

Jan. 12 , 1926.

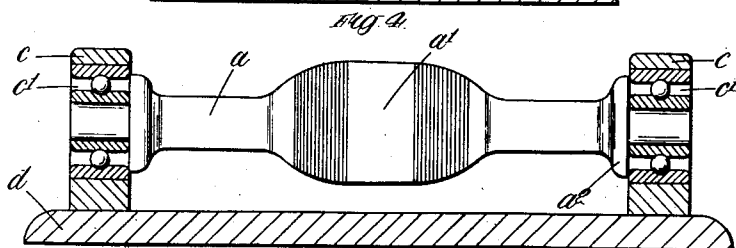
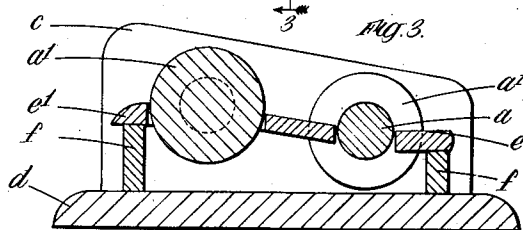
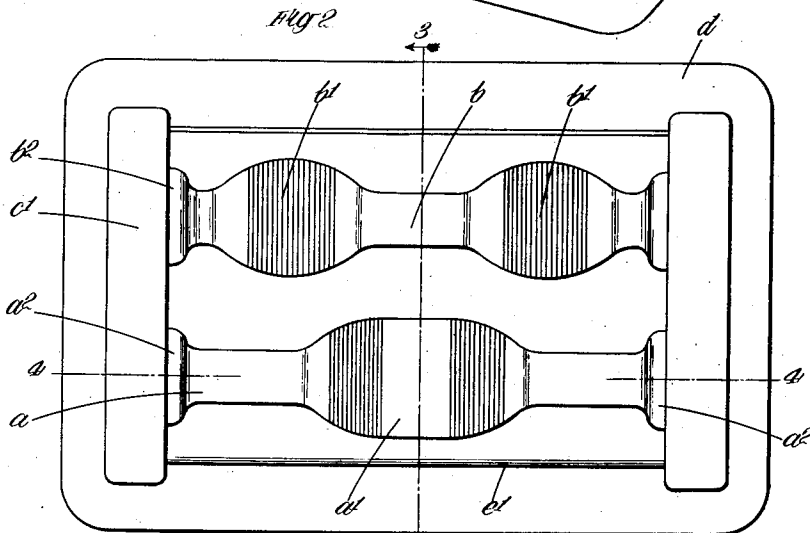
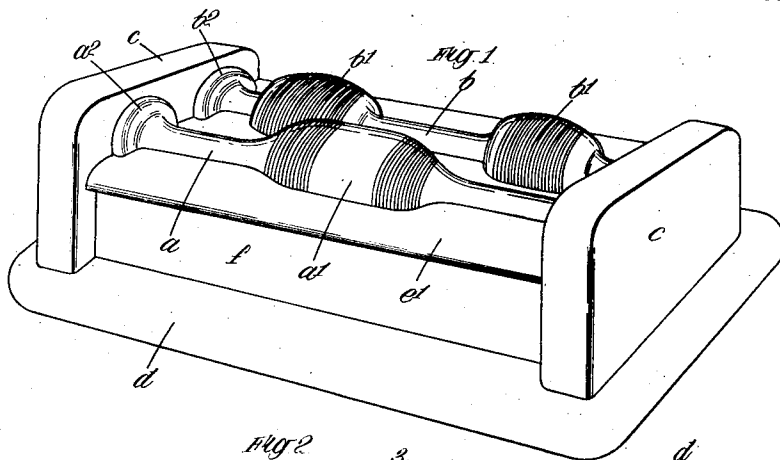
1,569,467

H. EDWARDS

SURGICAL DEVICE FOR USE WITH THE FEET

Filed July 24, 1922

2 Sheets-Sheet 1



INVENTOR
Henry Edwards
by *Charles Neill*
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Jan. 12, 1926.

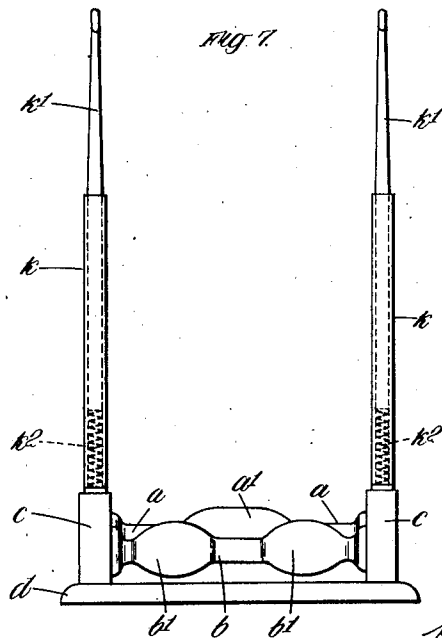
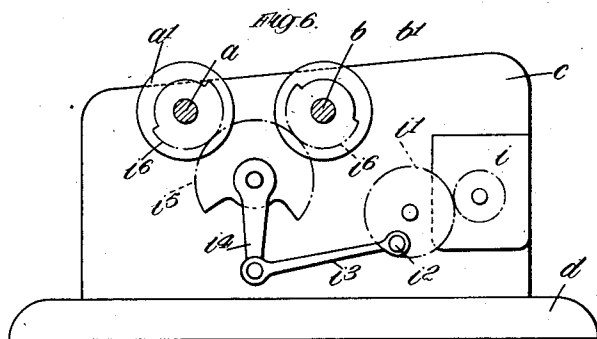
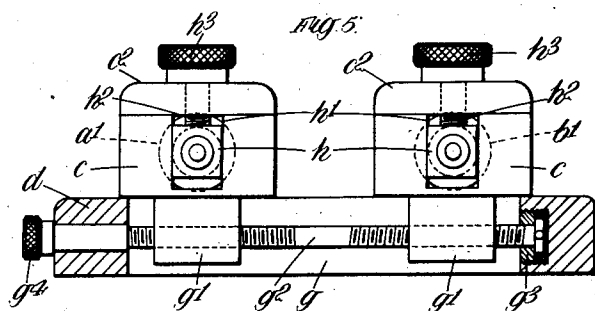
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H. EDWARDS

SURGICAL DEVICE FOR USE WITH THE FEET

Filed July 24, 1922

2 Sheets-Sheet 2



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Patented Jan. 12, 1926.

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UNITED STATES PATENT OFFICE.

HENRY EDWARDS, OF NORTH FINCHLEY, LONDON, ENGLAND.

SURGICAL DEVICE FOR USE WITH THE FEET.

Application filed July 24, 1922. Serial No. 577,107.

To all whom it may concern:

Be it known that I, HENRY EDWARDS, a subject of the King of Great Britain, residing at 17 Moss Hall Villas, North Finchley, in the county of London, England, have invented certain new and useful Improvements in or Relating to Surgical Devices for Use With the Feet, of which the following is a specification.

This invention has reference to surgical devices for use with the feet and adapted particularly for correcting or curing the irregularity known as "flat foot."

The device under this invention is designed to treat more especially the tarsus, and metatarsus sections of the foot wherein are situated the longitudinal and transverse arches respectively, and to restore the bones of the foot to their normal positions, thereby re-forming the longitudinal and transverse arches and readjusting the os calcis or heel-bone, effecting the reinvigorating of the muscles, tendons, ligaments and the whole foot generally.

According to the invention the device which is more particularly adapted for the treatment of "flat foot" and "weak ankle" embodies a rotatable member or members having a rounded or other suitably shaped surface or surfaces which correspond approximately to the natural conformation of a part or parts of the under surface of the human foot and with which the said part or parts move in contact under pressure when using the appliance for massaging such part or parts and reinvigorating the foot and restoring the natural elasticity thereto. The pressure under which the massaging is to be effected is preferably that of the entire weight of the person whose foot is to be treated. Each of the rotatable members may be in the form of a ball or of a figure somewhat representing a ball arranged on ball bearings in a frame or in the form of a roller mounted in side supports attached to a base and provided with one or more integral or removable rounded or other suitably shaped enlargements either smooth finished or formed with a roughened or serrated surface or covered with suitable material. Where the enlargements are removably mounted on the rollers they may be adapted to be adjusted lengthwise thereof and may be mounted with balls or roller bearings on the rollers and the rollers may be mounted on ball or roller bearings in the said side supports.

Where two, or more members are used they may be adjustably mounted in the supports for varying the height of one or more members relatively to the other member or members and the supports for such members may be adjustably mounted on the base for varying the distance or distances between the members. Each of the members is partially rotated in an opposite direction by moving the foot in opposite directions in contact therewith, or by power driven mechanism, it being understood that a suitable pressure should be exerted between the foot and the member or members no matter whether the latter is or are rotated by movement of the foot or by the power driven mechanism. The device may be provided with side frames fitted with spring supported handles for enabling a person to maintain an upright position when using the appliance without supporting his weight on the frame, so as to ensure such weight being carried by the said member or members. One construction of device adapted for use with both feet at the same time comprises two spaced parallel roller members mounted in a frame, one of such members being provided with an enlargement in the middle of its length and the other of which is provided with two enlargements one on each side of the middle of its length, the enlargements on the two roller members being so disposed relatively to each other that when the feet are placed in position the forward portions of the feet such as where the metatarsal muscles are situated are in contact with the rounded or other surface of the side enlargements which serve to arch the forepart of each foot transversely, and the instep of each foot where the astragalus muscles are situated are in contact with opposite sides of the rounded or other surfaces of the middle enlargement which serve to arch the instep of each foot to correspond with the natural shape of the longitudinal arch. In this manner each foot is arched in the two directions in accordance with the normal state of the foot and in exercising the feet backwards and forwards in contact with the roller members the different muscles concerned are effectively massaged and the feet are returned to their natural conformation and the natural elasticity of the foot restored. If desired the enlargements may be built up of rings or sections so as to enable the feet to be simultaneously moved in opposite directions.

In order that the said invention may be clearly understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of one construction of device adapted for the use of both feet simultaneously.

Figure 2 is a plan view and Figures 3 and 4 are respectively transverse and longitudinal sections on the lines 3—3 and 4—4 of Figure 2.

Figure 5 is a side elevation partly in section of a device wherein the roller members are adjustable vertically and horizontally.

Figure 6 is a transverse section of a device wherein the roller members are adapted to be partially rotated in opposite directions by a clockwork motor.

Figure 7 is a rear view of a modification of Figure 1 provided with side frames.

In the construction illustrated in Figures 1, 2, 3 and 4, which is shown by way of example, the front roller member *a* is formed with a middle enlargement *a'* and the rear roller member *b* with two side enlargements *b'* and such enlargements *a'* and *b'* are provided with rounded surfaces which are tapered or reduced until flush with the surface of the corresponding roller and are preferably formed with serrations. The rollers *a* and *b* are provided with flanges *a*² and *b*² to prevent longitudinal movement and are rotatably mounted at their ends in side members *c* attached to or forming part of the base *d*, ball bearings *c'* being provided for the ends of the rollers if needed for reducing friction to a minimum. Between the side members *c* is disposed an upper wall *e* which has a rounded front margin *e'* to avoid the heels contacting therewith when moving the feet backwards and forwards in contact with the enlargements, which with the rollers partly project through the upper wall *e*, the front and rear margins of which are supported by front and back walls *f*. The upper wall may be provided with particulars for indicating the manner in which the feet are to be placed thereon and exercised.

In Figure 5 is shown by way of example a device with adjustable rollers and separate side members *c* for each end of each roller. In this construction each side margin of the base *d* is formed with a slot *g* and into such slots depend internally screw threaded lugs *g'* attached to the side member, and through such lugs *g'* extend screw threaded rods *g*² supported at one end in recesses in the base in which they are retained by nuts *g*³ and at the other end projecting through the base and being fitted with milled heads *g*⁴ whereby the rods may be rotated in either direction for moving the side members with their rollers nearer to or farther from each other,

this being effected by providing the screw threaded rods with right and left hand screw threads. Vertical adjustment of the rollers is obtained by mounting the ends thereof in blocks *h* disposed in slots *h'* in the side members *c* and securing the blocks *h* to screw threaded pins *h*² extending through the upper part of the blocks and fitted with milled headed nuts *h*³ the turning of which enables the height of the rollers to be varied. To enable the relative positions of the enlargements *a'* and *b'* to be adjusted, these are made separate from and fitted on the rollers *a* and *b* and are secured in position by nuts in engagement with screw threads on the rollers and with the ends of the enlargements. Where the rollers are provided with relatively adjustable enlargements they are adapted to receive enlargements of varying sizes and for this purpose the flanges *a*² and *b*² are removable and the upper parts *c*² (Figure 5) of the side members *c* are made detachable from the lower parts thereof. A construction of device with the three adjustments herein set forth is adapted for the use of a number of persons.

The mechanism shown by way of example in Figure 6 for partially rotating the rollers *a* and *b* in opposite directions alternately comprise a spring motor *i* which serves to rotate a toothed wheel *i'* having an eccentric pin *i*² connected with a link *i*³ whereby oscillatory motion is imparted to a lever *i*⁴ connected with a toothed rack *i*⁵ in engagement with toothed racks *i*⁶ on the rollers, the oscillatory motion of the lever serving to alternately rotate the rollers in opposite direction for massaging the feet of a person standing thereon. Where the rollers are adjustable the toothed rack *i*⁵ is also mounted as to be vertically adjustable.

In the construction shown by way of example in Figure 7 the device is similar to that illustrated in Figures 1, 2, 3 and 4 with the exception that the upper, front and rear walls are dispensed with and the side members *c* are fitted with telescopic side frames for enabling a person to maintain an upright position when using the device without supporting his weight on the frames through the hands and arms and ensuring such weight being borne by the rollers through the feet. Each of the side frames comprises tubular portions *k* attached to the side members or they may be attached to the base, and an upper inverted U shaped portion *k'* which slides in the tubular portions *k* and bears on springs *k*² contained in the latter.

It will be understood that the device is to be used with bare or stockinged feet.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A surgical device for use with the feet comprising a support fitted with rotat-

able members having enlarged rounded portions positioned in parallelism, the parts of maximum diameter of the said portions being disposed in approximately parallel transverse planes, spaced from each other.

2. A surgical device for use with the feet, comprising a support, and a pair of rollers rotatably mounted therein, the rollers having rounded enlargements approximately corresponding with the natural curves of the longitudinal and transverse arches of the feet, the parts of maximum diameter of the enlargements being arranged in spaced parallel planes disposed transversely relatively to the axes of the rollers.

3. A surgical device for use with the feet, comprising a support, and a pair of parallel rollers rotatably mounted therein and provided with rounded enlargements and capable of supporting the weight of a person when using the device, the rounded enlargements of the respective rollers being correspondingly arranged to the longitudinal and transverse arches of the feet when arranged thereon side by side in proximity to each other and the parts of maximum diameter of the enlargements being arranged in spaced parallel planes disposed transversely relatively to the axes of the rollers.

4. A surgical device for use with the feet, comprising a support, and a pair of parallel rollers provided with rounded enlargements and journaled in said support, the respective enlargements being arranged on the rollers with the parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers for supporting the longitudinal and transverse arches of the feet when placed thereon side by side in proximity to each other.

5. A surgical device for use with the feet, comprising a support fitted with a plurality of rotatable rollers capable of adjustment relatively to each other and provided with rounded enlargements and constituting a surface corresponding with the natural curves of the longitudinal and transverse arches of the feet when arranged thereon side by side in proximity to each other, the parts of maximum diameter of the rounded enlargements being arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers.

6. A surgical device for use with the feet, comprising a support, and a plurality of rollers journaled in said support and provided with rounded enlargements adjustable lengthwise of the rollers and having their parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the rollers, the enlargements

constituting a surface corresponding with the natural curves of the longitudinal and transverse arches of the feet when arranged side by side in proximity to each other.

7. A surgical device for use with the feet, comprising a stationary support, a pair of rotatable rollers provided with rounded enlargements having their parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers, the enlargements corresponding in their relative positions to the longitudinal and transverse arches of the foot, and means for effecting vertical adjustment of said rollers relatively to each other said means serving to retain the rollers in the adjusted position.

8. A surgical device for use with the feet, comprising a stationary support, a pair of rotatable rollers provided with rounded enlargements having their parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers, the enlargements corresponding in their relative positions to the longitudinal and transverse arches of the foot, and adjusting means for varying the distance between the rollers such means serving to retain the rollers in the adjusted position.

9. A surgical device for use with the feet, comprising a stationary support, a pair of rotatable rollers provided with rounded enlargements having their parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers, the enlargements corresponding in their relative positions to the longitudinal and transverse arches of the foot, means for effecting definite vertical adjustments of said rollers relatively to each other, and means for horizontally adjusting the rollers for varying the distance between the same, the means for effecting the vertical and horizontal adjustments serving to retain the rollers in the adjusted positions.

10. A surgical device for use with the feet, comprising a stationary support, a pair of rotatable rollers provided with rounded enlargements having their parts of maximum diameter arranged in spaced parallel planes transversely disposed relatively to the axes of the rollers, the enlargements corresponding in their relative positions to the longitudinal and transverse arches of the foot, means for adjusting the rollers vertically and horizontally and retaining them in the adjusted position, and means for adjusting the enlargements lengthwise of the rollers.

HENRY EDWARDS.