

(Model.)

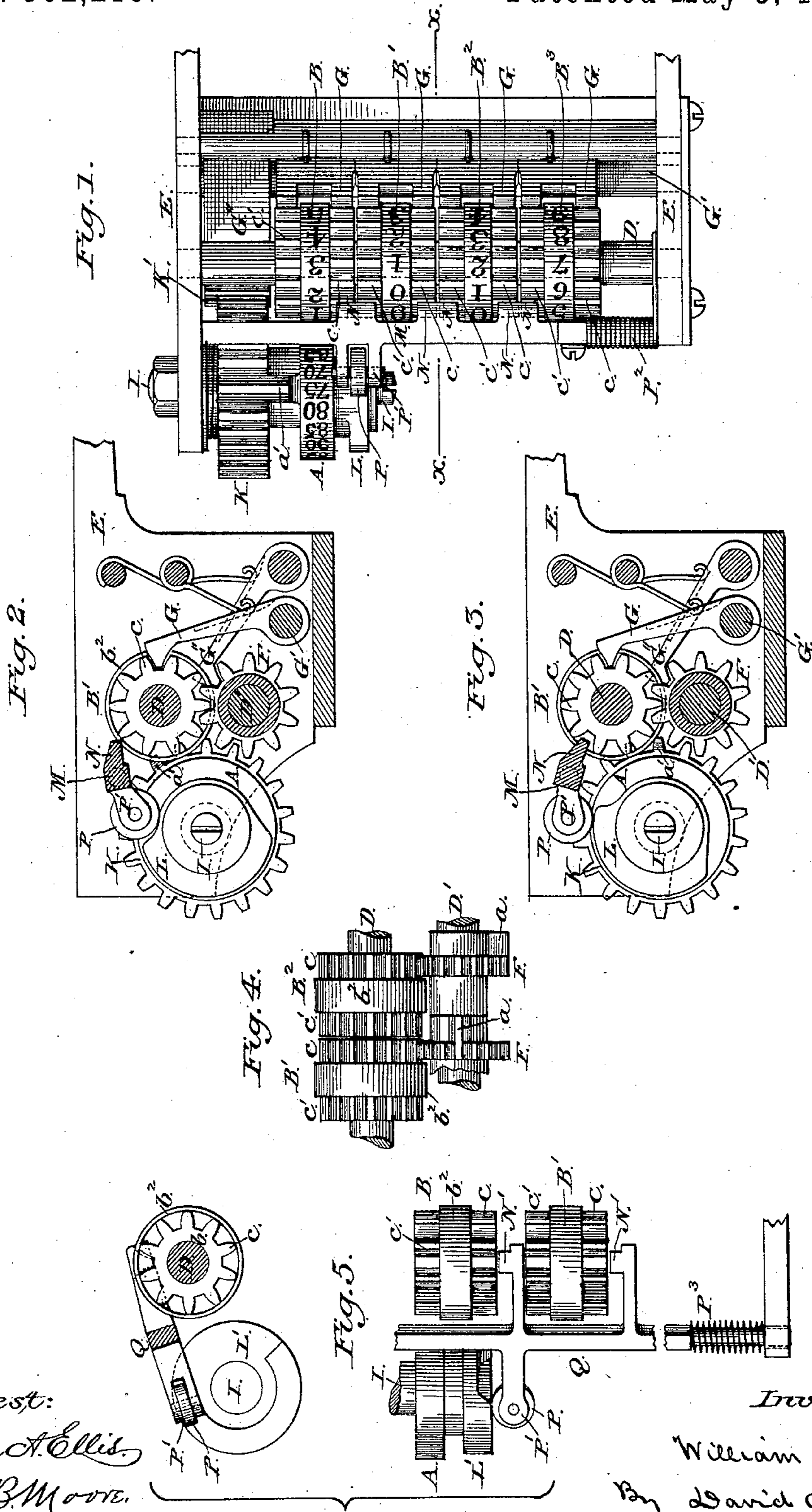
2 Sheets—Sheet 1.

W. KOCH.

STOP DEVICE FOR ADDING, COUNTING, OR REGISTERING MACHINES.

No. 362,219.

Patented May 3, 1887.



(Model.)

2 Sheets—Sheet 2.

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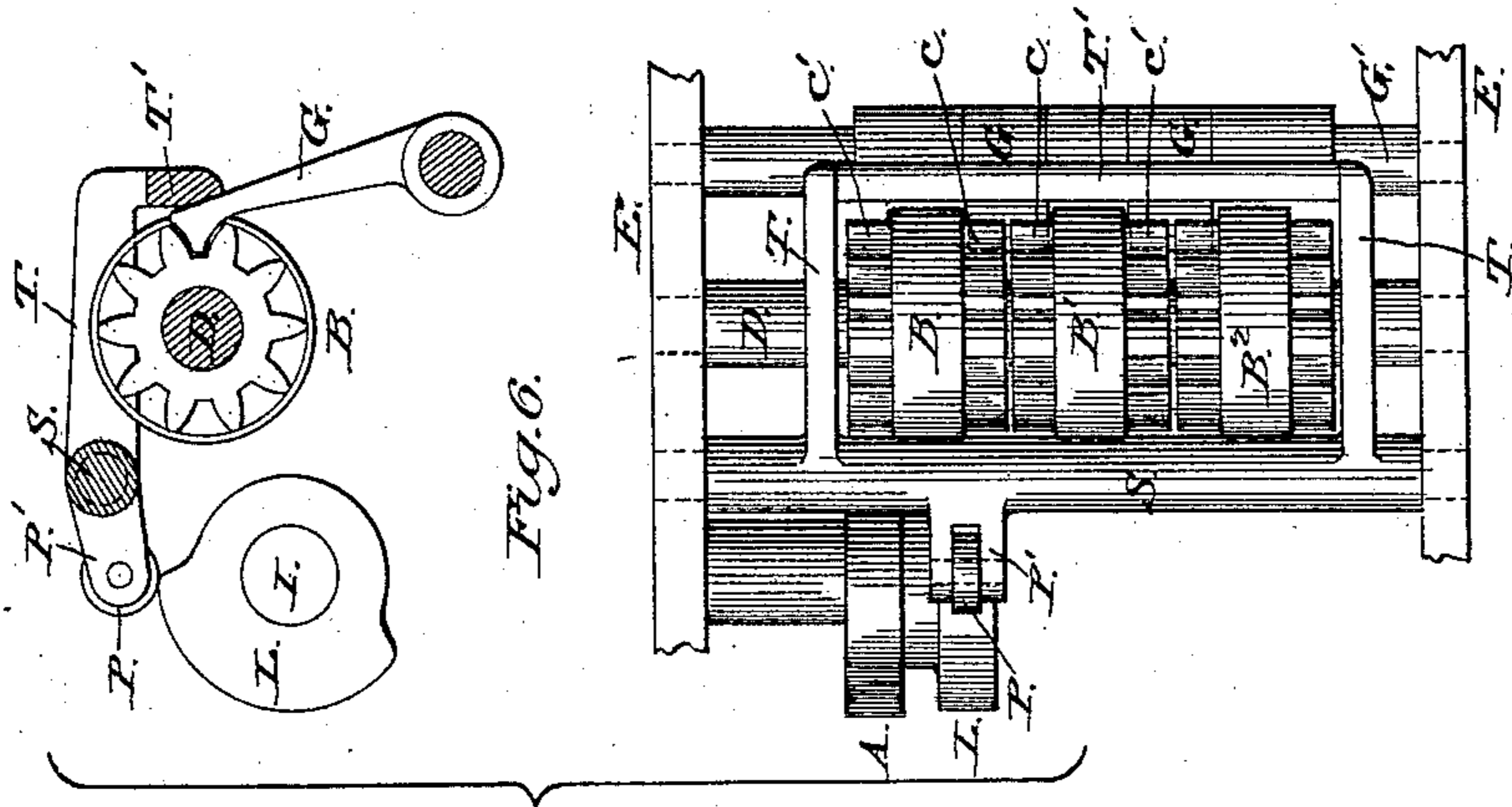


Fig. 6.

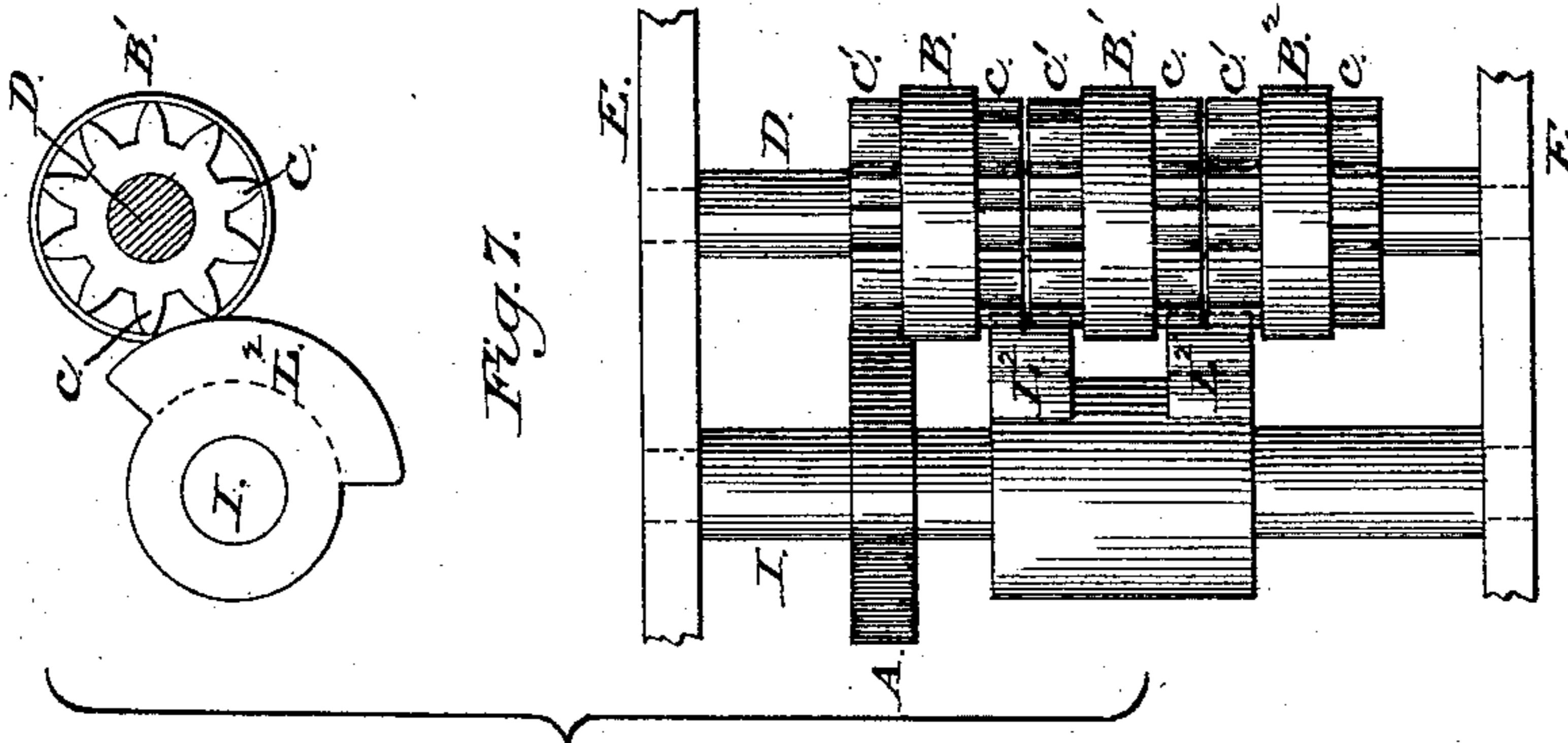


Fig. 7.

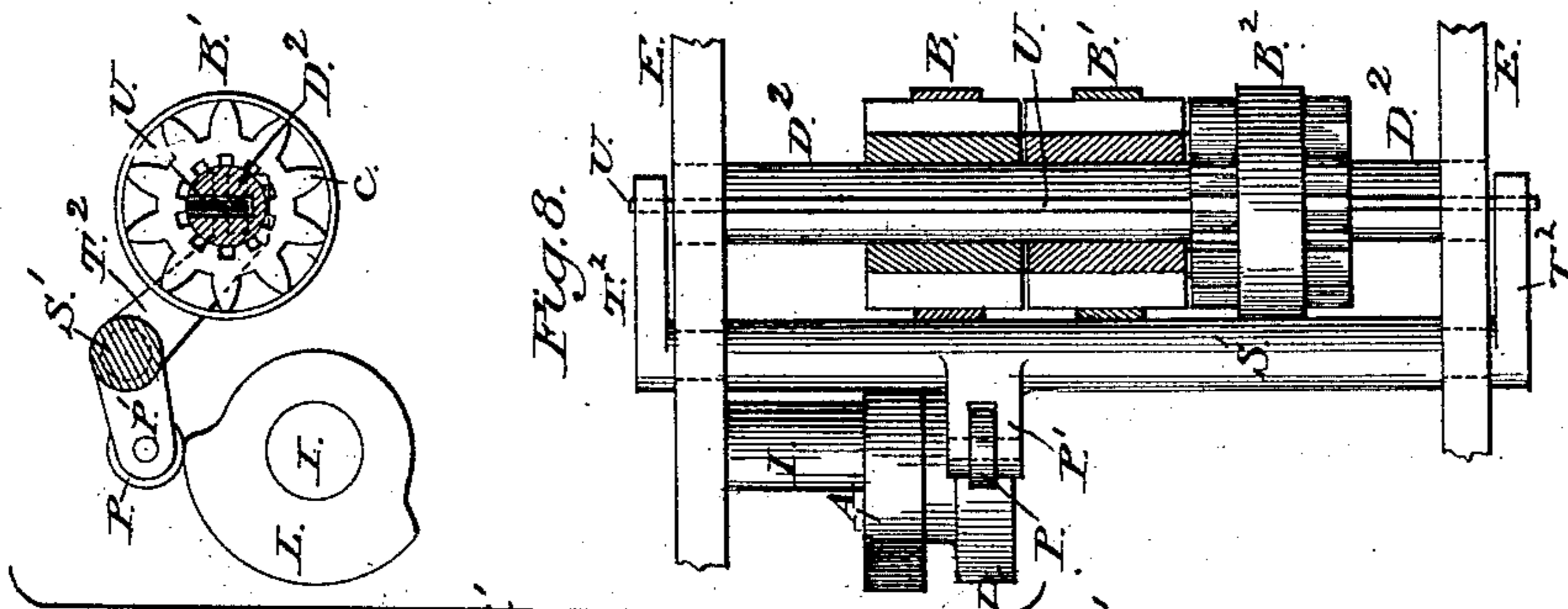


Fig. 8.

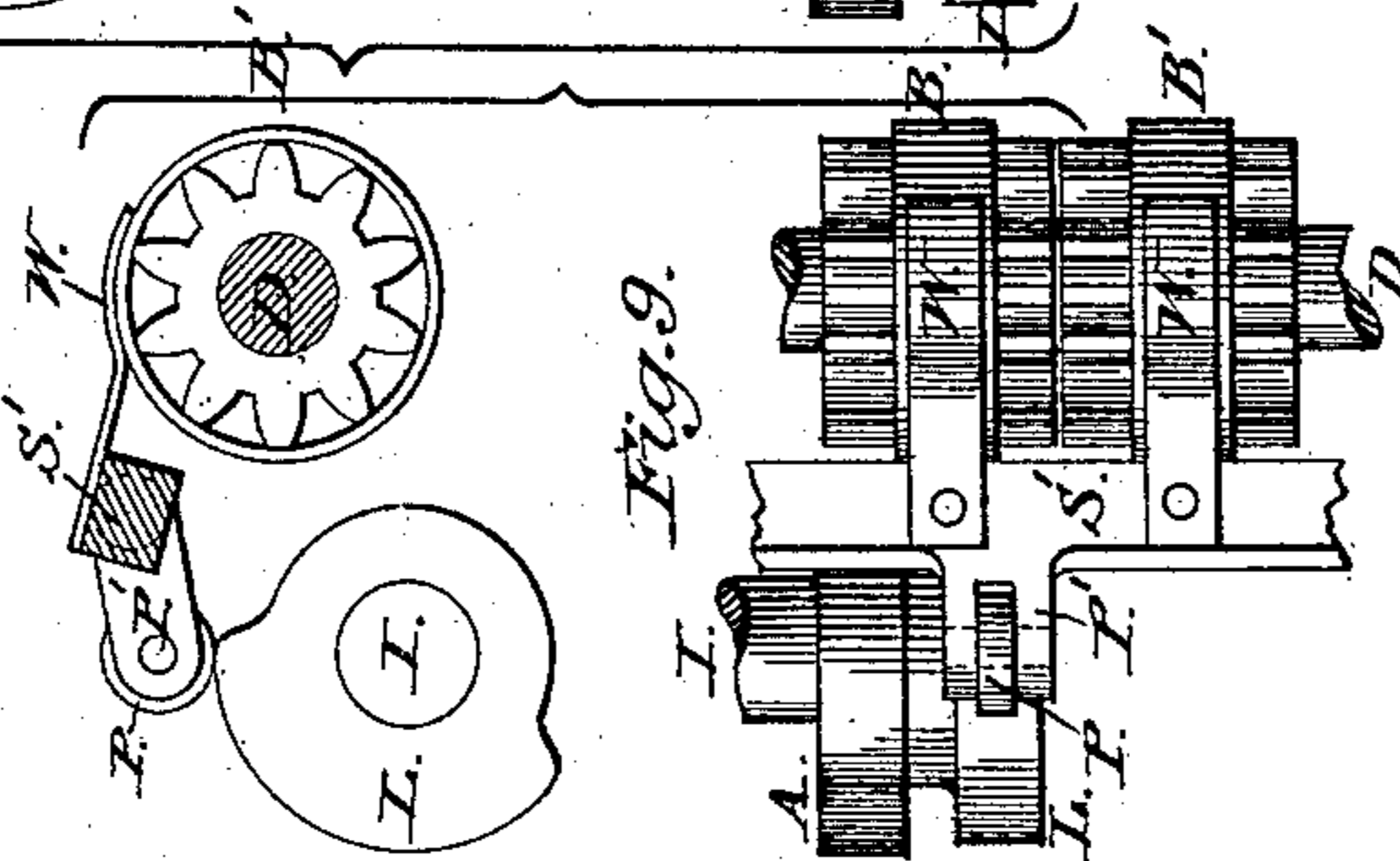


Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y., ASSIGNOR TO THE KRUSE CHECK
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STOP DEVICE FOR ADDING, COUNTING, OR REGISTERING MACHINES.

SPECIFICATION forming part of Letters Patent No. 362,219, dated May 3, 1887.

Application filed June 29, 1885. Serial No. 170,111. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, of the city, county, and State of New York, have invented an Improved Stop Device for Adding, Counting, or Registering Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to adding and registering machines operating by means of geared numbering-wheels.

In the use of a series of adding-wheels geared in the customary manner, so that each successive wheel in the train shall be turned a distance equal to one unit at each complete revolution of the preceding wheel, difficulty has been experienced in obtaining accuracy and precision in the machine when moved at a high speed, from the fact that the momentum acquired by the rapidly-rotating wheel tends to carry it beyond the point at which it should come to rest.

The object of my invention is to produce a simultaneous engagement of the stops provided for each and every wheel in the entire series at the precise moment when the units-wheel has actuated the train of wheels, and thereby render the machine absolutely exact in its movements.

In the accompanying drawings, Figure 1 is a plan view of an adding-machine fitted with my invention. Fig. 2 is a cross-section in line *xx* of Fig. 1, illustrating the adding-wheels released from the stop devices. Fig. 3 is a similar section illustrating the stops in position to engage the wheels. Fig. 4 is a side elevation of two of the adding-wheels, illustrating the position of the single tooth by which each complete rotation of one of the wheels is made to turn the next forward one tooth. Fig. 5 is a plan view with an accompanying transverse section illustrating a modification of my invention. Figs. 6, 7, 8, and 9 are respectively plans with accompanying sections illustrating other modifications of my invention.

A represents the units-wheel, and B B' B² B³, &c., the adding-wheels, of an adding and registering machine.

The adding-wheels are of the customary form, each bearing numbers from 1 to 10 on their peripheries, and are constructed, as is usual, each with a ten-toothed flange or pinion, *c c'*, on each side thereof. They are mounted to rotate loosely upon a shaft, D, secured in the frame E of the machine. One pinion, *c*, of each wheel is made to gear into a loose pinion, F, of an equal number of teeth, mounted upon a second shaft, D', (see Figs. 2, 3, and 4,) parallel with the shaft D, and each pinion F is provided with a single tooth, *a*, which projects laterally beyond the remaining teeth to engage the teeth of the pinion *c'* of the adding-wheel next beyond that which gears into the pinion F. The single tooth *a* thus operates at each revolution of the adding-wheel to move the next adding-wheel forward one-tenth of a revolution. A reverse movement of each adding-wheel is prevented by means of spring-actuated pawls G G, secured at one end to a transverse rod, G', in the frame to project against and engage the teeth of one of the pinions *c c'*.

The units-wheel A is mounted upon a pin or spindle, I, projecting from the frame E parallel with the shafts D D'. If the machine is designed for counting dollars and cents, its periphery is marked with numerals indicating an even number of cents from 0 to 100, the adding-wheels being made to count the dollars by tens, hundreds, thousands, &c. In the drawings the wheel is represented as indicating the cents by fives. It is constructed with a hub projecting on both sides thereof, and upon the hub, on one side of the wheel, a single radial tooth, *a'*, (see Fig. 1,) is formed to gear with the teeth of the pinion *c'* of the first adding-wheel, B, so as to turn it one-tenth of a revolution at each revolution of the units-wheel.

The units-wheel A is geared to the mechanism whose movements are to be counted or measured by means of a pinion, K, on its hub or other customary gear. Its reverse movement is prevented by a spring-actuated pawl, G'', engaging a toothed wheel, K', (see Fig. 1,) geared to the pinion K. The device, as thus far described, differs in no essential particular from the customary forms of adding-machines.

My improvement consists in forming a cam

or inclined surface upon the units-wheel or its hub, which shall operate by its revolution to throw a stop between the teeth of the pinions of all of the adding-wheels, or otherwise to engage simultaneously all of said wheels at the moment the single tooth upon the units-wheel has produced a movement of one or more of said adding-wheels.

L in the accompanying drawings represents a cam formed upon the periphery of the outer hub of the units-wheel A.

M, Figs. 1, 2, and 3, is a rock shaft or bar pivoted at each end in the frame E parallel with the shafts D D', between the units and the adding wheels, but above the same, and which is provided with fingers or lugs N N, adapted to drop in between the teeth of the pinions c c' of the adding-wheels B B' B², &c.

A friction-roller, P, is mounted within a slotted arm, P', projecting laterally from the rock-shaft M over the cam-surface L of the hub, and this roller is made to bear constantly upon said surface by means of a coiled spring, P², Fig. 1, at one end of the shaft. When the friction-roller rests on the lesser diameter of the cam, as shown in Fig. 2, the stop-fingers N N are lifted clear of the pinions c c', but are thrown into engagement to completely lock the same, when, in the rotation of the units-wheel and its hub, the cam L is made to lift the roller P, as shown in Fig. 3. The proportions of the cam L and its position with reference to that of the single actuating-tooth a of the units-wheel are so adjusted as that the friction-roller P will ride up upon the cam and rock the shaft M at the moment the tooth a engages the pinion c' of the adding-wheel B, so that so soon as the adding-wheel has been moved by the tooth and the latter is free to pass therefrom the adding-wheel is locked by the engagement with its pinions of the finger N upon the rock-shaft. The single actuating-tooth for each adding-wheel is in like manner so adjusted with reference to the cam L as that each and every adding-wheel will be locked the moment it has been moved, and a movement of either of the wheels to carry the number thereon beyond the position to which it has been normally carried by the movement of its appropriate actuating-tooth is wholly prevented, as shown in Fig. 3. Before the actuating-tooth a has again come round into position for action the cam L allows the friction-roller P to drop, and the fingers N N on the shaft are lifted, as shown in Fig. 2, to allow the adding-wheels to move.

Instead of constructing the adding-wheels B B' B², &c., of a solid circular body with lateral toothed flanges or pinions on each side, they may be constructed of a single wide-toothed wheel, b, upon the center of which a central band, b², is fitted, the periphery of the band being numbered to serve as the face of the adding-wheel. (See Figs. 2, 4, 5, &c.)

Many equivalent modifications may be made in the manner of locking the entire series of

adding-wheels by means of a single movable piece actuated by a cam on the units-wheel.

Fig. 5 illustrates such a modification in the form of a cam, L', formed upon the lateral face of the units-wheel A. A friction-roll r, bears against it. This roller is mounted at the end of an arm, P', projecting from a rod or bar, Q, fitted to slide longitudinally parallel with the axial shaft of the adding-wheels B B', and which, being moved in one direction by the cam, is carried in the opposite direction by a spring, P³. This bar is provided with fingers N' N', arranged to enter between the pinions c c' upon the adding-wheels. The longitudinal movements of the bar Q, produced by the cam L' and spring P³, will cause the fingers N' to pass at the proper moment into and out of engagement with the teeth of the pinion c upon one side of each wheel, and the cam is so adjusted and proportioned as that an engagement of the pinion to lock the same is effected at the moment the movement of the adding-wheel is completed.

Fig. 6 illustrates another modification in the form of a rocking bar, S, mounted in the frame parallel with the axial shaft of the adding-wheels B B'. Upon one side this bar is provided with an arm, P', carrying a friction-roller, P, to bear upon a cam, L, formed on the hub of the units-wheel A, so that the rotation of the units-wheel shall produce, as the roller rides upon the cam, an oscillation of the bar at each revolution of the wheel. From the other side of the bar, arms T T are made to project out beyond the adding-wheels B B' B², &c., and are united by a cross-bar, T', which, when the cam L carries up the arm P', will be brought to bear upon the pawls G G, which engage the pinions c c' of the entire series of adding-wheels, (see Figs. 2 and 3,) and by preventing them from lifting will cause them to lock all of the adding-wheels at the instant the movement of any one of them, produced by their gearing with the units-wheel, is completed.

Fig. 7 illustrates the shaft I of the units-wheel extended parallel with the axial shaft D of the adding-wheels, so as to carry a series of cams, L² L², mounted thereon against the peripheries of the toothed wheels or pinions c c' of all of the adding-wheels B B', &c., at the moment the movement of either adding-wheel is completed. The periphery of the cam is made to bear upon the ends of the two adjacent teeth of the pinion with which it is brought into register, (shown in section Fig. 7,) and will thus lock the same effectually.

Fig. 8 illustrates the adding-wheels B B' B², &c., as mounted to turn loosely upon a fixed axial shaft, D², slotted longitudinally and provided with a longitudinal bar, U, fitted in said slot, with freedom to move out radially therefrom. The inner periphery of the bore of each and every adding-wheel in the series is notched, (seen in cross-section, Fig. 8,) so that when the bar U is moved outward radially from its seat

in the fixed shaft D² it will engage some one of these internal notches, and thus lock the wheel. This radial locking movement of the bar U is effected at the moment any one of the adding-wheels has completed its movement by means of arms T² T² upon the ends of a rocking shaft, S', mounted parallel with the axial shaft D. The arms T² T² engage the projecting ends of the bar U. The shaft S' is made to rock at the proper moment to lift the bar U by means of a friction-roller, P, upon an arm, P', projecting from the opposite side of the shaft over a cam, L, on the hub of the units-wheel A, as has hereinbefore been described, and substantially as shown in Figs. 1, 2, 3, and 6.

Fig. 9 illustrates the rocking shaft S', which is actuated, as described, by a cam, L, on the units-wheel A, as provided with elastic plates or arms W W, which at the proper moment are brought to bear, by the oscillation of the shaft, upon the periphery of each adding-wheel, to arrest its movement by frictional contact therewith.

In the operation of my device, so soon as, in the rotation of the units wheel, its actuating-tooth is made to engage the first adding-wheel in the series the cam or projection moving with the units-wheel is brought to bear upon the rock-shaft actuating the stops fitted to engage each adding-wheel, and by moving said

shaft will cause a simultaneous engagement of said stops with every adding-wheel in the entire series at the moment the movement of the first wheel is completed, and thereby prevent any one of said wheels from moving too far.

I claim as my invention—

The combination, with the units-wheel and train of adding-wheels in an adding-machine, of a single cam or irregular projection revolving with the units-wheel, a series of movable stop plates or fingers fitted to engage each of the adding-wheels in the entire series, and a single intermediate rocking bar or shaft governing each and every stop plate or finger, whereby the movement of the single cam or projection synchronously with the units-wheel will produce automatically a simultaneous engagement or disengagement of all the stop plates or fingers with the adding-wheels in the entire series, substantially in the manner and for the purpose herein set forth.

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

WILLIAM KOCH.

Witnesses:

J. F. ACKER, Jr.,
A. B. MOORE.