

E. G. BAILEY.
INTEGRATOR.

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1,190,701.

Patented July 11, 1916.

Fig. 1.

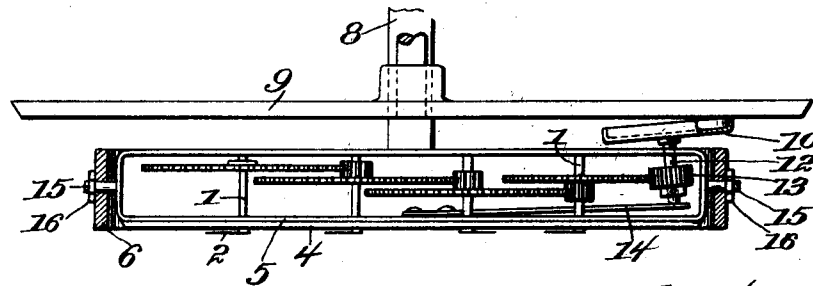


Fig. 3.

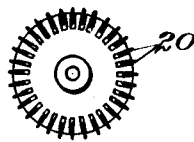


Fig. 2.

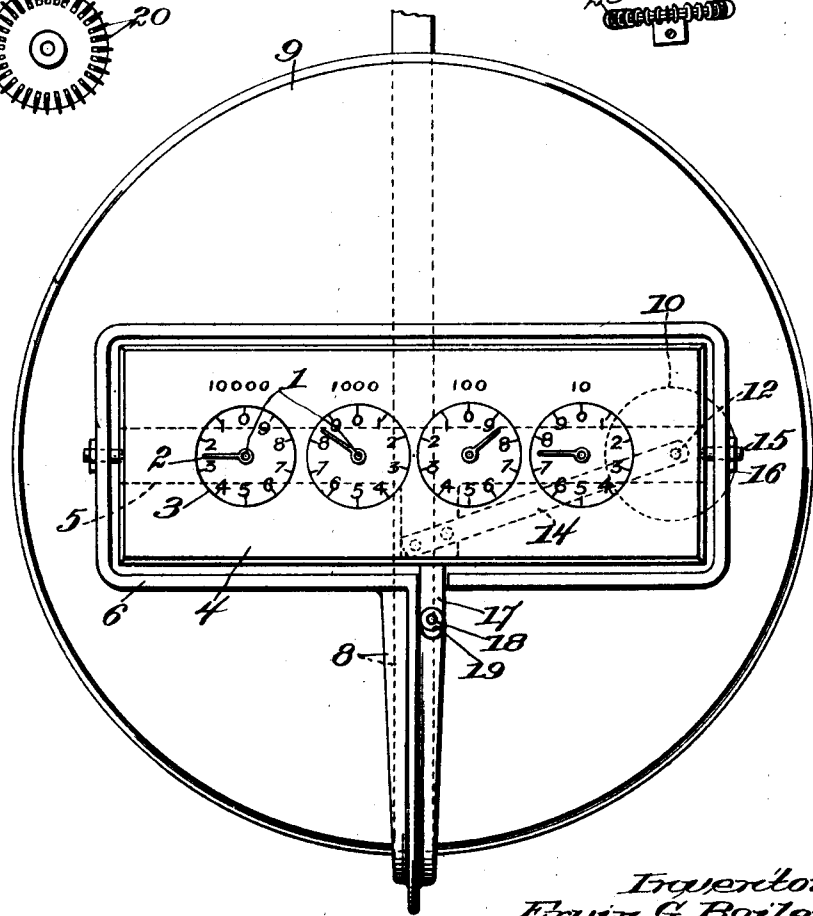


Fig. 4.



Inventor,
Ervin G. Bailey.
by *J. H. [unclear]* atty.

UNITED STATES PATENT OFFICE.

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INTEGRATOR.

1,190,701.

Specification of Letters Patent.

Patented July 11, 1916.

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To all whom it may concern:

Be it known that I, ERVIN G. BAILEY, a citizen of the United States, residing in Newton Highlands, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Integrators, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

The present invention relates to an integrator of the kind used in connection with flow meters and the like, in which indicating or counting mechanism is actuated by a frictionally driven wheel, movable radially across the face of a revolving surface having radial components with which it is in contact.

The invention is embodied in an improved construction and arrangement of the instrument, whereby there is a more efficient contact between the wheel and the revolving surface than in instruments of the kind heretofore used. It is practicable, moreover, to utilize a spring to maintain continuous contact between the wheel and the revolving surface, which contact will not be broken by vibrations as is possible in instruments where gravity is relied on to keep the parts in contact, and where the parts are so heavy as to have considerable inertia.

The construction embodying the invention admits of a simpler form of gearing than has been heretofore employed, so that less friction is encountered, greater accuracy is secured, and the instrument is less expensive to construct.

Figure 1 is a plan view of an integrator embodying the invention; Fig. 2 is a face view of the same; Fig. 3 is a face view of a modified form of traction wheel; and Fig. 4 is a top edge view of said modified wheel, in the position corresponding to that shown in Fig. 1.

The integrator embodying the invention is provided with geared shafts 1, each having a hand 2 traveling over a dial 3 on a face-plate 4 at the front of a frame 5 in which the gears are mounted; this part of the instrument constituting a counter train of ordinary construction. The frame 5 is shown as carried in an outer frame 6 mounted on a movable arm 8 actuated by a meter, not herein shown, in the usual way. Associated with the integrator is a revoluble

surface having radial components herein shown as a motor driven disk 9 adapted to make one revolution during a given period of time. In the construction shown, the main part of the arm 8 is behind the time disk as indicated in dotted lines, the counter frame being connected with the upwardly projecting branch shown in front of the disk.

The counter train gears are driven, in accordance with the invention, by a traction wheel 10 mounted on a shaft 12, which has a bearing in the frame 5 and is nearly perpendicular to the face of the time disk. The said shaft is so connected for operation with the counterframe as to have a sufficient endwise movement with relation to the frame 5 as to admit of any endwise movement of the said shaft which may take place for any reason such, for example, as vibration of the heavy parts. As herein shown the shaft 12 is connected with the gearing of the counterframe by means of a spur gear 13 which is of sufficient width to remain in mesh with the gearing of the train throughout any independent movement which can take place. The traction wheel 10 mounted on the shaft 12 is nearly parallel to the face of the disk, so that the side edge thereof makes contact with the disk; and I have shown the wheel as provided with a flange, the edge of which constitutes the side edge of the wheel and lies in contact with the face of the disk, this arrangement resulting in a very effectual contact. The counter frame is shown as vertically hung and therefore has no tendency to swing toward the face of the disk, the contact between the traction wheel and the disk being provided for by means of a spring 14 which bears against the end of the shaft 12. By this construction the unnecessary friction encountered when the weight of the counter train is depended upon to keep the wheel in contact with the disk is obviated, while abnormal movements which may arise from vibration of the parts, or from other causes, do not affect the contact which is maintained by the spring. It is, however, not essential to the invention that the integrator should be hung vertically, it being obvious that the instrument may be placed in any position with relation to the meter that may be found most convenient.

In the construction shown, the counter

train is adjustable in its position with relation to the disk, in order that the traction wheel may lie in contact therewith in exactly the right position. For this purpose I have shown the frame 5 as supported in the frame 6 by means of screws 15 extending through the frame 6 and engaging indentations in the ends of the frame 5, the said screws having lock nuts 16. Projecting downward from the frame is a tongue 17 having an opening through which projects a screw threaded pin 18 on the arm 8, the said pin being provided with set nuts 19 (the front nut only being shown) between which the tongue 17 is held so that the said tongue can be moved in and out to a slight extent with relation to the frame 6 and locked in its adjusted position.

In the modification shown in Figs. 3 and 4 the traction wheel is provided with anti-friction disks or rollers 20 having their axes in the plane of the traction wheel so that the friction encountered in the movement of the traction wheel across the face of the disk is minimized without lessening the frictional engagement between the wheel and the disk which produces the rotary movement of the wheel in the travel of the disk.

What I claim is:

1. An integrator comprising a clock-driven revoluble surface; a traction wheel in frictional contact with said surface, the plane of said wheel being nearly parallel to said surface; a spring constituting the sole means for holding said wheel in frictional contact with said surface; a meter adapted to move said wheel radially with relation to said surface; and indicating mechanism operated by said wheel.

2. An integrator comprising a motor driven revoluble surface having radial components; a traction wheel, the side edge of which is in frictional contact with said surface, the axis of said wheel being nearly perpendicular to the said surface; a spring bearing on the end of said axis and constituting the sole means for holding said wheel in contact with said surface; a meter adapted to move said wheel radially with relation to said surface; and counting mechanism operated by said wheel.

3. An integrator comprising a revoluble surface; a traction wheel adapted to lie in contact with said surface and to be moved radially along said surface, said traction wheel lying nearly parallel to said surface and having anti-friction devices along its bearing periphery, the axes of which are in the plane of the traction wheel and transverse to the path of travel of the wheel across the revoluble surface; and a counter-train actuated by said wheel.

4. An integrator comprising a clock driven revoluble surface; a traction wheel in friction contact with said surface, the plane of said wheel being nearly parallel to said surface; a meter adapted to move said wheel radially with relation to said surface; indicating mechanism operated by said wheel; and means whereby said wheel is capable of movement lengthwise of its axes with relation to said indicating mechanism.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ERVIN G. BAILEY.

Witnesses:

M. L. MALONEY,
JAS. J. MALONEY.