Sept. 12, 1933. H. E. CLARKE 1,926,581

FOOT MEASURER

Filed April 24, 1930

Fig. 1

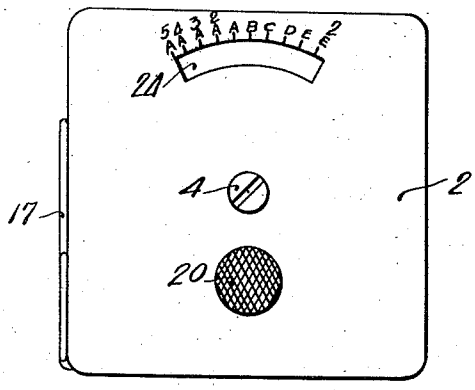

Fig. 2

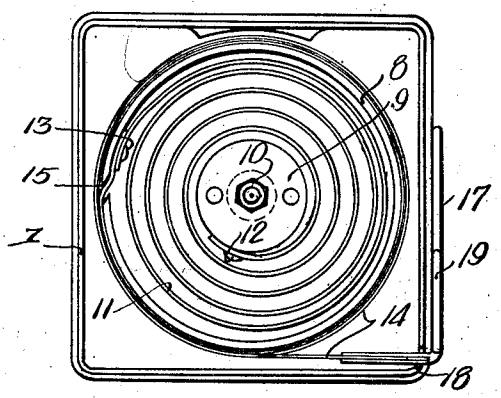

Fig. 3

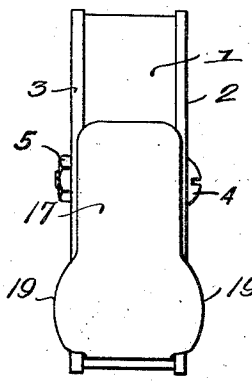

Fig. 4

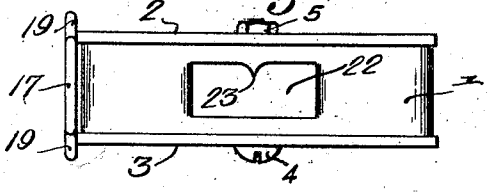

Fig. 5

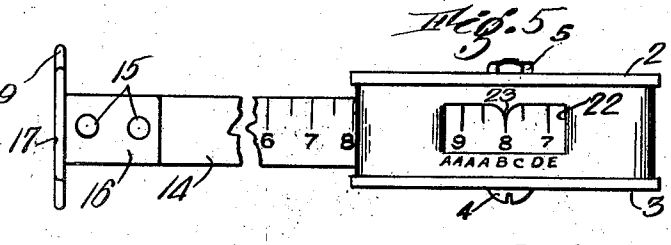

Fig. 6

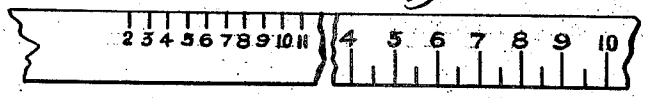

Fig. 8

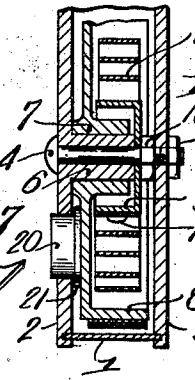

Fig. 9

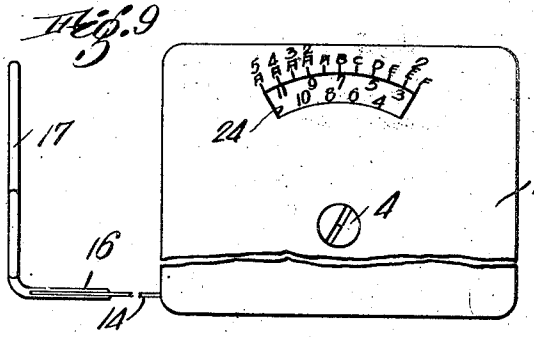

Fig. 7

Inventor
Harold E. Clarke
by Franklin T. Phillips Jr.
his Atty.

Patented Sept. 12, 1933

1,926,581

UNITED STATES PATENT OFFICE

1,926,581

FOOT MEASURER

Harold E. Clarke, West Somerville, Mass.

Application April 24, 1930. Serial No. 446,393

3 Claims. (Cl. 33—3)

My invention relates to foot measurers for measuring the human foot in terms of shoe size, both as to length and width, and it has been the special object of my invention to provide a simple, accurate and convenient device which shall be compact and inexpensive.

My device may be best understood by reference to the accompanying drawing, in which

Fig. 1 is a front view of my device, with the measuring tape wound up within it, the casing being partly broken away.

Fig. 2 is a back view of my device with the back cover plate removed.

Fig. 3 is an end view of my device.

Fig. 4 is a top view of my device as it appears with the measuring tape wound up.

Fig. 5 is a top view of my device as it appears with the measuring tape partly extended and broken away, showing length-size markings on both sides of the tape, those on the outer side of the tape appearing through the casing window.

Fig. 6 is a view of the tape, partly broken away showing the outer side of the tape and the separate length and width scales appearing thereon.

Fig. 7 is a perspective view of a small section of the flexible steel tape, showing its normal curved or arched structure.

Fig. 8 is a medial vertical cross-section of my device, showing its internal structure.

Fig. 9 is a front view of my device, broken away and reduced in height, showing the tape partly extended, and special scale markings appearing upon the back of the tape-winding drum when viewed through the curved window of the front cover plate.

Referring now more specifically to the drawing, 1 is a side casing, the opposite sides of which are fitted into grooves in the front cover plate 2 and back cover plate 3, respectively, (Fig. 8) thus making a tight box held together by a bolt 4 and nut 5.

The bolt 4 passes closely through a hollow cylindrical bearing 6, which is embraced by the hub 7 of an open drum or reel 8, which is thus rotatably mounted on the bearing 6. A cylindrical hub cap 9 is secured by the nut 10 on bolt 4, which nut retains the hub cap 9 in fixed position against the end of the cylindrical bearing 6. A helical spring 11 is attached at its inner end by means of the screw 12 to the hub cap 9, and is attached at its outer end to the inner face of the drum or reel 8 by means of the screw 13, which also secures one end of a flexible steel tape 14 which passes through a slot 15 in the face of the drum 8 and extends under the end of the helical spring 11. This tape 14, which is preferably about twenty inches long, is preferably made of spring tempered steel and arched slightly in cross-section, as shown in Fig. 7, for a purpose to be hereinafter specified. The tape 14, notwithstanding its curved or arched cross-section, will, nevertheless, lie flat on the face of the drum 8 on which it is tightly wound.

The outer end of the tape 14 is attached by rivets 15 to the split end 16 of the rectangular abutment plate 17 after passing through the slot 18 in the side casing 1. This slot 18 is of sufficient size to permit the entry of the end 16 of the abutment plate 17. The abutment plate 17 is provided with ears or thumb pieces 19, in order that it may be conveniently seized and pulled out, thus unwinding and extending the tape 14 which tends to wind up again under the influence of the helical spring 11, which causes back rotation of the drum or reel 8. To prevent such back rotation at the will of the operator, there is provided a friction brake-button 20, which is cylindrical in form and passes freely through a round hole in the front plate 2, being retained in place with normal light frictional contact with the back of the drum 8 by means of flange 21.

The top face of the side casing 1 is provided with an oblong window or opening 22, as shown in Figs. 4 and 5, through which, as shown in Fig. 5, scale markings of length-size on the outer side of the tape 14 may be read, as the tape lies on the drum or reel 8. One side of the window 22 is shaped to form a pointer 23, and the casing 1 is depressed and shaped adjacent to the edges of the window 22 so that the edges lie in fairly close proximity to the tape lying on the reel 8 beneath the window.

A curved window 24 is also provided in the upper part of the cover plate 2, the radius of curvature of its upper edge being substantially that of the drum or reel 8. Through this window 24 the back of the drum 8 is visible and on it is placed, in a manner to be hereinafter described, a scale of length sizes.

I will now proceed to explain how the several scales are organized, positioned and used. It is, of course, well known that according to the present standard of shoe-size measurement, a given width-size increases by a unit of width increase for each unit of increase of length-size. An A width is accordingly, and for example, one unit of width size wider in a size 7 shoe than is an A width in a size 6 shoe. The length sizes are designated by numbers commonly spaced in the scale one-third of an inch apart; whereas, the

width sizes are commonly designated by letters spaced one-twelfth of an inch apart. With these facts in mind, the following-described matters will be more readily understood.

For purposes of most complete convenience, three sets of scales are placed upon the tape itself—one upon the upper face of the tape, and two upon the outer side of the tape. Upon the upper face of the tape as it is extended from the drum or reel I put a scale of length sizes so positioned as to read progressively upward measuring from the abutment plate 17, as indicated by the scale markings 6, 7 and 8 on the extended portion of the tape shown in Fig. 5.

Upon the outer side of the tape, so as to be visible through the window in the top of the casing when the tape is partly rolled up on the drum or reel 8, is a second length-size scale, the position of which has been determined by extending the tape to a distance equal to any given length size, as measured between the abutment plate 17 and the opposite face of the casing 1 and then so locating the scale on the outer side of the tape and visible through the window that the numeral representing that particular length size will be opposite the pointer 23.

Located on the outer side of the tape also is a second scale shown in Fig. 6 on the part of the tape to the left of the scale last described above, which second scale is graduated at intervals of one-twelfth of an inch, namely, the intervals of shoe-width size, but marked with the numerals of length size running in inverse order. The position of this second scale on the outer side of the tape has been determined, in a manner to be hereinafter described, with reference to a scale of shoe width-sizes placed upon the top of the casing 1 below the window as shown in Fig. 5, the letters indicating width size being spaced apart one-third of an inch. To locate this second scale upon the outer side of the tape, the tape is extended till the abutment plate 17 is separated from the opposite face of the casing 1 by a distance equal to the width of a given width size—let us say 7B and the width size scale mark 7 on the above-described second scale on the back of the tape is placed opposite the B on the scale on the top of the casing and used as a point of reference for locating the remainder of this second scale on the outer side of the tape.

There is also a second scale of width sizes placed on the front cover plate 2 above the curved window 24, the top edge of which is an arc of a circumference corresponding substantially with that of the surface of the drum or reel 8, and centered upon the axis of the drum. The letters on this scale on the cover plate 2 are spaced radially against leaders or graduation marks radially arranged, as shown in Figs. 1 and 9, and spaced at the curved top of the window at intervals of one-twelfth of an inch. Through the window 24 is visible a portion of the back of the drum or reel 8 upon which has been placed a scale similarly graduated as to spacings but bearing length-size markings in reverse order. The scale on the back of the drum 8 bearing length-size markings spaced as aforesaid is located upon the drum by extending the tape 14 a distance equal to a certain width size, which is, of course, based upon an element of length size, and placing that length-size figure upon the scale in question opposite the corresponding width-size marking on the scale on the cover plate 2 above.

Although I have shown in the drawing the window 24 having its top edge coinciding substantially with the curve of the reel surface, it is to be understod that the top edge may be placed lower, so long as its curvature is centered on the axis of the reel, in which event the spacing of the letters of the scale above the window will be condensed, as the letters are, in any event, placed opposite leaders spaced to coincide with radial leaders or graduation marks on the back of the drum or reel, which radial leaders are spaced so as to indicate the angular displacement of the reel occasioned by extending the tape a distance or amount equal to a unit of shoe width-size variation, namely, one-twelfth of an inch.

The operation of my device is as follows:

To measure length of the foot, the tape 14 is extended and the tape is applied to the sole of the foot with the longest toe in contact with the abutment plate 17 and the heel in contact with the opposite side of the casing 1, or vice versa. The steel tape 14, owing to its curved construction, will extend outwardly in a fairly rigid condition, thus maintaining the upright position of the abutment plate 17 in a parallel relationship with the opposite side casing and greatly facilitating the application of my device to the foot.

When the device is removed from the foot, the tension of the spring 11 tends to revolve the drum or reel 8 and wind up the tape 14 upon it. Such action is promptly checked, as the device is removed from the foot by thumb pressure upon the brake button 20, so that scale readings may be observed with the tape at rest and extended to the extent that it was extended by the foot. The length reading may then be taken at either of two places, namely, either from the scale on the upper face of the tape, where it is extended, reading the scale with reference to the adjacent edge of the side casing 1 or from the conventional length-size scale on the outer side of the tape which has now come into view in the window on the top of the casing 1. The reading here is taken with reference to the pointer 23.

To measure the width of the foot, the tape is extended and applied to the foot across the ball-joint portion thereof, with the sides of the foot embraced between the abutment plate 17 and the opposite side of the casing 1. The second scale on the outer side of the tape, namely, that bearing length-size markings but graduated at intervals of width size, now appears in the window on the top of the casing 1, and a reading is taken from the scale of width-sizes beside the window on the top of the casing 1 at the point opposite that length numeral, on the scale now appearing through this window, which has been previously determined as representing the length measurement of the foot being measured.

A width reading may also be had by observing, in the window in the upper part of the cover plate 2, (Fig. 9) the position of the previously-ascertained length-size number on the scale on the back of the drum as related to the lettered scale of width-size markings on the cover plate above. It will be readily understood, of course, that this last-described means for ascertaining width size is a supplementary means added for the purpose of further convenience. It will also be readily understood that either of the length-size scales upon the tape may be dispensed with and use may be made of the other by taking readings at the appropriate place in the manner described.

Although I prefer to use the curved steel tape above described because of the advantage stated, it is apparent that a flat steel tape or a fabric

tape might be employed. The curved steel tape will, notwithstanding its curvature, lie flat upon the drum because it will flatten when winding; and, being very thin, the effective winding diameter of the drum is not appreciably increased as the winding up of the tape progresses.

My device has the great advantage of being very simple and compact, and may, therefore, be conveniently carried in the pocket of the shoe salesman.

Having thus fully described my invention, what I claim is:

1. In a device of the character specified the combination of a revolubly mounted reel, a flexible tape attached to said reel and provided with a scale of shoe length-sizes on the outer side thereof and also provided on the outer side thereof with a second scale graduated at intervals of shoe width-size variation but marked with numerals of shoe length-size, a casing provided with a window through which the outer side of said tape wound on said reel is visible and provided also with a scale marked with shoe width-sizes and graduated at intervals of shoe-width size variation, said scale of width-sizes being located along one side of said window and said scale of shoe length-sizes on the outer side of said tape being so located that the amount of extension of said tape beyond said casing in terms of shoe length may be indicated by means of the position of said scale of shoe length-sizes with respect to a designated point on said casing associated with said window, and said second scale on the outer side of said tape being so located that the amount of extension of said tape beyond said casing equal to the width of a given shoe width-size as co-ordinated with a given shoe length-size will be indicated by the association of the said second scale marking for that given length-size with the given width-letter on said scale marked with shoe width-size located along one side of said window, and means for exerting a winding force on said reel.

2. In a device of the character specified the combination of a revolubly mounted reel, a flexible tape attached to said reel, a casing provided with an opening through which said tape may extend and also provided with a curved window in the side thereof, the top of which has a curvature representing an arc of a circle centered upon the axis of rotation of said reel, and provided also, above said window, with a scale of shoe width-sizes graduated at equal radial intervals above said window, which interval represents the angular displacement of said reel when said tape is extended a distance equal to a single unit of shoe width-size variation, the reel being provided with a scale of shoe length-sizes, said scale being arranged, in indicating position, to read in descending order from left to right, the graduations of which are radially spaced like those of said scale of shoe width-sizes, said scale being located on the back of said reel in a position such that when said tape is extended to an amount equal to a given shoe width-size as co-ordinated with a given shoe length-size that length-size marking on said scale of shoe length-sizes on the reel will coincide with the given width-size marking on said scale of width-size markings on said casing, and means for rotating said reel.

3. In a device of the character specified the combination of a revoluble means, a casing within which said revoluble means is mounted, said revoluble means comprising a reel and a flexible tape wound thereon, said casing being provided with an opening through which the end of said flexible tape may be withdrawn thereby unwinding the same in part from said reel and revolving said revoluble means, said revoluble means being provided with a scale, said scale being arranged, in indicating position, to read in descending order from left to right, of shoe length-sizes spaced at radial intervals which correspond to the extent of angular displacement of said revoluble means when influenced by the extension of said tape beyond said casing for a distance equal to a unit of width-size variation, said casing being provided with a window through which said scale may be observed, and a second scale of shoe width-sizes located adjacent the edge of said window and arranged to be read with reference to said first mentioned scale, said scales both being so located that, when said tape is extended to a distance from said casing equal to a given width-size as co-ordinated with a given length-size, that scale marking on said revoluble means numbered in terms of shoe length-size may show said length-size number opposite the appropriate width-size letter on said scale adjacent said window.

HAROLD E. CLARKE.