March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 1 of 7

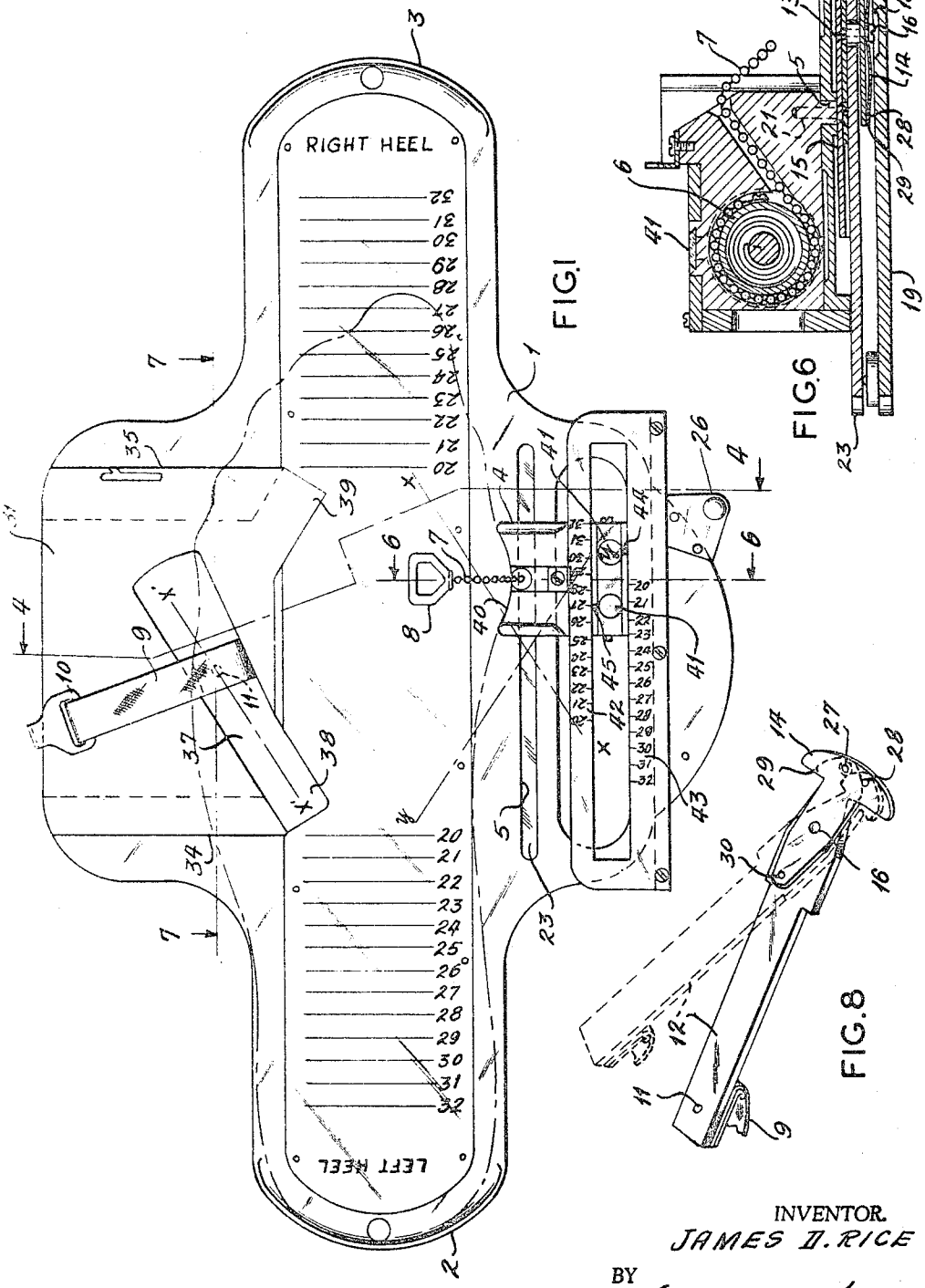


FIG. 1

FIG. 6

FIG. 8

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March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 2 of 7

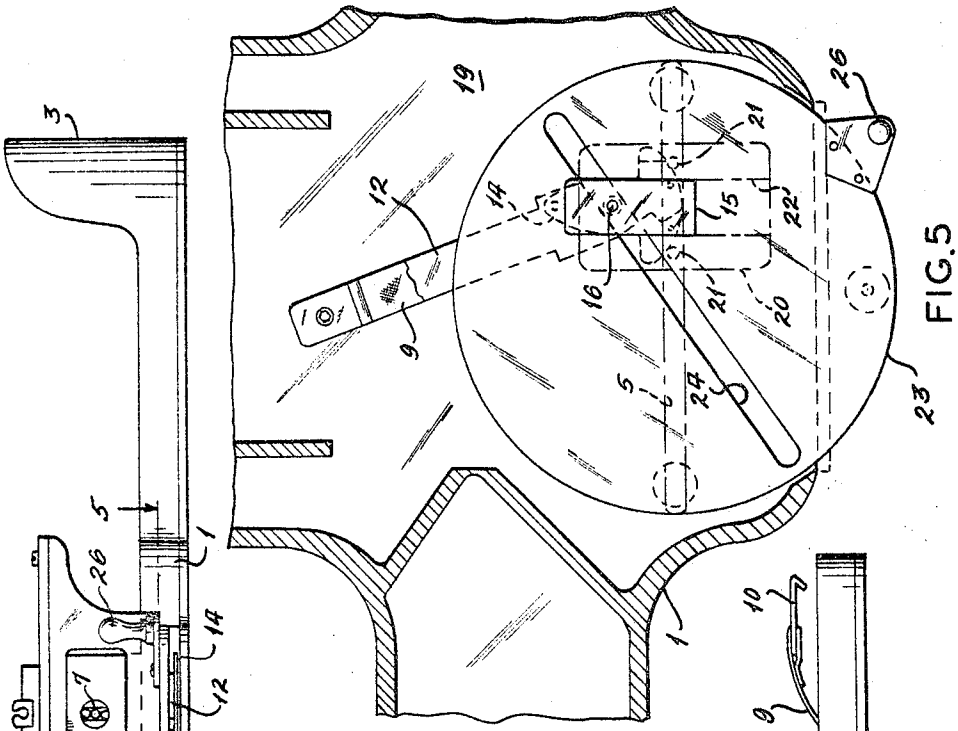


FIG. 5

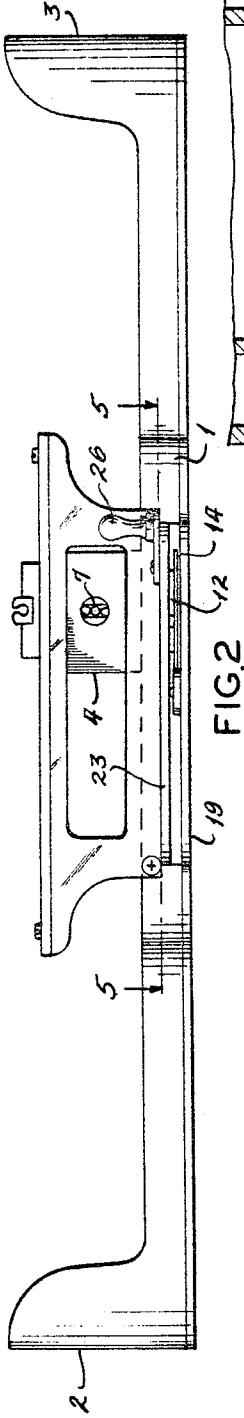


FIG. 2

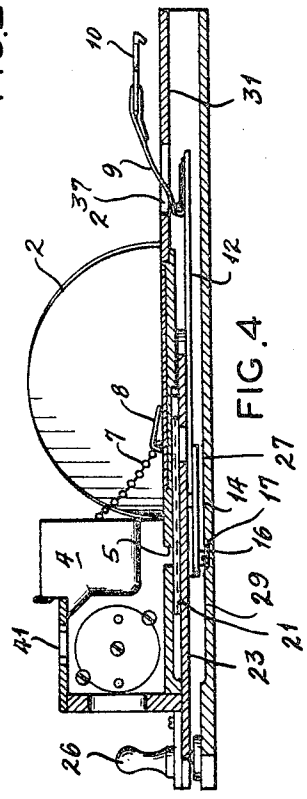


FIG. 4

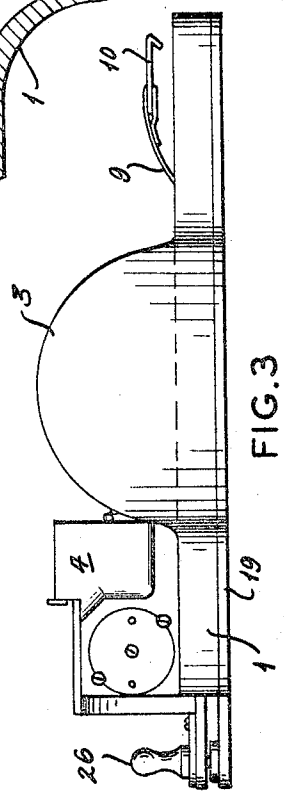


FIG. 3

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March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 3 of 7

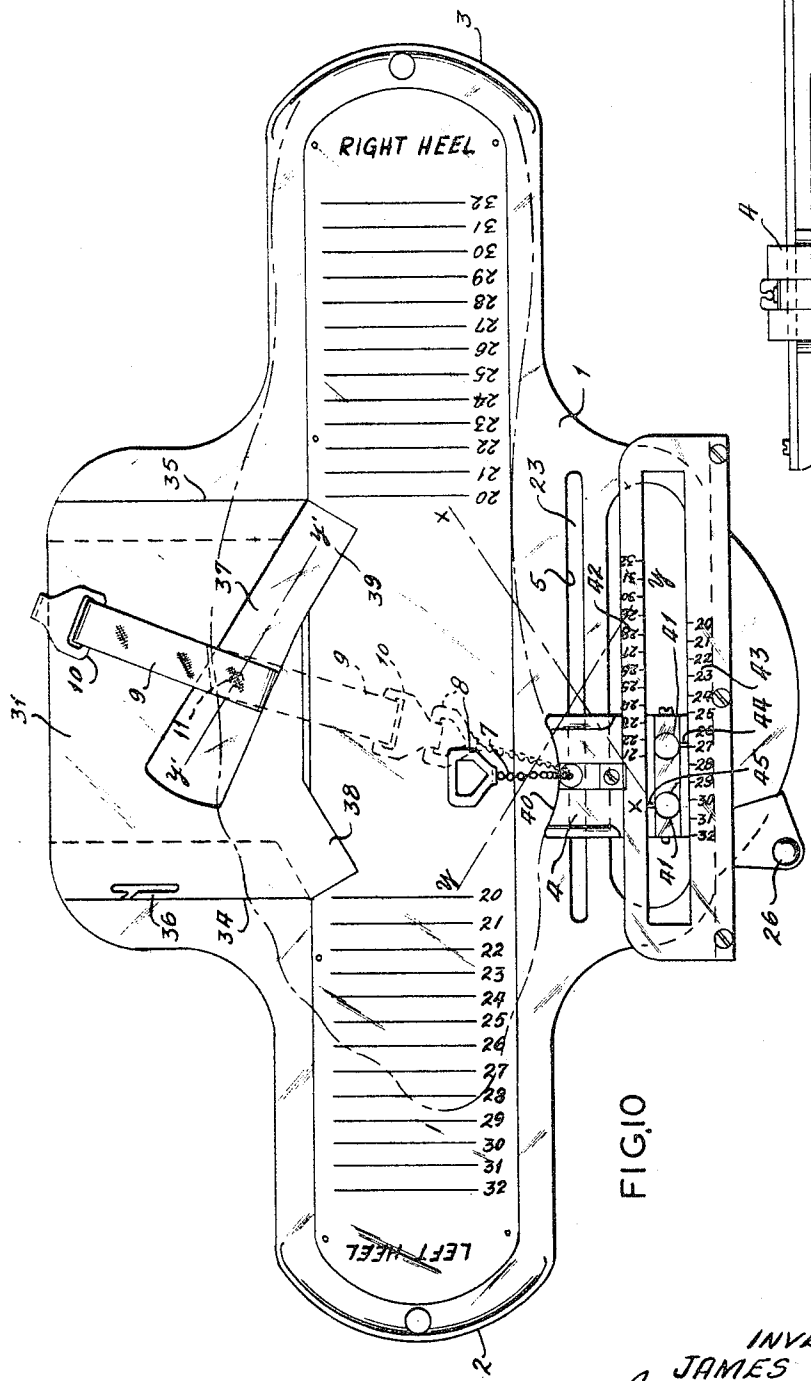


FIG. 10

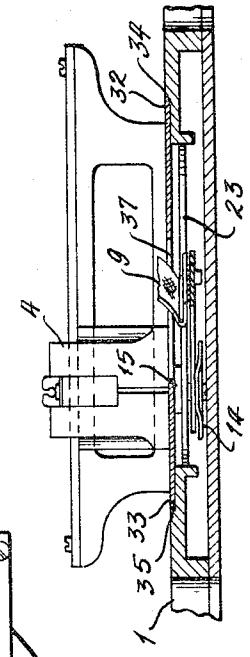


FIG. 7

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March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 4 of 7

FIG.11

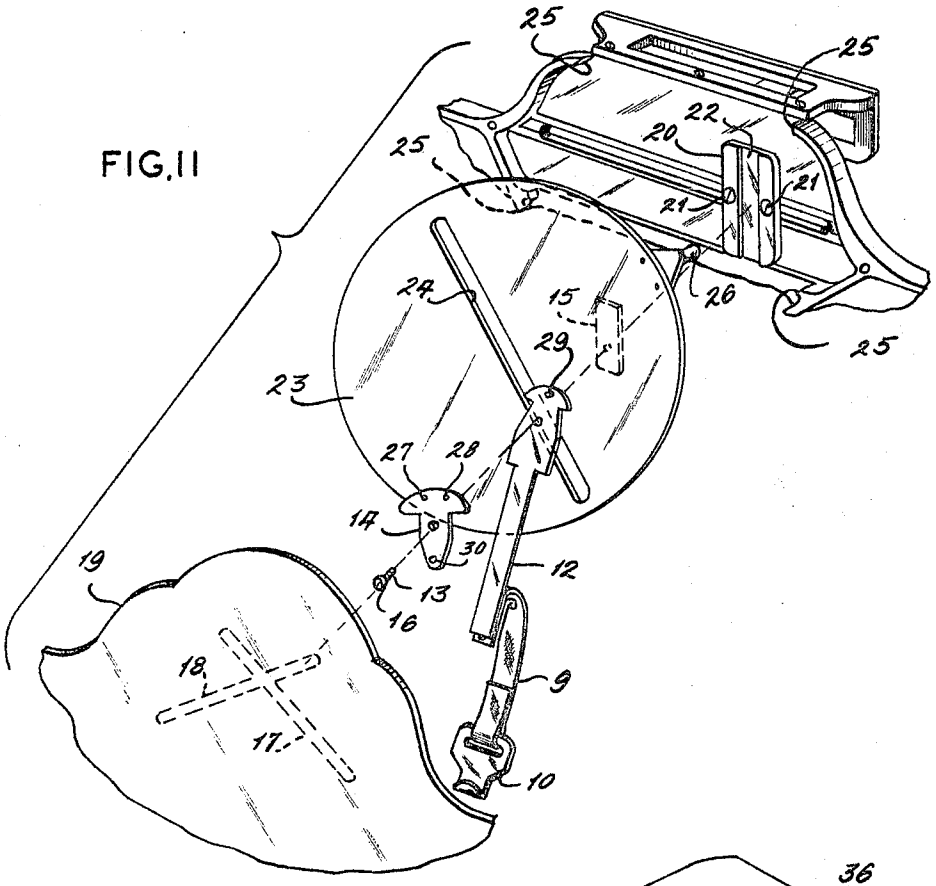
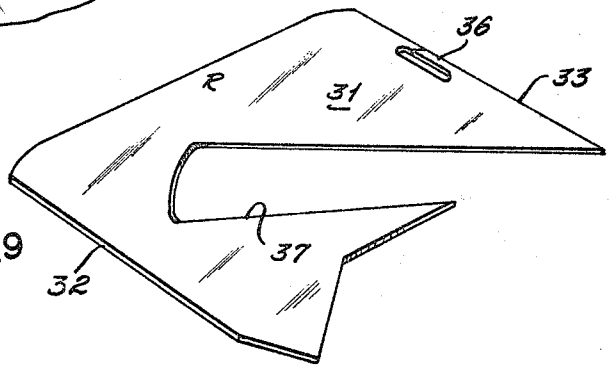


FIG.9



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March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 5 of 7

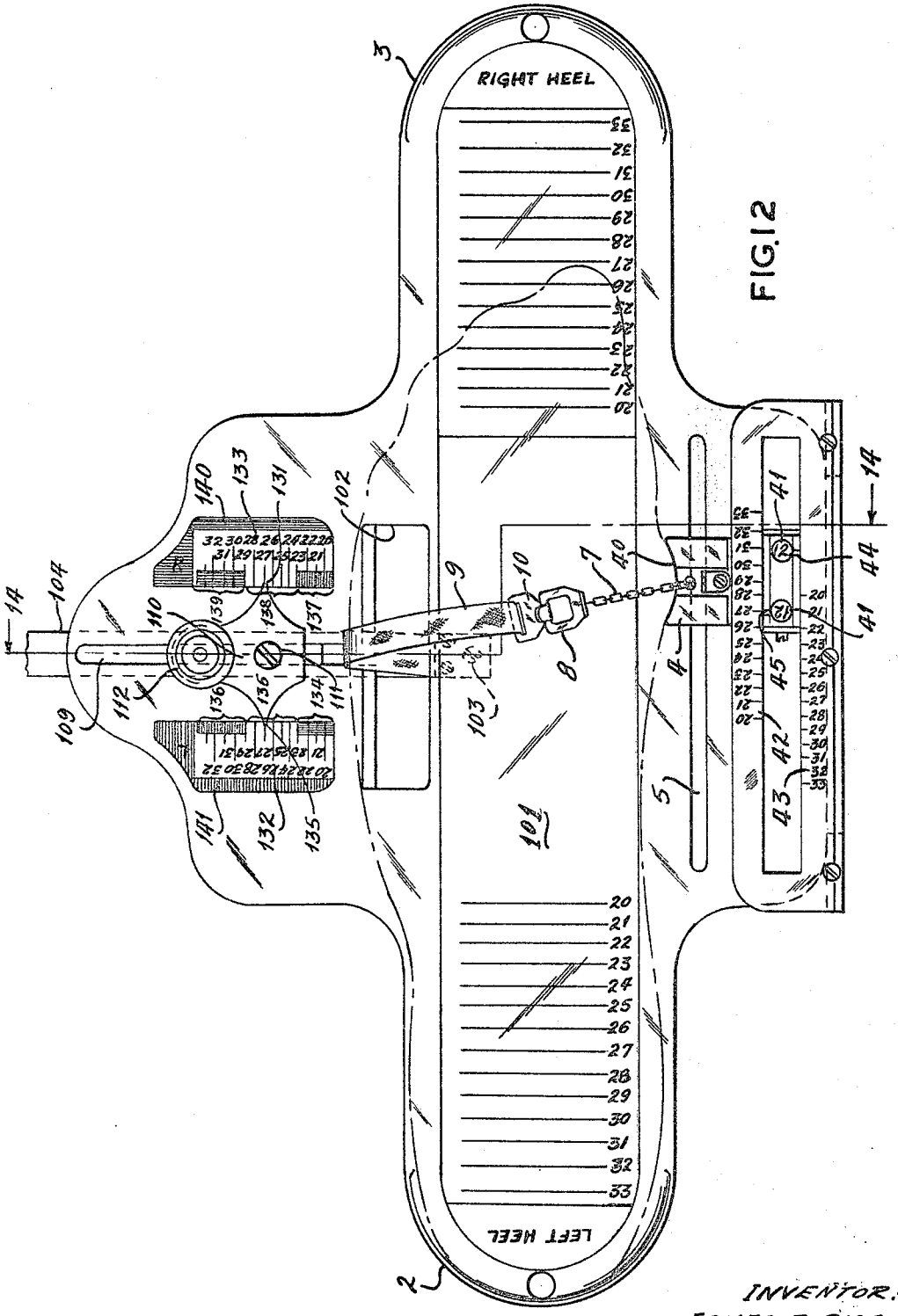


FIG. 12

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SHOE FITTING

Filed Feb. 28, 1967 Sheet 6 of 7

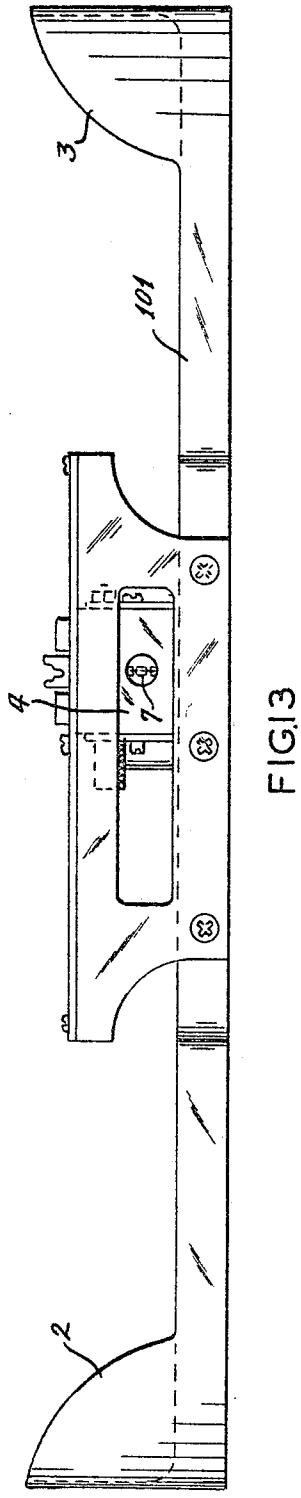


FIG.13

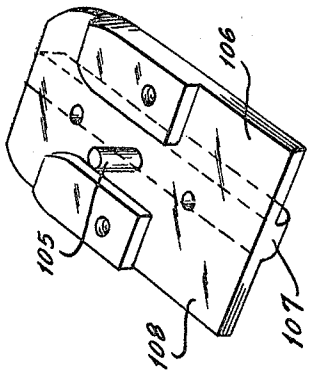


FIG.17

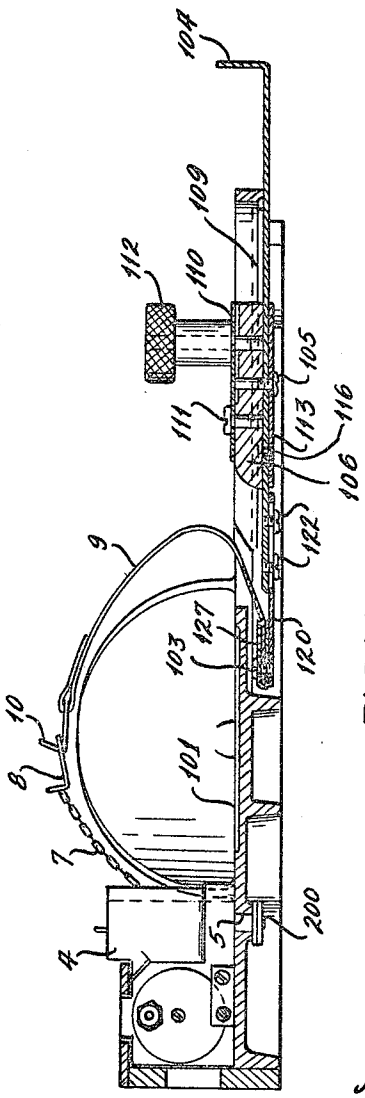


FIG.14

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March 18, 1969 J. D. RICE 3,432,928

SHOE FITTING

Filed Feb. 28, 1967 Sheet 7 of 7

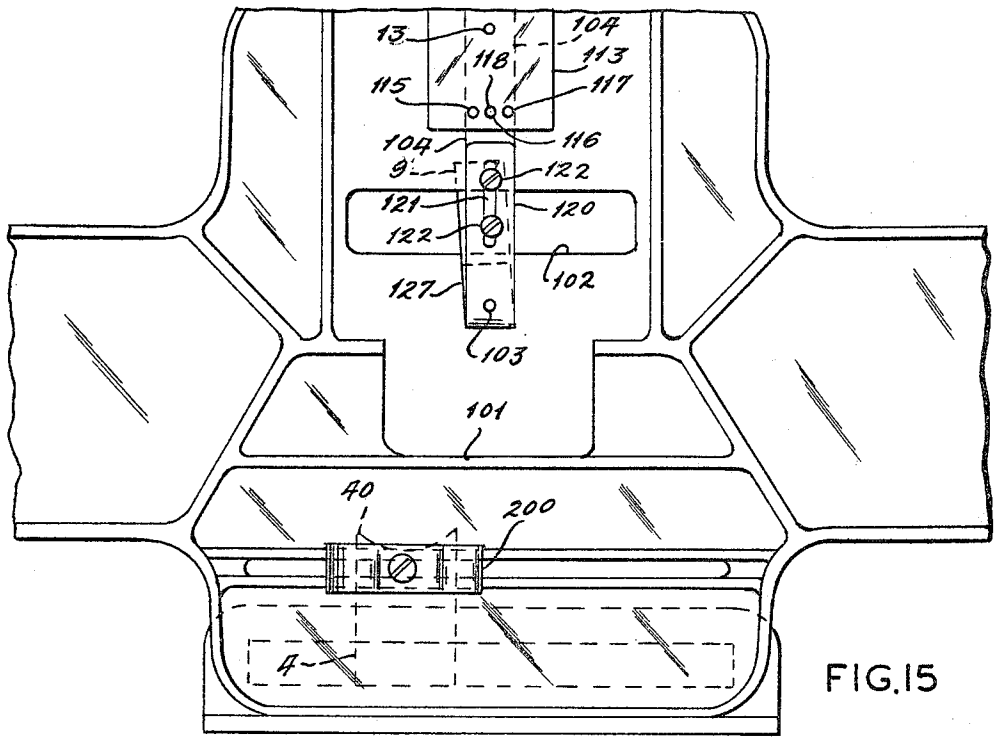


FIG.15

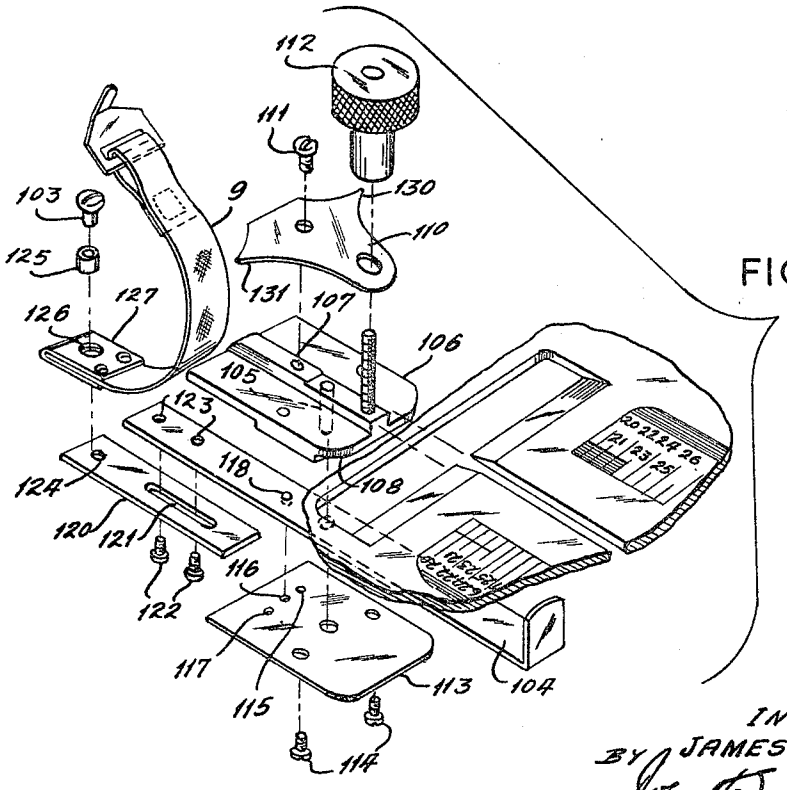


FIG.16

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United States Patent Office 3,432,928 Patented Mar. 18, 1969

3,432,928

SHOE FITTING

James D. Rice, Hendersonville, Tenn., assignor to Genesco, Inc., Nashville, Tenn., a corporation of Tennessee

Continuation-in-part of application Ser. No. 340,316, Jan. 27, 1964. This application Feb. 28, 1967, Ser. No. 619,436

U.S. Cl. 33—3 8 Claims

Int. Cl. A43d 1/02

ABSTRACT OF THE DISCLOSURE

A foot measuring device for use in fitting shoes to human feet having two or three pairs of oppositely readable length scales, and one pair of oppositely readable ball girth scales. The ball girth scale is on a reel which is mounted on a movable seat for accommodating the inside ball of the foot. On the reel there is wound a short length of chain which may be pulled out, against the bias of a spring to bring successive ball girth indicia into view. The free end of the reeled chain is connected to one end of a piece of flexible measuring tape, the opposite end of which is pivotally anchored, and the anchorage is movable lengthwise and cross-wise of the device to accord with the foot being measured.

This application is a continuation-in-part of my application Ser. No. 340,316, filed Jan. 27, 1964, now abandoned.

This invention relates generally to the fitting of shoes to feet, and particularly to apparatus for such purposes. The purveyors of shoes are customarily equipped with devices to measure the overall length of the prospective customer's foot, i.e., heel to toe, which, in the art, is termed the "stick length." Such measuring devices are provided with a scale graduated by inches, by shoe "sizes," or other units of measure. Occasionally, such purveyors are also provided with equipment which measures other dimensions of the prospective customer's foot as, for example, the "ball girth."

In the fitting of shoes to feet, however, it is, more often than not, critical with respect to comfort that the heel to ball measurement of the foot and the shoe accord with more precision than is usually given in shoe purveying establishments.

Accordingly, it is an object of the present invention to provide an apparatus which at once indicates not only the stick length and the ball girth, but also the heel to ball dimension of the foot being measured.

A further object of the invention is to provide a device of the character described which is adaptable to measure both right and left feet.

Other objects of the invention will become apparent from the following description.

Generally stated, the apparatus of the present invention comprises a foot rest having a heel abutment at one end, and a stick length measuring scale having its origin at the heel abutment, but positioned to be readable at the end of a big toe on a foot whose heel is adjacent the heel abutment, together with a movable carriage having a part conformd to accommodate the inside ball of the foot, which carriage is adjustable lengthwise of the foot rest so as to accommodate the inside ball of feet whose heel to ball dimension varies widely. The carriage is equipped not only to measure the heel to ball length, but, while fitted in conformity with the inside ball of a foot, also to measure from that point of origin the ball girth of the foot.

Preferably, the apparatus contemplated by the present

invention is adapted to measure both right and left feet from the same carriage, and accordingly the device is equipped with a plurality of either heel abutmnts on the foot rest, or inside ball receiving conformities on the carriage; and in either event, the carriage is provided with a flexible girth measure having an anchorage movable with the carriage, but differently oriented for measuring the right foot than for measuring the left foot. In the preferred form of the invention, the foot rest is provided with two heel rests, one for the right, the other for the left foot, and a pair of stick length scales each having its point of origin at the heel rest remote from it; and with the aforesaid carriage having a single inside ball joint conformity located centrally of the two heel abutments, but movable relative thereto lengthwise of the foot rest for a distance sufficient to accommodate a full range of variation in ball length measurements for normal feet. The invention also contemplates a two-part flexible girth measure, one part being wound upon a reel which is biased to retract the one part, and the other part being anchored elsewhere, and preferably beneath the foot rest, but movable across the top of a foot on the device so as to connect with the reel-anchored part. The point of anchorage of the last-mentioned part is variable, depending upon the heel to ball dimension of the foot being measured. Such variation is accomplished, in accordance with the present invention, either automatically or manually, as illustrated in FIGURES 1 through 11 of the accompanying drawings for the automatic version, and in FIGURES 12 through 17 for the simplified manual version.

The two forms of the apparatus are shown in the drawings, in which:

FIGURE 1 is a plan view of the automatic version of a device embodying the present invention, and shown with its parts in position for measuring a left foot;

FIGURE 2 is a view in side elevation of the device shown in FIGURE 1;

FIGURE 3 is a view in end elevation of the device shown in FIGURE 1;

FIGURE 4 is a sectional view taken along line **4—4** of FIGURE 1;

FIGURE 5 is a sectional view taken along line **5—5** of FIGURE 2;

FIGURE 6 is a sectional view taken along line **6—6** of FIGURE 1;

FIGURE 7 is a sectional view taken along line **7—7** of FIGURE 1;

FIGURE 8 is a perspective view of a movable anchorage for one part of the girth measuring device shown in FIGURES 1, 4, 5 and 7;

FIGURE 9 is a perspective view of a reversible slide plate for accommodating the movable anchorage of the girth measuring device;

FIGURE 10 is a plan view of the device shown in FIGURE 1, with the parts arranged for measuring a right foot;

FIGURE 11 is an exploded view of the parts for moving and reversing the anchorage for the girth measuring device;

FIGURE 12 is a view corresponding to FIGURE 1, but showing the simplified or normal version of the invention;

FIGURE 13 is a view in side elevation taken from the upper side as seen in FIGURE 12;

FIGURE 14 is a sectional view taken along line **14—14** of FIGURE 12;

FIGURE 15 is a bottom plan view of a part of the device shown in FIGURE 12, which replaces the part shown in FIGURE 5 for the automatic device;

FIGURE 16 is an exploded view of the parts for mov-

ing and reversing the anchorage for the girth measure as employed in the embodiment shown in FIGURE 12; and

FIGURE 17 is a bottom side perspective view of a cross-head shown in FIGURE 16 as seen from the top side.

Referring now to the drawings for an illustrative embodiment of the automatic version of the invention, and particularly to FIGURE 1, there is shown a shoe fitting device having a base **1**, of length sufficient to accommodate the feet to be measured, and provided at one end with a left heel rest **2**, and at the other end with a right heel rest **3**. The endward parts of the base **1** are provided with separate "stick length" measuring scales, each of which is identical, except that the numeric values are printed upside down with respect to each other, the scale for measuring the left foot having its point of origin at the left heel rest **2** and its numeric values located at the end of base **1** which is adjacent the right heel rest **3** (so as to be readable from right heel rest end), while the scale for measuring the right foot has its point of origin at the right heel rest **3** and the numeric values are at the opposite end so as to be readable from the left heel rest end.

Centrally of the base **1**, there is a girth measuring device, part of which is on one side, and the balance on the other. At the lower side of the fitting device, as shown in FIGURE 1, there is a carriage **4**, which is traversable back and forth along slot **5** in base **1**. The carriage **4** contains a spring-biased reel **6**, to which is anchored a flexible, but not stretchable, girth measuring member in the form of chain **7**, having a loop **8** at its outer end. At the upper side of the fitting device, as seen in FIGURE 1, there is a flexible strap **9**, having a hook **10** at its outer end for cooperating with loop **8** in the measurement of the ball girth of a foot.

Strap **9** is anchored at **11** to a lever **12**, which is pivoted for movement about a pin **13** (see FIGURE 11) at a position beneath carriage **4** and in line with slot **5** when the carriage **4** is located substantially midway of the ends of slot **5**. The mounting of lever **12** is such that it responds to movement of carriage **4**, but is also movable relative thereto in the direction perpendicular to slot **5**, as seen in FIG. 1, and during such movement, the path of pivot pin **13** is either along line *x*—*x* (for measuring the left foot), or line *y*—*y* (for measuring the right foot), depending upon the appropriate setting of the apparatus now to be described. The angularity of grooves **17** and **18** relative to the direction of traverse of carriage **4** is such as to correspond with the "gradient" on which shoes are graded between "sizes" of the same width; and, in the embodiment shown, the angularity comports with the gradient taught in the copending application of Charles W. Mann, Ser. No. 322,122, filed Nov. 7, 1963, now Patent No. 3,321,833 issued May 30, 1967 to wit: about 0.54 (±10%) units of ball girth to each whole unit of length. This "gradient" is not uniform in the industry, but substitution of a bottom plate such as **19**, with is grooves angled to correspond with the gradient of the shoes in stock at a given location, will adapt the device for the appropriate measurements.

For clarity of illustration, thte lever **12** is shown in FIGURE 8 in upside down relationship to that shown in FIGURE 1. The pivot pin **13** interconnects lever **12** with a relatively movable T-shaped member **14** and a follower **15**, as clearly shown in FIGURES 6 and 11. The pivot pin **13** secures T-shaped member **14** and follower **15** against movement relative to each other, and the head **16** of pin **13**, on the lower side thereof, is arranged to ride alternately in grooves **17** and **18** in bottom cover plate **19**. The grooves **17** and **18** are, respectively, aligned with lines *x*—*x* and *y*—*y* in FIGURE 1. The head **16** of pin **13** rides in groove **17** when a left foot is being measured, and rides in groove **18** when a right foot is being measured, and the parts are arranged so that when carriage **4** is positioned centrally of slot **5**, pin head **16** will lie at the intersection of grooves **17** and **18**, so as to be transferable from one groove to the other.

The reason for the angular disparity between grooves **17** and **18** is that when a left foot is being measured, the anchorage point **11** on lever **12** is preferably moved in response to movement of the carriage **4**, along a path delineated by line *x'*—*x'* in FIGURE 1, whereas when a right foot is being measured, said point **11** is preferably moved, in response to movement of carriage **4**, along a path delineated by line *y'*—*y'* in FIGURE 10.

Movement of point **11** along either of paths *x'*—*x'* or *y'*—*y'*, in response to movement of carriage **4**, along slot **5** is effected by interconnecting follower **15** with a cross-head **20** fixedly secured by a pair of screws **21** to the bottom of carriage **4** with base **1** intervening. The screws **21** extend through slot **5**, and are slidable relative thereto, thus acting to confine the traversing movement of carriage **4** to the course defined by slot **5**. To effectuate this connection, cross-head **20** is provided with a parallel-sided groove **22** proportioned to slidably receive the follower **15**. Groove **22**, in the embodiment shown, is permanently oriented in 90° relationship with slot **5**, so that as the carriage is moved lengthwise of slot **5**, pivot pin **13** moves lengthwise of slot **5** in the same degree, but compounded with that movement is a transverse movement of pivot pin **13**, which is caused by the structure now to be described. A cam plate **23**, having a diametrical slot **24**, is interposed between lever **12** and follower **15**. The cam plate, like lever **12** but unlike follower **15** and T-shaped member **14**, is movable relative to pivot pin **13**. Pivot pin **13** extends through slot **24** in cam plate **23**, and is movable relative thereto. Cam plate **23**, in the form shown, is of circular periphery and is rotatable about an axis which (when the head **16** of pivot pin **13** is at the intersection of grooves **17** and **18**) is substantially coincident with pivot pin **13**. Cam plate **23** is confined by shoulders **25** on the underside of base **1**, so that its only movement relative to base **1** is rotational movement about the axis aforesaid. Cam plate **23** is provided with a handle **26**, whereby the cam plate may be rotated from the position shown in FIGURE 1 for measuring the left foot to the position shown in FIGURE 10 for measuring the right foot. In the FIGURE 1 position, slot **24** in the cam plate is aligned with groove **17** in the bottom cover **19** for measuring the ball girth of the left foot, while in the FIGURE 10 position of handle **26**, slot **24** in the cam plate is aligned (as shown in dotted lines in FIGURE 5) with groove **18** in the bottom cover **19** for measuring the ball girth of the right foot. However, such transference of the path of pivot pin head **16** between grooves **17** and **18** does not fully effectuate the interchange of the apparatus from adaptability for measuring ball girth of one foot to adaptability for measuring ball girth of the other foot.

Except in the case of extremely abnormal feet, the ball girth dimension is not perpendicular to the length dimension of the foot. In normal and near-normal feet, the outside ball of the foot is located substantially behind the inside ball. This condition dictates that, regardless of which foot is being measured, anchorage point **11** on lever **12** must be in trailing relationship (i.e., toward the heel) with respect to pivot pin **13**. Consequently, in the position of parts shown in FIGURE 1 for measuring the left foot, anchorage point **11** is closer to the heel than is the center of carriage **4**, and while in the position of the parts shown in FIGURE 10 for measuring the right foot, anchorage point **11** is still closer to the heel than is the center of carriage **4**, the heel is at a different end or base **1**. To maintain this trailing relationship of point **11** relative to the center of carriage **4**, regardless of which foot is being measured, lever **12** has two positions relative to T-shaped member **14**. In FIGURE 8, there is shown, in full lines, the relative positions of lever **12** and T-shaped member **14** when the right foot measurement is being made (it being remembered that FIGURE 8 shows the

parts in upside down relationship to the showing of FIGURES 1, 4, 5, and 6), while the dotted lines in FIGURE 8 show the relative position between lever **12** and T-shaped member **14** when a left foot is being measured. These two alternate positions of lever **12** are accomplished by providing two recesses, or holes, **27** and **28** in the tail-piece of T-shaped member **14**, and providing on the tail-piece of lever **12** a projection **29** for alternate engagement as a detent with either recess **27** or **28**. The T-shaped member **24** is preferably constructed of material having a sufficient spring characteristic to permit projection **29** to be forcibly disengaged from recesses **27** or **28** when desired, and is preferably also provided with a dimple **30** for engagement with the adjacent surface of lever **12**, whereby to bias T-shaped member **14** in a direction such as to maintain the detent engaged.

At the side of base **1** opposite carriage **4**, there is provided a removable plate **31** shown in FIGURE 9. The plate **31** has opposite double-beveled edges **32** and **33**, which are accommodated by undercut shoulders **34** and **35** in th ebase **1**, as shown in FIGURE 7. Along the edge **33** of plate **31**, there is provided a cantilever spring finger **36**, which exerts sufficient pressure against the adjacent undercut shoulder to maintain the plate in position relative to base **1**. The plate **31** is cut out, as shown at **37**, to permit strap **9** to extend from anchorage **11** below the plate to a position above the plate (and above base **1**) for interengagement with chain **7** in the process of measuring ball girth, and to permit lever **12** with strap **9** to be traversed along the path delineated by line *x'—x'* when measuring the left foot pursuant to movement of carriage **4** along the path delineated by slot **5**. Cut-out **37** in plate **31** cooperates at its open end with a cut-out portion **38** in base **1** when measuring the left foot, or with a cut-out portion **39** in base **1** when measuring the right foot, thereby to permit greater amplitude of movement of strap **9** toward the position necessary to measure the ball girth in the smaller sizes of feet. When it is desired to adapt the apparatus for measuring of the right foot, plate **31** is slid outwardly and turned over and end-for-end, and reinserted, so that cantilever spring finger **36**, instead of being adjacent shoulder **35** as shown in FIGURE 1, is adjacent shoulder **34** as shown in FIGURE 10, and cut-out **37**, instead of aligning with cut-out **38** as shown in FIGURE 1, aligns with cut-out **39** as shown in FIGURE 10.

In order to convert the apparatus from the condition of parts necessary to measure the left foot to the condition of parts necessary to measure the right foot, carriage **4** is moved to its central position along slot **5**, and while in that position, with or without removing slide plate **31**, lever **12** is engaged and manually moved so that detent **29** disengages recess **28** and engages recess **27**, thereby assuming the position shown in full lines in FIGURE 8. Handle **26** is then moved from the position shown in FIGURE 1 to the position shown in FIGURE 10. Slide plate **31** is then reversed, as above described, and the apparatus is now in condition for measuring a right foot, the heel of which is to be against heel rest **3**, as shown in FIGURE 10.

In the operation of the device, regardless of the foot being measured, but which, for illustration, will be considered to be the left foot as shown in dotted lines in FIGURE 1, the several parts are first put into the relationship shown in FIGURE 1, except that the carriage **4** may be indiscriminately positioned at any point along slot **5**. The foot being measured is firmly planted on base **1**, with the heel thereof resting firmly against the bottom of heel rest **2**, and the weight of the leg (but not the body) upon the foot. Carriage **4** is then moved to a position where the concavity **40** therein snuggly engages the inside ball of the foot. Chain **7** is then drawn out of reel **6** to an extent sufficient to interengage loop **8** with hook **10** on strap **9**, and the chain is then released so that strap **9** is pulled taut against the foot by the action of the spring within reel **6**. Reel **6** has imprinted thereon a series of characters which may be either alphabetic or numeric, which indicate the extent to which chain **7** is unreeled, and thus when the loop **8** on the chain is engaged with hook **10** on strap **9** and drawn taut across the foot by the action of the spring within reel **6**, the characters on the reel, which are readable through two windows **41**, indicate the ball girth measurement of the foot, or the so-called "width" of the appropriate shoe. Two sets of characters are preferably provided on reel **6**, one set being visible through each of windows **41**. The characters are arranged so that the same character is visible through both windows **41** at any given time, but the characters in the respective series are upside down relative to each other, so that one set is readable from the right end of the device when a left foot is being measured, and the other set is readable from the left end of the device when a right foot is being measured. Overlying carriage **4**, and on the opposite side of windows **41**, there are two "size" scales **42** and **43**, oppositely oriented so that one is readable from the right end for measuring the left foot, and the other readable from the left end for measuring the right foot. Adjacent one window **41**, an indicant **44** is provided on the carriage **4**, while opposite the other window **41** an indicant **45** is provided on the carriage. The former indicant cooperates with scale **42**, and the latter indicant cooperates with scale **43**.

The respective scales **42** and **43** designate the "size" of shoe required for the so-called "ball length" dimension of the foot being measured, but due to the wide disparity in toe length of various feet and to the disparity in toe room of various styles of shoes, the "size" indicated by the ball length reading may not, in the customer's chosen style or design, provide sufficient toe room. Accordingly, the "stick length" of the foot is simultaneously taken by reading the value, at the end of the big toe on the scale inscribed at opposite ends of base **1**. Where the "stick length" reading is greater than the ball length reading, the fitting clerk is alerted to the fact that he must be careful to limit his offering to styles which provide ample toe room, or make a compromise between the two length readings. Usually, this difference is not over one "size," and the larger size will, in all probability, result in a comfortable fit regardless of style. Where the difference between the ball girth "size" reading and the "stick length" "size" reading is greater than one "size," however, a comfortable fit will more often than not be achieved by splitting the difference.

For an illustration of the simplified embodiment wherein the anchorage of the end of strap **9** opposite hook **10** has its position controlled manually both lengthwise and crosswise of the foot rest, depending upon the position of member **40** relative to scale **42** or **43**, as the case may be, when member **40** is aligned with the inside ball of a foot being measured, reference may be had to FIGURES 12 through 17.

In the embodiment of FIGURES 12 through 17, the base **101** is identical with base **1** of the previous embodiment insofar as concerns heel rests **2**, **3**, the foot rest area between **2** and **3** and the indicia thereon, slot **5**, reel **6** and its adjunct concavity **40**, chain **7**, loop **8**, strap **9** (save as to length), hook **10**, scales **42** and **43**, window **41**, and markers **44** and **45**, and the mounting for carriage **4**. Unlike the previous embodiment, the carriage **4** is not connected with any relatively movable mechanism beneath the device, but any suitable means, such as cross-head **20** (FIGURE 11) or leaf spring **200** (FIGURE 14), may be utilized to maintain the carriage entracked on slot **5**.

In the embodiment of FIGURES 12–17, the base **101** is provided with a opening **102** which, unlike the cut-outs **38** and **39** of the previous embodiment, extends substantially parallel with the heel-rest-to-heel-rest, or lengthwise, the strap **9** is anchored beneath the foot rest portion of the device, and has its free end extending upwardly and freely for ready connection about a foot to the end

8 of chain 7. In the simplified version shown in FIGURE 12, the strap 9 extends through a permanent opening 102, which is dimensioned to accommodate ready adaptation of strap 9 to conformity with a foot on the device, in any one of a multiplicity of the positions (longitudinally and crosswise) of its anchorage 103.

In this embodiment, the anchorage 103 (like its counterpart 16 in the previous embodiment) is a pivot pin whose axis extends substantially normal to the plane of the foot rest. The anchorage 103 thus pivotally secures the lower end of strap 9 to lever 104, as shown clearly in FIGURE 14. The fulcrum for lever 104 is a pin 105 mounted in a cross-head 106. The cross-head 106 has a central rib 107 upstanding from a plate 108, and the parts are arranged so that the rib 107 rides in, and is guided by, a groove or slot 109 formed in base 101, and extending in the direction transverse to the length of the device. Thus, the fulcrum 105 for lever 104 and the cross-head 106, as well as the anchorage 103 for strap 9, are slidable transversely of the foot rest. The cross-head rib 107 is confined in slot 109 by a double-pointed plate 110, a screw 111, and an internally threaded knurled knob 112; said pointer plate 110 and knob 112 being on the foot rest side of the device and overlapping slot 109 in the lengthwise direction of the device, i.e., transversely to the length of slot 109, thereby retaining the cross-head in the slot, but permitting movement lengthwise thereof when the clamping pressure exerted by knob 112 is relaxed. On the other hand, when knob 112 is tightened, the position of fulcrum 105 relative to slot 109 is fixed.

Lever 104 is held on the underside of cross-head 106, by a spring plate 113 connected, as by screws 114, to plate 108 of the cross-head, and the underside of plate 113 is routed out, as shown in FIGURE 17, to accommodate, and limit the amplitude of movement of, lever 104 about its fulcrum 105.

In the use of the device, lever 104 assumes any one of three predetermined angular positions, depending upon the foot being measured, and in order to assure compliance with such predetermined positions, spring plate 113 is provided with three holes 115, 116 and 117 to cooperate with a ball fixedly encaged in hole 118 of lever 104 so that the ball projects beyond the lower surface of lever 104 enough to make engagement within any one of holes 115, 116 or 117 as circumstances may require. In moving lever 104 between the respective positions, the encaged ball cams the adjacent part of spring plate 113 downwardly to release the engagement at one of the holes (for example, 116); and then when the lever has moved to align the ball with another of the holes (for example, 117) the strain in plate 113 biases the latter hole into engagement with the ball. Thus, when in the course of using the device, a shoe fitter must change the angular position of lever 104, the engagement of the ball detent in any one of holes 115, 116, 117, is readily sensed, and the lever impositively retained in that position. The likelihood that the lever will be unintentionally out of register with any one of the three predetermined positions is thus minimized.

As the part 9 of the ball girth measure is a flexible non-metallic strap, preferably made of textile ribbon or other soft material which is unstretchable in use, it is the most perishable part of the device, and hence requires more frequent replacement than any other part. Such replacement requires careful calibration of the effective length of member 9. To facilitate such calibration, lever 104 may be provided with an adjustable extension 120, as shown clearly in FIGURE 16. The extension 120 has a slot 121 for the reception of two screws 122, which are threaded into holes 123 in lever 104. The extension 120 has a threaded hole 124 for the reception of pivot screw 103 which, with a collar 125, fits into a hole 126 in a metal clip 127 on the anchored end of strap 9 with freedom such that strap 9 easily pivots about the axis of hole 124. Thus, adjustment of extension 120 relative to the screws 122, i.e., lengthwise of slot 121, permits the calibration to be made by moving anchorage 103 toward, or away from, fulcrum 105 of lever 104.

As mentioned previously, plate 110 is exposed on the operating side of the device, and has two oppositely directed points 130 and 131. These points cooperate respectively with scales 132 and 133 on opposite sides of slot 109 and parallel therewith. The scales 132 and 133 have identical indicia, but are arranged in reverse order of ascension, and are oppositely oriented so as to be read, scale 132 when the left foot is being measured, and scale 133 when the right foot is being measured. The indicia on scales 132 and 133 are not only identical with the indicia on the scales on the foot rest, but also with the indicia on scales 42 and 43. However, the magnitude between successive values on scales 132 and 133 is approximately half the magnitude between successive values on scales 42 and 43, as the latter are approximately half the magnitude between successive values in the scales on the foot rest. Since, in the measurement of feet for fitting the shoes which are graded according to the aforesaid application of Charles W. Mann, the fitting is achieved by correlation of heel-to-ball dimension with ball-girth dimension, the correlation of scales 42 and 43 with scales 132 and 133 is the more critical of the scale correlations. Accordingly, when the heel to ball-girth dimension of, for example, a left foot is ascertained by the location of marker 45 along scale 42, while the inside ball of that foot is seated in concavity 40, lever 104 is adjusted longitudinally of guide 109 until pointer 130 is at the same value as that just read from scale 42. In that adjusted position, knob 112 is tightened, thus fixing the position of the fulcrum 105 without clamping the lever 104 in any angular position. The proper angular position of the lever 104 depends upon whether the heel-to-ball dimension of the foot being measured falls within the long, short, or medium range. Thus, each of the scales 132 and 133 is divided into three parts as by colors, for instance, red, white, and blue. Thus, on scale 132, the short range 134 may be delineated by red, the medium range 135 may be delineated by white, and the long range 136 may be delineated by blue; and on scale 133, the short range 137 is indicated in blue, the medium range 138 in white, and the long range 139 in red. Thus, when a left foot is being measured, and pointer 130 has been brought to the position along scale 132 which corresponds to the indicia read on scale 42 at mark 45:

(a) If the pointer 130 is within the medium (white) range 135, the lever 104 is moved to its central position where it is substantially perpendicular to the lengthwise dimension of the foot rest, and where the ball detent in hole 118 engages hole 116 in plate 113;

(b) If the pointer 130 is within the short (red) range 134, the outer end of lever 104 is moved away from the heel, where the ball detent in hole 118 engages hole 115 in plate 113;

(c) If the pointer 130 is within the long (blue) range 136 of scale 132, the outer end of lever 104 is moved toward the heel until the ball detent 118 engages hole 117 in plate 113.

All this is in accordance with the rule of operation that the shorter the foot, the closer the anchorage 103 is to the heel rest for that foot, which rule applies regardless of the hand of the foot being measured. That is to say, that when a right foot is being measured, and the pointer 131 has been brought to the position along scale 133 which corresponds to the indicia read on scale 43 at mark 44:

(a) If the pointer 131 is within the medium (white) range 138, the lever 104 is moved to its central position where it is substantially perpendicular to the lengthwise deminsion of the foot rest, and where the ball detent in hole 118 engages hole 116 in plate 113;

(b) If the pointer 131 is within the short (blue) range 137, the outer end of lever 104 is moved away from the

heel of the foot being measured to the point where the ball detent in hole **118** engages the hole **117** in plate **113**;

(c) If the pointer **131** is within the long (red) range **139** of scale **133**, the outer end of the lever **104** is moved toward the heel of the foot being measured until the ball detent in hole **118** engages hole **115** in plate **113**.

To facilitate understanding by the shoe fitter of the direction in which the lever **104** is moved under various circumstances, the scale **133** is preferably embraced by red background **140**, and scale **132** is likewise embraced by a blue background **141**. With this arrangement, all the shoe fitter has to know is that when the pertinent pointer terminates in a blue zone, the outer end of the lever **104** is moved toward the blue background, and when the pertinent pointer terminates in a red zone, all he has to do is move the outer end of lever **104** toward the red background.

With the anchorage **103** of strap **109** thus positioned, it may be drawn across the foot, latched with ring **8** of chain **7**, which is withdrawn from the reel **6** to an extent such as to permit to be connected with the hook **10**, then released, whereupon chain **7** is retracted to draw the multi-part girth measure taut about the foot at an acute angle with the heel to toe dimension to measure the ball-girth which is registered by the indicia on reel **6**, as revealed through the appropriate one of windows **41**.

Thus, while the embodiment shown in FIGURES 12 through 17 is simplified in that it eliminates the mechanism for automatically positioning the anchorage of strap **9** both lengthwise and transversely in correlation to the heel to ball measurement, the simplified version facilitates the proper position of the anchorage of strap **9** manually in a relatively fool-proof manner.

From the foregoing description, those skilled in the art should readily understand that the invention accomplishes its objects, and provides a foot measuring device which simultaneously indicates the stick length, ball length, and ball girth of a foot being measured, but is reversible to accommodate the opposite foot. While the preferred form of the apparatus has been shown in the drawings, and described in detail, it is manifest that many variations and modifications of the embodiment so disclosed will present themselves to those skilled in the art without departing from the spirit of this invention, and it is, therefore, to be distinctly understood that the invention is not limited to the details of the foregoing disclosure.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a shoe fitting device having an elongated base with a right heel rest at one end and a left heel rest at the other end, a pair of foot length scales having their points of origin respectively at different heel rests, a girth measuring member located substantially midway between said heel rests and having a pivot located beneath said base, said pivot having an axis extending substantially normal to said base, means for selectively moving said pivot lengthwise and transversely of said base, and said girth measure having a flexible portion extending at least in part above said base, and said part being flexible for free movement in all directions relative to said pivot.

2. In a shoe fitting device having an elongated base with a right heel rest at one end and a left heel rest at the other end, a pair of foot length scales having their points of origin respectively at different heel rests, a multi-part flexible girth measuring member, one part thereof having an anchorage which is movable lengthwise of the base, and the other end thereof having an anchorage which is movable both lengthwise and transversely relative to the base, said anchorages being so interconnected that movement of the former effects movement of the latter.

3. In a shoe fitting device having an elongated base with a right heel rest at one end and a left heel rest at the other end, a pair of foot length scales having their points of origin respectively at different heel rests, a reel mounted for movement lengthwise of the base selectively to positions correlated with said pair of foot length scales, a two-part flexible girth measuring member, one part thereof having an anchorage which is movable lengthwise of the base, and the other part thereof having a free end engageable with said first-mentioned part, said last-mentioned part being located alternately, depending upon the foot being measured, closer than the first-mentioned anchorage to the appropriate heel rest.

4. In a shoe fitting device having an elongated base with a right heel rest at one end and a left heel rest at the other end, a pair of foot length scales having their points of origin respectively at different heel rests, a reel mounted for movement lengthwise of the base selectively to positions correlated with said pair of foot length scales, a two-part flexible girth measuring member, one part thereof having an anchorage on and retractible by said reel, the other part of said flexible girth measuring member being releasably engageable at one end with said one part, and the opposite end of said other part being anchored, and means movably mounted beneath said base for anchoring said other part.

5. The combination of claim **4** wherein said means is movable both longitudinally and transversely of said base to selected positions depending upon the foot being measured.

6. A shoe fitting device comprising an elongated foot rest having a left heel abutment at one end and a right heel abutment at the other end, a length scale adjacent the right heel abutment having its origin at the left heel abutment, another length scale adjacent the left heel abutment having its origin at the right heel abutment; a carriage mounted at one side of said foot rest intermediate said length scales and movable toward and away from said heel abutments over a path which extends substantially between the nearest ends of said length scales, said carriage having a reel mounted thereon, a flexible girth measuring member wound on said reel, indicia on said reel for indicating the extent to which said member is unwound, means for biasing said reel to retract said member, said carriage having a conformed seat for accommodating the inside ball of either a right foot whose heel is against the right heel abutment or a left foot whose heel is against the left heel abutment, said conformed seat being centered with respect to the line of emergence of said member from said reel, two length scales adjacent the path of said carriage, one of said last-named scales having its point of origin toward the left heel rest and the other having its point of origin toward the right heel rest; a second flexible girth measuring member for interconnecting at one end with the first-mentioned flexible girth measuring member and having its other end anchored to a lever having a fulcrum and a free end, said free end being at the opposite side of said foot rest from the carriage, and said fulcrum being connected for movement with the carriage, means for locking said lever against movement relative to its fulcrum in either of two positions at one of which the anchorage with said second flexible girth measuring member is closer than said conformed seat to said left heel abutment, and at the other of which positions said anchorage is closer than said conformed seat to said right heel abutment; means for connecting said fulcrum to said carriage for movement relative thereto in the direction transverse to the path of said carriage; a guide for said fulcrum, said guide being movable between two positions at one of which (for measuring a left foot) the path of said fulcum extends at an angle of about 30° with the path of said carriage and toward said left heel abutment, and in the other of which positions (for measuring a right foot) the path of said fulcrum extends at an angle of about 30° with the path of said carriage but toward said right heel abutment; and a reversible cover plate at the free

end of said lever, said cover plate having a cut-out therein the edges of which extend in a direction making an angle of about 30° with the path of said carriage and being alternately directed toward the left heel abutment (when a left foot is measured) or toward the right heel abutment (when a right foot is measured), said cut-out exposing the free end of said lever and accommodating the passage therethrough of said second flexible girth measuring member.

7. A shoe fitting device comprising an elongated foot rest having a left heel abutment at one end and a right heel abutment at the other end, a length scale adjacent the right heel abutment having its origin at the left heel abutment, another length scale adjacent the left heel abutment having its origin at the right heel abutment; a carriage mounted at one side of said foot rest intermediate said length scales and movable toward and away from said heel abutments over a path which extends substantially between the nearest ends of said length scales, said carriage having a reel mounted thereon, a flexible girth measuring member wound on said reel, indicia on said reel for indicating the extent to which said member is unwound, means for biasing said reel to retract said member, said carriage having a conformed seat for accommodating the inside ball of either a right foot whose heel is against the right heel abutment or a left foot whose heel is against the left heel abutment, said conformed seat being centered with respect to the line of emergence of said member from said reel, two length scales adjacent the path of said carriage, one of said last-named scales having its point of origin toward the left heel rest and the other having its point of origin toward the right heel rest; a second flexible girth measuring member for interconnecting at one end with the first-mentioned flexible girth measuring member and having its other end anchored to a lever having a fulcrum and a free end, said free end being at the opposite side of said foot rest from the carriage, said fulcrum being mounted for movement relative to said foot rest, means for locking said lever against movement relative to its fulcrum in any of a plurality of positions at one of which the anchorage with said second flexible girth measuring member is closer than said conformed seat to said left heel abutment, and at another of which positions said anchorage is closer than said conformed seat to said right heel abutment; means for moving said fulcrum in the direction transverse to the path of said carriage; a guide for said fulcrum, said guide including a pair of spaced parallel surfaces lying in planes substantially normal to the heel-abutment-to-heel-abutment dimension of said foot rest.

8. The combination of claim 7 wherein: said second flexible girth measuring member is anchored to said lever by a pivotal connection whose axis is substantially normal to said foot rest; said fulcrum guide is located at the opposite side of said foot rest from said conformed seat; adjacent said fulcrum guide there is a pair of oppositely oriented scales correlated with said length scale; mounted to move with said fulcrum along said guide there is a double pointed indicator whose points respectively cooperate with the adjacent oppositely oriented scales; and said last-mentioned scales have means for indicating the proper position of said lever for the foot being measured.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,432,928 March 18, 1969

James D. Rice

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 64, "conformd" should read -- conformed --. Column 2, lir 3, "abutmnts" should read -- abutments --. Column 3, line 57, "is" should read -- its --; line 61, "thte" should read -- the --. Column 4, line 68, "o should read -- of --. Column 5, line 21, "th ebase" should read -- the base - line 41, "over and end-for-end" should read -- over end-for-end --. Column 6, line 52, "scale" should read -- scales --; line 62, "window" should read -- windows --; line 73, after "wise," insert -- dimension of the device. As in the previous embodiment, --. Column 8, line 72, "deminsion" should read -- dimension --. Column 9, line 21, after "permit" insert -- it --.

Signed and sealed this 14th day of April 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

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Commissioner of Patents