L. W. WILMS.

FOOT TREATMENT APPARATUS.

APPLICATION FILED JULY 30, 1915.

1,213,786.

Patented Jan. 23, 1917.

Fig. 1.

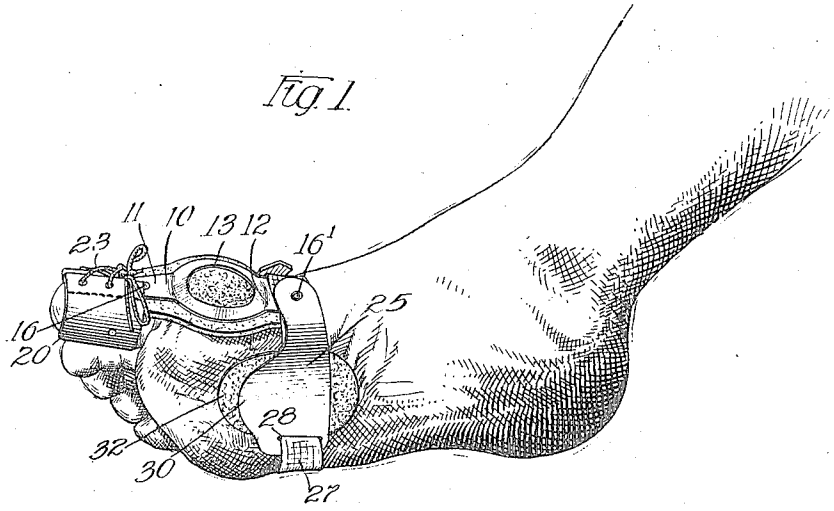


Fig. 5.

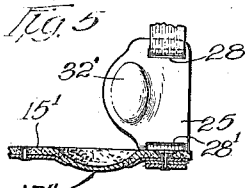


Fig. 2.

Fig. 3.

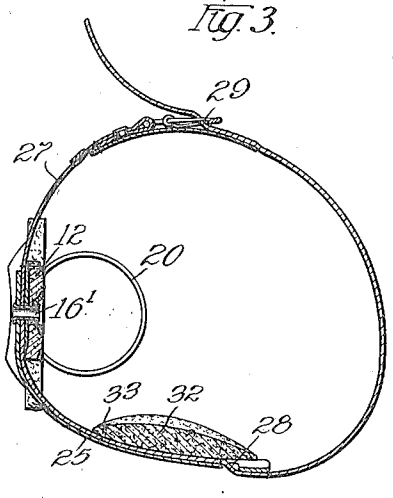
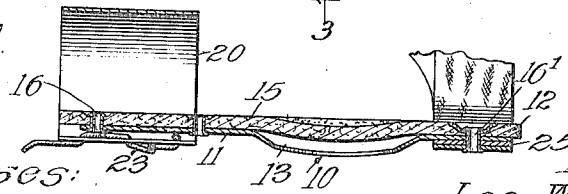


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FOOT-TREATMENT APPARATUS.

1,213,786. Specification of Letters Patent. Patented Jan. 23, 1917.

Application filed July 30, 1915. Serial No. 42,714.

To all whom it may concern:

Be it known that I, LEE W. WILMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Foot-Treatment Apparatus, of which the following is a specification.

My invention relates to foot treatment apparatus, and more particularly to appliances for treating hallux valgus, and other troubles involving displacement of the metatarsal and phalangeal bones.

Hallux valgus is a deformity occurring at the junction of the first metatarso-phalangeal articulation, the great toe crowding over toward or overlapping the adjacent toes, the joint being displaced outwardly and, very frequently, the joint being enlarged, inflamed, and exceedingly painful. Very frequently, also, this trouble is accompanied by other dislocations of the metatarso-phalangeal articulations, involving a falling of the transverse arch of the foot, sometimes known as "Morton's toe," with a concomitant widening of the foot, and painful sensitiveness of the affected area. Various expedients, more or less useful, have been employed in the effort to correct such foot ailments without necessity of surgical operation, and in the prior Patent No. 1,055,810 issued to William M. Scholl, March 11th, 1913, for instance, there is shown an advantageous splint or toe straightening mechanism for bringing back to normal position the displaced great toe. All of the splint-apparatuses designed for such service, as far as I am aware, have had the serious drawback that they are difficult to maintain in intended position without either up and down or fore and aft slippage, and in that they afford no tendency to restore the other metatarsal bones to normal position, if displaced, or to hold them in normal relation notwithstanding any tendency to displacement due to the constricted action of the splint holding strap.

Among the general objects of my invention are to provide a treatment apparatus of the character described that will be simple, inexpensive, certain in its action, easy to maintain in intended position, effective in acting upon the entire affected area of the foot, capable of ready and accurate adjustment for pressure application at just the desired point, and to the desired extent, and that gives greatest comfort to the wearer in use.

In the drawings wherein I have illustrated an embodiment of my invention Figure 1 is a perspective view illustrating the appliance in use. Fig. 2 is an enlarged side elevation. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4 is a longitudinal section on line 4—4 of Fig. 2. Fig. 5 is a longitudinal section showing a fragment of a modified structure.

In the drawings 10 indicates a splint, preferably of non-corrosive spring metal, adapted to span the first metatarso phalangeal joint and connectible at opposite ends respectively with the great toe and with the larger part of the foot. Specifically I prefer that this metallic spring shall comprise an arm 11 to extend along side the great toe, a bearing arm 12, and an intervening pocketed portion 13 that conveniently may take the form of an oval band, suitably bowed or convexed in cross section and with a crest-opening as at 14.

On the inner face of the spring, to rest against the foot, I provide a suitable pad or cushion 15, that may be made of felt, as illustrated in Figs. 1 to 4, or that may be an uninterrupted rubber cushion 15′ molded to shape and preferably thinned to a mere "skin" as at 15″ at the part that is to receive the joint enlargement. The pad in either construction is suitably riveted as at 16—16′ to the splint or otherwise suitably secured thereon, and is preferably large enough to extend to or beyond the edges of the splint in all directions.

The front arm 11 of the splint may be secured to the great toe by a suitable adjustable band 20, shown as a strip secured as at 21, by sewing or otherwise, to the pad, adjacent one end of the band, and having that end which is adjacent to the sewing and the opposite extremity of the band adjustably secured together as by lacing 23. Other means of securing the front end of the structure to the toe may, however, be substituted. With the bearing end portion 12 of the splint I connect an underfoot-plate or spring 25, preferably made of flat, fairly stiff metal, pivoted as at 16′ to the splint portion 12 and curved in cross section to extend down the inner side of the foot and under the foot to lie in the neighborhood of the ends of the

metatarsal bones. Associated with this underfoot spring is a belt 27 to encircle the foot, this being preferably a non-elastic web placed between the two springs at their pivot point 16′ and secured by the same rivet 16′, the belt being preferably connected with the underfoot part of plate 25 by being passed through one or more apertures 28, 28′ for guidance, and the extremities of the belt being adjustably connectible as by a suitable buckle structure 29. As shown in Fig. 1 the belt may be passed over the spring 25 and down through the single aperture 28, or, as shown in Fig. 5, it may be threaded through a plurality of slots 28, 28′.

I prefer that the portion of the spring 25 that underlies the plantar surface of the foot shall have its forward edge bowed into a curved form, or tongue, 30, approximately to conform to the line of the heads of the metatarsal bones, particularly adjacent the middle ones of said bones, and it will be apparent that by slight pivotal adjustment of the two metal members 10 and 25 the exact relations of the front edge of the tongue 30 to the joint receiving pocket 13 of the splint, and consequently to the bones of the foot may be varied. Also, preferably, I associate with the underfoot spring structure a means to elevate the middle metatarsal bones. This may conveniently be a convex pressure pad 32 of felt or rubber, sewed, as at 33, or otherwise secured, to the portion of belt 27 that overlies the spring 25, said pad adapted to underlie the forward portions of the middle metatarsal bones. Or plate 25 may itself be humped, as at 32′, as shown in Fig. 5, above its normal plane or curvatures, to effect the restorative pressure. Of course the size and contour of the pads 32, may readily be varied, and the user may, by manipulation of the pivoted springs bring the elevating hump under exactly the point of the foot where it is elevating such metatarsal bones as may have become depressed. The band 27 when strapped around the foot operates effectively to hold the stiff spring, with its stiff hump or its resilient pad, pressed tightly up against the foot of the wearer, lifting the fallen matatarsal bones, while the circumferential compression of the band tends to draw all of the metatarsal bones together and to aid in securing the curvature effect that results from the forcing of the bones back toward normal position.

The mutual action of the lateral splint portion and the underfoot spring portion of the structure is conducive to best performance of all of the functions of both. The stiff underfoot spring, associated with the retaining band, gives an assurance against shifting of the part 12 of the great-toe splint that is very effective in preventing hurtful displacement of the splint and that aids in giving a firm fulcrum for the operation of the splint. And the accurate maintenance of this underfoot spring in position is aided by the pressing of the pad or hump into the yielding flesh of the foot. The splint construction, likewise, effectively aids in accurately determining and maintaining the position of the underfoot structure that supports and restores the transverse arch, preventing the fore-and-aft slippage of spring 25 that would militate against its effectiveness. Furthermore the use of a non-absorbent, impervious pad like the rubber structure 15′ gives a moisture-retaining and "drawing" effect that stimulates circulation and tends to cause reduction of any growths that have enlarged the joint.

Having described my invention, what I claim is:—

1. In a device of the character described, the combination of a toe splint connectible to a toe, an under-foot spring, connected to the rear end of the splint, and an adjustable band for encircling the foot guided by said under-foot spring.

2. In a device of the character described, the combination of a toe splint, means for connecting the anterior end thereof to a toe, an underfoot plate pivotally connected with the posterior portion of the splint and extending laterally to pass crosswise of the foot adjacent the ball of the foot, and adjustable band-means engaging the plate to complete a circlet around the foot.

3. In a device of the character described, the combination of a splint, means for attaching the front end of said splint to a toe, a transversely bent plate member pivoted to the rear end of said splint and arranged to extend down alongside of and under the foot adjacent the heads of the metatarsal bones, and a band for securing said plate to the foot.

4. In a device of the character described, the combination of a toe-splint, means for attaching the front end thereof to the great toe that the splint may extend alongside of the toe past the metatarso-phalangeal joint, a transversely-bent plate-member connected to the splint to lie in rear of the joint and pass down under and cross the foot adjacent the heads of the metatarsal bones, means supplementing the normal curvatures of said plate to exert a restorative upward pressure under the metatarsal bones, and means for securing said plate to the foot.

5. In a device of the character described, the combination of a splint, means for attaching the front end of said splint to a toe, a transversely bent plate member pivoted to the rear end of said splint and arranged to extend down alongside of and under the foot adjacent the heads of the metatarsal bones, means supplementing the normal curvatures of said plate to exert a restora-

tive upward pressure under the metatarsal bones, and a band for securing said plate to the foot.

6. In an appliance of the character described, the combination of a splint adapted to span lengthwise the great toe joint, and having a joint receiving pocket and longitudinal arms on opposite sides thereof, a cushioning cover for said splint arranged to lie against the foot, adjustable means for connecting the front end of said splint with the great toe, an underfoot plate connected with the rear end of said splint and curved to extend under the foot adjacent the ball thereof, said plate having an aperture therein, and a band, threaded through the aperture of said plate, adapted to encompass the foot.

7. In a device of the character described, the combination of a toe-splint, means for attaching the front end thereof to the great toe that the splint may extend alongside of the toe past the metatarso-phalangeal joint, a transversely-bent plate-member connected to the splint to lie in rear of the joint and pass down under and across the foot adjacent the heads of the metatarsal bones, said plate having its anterior edge convexly curved in plan to extend forward under the middle metatarsal bones, means supplementing the normal curvatures of said plate to exert a restorative upward pressure under the metatarsal bones, and means for securing said plate to the foot.

8. In an appliance of the character described, a structure to underlie the anterior portion of the metatarsal bones, normally curved for approximation of the curvatures of the foot-portions with which it contacts, said structure having means supplementing its normal curvatures to provide an upwardly acting hump or protuberance to exert a restorative pressure beneath the metatarsal bones adjacent their heads, and means to position said structure against displacement with respect to the foot including a relatively narrow splint extending forward beyond the first said structure, and means carried by said splint for engaging the toe.

9. In an appliance of the character described, a structure to underlie, and terminate forwardly at the anterior portion of the metatarsal bones, curved in general for conformity with the foot-portions that it engages and having hump-formed means convexed in excess of the normal curvatures to exert an upward restorative pressure adjacent the heads of the metatarsal bones, and means to position said structure with respect to the foot including a splint member extending longitudinally along-side of the foot and means for fastening said splint member to the foot at two longitudinally-separated points.

10. In an appliance of the character described, the combination of an underfoot, hump-bearing plate constructed to underlie the anterior portion of the metatarsal bones and by its hump-configuration, curved upwardly in excess of the normal curvatures of the plantar surface of the foot, to exert an upward restorative pressure under the metatarsal bones, and attaching means therefor comprising a band to encircle a toe and a band to encircle the foot in rear of the toes.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses.

LEE W. WILMS.

In the presence of—
WM. M. SCHOLL,
FAIRIE HUNTSMAN.