

(No Model.)

H. HERDEN.
CENTRIFUGAL SPEED INDICATOR.

No. 579,826.

Patented Mar. 30, 1897.

FIG. 1.

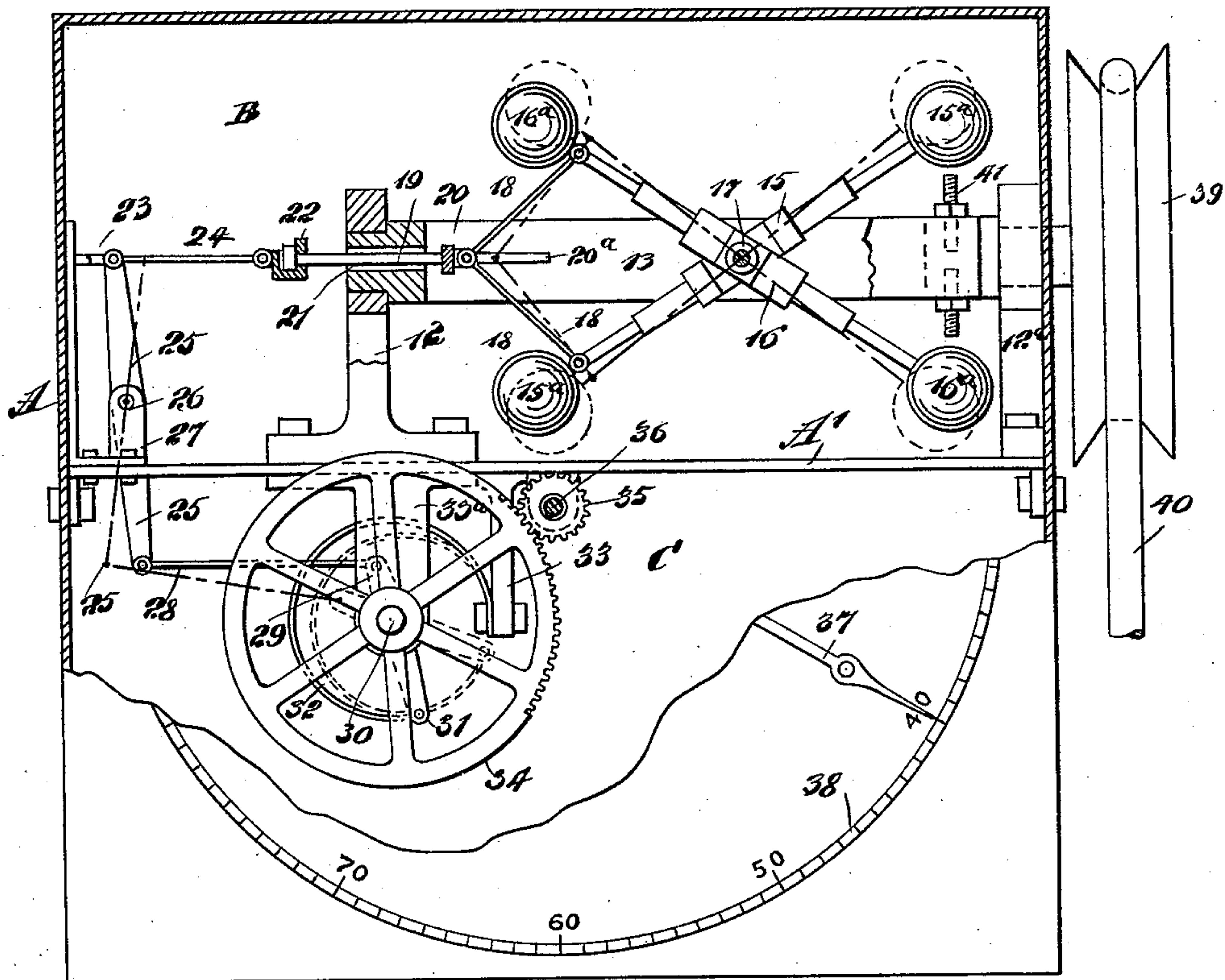


FIG. 2.

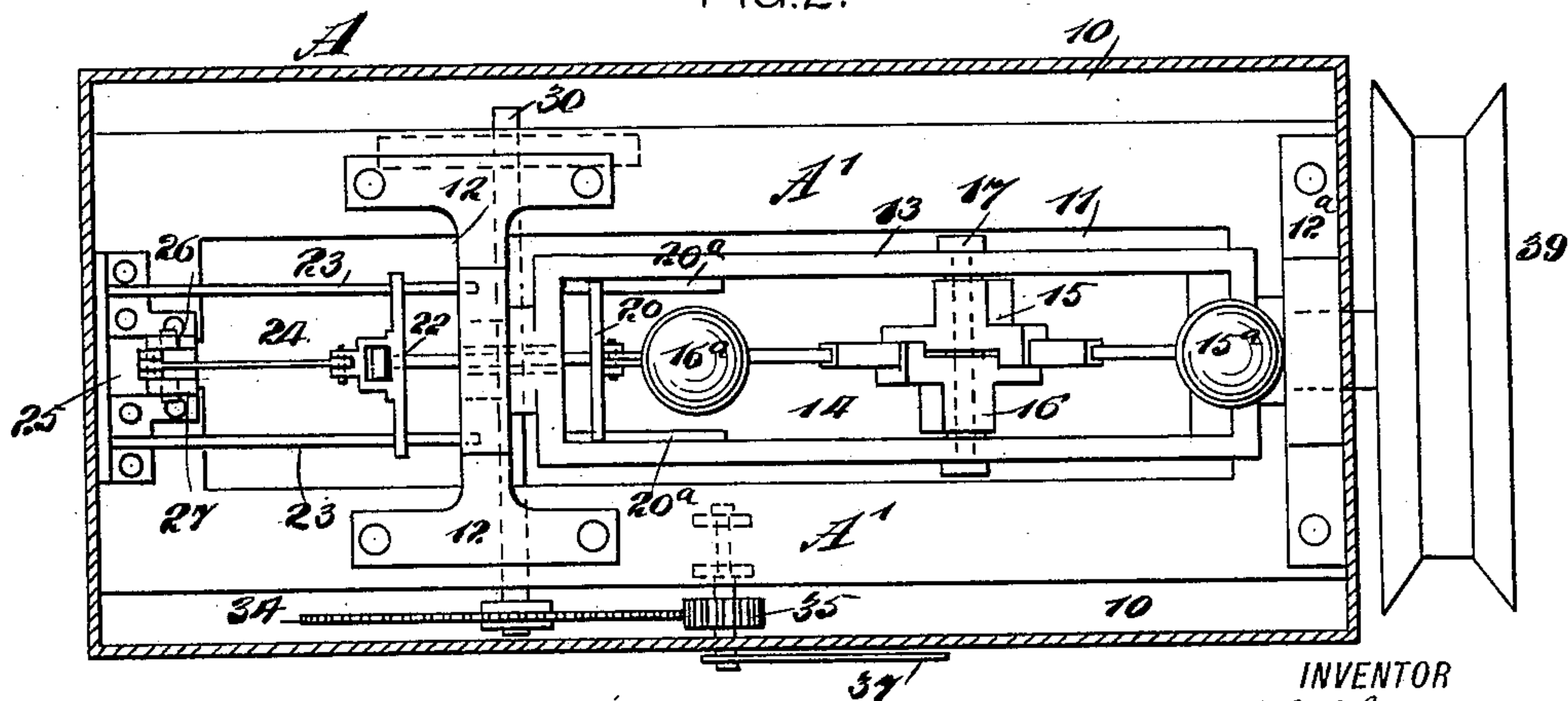
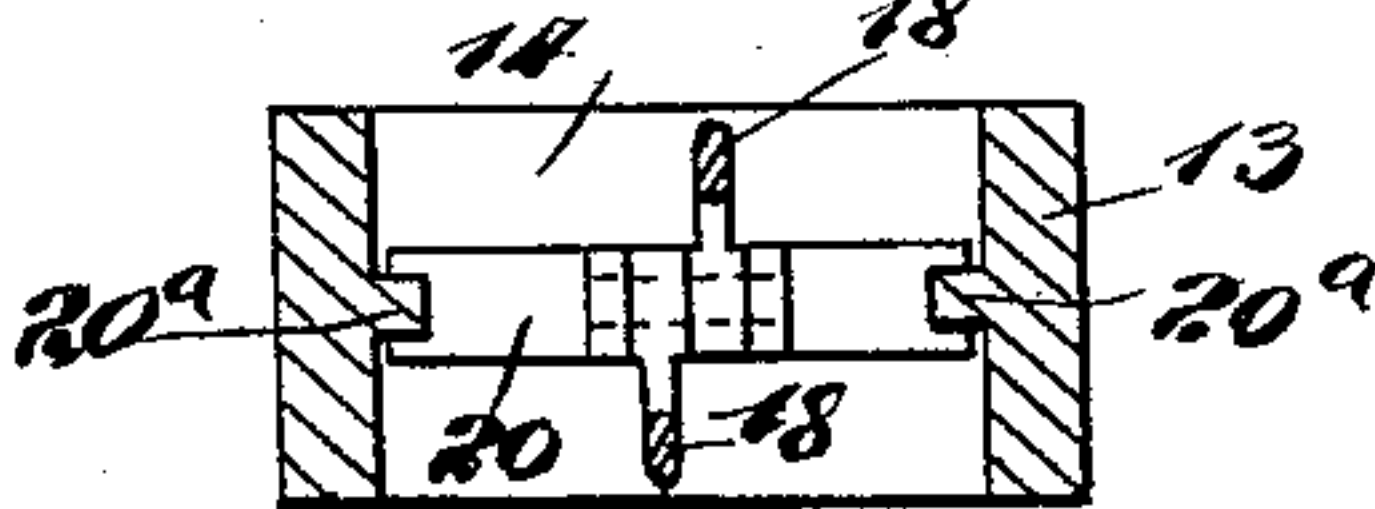


FIG. 3.



WITNESSES:

Donn Twitchell
J. H. A. K.

INVENTOR
H. Herden.

BY

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY HERDEN, OF WELLSBOROUGH, PENNSYLVANIA.

CENTRIFUGAL SPEED-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 579,826, dated March 30, 1897.

Application filed October 30, 1896. Serial No. 610,561. (No model.)

To all whom it may concern:

Be it known that I, HENRY HERDEN, of Wellsborough, in the county of Tioga and State of Pennsylvania, have invented a new and Improved Centrifugal Speed-Indicator, of which the following is a full, clear, and exact description.

My invention relates to that class of speed-indicators in which the indicating mechanism is actuated by the centrifugal action of weights receiving motion from the machinery whose speed is to be indicated.

The object of the invention is to render indicators of this class much more accurate than heretofore, and, furthermore, to improve upon the construction of the speed-indicator for which Letters Patent were granted to me March 30, 1886, No. 338,841, and to provide a means for effectually equalizing the centrifugal force by the resistance of a spring.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section taken through the larger portion of the case and likewise through a portion of the mechanism contained in the case. Fig. 2 is a horizontal section through the case, illustrating the mechanism contained therein in plan view; and Fig. 3 is a transverse section through the slotted shaft in which the weighted levers are contained and likewise a section through the links connecting the said levers and showing the cross-bar to which the links are attached in side elevation.

In carrying out the invention the case A is shown as divided practically into two compartments, an upper compartment B and a lower one C, this division being effected through the medium of a skeleton horizontal partition A', (shown best in Fig. 2,) and a space 10 is preferably provided between the side edges of this partition and corresponding faces of the case. Ordinarily over a central opening 11 in the said partition A' a shaft 13 is mounted to turn in bearings 12 and 12^a,

both bearings being supported upon the partition A', one at a point beyond the center and the other near the end of the case. The shaft 13 turns freely in its bearings 12 and 12^a, but the central portion of the shaft is rectangular in cross-section and is provided with a longitudinal slot or opening 14. In this slotted portion of the shaft 13 two levers 15 and 16 are pivoted at their centers. These levers are perfectly balanced upon a pivot-pin 17, extending transversely through the shaft, as is best shown in Figs. 1 and 2, and the arms of the levers are at equal distance from the centers, and each arm at its outer end is provided with a weight, the weights on the arms of the lever 15 being designated as 15^a and the weights on the arms of the lever 16 being designated as 16^a. These levers cross one another, and their opposing faces at their points of suspension are recessed so that the opposing balls or weights of the levers will be brought into horizontal alinement.

The inner ends of the two levers 15 and 16 are pivotally attached to links 18 adjacent to the weighted extremities, and the links 18 are brought together and pivotally attached to a cross-bar 20, which cross-bar is held to slide on suitable ways 20^a, formed on the inner faces of the side walls of the slot 14 in the shaft 13, as shown in Fig. 3.

The inner end of the shaft 13, or that end which is located in the inner bearing 12, is provided with an opening 21, and a rod 19 is passed through the opening 21 in the shaft, being attached at one end to the cross-bar 20, and the other end of the rod is made to terminate in a head, whereby the rod may have a swivel connection with a cross-head 22, and the aforesaid cross-head, as illustrated, may be so shaped as to form an oil-receptacle around the point where the rod 19 is connected with the cross-head. The cross-head is held to slide upon horizontal guide-bars 23, which are usually secured in the bearing 12 and in the opposing wall of the case, as shown in Fig. 2. A link 24 is pivotally attached to the cross-head 22, and this link is pivoted at its outer end to the upper extremity of a balance-lever 25, the said lever being fulcrumed upon a central pin 26, supported in suitable bearings 27. The balance-lever extends down-

ward into the lower chamber C, and its lower end is pivotally attached to a connecting-rod 28, the opposite end of the said rod being secured to an upwardly-extending arm 29, secured upon a spindle 30, and from the same spindle a second arm 31 is carried downward or in an opposite direction to the arm 29, while one end of a spring 32 is attached to the lower end of the arm 31 and is carried usually close around the spindle 30 and secured to a hanger 33, projected downward from the partition A' or other support, as is best shown in Fig. 1, the spindle 30 being mounted to turn in a hanger 33^a. The spring 32 is that which is referred to in the preamble of the specification as being used for equilibrizing the centrifugal force of the levers 15 and 16.

A segmental gear 34 is carried by the spindle 30, and the said segmental gear is in mesh with a pinion 35, the spindle upon which the pinion is secured being carried out through a dial 38, located on the outer side of the case, and is provided with a pointer 37, as shown in Figs. 1 and 2. In the drawings a wheel having only a portion of its periphery toothed is illustrated instead of the segment above referred to, since the wheel is sometimes desirable and provides for a more perfect balance.

The shaft 13 is provided with a pulley 39 at its outer end, and a belt 40 is carried over the said pulley and is connected with the machinery whose speed is to be indicated. A set-screw 41 is carried by the shaft 13, occupying such position that it will engage with the outermost weight of one of the levers 15 or 16, the said set-screw being intended to limit the movement of the levers when the index-hand 37 is at zero on the dial. If found desirable, a second set-screw (shown in Fig. 1) may be employed, in order that undue strain may not be brought to bear upon the connections, impairing the accuracy of the instrument in the event the belt should break or slide off the pulley 39.

By employing two crossed weighted levers instead of one and perfectly balancing them a true-running machine is obtained. The special connection between the spring and weighted levers insures a uniform action of the spring upon both of the weighted levers when the resisting quality of the spring is brought into play.

It is evident that an indicator made in the manner described may be placed at any conceivable angle to the level plane, and when connected by a belt from the machinery to the pulley 39 the indicator-hand will move or will remain stationary as the speed of the machinery changes or remains even.

The indicator will not be affected by other forces, as, for instance, by the jolting of a moving railroad-train, as a blow given the instrument from any direction while the shaft 13 is at rest will not affect the angle of the levers 15 and 16 to any appreciable extent, and much less if the shaft 13 is in motion.

For this reason the indicator is especially adapted to show the speed in miles of a railroad-train or the speed by number of revolutions or feet as required for any piece of machinery. As the levers 15 and 16 are well balanced and are not dependent on gravity, the slightest change in speed will be instantly shown, no matter in what direction the shaft revolves.

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

1. The combination with a casing, of two bearings, a slotted shaft turning in the bearings, two levers extending through the slot of the shaft and pivoted therein on a fulcrum common to each lever, a cross-head sliding longitudinally within the slotted shaft, a link connected to each lever and to the cross-head, a rod passing axially through one end of the shaft and connected to the cross-head, two parallel guide-bars held by the casing, a cross-head running in the said guide-bars and pivotally connected to the rod of the first-named cross-head, a lever fulcrumed within the casing, a link connecting the lever with the second-named cross-head, and an indicator actuated by the lever, substantially as described.

2. The combination with a frame, of a shaft revolubly mounted therein and having a slot running through it, a lever fulcrumed within the slot, a cross-head running longitudinally within the slot of the shaft, a connection between the lever and the cross-head, a rod fixed to the cross-head and passing axially through one end of the shaft, a second cross-head movably held by the frame and to which second cross-head the rod is pivotally connected, and an indicator actuated by movement derived from said second cross-head, substantially as described.

3. In a speed-indicator the combination of a casing, of a shaft revolubly mounted therein and having a slot running longitudinally therewith, a lever extending through the slot and fulcrumed within the shaft, a cross-head mounted to slide in the slot of the shaft and longitudinally with the shaft, a connection between the lever and the cross-head, a rod running axially through one end of the shaft and connected with the cross-head, and an indicator deriving movement from the rod, substantially as described.

4. In a speed-indicator, the combination of a casing, of a shaft revolubly mounted therein and having a slot running longitudinally through it, a lever extending through the slot and fulcrumed therein, a cross-head sliding within the slot and longitudinally with the shaft, a link connecting the cross-head with the lever, an indicator, and a connection between the indicator and the cross-head, a portion of said connection running axially through one end of the shaft, substantially as described.

5. In a speed-indicator, the combination

with a casing, of a shaft revolubly mounted therein and having a slot running longitudinally with the shaft, a lever extending through the slot and fulcrumed therein, a cross-head
5 sliding in the slot and longitudinally with the shaft, the cross-head being connected with the lever, a rod connected with the cross-head and passing axially through one end of the

shaft, a cross-head slidably held by the casing and pivotally connected to the rod, and an indicator in connection with the second cross-head, substantially as described.

HENRY HERDEN.

Witnesses:

C. W. WEBB;
E. H. OWLETT.