(No Model.)

J. GRAY.

ROTARY MEASURE.

No. 530,686. Patented Dec. 11, 1894.

Fig. 3.

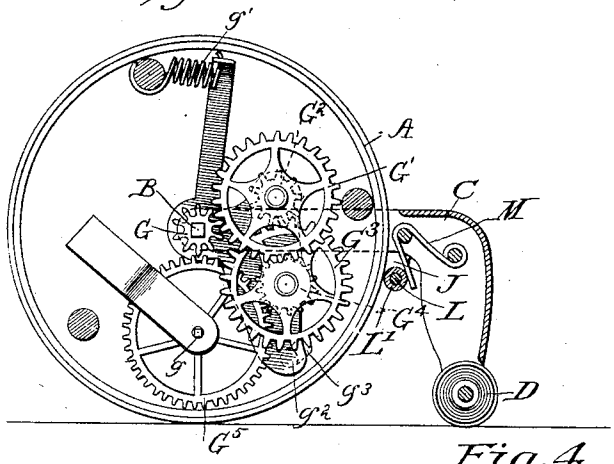


Fig. 4.

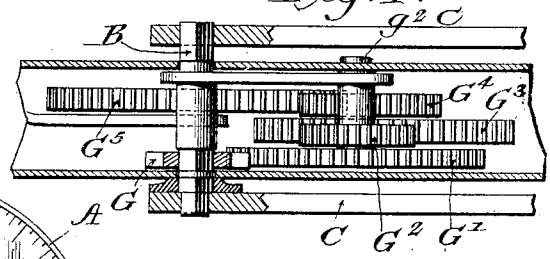


Fig. 1.

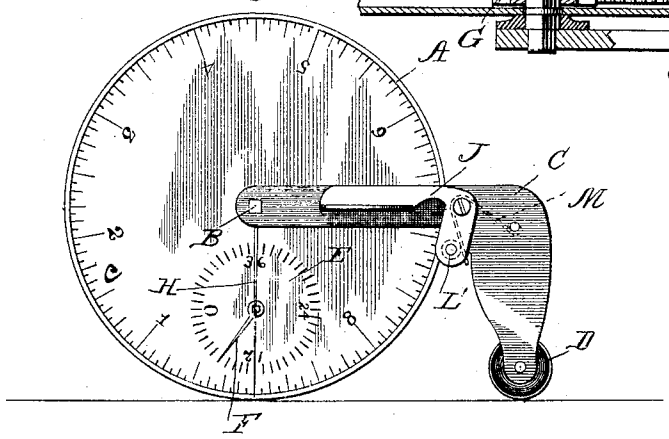
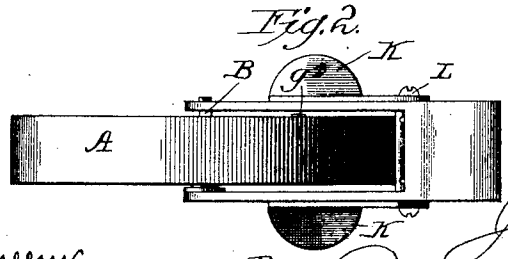


Fig. 2.



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JAMES GRAY, OF CHICAGO, ILLINOIS.

ROTARY MEASURE.

SPECIFICATION forming part of Letters Patent No. 530,686, dated December 11, 1894.

Application filed February 20, 1893. Serial No. 463,023. (No model.)

To all whom it may concern:

Be it known that I, JAMES GRAY, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Measuring-Instruments, of of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to hand propelled rotative measuring-instruments for measuring various kinds of lines, surfaces and materials, and particularly for making measurements of interrupted lines or surfaces so as to enable the aggregate of numerous measurements to be ascertained, as a guide in estimating materials, cutting out stock of various kinds and in analogous work.

Among the primary objects of my invention is included that of producing a hand-propelled rotative measuring-instrument which shall be simple, compact and durable in its construction, and rapid and accurate in its operation, and which shall be easy to manipulate and not liable to errors in its operations even when used with the greatest rapidity or haste. Furthermore, to produce a rotative measuring-instrument which shall be practically automatic in its operation and the operation of which can be readily started and arrested at the will of the user, and which, furthermore, shall so closely indicate the aggregate of numerous interrupted measurements as to require only the most simple calculation for ascertaining the total of such measurements.

To the above purposes, as well as to such others as may appear from the ensuing description, my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

The more precise nature of my invention will be better understood when described with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a measuring-instrument embodying my invention. Fig. 2 is a plan view of the measuring-instrument. Fig. 3 is a side elevation of the main measuring-wheel of the instrument, having one of its sides removed so as to expose the interior gearing, the traction-frame being shown in vertical section. Fig. 4 is a horizontal section of the measuring-instrument as shown in Fig. 1.

In the said drawings, A designates the main measuring and indicating wheel of the instrument, said wheel being hollow and preferably of such width as to enable the wheel to stand alone when placed upright on its periphery. The said main wheel may be of any dimensions, according to the character of work to be required of it in any given instance, but for ordinary practical purposes the wheel may be say of nine inches in circumference. In any event, one or both of the sides of the wheel are preferably or desirably removable from the annular peripheral portion thereof, and are secured together by rivets, bolts or screws *m* extending transversely through the sides of the wheel, or in any other suitable manner. Upon its outer surface, one of the side-pieces of this wheel is provided with an annular graduated index, which is divided into inches and fractions of inches; such scale being shown as divided into nine inches and into fractions thereof. Of course, if desired both sides of the wheel may be similarly graduated upon their outer surfaces, and either one or both of the sides is also provided upon its outer surface with a second annular graduated scale E, for a purpose to be presently explained; the secondary scale being located at one side of the center of the wheel and adjacent to the margin thereof. This main measuring and indicating wheel A is loosely journaled upon an arbor or shaft B which extends through the center of the wheel, and the ends of which are formed angular so as to fit into the upper ends of a traction-frame C in such manner as to prevent the arbor or shaft from rotating. An index-arm or pointer H depends vertically from one or each end of the arbor or shaft B and the outer end of each pointer operates in conjunction with the graduated scale *c* of the main wheel A, so as to clearly indicate the various points between which measurements are to be taken, and a second index arm or pointer F is secured to the outer end of a revoluble shaft or arbor *g*, to be hereinafter described, and operates in conjunction with the secondary dial or scale E.

Upon the outer ends of the shaft or arbor B are fitted the upper ends of an L-shaped traction-frame C, which may be hollow, as shown, and the upper horizontal arm of which is forked so as to embrace the main wheel A, while the lower end of the vertical arm of the frame is shown as provided with a roller or wheel D trailing behind the main wheel A. The roller D is simply for the purpose of lessening tractional resistance to the travel of the measuring-instrument, and such wheel or roller may obviously therefore be omitted, if so preferred. In any event, a bell-crank lever J is provided, this lever being desirably pivoted at the juncture of its upper horizontal arm with its lower vertical arm upon the upper arm of the frame C, and at one side of the latter, and a similar lever is likewise pivoted upon the opposite side of the frame C, the lower ends of the vertical arms of these two levers being connected together by a rivet or screw L loosely surrounded by a roller-sleeve L′. A spring M which is secured to the frame C presses the roller L′ against the periphery of the wheel A, and thus serves to hold the upper arms of the levers J normally in elevated position, and by its pressure produces a braking-action upon said wheel by the roller L′. The upper arm of each lever J is formed with an outwardly extending lip or finger-piece K to be pressed upon by the operator's thumb and finger, so as to move the roller L′ backward out of engagement with the periphery of the wheel A when it is desired to move the instrument along. Inasmuch as the roller L′ is simply an anti-friction device, it may obviously be dispensed with, if so preferred, the spring M acting directly against the rivet or screw L and the latter acting directly against the periphery of the wheel A. In any event, this brake-attachment enables the rotation of the measuring wheel A to be instantly arrested whenever the terminus of measurements is reached, so that the measurements shall be absolutely accurate.

Within the main-wheel A is placed a gear-train supporting frame or plate G^6 which is of approximately V-form, and which is loosely supported upon the shaft or arbor B; said shaft extending through the frame or plate at the juncture of its two arms. The upper end of the upper arm of this plate G^6 is connected by an expansively acting spring g' to an adjacent screw or rivet m, and the lower arm of the plate is desirably of approximately triangular form, or of any other proper shape to bring the several members of the gear-train, to be presently described, into proper relative position. Upon the shaft or arbor B, and within the wheel A, is also mounted a gear-pinion G, which is so connected to the shaft as to remain stationary therewith, and which meshes with a gear-wheel G′ journaled in the upper part of the lower arm of the plate G^6. The arbor of this gear-wheel G′ carries a gear-pinion G^2 which rotates with the gear-wheel G′ and the teeth of which mesh with the teeth of a gear-wheel G^3 journaled upon the intermediate portion of the lower arm of the frame G^6. The arbor of this gear-wheel G^3 also carries a gear-pinion G^4 which rotates with the gear-wheel G^3 and the teeth of which mesh with the teeth of a gear-wheel G^5 mounted upon the arbor or shaft g before referred to as carrying the pointer or pointers F; the gear-wheel G^5 being arranged to turn with said arbor g, and this arbor being journaled within the wheel A independently of the frame or plate G^6, preferably as shown in one side of the wheel A and in a strap-hanger m' secured to the inner surface of said side.

The gearing-train is so proportioned, ordinarily, that one complete revolution of the main wheel A will rotate the arbor g a sufficient distance to cause the pointer or pointers F to travel from one graduation-mark on the dial or scale E to the next succeeding mark, so that each graduation-mark on said scale E indicates nine inches. The expansive action of the spring g', before referred to, operates to force the upper arm of the frame G^6 toward the right and thus normally retain the gear-pinion G^4 in engagement with the gear-wheel G^5, but in order to disengage the said pinion and wheel from each other, and thus to throw the entire train of gearing out of operative condition when so desired, a projection g^2 is provided; this projection extending outward from the lower end of the lower arm of the frame or plate G^6 and also through a slot g^3 in the adjacent side or face piece of the wheel A. Thus whenever it is desired to throw the train of gearing out of action, the projection g^2 is pressed toward the left and the gear-pinion G^4 is moved out of engagement with the gear-wheel G^5; the spring g' being correspondingly compressed. With the gearing-train thus out of action, the pointer F can be readily turned back or forward to "0" on the scale E, at the completion of a set of measurements, and the instrument thus be in readiness for a new set of measurements.

It is believed that, in view of the above description, no further detailed explanation of the operation of the instrument is necessary, it sufficing to say that when starting the instrument, the large pointer H is brought directly over the spot at which the measurement is to begin and that the instrument is run along until said pointer is directly over the spot at which the measurement is to stop. The brake L is thrown off of the wheel A at the commencement of the measuring operation and is applied at the completion of such measurement; the thumb-pieces K being also pressed upon at the completion of the several measurements, and the machine reset, as above described.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A rotary hand-propelled measuring-in-

strument, comprising a rotative measuring-wheel carrying a graduated scale and operated by tractional rotation, a frame-piece or arm on which said measuring-wheel is journaled, and a pointer rigidly secured to said frame and operating in conjunction with the graduated scale at the starting point of the measurement; said frame being formed for direct tractional contact with the surface to to be measured and thus maintaining itself and its pointer in operatively fixed relation to the wheel during the measuring-operation, substantially as set forth.

2. A rotary measuring-instrument, comprising a rotative measuring-wheel carrying a primary and also a secondary graduated scale and operated by tractional rotation, a frame-piece or arm on which said wheel is journaled, an indicating arm or pointer rigidly secured to the frame and operating in conjunction with the primary scale, a train of gearing carried and actuated by the measuring-wheel, a rotative arbor also carried by the measuring-wheel and having a gear-wheel engaging the train, and a pointer carried by said arbor and operating in conjunction with the secondary scale; the frame-piece being formed for direct tractional contact with the surface to be measured and thus maintaining itself and its pointer in fixed operative relation to the measuring-wheel during the measing-operation, substantially as set forth.

3. A rotary measuring-instrument, comprising a rotative measuring-wheel carrying a primary and also a secondary graduated scale and operating by tractional rotation, a frame-piece or arm, on which said wheel is journaled, formed for direct tractional contact with the surface to be measured and carrying a rigid pointer operating in conjunction with the primary scale, a train of gearing carried movably as a whole by the measuring-wheel, a rotative arbor also carried by the measuring-wheel and having a gear-wheel for disengageable connection with the gear-train, and a pointer movable with said arbor and operating in conjunction with the secondary scale, substantially as set forth.

4. A rotary measuring-instrument, comprising a rotative measuring-wheel carrying a primary and also a secondary graduated scale and operating by tractional rotation, a frame-piece or arm, on which said wheel is journaled, formed for direct tractional contact with the surface to be measured and carrying a rigid pointer operating in conjunction with the primary scale, a rotative arbor carried by the wheel and carrying a rigid pointer operating in conjunction with the secondary scale, and a gear-wheel also carried by said arbor, and a spring-pressed frame carried by the measuring-wheel and supporting a train of gearing one member of which engages the wheel on the secondary pointer arbor; said train-carrying frame being formed for engagement by hand to throw its train out of engagement with said arbor-wheel, substantially as set forth.

5. A rotary hand-propelled measuring-instrument, comprising a rotative measuring-wheel, a frame-piece or arm essentially right angular in form, upon which said wheel is journaled, formed for direct tractional engagement with the surface to be measured, and a brake-lever pivoted upon said arm adjacent to the angle thereof and engaging the periphery of the wheel, substantially as set forth.

6. A rotary hand-propelled measuring-instrument, comprising a rotative measuring-wheel, a frame-piece or arm essentially right angular in form, upon which said wheel is journaled, formed for direct tractional engagement with the surface to be measured, and a spring-pressed brake-lever carried by said arm adjacent to the angle thereof and engaging the periphery of the wheel; said lever being formed with a handle or projection to disengage it from the wheel, substantially as set forth.

7. A rotary measuring-instrument, comprising a hollow rotative measuring-wheel carrying a primary and also a secondary graduated scale and operating by tractional rotation, a frame-piece or arm, on which said wheel is journaled, formed for direct tractional contact with the surface to be measured and carrying a rigid pointer operating in conjunction with the primary scale, a train of gearing carried movably as a whole within the measuring-wheel, a rotative arbor also carried by the measuring-wheel and having a gear-wheel, within said measuring-wheel, for disengageable connection with the gear-train, and a pointer movable with said arbor and operating in conjunction with the secondary scale, substantially as set forth.

8. A rotary measuring-instrument, comprising a hollow rotative measuring-wheel carrying a primary and also a secondary graduated scale and operating by tractional rotation, a frame-piece or arm, on which said wheel is journaled, formed for direct tractional contact with the surface to be measured and carrying a rigid pointer operating in conjunction with the primary scale, a rotative arbor carried by the wheel and having a rigid pointer operating in conjunction with the secondary scale, and a gear-wheel also carried by the arbor and located within the measuring-wheel, a spring-pressed frame located within the measuring-wheel and supporting a train of gearing one member of which engages the wheel on the secondary-pointer arbor; said train-carrying frame being formed for engagement by hand to throw its train out of engagement with said arbor-wheel, substantially as set forth.

9. A rotary hand-propelled measuring-instrument, comprising a main measuring-wheel, a frame in which the wheel is journaled, a pointer rigidly connected to said

frame and extending substantially at right angles therewith to the periphery of the wheel; said frame being provided with a depending end having a traction roller or wheel to rest upon the surface to be measured, substantially as set forth.

10. A rotary measuring-instrument, comprising a measuring-wheel and a frame in which said wheel is mounted, said frame having a depending end-portion to bear upon the surface to be measured, a lever pivoted to said frame and means for passing said lever normally at one end against the measuring-wheel the lever terminating at its opposite end in such position as to be pressed to release the lever from braking contact with the wheel, substantially as set forth.

11. A rotary measuring-instrument, comprising a measuring-wheel, and a frame in which said wheel is mounted, bell-crank levers pivoted on opposite sides of the frame and connected together at one end, and a roller located at such point of connection and means for pressing the lever-roller normally against the periphery of the measuring-wheel, substantially as set forth.

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