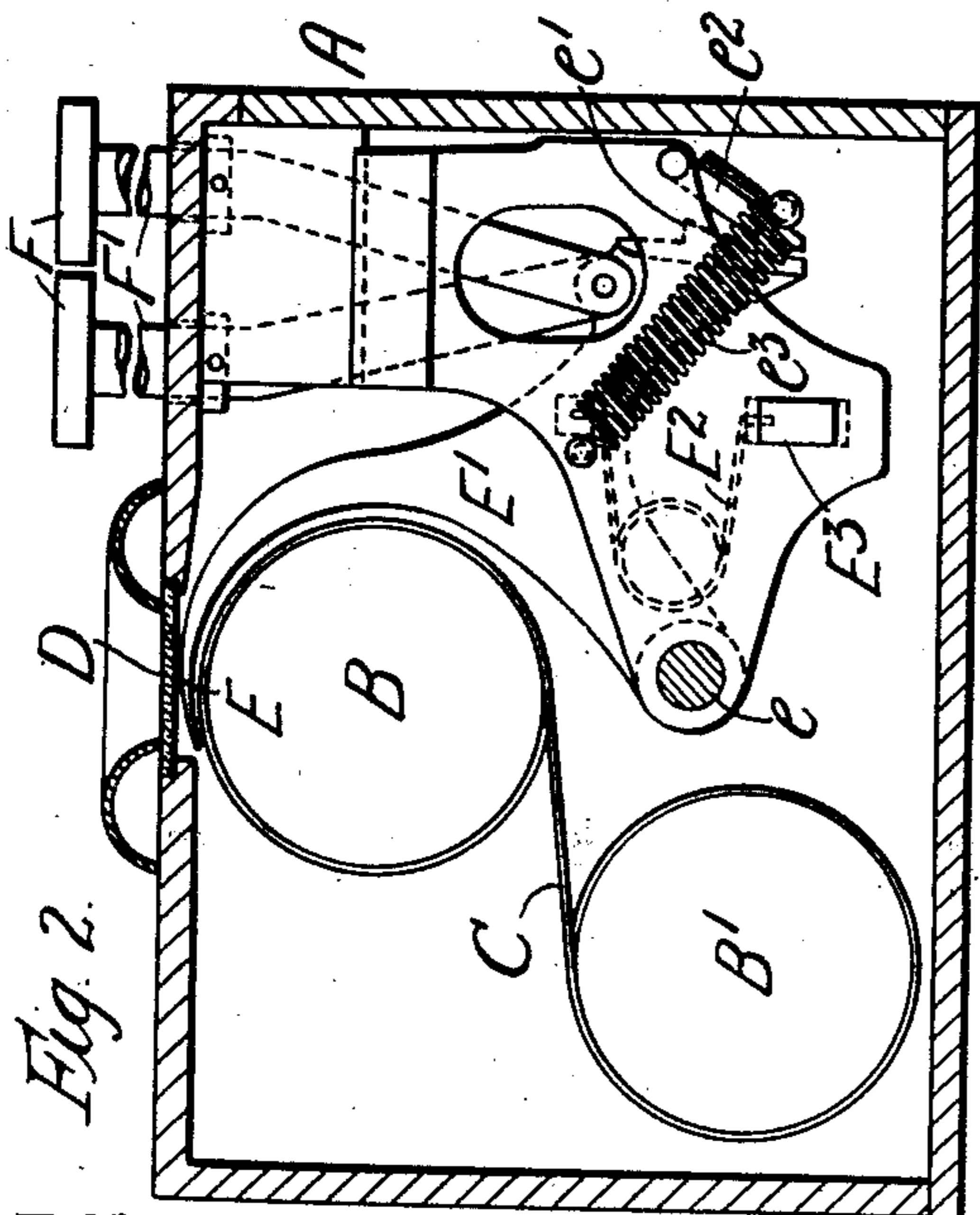


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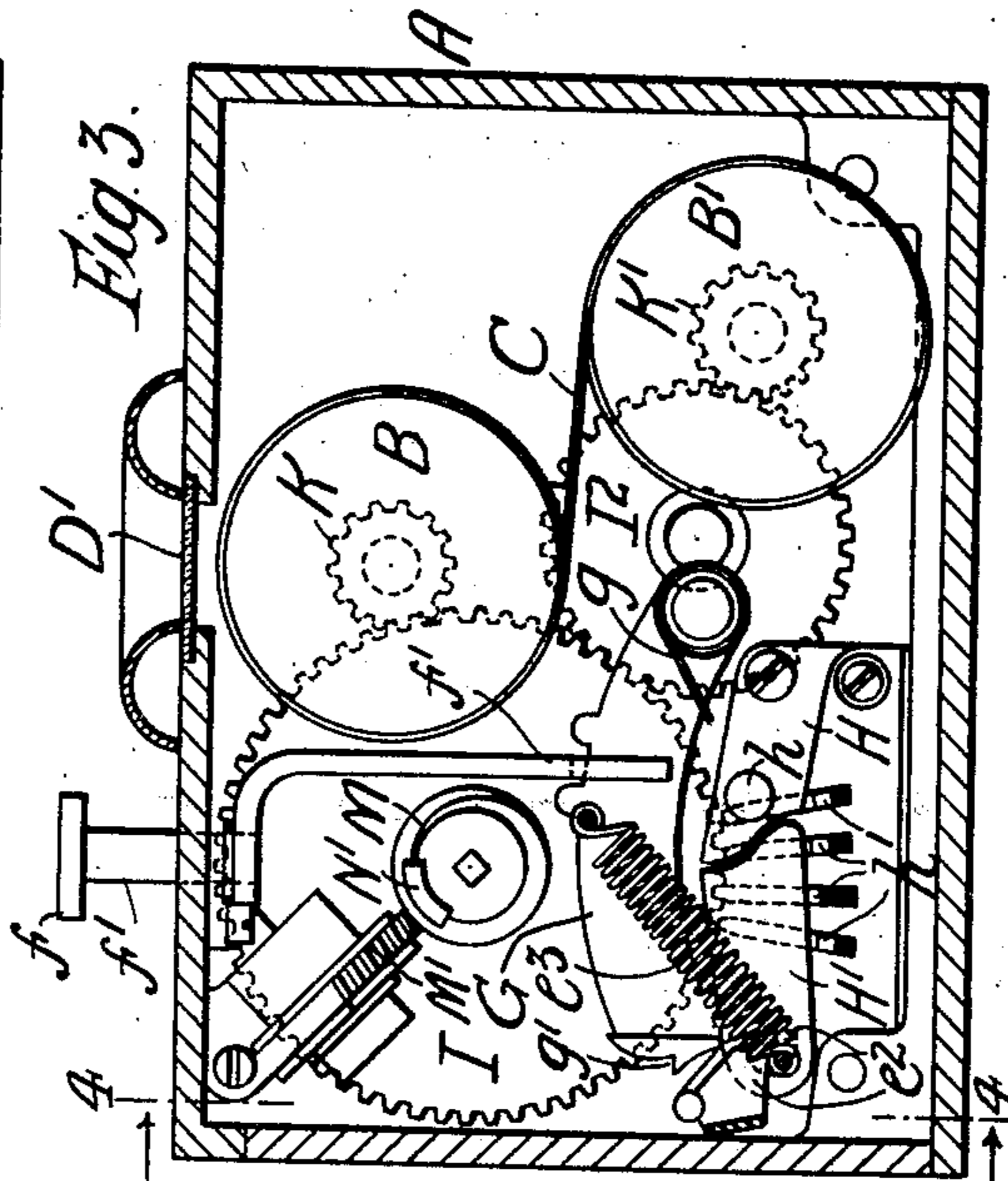
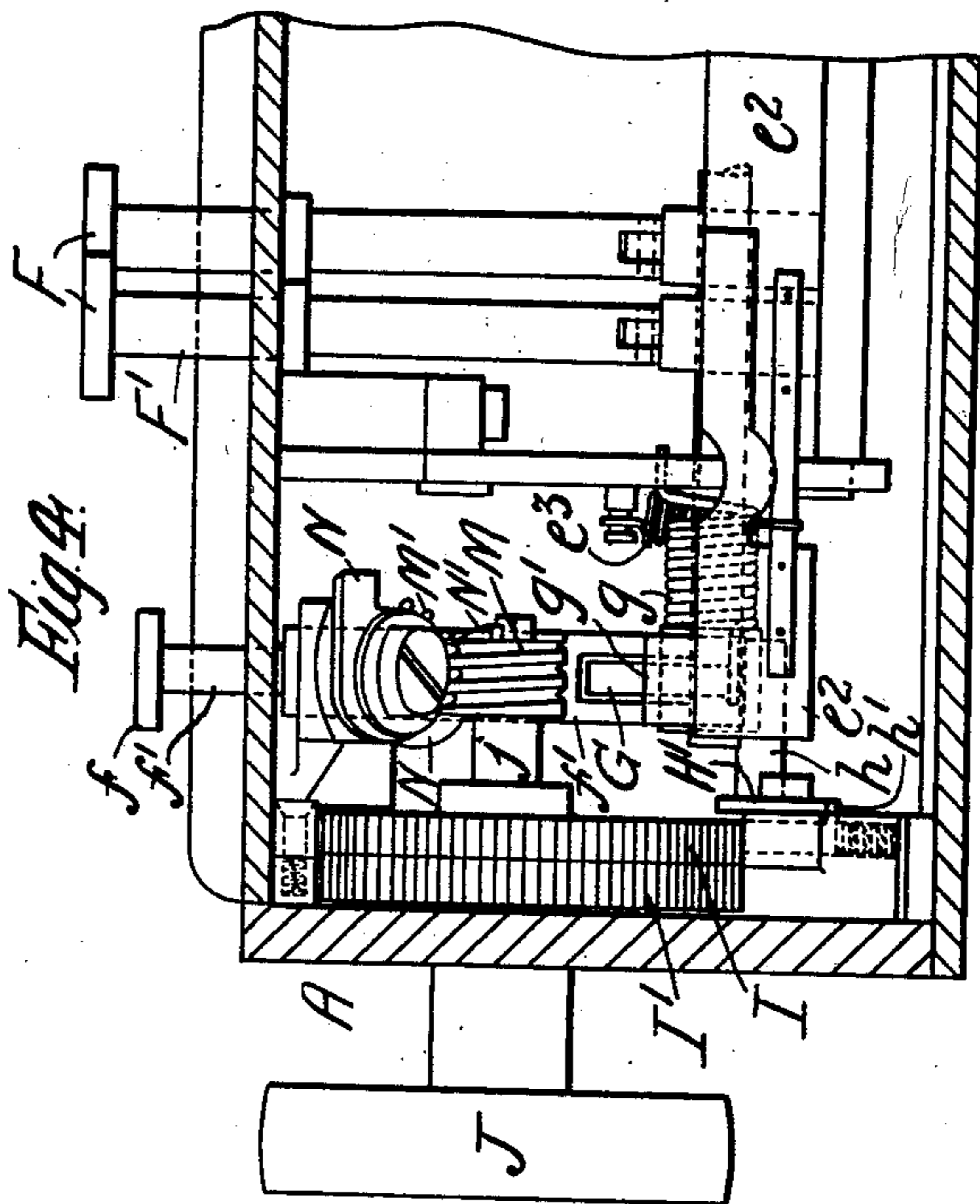
PATENTED AUG. 28, 1906.

J. HINES.
CALCULATING MACHINE.
APPLICATION FILED SEPT. 27, 1906.

4 SHEETS—SHEET 2.



Witnesses:
C. H. Crawford
L. Waldman



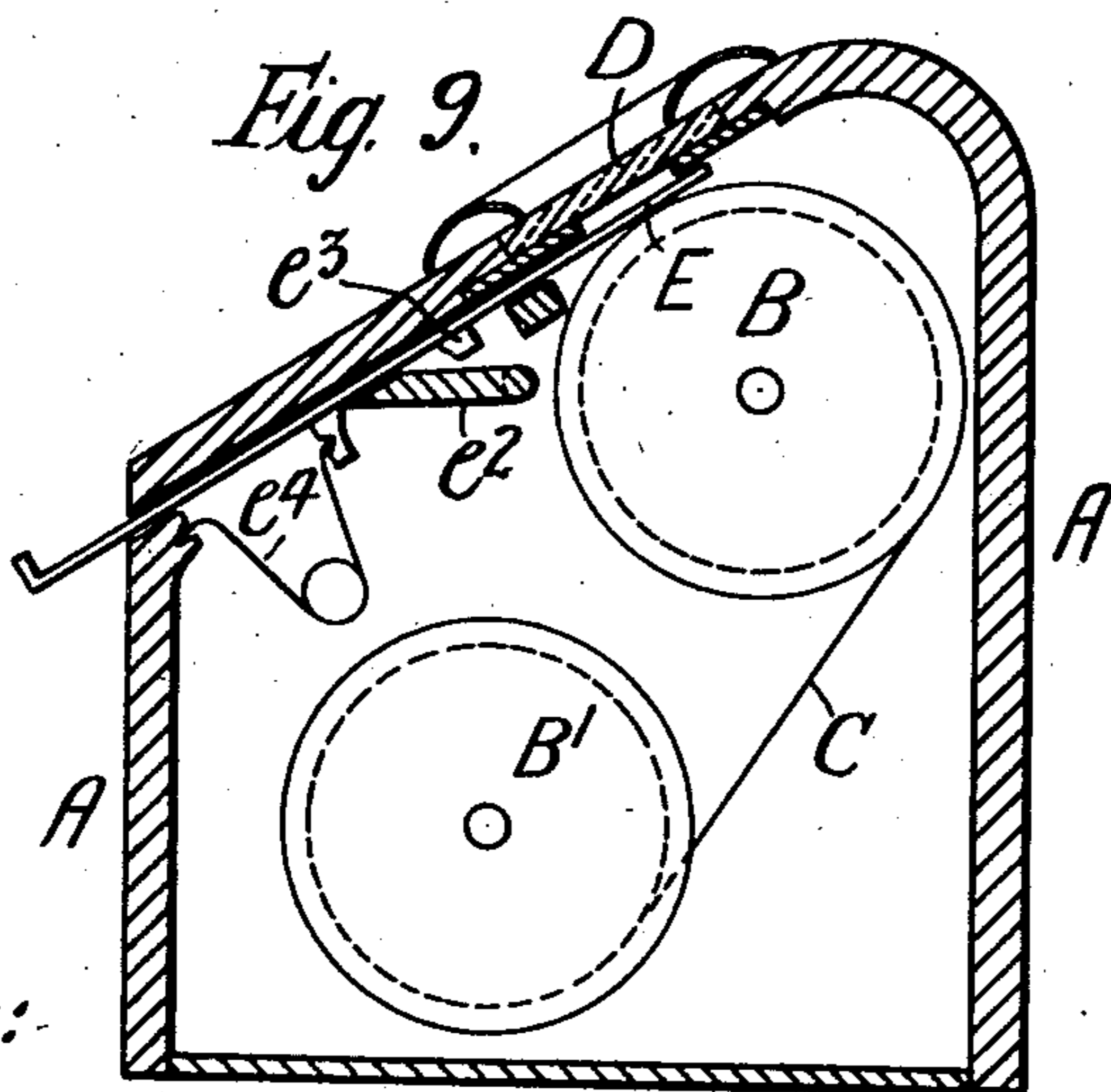
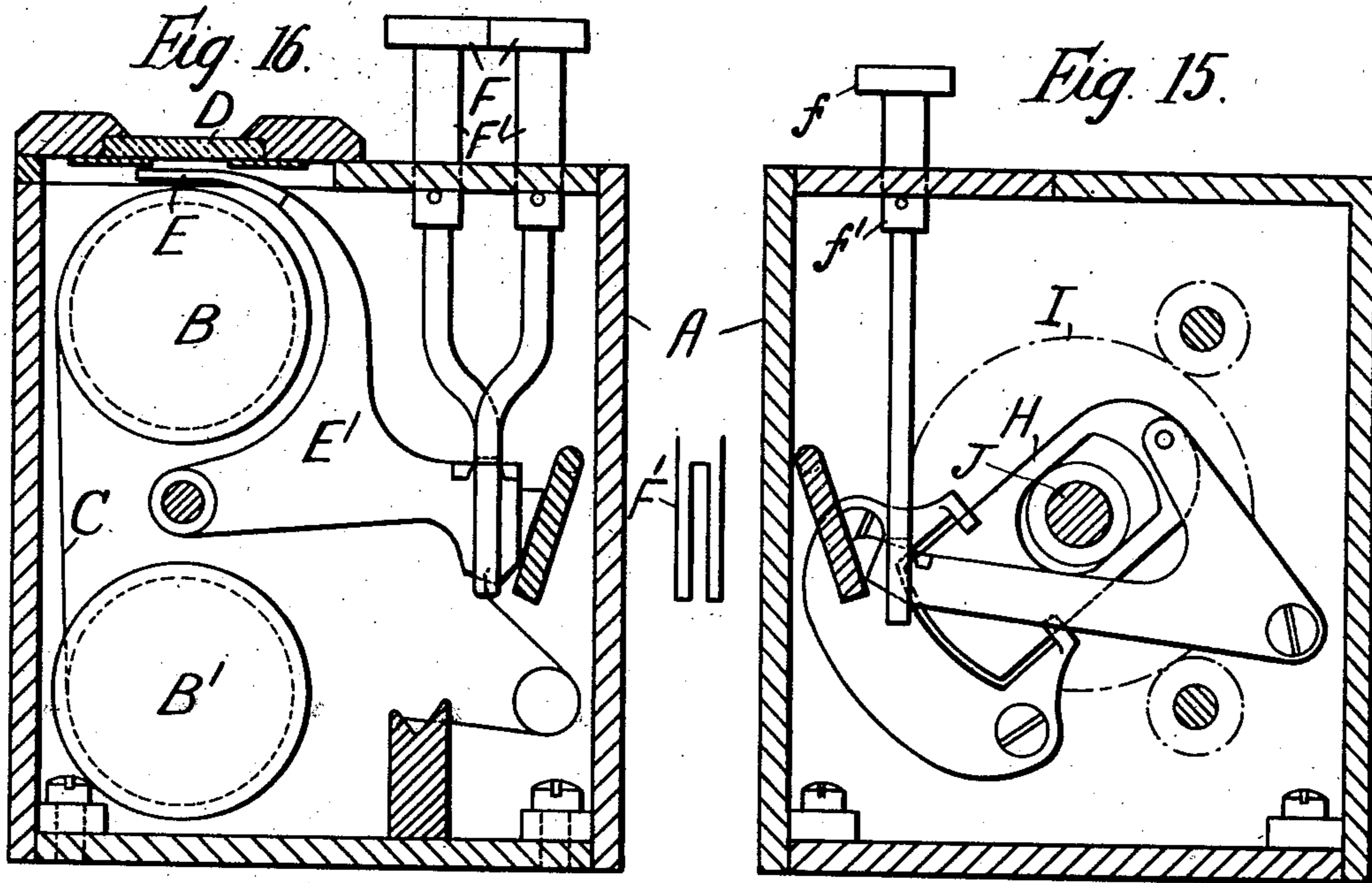
Inventor:
James Hines
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Witnesses:

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Inventor

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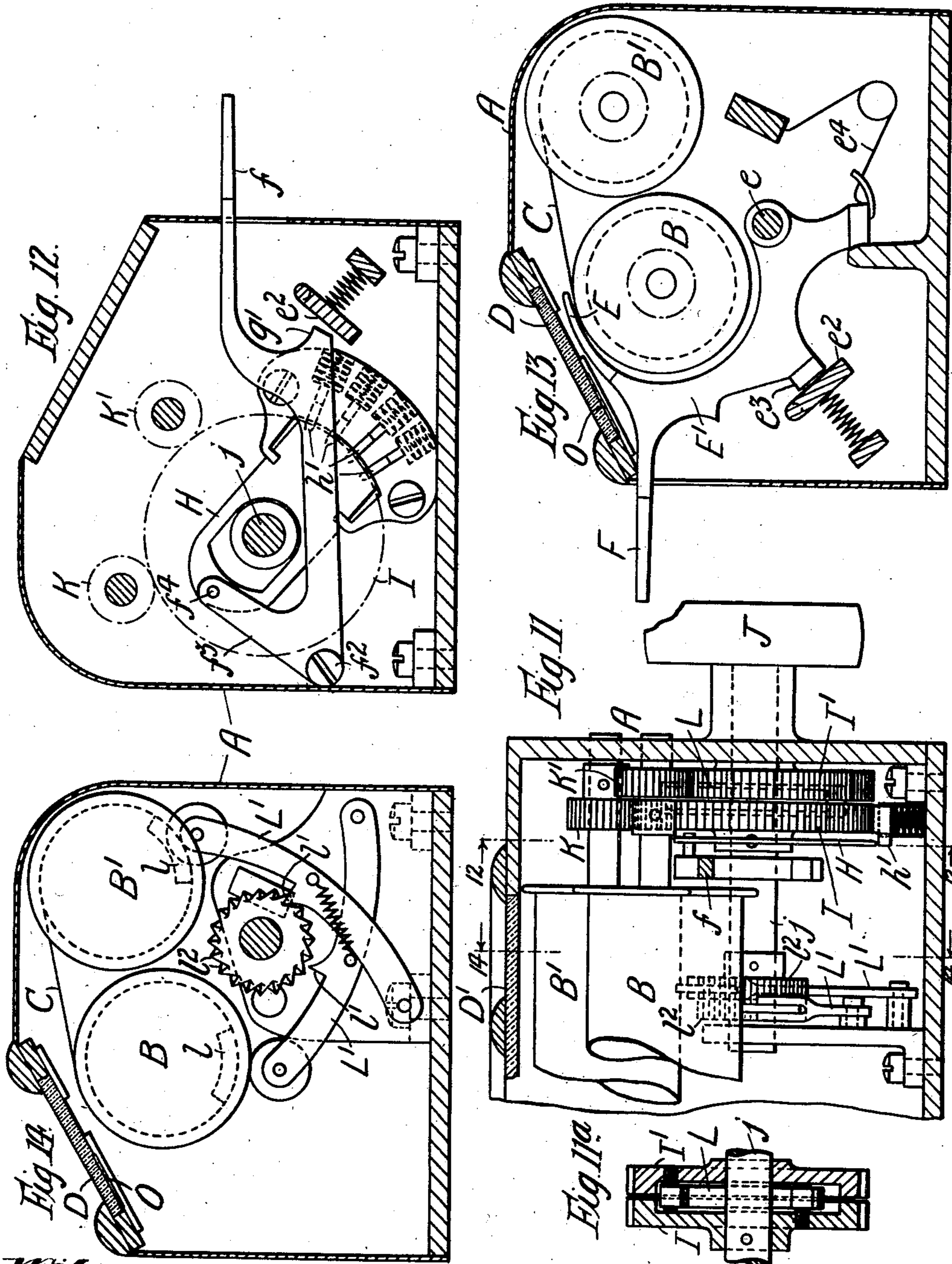
by P. Singer
Attorney

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4 SHEETS—SHEET 4.



Witnesses:-
C. M. Crawford
L. Waldman

Inventor:
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UNITED STATES PATENT OFFICE.

JAMES HINES, OF LENZIE, SCOTLAND.

CALCULATING-MACHINE.

No. 829,526.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed September 27, 1905. Serial No. 280,289.

To all whom it may concern:

Be it known that I, JAMES HINES, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at Lenzie, county of Dumbarton, Scotland, have invented a certain new and useful Improvement in Calculating-Machines, of which the following is a specification.

This invention relates to apparatus for use in calculating wages of workmen at given rates per hour or other unit of time, for computing the price of goods by weight or other measure—as, for example, at given rates per pound—and for similar purposes, the improved apparatus being designed to exhibit when a suitable key is operated a single amount of wages or price of goods.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan of part of the computing apparatus. Fig. 2 is a cross-section as at the line 2 2 of Fig. 1. Fig. 3 is a cross-section as at the line 3 3 of Fig. 1. Fig. 4 is a part longitudinal vertical section as at the line 4 4 of Fig. 3. Fig. 5 is a sectional view of the operating-handle and spindle of the apparatus. Fig. 6 is a longitudinal section thereof and of part of the casing. Figs. 7, 8, and 9 are cross-sections showing various modifications of the apparatus. Fig. 10 is a plan of part of the top of the apparatus as shown adapted for use as a wage-calculator. Fig. 11 is a part longitudinal vertical section of the apparatus, the flaps or shutters being removed. Fig. 11^a is a sectional detail view hereinafter referred to. Fig. 12 is a cross-section as at the line 12 12, Fig. 11. Fig. 13 is a cross-section showing one of the flaps or shutters and relative parts. Fig. 14 is a cross-sectional view as taken at the line 14 14, Fig. 11, showing means for preventing overwinding of the rollers after the material carried by same has been fully unwound. Figs. 15 and 16 are somewhat similar views to Figs. 12 and 13, respectively, of another modification, but differ in that the operating-levers are replaced by plungers.

As represented at Figs. 1 to 6, the improved apparatus comprises a long rectangular or other casing A, in which is fitted a pair of rollers B B', carrying a band C of suitable fabric wound partly on each, the band having rows of figures printed or otherwise impressed thereon representing summation of weekly wages at given rates per hour or the price at given rates of given weights of goods.

For example, at one end of each row the weight in pounds or other unit is engraved and on the same horizontal line are exhibited in succession the prices for that weight of goods at one, two, three, four, &c., pence or shillings per unit of weight. A glazed slit D in the casing exposes only a single row of price-figures along with the weight of the goods, which is seen through a smaller opening D'; but such price-figures are concealed by shutters or flaps E, of which one is provided for each price-figure, the said shutter being carried or formed on lever-arms E' and operated by finger-keys F to uncover a single price-figure at a time.

A keyboard resembling that of a type-writing machine is provided, the keys being preferably in the form of plungers F', passing down through orifices in the top of the casing A and being for convenience arranged in double rows. One key is provided for each shutter or flap E, covering a price-figure, and each key-plunger F' is pivoted at its lower end to a corresponding pivoted lever-arm E', which is normally maintained in the position indicated at Fig. 2 by means of a spring E², having one end secured to a stationary bar E³ and the other to a snug on the arm E'. By depressing the key and plunger F F' the corresponding lever-arm E' is rocked on its pivot e and the shutter or flap E drawn back to expose the price-figure under it on the band C. The depression of the lever-arm E' brings a catch e' thereon under a pawl e², extending the length of the casing and actuated by a spring e³, and the lever-arm is thereby held down. If another key be pressed down, the corresponding lever-arm E' is depressed and the catch e' thereon in clearing the pawl e² prior to being engaged presses it aside, and thereby releases the catch e' of the first-mentioned lever-arm, which thereupon rises. By this means when any key is acted on to expose a fresh figure on the band C the figure previously exposed is immediately covered up, so that one summation only is exhibited at a time.

In order that the weight-figure may be exhibited prior to operating the keys to expose a summation-figure and that the said weight-figure may not be involuntarily changed, a special key f and plunger f' are provided to actuate a locking device, as represented at Fig. 3. The plunger f' when depressed forces down against the action of a spring g a lever G, which by contact with a pin h on a

divided lever H H' depresses a series of spring-actuated catches h' , which normally engage the teeth of a gear-wheel I on the spindle of the operating-handle J. On the
 5 end of a lever G a catch g' is formed to engage with the pawl e^2 and retain said lever in its depressed position. The catch g' on the lever G by displacing the pawl e^2 in clearing it
 10 frees from engagement with the pawl any one of the plungers F and lever-arms E' which may for the time being be depressed, so that on changing from one rate-figure to another the summation-figures are all covered.

When the key f has been depressed and the
 15 gear-wheel I unlocked, the handle J may be turned round to bring into view through the glazed opening D' any weight-figure or time-figure of the row on the band C, as also to bring the corresponding summation-figures
 20 under the flaps E. A key F may now be depressed to expose the desired summation, and its action on the pawl e^2 serves to release the locking-key f , which thereupon rises.

In order to insure that the band C may be
 25 kept taut, the drums B B' are driven by gearing, as shown at Fig. 3, the gear-wheel I being in mesh with a pinion K on the axle of the drum B, while a gear-wheel I' (shown at Fig. 6) drives the pinion K' on the drum-axle
 30 B' through an intermediate gear-wheel I². To compensate for variations of diameter in transferring the band from one drum to the other, the coiling and uncoiling of a spring L is used, said spring being preferably fitted
 35 within the handle J, which, as shown at Fig. 6, is made up of two disks, one end of the spring being secured to one disk and the other end to the other disk.

One disk J is fast on the spindle j , on which
 40 the gear-wheel I is keyed, and the other, J', is on a sleeve j' , on which is fitted the gear-wheel I', and while the gear-wheels I and I' are arranged to drive the drums B B' at equal speed inequality of speed of winding and un-
 45 winding of the hand is compensated for by the spring yielding or taking up slack.

To prevent overwinding of the drums, a worm M on the spindle j is fitted to gear with a worm-wheel M', carrying arm N, which on
 50 full winding in one direction strikes a stop N', and in the other direction the end of the worm M brings the drums to rest.

In the modification shown at Fig. 7 the flaps E and lever-arms E' are made in the
 55 form of bell-cranks, to which the plungers F' are pivoted, and notches f' are formed in the latter with which engage pawls e' , which are coupled together, as shown, so that when one key F is depressed that previously engaged is
 60 released and forced up to its normal position by a spring e^4 .

In the modification represented at Fig. 8 the flaps E are in the form of sliding plates
 65 cranks E', connected to the key-plungers F'.

In this case the pivoted pawl e^2 is adapted to engage a catch-piece e^3 on the plate E, which is drawn back to uncover a summation-figure by the action of depressing a key, and on a
 70 second key being depressed the catch e^3 on the plate E thereby actuated by tilting the pawl e^2 releases the plate E previously withdrawn.

In the example shown at Fig. 9 the keys F are replaced by hooked ends on sliding cover-
 75 plates E, which are pulled down by hand against the action of springs e^4 . The engaging pawl devices are similar to those shown at Fig. 8.

Figs. 10 to 14 illustrate a modified construc-
 80 tion of the apparatus as shown adapted for wage-calculating purposes. The card O under the glazed slit in Figs. 10 and 13 is marked with figures representing in shillings the rate
 85 per week of fifty-four hours. The band C on the rollers B B' is figured with the amounts earned at corresponding rates for the total of hours for which wages are payable.

As an example of the operation of the apparatus and as shown at Fig. 10, seventy-one
 90 and one-half hours have been chosen as at the total number of hours for which wages are payable, the rate selected being forty shillings per week. The total wage, "52/11½," is given on the band C on withdrawing the
 95 corresponding flap or shutter E. The flaps or shutters E are in this case formed integral with the arms E' and keys or finger-levers F, which are pivoted at e and held in the normal position by springs e^4 . A spring-actuated
 100 pawl e^2 is provided to engage with catches e^3 on the levers E', and, as in the examples already described, the depression of any one key acts to release the previously-depressed
 105 key-lever from engagement with the pawl. The form of locking device used in this modification in order to exhibit the hour-figure prior to operating the keys to expose a summation-figure and that the said hour or
 110 weight figure may not be involuntarily changed consists of a finger-lever f , pivoted at f^2 and having an arm f^3 , attached at f^4 to a sliding plate H, adapted on depression of the
 115 finger-lever f to engage with a series of spring-actuated catches h' , which normally engage the teeth of the gear-wheel I on the spindle of the operating-handle J. On the lever f is a
 120 catch g' to engage with the pawl e^2 and retain said lever in its depressed position. The catch g' by displacing the pawl e^2 in clearing it frees from engagement with the pawl any
 125 one of the finger-levers F and lever-arms E' which may for the time being be depressed, so that on changing from one rate-figure to another the summation-figures are all covered.

When the key f has been depressed and the gear-wheel I unlocked, the handle J may be
 130 turned round to bring into view through the glazed opening D' any hour-figure or weight-

figure, as the case may be, of the row on the band C, as also to bring the corresponding summation-figures under the flaps or shutters E. On depression of a key F to expose
 5 a desired summation it, through its action on the pawl e^2 , serves to release the locking-key f , which thereupon rises.

The gear-wheels I I' are arranged to drive the drums B B' through pinions K K', the
 10 wheel I being fast on the spindle j of the handle J, while the wheel I' is loosely mounted on said spindle. To compensate for variations of diameter in transferring the band from one drum to the other, the spring L is,
 15 as shown particularly at Fig. 11^a, located between the gear-wheels I I', but may be placed at any other convenient part of the mechanism connecting the drums.

To prevent overwinding of the rollers, apparatus such as is represented at Figs. 11 and
 20 14 may be used, and comprises spring-actuated pivoted levers L', the roller of either being adapted, as shown, to engage with the slot l in the roller B or B' when the band C has
 25 been fully unwound from either roller, a catch l' on each lever also engaging with either of two ratchet-wheels l^2 (having teeth arranged in opposite directions to each other) on the spindle j of the handle J, so that fur-
 30 ther rotation in an unwinding direction is prevented.

The mechanism illustrated at Figs. 16 and 17 is somewhat similar to that shown at Figs. 12 and 13, respectively, but differs therefrom
 35 in that the finger-keys and forked plungers F F' and $f f'$ replace the finger-levers F and f , Figs. 12 and 13.

Having now described my invention, what I claim, and desire to secure by Letters Pat-
 40 ent of the United States, is—

1. Calculating or computing apparatus comprising a casing having fitted within it rotatable drums carrying a band on which

are rows of figures any of which may be ex-
 posed through a slit in the casing, a series of
 45 movable flaps or shutters normally covering the figure on the band, and a series of keys so connected to said flaps or shutters that when one is depressed and locked to withdraw a
 shutter and expose a figure the others are
 50 freed to cover the remaining figures so that only one summation is exposed at each action.

2. In calculating or computing apparatus the combination with a casing having fitted
 therein drums carrying a band showing rate
 55 and summation figures, a slit in said casing for viewing the figures on said band, a series of flaps normally interposed to cover said figures manually-operated keys for withdraw-
 ing any of said flaps, and interconnecting de-
 60 vices whereby any single flap when opened to expose a figure is retained and the others of the flaps released and closed as described.

3. In calculating or computing apparatus the combination with a casing and drums
 65 carrying a figured band of flaps covering said band, spring-actuated locking devices for holding the drum and manually-operated means for releasing the drum as described.

4. In a calculating or computing appara-
 70 tus the combination with a casing of a pair of drums carrying a band and arranged so that either drum unwinds said band from the other of said drums, a handle comprising two
 parts connected by a spring, and gear-wheels
 75 serving to positively operate one drum and to operate the other of said drums through the intervention of said spring, substantially as described.

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

JAMES HINES.

Witnesses:

WALLACE FAIRWEATHER,
 JOHN McCLEARY, Jun.