Dec. 2, 1952 M. B. DE JARNETTE 2,619,729

DEVICE FOR THE ANALYSIS OF ANKLE PRONATION

Filed Nov. 15, 1950 2 SHEETS—SHEET 1

Fig. 1.

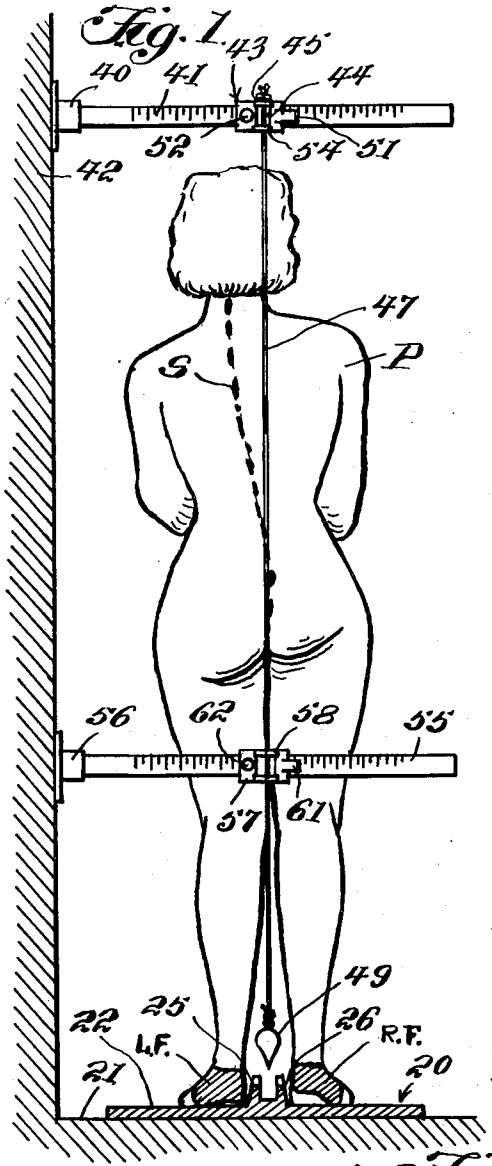


Fig. 2.

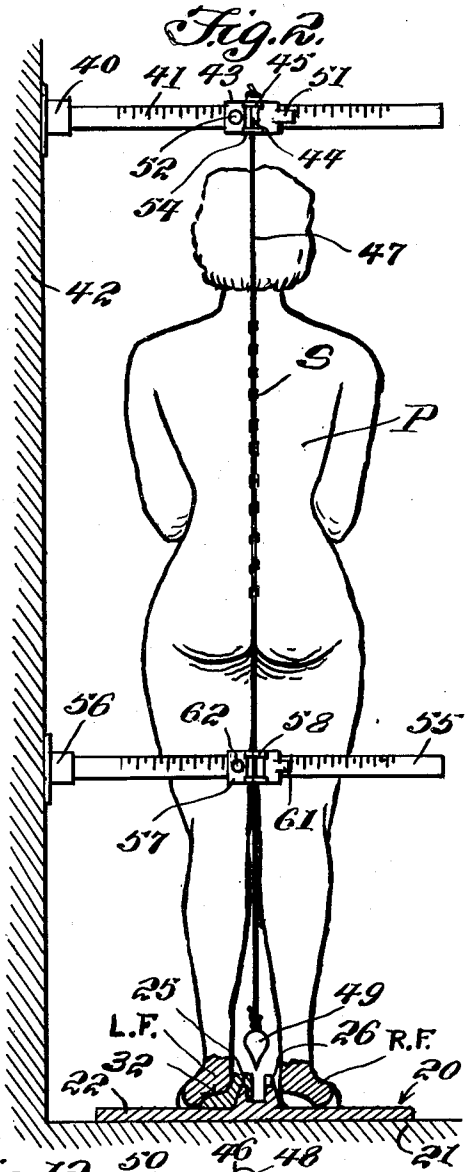


Fig. 11.

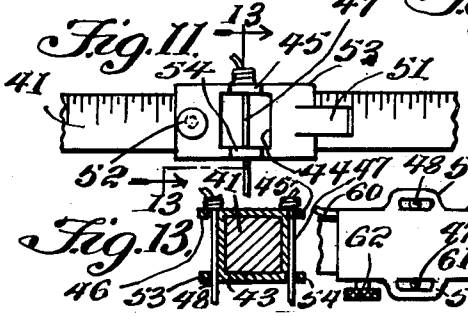


Fig. 12.

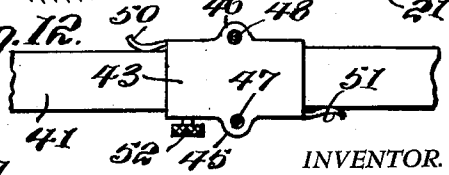


Fig. 13.

Fig. 14.

INVENTOR.

Major B. DeJarnette,

BY Victor J. Evans & Co.

ATTORNEYS

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Fig. 3.

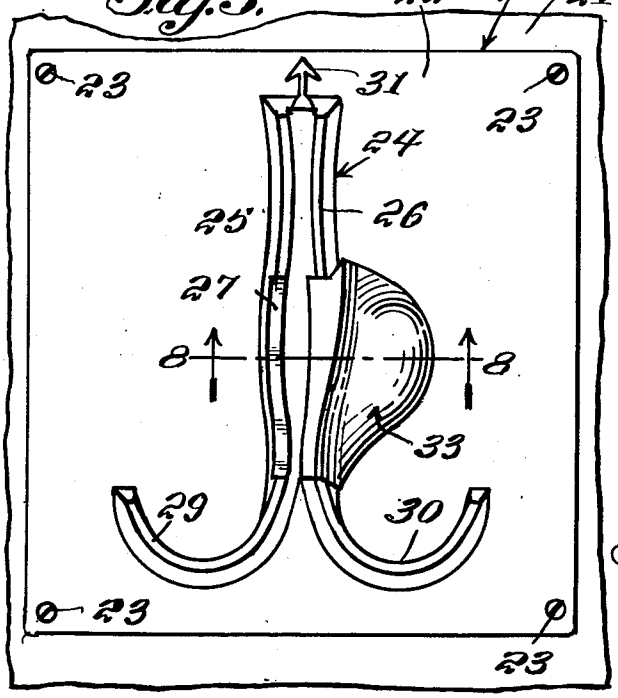


Fig. 4.

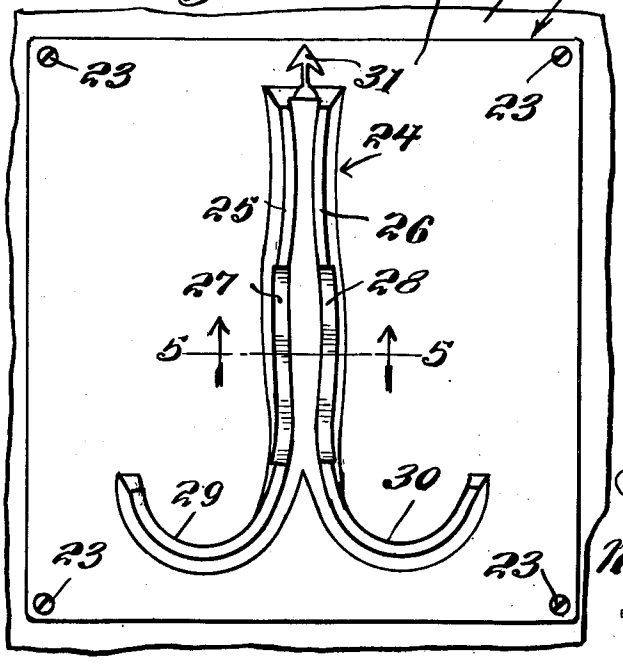


Fig. 5.



Fig. 6.

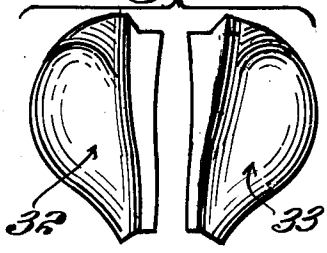


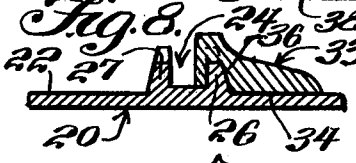
Fig. 9.



Fig. 10.



Fig. 8.



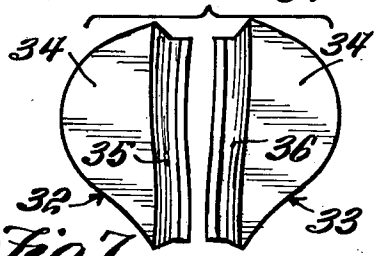


Fig. 7.

INVENTOR.

Major B. De Jarnette,

BY Victor J. Evans & Co.

ATTORNEYS

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UNITED STATES PATENT OFFICE

2,619,729

DEVICE FOR THE ANALYSIS OF ANKLE PRONATION

Major B. De Jarnette, Nebraska City, Nebr.

Application November 15, 1950, Serial No. 195,797

2 Claims. (Cl. 33—174)

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This invention relates to a foot-alignment device, and more particularly to a device for analyzing ankle pronation.

The object of the invention is to provide an apparatus for accurately analyzing or determining the degree of faulty posture due to foot faults, whereby the feet can be treated so as to correct the faulty posture.

Another object of the invention is to provide an apparatus which is adapted to be used for quickly and easily ascertaining the degree of fault in a patient's foot or feet, whereby a wedge or build-up may be made or fitted according to such measurements, the build-up adapted to be inserted in a prescribed shoe to correct the faults of the feet.

A further object of the invention is to provide a device for the analysis of ankle pronation which is extremely simple and inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is an elevational view of the apparatus of the present invention in use on a patient;

Figure 2 is a view similar to Figure 1, but illustrating a corrected final alignment;

Figure 3 is a top plan view of the foot piece or plate with one foot corrector or pronator wedge in place;

Figure 4 is a view similar to Figure 3, but with the pronator wedge removed;

Figure 5 is a sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a top plan view of a pair of pronator wedges;

Figure 7 is a bottom plan view of a pair of pronator wedges;

Figure 8 is a sectional view taken on the line 8—8 of Figure 3;

Figure 9 is a top plan view of a differently-shaped pronator wedge;

Figure 10 is a transverse sectional view of the pronator wedge of Figure 9;

Figure 11 is a fragmentary elevational view of the top metered bar and sliding carriage;

Figure 12 is a fragmentary top plan view of the structure illustrated in Figure 11;

Figure 13 is a sectional view taken on the line 13—13 of Figure 11;

Figure 14 is a fragmentary plan view of the lower metered bar and sliding carriage.

Referring in detail to the drawings, the numeral 20 designates a foot plate, Figures 1 and 3, and the foot plate 20 is adapted to rest on or be supported on the usual floor 21. The foot plate

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20 includes a rectangular body section 22 which may be secured to the floor 21 by suitable securing elements, such as screws 23.

Arranged on the upper surface of the foot plate 20 and formed integrally therewith, or secured thereto, is a body member 24. The body member 24 includes a pair of spaced ribs 25 and 26. It will be seen from Figure 3 that each of the ribs 25 and 26 includes an elongated straight portion, the straight portion of the rib 25 being provided with a recess 27, while the straight portion of the rib 26 is provided with a recess 28. These recesses or cutouts in the ribs 25 and 26 define shoulders, as best seen in Figure 5, for a purpose to be later described.

The rear end of the rib 25 is curved, as at 29, while the rear end of the rib 26 is curved, as at 30, and these curved portions 29 and 30 define heel stops to be engaged by the heels of the patient's feet when the apparatus of the present invention is being used. An arrow 31, Figure 4, is arranged forwardly of the body member 24 so as to facilitate the correct placement of the apparatus.

The apparatus of the present invention further includes a plurality of pronator wedges which are of different sizes and shapes. The pronator wedges are preferably provided in pairs, and a pair of these pronator wedges are shown in Figures 6 and 7, the wedges being indicated by the numerals 32 and 33. Each of the wedges 32 and 33 has substantially the same construction, except that the wedge 32 is adapted to be used below the patient's left foot, while the wedge 33 is adapted to be used below the patient's right foot. Each of the pronator wedges 32 and 33 has a lower flat surface 34, Figure 8, and the flat surface is adapted to be engaged with the upper surface of the foot plate 20. The pronator wedge 32 is provided with a groove 35, Figure 7, while the other pronator wedge 33 of the pair is provided with a groove 36. The groove 35 is adapted to engage the recessed portion 27 of the rib 25, when the wedge 32 is being used, and when the wedge 33 is being used, as shown in Figure 3, the groove 36 receives therein the recessed portion 28 of the rib 26. The shoulders provided on each side of the recesses 27 and 28 serve to insure that the pronator wedges will not accidentally move out of their correct positions.

In Figures 9 and 10 there is shown a pronator wedge which is indicated by the numeral 37, and the pronator wedge 37 is adapted to be used in the same manner as the previously-described pronator wedges 32 and 33. However, the pronator wedge 37, which may be one of a pair, has a different size and shape from the previously-described wedges, the wedge 37 including a flat bottom 38 for engagement with the foot plate 20, and a groove 39, Figure 10, for receiving therein the recessed portion of the proper rib.

A bushing 40 secures one end of a metered bar 41 to a vertical wall 42, Figures 1 and 2, and slidably arranged on the metered bar 41 is a carriage 43. The carriage 43 may be made of any suitable material and is provided with a slot 44 which defines a window, so that the user can readily determine the position of the carriage 43 with respect to the scale or graduations on the bar 41. The carriage 43 is provided with a pair of apertured ears 45 and 46 which are arranged on opposite sides of bar 41, and a cord 47 extends downwardly through the apertured ears 45, there being a similar cord 48 extending downwardly through the other apertured ear 46. The cords 47 and 48 may have different colors, such as the cord 47 being red, while the cord 48 being white. A plumb or weight 49 is connected to the lower end of each of the lines or cords 47 and 48.

For maintaining the carriage 43 immobile in its various adjusted positions on the bar 41, springs 50 and 51 extend from opposite ends of the carriage 43, Figure 12, and the springs 50 and 51 frictionally engage the bar 41. A set screw 52 is carried by the carriage 43, and the set screw 52 can be tightened when the carriage 43 is to be maintained immobile. It will be seen from Figure 13 of the drawings that the carriage 43 is further provided with an apertured ear 53, which is arranged below the ear 46, and the cord or line 48 also extends through the apertured ear 53. Similarly, an apertured ear 54 is arranged below the apertured ear 45, and the cord 47 extends downwardly through the apertured ear 54.

Arranged in spaced, parallel relation below the bar 41 is a horizontally disposed, metered or graduated bar 55, the bar 55 being connected to the wall 42 by a bushing 56. Slidably arranged on the bar 55 is a carriage 57, and the carriage 57 is provided with an apertured ear 58, Figure 14, through which the cord 47 extends. The carriage 57 is further provided with an apertured ear 59 through which the cord or line 48 extends. Spring members 60 and 61 extend from the carriage 57 for engagement with the bar 55, and these spring members coact with a set screw 62, whereby the carriage 57 can be maintained immobile in its various adjusted positions on the bar 55. The bar 55 provides a slidable support for the carriage 57.

In Figure 1 there is shown a patient P having a faulty posture or faulty spinal arrangement S, due to faulty feet conditions. In Figure 2 the patient P is shown having a corrected posture or spinal arrangement S, the correct posture shown in Figure 2 being obtained by positioning one of the pronator wedges, such as the pronator wedge 32, below the left foot of the patient. The left foot of the patient is indicated by the letters LF, while the right foot of the patient is indicated by the letters RF. By using the apparatus of the present invention, the operator can determine which size of pronator wedge to use in order to give the patient the correct posture, and then a build-up can be provided for the patient's shoe according to the size and shape of the pronator wedge, whereby the patient will have his or her faulty posture corrected.

The present invention is adapted to be used for analyzing ankle pronation. By means of the pair of cords or lines 47 and 48, the operator will be able to determine when the patient is standing in the proper position, since, when the operator is standing in the proper position, only one of the cords will be seen. In other words, the

cords 47 and 48 are arranged one in back of the other. The plumbs 49 attached to the bottoms of the cords are used to check alignment of the apparatus. The plate 20 is constructed so that the feet of the patient are in normal weight-bearing position at all times. The carriers 43 and 57 can be moved laterally along the respective metered bars. When the operator sees only one of the cords, the operator is in alignment with the center of the foot plate, and the plumb cords. The ribs 25 and 26 on the foot plate 20 are curved to fit the normal medial side of the foot and to help correctly position the abnormal foot. The curved heel stops 29 and 30 are arranged in alignment with each other so that when the heels of the patient's feet are placed against the stops, the heels will be aligned with each other. The arrow 31 indicates the exact center of the foot plate 20, so that the installation of the foot plate will be facilitated as for example, when the foot plate 20 is being initially installed. The pronator wedges are constructed so that when the patient stands upon these wedges, the medial arch will be lifted or raised and the medial ankle weight will be distributed properly. By using the pronator wedges, the operator will be able to determine the corrective effect which a build-up of the same size and shape will produce when used in a patient's shoes. The pronators are made in pairs and of various sizes. Also, the pronator wedges can be easily changed as desired. The graduations on the bars 41 and 55 enable the operator to make visual lateral measurements of the degree of distortion, since the carriages can be moved along the bars to thereby move the cords to the right or left of center into the widest lateral area of the distortion.

Before the pronator wedges are used, the patient stands upon a level board with the feet separated so that the weight is borne naturally by the feet. The operator then determines which of the feet has the least clearance therebeneath, and then positions the proper pronator wedge on th corresponding rib. Thus, if a person has less clearance below the right medial arch, a pronator wedge of the proper size is placed on the right side of the foot plate below the right foot, and the patient then places his or her feet upon the foot plate with the right foot placed over the right pronator wedge. The patient stands naturally, and by observing the plumb lines as a normal guide, it will be seen that this lifting of the right medial arch straightens the right ankle and forces it to the right lateral producing a correction to the distorted posture.

By means of the apparatus of the present invention, distortions or faulty postures, such as a distorted pelvis, spine, femur, tibia and fibula, can be corrected. The build-up is placed in the shoe according to the size of the pronator wedge required, so that there will be a shift in weight to affect those muscles that control the distorted posture. The double set of cords 47 and 48 insure that the operator is properly aligned with the apparatus before analyzing human distortions. Also, the apparatus of the present invention will enable the operator to determine the degree of corrective influence that will be effected by a shoe build-up of the same size and shape as the pronator wedge.

By means of the apparatus of the present invention, the possibility of error in determining the effects of an appliance worn in a patient's shoe for the correction of apparent foot disorders will be minimized, and further, by means

of the present apparatus, it is possible to ascertain whether either or both of the patient's feet are responsible for any distortions that may be suffered by the patient.

I claim:

1. In an apparatus for the analysis of ankle pronation, a horizontally disposed foot plate, a body member arranged centrally on the upper surface of said foot plate and including a pair of spaced ribs, said ribs each including an elongated portion and a curved rear portion defining a heel stop, there being opposed recesses in each of said ribs defining shoulders on opposite sides of said recesses, pronator wedges detachably connected to the elongated portion of said body members, each of said pronator wedges including a body having a flat lower surface for engaging said plate, there being a groove arranged in said body for receiving the portions of said ribs between said shoulders, a pair of horizontally disposed metered bars arranged in spaced parallel relation above said plate, a first carriage provided with a slot defining a window slidably arranged on the uppermost of said bars, a pair of cords of different colors carried by said carriages, plumbs on the lower ends of said cords arranged contiguous to said wedges and providing an indicator for the wedge adjustment, a second carriage slidably arranged on the lowermost of said bars and engaging said cords, and means for preventing accidental sliding movement of said carriages.

2. In an apparatus for the analysis of ankle pronation, a horizontally disposed foot plate, a body member arranged centrally on the upper surface of said foot plate and including a pair of spaced ribs, said ribs each including an elongated portion and a curved rear portion defining a heel stop, there being opposed recesses in each of said ribs defining shoulders on opposite sides of said recesses, pronator wedges detachably connected to the elongated portion of said body members, each of said pronator wedges including a body having a flat lower surface for engaging said plate, there being a groove arranged in said body for receiving the portions of said ribs between said shoulders, a pair of horizontally disposed metered bars arranged in spaced parallel relation above said plate, a first carriage provided with a slot defining a window slidably arranged on the uppermost of said bars, a pair of cords of different colors carried by said carriages, plumbs on the lower ends of said cords arranged contiguous to said wedge and providing an indicator for the wedge adjustment, a second carriage slidably arranged on the lowermost of said bars and engaging said cords, and means for preventing accidental sliding movement of said carriages, said last-named means comprising set screws and spring members.

MAJOR B. DE JARNETTE.

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