 when the brace is in use, and the joint bent. The aforesaid cut-out portion 3, 4 and 5 will also allow for the proper movement of the knee joint and prevent the striking of the adjacent edges at 5 under normal conditions by having the portions at 4 and 5 angularly disposed as shown.

The aforesaid bandage members 1, 2 are usually made with the top member slightly longer than the bottom member 2 and both of said members 1 and 2 are reinforced at their opposite ends 6 with flat strips of suitable reinforcing material which is sewed or otherwise encased in the material of the bandage member ends. Near these ends I provide a series of eyelets or holes 7 that may be grommeted to receive and engage laces 8, the function of which is to draw the ends of the bandage members 1 and 2 toward each other and adjust said members to any degree of tightness when applied to the joint.

The bandage members 1 and 2 are spaced apart a suitable distance but are joined by flexible bracing and supporting members 9. These bracing members 9 are firmly encased in a portion of the length of the bandage members 1 and 2 and they are held at their opposite end portions fixedly thereto; while they are disposed on the outer sides of the aforesaid bandage members 1 and 2 by having an outer layer of the bandage members overlap them and be stitched tightly around them to form pockets 10 for retaining said bracing members in operative

relation with respect to the upper and lower members 1 and 2 respectively.

The bracing members may be made of any suitable flexible material, but in the form of my device shown, I find an especial efficiency in applying a peculiar type of tubular bracing member 9, a detail view of which is shown by Figure 4. The outer or main branching member 9 comprises a flexible tubing of rubber or other suitable material. To co-operate with this tubing I fit therein a solid resilient flexible core or reinforcing member 11 which is slidably and fixedly encased within the tubing 10 so that it may bend and move in corresponding movement with the tubular bracing member 9. At the same time this inner reinforcing member 11 will give added stiffness and bracing power to the bracing member 9, while permitting the maximum amount of flexibility consonant therewith, thus rendering the bending of the joint easy and without undue strain upon the muscles.

The bandage members 1 and 2 may be made of any suitable fabric sufficiently strong to stand the required strain when the parts are laced into position on a limb. Bracing members 9 being applied to the bandage members 1 and 2, and the inner face of the brace next to the skin of the wearer will present a smooth and comfortable surface.

To apply my brace, the bandage member 1 is placed upon the limb and laced into position by the laces 8 to the required degree of tightness. The bandage member 2 is then similarly placed and laced whereupon the bracing members 9 extending between said bandage members 1 and 2 will make a substantially integral structure of the whole. Still further it will be noted that my improved brace will lie closely and snugly to the joint portion of the limb while permitting movement thereof and at the same time holding the bandage members 1 and 2 in correct position, thus preventing displacement of the joint or unnecessary strain thereon.

In the form of bandage shown in the drawings I have illustrated four flexible bracing members but it is obvious that as the needs of the case may require more or less of these bracing members may be used without departing from the spirit and scope of my invention as more particularly defined by the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a surgical brace the combination of a pair of bandage members, lacing means to adjustably fix said bandage members in spaced relation upon a limb, tubular flexible bracing members bridged between and engaging said bandage members, flexible bracing core members encased in the aforesaid tubular bracing members, said tubular and solid flexible members co-operating with each other and with said bandage members to flexibly brace and support a limb joint.

2. In a surgical brace the combination of a pair of non-elastic bandage members having irregular cut-out portions similarly positioned on their opposed edges, lace members to independently and adjustably fix each of the aforesaid bandage members in spaced relation upon a limb, tubular flexible bracing members bridged between and engaging the outer edges of said bandage members, solid circular-shaped flexible bracing core members encased in said tubular bracing members and extending the length thereof, said tubular and solid flexible members co-operating with each other and with the aforesaid bandage members to flexibly brace and support a limb joint.

3. In a surgical brace, the combination of a pair of bandage members formed with oppositely opening pockets, a plurality of rubber tubes inserted in the opposed pockets of said bandage members, and a plurality of rubber core members of less resilience than said tubes and inserted therein.

In testimony whereof I affix my signature.

ROBERT A. LYCHOU.