R. S. CARLING.

PNEUMATIC ARCH SUPPORT.

APPLICATION FILED DEC. 21, 1915.

1,223,368. Patented Apr. 24, 1917.

Fig. 1.

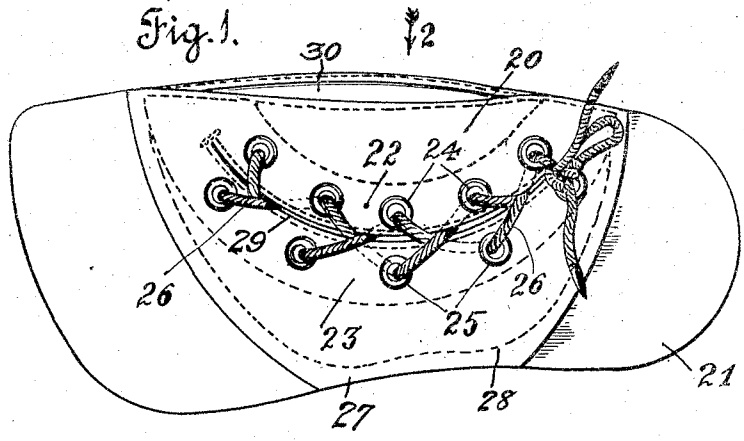


Fig. 2.

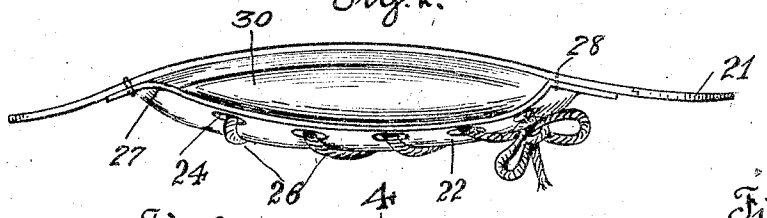


Fig. 3.

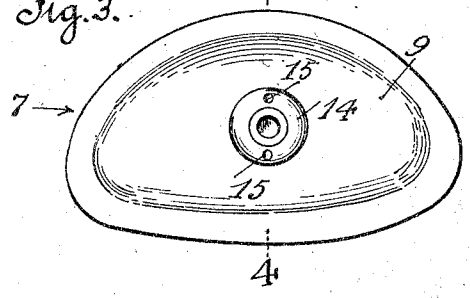


Fig. 4.

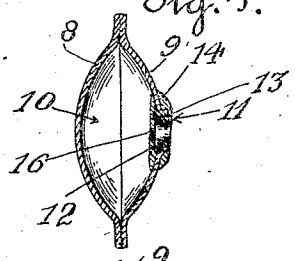
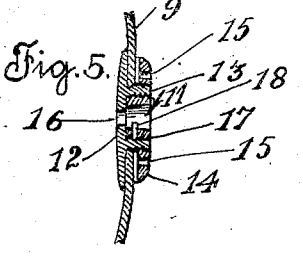


Fig. 5.



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PNEUMATIC ARCH-SUPPORT.

1,223,368. Specification of Letters Patent. Patented Apr. 24, 1917.

Application filed December 21, 1915. Serial No. 68,009.

To all whom it may concern:

Be it known that I, ROSE SCHUESSLER CARLING, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Pneumatic Arch-Supports, of which the following is a specification.

This invention relates to a pneumatic pad and particularly pertains to a pad which is adapted for use in surgical appliances and especially to insole arch supports, trusses, and the like.

In the construction and application of surgical pads it is necessary to provide pads of various degrees of pliability and resistance to pressure in order to suit varying conditions. This requires a numerous assortment of pads and involves the provision of various facilities in their manufacture and distribution coupled with the difficulty of providing a pad of the required character to fit a particular case.

It is the object of this invention to provide a pneumatic pad which may be inflated to any desired extent to obtain various degrees of resiliency and pliability as occasion may require so that a single pad may be adjusted and adapted for use to any one of a number of different cases.

Another object is to provide a pneumatic pad of simple and economical construction.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a plan view illustrating the invention as applied in forming an insole arch support.

Fig. 2 is a view in elevation as seen in the direction indicated by the arrow 2 in Fig. 1.

Fig. 3 is a plan view of the pneumatic pad as removed from its casing.

Fig. 4 is a detail section on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged sectional detail of the valve.

More specifically, reference being had to Fig. 3, 7 indicates the pneumatic pad in its preferred embodiment and which is here shown as comprising a pair of normally substantially flat side portions 8 and 9 formed of rubber or similar resilient material and ovaloid in outline. The side members 8 and 9 are vulcanized or otherwise connected together along their marginal edges to form a hermetic joint which encircles a space between the adjacent faces of the side members 8 and 9 constituting an air chamber 10 as particularly shown in Fig. 4 when the chamber is inflated. One of the side members 8 or 9 is equipped adjacent its center with a valve 11 of peculiar construction and so designed as to be substantially flat and of slightly greater thickness than the thickness of the material forming the side member so as not to present an objectionable protuberance which would render the pad uncomfortable to the wearer. This valve consists of a disk 12 having a central tubular projection 13 thereon threaded interiorly and exteriorly. The projection 13 is adapted to extend through an opening in the side member and to receive a flat annular binding nut 14 which, when screwed on the projection 13, will clamp the material forming the marginal edge of the opening through which the projection 13 extends tightly against the disk 12 to form an air tight joint. The nut 14 is formed with diametrically opposed sockets 15 for the reception of a spanner wrench by which the nut may be turned in applying it to or removing it from the projection 13. The interior of the projection 13 opens to the chamber 10 through an aperture 16 in the disk 12. Threaded on the interior of the projection 13 is an externally threaded socket 17 having a side slot 18 through which the interior of the socket will communicate with the interior of the projection 13 and with the chamber 10 through the aperture 16 when the socket is in a partially removed position. The walls of the inner face of the side walls of the socket 17 are tapered to receive a correspondingly tapered removable tubular member, not shown, which may be introduced into the socket and in frictional engagement therewith to rotate the latter to open the slot 18 to the aperture 16 and permit of air under pressure being delivered to the chamber 10 to inflate the pneumatic pad and distend the side members 8 and 9 as shown in Fig. 4. The valve is thus formed and arranged so as not to take up space and be readily concealed, thus rendering the pad compact. On the desired inflation of the pneumatic pad being effected the socket 17 is

screwed tight against the inner end wall of the projection 13 to close the aperture 16 and thereby prevent the escape of the air under pressure in the chamber 10. The resiliency of the pad thus formed may be varied as occasion requires by increasing or decreasing the air pressure therein; the greater the air pressure within the chamber 10 the less will be the pliability of the pad and inversely the less the pressure of air the greater the pliability of the pad. The pad, when inflated, will be substantially elliptical in cross section; the side walls converging toward their point of juncture.

In the preferred application of the invention, namely, in the construction of an arch supporting insole, the pneumatic pad 7 is placed within a pocket 20 formed on the under side of an insole 21 as particularly shown in Figs. 1 and 2. The pocket 20 is formed with contiguous flaps 22 and 23 fitted with eyelets 24 and 25, respectively, through which a cord 26 is laced, as shown in Fig. 1, to inclose the pneumatic pad within the pocket and dispose it adjacent the under wall of the insole 21 so that when the latter is placed within a shoe the portion thereof opposite the arch of the shoe and foot will be extended so as to form a resilient arch support.

In forming the pocket 20, a sheet of pliable material 27 of a shape substantially corresponding to the desired support is stitched along its ends transversely of the insole 21 and also along one edge, as indicated by the dotted line 28 in Fig. 1. The sheet 27 is formed with a slit 29 which is preferably arcuate and which forms the contiguous flaps of the pocket. A gore 30 is interposed between the outer edge of the sheet 27 and the insole 21 and stitched thereto; this gore permitting of expansion or contraction of the pocket and allowing of various degrees of inflation of the pneumatic pad. Furthermore, the gore permits the pocket being expanded to form a bulge along the inner edge of the insole which will taper toward the heel and toe ends of the insole and toward the outer edge thereof, thus providing a support of such shape and thickness as to support and conform to the longitudinal arch on the inner border of the foot. The pad thus forms a support for the highest point of the arch of the foot, which is the weakest part and that which is effected on stretching of the ligaments which, on being strained and weakened, allow the bones forming the arch of the foot to become depressed bringing about the condition known as "flat foot." By the use of my invention the various arch forming bones of the foot may be supported in their proper relation and will serve not only in restoring the arch, but by the leverage action due to the air in the pad the active use of the foot is encouraged and a strengthening of the muscles effected.

By locating the valve centrally in the side wall of the pad, it will be disposed flat against the insole or the sheet forming the side walls of the pocket, thus completely covering and concealing the valve.

It will be seen that the resiliency or pliability of this arch support and the extent of its thickness may be varied to suit numerous conditions by regulating the amount of air under pressure within the pneumatic pad. By this arrangement an arch support may be formed by a single pad adapted for use by a person light in weight or by one of considerable weight. The same pad might thus serve for a child or an adult, necessitating only a change in dimensions to meet requirements as to size.

What I claim is:

1. In an arch supporter, an insole, a sheet arranged across the insole and secured thereto having an opening to form a pocket, a gore interposed between one edge of the sheet and the insole, and a removable pneumatic pad adapted to be disposed in the pocket formed by the sheet, insole and gore.

2. In an arch supporter, an insole, a sheet secured along its ends and one of its sides to the insole, forming a pocket, a removable pneumatic pad adapted to be disposed in the pocket, and flexible means connecting the other side of the sheet to the insole to permit expansion of the pocket.

3. In an arch supporter, an insole, a sheet arranged across the under side of the insole stitched at its ends transversely of the insole and along the outer edge thereof, said sheet formed with a slit to provide contiguous flaps, a gore interposed between the inner edges of the sheet and insole, and a removable pneumatic pad disposed in the pocket formed by the sheet, insole, and gore.

4. In an arch supporter, an insole, a sheet arranged across the under side of the insole stitched at its ends transversely of the insole and along the outer edge thereof, said sheet formed with a slit to provide contiguous flaps, a gore interposed between the inner edges of the sheet and insole, a removable pneumatic pad disposed in the pocket formed by the sheet, insole, and gore, and means for fastening the contiguous flaps together.

5. In an arch support, a flexible insole, a flexible sheet of material secured upon said insole and having an opening therein to form a pocket, a removable resilient pad adapted to be inflated to a desired pressure and to fit within said pocket, and means formed by said sheet of material whereby pressure exerted by the outer edge of the foot upon said resilient pad will produce a counter-pressure adapted to expand the pad up-

wardly and outwardly toward the inner side of the foot arch, thereby adding support to the weakened portion of the foot and transferring the weight to the outer portion of the foot arch.

6. In an arch supporter, an insole, a sheet arranged across the under side of the insole and secured thereto having an opening to form a pocket, a gore interposed between one edge of the sheet and insole, and a removable resilient pad adapted to be disposed in the pocket formed by the sheet, insole and gore.

In testimony whereof I have signed my name to this specification.

ROSE SCHUESSLER CARLING.