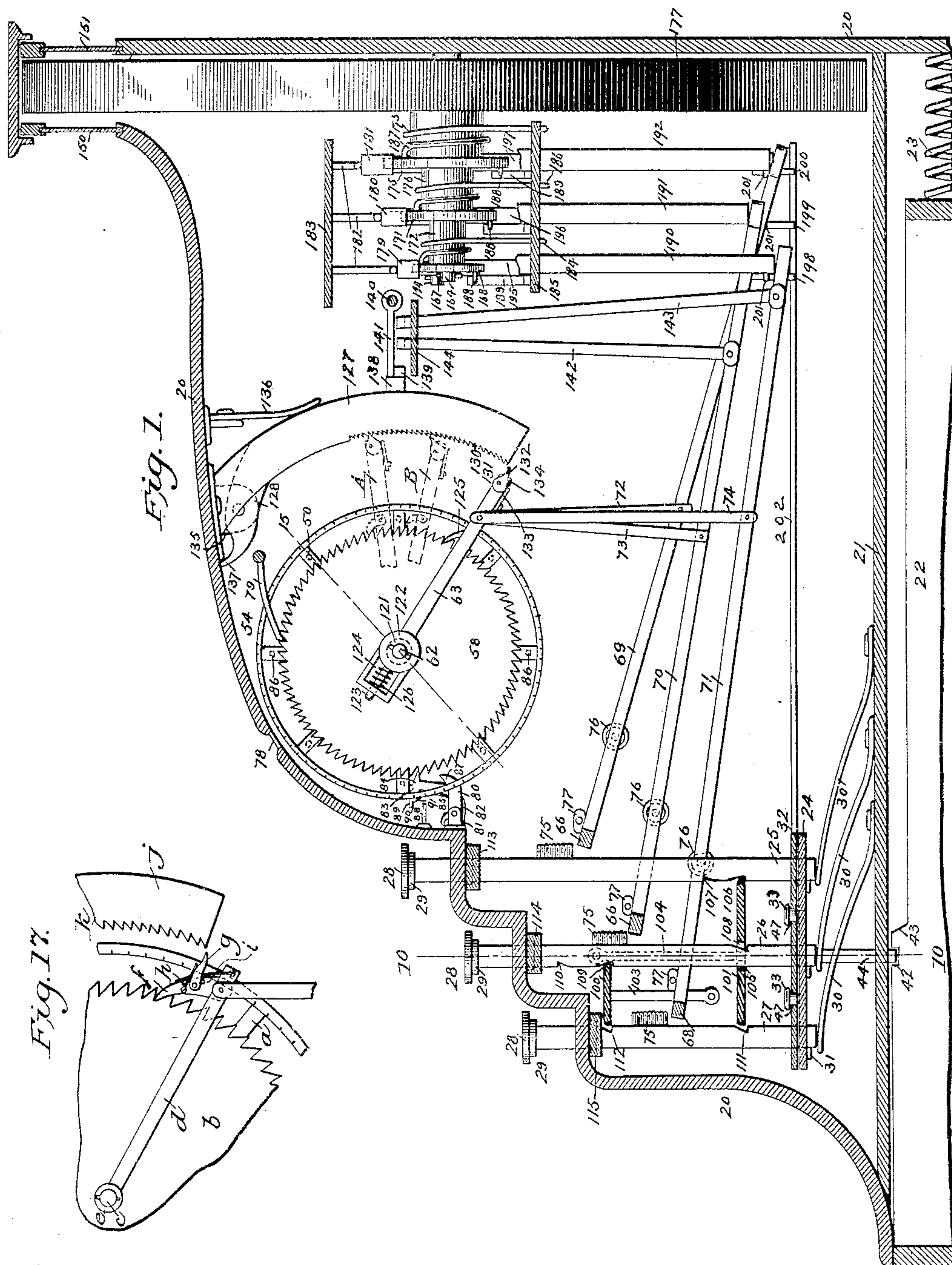


4 Sheets—Sheet 1.

No. 532,693.

Patented Jan. 15, 1895.



Witnesses.
Theodore T. Pickell.
Jas. J. Curtis.

Inventor.
William K. Nichols

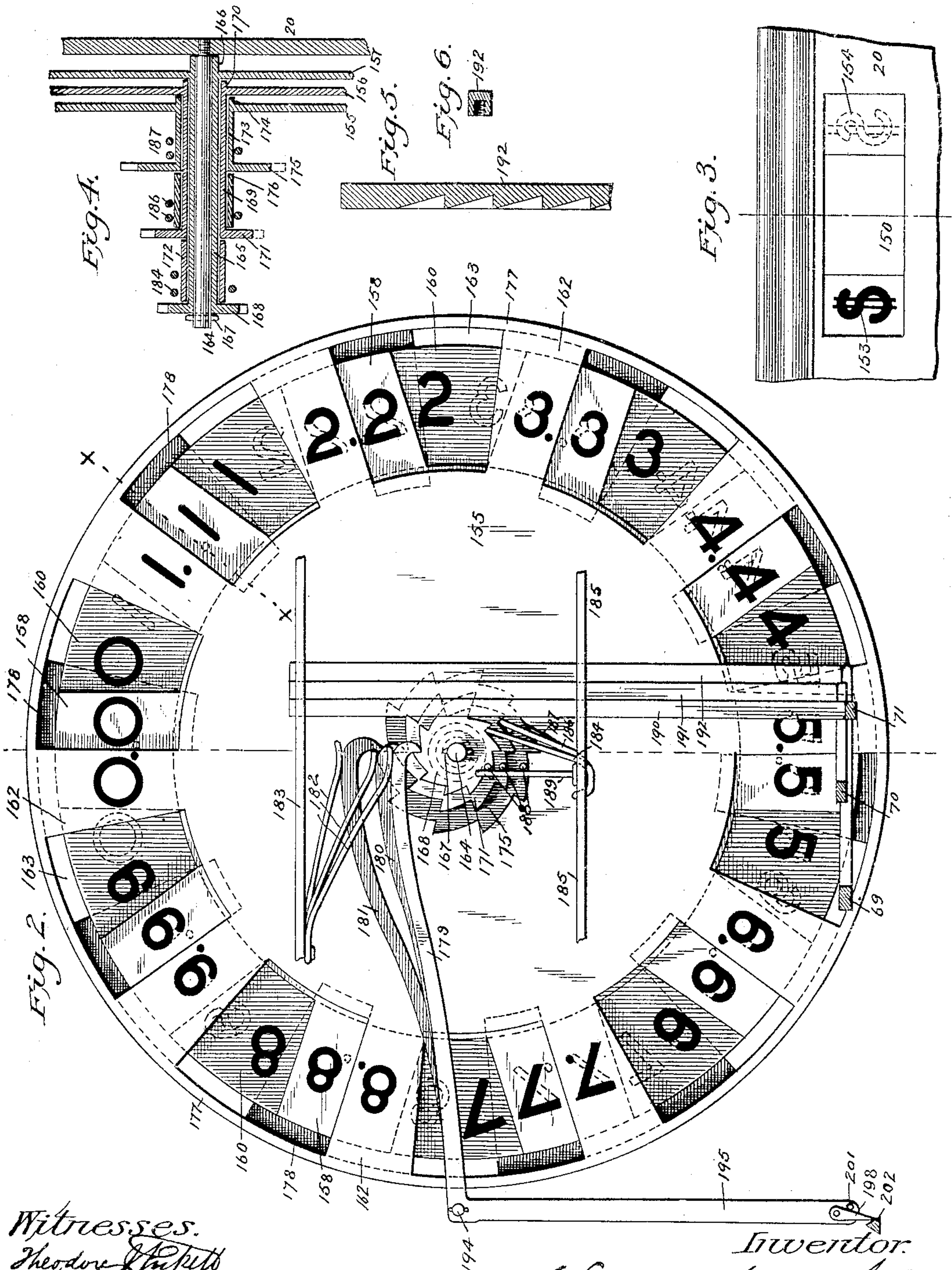
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4 Sheets—Sheet 2.

W. K. NICHOLS.
CASH REGISTER AND INDICATOR.

No. 532,693.

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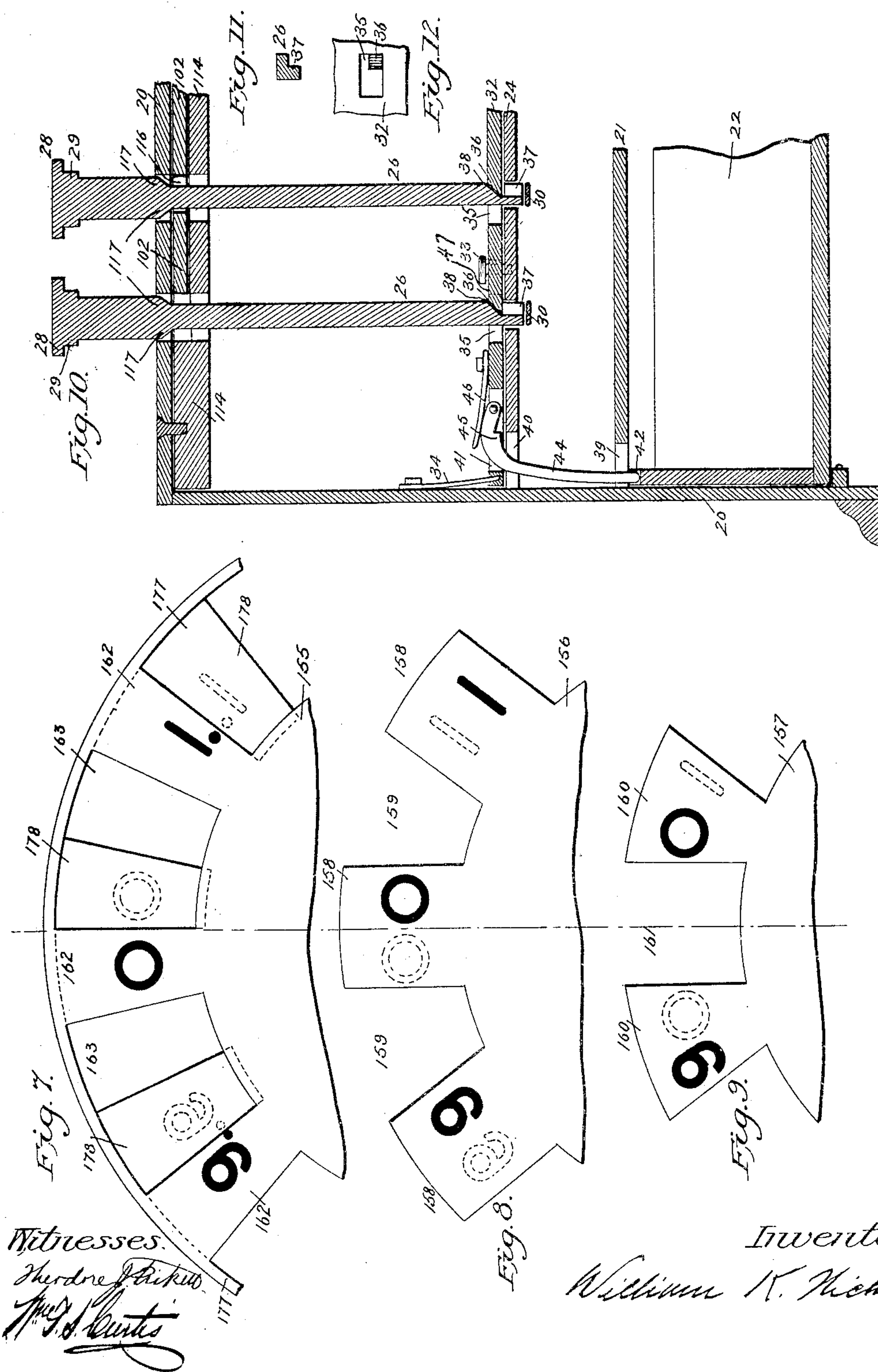
Witnesses.
Theodore J. Nichols
J. G. S. Smith

Inventor.
William K. Nichols

4 Sheets—Sheet 3.

No. 532,693.

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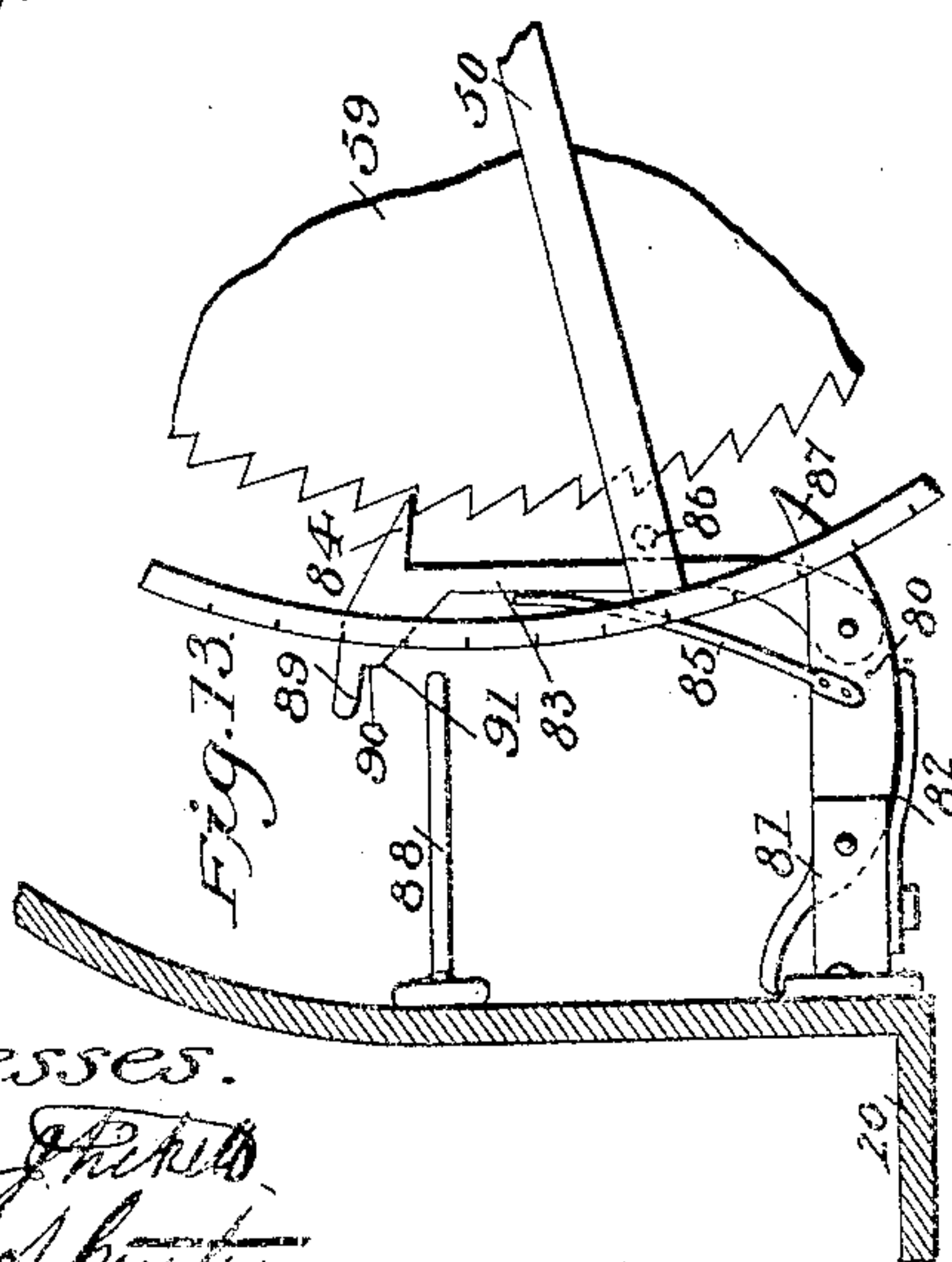
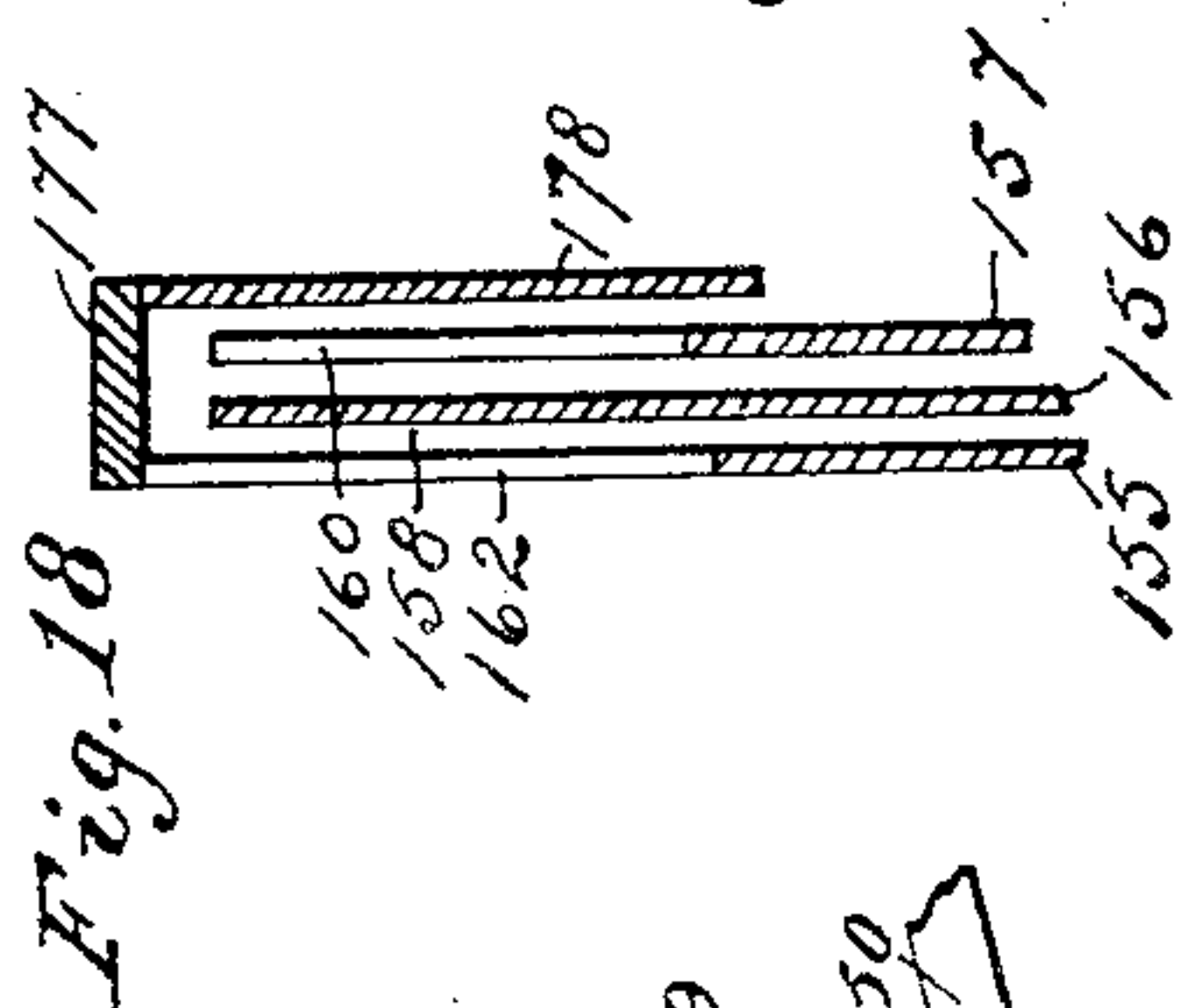
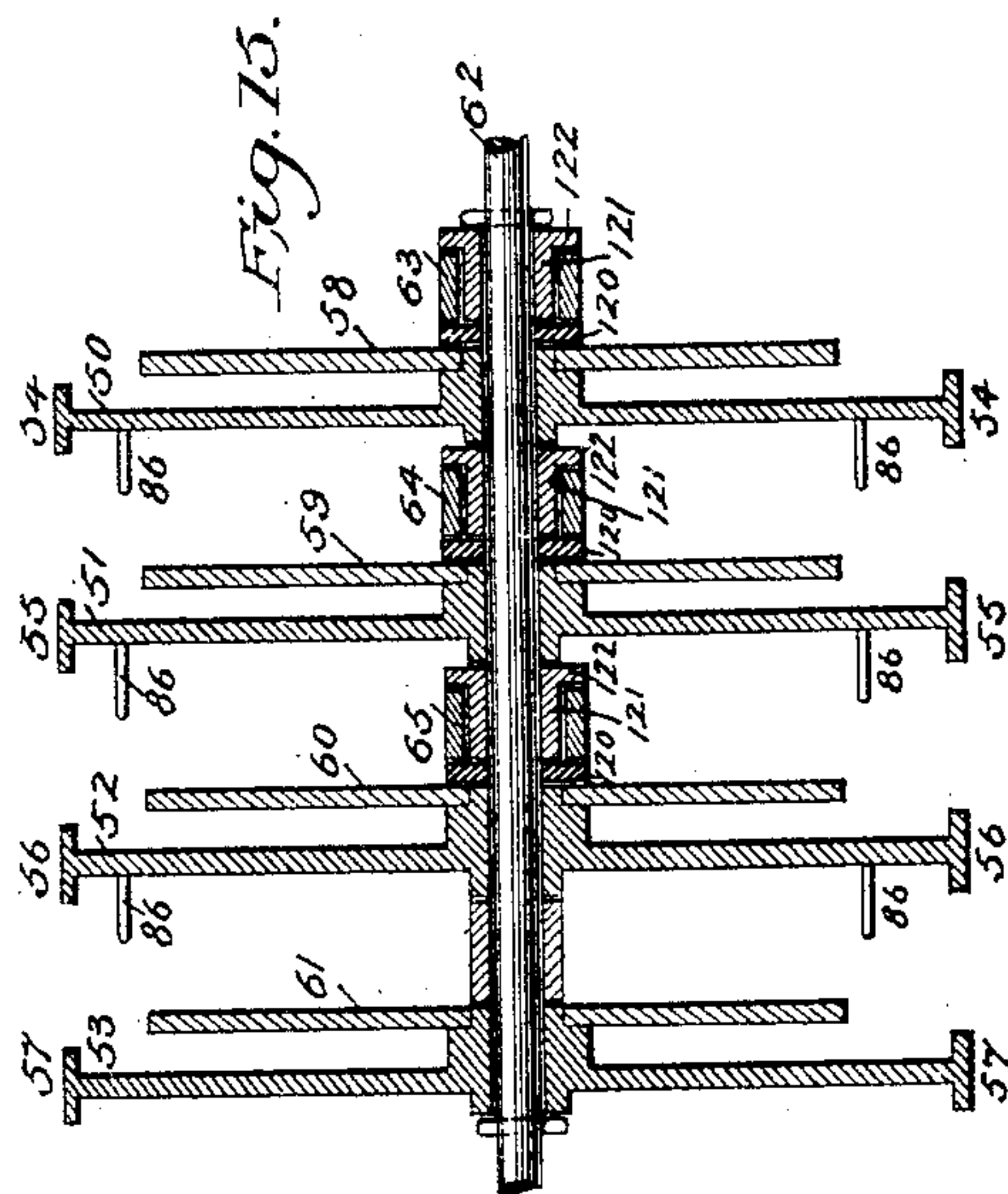
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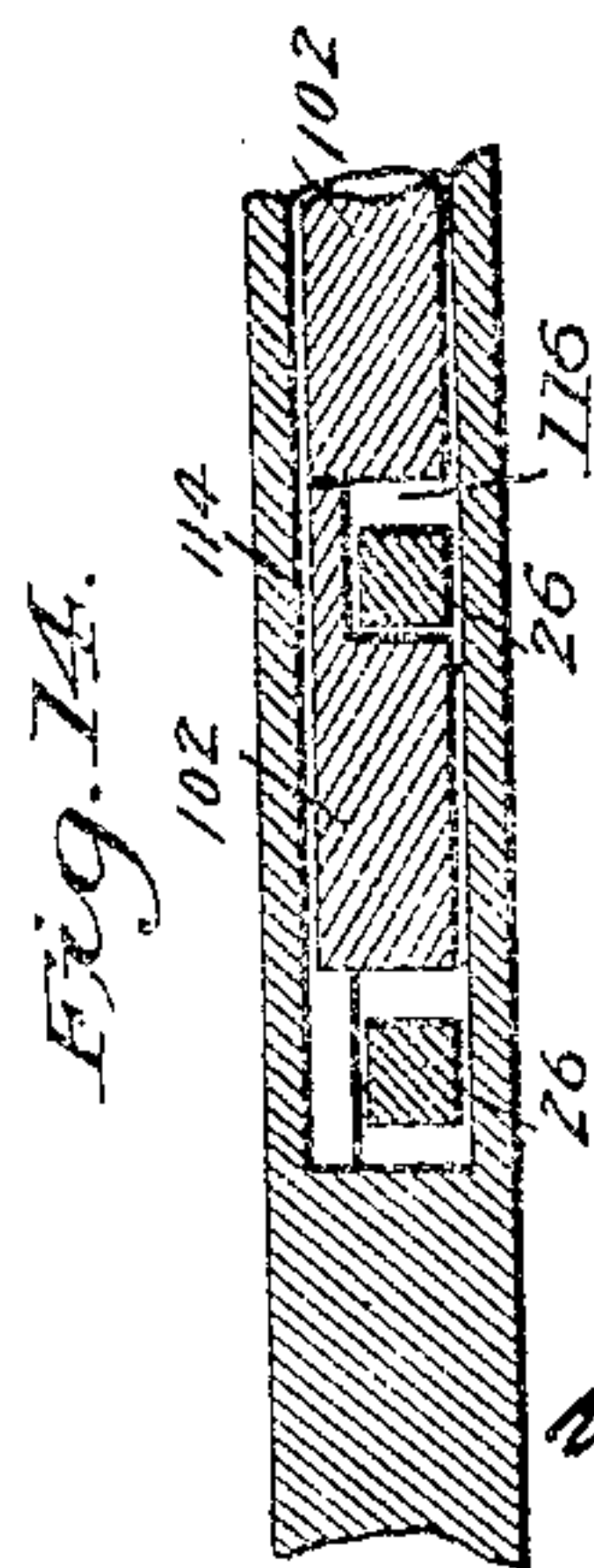
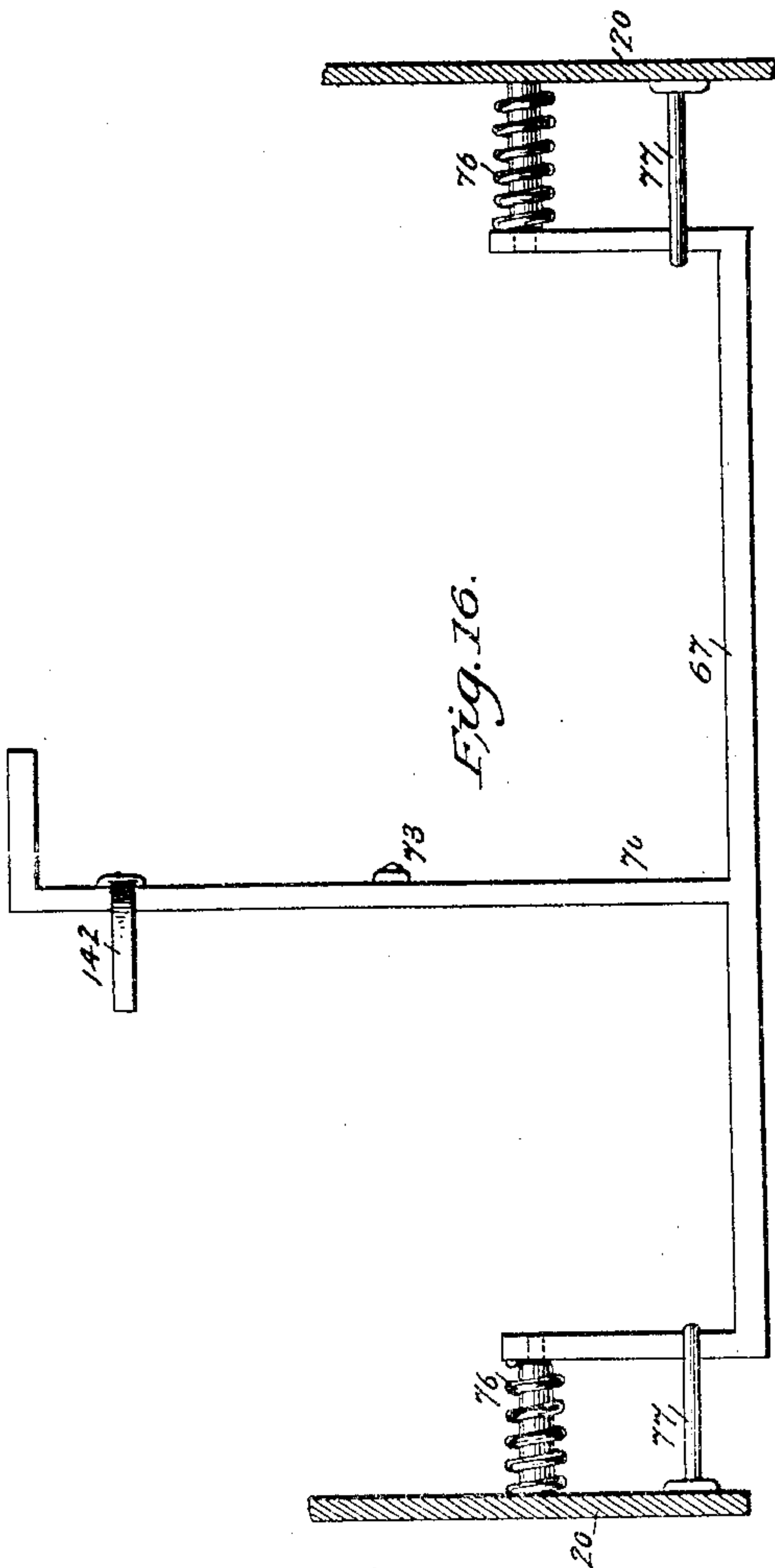
W. K. NICHOLS.
CASH REGISTER AND INDICATOR.

No. 532,693.

Patented Jan. 15, 1895.



Witnesses.
Theodore Nichols
Jas. S. Smith



Inventor.
William K. Nichols

UNITED STATES PATENT OFFICE.

WILLIAM K. NICHOLS, OF WASHINGTON, DISTRICT OF COLUMBIA.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 532,693, dated January 15, 1895.

Application filed November 28, 1892. Serial No. 453,368. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM K. NICHOLS, a citizen of the United States, residing at Washington, in the District of Columbia, have
5 invented certain new and useful Improvements in Cash-Registers; and I do hereby 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 ap-
10 pertains to make and use the same.

The objects of this invention are, first, to provide means whereby, when a wheel is rotated, its momentum is automatically overcome to stop said wheel as desired, either
15 when said wheel is actuated directly, or when actuated by an adjacent wheel at determined intervals; second, to provide a drawer locking and releasing mechanism whereby, on the operation of any key said drawer is un-
20 locked, and whereby, after one registration, another cannot be made until said drawer has been closed; third, to provide, in a registering and indicating machine, an indicating mechanism which shall indicate any registra-
25 tion in proper dollars and cents columns, both to the front and back of the machine, and a means whereby, when another registration is made, said indicator is automatically released and the second registration is
30 indicated.

Figure 1 of the accompanying drawings represents a transverse vertical section through the machine near the right hand end thereof, the lower portion of the drawer being broken
35 away, and shows a side view of the mechanisms. Fig. 2 represents a front view of the indicating mechanism with part of adjunctive mechanisms thereto. Fig. 3 represents the windows through which the registrations are indicated. Fig. 4 represents a vertical
40 diametrical section through the sleeves and ratchet wheels of the indicating dials. Fig. 5 represents a vertical section through one of the racked bars for actuating the indicating
45 dials. Fig. 6 represents a horizontal section through one of said racked bars. Fig. 7 represents a front view of a portion of the dollars indicating dial. Fig. 8 represents a front view of a portion of the tens of cents indi-
50 cating dial. Fig. 9 represents a front view of a portion of the units of cents indicating

dial. Fig. 10 represents a partial section on line 10—10 of Fig. 1, showing the drawer locking and releasing mechanism and a portion of the key locking mechanism. Fig. 11 repre-
55 sents a horizontal section through the lower end of one of the keys. Fig. 12 represents a plan of a portion of the drawer releasing plate, showing one of the slots through which a key stem passes and the cam in said slot
60 for moving said plate. Fig. 13 represents a side view of the dog for carrying from one wheel to another with the means for stopping the momentum of the wheel actuated by said
dog. Fig. 14 represents a horizontal section
65 through a portion of the slides for locking the keys and the pocket containing said slides. Fig. 15 represents a diametrical section through the registering wheels on line 15—15 of Fig. 1. Fig. 16 represents a plan of
70 one of the actuating yoked levers. Fig. 17 represents a side view of the means for stopping the momentum of the wheels in a modified form from that shown in Fig. 1. Fig. 18 represents a partial section of the dials on
75 line *x—x* of Fig. 2.

Like numerals and letters of reference represent corresponding parts in the different figures.

These improvements, together with adjunctive mechanisms, are inclosed by the case, 20,
and the base plate, 21, and in the compartment beneath the base plate, 21, is the cash
drawer, 22. Said drawer, when unlocked, is
thrown outward by means of the spring, 23.
80 A series of keys for operating the machine extends through the case, 20, and said keys are guided by said case and the guide plate,
24. These keys may be of any number and of any desired denominations and values. In
90 the drawings are shown three rows of said keys, 25, 26 and 27. The upper row, 25, represents dollars from one to nine. The second row, 26, represents the cents in multiples of ten from ten to ninety; and the lower row, 27,
95 represents the units of cents from one to nine. The keys are provided with caps or finger plates, 28, which bear the numerals to indicate the values of the keys, and on the under side of said caps, 28, are the stop collars, 29,
100 which limit the down stroke of said keys. Springs, 30, serve to return the keys to their

normal positions after operation, and the pins, 31, limit the up stroke of said keys.

Adapted to slide upon the guide plate, 24, is the plate, 32. (See specially Fig. 10.) The screws, 33, fastened in the plate, 24, and which pass through the slots, 47, in the plate, 32, serve as guides for said plate, 32, and the spring, 34, serves to return said plate to its normal position after displacement. The plate, 32, is provided with the slots, 35, through which the key stems play, and said slots are of greater width than the key stems. Said plate is also provided with the cams, 36, which project into the rectangles of the slots, 35. These cams are of less depth than the key stems. In the lower ends of the key stems are cut the notches, 37, at the top of which are the cams, 38, corresponding to the cams, 36. In the base plate, 21, is the slot, 39. In the guide plate, 24, is the slot 40, and in the plate, 32, is the slot, 41. In the side of the drawer, 22, is the notch, 42, and slightly back of said notch, 42, is the cam, 43; and the side of said drawer back of said cam is cut away lower than the bottom of the notch, 42. A dog, 44, is pivoted in the slot, 41, of the plate, 32, and the tongue of said dog extends through the slots, 40 and 39, of the guide plate and base plate, and when the drawer is closed and the plate, 32, is in its normal position, the end of said tongue is in the notch, 42, of the side of said drawer, and said drawer is locked. The dog, 44, is provided with the tooth, 45, which is just above the plate, 24, when said drawer is locked. The spring, 46, bears downward on said dog, 44.

When a key is operated, its cam, 38, in contact with a cam, 36, of the plate, 32, moves said plate sufficiently to allow the passage of the key stem through one of the slots, 35, of said plate, and moves with said plate the dog, 44, sufficiently to release the drawer. Said drawer is then thrown open by means of the spring, 23. When the key is released, one of the springs, 30, returns said key to its normal position, and the plate, 32, being then free to move, its spring, 34, returns said plate and therewith the dog, 44, to their normal positions. The drawer, however, being then open, the lower portion of the side thereof is beneath the tongue of the dog, 44, and said dog drops downward, and the tooth, 45, thereof enters the slot, 40, of the guide plate, 24. This prevents the plate, 32, from being moved, and thereby locks the keys until the drawer is closed. When said drawer is pushed inward, the dog, 44, is raised by means of the cam, 43, and the tongue of said dog enters the notch, 42, and locks said drawer, but the tooth, 45, being then out of the slot, 40, the plate, 32, and the key stems are released. If it is desired to use two or more keys, for one registration, one is held down until the next is operated or they are depressed simultaneously. In the machine illustrated, however, it is made impossible to depress two or more keys simultaneously by means of a locking

device which will be described hereinafter. The reason for not having the cams, 36 and 38, and the notches, 37, extend the full depth of the key stems is in order to have the plate, 24, serve as a guide for the keys, which it could not do if said key stems were notched to their full depth.

The registering mechanism herein shown consists of a series of wheels, 50, 51, 52 and 53. These wheels are all of the same construction and are provided, respectively, with the rims, 54, 55, 56 and 57, and with the ratchet wheels, 58, 59, 60 and 61. The rims are connected to the hubs of the wheel by means of spokes or webs, and the ratchet wheels are rigidly connected with the registering wheels. The wheel, 50, is actuated by means of the units of cents keys and represents cents. The wheel, 51, is actuated by means of the tens of cents keys and represents tens of cents. The wheel, 52, is actuated by means of the dollars keys and represents dollars, and the wheel, 53, is disconnected from the keys and represents tens of dollars. These registering wheels are adapted to turn on a common arbor, 62, and have a connecting mechanism hereinafter described to transfer the sum on a wheel of lower denomination to the next adjacent wheel of higher denomination. The rims of the wheels may be divided into any desired number of parts divisible by ten, and the teeth of the ratchet wheels correspond in number to the divisions on the rims. As shown in the drawings, each wheel is divided into eighty parts and there are eighty teeth to each ratchet wheel.

The divisions on each of the wheels, 50, 51 and 52, are numbered in eight series, the numbers in each series being from 0 to 9, and the divisions on the last wheel, 53, are numbered in one continuous series from 0 to 79. If there were more than one wheel disconnected from the keys, the last only would have one continuous series of numbers.

It is obvious that, if the machine were used for foreign money, the divisions on any wheel would correspond to some multiple of the number of times the denomination of said wheel was contained in the denomination of the next higher wheel.

The wheels, 50, 51 and 52, are provided with actuating pawl carrying arms, 63, 64 and 65, the special construction of which will be hereinafter fully described. Said pawl carrying arms are pivoted with the arbor, 62, as a center, and the pawls thereof engage with the teeth of the ratchet wheels for actuating the registering wheels.

Any suitable mechanism may be employed to connect the keys with the pawl carrying arms of the registering wheels, and that shown in the drawings is of similar construction to that shown and fully described in Letters Patent No. 480,208, issued to me August 2, 1892. This mechanism herein employed consists of the three yoked levers, 66, 67 and 68. These yokes are provided, respectively, with

the rearwardly extending arms, 69, 70 and 71, and are pivoted at the ends of the casing so that their front bars come parallel and adjacent to the rows of keys, 25, 26 and 27. The yoke, 66, is actuated by the dollars keys, and its arm, 69, is connected with the pawl carrying arm, 65, of the dollars wheel by means of the upright lever, 72. The yoke, 67, is actuated by the tens of cents keys, and its arm, 70, is connected with pawl arm, 64, of the tens of cents wheel by means of the upright lever, 73. The yoke, 68, is actuated by the units of cents keys, and its arm, 71, is connected with the pawl arm, 63, of the cents wheel by the upright lever, 74. On the key stems, immediately above the bars of the yoke levers, are the lugs, 75. These lugs are so arranged as to come in contact with the bars of the yoke levers when the keys are operated, and are adjusted at different distances from said bars so that, when they come in contact therewith, they depress said bars more or less to rotate the corresponding registering wheels through the desired number of divisions according to the values of the keys operated. When the keys are released, the yoke levers are returned to their normal position by means of the springs, 76, and are stopped in their upward movements by the stops, 77.

The registering wheels are read through any suitable reading slot, as 78, and every time the 9 or last number of a series on a wheel is brought past said reading slot, the next adjacent wheel of higher denomination is actuated through one division. By this means all the registrations are added automatically and the total thereof is always shown in the reading slot.

The capacity of the machine with the four wheels and with eighty divisions to a wheel would be seven thousand nine hundred and ninety-nine dollars and ninety-nine cents (\$7,999.99), but it is obvious that, if the number of wheels were changed, or the number of divisions on the wheels were varied from that shown, the capacity of the machine would vary likewise. When the registering wheels are rotated, they are prevented from returning backward by any suitable check pawls, as 79.

I will now describe the device I use for carrying from one wheel to another, and the means of stopping the momentum of a wheel when actuated by said carrying device. (See especially Fig. 13.)

A lever, 80, is pivoted to the support, 81, and projects slightly between the two registering wheels of higher and lower denominations. The support, 81, is permanent and is fastened to the case or other convenient point. The spring, 82, bears upward against said lever, 80, and the outer end of said lever in contact with the support, 81, serves as a stop to limit the upward movement of said lever. The dog, 83, is pivoted to said lever, 80, and its tooth, 84, is adapted to engage with the teeth of the ratchet wheel of the registering

wheel of higher denomination. A spring, 85, bears against said dog, 83, and tends to hold said dog in contact with the teeth of said ratchet wheel. On the spokes or web of the registering wheel of lower denomination is arranged a series of lugs, as 86, one lug for each series of numerals on said wheel. These lugs are so arranged that, when said wheel of lower denomination is rotated and the nine or last number of one of the series on said wheel starts to leave the reading slot, one of said lugs engages the pointed tooth, 87, of the lever, 80, and causes the dog, 83, in engagement with the teeth of the ratchet wheel of the registering wheel of next higher denomination to rotate said last mentioned wheel until the lug, 86, has passed said tooth, 87, of the lever, 80. This tooth is so arranged that said lug will have passed the same as soon as the wheel actuated by the dog, 83, has been rotated one division. When said lug has passed said tooth, 87, of said lever, 80, said lever and therewith the dog, 83, will return to their normal positions by means of the spring, 82.

The momentum of the wheel actuated by the carrying dog is overcome as follows: The permanent stop, 88, is so fixed that, when the dog, 83, is drawn downward in the act of carrying the heel, 89, of said dog, comes in contact with said stop, 88, and prevents said dog from going farther than desired. When said dog reaches its full downward stroke, the shoulder, 90, at the upper end of the cam, 91, at the back of said dog, comes opposite the end of said stop, 88, and near enough to said stop to prevent said dog from being thrown out of engagement with the teeth of the ratchet wheel actuated by said dog; but said shoulder does not come close enough to said stop, 88, to bind on the return of said dog to its normal position. Now the wheel of higher denomination actuated by the carrying dog cannot go farther than desired, without either taking said dog with it or throwing said dog out of engagement with its ratchet teeth, and, therefore, said dog, together with the stop, 88, checks the momentum of said wheel as desired. The dog, 83, is allowed to return to its normal position without interfering with the stop, 88, as there is enough play between the shoulder, 90, and said stop, 88, to allow said dog to move upward until said shoulder has passed said stop, and the cam, 91, is beveled sufficiently to allow the outward and upward movement of said dog without any interference with the said stop, 88. Now between each wheel of lower denomination and its adjacent wheel of higher denomination there is a carrying dog and adjunctive mechanism similar to that just described, so that, when any wheel is actuated, its totals are automatically and accurately transferred to the wheel of next higher denomination.

In order that there may be no errors in the registrations by simultaneously operating two or more keys, any suitable locking de-

vice may be used; and the one I herein illustrate is substantially the same as the one shown and patented by me in Letters Patent above referred to, No. 480,208, of August 2, 1892. This locking device consists of the locking plates, 100 and 101, to lock the keys of different rows, and the slides, 102, to lock the keys of the same row to which an operated key belongs. The plates, 100 and 101, are pivoted at the ends of the casing by means of arms, as 103 and 104. The plate, 100, is adapted to swing between the rows of keys, 26 and 27, and is of slightly greater width than the space between said rows of keys. The plate, 101, is adapted to swing between the rows of keys, 25 and 27, and is of greater width than the space between said rows, 25 and 27. The row of keys, 26, passes through said plate, 101, and the distance between the edge of said plate next adjacent to the row, 25, and the edges of the slots, 105, through which said row, 26, passes is of greater width than the distance between said rows, 25 and 26. The row of keys, 25, is provided with the locking notches, 106, which are opposite to the edge of the plate, 101, when said keys, 25, are in their normal positions; and said keys are also provided with the releasing notches, 107, which come opposite said plate, 101, when said keys are fully depressed. The keys, 26, are provided with the locking notches, 108, which are opposite the plate, 101, when said keys are in their normal positions, and with the locking notches, 109, which are opposite the plate, 100, when said keys are in their normal positions, and said keys are also provided with the releasing notches, 110, which come opposite the plate, 100, when said keys are fully depressed. The keys, 27, are provided with the locking notches, 111, which are opposite the plate, 101, when said keys, 27, are in their normal positions, and said keys are also provided with the locking notches, 112, which are opposite the plate, 100, when said keys are in their normal positions.

The pockets, 113, 114 and 115, contain the slides, 102, and the keys pass through said pockets and through the notches, 116, of said slides, 102. The slides, 102, are equal in length to the distance from the center of one key to the center of the next adjacent key in the same row. The key stems are provided with cammed shoulders, 117, and the notches, 116, of the slides are each equal in length to the width of a key stem below the shoulders thereof plus the width of one of said shoulders. When a key of the dollar row is operated, the slides in the pocket, 113, are forced, by the cams on said key, beneath the cams of the other keys of the same row to which said operated key belongs, and said keys are locked until the return of said operated key to its normal position; also the plate, 101, is forced into engagement with the notches, 108 and 111, of the keys, 26 and 27, and said keys are locked until the key operated is fully depressed and the releasing notch, 107, thereof

is brought opposite said plate, 101. So when a key of the tens of cents row, 26, is operated, the remaining keys of said row are locked by the slides in the pocket, 114, and the edge of the plate, 101, is forced into the notches, 106, of the dollars row, and said row, 25, and the other keys of the row, 26, are locked until the return of the operated key to its normal position. The plate, 100, is also forced into engagement with the notches, 112, of the cents row, 27, and said row is locked until the key operated is fully depressed and the releasing notch, 110, thereof comes opposite said plate, 100. When a units of cents key, 27, is operated, the slides in the pocket, 115, are forced under the cams of the keys of the same row, 27, the plate, 100, engages with the notches, 109, of the tens of cents keys, and the plate, 101, engages with the notches, 106, of the dollars keys, thereby locking all the other keys until said operated key is returned to its normal position.

In making a registration where two or more keys are used, the key of the highest denomination is operated first, then that of the next lower, and so on. For instance, to register four dollars and ninety-five cents the \$4 key would be operated first and held down, then the 90 cents key would be operated and held down and the \$4 key released, and then the 5 cents key would be operated, and the last two keys would be released and returned to their normal positions one at a time.

By having a releasing notch for each locking notch on the several key stems, any key might be operated first, or, if there were no releasing notches at all, the keys could be operated and returned to their normal positions one at a time and give correct registration; but the reason for the special arrangement of the releasing notches herein shown, and for holding down one key of a registration until the next is operated, will be appreciated on referring to the mechanisms hereinafter described for stopping the momentums of the wheels and for indicating the registrations.

I will now describe the construction of the pawl carrying arms of the registering wheels and the means for stopping the momentums of said wheels when actuated by means of said arms.

On the arbor, 62, adjacent to the ratchet wheels, 58, 59 and 60, are disposed the washers, 120, and on said arbor, 62, adjacent to said washers are disposed the sleeves, 121. Said sleeves, 121, are provided with the flanges, 122, and each of said sleeves is also provided with a radially projecting pin, 123. The pawl carrying arms, 63, 64 and 65, are severally provided with elongated pivot slots, 124, and the sleeves, 121, pass through said pivot slots and act as pivots for said arms. The radial pins, 123, extend longitudinally of said pivot slots and loosely through the ends of the arms. Said pins cause the sleeves to turn with the arms and, together with the washers, 120, and the flanges, 122, guide said

arms from any lateral movements, but allow said arms a longitudinal movement over said sleeves. The arms, 63, 64 and 65, are also provided with permanent pawls, as 125, which
 5 pawls are adapted to engage with the teeth of the ratchet wheels, 58, 59 and 60, to actuate the same. These pawls are not pivoted spring pawls as is usually used for a like purpose, but are rigidly fastened to the sides of the
 10 arms, or are made as a part of said arms. Springs, as 126, encircle the radial pins, 123, and bear against the sleeves, 121, and the pawl carrying arms at the ends of the pivot slots and tend to hold the pawls, 125, in en-
 15 gagement with said teeth of the ratchet wheels.

Depending from the case or other suitable support is a segment, 127. The inner face of said segment has the arbor, 62, for a center
 20 and is parallel to the peripheries of the ratchet and registering wheels. The inner face of said segment, 127, is provided with a series of small ratchet teeth, 130, of less depth than the teeth of the ratchet wheels, and said series
 25 of teeth subtends an angle as great, or slightly greater, than that through which the units of cents registering wheel, is rotated by the highest key actuating said wheel. The number of the teeth, 130, for a given angle is
 30 preferably equal to some multiple of the teeth of the ratchet wheel subtending the same angle, and the under sides of said teeth, 130, point radially to the geometrical center of the segment. At the outer end of the pawl carry-
 35 ing arm, 63, is pivoted a dog, 131. Said dog is provided with a tooth, 132. A spring, 133, bears against said dog and tends to hold the same in its normal position, and a stop, 134, prevents the outer end of said dog from being
 40 swung downward. The pivot of the dog is but a short distance from the tooth of said dog and slightly above said tooth. Said dog is directly opposite the racked segment, 127, and when the pawl carrying arm, 63, is re-
 45 volved, said dog moves in the vertical plane of said segment, 127. The upper side of the tooth of said dog points radially to the geometrical center of the segment and is so ad-
 50 justed as to just pass the points of the teeth, 130, of said segment when the pawl carrying arm, 63, is actuated, and the pawl, 125, thereof is fully engaged with the teeth of the ratchet wheel. When a units of cents key is
 55 operated, and its yoke lever is depressed, the pawl carrying arm, 63, is actuated, and its pawl, 125, rotates the cents ratchet wheel and registering wheel in connection therewith. Now the spring, 126, of said arm holds said
 60 pawl, 125, in full engagement with the teeth of said ratchet wheel, thereby allowing the tooth, 132, of the dog, 131, of said arm to pass by the teeth, 130, of the segment, 127. When the key operated is fully depressed, and the registering wheel has been rotated as desired,
 65 said wheel cannot go farther without either carrying the pawl, arm and yoke with it or throwing the pawl out of engagement with its

ratchet teeth. Now the springs, 126, are light, while the springs, 76, of the yoke levers are of a heavier nature, so that, if the momentum
 70 of the wheel tends to carry said wheel farther than desired, the cam of the tooth of the ratchet wheel engaged by the pawl will tend to force said pawl out of engagement with
 75 said tooth before carrying said pawl, arm and yoke upward. As soon as the pawl, 125, is forced outward, the tooth, 132, of the dog, 131, enters one of the teeth, 130, of the segment,
 80 127, and as the teeth, 130, are of less depth than the teeth of the ratchet wheel, said pawl, 125, cannot be forced entirely out of engagement with the said tooth of the ratchet wheel. When the tooth, 132, of the dog, 131, enters a
 85 tooth, 130, of the segment, 127, its upper surface comes in contact with the parallel lower surface of the said tooth, 130, and the pawl carrying arm cannot be then lifted by the up-
 90 ward force of the ratchet tooth of the ratchet wheel against the said pawl, 125. The dog, 131, cannot be swung upward when thus forced to enter the teeth, 130, as the pivot of said
 95 dog is slightly above the tooth thereof, and the force applied by the teeth of the ratchet wheel against the pawl, 125, is outward and upward and tends to swing the said dog down-
 100 ward, which is prevented by the stop, 134. Thus the momentum of the wheel is overcome as desired, as said wheel cannot rid itself of engagement with its actuating pawl, and is prevented from carrying said pawl ahead
 105 with it. This mechanism in the act of stopping the momentum of the wheel is shown by the dotted lines marked A of Fig. 1. When the key operated is released and the yoked lever depressed by said key, returns to its
 110 normal position, the tooth, 132, of the dog, 131, is swung upward by contact with the teeth, 130, as the force to retract the pawl carrying arm is downward, and the pivot of said dog, 131, is near enough to the tooth of said dog to
 115 allow said dog to swing thus without binding with the said teeth, 130. When said dog, 131, is swung upward, the pawl, 125, is allowed to pass out and over the teeth of the ratchet wheel and said arm can return to its normal
 120 position, after which the spring, 133, returns said dog, 131, as originally. The action of the dog, 131, on the retraction of the pawl carrying arm is illustrated by the dotted lines marked B of Fig. 1. Similar mechanisms to that de-
 125 scribed for the cents wheel are used to overcome the momentums of the other wheels when actuated by the arms, 64 or 65. This principle of stopping the momentum is shown in a modified form in Fig. 17. In said figure I show
 130 the same general principle of the racked segment to prevent the pawl from being thrown outward or lifted, but the construction used varies somewhat from that shown in Fig. 1. In this modified construction the registering
 wheel, *a*, with its ratchet wheel, *b*, is adapted to turn on the arbor, *c*, and the pawl carry-
 ing arm, *d*, is pivoted on said arbor in the usual manner by means of the permanent

sleeve, *e*. The arm, *d*, is provided with the spring pivoted pawl, *f*, which engages with the teeth of the ratchet wheel, *b*, to rotate said ratchet wheel and the registering wheel, *a*.
 5 Pivoted to said pawl, *f*, is an auxiliary pawl or dog, *g*. The dog, *g*, points outward from the ratchet wheel and is held in its normal position by the spring, *h*, fastened to the pawl, *f*, and said dog, *g*, is prevented from being
 10 swung downward by means of the stop, *i*. Depending from the case is a racked segment, *j*, similar to 127. The inner face of this segment has the arbor, *c*, for a center and said face is parallel to the periphery of the ratchet
 15 wheel and is directly opposite the dog, *g*. Said dog, *g*, is adapted to move in the same vertical plane with said segment, *j*. Said segment is provided on its inner face with a series of teeth, *k*, corresponding in size and number
 20 to the teeth of the segment, 127, said teeth being of less depth than the teeth of the ratchet wheel, *b*, and said segment is so disposed that the point of the dog, *g*, will just pass the teeth, *k*, of said segment when the
 25 arm, *d*, is actuated and the pawl, *f*, is in full engagement with a tooth of the ratchet wheel, *b*. Now when said arm has been actuated and the wheels rotated as desired, the momentum of said wheels will tend to throw the pawl, *f*,
 30 out of engagement with the teeth of the ratchet wheel, and when said pawl is thus thrown outward, the point of the dog, *g*, enters one of the teeth, *k*, of the segment, *j*. As said teeth, *k*, are of less depth than the teeth of the
 35 ratchet wheel, *b*, said dog, *g*, prevents the pawl, *f*, from being thrown fully out of engagement with the said teeth of said ratchet wheel, and when said dog, *g*, is in engagement with the teeth, *k*, the pawl, *f*, and arm, *c*, are prevented
 40 from being lifted, as said dog, *g*, cannot be swung downward. Thus the momentum of the wheel is overcome similarly as in the construction before described, as said wheel cannot go farther without either carrying the
 45 pawl ahead or throwing said pawl out of engagement with the teeth of the ratchet wheel. When the arm, *d*, is retracted, the dog, *g*, is swung upward by contact with the teeth, *k*, and the pawl, *f*, is allowed to pass down over
 50 the teeth of the ratchet wheel.

In making a registration in which two or more keys are used, it would seem preferable to operate the key of highest denomination first, then that of the next lower, and so on,
 55 rather than vice versa, and this could not be done if the segments for the wheels of higher denominations were all rigid, as 127, unless each key were allowed to return to its normal position before the next was operated. For if,
 60 for instance, a dollars key were operated first and held down, and then a tens of cents key operated and the 9 on the tens of cents wheel should be brought past the reading slot, the dollars wheel could not be rotated by the carrying device, as said dollar wheel could not
 65 pass its pawl, 125. I have, therefore, pivoted the segments for the tens of cents and the dol-

lars wheels with convenient stops so as to operate the keys in the desired order from higher to lower denominations. The segment, 128, 70 for said tens of cents wheel and the corresponding segment for the dollars wheel are pivoted to convenient supports, as 135, and are returned to their normal positions after being displaced by light springs, as 136. Said 75 segments are prevented from going too far forward by means of convenient stops, as 137, and when said segments are in their normal positions against said stops, their ratchet teeth are in corresponding positions to the 80 teeth of the segment, 127. The segment, 128, is provided at the back thereof with a projection, 138, and at the bottom of said projection extending rearward is a lug, 139. Pivoted on the bar, 140, or other convenient 85 pivot point, is an arm, 141, the outer end of which rests on the lug, 139, and against the projection, 138, when the segment, 128, is in its normal position, and serves as a lock for said segment to prevent the same from being 90 thrown backward. So the segment for the dollars wheel is provided with a projection and a lug similar to those of the segment, 128, and a corresponding arm to 141 acts as a lock for said dollars segment. Projecting up- 95 ward from the arm, 70, of the tens of cents yoked lever, 67, and pivoted to said arm, 70, is an auxiliary arm, 142, which is bent at the top (shown in Figs. 1 and 16), so that, when said yoke is in its normal position, the upper 100 end of said arm, 142, is just beneath and in close contact with the arm corresponding to 141, which acts as a lock for the segment of the dollars wheel, and projecting upward from the arm, 71, of the units of cents yoke, 105 68, and pivoted thereto is an auxiliary arm, 143. Said arm is similar to the arm, 142, and is bent at the top so that, when the said yoke, 68, is in its normal position, the upper end of said arm, 143, is close beneath the lock, 141, 110 of the tens of cents segment, 128, and extends also beneath the corresponding lock of the dollars segment. The arm, 143, is slightly back of the arm, 142, so as not to interfere with said arm, 142, and said arms 142 and 143 115 are guided by the plate 144. Now when a key of the tens of cents row is operated, the arm, 142, connected therewith immediately lifts the lock of the dollars segment, and if a dollars key were at that time held in a de- 120 pressed position, the dollars wheel could still be actuated from the tens of cents wheel by the carrying device for the segment for said dollars wheel being unlocked, said dollars wheel could pass its actuating pawl, 125, with- 125 out interference. In a like manner the operation of a units of cents key would unlock the segment of both the tens of cents wheel and the dollars wheel, and both of said wheels would be free to move by means of the carry- 130 ing device.

In order to prevent any possible mistakes by thus unlocking the segments, I have arranged the releasing notches on the key stems

so that a key of higher denomination cannot be operated while a key of lower denomination is depressed. If the segments were all rigid, as 127, then the releasing notches of the key stems would be arranged to necessitate the operation of the keys of lower denominations first.

When the radial arms are in their normal positions, it will be seen that the wheels may be actuated by the carrying devices, without interference with the rack segments, as the points or dogs 132, will not engage with the segments.

The sums registered are indicated through suitable windows, 150 and 151, in the front and back of the case. (See Figs. 1 and 3.) Each of said windows is provided with four equal spaces or columns, two on either side of the center thereof. The window, 150, in the front of the casing is provided with a permanent (\$) dollars sign, 153, occupying the second space or column to the left of the center of said window, and the back window, 151, is likewise provided with a permanent dollars (\$) sign, 154, which occupies a similar position in said back window looking at said window from the back of the machine. This arrangement leaves in each window one open column to the left of the center thereof and two open columns to the right of said center, or one open column in each window for each denomination of the keys used. The indicating mechanism is comprised chiefly of a series of indicating dials, 155, 156 and 157, one dial for each denomination of registering keys. The dial, 155, indicates the dollars, the dial, 156, indicates the tens of cents, and the dial, 157, indicates the units of cents. The tens of cents dial, 156, is notched at the edge thereof, as shown in Fig. 8, leaving a series of alternate projections, 158, and spaces, 159. The projections, 158, of said dial, 156, are of a width corresponding to two columns in the reading windows of the indicator, and the sides of said projections are parallel to the lines drawn from the center of the dial through the centers of said projections. The spaces, 159, are all equal. The units of cents dial, 157, is also notched, as shown in Fig. 9, and its projections, 160, correspond to the spaces, 159, of the dial, 156, and its spaces, 161, correspond to the projections, 158, of said dial, 156. The dial, 155, or dollars dial, is notched to produce the projections, 162, and the spaces, 163, (see Fig. 7,) and its projections, 162, are cut so that the right hand sides thereof are on lines from the circumference to the center of said dial, and their left sides are cut so as to leave a full column on each of said projections. The spaces, 163, are all equal. The projections on each dial are ten in number and are of a length preferably greater than the height of the reading windows.

The indicating dials, 155, 156 and 157, are disposed parallel to the back of the case and are adapted to turn about a common center, so that, when said dials are revolved, their

projections pass between and are seen through the windows, 150 and 151. A pivot pin, 164, extends inward from the back of said case and at right angles thereto, and the units of cents dial, 157, is swiveled on said pivot pin by means of its sleeve, 165. Said dial, 157, is near the back of the case and the shoulder, 166, of its sleeve keeps said dial the proper distance from said case. Said sleeve, 165, extends some distance from said dial, 157, toward the front of the machine, and is prevented from sliding inward by the stop pin, 167, through the end of said pivot pin. Rigidly connected to the end of said sleeve, 165, is a small ratchet wheel, 168, having ten teeth, or as many as there are projections, 160, on the dial, 157. The tens of cents dial, 156, is disposed in front of the units of cents dial and is swiveled to turn on the sleeve, 165, by means of the sleeve, 169, and the shoulder, 170, of said sleeve, 169, keeps said dial, 156, a short distance from the dial, 157. The sleeve, 169, of said dial, 156, extends toward the front of the machine over the sleeve, 165, and is provided at its end with a ratchet wheel, 171, which ratchet wheel is some little distance back of the ratchet wheel, 168, of the said sleeve, 165. Said ratchet wheels are kept apart by the collar, 172, disposed on the sleeve, 165, between said ratchet wheels. The ratchet wheel, 171, is provided with ten teeth in the same manner as is the ratchet wheel, 168. The dial, 155, is disposed in front of, and a short distance from, the dial, 156, and is swiveled to turn on the sleeve, 169, of said last mentioned dial by means of the sleeve, 173, and is kept the requisite distance from said dial, 156, by means of the shoulder, 174, of said sleeve, 173. This sleeve, 173, extends inward over the sleeve, 169, and at the end thereof is attached the ratchet wheel, 175, which is also provided with ten teeth. This ratchet wheel is some distance from the ratchet wheel, 171, and is kept so by the collar, 176.

It is immaterial in which direction the dials are adapted to turn, and in the drawings I have shown the same constructed to turn from right to left.

The projections, 162, of the dial, 155, extend outward from the center of said dial farther than the projections of the other dial, and fastened to the outer ends of said projections, 162, is a rim, 177, which projects over the dials, 156 and 157. Extending from said rim, 177, between the case and the dial, 157, is a series of projections, 178. Said projections, 178, are of the size and number of the projections, 162, and just the reverse thereof, the right side of the projections, 162, looking at the front thereof, coinciding with the left side of the projections, 178, looking at the back thereof.

The right side of the teeth of the ratchet wheels, 168, 171 and 175, all point to the centers of said ratchet wheels, and check pawls, 179, 180 and 181, in engagement with the teeth

of said ratchet wheels, serve to hold the dials in any desired position to which they are rotated. Said check pawls are held in contact with the teeth of said ratchet wheels by means of the springs, 182, attached to the stationary plate, 183. The spring, 184, coiled around the collar, 172, and the ends of which are fastened one to the ratchet wheel, 168, and the other to the plate, 185, serves to return the dial, 157, to its normal position when released after having been rotated. So the spring, 186, coiled around the collar, 176, and with its ends attached to the ratchet wheel, 171, and the said plate, 185, returns the dial, 156, to its normal position, and the spring, 187, coiled around the sleeve, 173, and fastened to the ratchet wheel, 175, and said plate, 185, returns the dial, 155, to its normal position. Said dials are prevented from returning too far backward through the retracting springs by the lugs, 188, on the ratchet wheels, 168, 171 and 175, coming in contact with the stops, 189, projecting upward from the plate, 185.

When the dollars dial, 155, is in its normal position, the right side of one of its projections, 162, is perpendicular and coincides with the center line of the window, 150, and said projection, 162, then fills the dollar column to the right of the center line of said window, and the corresponding overlapping projection, 178, fills the corresponding column in the window, 151, looking at said window, 151, from the back of the machine. On the front faces of the projections, 162, are numerals ranging from 0 to 9, inclusive, one numeral for each projection, and arranged in numerical order on said projections from left to right. The 0 is on the projection, 162, exhibited in the window when the dial is in its normal position. These numerals are at the proper distance from the center of the dial to show through the center of the window opposite the dollars sign, 153, and when in their proper column are vertical in said window. At the right and bottom of each of said numerals on said projections, 162, is a decimal point. On the back faces of the projections, 178, are like numerals and decimal points which show in the dollars column of the back window, 151, opposite the dollars sign, 154. The numeral on each projection, 162, and on its corresponding projection, 178, are the same, so that, when the dial, 155, is rotated to any desired point, a like number is shown in the dollar column of each window.

When the tens of cents dial, 156, is in its normal position, the radius thereof passing through the center of one of its projections, 158, is vertical, and said radius coincides with the center lines of both windows. To the right of the radii through the centers of the projections, 158, are numerals similar to those on the dial, 155. Said numerals range from 0 to 9 in numerical order from left to right on said projections. The 0 is on the projection in the window when the dial is in its normal position. On the back faces of said pro-

jections, 158, and on the opposite sides of the center lines thereof are like numerals to those on the front faces of said projections. The number on the back of each projection corresponds in value to the one on the front side thereof. The numbers on the front of said dial, 156, show in the window, 150, through the spaces, 163, of the dial, 155, and in the tens of cents column of said window, and are arranged to show vertical in said window and on the same horizontal line as the dollar sign, 153, and the numbers on said dial, 155. The numbers on the back of said dial, 156, show in the tens of cents column at the back window, 151, through the spaces, 161, of the dial, 157, and through the spaces between the projections, 178. These numbers also show vertical in said window, 151, and on the same horizontal line with the dollar sign, 154, and the numbers on the projections, 178.

When the dial, 157, is in its normal position, the right side of one of the projections, 160, is parallel to the center line of the windows, and the width of one space or column to the left of said center line, and the left side of another of said projections, 160, is parallel to said center line and the width of one column to the right thereof, so that its spaces, 161, coincide with the projections, 158, of the tens of cents dial, 156, and its projections, 160, coincide with the spaces, 159, of said dial, 156. On the front side of the projections, 160, of the dial, 157, and at the left edges thereof is a similar set of numerals to those on the other dial, and said numerals are arranged in the same numerical order from left to right and range from 0 to 9. The 0 on one of said projections appears in the units of cents column when said dial, 157, is in its normal position. On the back of said projections, 160, is another similar set of numerals, said numerals appearing in the units of cents column of the back window, 151. These back numbers are near the right edges of the projections, 160, looking from the front of the machine, or the left edges looking from the back thereof. The numerals on this dial are arranged to show vertical in the windows and on the same horizontal lines as the numbers on the other dials. The numbers on the front of this dial show through the spaces, 159, of the dial, 156, and through the spaces, 163, of the dial, 155. The back numbers show through the spaces between the projections, 178. The number on the front of each of the projections, 160, corresponds in value to the number on the back of the next adjacent projection, 160, to the left. This arrangement of the dials causes any amount that is indicated in the front window to be also indicated in proper dollar and cents columns in the back window.

I do not intend to limit this invention to the special number and denominations of dials used, as it is obvious that both the number of dials and the denominations thereof might be varied without substantially changing the construction shown; and it would be

an endless task to illustrate all the combinations of dials that might be made on this principle to indicate different amounts. In using a greater or less number of dials, the projections and spaces would vary according to the number used and the denominations thereof, and it would become necessary in some cases to have two or more dials overlap the others (as 155 in drawings) in order to indicate properly both to the front and back of the machine.

I will now describe the means for operating said dials and the means for releasing them.

Passing through the plates, 183 and 185, and guided thereby, are the three bars, 190, 191 and 192. Sunken in the left face of each of these bars is a series of ratchet teeth, as shown in Figs. 5 and 6. The bar, 190, is so disposed that its teeth are adapted to engage with the teeth of the ratchet wheel, 168, and said teeth of said bar are of the proper length so that they may enter into engagement with the said teeth of the ratchet wheel without binding. In a like manner the bar, 191, is so disposed that its ratchet teeth are adapted to engage with the teeth of the ratchet wheel, 171, of the tens of cents dial, and the bar, 192, is likewise disposed so that its ratchet teeth are adapted to engage with the teeth of the ratchet wheel, 175. The reason of not having the teeth of the bars, 190, 191 and 192, extend all the way across the faces of said bars is in order that said teeth may pass through the guide plates, 183 and 185, without interfering with the regular movements of said bars. The bar, 190, rests, when the units of cents dial is in its normal position, on the extended arm, 71, of the yoke, 68, actuated by the units of cents keys, and the ratchet wheel, 168, is of the proper diameter so that, when said yoke is actuated by one of said keys, and the ratchet bar, 190, is raised by the inner end of said arm, 71, said ratchet wheel is rotated from right to left, one tooth for each unit represented by the key operated; thereby rotating the units of cents dial one or more divisions according to the value of said operated key, and thus bringing a number in the units of cents column of each window indicative of the value of the key depressed and the amount registered by said key. The bar, 191, rests on the extended arm, 70, of the yoke, 67, when the tens of cents dial, 156, is in its normal position, and the ratchet wheel, 171, is of the proper diameter to be rotated when a tens of cents key is operated, one tooth for each ten cents represented by said key; and the dial, 156, is thereby rotated through the desired number of spaces to indicate in the tens of cents columns of the windows the amount registered by said tens of cents key operated. The inner end of the arm, 70, is bent around the end of the arm, 71 (shown in Figs. 1, 2, and 16) so as to come under the said bar, 191, without interfering with the said arm, 71. In a like manner the arm, 69, of the yoke, 66, of the dollars keys is bent around the ends of the arms, 70 and 71, to

come under the bar, 192, and said bar, 192, rests on the end of said arm, 69, when the dollars dial is in its normal position. The ratchet wheel, 175, is of the proper diameter so that, when a dollars key is operated, said ratchet wheel and the dollars dial are turned one or more spaces, according to the key operated, to indicate in the dollars columns of the windows the amount registered by said operated key. When the dials are thus rotated to indicate a registration, they are held in their indicating positions by the check pawls, 179, 180 and 181, and the bars, 190, 191 and 192, being in confined engagement with the teeth of the ratchet wheels, 168, 171 and 175, said bars are held up until said dials are returned to their normal position. The momentum of the dials, when said dials are rotated, cannot carry them farther than desired, as the backs of the teeth of their ratchet wheels would press outward against the teeth of the ratchet bars, 190, 191 and 192, and would bind sufficiently to overcome said momentum, as the cams of the teeth of said bars are long and too vertical for the momentum of the dials to cause the teeth of the ratchet wheels to lift said bars.

The check pawls, 179, 180 and 181, are all pivoted on a common pin, 194, projecting inward from the back of the case at the left side of the dials. These check pawls are provided with downward extending arms, 195, 196 and 197, at the bottom of which are pivoted the dogs, 198, 199 and 200. These dogs have their points downward, and said dogs are prevented from swinging to the right by the stops, as 201. Extending rearward from the drawer releasing plate, 32, and rigidly connected thereto, is an arm, 202. This arm extends to the left past the lower points of the dogs, 198, 199 and 200, and close adjacent thereto. The upper surface of this arm, 202, opposite said dogs is beveled to a pointed edge. Now, when a key is operated, the plate, 32, is moved to the right, as hereinbefore explained, to release the drawer, and when so moved the arm, 202, thereof comes in contact with the lower points of the said dogs, 198, 199 and 200. Now said dogs cannot swing to the right, on account of contact with the stops, 201, and said dogs, being pivoted to the arms, 195, 196 and 197, of the check pawls, said arms are moved to the right until said arm, 202, has passed over the points of said dogs. When said arms of the check pawls are thus moved, said check pawls are lifted out of engagement with the teeth of the ratchet wheels of the dials, and said dials, being thus released, those indicating a previous registration return, together with their actuating bars, 190, 191 and 192, to their normal positions by the action of the springs, 184, 186 and 187. When the arm, 202, has passed the points of the dogs, 198, 199 and 200, the check pawls again engage with the teeth of the ratchet wheels of the dials, and in time to hold the dial just rotated in its proper position to in-

dicating the value of the last operated key. When a dial of a corresponding denomination to a key in operation is in an indicating position, said dial will not return to its normal position when released, as its actuating bar in its downward movement will meet the arm of the yoke actuated by the said key in operation, and said dial will be again rotated to an indicating position. When said key operated is released and the plate, 32, returns to its normal position, the dogs, 198, 199 and 200, are swung to the left by the arm, 202, without disturbing the check pawls, and when said arm, 202, has passed said dogs to the left, said dogs drop to their normal positions against the stops, 201.

It will now be seen why in making a registration in which two or more keys are used the first key is held down until the next is operated, for if the first key operated were returned to its normal position before the second key for the same registration were depressed, the dial indicating the amount registered by the first key would be released by the operation of the second key, and the first dial would be returned to its normal position and leave the 0 thereof in the indicating window; but if the first key were held down until the next were operated, the second key would not release the dial first rotated, as the releasing arm, 202, would be held to the right of the dogs, 198, 199 and 200, by the first operated key, and both the dials would remain in their indicating position.

While I have thus illustrated and specifically described the preferred embodiment of my invention as a whole, so as to enable those skilled in the art to fully understand the principles thereof, it will be understood that I do not limit myself to the details of construction and arrangement and mode of operation of the parts set forth herein, as these may be varied by those skilled in the art, to adapt the various parts or features of my invention to different purposes, without departing from the general principles of the invention.

I claim as my invention—

1. In a cash register, the combination of a series of keys, a sliding plate, a drawer, a latching pivoted dog attached to said plate and adapted to lock said drawer, means whereby, when a key is operated, said plate is so moved as to unlock said drawer, and a tooth or lug on said dog adapted to engage with a permanent stop whenever said drawer is open and said plate is in its normal position, whereby said plate, and therewith said keys, are locked until said drawer is closed after each registration.

2. In a cash-register, the combination of a series of keys, a sliding plate, a drawer, a latch connected with said plate to lock said drawer, means whereby, when a key is operated, said plate is moved to unlock said drawer, and means whereby, when said drawer is opened and said plate is in its normal position, said plate and therewith said keys are locked until

said drawer is closed, substantially as described.

3. In a cash-register, the combination of a series of keys, a sliding plate, a drawer, a latch attached to said plate to lock said drawer, means whereby, when a key is operated, said plate is moved to unlock said drawer, and means whereby, when said drawer is opened, said plate and said keys are locked until said drawer is closed, substantially as described.

4. In a cash register, the combination of two registering wheels of higher and lower denominations, a ratchet wheel attached to the registering wheel of higher denomination, a lever pivoted to a permanent support, a dog pivoted to said lever and adapted to engage with the teeth of said ratchet wheel, a lug on the wheel of lower denomination adapted to actuate said dog to rotate said ratchet wheel and wheel of higher denomination, a stop, a cam or shoulder on said dog adapted to engage with said stop, whereby, when said dog is actuated and said ratchet wheel is rotated, said dog is prevented from being thrown out of engagement with the teeth of said ratchet wheel, and means for automatically returning said dog to its normal position.

5. The combination of a wheel, a second wheel, means for actuating said second wheel by the first wheel, and a stop device whereby the momentum of said second wheel is prevented from disengaging said wheel from its actuating mechanism and is prevented from carrying said actuating mechanism farther than desired, while allowing said second wheel to turn independently of the first wheel.

6. The combination of a wheel, a second wheel, means for actuating said second wheel by the first wheel, means whereby the momentum of said second wheel is prevented from disengaging said wheel from its actuating mechanism and is prevented from carrying said actuating mechanism farther than desired, and means for automatically returning said actuating mechanism to its normal position.

7. The combination of a wheel, a second wheel provided with notches or teeth, a dog or catch adapted to engage with said notches or teeth, means connected with the first wheel to actuate said dog or catch to rotate said second wheel, a stop by which said dog or catch is prevented from being thrown out of engagement with said notches or teeth, and means for automatically returning said dog or catch to its normal position.

8. The combination of two wheels, a ratchet wheel attached to one of said wheels, a lever pivoted to a permanent support, a dog pivoted to said lever and adapted to engage with the teeth of said ratchet wheel, means connected with the other wheel to actuate said dog to rotate said ratchet wheel and wheel connected therewith, a stop with which said dog is adapted to engage, whereby, when said dog is actuated and said ratchet wheel is rotated, said dog is prevented from being

thrown out of engagement with the teeth of said ratchet wheel, and means for automatically returning said dog to its normal position.

9. The combination of a wheel, a pawl to rotate said wheel, means for actuating said pawl different distances, and means whereby, when said wheel is actuated, the momentum is prevented from disengaging said pawl or carrying said pawl farther than desired, while allowing said pawl and its actuating mechanism to return to their normal positions simultaneously and independently of said wheel.

10. The combination of a wheel, a pawl to rotate said wheel, a lever for actuating said pawl different distances, and means whereby, when said wheel is actuated, the momentum is prevented from disengaging said pawl or carrying said pawl farther than desired, while allowing said pawl and its actuating lever to return to their normal positions simultaneously and independently of said wheel.

11. The combination of a ratchet wheel, a radial arm, a pawl rigidly connected with said arm, said arm being pivoted by a slot whereby said pawl is allowed to pass over the teeth of said wheel to return to its normal position, and a spring at the pivot to cause said pawl to engage with the teeth of said wheel.

12. The combination of a ratchet wheel, a radial arm, a pawl rigidly connected to said arm means to engage said pawl with the teeth of said ratchet wheel, said arm being pivoted by means of a slot whereby said pawl is allowed to pass over the teeth of said wheel on the return of said arm to its normal position, and means for actuating said arm different distances.

13. The combination of a wheel, an actuating mechanism therefor, a point or dog disposed in connection with said actuating mechanism and a series of stops with which said point or dog engages to prevent said wheel from disengaging its actuating mechanism or carrying said actuating mechanism farther than desired.

14. The combination of a ratchet wheel, a pawl adapted to engage with the teeth of said ratchet wheel to rotate said wheel, a dog in connection with said pawl, a racked segment, the teeth of which are of less depth than the teeth of said ratchet wheel, said segment being disposed so that said dog may engage with the teeth of said segment to prevent said wheel from throwing said pawl out of engagement with the teeth of said wheel and to prevent said wheel from carrying said pawl farther than desired, and means for releasing said dog from said segment to allow said pawl to return to its normal position.

15. The combination of a wheel, an actuating pawl therefor, a dog in connection with said pawl, and a racked segment disposed so that said dog may engage with the teeth thereof to prevent said wheel from disengaging its actuating pawl and to prevent said

actuating pawl from being carried farther than desired.

16. The combination of two wheels, actuating mechanisms therefor, stops to check the momenta of the wheels, and means whereby the stop for one wheel is released on the operation of the other wheel.

17. The combination of a ratchet wheel, a racked segment, an actuating mechanism for said wheel and a point or dog disposed to engage with the teeth of the segment to stop the momentum of the wheel.

18. In a registering and indicating machine, the combination of three dials disposed one in front of another, and numerals on said dials, the front dials being so slotted that the numerals on the dials show in a line at right angles to the radii of the dials.

19. In a registering and indicating machine the combination of two dials, numerals on the fronts and backs on said dials, an opening in said dials, said dials being so disposed that the numerals on each dial show through an opening of the other dial, the numerals showing in lines at right angles to the radii of the dials at the front and back of the machine.

20. In a registering and indicating machine, the combination of two dials disposed one in front of the other, a slot in the front dial through which may be seen the other dial, said front dial overlapping the other dial and having a slot in its overlapping part through which may be seen said other dial, numerals on the fronts of said dials, and numerals on the back of the overlapping part of the front dial and on the back of the other dial, and means for rotating said dials to indicate a registration both to the front and back of the machine.

21. In a registering and indicating machine, the combination of two dials disposed one in front of the other, slots in the front dial through which may be seen the other dial, said front dial overlapping the other dial and having slots in its overlapping part through which may be seen said other dial, numerals on the fronts of said dials and numerals on the back of the overlapping part of the front dial and on the back of the other dial, means for rotating said dials to indicate the registrations both to the front and back of the machine, means for holding said dials as rotated, and connecting mechanisms whereby, when a key is operated, said dials are released to return to their normal positions and whereby the dial of corresponding denomination to the key operated is then rotated and held to indicate the value of said operated key.

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

WILLIAM K. NICHOLS.

Witnesses:

H. M. WILSON,
FRANK SUTTON.