J. E. HIRES.

MECHANICAL MOVEMENT.

APPLICATION FILED AUG. 26, 1915.

1,167,179.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

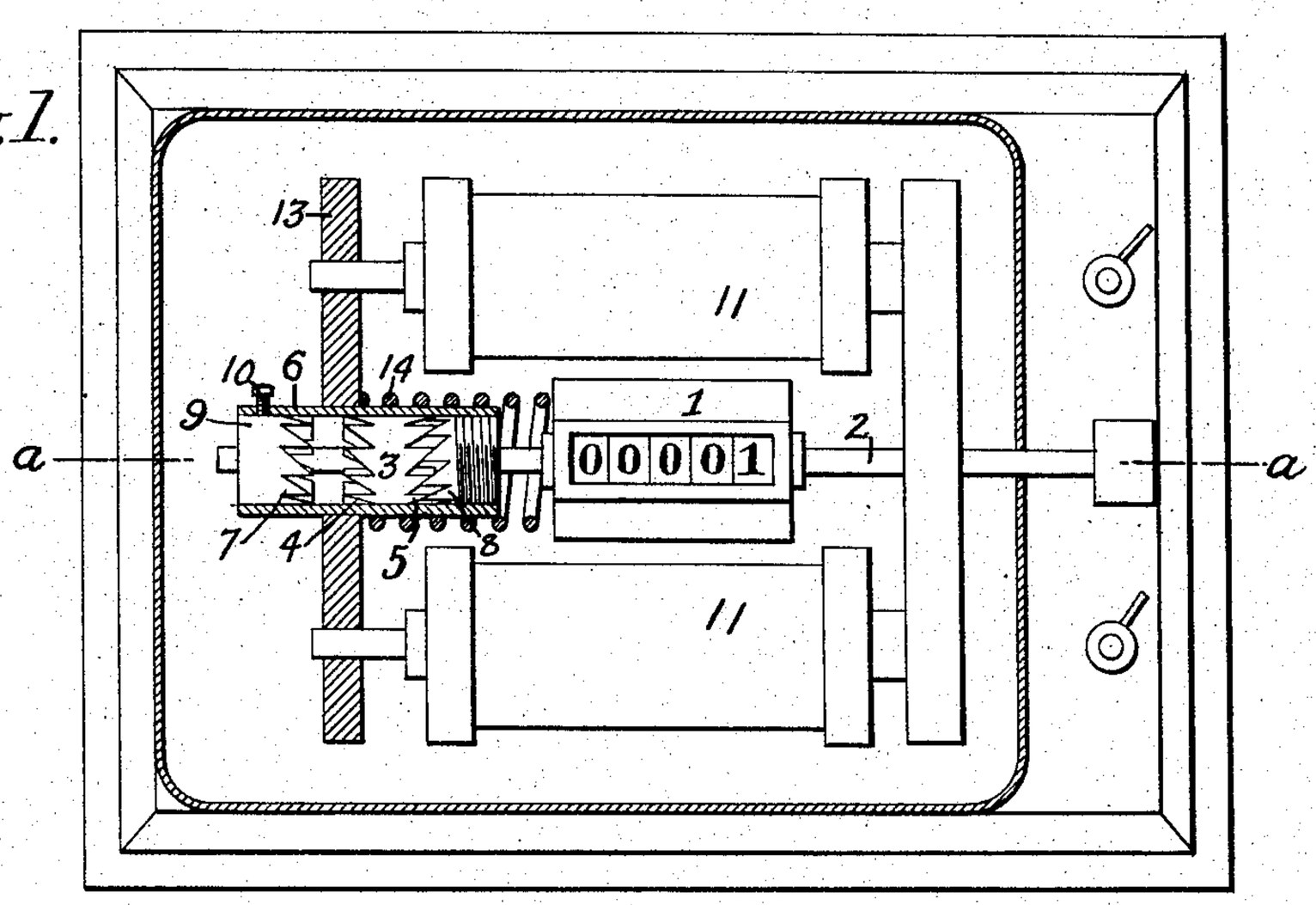
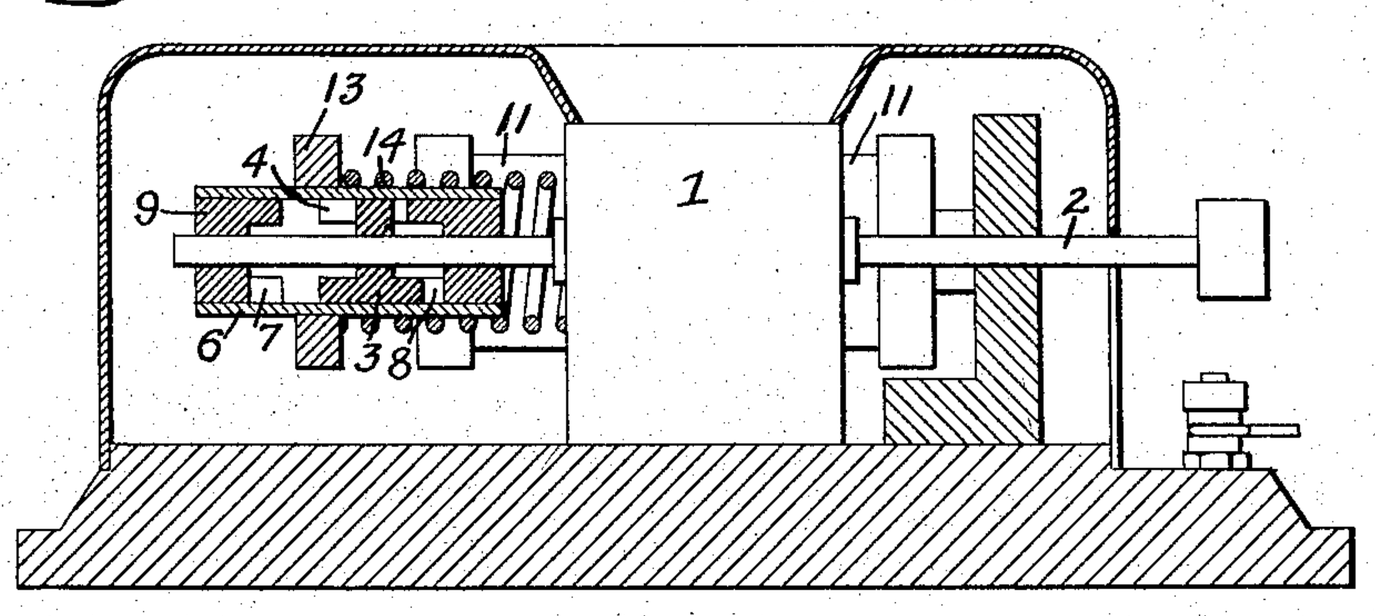


Fig. 2.



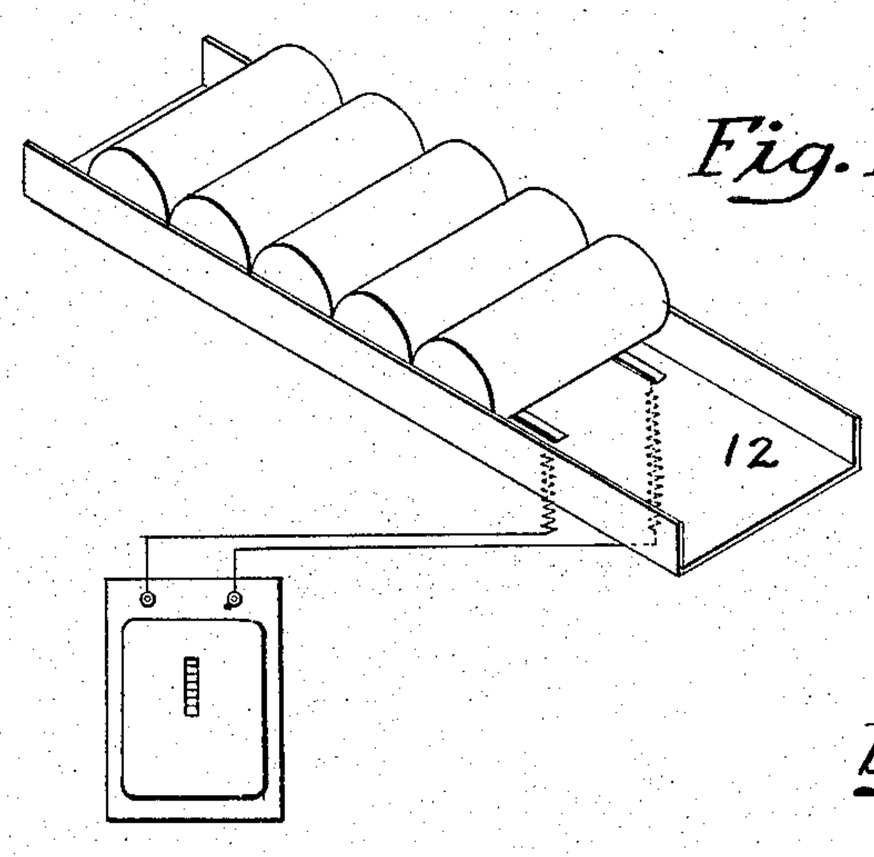


Fig. 11.

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2 SHEETS—SHEET 2.

Fig. 10.

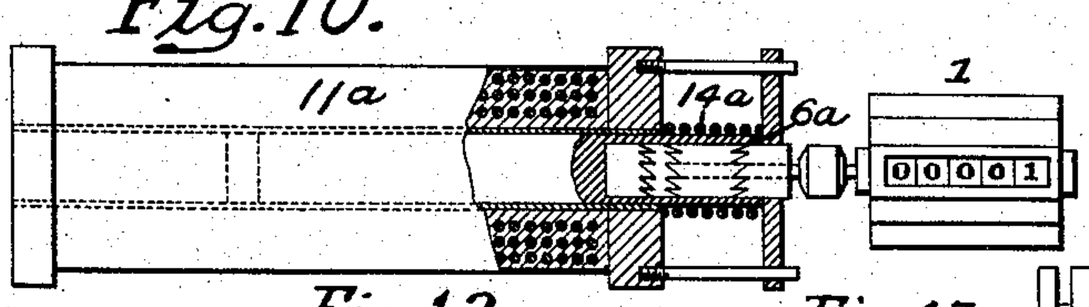


Fig. 4.

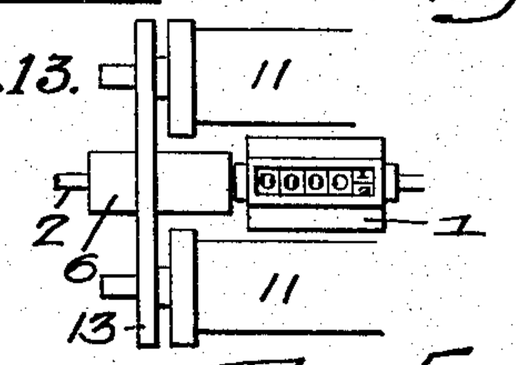


Fig. 12.

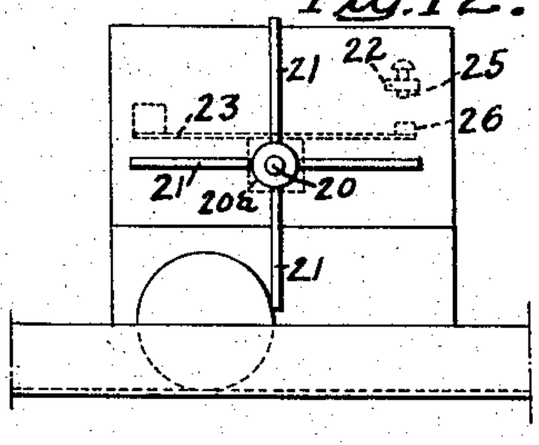


Fig. 13.

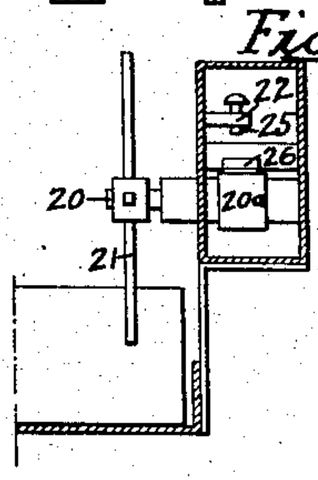


Fig. 5.

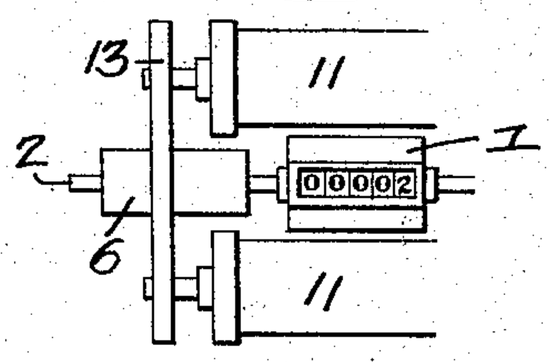


Fig. 14.

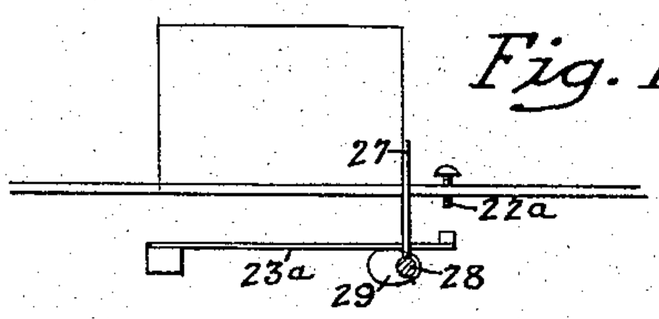


Fig. 6.

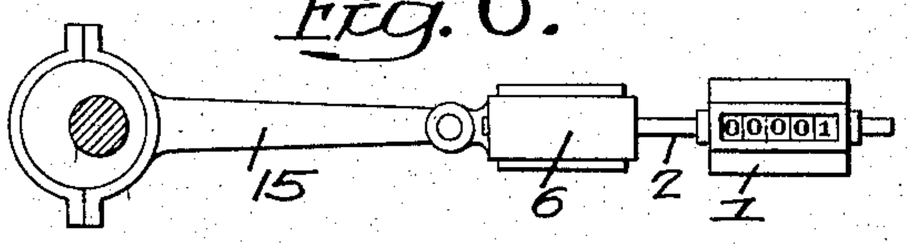


Fig. 7.

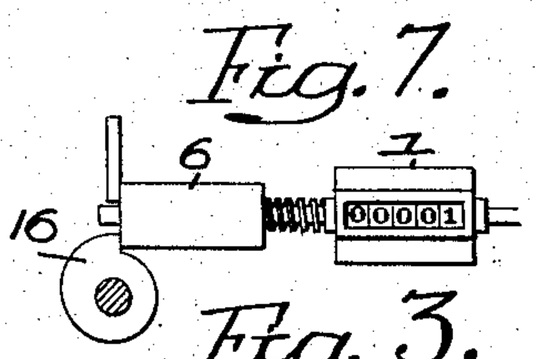


Fig. 8

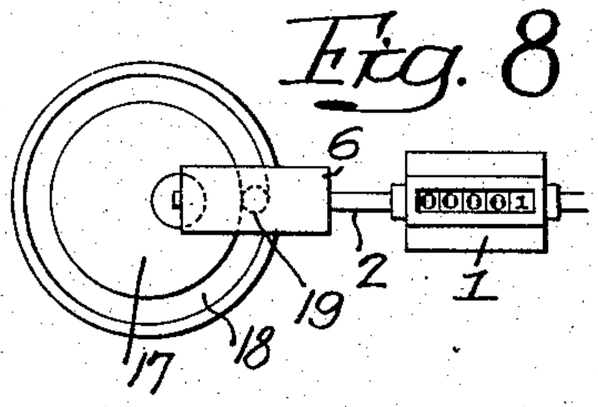


Fig. 3.

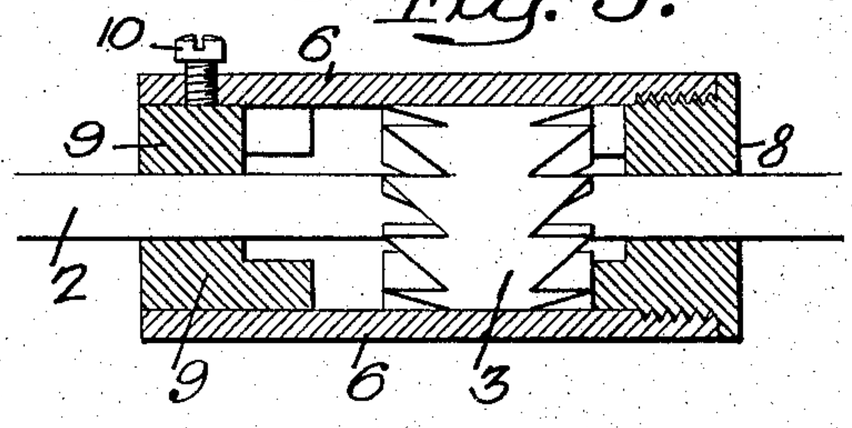
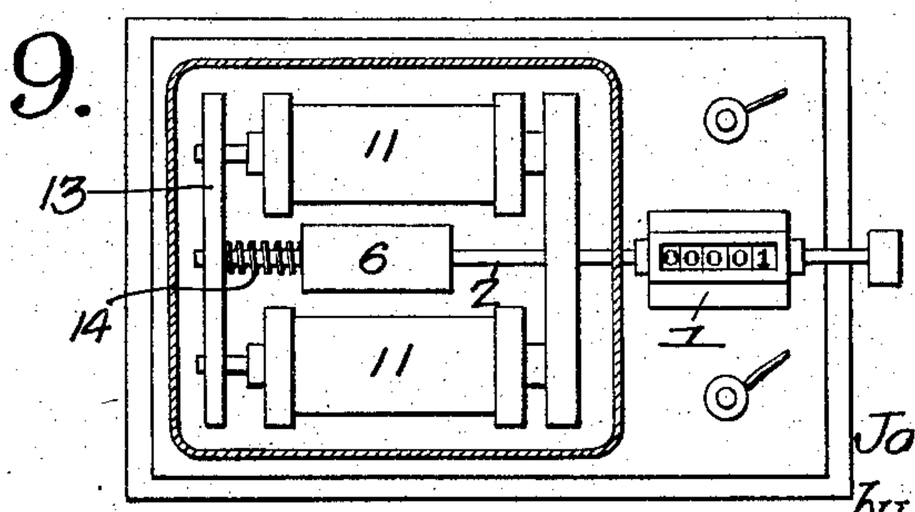


Fig. 9.



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MECHANICAL MOVEMENT.

1,167,179. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed August 26, 1915. Serial No. 47,514.

To all whom it may concern:

Be it known that I, JOHN E. HIRES, a citizen of the United States, and a resident of Ardmore, Montgomery county, Pennsylvania, have invented Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to means for transforming a reciprocative movement of a driven member into rotative movement, which rotative movement may be applied to a driving shaft or spindle.

The structure forming the subject of my invention has been employed for operating counting mechanism, and specifically in connection with an electrically operated device for counting cans, boxes, and various other articles while the same are moving past a given point. One feature of such construction is the provision of an electrical device which will accurately count the articles as they pass no matter how fast they travel, and a further feature is the arrangement of the counting mechanism and its operating means so that such structure can be placed at some distance from the point at which the cans, boxes, or other articles are moving.

The counting device is particularly well adapted for use in the counting of cans, bottles, boxes, or other objects in a factory or warehouse wherein the movement of such articles may effect the closure of an electrical circuit whereby the mechanical device forming the subject of my invention may operate such counting mechanism located in an office or other central point. It will be understood, of course, that my improved mechanical movement may be employed and operated in connection with various moving parts of machinery of different kinds, since its use is not limited to operation by an electrical means.

These and other features of my invention are more fully described hereinafter, reference being had to the accompanying drawings, in which:

Figure 1, is a plan view of the counting mechanism and one form of actuating means therefor forming the subject of my invention, the same being shown as arranged for electrical operation; Fig. 2, is a sectional elevation of the operating mechanism on the line *a*—*a*, Fig. 1; Fig. 3, is an enlarged sectional view of the means employed to transform longitudinal movement into rotative movement for the operation of the counter; Figs. 4 and 5, are views illustrating diagrammatically the manner of operating the counter; Figs. 6, 7 and 8, are views illustrating various forms of mechanical devices for operating the counting mechanism; Fig. 9, is a view of a slightly modified construction; Fig. 10, is a view showing my improvement in connection with a solenoid; Fig. 11, is a perspective view illustrating a trough or runway for objects arranged to pass contact points for closing an electric circuit to operate the counting device, and Figs. 12, 13 and 14, are views illustrating in detail the character of contact points and their operating means which I may employ in the counting of cylindrical and rectangular bodies.

The counting device proper may be any of the usual structures now upon the market, and in practice I have used a Veeder counter which is illustrated at 1. The shaft of this counter is extended at 2, and mounted upon this shaft is a ratchet or pinion 3 having sets of teeth 4 and 5 at opposite ends of the same, of the shape clearly shown in the drawings. Inclosing this pinion is a slidable, non-rotataive sleeve 6 having sets of internal teeth 7 and 8 at opposite ends of the same adapted to engage alternately the sets of teeth 4 and 5 at the opposite ends of the pinion 3. One set of internal teeth may be formed on a screw threaded part adapted to threads on the sleeve 6, and having a fixed relation to the sleeve while the other set is carried by an adjustable collar 9, which may be secured to the sleeve by a set screw 10. The teeth are preferably shaped as shown in Figs. 1 and 3, being beveled on one side so that when the two beveled surfaces come in contact the pinion 3 is turned.

In order to operate the counting mechanism, the sleeve is given a longitudinal movement with respect to the pinion, which occupies a substantially fixed position against longitudinal movement, whereby the pinion may be rotated step by step and thereby effect unit operation of the counting shaft and the counting wheels carried thereby, and various means may be employed to impart such movement thereto.

In Figs. 1, 2, 3, 4 and 8, I have shown an electrically operated structure. In this arrangement I employ a pair of magnets 11 which may be energized by the closing of an electric circuit in which the necessary con-

tacts are actuated by a moving can, box or other body passing along a chute or runway 12, and these magnets attract an armature bar 13 attached to the sleeve 6. A spring 14 is located between the armature and the casing of the counter in the present instance, and acts to return the armature after attraction. The attraction effects longitudinal movement of the sleeve with respect to the ratchet or pinion 3, and by reason of the engagement of the teeth of the sleeve and pinion at the termination of the reciprocative movements of the sleeve, the counting shaft will be rotatively moved, and the arrangement is such that such shaft is moved one-twentieth of a revolution by the movement of the sleeve in one direction under the magnetic influence, and one-twentieth of a revolution by the movement of the sleeve in the opposite direction by the spring 14, the total extent of such reciprocative movements effecting the movement of the counting shaft one-tenth of a full revolution, and therefore racking forward one of the disks of the counter one unit. The counter is provided with the usual coöperating mechanism between the disks so that movement of the first or unit disk will effect movement of the other disks at the proper time to count tens, hundreds &c.

In Figs. 1, 2, 3 and 4, I have shown the counting device as disposed between the magnets, while in Fig. 9, I have shown the counting device arranged outside and beyond the same. In Fig. 10 I have shown the device operated by a solenoid magnet 11^a, the sleeve 6^a forming part of the sliding core and the spring 14^a being so located as to project the sleeve when the contact is broken.

Any means may be employed to impart longitudinal movement to the sleeve, and therefore effect step-by-step rotation of the pinion or ratchet member 3; hence it is applicable to any form of moving machinery, in which it is desired to count the number of operations, or the number of parts delivered, or any other operation of which a record may be desired to be kept.

The sleeve may be directly connected to a moving part of such machinery, as in Fig. 6, where it is shown attached to the pitman 15 of an eccentric, or cams may be employed to operate the sleeve, as in Figs. 7 and 8; the cam 16 shown in Fig. 7, effecting movement of the sleeve in one direction and a spring moving the sleeve in the opposite direction. A lever or arm may be arranged to operate the sleeve if desired. In most instances, a spring will be employed to restore the sleeve to its normal position, although if a cam is employed it may have such an operative connection with the sleeve as to move the latter in both directions upon a full revolution of the cam, as in the structure shown in Fig. 8, in which a cam 17 is shown as grooved at 18 to engage a pin 19 on the sleeve.

In counting cans and similar articles which may revolve or roll in passing down a chute or runway, I may employ a contact closing device, such as that shown in Figs. 12 and 13 which includes a rotatable shaft or spindle 20 having wings or arms 21 which lie in the path of said cans or other objects; the engagement of said cans with the wings moving the latter one-fourth of a revolution for each can or other object passing said wings, and the shaft 20 upon which said wings are mounted being provided with a cam or other device whereby a suitable contact arm may be actuated. In the present instance, I may employ a fixed contact 22 connected to one terminal, and a movable contact arm 23 connected to the other terminal, which movable contact is actuated by a cam 20^a on the shaft 20. I preferably employ platinum contact points 25 and 26, although any suitable form of contacts may be used.

When counting boxes or similar structures which may slide along a runway, or be carried by a conveyer or elevator, I employ a circuit closing trip 27 Fig. 14 which lies in the path of the moving boxes. This trip is arranged to swing between an inactive and active position, and is mounted on a spindle or shaft 28 carrying a cam or arm 29 to raise a movable contact arm 23^a in engagement with the fixed contact point 22^a whereby the circuit is closed each time a box passes such trip; the closing of such circuit actuating the armature to effect movement of one unit of the counting mechanism.

While I have described the ratchet or pinion 3 as provided with a complete set of teeth at each end for engagement with complete sets of internal teeth disposed within the sleeve 6, it will be understood that a single tooth or pair of teeth at each end of the pinion may be employed in connection with full sets of internal teeth carried by the sleeve, or the sleeve may have a single tooth or pair of teeth at each end for coaction with full sets of teeth on the ends of the ratchet or pinion 3, without departing from my invention.

While I have shown and described a structure in which a non-rotative toothed sleeve is moved relatively to a ratchet or pinion having teeth at its ends and carried by the rotatable counting shaft, it will be understood that the sleeve may be connected to the shaft of the counting mechanism and be rotated by engagement with a non-rotative ratchet or pinion which is longitudinally reciprocated with respect to said sleeve, either electrically or mechanically, in the same manner as described with respect to the manner of operating the sleeve.

I claim:

1. Means for rotating a shaft, comprising a cylindrical member toothed at each end, a tubular member surrounding said cylindrical member, and means for reciprocating one of said members with respect to the other, said tubular member having teeth for engagement with the teeth at both ends of the cylindrical member, and one of said members being connected to the shaft; the contact of the teeth of said tubular member with those of the cylindrical member effecting rotative movement of the shaft when the slidable member is moved in either direction.

2. Means for rotating a shaft, comprising a cylindrical member toothed at each end, a tubular member surrounding said cylindrical member, means for imparting longitudinal or sliding movement to one of said members with respect to the other in one direction, said tubular member having teeth for engagement with the teeth at both ends of the cylindrical member, one of said members being connected to the shaft, and a spring for moving said slidable member in the opposite direction, the contact of the teeth of said tubular member with those of the cylindrical member effecting rotative movement of the shaft when the slidable member is moved in either direction.

3. Means for rotating a shaft, comprising a ratchet or pinion having teeth at its end mounted on said shaft, a slidable sleeve surrounding said pinion, and means for imparting movement to said sleeve, the latter having teeth for engagement with the teeth of the ratchet or pinion; the contact of the teeth of said sleeve with those of the ratchet or pinion effecting rotative movement of the shaft when the sleeve is moved.

4. Means for rotating a shaft, comprising a double-ended ratchet or pinion mounted on said shaft, a slidable sleeve surrounding said pinion, and means for reciprocating said sleeve, the latter having teeth for engagement with the teeth at both ends of the pinion; the contact of the teeth of said sleeve with those of the ratchet or pinion effecting rotative movement of the shaft when the sleeve is moved in both directions.

5. Means for rotating a shaft, comprising a double-ended ratchet or pinion mounted on said shaft, a slidable sleeve surrounding said pinion, means for imparting movement to said sleeve in one direction; the latter having teeth for engagement with the teeth at both ends of the ratchet or pinion, and a spring for returning said sleeve to its normal position, the contact of the teeth of said sleeve with those of the ratchet or pinion effecting rotative movement of the shaft when the sleeve is moved in both directions.

6. Means for rotating a shaft, comprising a double-ended ratchet or pinion mounted on said shaft, a sliding sleeve surrounding said pinion, electrically actuated means for imparting movement to said sleeve in one direction; the latter having teeth for engagement with the teeth at both ends of the ratchet or pinion, and a spring for returning said sleeve to its normal position, the contact of the teeth of said sleeve with those of the ratchet or pinion effecting movement of the shaft when the sleeve is moved in both directions.

7. Means for rotating a shaft, comprising a cylindrical member with teeth at one end of the same, a tubular member surrounding said cylindrical member, and means for reciprocating one of said members with respect to the other, said tubular member having teeth for engagement with the teeth of the cylindrical member, and one of said members being connected to the shaft; the contact of the teeth of said tubular member with those of the cylindrical member effecting rotative movement of the shaft when the slidable member is moved.

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