Jan. 27, 1931. E. J. BLISS ET AL 1,790,458

FOOT MEASURING DEVICE

Filed Nov. 4, 1925

Fig. 1.

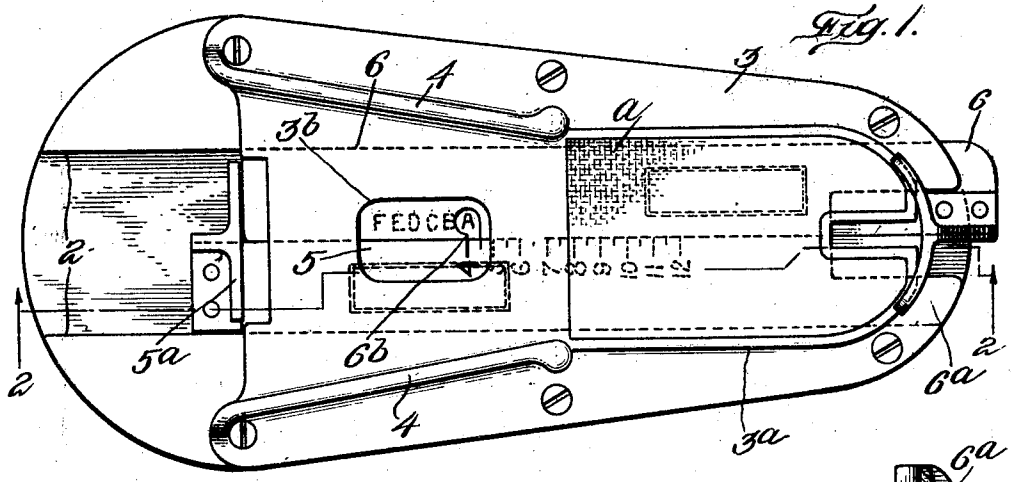


Fig. 2.

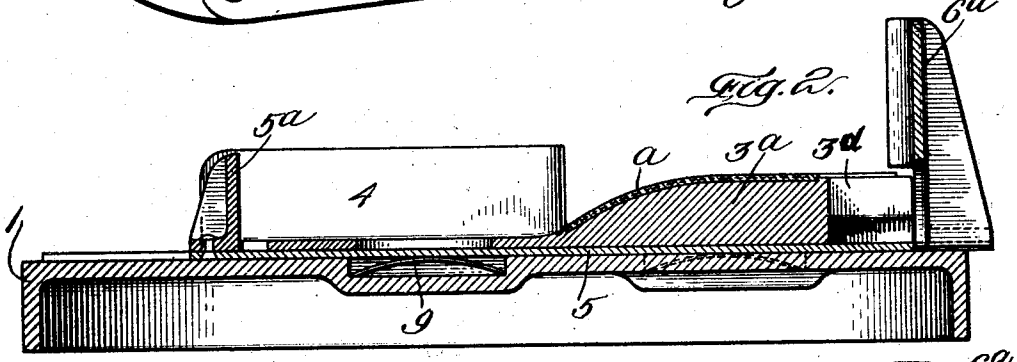
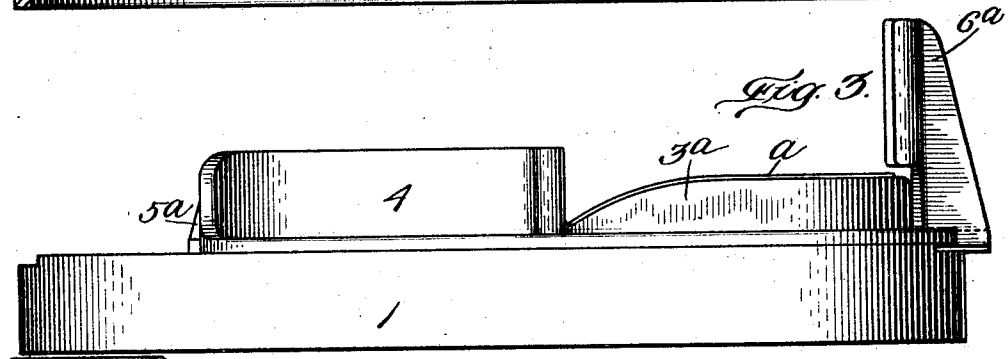


Fig. 3.



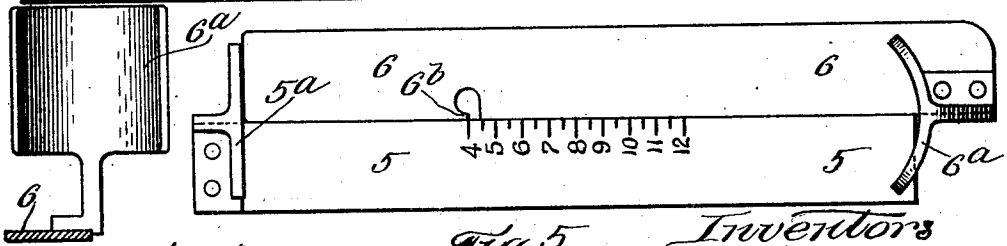


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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FOOT-MEASURING DEVICE

Application filed November 4, 1925. Serial No. 66,854.

This invention relates to the art of fitting feet with shoes of appropriate length and width, and comprises certain improvements in foot measuring devices especially adapted to the easy and convenient ascertainment of the particular size of shoe available from a commercial stock that will most nearly fit the pair of feet being measured.

In United States Letters Patent to E. J. Bliss No. 1,426,123, there is illustrated and described a form of foot measuring machine characterized by two independently movable side gauges so co-ordinated with a width size scale and pointer as to indicate width sizes in correspondence with the length of the foot.

The present invention deals with the same problem but employs width or side gauges which are fixed in place, while longitudinally movable heel and toe gauges are utilized in association with properly laid out scales to give at once the length size and the width size readings appropriate to the interposed foot being measured. Because of its greater simplicity of construction, and by reason of the fact that a single reading indicates both width and length sizes of the foot measured, this device is particularly adapted to be sent out to customers for self-measurement so that shoes of correct size may be ordered without a personal call at the store by the customer.

The principle of utilizing fixed side gauges for ascertaining correctly the width size of a human foot and of indicating the length of the foot in conjunction with such side gauges is believed to be new in the art of shoe fitting, and constitute the underlying features of this invention. These and other features of the invention will be particularly described in this specification and will be defined in the claims annexed.

In the accompanying drawings is illustrated a construction and arrangement embodying the principles of this invention in concrete form, in which:

Figure 1 is a plan view of the complete foot-measuring device.

Figure 2 is a longitudinal vertical section on the plane 2—2 of Fig. 1.

Figure 3 is a side elevation of the device.

Figure 4 is a front elevation of the heel gauge.

Figure 5 is a detail view showing the slidable heel and toe gauges in their relative positions to each other but removed from the body of the machine.

In order to make clear the principle of action of this measuring device it may be stated that while, under standard practice in shoe making and size marking of shoes, each increase in length size is equal to 1/3 of an inch, and each increase in width size is equal to 1/12th of an inch, yet the designations of length sizes are absolute and uniform, while the designations of width sizes vary according to the length of the foot. That is, for each increase in the length size measurement of a foot the width size designation drops one gradation or width size if the actual distance across the ball is the same in both cases. For example, under the standard system of shoe making and marking a No. 8 foot will measure just 1/3 inch longer than a No. 7 foot or 1/3 inch less than a No. 9 foot, and the length size numbers 7, 8, 9, or any others in the series, always denote a positive and uniform length measurement in inches and fractions of an inch. However, a foot that measures 8C will have the same actual ball width measurement in inches and fractions thereof as a No. 7D or as No. 9B; hence a No. 9B is two width sizes wider than a No. 7B, and a No. 8D will measure two width sizes or 1/6th of an inch more across the ball than will a No. 6D. In standard practice it is assumed that the ball length measurement of a normal foot, that is the length from the back of the heel to the ball-joint of the great toe, is practically equal to 2/3 of the entire length of the foot from heel to toe. Consequently, in comparatively normally proportioned feet it will be clear that if one foot measures one size length or 1/3 inch longer than another, the ball length of that foot will be $2/3 \times 1/3$ or 2/9 inch longer than the other foot. Concretely comparing an 8C foot with a 7C foot, both normally proportioned, the former will be 1/3 inch longer and 1/12 inch wider across the ball than the latter, while the ball length

of the former will be 2/9 inch longer than that of the latter.

There is one further point that should be noted in shoe making, namely, the practice of extending the toe of the last, and consequently of the shoe on which the last is made, from 1 1/2 to 4 length-sizes in excess of the actual length measurement of the foot for which the shoe is intended. These extensions or additions in length to the toe part of the shoe vary with the style of shoe and with the individual notions of the different shoe manufacturers, but it will be obvious that unless the last was made somewhat longer than the actual length of the foot the tip of the toe would press against the forward part of the toe-cap and cause discomfort. While such extensions, so-called, are always used for this reason, the length-size designation is not changed by any addition of extensions but conforms to the actual size measurement of the foot for which it is intended.

With these prefatory explanations we will now explain the construction and arrangement of our foot-measuring device which, of necessity, recognizes the size-designating practice above set forth.

The frame or body portion 1, of the device, primarily affords a means of supporting or carrying the gauging elements and, incidentally, affords a supporting platform for the foot. In the form shown the base is provided with a longitudinal shallow groove or slideway 2, in which are mounted, side by side, a pair of longitudinal slides 5 and 6. One of these, slides 5, is provided at its forward end with an upstanding stop 5*a*, forming a toe-gauge across the forepart of the machine. The other slide 6 is provided at its rear end with an upstanding heel engaging stop 6*a* adapted to gauge against the rear of the heel. These toe-gauging and heel-gauging members form a caliper provided with a length-size scale and pointer giving the length-size reading of an interposed foot.

A cover plate or top plate 3 is secured on top of the base 1 so as to bridge over the longitudinal slides 5 and 6 and keep them in position, without interfering with their sliding movements. This top plate is provided at its forward portion with two divergent upright members or gauges 4, whose angle of divergence corresponds to the increment of width measurement for each increment in ball length, that is, the width between opposite points of the gauge members 4, increases at the rate of 1/12 of an inch for each 2/9 of an inch increase in distance from the heel.

A window or opening, as shown at 3*b*, midway between the two side gauges 4, exposes to view the underneath portion of the two slides 5 and 6. One of these slides, in this case, the slide 5 forming part of the toe-gauge member, is provided with a length size scale with numbers running from 4 to 12, so as to include the full range of length sizes for men's shoes. The other slide forming part of the heel gauge member is cut out at its inner edge to leave a pointer 6*b*, adapted to travel alongside the length size scale of the toe-gauge to act, in conjunction with the length-size scale, to indicate the length size of shoe appropriate to the interposed foot being measured.

On the stationary bottom of the slideway 2, adjacent to and directly beneath the pointer portion of the heel-gauge slide, is arranged a width-size scale, the different scale lines being designated A, B, C, D, E and F successively and being spaced 2/9 of an inch apart in correspondence with the standard ball length gradations previously described. The width-indicating letters A, B, C etc., are used in preference to the width scale numerals to avoid possible confusion between the length scale numerals and the width scale.

The position of the scale indicia is definitely located as follows: a foot-form or dummy conforming in length and width, let us say, to a 7C foot under standard measurements, is placed, toe forward, between the gauges and is moved rearwardly until the ball portion or widest part of the foot-form snugly engages the two side-gauges so that further rearward movement is thereby prevented. The heel-gauging member is then moved forward into gauging contact with the heel end of the foot form, and in that position the opening that defines the pointer 6*b* also defines the location for the letter C of the width-scale. The toe-gauge is also slid back into engagement with the tip end of the toe portion of the foot-form, and when it is in that position the pointer 6*b* will define or point to the correct location for the length-scale mark to be designated by the length-size numeral 7, in correspondence with the length-size of the foot-form used.

The other length scale marks may then be laid off from the No. 7 mark thus ascertained as a starting point at intervals of 1/3 inch apart for full sizes, the numerals applied running in a consecutive ascending order toward the heel and in a consecutive descending order toward the toe. Half sizes may be indicated by intermediate marks.

The width scale marks are spaced 2/9 inch apart since, in the arrangement illustrated, they represent gradations in ball length.

To prevent accidental displacement of the heel and the toe-gauge members when the foot is removed for inspection of the indicator scales, we employ friction brakes in the form of springs 8, mounted in recesses or pockets 9, in the base so as to normally maintain a frictional contact with the slides 5 and 6, and resist any tendency on their part to jar out of place.

Since it is desirable to take the foot-measurement when the foot is expanded under the

weight of the body, with the weight thrown forward to more effectively expand the arch, the heel portion of the machine is elevated, as shown at 3*a*. The rear end of this elevated portion is recessed, as shown at 3*d*, to allow the heel-gauge 6*a* to move forward into engagement with the heel while the heel-rest is affording adequate support for the heel. To permit this forward movement, while affording support for the heel, the wider part of the upright gauge 6*a* is under-cut, as shown at 6*c*, so as to overhang the elevated portion 3*a*.

A felt covering, as shown at *a*, may be used to avoid metal contact with the foot when the device is made of metal.

In practice the person whose foot is being measured places his foot between the side gauges, drawing it rearwardly as far as the side gauges will permit. The side gauges, therefore, define the position of the ball or widest portion of the foot. The heel gauge is then moved up into gauging contact with the heel and the toe-gauge is moved rearwardly into gauging contact with the toe of the foot. The movable heel and toe-gauges, therefore, form, in effect, a size-stick for measuring the over-all length of the foot, 2/3 of that length lying normally between the ball and the heel and being taken up by the movement of the heel-gauge, while the other third of the length of the entire foot is embraced between the tip of the toe and the ball and is taken up by the movement of the toe-gauge.

While we have shown in the form illustrated the heel-gauge member provided with a pointer to register with the length-scale on the toe-gauge member, and with the width-scale on the body of the device, it will be understood that the heel-gauge or the toe-gauge member may be used as the pointer member in co-ordination with the properly laid out length-scale on the other slidable gauge member, and with the fixed or stationary width-scale on the base or body of the device. This will be apparent if we consider the measurements, for example, of a normal 7C foot in which the foot is so related to the gauges as to indicate a 7C measurement. Now suppose that a 7D foot is placed in the measuring device. In that case the additional width size at the ball of the foot will arrest or stop the rearward movement of the foot 2/9 inch in advance of the position assumed by the 7C, and the heel-gauge and the toe-gauge must, of course, advance the same distance since the length measurement of the foot is precisely the same as the 7C foot. As both scales advance to a like extent they will both move forward one step on the width scale, and, therefore, either one of them, if provided with the pointer opening corresponding to 6*a*, will expose to view the width-indicating letter D instead of, as before, the width-indicating letter C.

It will, therefore, be seen that the fixed pair of side gauges constitute the means for definitely locating or positioning the foot by reason of their engagement with the ball portion or widest part of the foot, and that all measurements are determined with reference to the predetermined location of the ball of the foot by the fixed side gauges.

What we claim is:

1. In a foot-measuring device, the combination with divergent lateral gauge members and means holding them in fixed spaced relation to each other to receive an interposed foot and form gauging contact with opposite sides of the ball portion of such foot, of longitudinally movable heel and toe gauges provided with a length-size scale and with a width-size scale indicating, respectively, the length-size and the width-size measurements of the foot when all members are in gauging contact with the foot.

2. In a foot measuring device, the combination with a base, of divergent side gauges projecting above said base in fixed spaced relation to receive and contact with the ball portion of an interposed foot, said base being provided with a width-size scale, longitudinally movable heel-gauging and toe-gauging members, one of which is provided with a length-size scale, the other of which is provided with a length-size pointer adapted to register with appropriate points of the length-size scale and also with appropriate points on said width-size scale, thereby indicating the width of the interposed foot in correlation with the length measurement thereof.

3. In a foot-measuring device, the combination with a foot-supporting base having opposite side gauges diverging forwardly at a predetermined angle for positioning an interposed foot on the support, of longitudinally slidable heel and toe gauge-members having upraised stops forming gauging contact with the heel and with the toe, respectively, of an interposed foot whose ball portion is in contact with said side gauges, one of said longitudinally slidable gauge-members being provided with a length-size scale properly associated with a pointer on the other slidable gauge-member to indicate the length size of a foot, and a fixed width-size scale coordinated with one of said slidable gauges to indicate the width-size of the foot in correlation to its length-size.

4. In a foot-measuring device, the combination with a foot-supporting element having opposite side gauges diverging at a predetermined angle for positioning an interposed foot on the support, of longitudinally slidable heel and toe gauge-members movable into gauging contact with the heel and the toe, respectively, of an interposed foot whose ball portion is in contact with said side gauges, one of said slidable gauges being

provided with an indicating pointer defined by an aperture at its inner edge portion, a fixed width-size scale located longitudinally beneath the path of travel of said apertured portion of the scale, the other slidable scale member being provided with a length-size scale extending longitudinally thereof to register with said pointer in various positions of adjustment.

5. In a foot-measuring device, the combination with a foot-supporting base provided with a raised heel portion and having fixed divergent ball-gauging members, of longitudinally slidable heel and toe-gauging members one of which is provided with a length-size scale and the other being provided with a pointer adapted to register with said scale, the raised heel portion of said base being slotted at its rear end to provide support for the heel of a foot while allowing the heel-gauge to travel forward into said slot to form gauging contact with the heel of a superposed foot.

6. In a foot-measuring device, the combination with a base adapted to provide a supporting frame for the foot being measured and having divergent side-gauges for engaging the ball portion of the foot, of longitudinally movable heel and toe gauges adapted to form gauging contact with the heel and toe, respectively, of an interposed foot to indicate, in association with a suitable scale, the size length of the foot, and means for frictionally retaining the movable gauge members against accidental displacement from gauging position.

7. In a foot measuring device for fitting shoes, the combination of forwardly divergent side gauges secured together in fixed relation, longitudinal independently movable slides arranged in juxta-position to each other, a toe-gauge member at the forward end of one slide, a heel-gauge member at the rear end of the other slide, one of said slides being provided with a length-size scale in coordination with a size-indicating pointer on the other slide, and means for frictionally holding said slides against accidental movement, while allowing them to be shifted to gauging position.

8. In a foot measuring device the combination with a base having means for engaging the opposite ball portions of a foot to position the foot lengthwise of the base according to its width, and provided with a width-size scale, of means for calipering the length of the foot wherever it may be thus positioned, said length calipering means being coordinated with said width-size scale to indicate the width measurement of the foot in correlation with its length.

9. A foot measuring device embracing in combination a base having upwardly projecting, rearwardly converging fixed side gauges adapted to engage the opposite ball portions of an interposed foot to limit the rearward position of such foot and having a width-size scale located in fixed relation to said side gauges, separate longitudinal slidable heel gauging and toe gauging members provided with means for indicating the length-size measurements of such foot wherever it may be positioned by the side gauges, one of said slidable gauges being provided with means correlated with said width-size scale to indicate the width-size of the foot in correlation to its length.

In witness whereof, we have subscribed the above specification.

ELMER J. BLISS.
CHARLES E. CLARKE.