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C. WESTERVELT ET AL

2,129,979

MEASURING DEVICE

Filed May 8, 1936

Fig. 1.

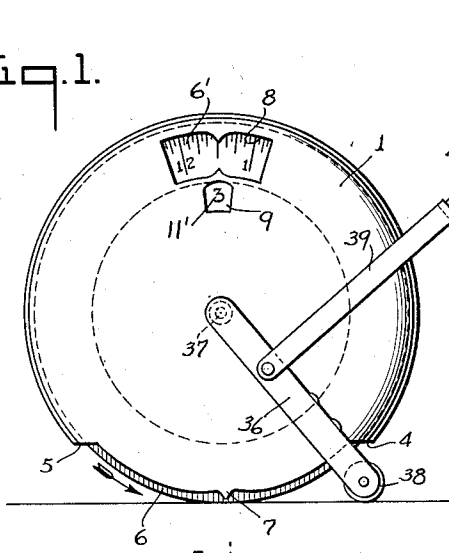


Fig. 7.

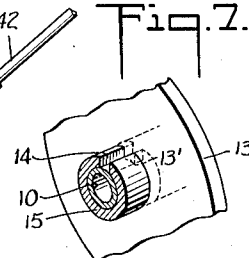


Fig. 6.

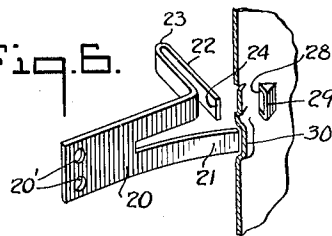
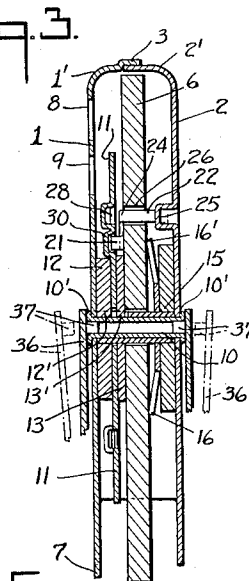


Fig. 3.



UNITED STATES PATENT OFFICE

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MEASURING DEVICE

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13 Claims. (Cl. 33—142)

The invention relates to measuring instruments, and particularly to pocket size disc-like instruments for measuring distances along surfaces.

One object of the invention is a novel instrument of the above indicated character whereby distances and lengths may be accurately measured with facility.

Another object of the invention is an instrument for the above purpose characterized by the simplicity of its construction and operation and by the low cost of manufacture and assembly.

A further object of the invention is an instrument of the above indicated character having a novel and simple resetting means.

Further objects of the invention will hereinafter appear.

For a better understanding of the invention reference may be had to the accompanying drawing forming a part of this application wherein:

Fig. 1 is a side view of the instrument;

Fig. 2 is an enlarged view similar to Fig. 1 with certain of the parts broken away;

Fig. 3 is a section along the line 3—3 of Fig. 2;

Fig. 4 is a section along the line 4—4 of Fig. 2;

Fig. 5 is an enlarged sectional view of a part of the operating mechanism;

Fig. 6 is a perspective view of an element of the mechanism; and

Fig. 7 is a perspective view of an element of the structure.

Referring to the drawing, the embodiment chosen for illustrating the invention comprises a pair of disc side walls 1 and 2 having their edges 1' and 2' spun or pressed over to form an interfitting connection, the edge 3 of the part 1' being offset to grip the periphery of the edge of the part 2'. These casing parts 1 and 2 may be permanently connected together as by welding or otherwise at 3 or they may be detachably connected as may be desired. The edges 1' and 2' are removed on the under side of the instrument between the points 4 and 5 to permit the projection therethrough of a traction and measuring disc 6, which disc may be made of any suitable material or materials, such as Masonite or hardboard. The side casing wall 1 is conveniently provided with a pointer 7 intermediate the points 4 and 5 and disposed on the same diameter with openings 8 and 9 which are disposed in the upper part of the casing wall to expose the measuring and recording dials.

The two side casing discs 1 and 2 are assembled upon a hollow centrally located bushing 10 which projects therethrough and in the particular embodiment shown this is peened over at both ends 10' to permanently hold the casing parts 1 and 2 tightly together. This bushing 10 together with the sleeve 15 thereon functions as a shaft upon which the traction disc 6 rotates. It also func-

tions as a shaft for an intermittently rotatable disc 11 having a scale 11' observable through the opening 9 of the casing wall, while the disc 6 has a scale around its periphery which is exposed through the opening 8. The disc 11 is disposed between and frictionally engaged by a pair of friction discs 12 and 13 which are fixed against rotation to the sleeve 15. In the particular embodiment shown these discs are keyed to the sleeve by means of projections 12' and 13' from the discs disposed in the slot 14 formed in the sleeve 15. The disc 6 is held firmly in frictional engagement with the disc washer 13 and the disc 11 is frictionally held between the disc washers 12 and 13 by means of a spring washer disc 16 surrounding the sleeve 15 and engaging the disc 6 at its outer turned over edge 16'. The spring disc washer 16 engages on its outer surface with a disc washer 17, the latter engaging the inner surface of the wall 2.

The traction disc 6 carries an actuating and resetting element 20 which, in the particular embodiment shown, is riveted at 20' or otherwise fastened to the side surface of the disc 6 facing the side wall 1. This element is preferably made of spring metal and is provided with a resetting spring finger 21 and a disc actuating spring element 22, these two parts being formed from the opposite sides of the main body part 20. The part 22 is U-shape and formed at right angles to the main body 20 with the bend of the U forming a round friction surface for engagement with a cam surface formed in the side wall 2 of the casing, while one leg of the U 22 projects slightly beyond the main body 20 to form an actuating finger 24. The part 22 which is turned at right angles to the main body 20 of the actuating and resetting member passes through an opening 26 formed in the disc to bring the rounded part 22 into the path of the cam or cams 25, in the particular embodiment shown there being only one such cam 25. The disc 11 is provided with a multiplicity of openings 28 disposed therearound for the reception of the finger 24 when the actuating part 22 runs up on a cam 25 (Fig. 5). These openings 28 may be formed in any suitable manner, as, for example, by punching out from the disc the metal as indicated at 29. In the particular embodiment shown, as hereinafter more particularly described, the cam surface 25 is of a construction and size to cause the finger 24 to move the disc 11 through a predetermined arc or part of a revolution.

The spring finger 21 is bent from the plane of the main body 20 of the actuating member in a direction opposite to that of the U part 22 and frictionally engages the disc 11; but the frictional engagement is insufficient to move the disc 11 with the traction disc 6 and, accordingly, the disc 11 is only actuated when a cam sur-

face 25 is passed by the actuating member 20. A ratchet tooth in the form of a recess 30 is formed in the disc 11 and in the path of the spring finger 21. When moving in the forward direction the finger 21 simply slides over this recess, but when the traction disc 6 together with the actuating member 20 are moved in the clockwise direction of Fig. 2 or backwards this finger 21 becomes an actuating pawl when it engages the recess 30 formed in the disc 11 to bring the latter back to the zero position. In the particular embodiment shown there is only one cam surface 25 and the back of this surface 25' functions as a stop for engaging the part 22 and arrests the backward or clockwise rotation of the traction disc 6 when the latter gets to the zero position.

The operation is as follows:

The instrument is brought into contact with the surface to be measured, with the traction wheel 6 engaging the surface, and is moved to the left (Figs. 1 and 2). The traction disc 6 with its scale 6' measures the distance the instrument is kept in contact and rolled along the surface. If that distance is more than one revolution the actuating member 20, through its U shaped part 22, engages the cam surface 25, which in turn actuates the finger 24 to cause it to enter an opening 28 and carry along with it for the predetermined distance the disc 11. Upon the part 22, 23 springing past the cam surface 25 the finger 24 is withdrawn and the disc 11 remains stationary until another revolution is completed when this operation is repeated. When the length to be measured is completed and the measurement is taken from the scales 11' and 6', the fractional part of the revolution indicated on the scale 6' is added to the number of revolutions shown on the scale 11' to give the distance. In the particular embodiment shown, the traction disc 6 is, for example, twelve inches in circumference, while the disc 11 is provided with fifty openings 28 so that the scale 11' indicates feet while the scale 6' indicates inches. The resetting is very simply effected by backing up the traction disc 6 through the fraction of a revolution, the spring pawl finger 21 engaging the recess 30 which is in radial line with the zero of the scale 11' and turning that scale backwards until the zero is in vertical position in line with the zero condition of the scale 6'. The stop 25' arrests the backward rotation of the traction disc 6 from the zero position when the scale 6' is reached.

The instrument casing 1, 2 may be gripped by the hand and the traction disc 6 caused to engage and roll along the surface to be measured, the pointer 7 indicating the starting point and the diameter including it and the center line of the openings 8, 9 being vertical. The instrument is of a size which may be carried in the pocket, an instrument of the capacity indicated, namely, fifty feet, being approximately four inches in diameter and three-eighths of an inch thick.

In some cases it is preferred to have a handle attachment 35 for operating the instrument as, for example, when the operator may desire to stand erect and measure a surface without requiring him to bend over, or when it is desired to make an overhead measurement such as on a ceiling. This attachment comprises a pair of spring arms 36 having pins 37 for entering the hollow bushing 10. These spring arms at their lower end bear the traction wheel 38 journaled therein. A U-shaped spring arm 39 is pivotally

attached at 40 to the spring arms 36 intermediate their ends and a handle 41 is rigidly attached to the U member 39. This handle attachment may be easily sprung into and out of position by means of the spring arms 36. The handle member 41 may be formed of telescopically arranged parts 41 and 42 or more parts, if desired.

Thus the instrument is of few parts and of simple construction and assembly, and capable of quantity production on a low cost basis.

We claim:

1. A measuring instrument of the character set forth comprising a pair of mating disc-like casing frame members, a traction disc journaled therein, one of said frames carrying a cam member, a spring operating member carried by the traction disc and disposed in the path of the cam, a second disc journaled in the casing frame adjacent the traction disc, said second disc having means thereon engaged by the spring member when riding up the cam surface for intermittently actuating the second disc, means interengaging said discs permitting relative rotation in one direction of movement of the traction disc, but preventing relative backward movement and permitting resetting the second disc when a backward movement is given to the traction disc, and exposed scales on both of said discs.

2. A measuring instrument of the character set forth comprising a pair of mating disc-like casing frame members, a traction disc journaled therein, one of said frames carrying a cam member, a spring operating member carried by the traction disc and disposed in the path of the cam, a second disc journaled in the casing frame adjacent the traction disc, said second disc having means thereon engaged by the spring member when riding up the cam surface for intermittently actuating the second disc, and exposed scales on both of said discs, the cam member being disposed on the opposite side of the traction disc from the second disc and the spring actuating member which is carried by the traction disc projecting through an opening formed in the traction disc, said spring actuating member being of U-shape with the bend of the U engaging the cam and one leg of the U projecting beyond the opposite surface of the traction disc when engaging the second disc.

3. In an instrument of the character set forth in claim 1, wherein the spring actuating member is formed of an integral piece of spring metal with a part thereof disposed in the path of the cam and engaging the second disc, and a second part thereof being in the form of a spring finger which frictionally engages the second disc without rotating it in one direction of rotation, but in opposite direction engages a recess or tooth in the second disc to rotate the same back to zero position.

4. An instrument of the character set forth comprising a pair of side wall discs having their edges pressed over into interfitting relation, said side discs being fastened together by a centrally disposed bushing, a traction disc journaled within the casing and upon the bushing, a second disc which is intermittently operated by the traction disc and is also journaled upon said bushing, said second disc being disposed between and frictionally engaging a pair of disc washers, said disc washers being locked against rotation, a disc washer disposed between the traction disc and the side wall disc on the opposite side from the second disc and a spring washer disposed

between the traction disc and the last named disc washer.

5. In an instrument of the character set forth in claim 4, wherein the bushing is hollow and the device is provided with a detachable handle mechanism comprising a pair of spring members having at one end pins for springing into and out of the ends of said hollow bushing and at the other end a traction roll and having a handle pivotally attached to said spring arms intermediate their ends.

6. An instrument of the character set forth comprising a traction disc with a scale thereon, a second disc intermittently actuated by the first disc and means for actuating the second disc on the traction disc comprising a cam, a spring actuating member carried by the traction disc and having a part disposed in the path of the cam and means on the second disc engaged by the actuating spring member while in engagement with the cam, the spring actuating member being provided with a part in engagement with the second disc which permits relative rotation of the two discs in one direction of movement but causes them to operate in unison in the backward direction for resetting.

7. An instrument of the character set forth comprising a traction disc with a scale thereon, a second disc intermittently actuated by the first disc and means for actuating the second disc on the traction disc comprising a cam, a spring actuating member carried by the traction disc and having a part disposed in the path of the cam and means on the second disc engaged by the actuating spring member while in engagement with the cam, the spring actuating member being provided with a part in engagement with the second disc which permits relative rotation of the two discs in one direction of movement but causes them to operate in unison in the backward direction for resetting, together with means limiting the backward rotation of the traction disc.

8. A measuring instrument of the character set forth comprising a pair of mating disc-like casing frame members, a traction disc journaled therein, one of said frames carrying a cam member, a spring pressed operating member carried by the traction disc and having a part disposed in the path of the cam, a second disc journaled in the casing frame adjacent the traction disc, said second disc having means thereon engaged by the spring member when riding up the cam surface for intermittently actuating the second disc, a resetting driving means interposed between the two discs which is operative only when the traction disc is rotated backwards, whereby the second disc may be reset when the traction disc is turned in the backward direction, and exposed scales on both of said discs.

9. An instrument of the character set forth in claim 8 wherein the spring pressed operating member is fastened to the traction disc on the side adjacent the second disc and the part disposed in the path of the cam projects through an opening formed in the traction disc to engage the cam.

10. An instrument of the character set forth in claim 8 wherein the spring pressed operating member is fastened to the traction disc on the side adjacent the second disc and the part disposed in the path of the cam projects through an opening formed in the traction disc to engage the cam, and the resetting driving means comprises a spring finger fastened to the traction

disc and a co-operating recess formed on the second disc.

11. A measuring instrument of the character set forth comprising a pair of mating disc-like casing frame members, a traction disc journaled therein, one of said frames carrying a cam member, a spring pressed operating member carried by the traction disc and having a part disposed in the path of the cam, a second disc journaled in the casing frame adjacent the traction disc, said second disc having means thereon engaged by the spring member when riding up the cam surface for intermittently actuating the second disc, a resetting driving means interposed between the two discs comprising a spring finger carried by the traction disc and frictionally engaging the second disc and a co-operating recess formed in the second disc, said resetting driving means being operative only when the traction disc is driven backward, and exposed scales on both of said discs with the starting points of the scales disposed in radial line with the recess, finger and the part of the operating member disposed in the path of the cam and with said part engaging the cam to prevent further backward movement of the traction disc.

12. A measuring instrument of the character set forth comprising a pair of mating disc-like casing frame members, a traction disc journaled therein, one of said frames carrying a cam member, a spring pressed operating member carried by the traction disc and having a part disposed in the path of the cam, a second disc journaled in the casing frame adjacent the traction disc, said second disc having means thereon engaged by the spring member when riding up the cam surface for intermittently actuating the second disc, a resetting driving means interposed between the two discs which is operative only when the traction disc is rotated backwards, whereby the second disc may be reset when the traction disc is turned in the backward direction, and exposed scales on both of said discs, and means for causing said traction disc to roll along the surface to be measured comprising a readily detachable handle mechanism with a traction roller thereon and with spring means having pins detachably engaging the axle upon which the discs are mounted.

13. A miniature disc-like instrument for measuring distances along surfaces comprising side disc-like frame members spaced from each other, a traction disc with an exposed scale thereon, a second disc with an exposed scale thereon, said discs being mounted for rotation on an axle carried by said frame members, fixed friction disc means engaging said second disc and normally holding the same stationary, a cam carried by the frame members disposed on the opposite side of the traction disc from the second disc, a spring actuating member carried by the traction disc, said spring having a part disposed in the path of the cam and a further part adapted to engage the second disc when said spring member engages the cam, said second disc having means disposed at predetermined distances all the way around the axis thereof with which said spring member engages when riding up the cam to rotate the same notwithstanding the said friction disc means, and said spring member extending through an opening in the traction disc.

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