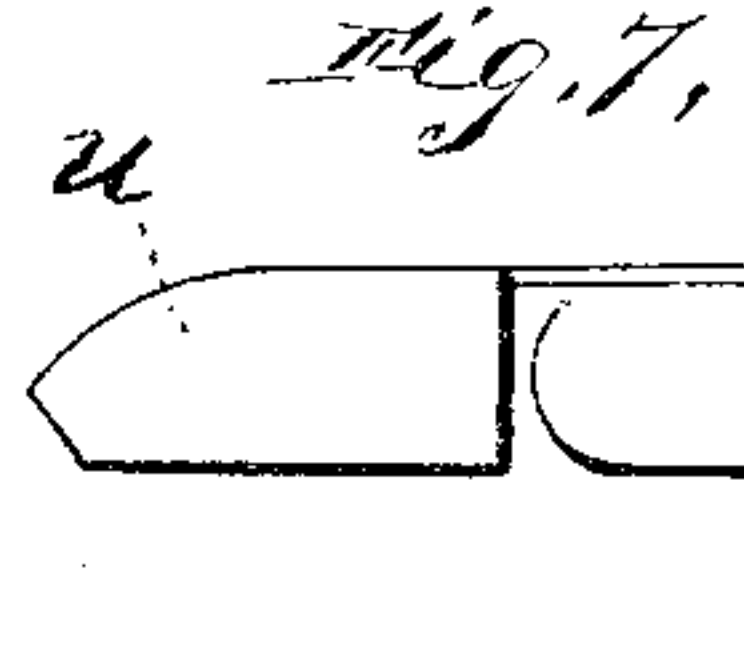
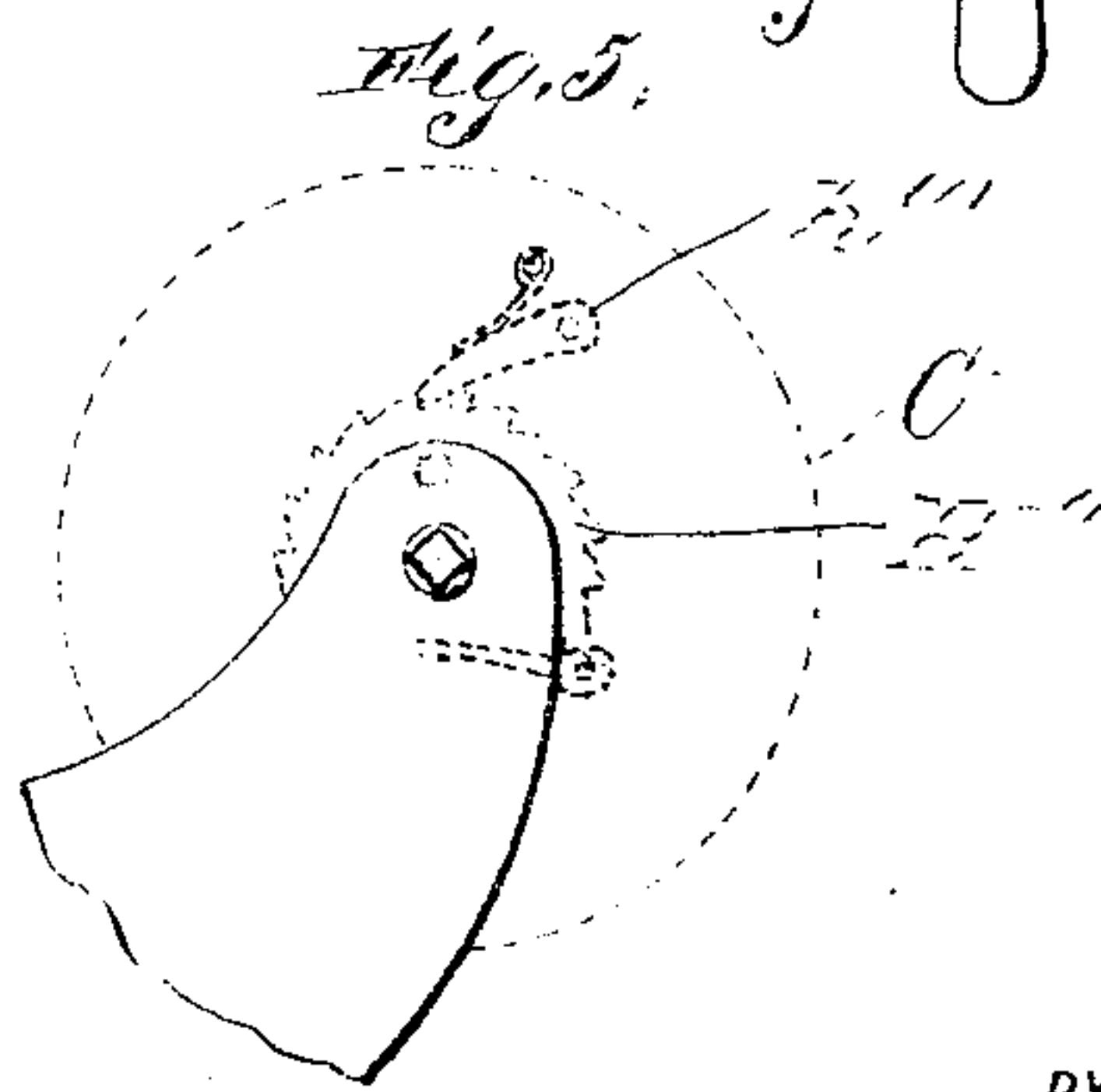
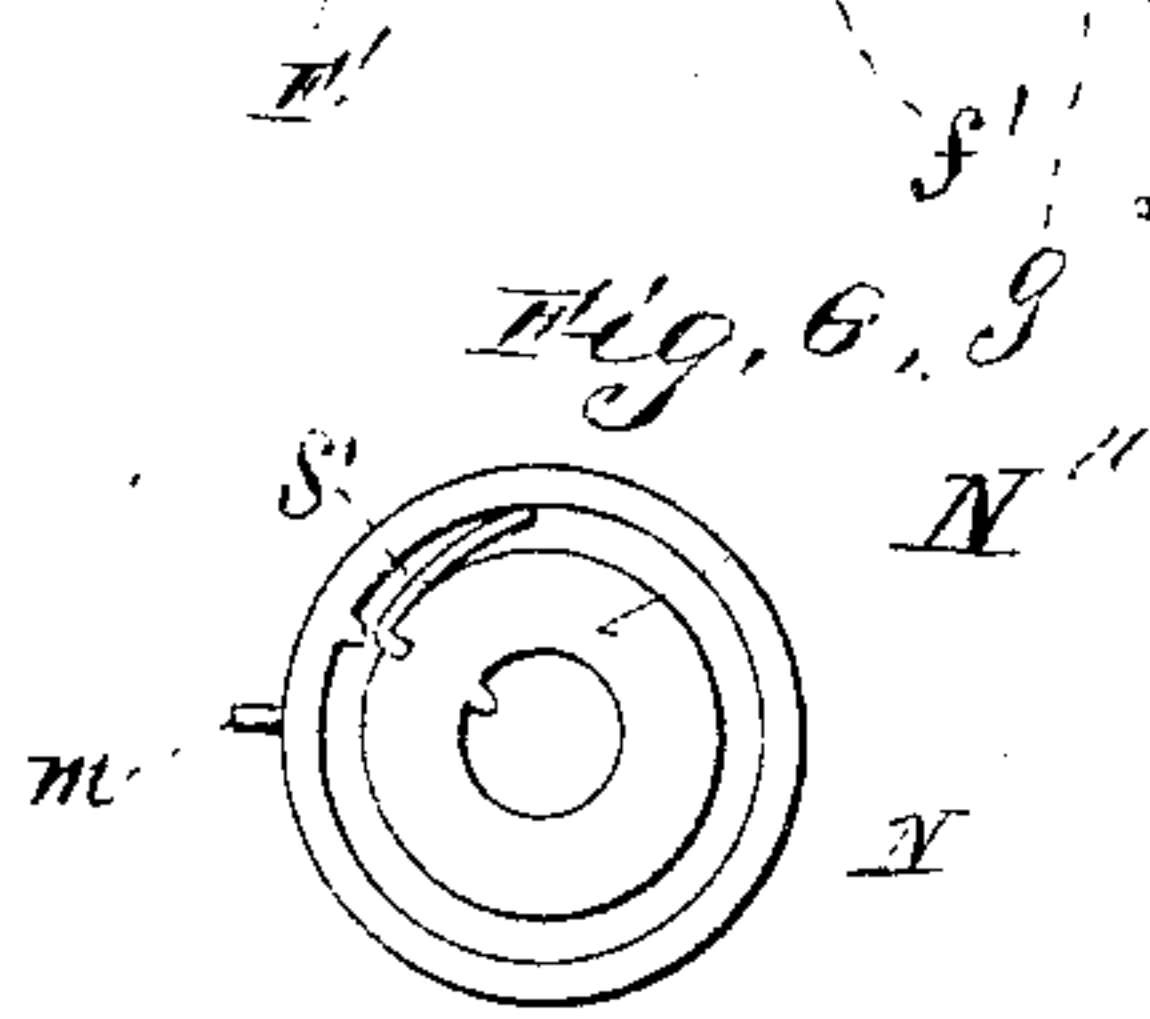
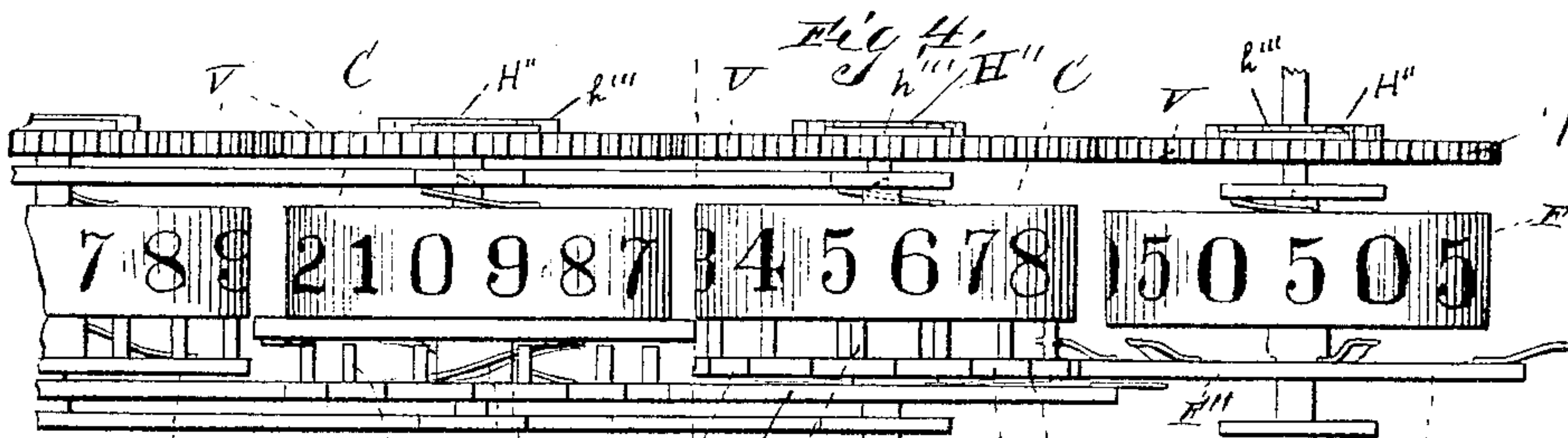
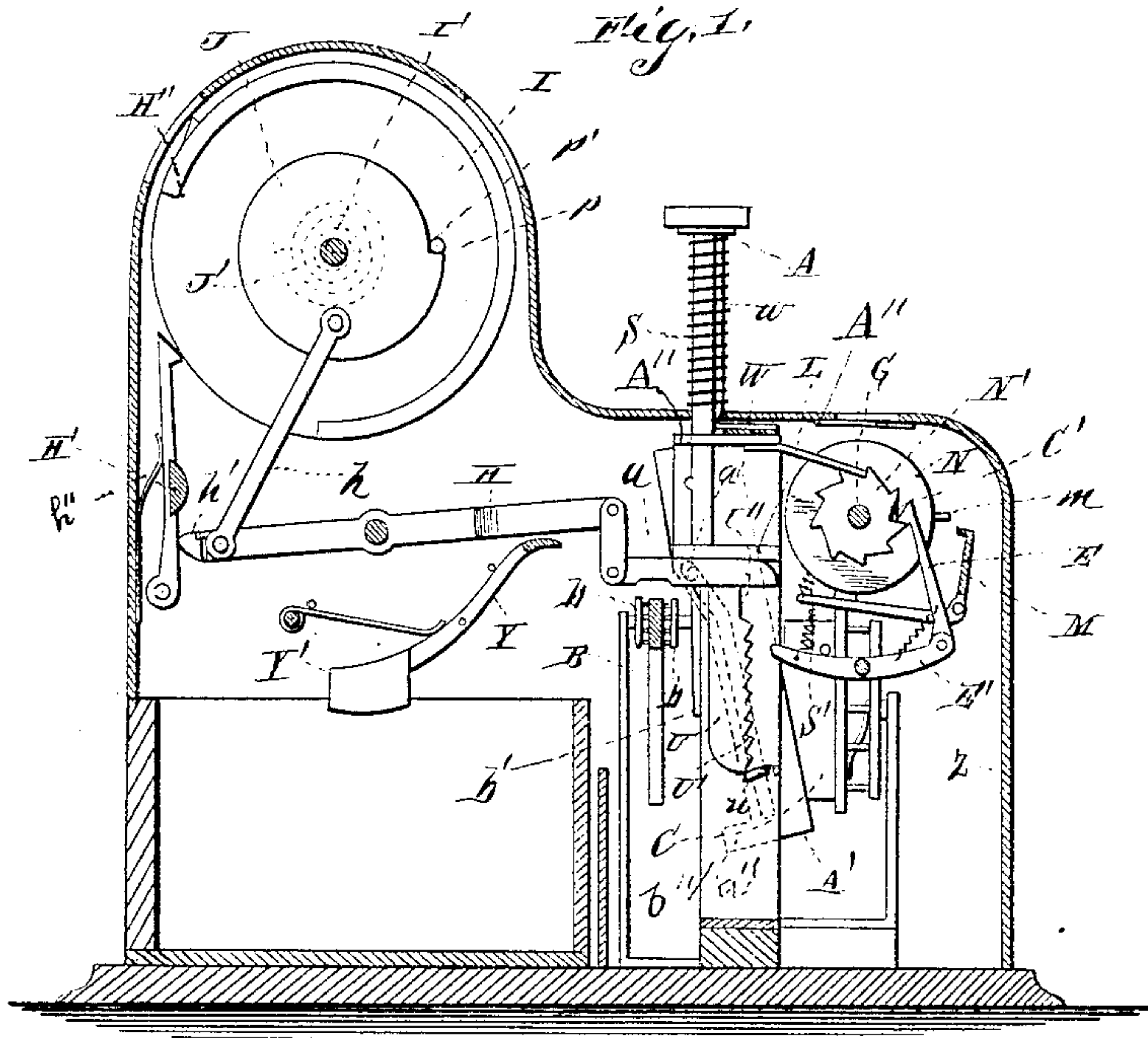


H. G. O'NEILL.
CASH REGISTER AND INDICATOR.

No. 480,612.

Patented Aug. 9, 1892.



WITNESSES:

Charles L. Taylor
Philip L. Massie

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H. G. O'Neill

BY

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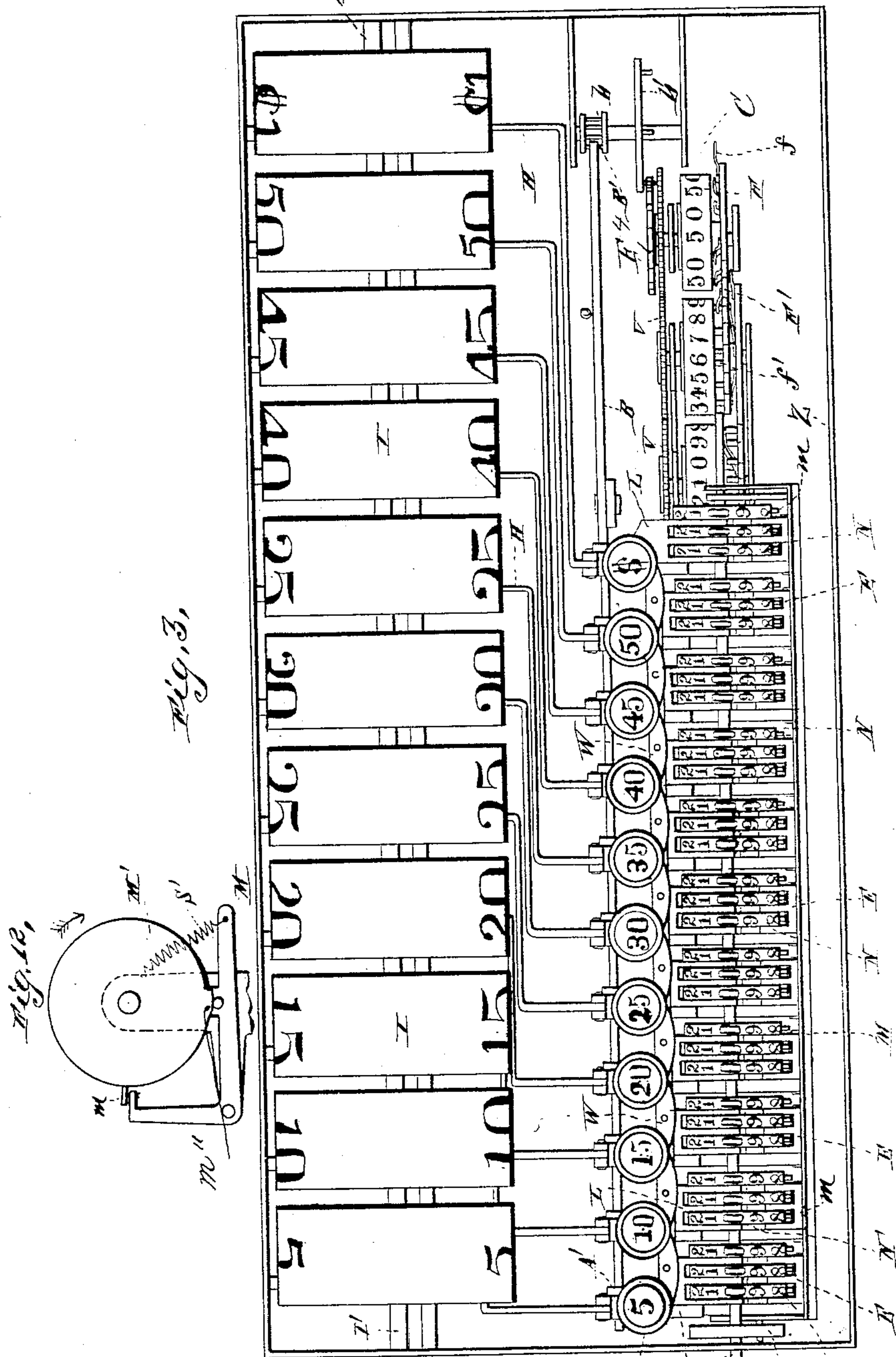
his

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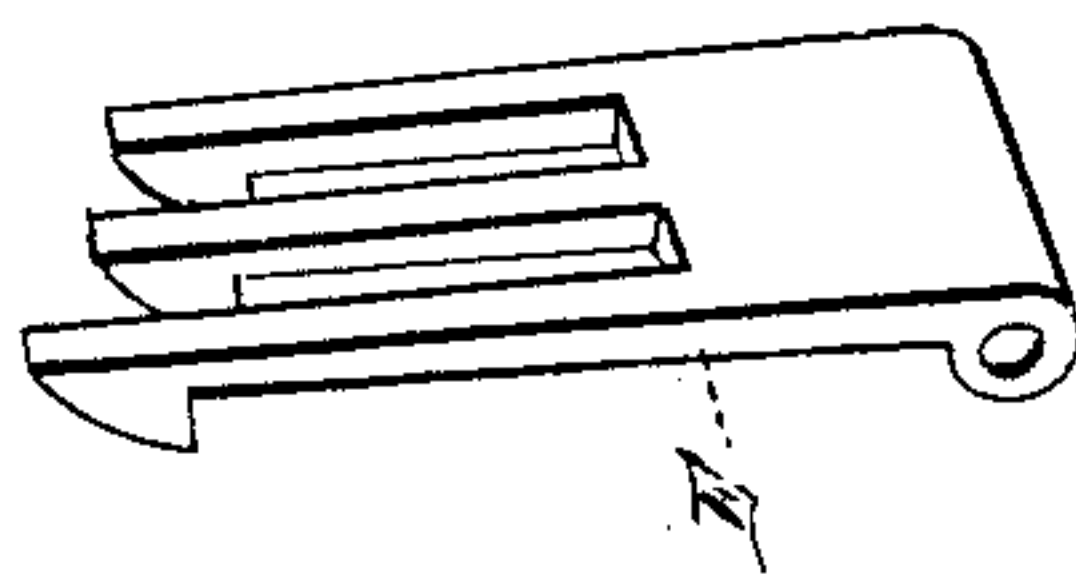
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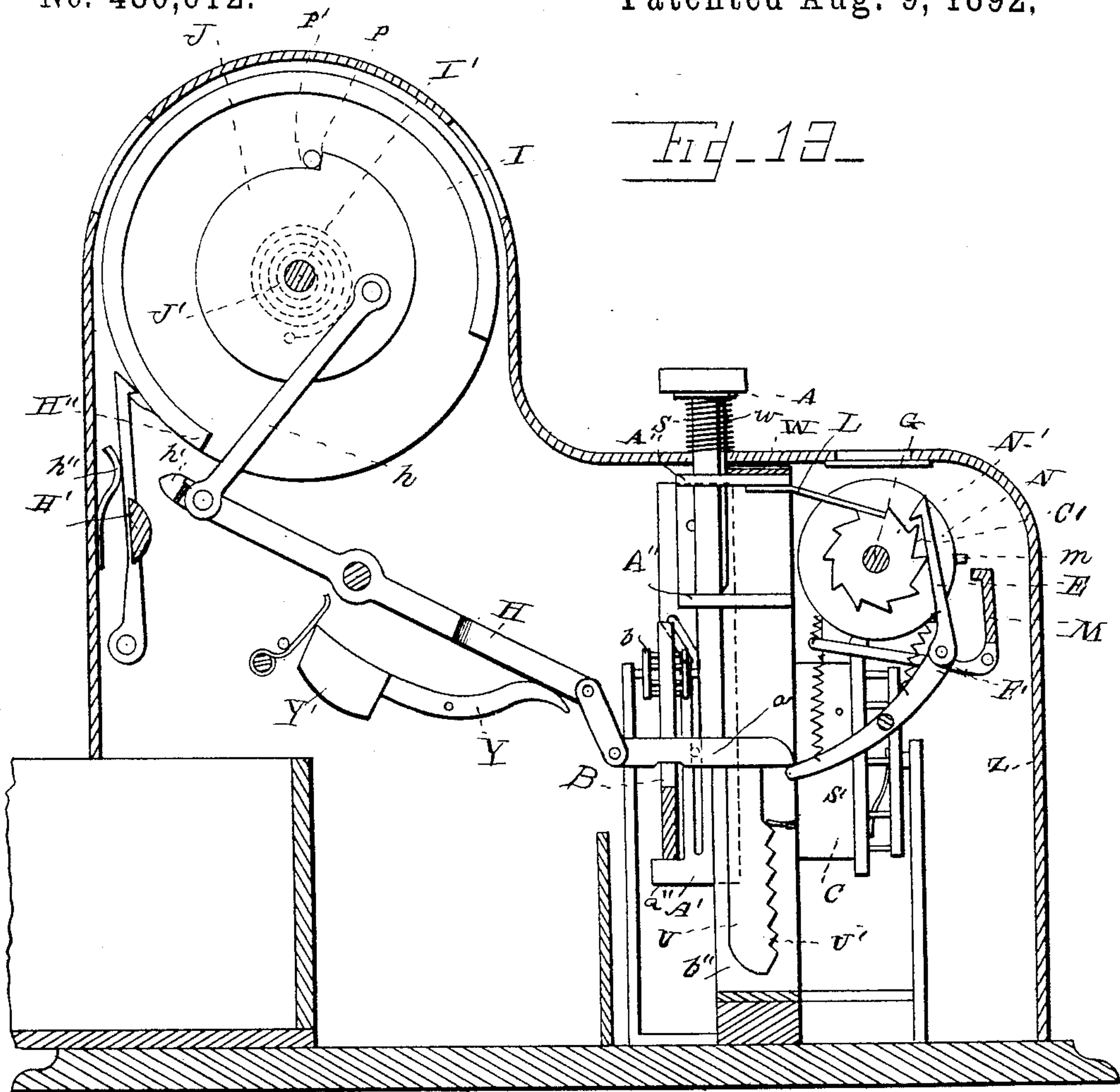
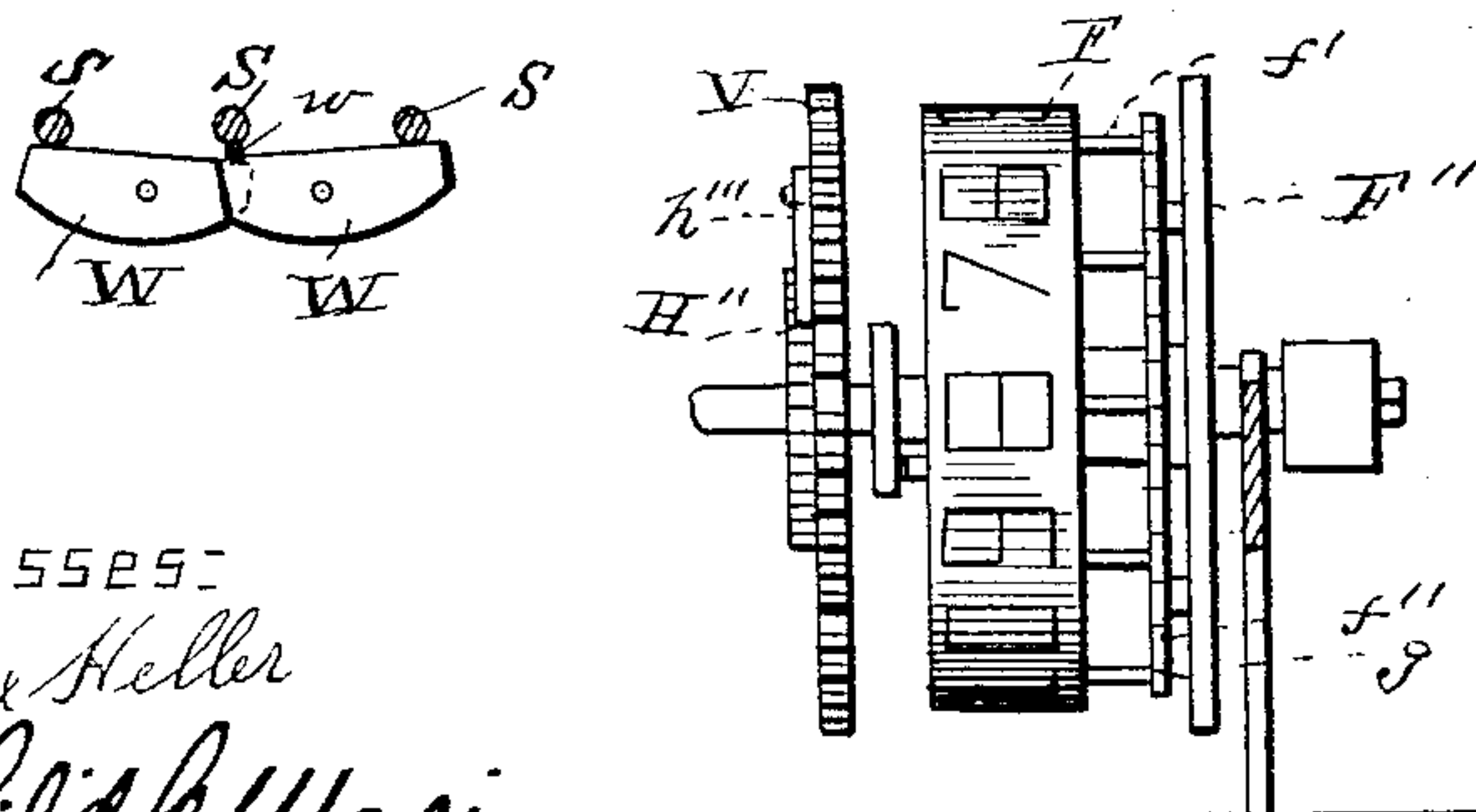


Fig. 15. Fig. 14.



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UNITED STATES PATENT OFFICE.

HENRY G. O'NEILL, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO THE STANDARD REGISTER COMPANY, OF BOSTON, MASSACHUSETTS.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 480,612, dated August 9, 1892.

Application filed November 22, 1890. Serial No. 372,386. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. O'NEILL, a citizen of the United States, and a resident of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Cash-Registers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a transverse section. Fig. 2 is a front view, partial section. Fig. 3 is a plan view of mechanism. Figs. 4 and 5 are detail views of adding mechanism. Fig. 6 is a detail view of numbering-wheel. Fig. 7 is a view of spring-pawl. Fig. 8 is a perspective view of key. Figs. 9, 10, and 11 are detail views of numbering mechanism. Fig. 12 is a detail of the reducing mechanism for the numbering-wheels. Fig. 13 is an enlarged transverse section on the line $x x$, Fig. 3, showing the parts in the positions they assume when a key is depressed, the key-levers and connections of the keys at the rear being omitted. Fig. 14 is a detail of one of the adding-wheels and the carrying and resetting devices in connection therewith. Fig. 15 is a sectional detail illustrating the operation of the slides for preventing the simultaneous depression of adjacent keys.

The object of this invention is to provide a safe and efficient machine for automatic accounting. While answering the place of a set of books, preserving a record of each itemized transaction, and giving the aggregate of all, both cash and credit sales, it will also provide an effectual safeguard against speculations and inaccuracies.

The machine is designed to take the place of the ordinary cash-registers now in use and differs from them inasmuch as it not only itemizes each and every transaction, but also at the same time foots up the aggregate volume of business during the period of time in which the machine has been operated by means of novel mechanism provided therefor. The following description will enable one

skilled in the art to which it appertains to understand its construction and working.

The letter A in the annexed drawings designates a series of reciprocating keys, which act upon or operate a lever or pivoted bar B, common to all the keys and parallel to said series, said bar having the form and construction as hereinafter specified. The series of keys A operate through openings in a bearing plate or plates A'', supported underneath by columns or standards b'' of the framework Z. On the upper end of each of these keys A is a finger-piece marked with the proper number or symbol. On the lower portion of each key is a transverse bearing portion a , so formed as to enable it to engage firmly the lever or bar B, upon which it operates as aforesaid, as best shown in Figs. 1, 2, and 13. In connection with each key of the series is a spiral spring S, which serves to make the key resume its normal position when it shall have been pressed down its entire distance. On one side of each of said keys, preferably from the bearing a , as shown, there projects a pin a' , which engages the slot of a slotted stop-plate A', that is pivoted to the corresponding column or bearing of the framework. Each slotted stop-plate is acted upon by its key and moves in such a manner as to project its lower end, having the lug a'' , so as to engage the lever or bar B and prevent said bar from passing below the position to which the key is designed to move it, as shown in Fig. 13.

The lever or pivoted bar B extends parallel to the series of keys in such a manner as to be acted upon by the depression of any one of said keys, and is so arranged that it will move a greater or less angular distance according to the key that is struck, the keys which are near its fulcrum giving it a greater movement than those which are at a distance therefrom. At the extreme end of said bar, beyond its fulcrum, is provided a toothed segment B', which serves when said lever is moved by engagement with the pinion b of the gear-wheel b' to actuate the series of wheels C, used for the purpose of registering, as hereinafter described. Near each key there is journaled upon a shaft affixed to the pillars or supports of the frame a series of

two or more numbering-wheels N, around whose peripheries are the numbers "1" to "9," "0" included. These are the registering, numbering, or individual-itemizing wheels, arranged in sets of two or more each, (three are illustrated in each set,) as may be desired, in order to register a greater or less volume of business for each key, and these sets of numbering-wheels should correspond in number to the number of keys used for the purpose of classifying the sales or itemizing the business. All of these wheels should be placed upon a shaft G, common to the series and parallel to the line of keys. On one side of each wheel, and between the two or more as they are arranged side by side, is attached a toothed wheel N', and the other side of each wheel N has within its hollowed wall a spring S', capable of retaining the wheels N fixed against the friction of the adjoining one by its engagement with the disk N'', fast to the shaft and lying within said hollowed wall, until such time as it is directly acted upon by a forked pawl E, engaging its teeth. The forks of this pawl may be arranged to stand at different angles, or they may be each of a different length, as shown in Fig. 9. There is in each of these wheels C an indentation C', and these indentations are so graded as to permit of the successive engagement of the figures of the forked pawl E when necessary to effect the carrying—that is to say, said indentations are of different depths, that in the first wheel of each set being deeper than that in the second, the one in the second deeper than that in the third, and so on, if there are more than three employed.

At the figure "8" or at any other figure which is in proper position there projects a pin *m* from the periphery of each wheel N, and at right angles to such pin and extending parallel with the line of the wheels is a spring-actuated stop-bar M, so pivoted and arranged that it is capable of engaging the pins on the peripheries of the numbering-wheels and holding the latter until the whole series of wheels shall show the marks "0" on their outer surfaces or at the sight-slot of the encasement. When this stop-bar is not in action, it is held away from the wheels, so that they can pass on their numbering course. The location of this stop-bar, journaled at each end to a suitable support, will depend upon the points at which the pins are placed in the peripheries of the numbering-wheels to bring the 0-marks to the sight-slot in the casing.

The fork-like pawl E is provided with two or more prongs, as above stated, according to the number of wheels in the set which it is designed to actuate, (in the present instant three,) and serves for the purpose of working said wheels. One of these pawl devices is provided for each key of the series and is connected to a lever E', which is acted upon by the respective key when it is depressed. In the construction illustrated upon the depression of the key the fork of the said pawl

is thrown upwardly over the tooth of wheel N'. Upon the return or upward stroke of the key said fork will engage a tooth and by the action of a spring S' will move said wheel, and thereby the numbering-wheel, for the purpose of itemizing that specific transaction.

The wheels N are loosely mounted upon the common shaft G, so as to permit each an independent movement, said shaft extending throughout the series. The connection between each of these wheels and said shaft consists of the friction-springs s', hereinbefore referred to and best shown in Fig. 6, said spring being within the hollowed wall of the wheel and in engagement with the disk N'', fast to the shaft. The positive action of the pawl E under the action of a key is sufficient to overcome the friction of this spring and actuate the wheel sufficiently to indicate the proper amount. In order to reset this series of wheels N to 0 when it may be desired, the shaft G is provided with a handle G² at one end, by means of which said shaft may be turned to move the wheels in the opposite direction to that which they move in registering. When the shaft is turned in this direction, the friction of the springs s' is sufficient to cause said wheels to move with the shaft until stopped by the bar M. In order to bring this bar M into position to engage the stop-pin M of the wheels, a circular disk M' is mounted on the shaft G, preferably adjacent to the handle. On this disk is a shoulder *m''*, which when the shaft is turned comes into engagement with a pin or projection on the arm of the bar M, throwing said bar into such position that it will be engaged by the pin *m* on the periphery of each wheel N, and thereby hold said wheel until the entire series are reset to "0." A series of pawls L is usually provided to engage the wheels M and prevent them moving until the proper time.

The adding or digit wheels C may be in a series of two or more, the periphery of one preferably facing the periphery of the other, so that they shall turn in the same plane, and the numbering and conformation of the first wheel will depend upon whether it is desired to register and add in multiples of five only or from one cent upward, the keys corresponding—that is to say, if it be desirable to use a multiple-of-five key, and consequently to add in multiples of five, the first wheel F of the series C will be marked around its periphery at equal distances with "0" and "5" alternately, and on the inner side of said wheel there will project beyond its periphery a spurred tooth *f* between each 0-mark and the next succeeding 5-mark; or, as shown, the spur-teeth may be fastened upon another disk or wheel F'', journaled on the same shaft with the first wheel F of the C series with such space between the two wheels as may be deemed necessary, according to the size of the carrying-pinions on the succeeding wheel. The wheel F and the wheel or disk F'', which carries the spurs, have a rigid connection with each other, and

therefore move simultaneously. Should it be desired, however, to add from one cent upward, said first wheel will bear on its periphery at equal intervals the numbers "1" to "9" and "0," inclusive, and the wheel F'' , adjacent and parallel thereto, will have but one spurred tooth, so located as to carry to the succeeding wheel the proper amount at the correct time. The second wheel of the series C and the succeeding wheels, while marked around their peripheries with the digits "1" to "9" and "0," inclusive, differ in construction from the first of the series C inasmuch as, in addition to the parts forming the wheel F, above described, as first of said series, each has also an independent and intermediate wheel F' , on the inner side of which and between the wheel carrying the digits and itself there projects a series of pins f' , which upon engagement of a spur of the first or preceding wheel assist to make the addition from the same. This intermediate wheel is fixed upon an axis common to these three component wheels; but the digit-wheel and the one carrying the projection or spur-tooth revolve together independently of the intermediate wheel. The periphery of this intermediate wheel is subdivided into concave arcs f'' of a circle of such a curve and depth as to conform to the circular edge of the contiguous wheel in the series, holding or bearing against its periphery sufficiently to act as a brake until the wheel in contact shall have performed the revolutions necessarily required by the operation of the key in use, when the carrying will be effected by the engagement of the spur-tooth, and thus effect the proper addition.

Between the digit-wheel and the intermediate one of each series or between the intermediate wheel F' and the wheel F'' , carrying the spur-teeth, there is a friction-spring g to prevent each wheel being carried beyond the desired mark by the momentum of the parts. It will therefore be observed that the wheels in this series of adding-wheels are operated each by the preceding wheel or wheels and that by this arrangement of the said wheels in component parts it is an easy matter to reset each of them to "0."

Fastened to the axis of the first wheel F of the C series is a toothed wheel F^4 , subdivided into as many teeth as there are figure-marks upon this first wheel, and as each key of the A series is depressed the lever B is moved a number of teeth corresponding to the number of the key touched, which produces a corresponding movement of the proper number of teeth on this wheel of the C series, which number is registered and added to the previous sum of the transactions. This is accomplished by means of the gear-wheel b' on the shaft of the pinion b , actuated by said lever B, said gear-wheel engaging the toothed wheel F^4 , which, as above stated, is fast on the axis of the first wheel F, so that as the pinion b is rotated through any arc by the lever B this toothed wheel F^4 and the first

adding-wheel will be moved through a corresponding arc.

I designates the series of indicator wheels or segments which turn on a shaft I' . Each said wheel is provided with a concentric-spring box J, containing the returning-spring J' , said box turning on the same axis with the indicator-wheel and having an engagement shoulder or projection p to engage a pin p' of said wheel. The box J is connected by a pivoted arm h to the end of a lever H, which is operated by its key, so that when said key is depressed the box will be turned through a short arc, carrying with it the indicator-wheel which will be caught and held in its new position, so as to show its number by means of the point of the pawl-bar H' , pivoted to the frame and engaging a shoulder on said wheel. The entire series of the pawls for the series of wheels is carried by this bar. The showing of the correct number will be effected, as the two like numbers on the indicating-wheel corresponding to the value of the respective key are so located as to be brought to the sight-slot on either side by the movement of the wheel. In order to release this indicator-wheel upon the subsequent operation of a key, the lever H is provided with a spring-pawl h' to engage the pawl-bar H' and push the pawl away from the notch H'' on the disk of said indicator-wheel. Said pawl-bar is provided with a spring h'' to normally hold its pawls toward the notched disks of the indicators. When the notched disk is disengaged from the pawl, the returning-spring J' carries said disk and its attached indicator wheel or segment to its first position, showing a blank at the sight-slot of the incasement.

All the parts are so arranged that by the depression of any key the bar-lever common to all said keys moving through an arc of the length indicated by the denomination or symbol of the key, turns by means of its segment end the wheel connected with the first wheel F of the digit series, as above described, a distance or number of teeth corresponding to the number of the key struck, which amount is at once added to the sum of the previous transactions on the adding-wheels, while at the same time the corresponding movement of the key A registers on the numbering-wheels N the individual transaction already added, as aforesaid, and the special lever H, connected to the key, acts upon the spring-box of the peripheral indicator-wheel, indicating the amount so registered and added by pressure of the key corresponding to that amount, and hence by depressing any key the amount corresponding to the value of said key is at once indicated, registered, and added to the sum of the previous transaction.

It will be observed at a glance that this form of machine, wherein there is common to all of the series of keys but one lever or bar, which by the depression of any one of the series of keys actuates the registering

mechanism, the adding-wheels, and the indicators, admits of various adaptations in form and shape embodying this general principle.

An adding mechanism with digit-wheels subdivided or composed of two or three distinct parts journaled on the same axis may be so arranged as to avoid the necessity of any mechanism for reducing the same to a common starting-point, allowing the wheels to be returned to "0" by hand. Should it be desired, however, to use mechanism, which is preferred, for bringing all of said digit-wheels to a common starting-point whenever it may be desired, in order to obviate the possibility of an error, which may occur when said wheels are turned back by hand, the following is a description of such simple mechanism as will effectually answer the purpose in view.

Upon the axle of each wheel of the C series there is placed a loose toothed wheel V, and these toothed wheels intergear one with the other in such a manner that by the operation of the middle wheel, actuated by a handle R on the axle thereof, each of the adding-wheels of said series will be revolved in the opposite direction to its normal movement until each engages a spring pawl or pin, so arranged that at the point of engagement between said pawl and the depression or catch of the toothed wheel itself each of the wheels shall show "0" opposite the opening of the incasement. To this end the shaft of each adding-wheel is provided with a ratchet-wheel H'', secured thereon, said ratchet-wheel engaging a pawl h''' of the loose gear-wheel when the shaft is turned in the direction to return to "0," but passing said pawl freely when said wheels are in reversed operation. The adding-wheels are usually in frictional engagement with the shaft and carrying-disks alongside of the wheel, intermediate frictional springs being provided. When, therefore, the shaft of the intermediate adding-wheel is turned backward, its ratchet turns its loose gear, while at the same time its adding-wheel is turned backward by friction. So, also, the shafts of the other adding-wheels are turned backward by the gearing, carrying, and adding wheels until all the adding-wheels are separately stopped at "0" by the engagement of the fixed pawls.

To insure each key its full stroke, the lower portions thereof are provided each with an extension U, having on one edge the inclined ratchet-teeth U', and near its upper portion a recess U'', which has a greater depth than that of the teeth. A spring-pawl u, secured to the frame, is arranged so as to engage said teeth, but permitting the key to be depressed its entire stroke. As the key is depressed the teeth U' will incline the said pawl, causing it to engage said teeth in such a manner as to prevent the return of the key until it has been depressed its entire stroke, when the increased depth of the recess U'' will per-

mit the pawl to assume its normal position and the key to return.

In order to prevent the simultaneous depression of more than one adjoining key, a series of horizontal pivoted levers W is provided, their ends adjoining each other near the keys and in a position to be engaged by a spline w, formed on one side of said keys as the key is depressed. It will be seen, therefore, that as a key is depressed its spline will engage the adjoining ends of its respective levers W, causing them to assume such a position that their opposite ends will serve as stops for the spline of the adjoining keys on either side.

A bar or lever is arranged underneath the arms of the keys in such a manner as to be depressed by the depression of any key, thereby operating an arm or lever Y, which will release the cash-drawer lock Y', by suitably-arranged springs, these acting to throw said drawer outward.

Having briefly specified the working and purpose of this machine, what I consider new, and therefore desire to cover by Letters Patent, is—

1. The combination, with a series of vertically-movable keys, of a series of rotary indicators mounted independently upon a common shaft, one indicator for each key, a link-and-lever connection between each key and its indicator, operated by the depression of the key to rotate said indicator to its indicating position, a continuous pawl-bar adjacent to the series of indicators and carrying a series of pawls adapted each to engage a shoulder on its respective indicator, a spring for throwing each pawl into engagement, a pawl carried by each link-and-lever connection and acting upon said continuous pawl-bar when the key is depressed to release the indicator operated by the previous transaction, and a returning-spring in connection with each indicator, substantially as specified.

2. The combination, with a series of vertically-reciprocating keys having engagement shoulders or projections thereon, of a series of sets of individual rotary registering-wheels having gear-wheels fast therewith and a series of swinging forked pawls operated by said engagement shoulders or projections upon the depression of the respective keys, substantially as specified.

3. The combination of a series of vertically-reciprocating keys, an arm on each projecting at right angles thereto, an oscillating bar or lever common to the entire series and operated by the impingement thereon of the said arm of any key, indicating mechanism for each key operated by a connection with said arm, devices in connection with each key for insuring their complete stroke and for properly limiting their stroke, and adding mechanism geared to said bar, substantially as specified.

4. In an accounting-machine, the combina-

tion, with a series of vertically-sliding keys, of a bar or lever acted upon by said keys and common to the entire series, a slotted stop-plate attachment to each key and adapted to be thrown into such position by the depression of said key as to serve as a stop for said bar or lever, adding mechanism operated by a segment-gear on the end of said bar, devices for resetting said adding mechanism to "0," and indicators having a connection with the keys in such a manner as to be rotated to indicating position by the operation thereof, substantially as specified.

5. In an accounting-machine, adding mechanism comprising a first wheel marked around its periphery with the numbers "0" and "5" alternately, a disk fast thereto and carrying a series of spur-teeth, one between each "0" and the succeeding "5" and gear for actuating said first wheel, and a series of succeeding wheels arranged periphery to periphery and having each a disk in connection therewith having one spur-tooth, and an intermediate wheel between the main wheel and the spurred tooth, said intermediate wheel having gear thereon operated by the spur-tooth of the preceding wheel and having its periphery subdivided into concave arcs, and resetting-gear in connection with the shaft of each wheel, substantially as specified.

6. In an accounting and indicating machine, the combination, with a series of sliding reciprocating keys, their guides, and returning-springs, of pawl-and-ratchet mechanism for insuring full stroke, and the continuous pivoted bar or lever underlying said series of keys and common thereto, adding mechanism operated by said bar, a set of parallel registering-wheels in connection with each key, a series of swinging pawls normally disconnected from the keys, but operated by a shoulder or projection thereon when the respective key is depressed, said pawls engaging gear fast to said registering-wheels, each of said wheels having a stop-pin projecting at right angles thereto, a swinging stop-bar normally out of engagement with said pins, and means for bringing it into engagement, substantially as specified.

7. In an accounting-machine, the combination, with a series of keys and their necessary connections, springs for taking them back to their normal position, of a lever common to all of said keys and actuated by any of them, slotted swinging stops adapted to be operated by said keys and thrown into such position by each key as to prevent the momentum of said stroke from causing the lever to be depressed beyond the desired distance indicated by said key, and adding mechanism and its necessary gearing, said mechanism consisting of a series of digit-wheels arranged periphery to periphery, as shown, the first wheel of the series being divided around its periphery into "0" and "5" at equal intervals alternately, a wheel parallel thereto and journaled on the same

axis, said wheel containing a spurred projection between each 0-mark and its succeeding 5-mark on the side of said wheel and extending beyond its periphery, a succession of other digit-wheels succeeding each other periphery to periphery, each having around said periphery the digits "1" to "9" and "0," inclusive, said other wheels having parallel carrying-wheels and the friction-springs between the parallel wheels, indicating mechanism operated by said keys, and numbering-wheels actuated by said keys, substantially as specified.

8. In an accounting-machine, the combination, with a series of vertically-sliding keys, their guides, and retracting-springs, of a lever or bar underneath said keys and actuated by any of them, a slotted swinging stop carried by each key and operated thereby in such a manner as to be thrown into position to serve as a stop for said common bar or lever, adding mechanism operated from said bar or lever, said adding mechanism comprising a series of digit-wheels arranged periphery to periphery and parallel with said bar, spur-gear in connection with each of said wheels to effect the carrying from one to the other, resetting-gearing in connection with each and intergearing, and rotary indicators operated by the depression of said keys, substantially as specified.

9. In an accounting-machine, the combination, with a series of vertically-sliding keys and their returning-springs, of a lever or bar arranged below said series and actuated by any key, a slotted swinging stop carried by each key and thrown by the operation thereof in position to arrest the downward movement of said bar, said stops being so arranged that each key moves said bar through a different arc, adding mechanism operated by a toothed segment on the end of said bar, said adding mechanism consisting of a series of digit-wheels arranged periphery to periphery, the first of the series of wheels having a series of toothed projections, the second of the series having spurred projections corresponding in number to the teeth upon the wheel attached to the first of the series that is actuated by said lever, and each succeeding wheel having spurs arranged to carry its succeeding wheel, rotary indicators operated directly by said key, a series of sets of numbering-wheels operated by each of said keys, and a series of pawls for holding said wheels in proper position until it shall be their turn to move, substantially as specified.

10. In an accounting and indicating-machine, the combination of a series of vertically-reciprocating sliding keys, their guides, devices for preventing more than one key being depressed at a time, mechanism for insuring each key its full stroke, a bar or lever common to and arranged underneath all said keys and actuated by any of them, a spring for returning said bar or lever to its normal position, a slotted swinging stop carried by each key and projected by the operation

thereof into such position as to limit the downward stroke of said bar, adding mechanism operated from said bar, and indicating and individual registering wheels operated by said
5 keys, substantially as specified.

11. In an accounting-machine, the combination of a series of vertically-reciprocating sliding keys, their retracting-springs, guides, devices for insuring their full stroke and for
10 preventing the simultaneous operation of the two adjacent keys, a single key bar or lever arranged below said series and common thereto, each key by its impingement with said bar moving it through a different arc, stops

projected by the operation of each key under- 15
neath said bar, total adding mechanism geared thereto, a series of indicators operated directly by each key, and a set of individual registering-wheels moved by pawls operated
by the depression of each key, substantially 20
as specified.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY G. O'NEILL.

Witnesses:

PHILIP C. MASI,
J. W. ANDERSON.