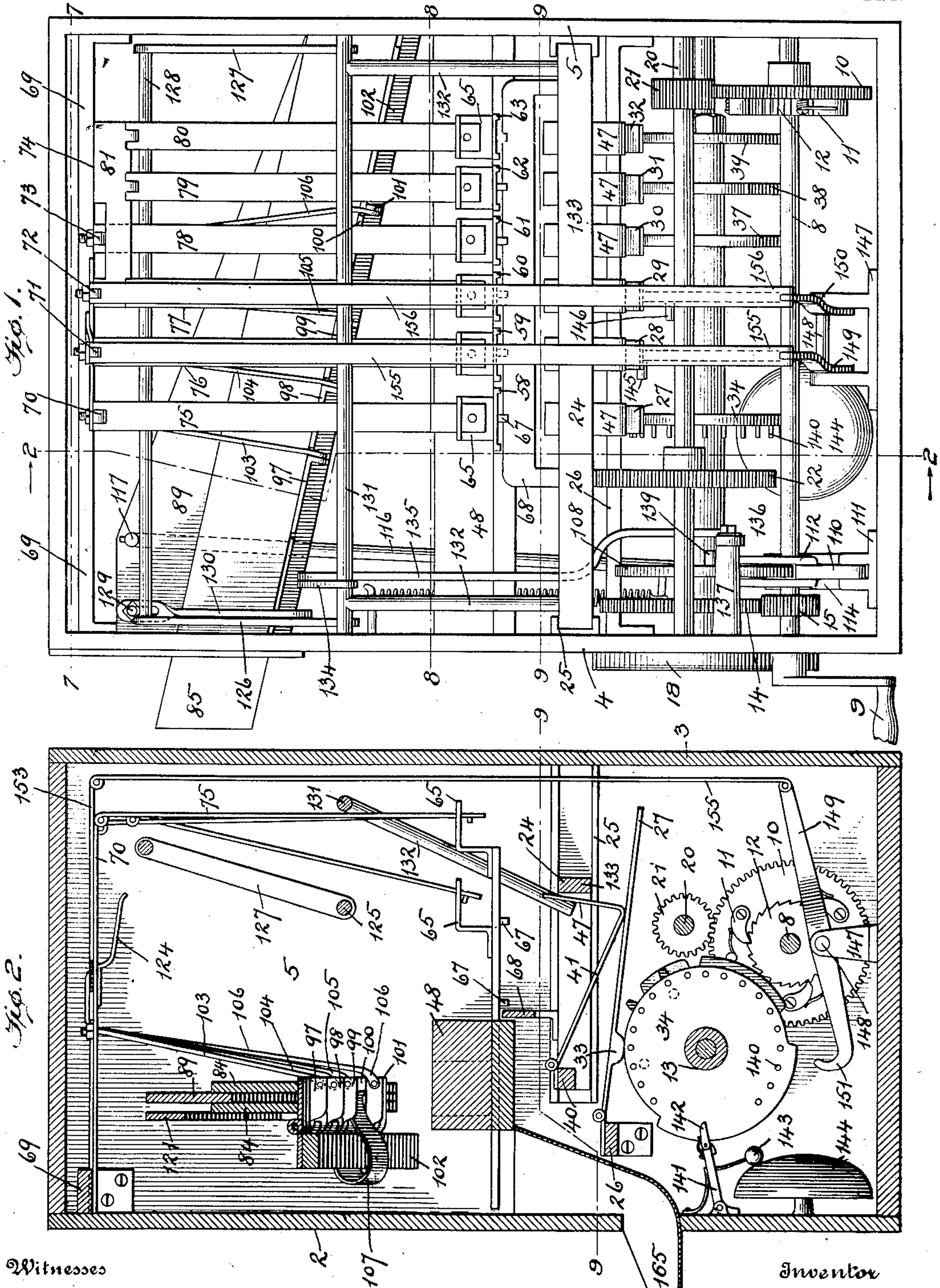


J. J. DUBBELDE.
CHANGE DELIVERING MACHINE.
APPLICATION FILED MAY 5, 1908.

978,713.

Patented Dec. 13, 1910.

6 SHEETS—SHEET 1.

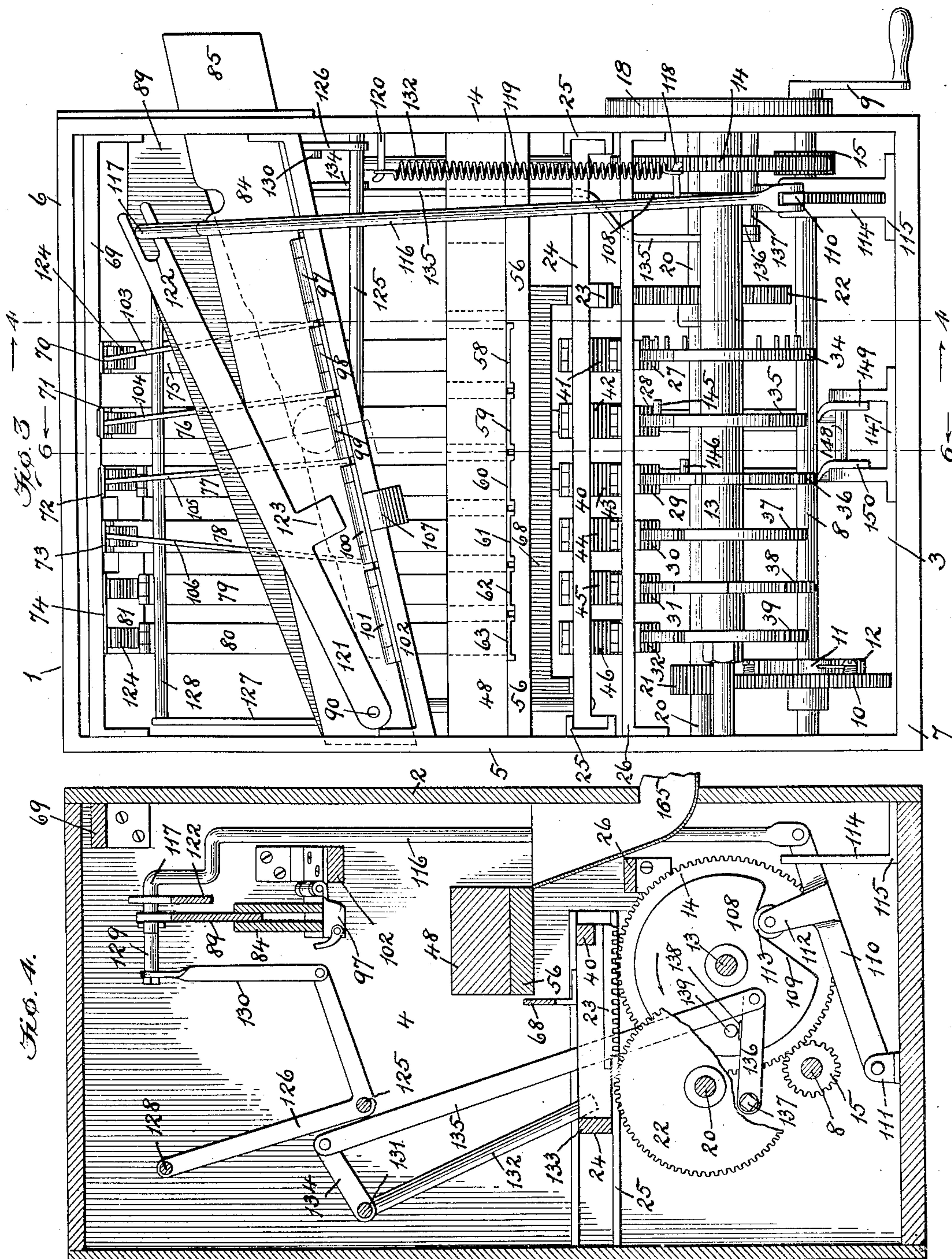


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6 SHEETS—SHEET 4.

Fig. 7.

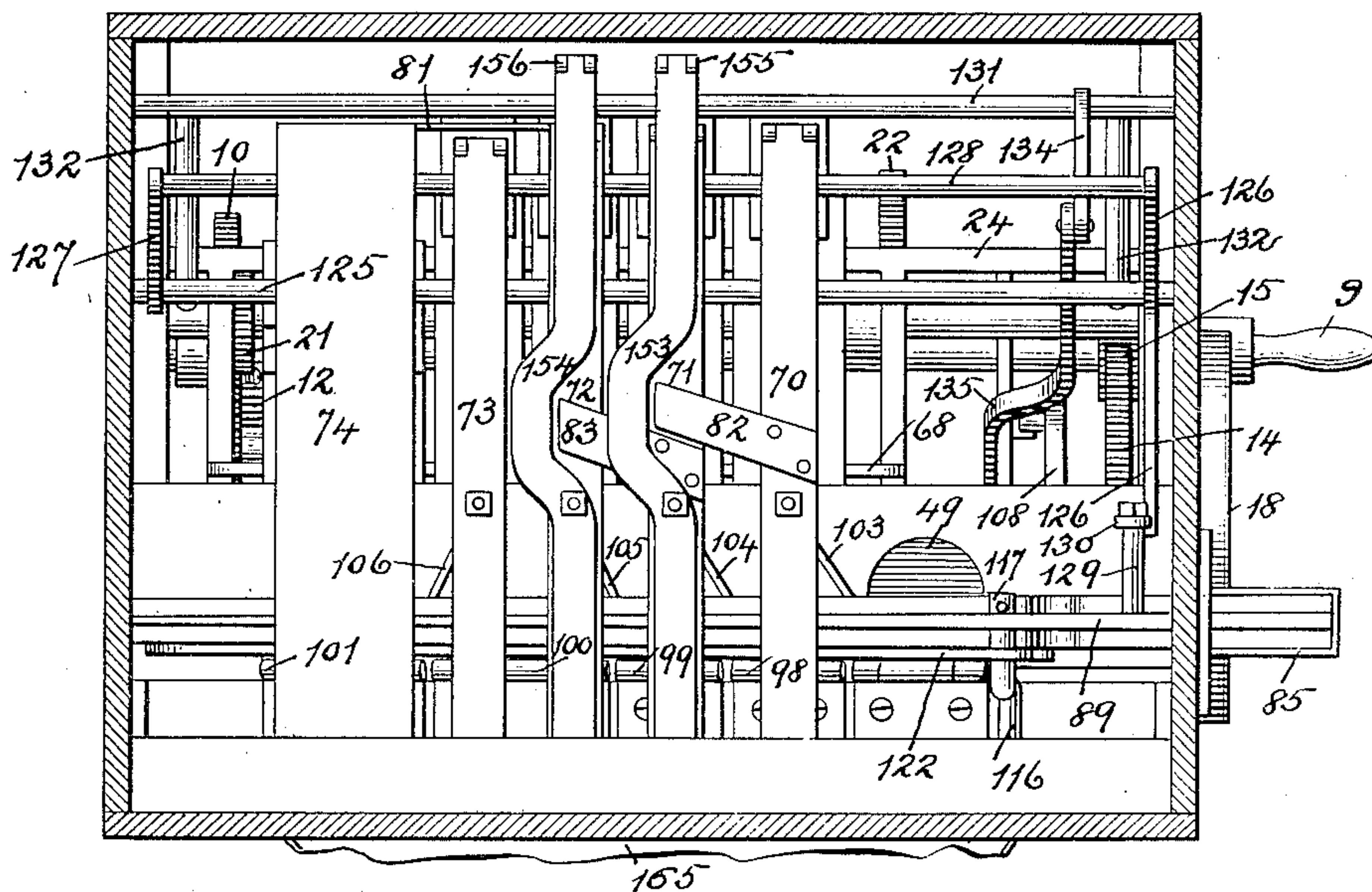
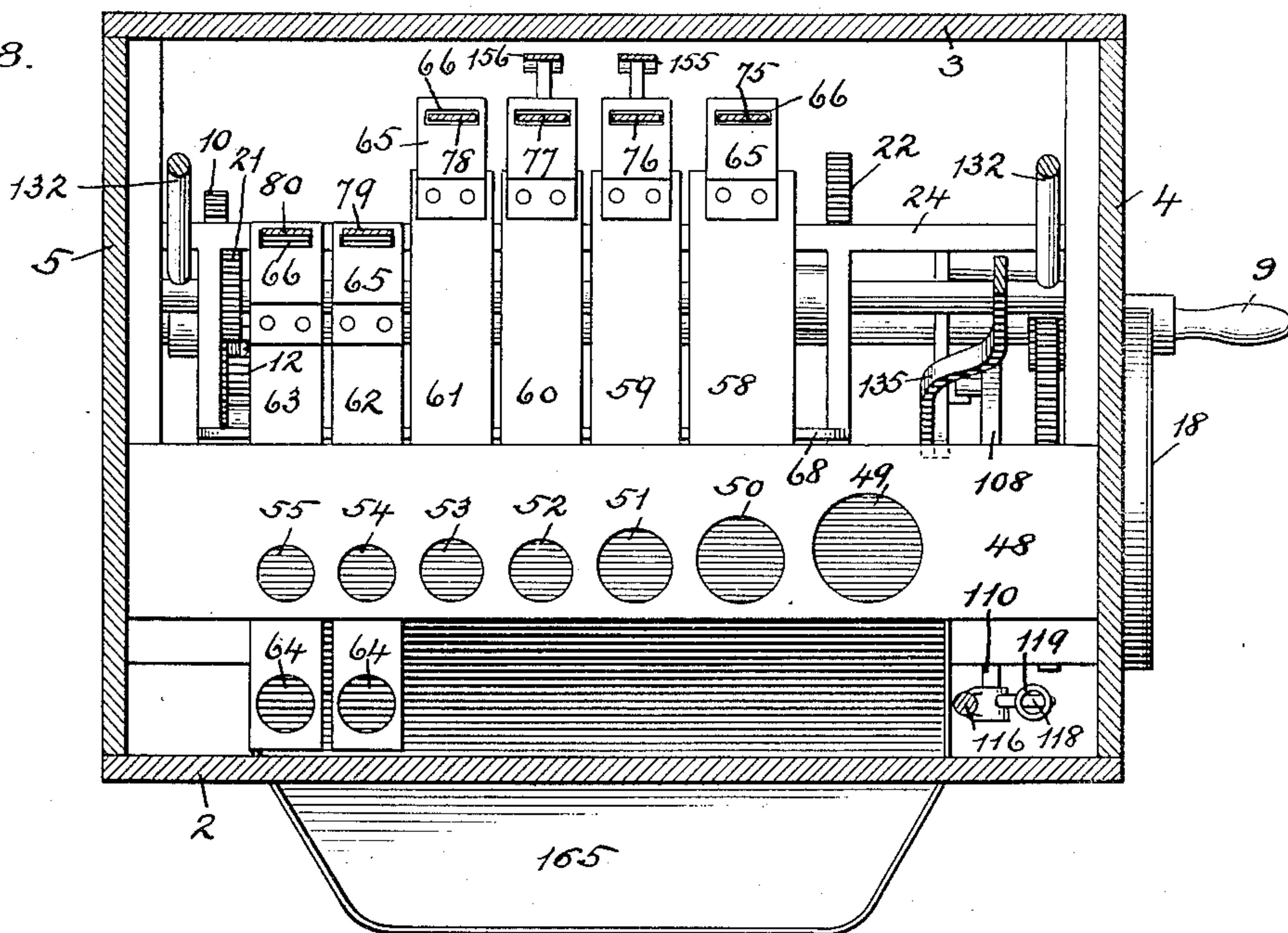


Fig. 8.



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6 SHEETS—SHEET 5.

Fig. 9.

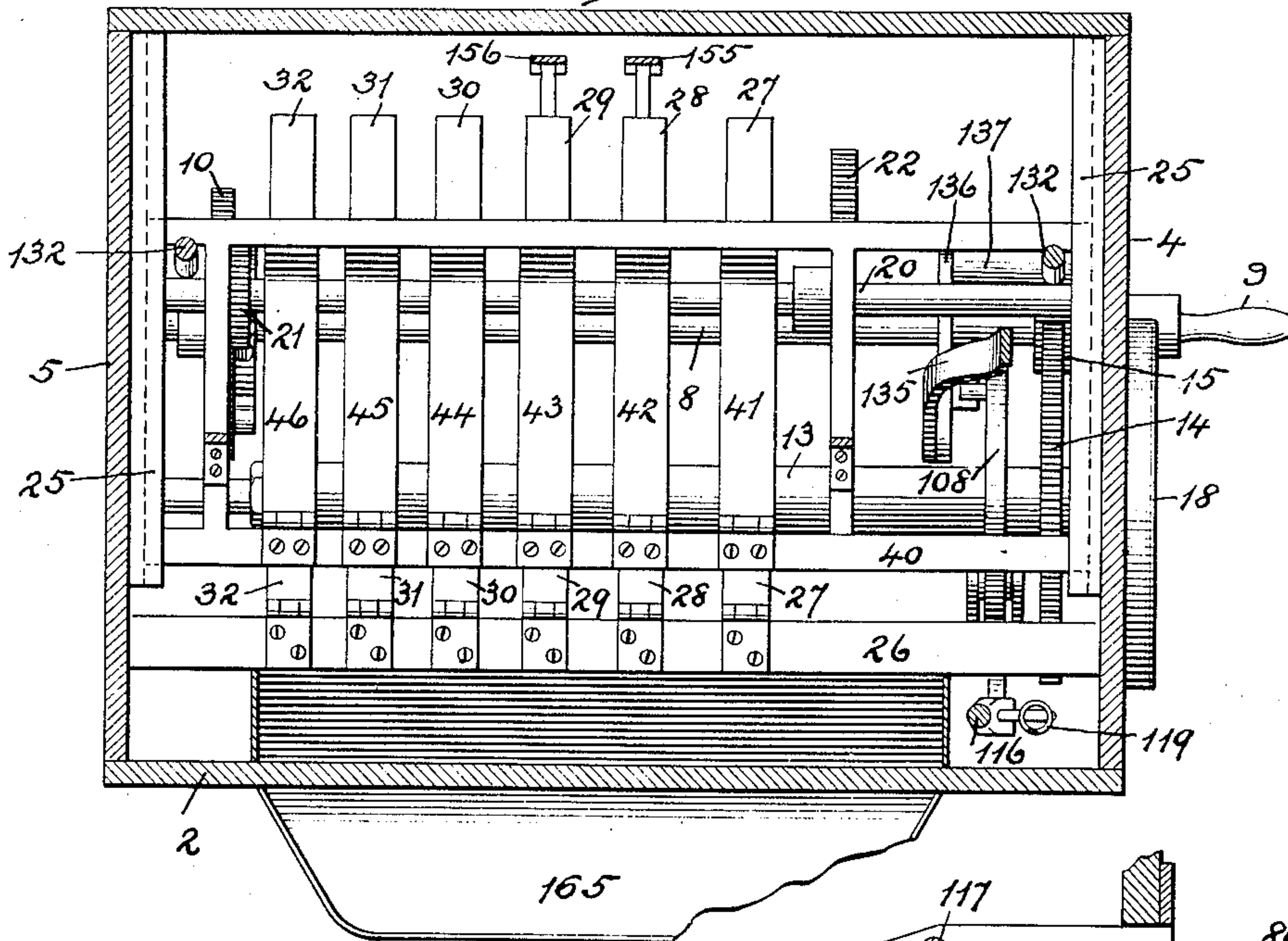


Fig. 10.

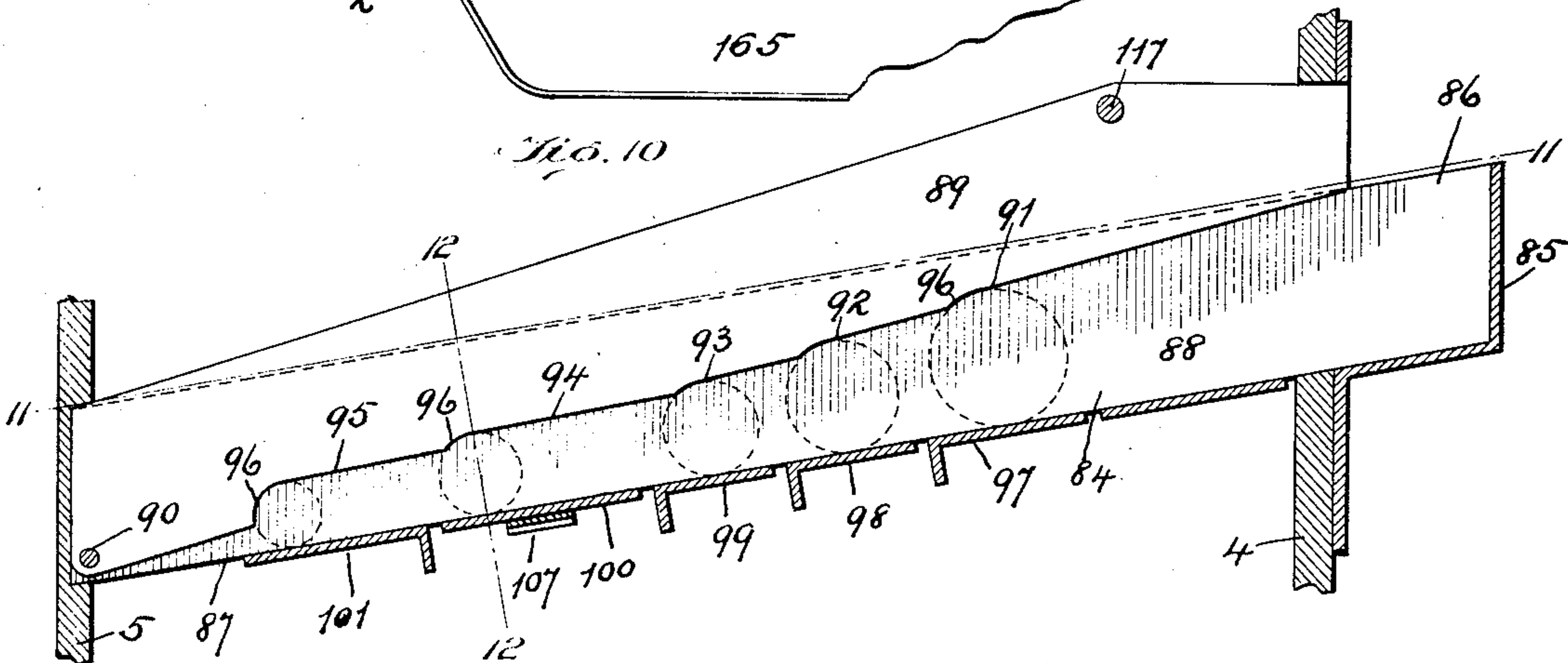


Fig. 11.

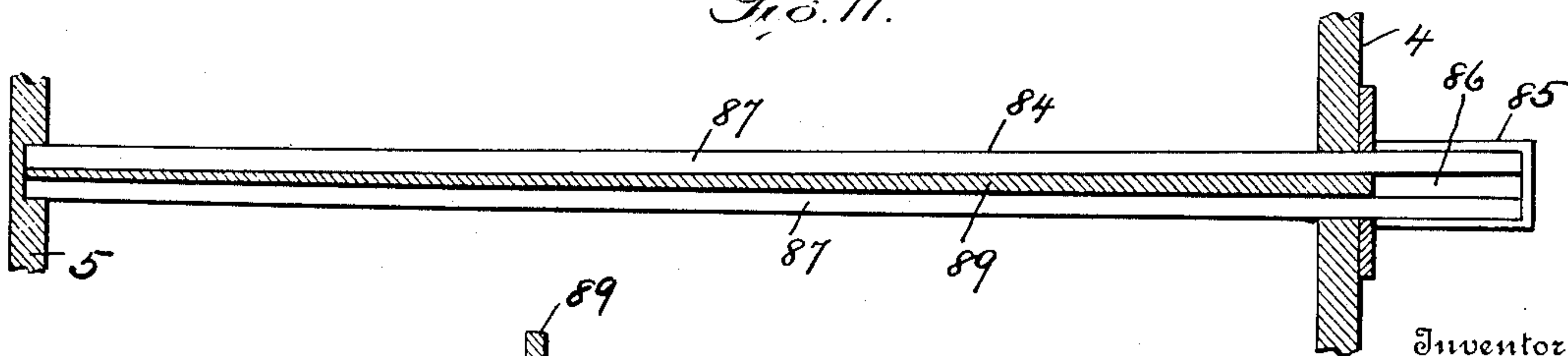
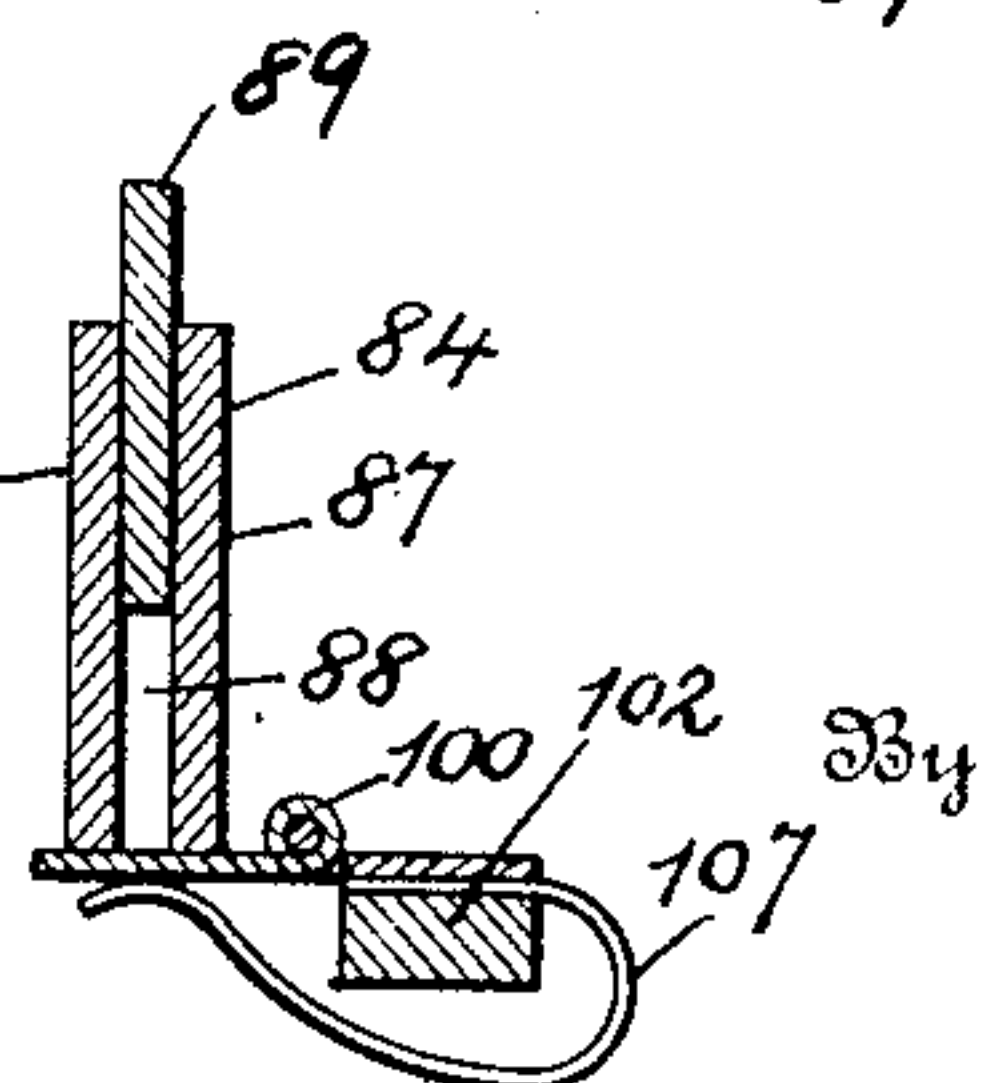


Fig. 12.



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6 SHEETS—SHEET 6.

Fig. 13.

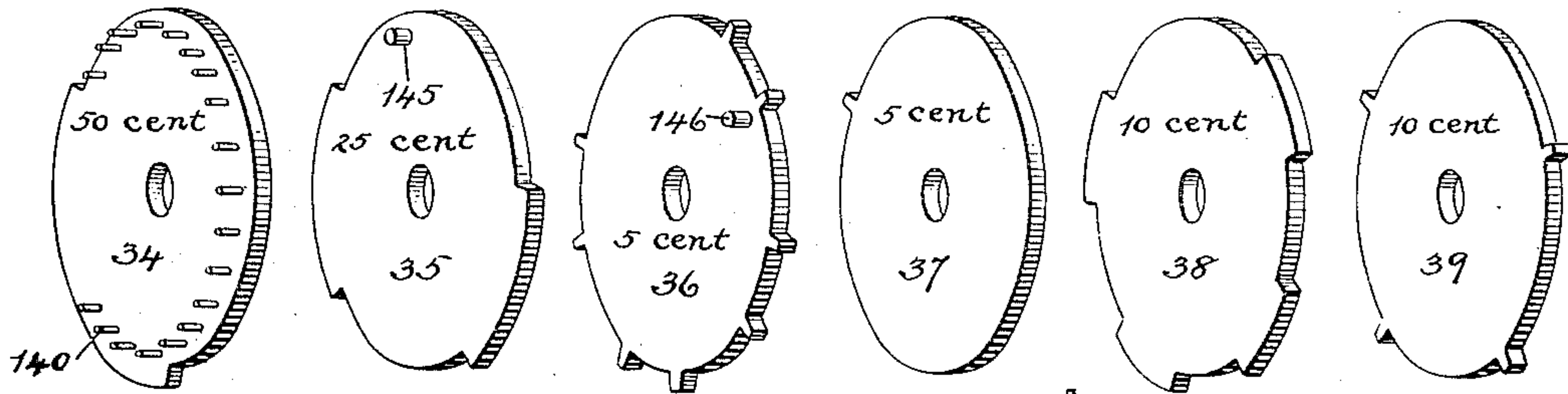


Fig. 14.

Fig. 17.

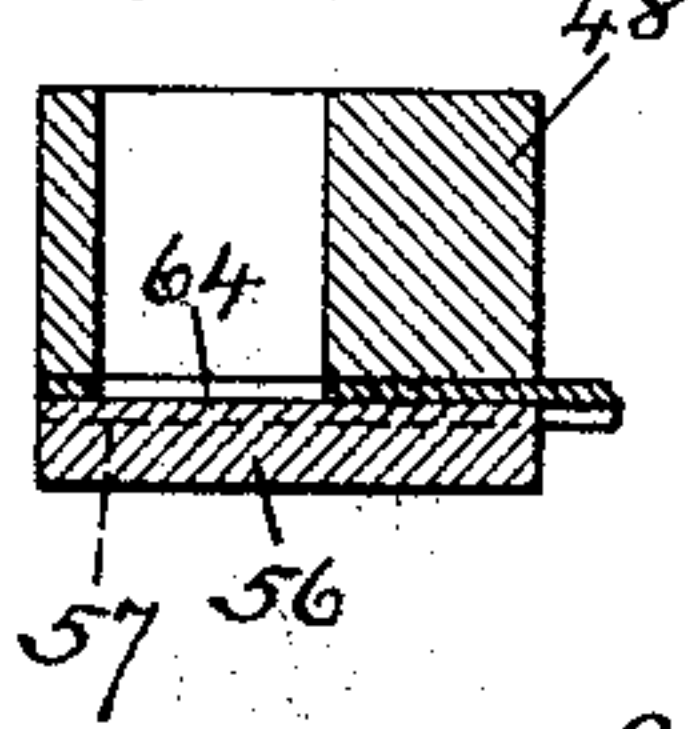


Fig. 18.

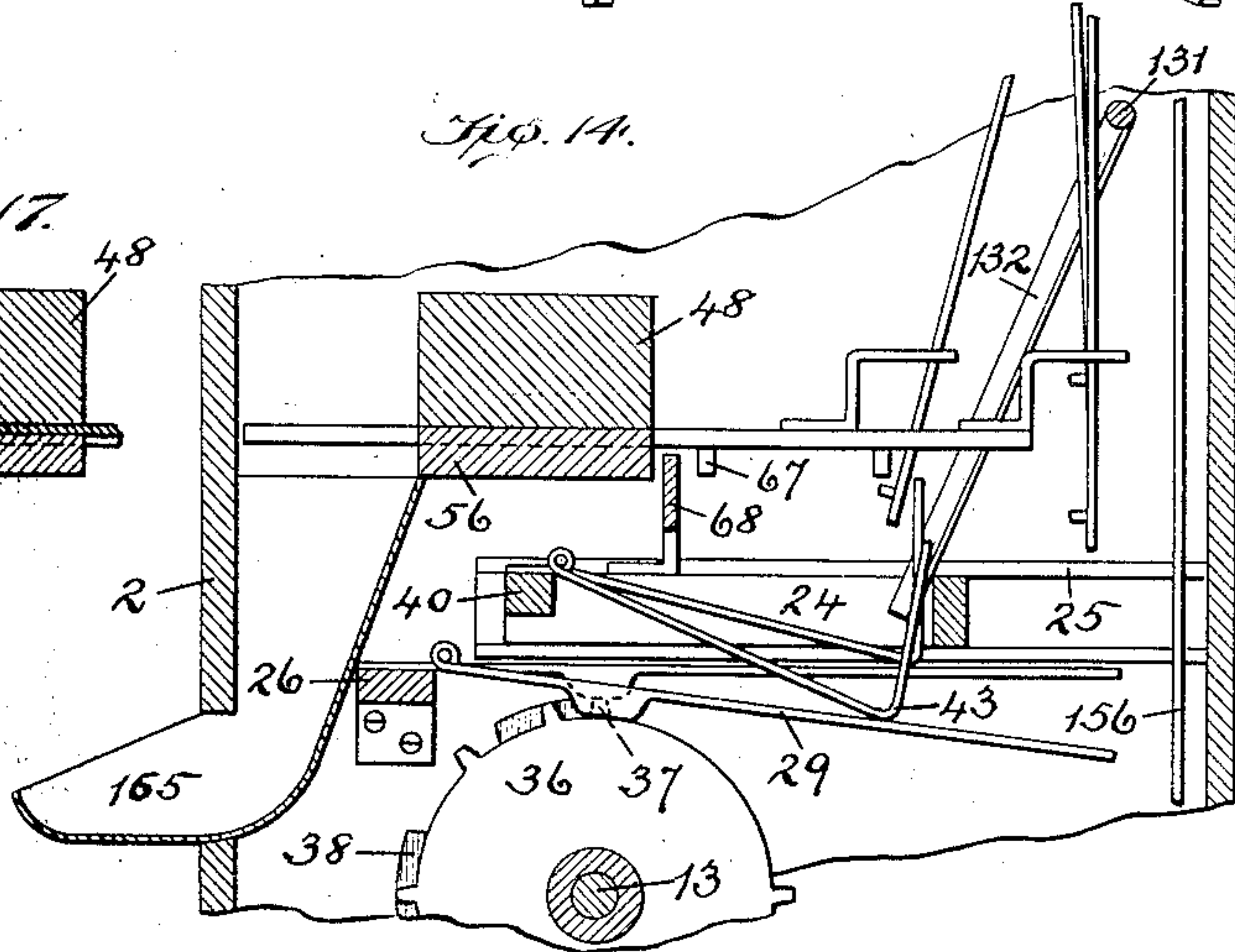
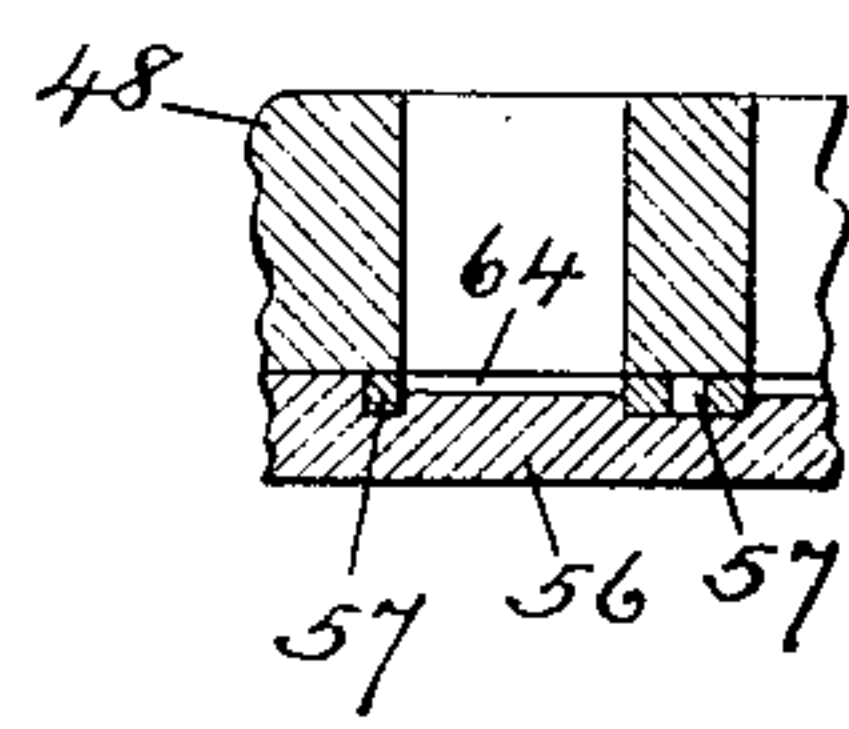
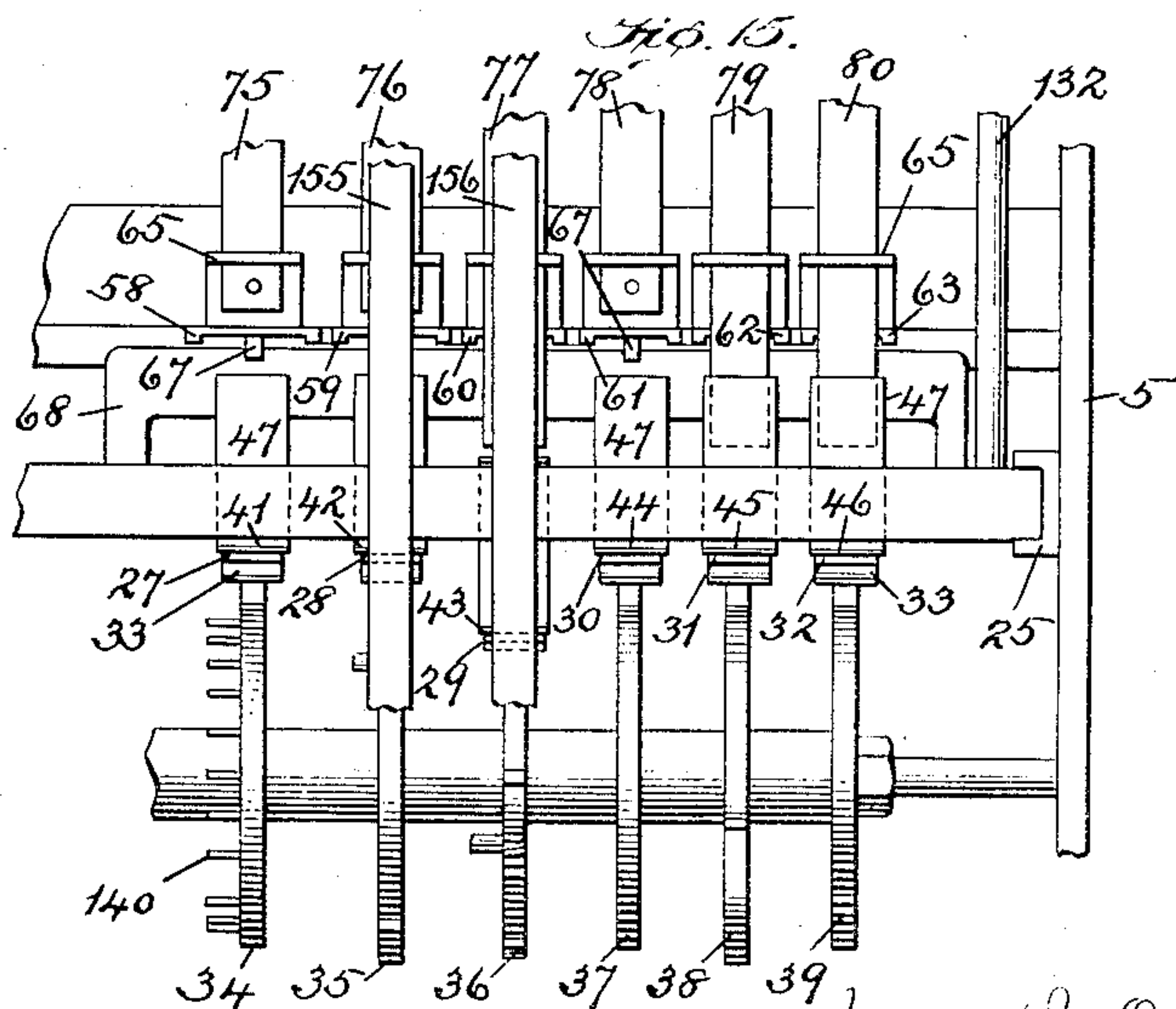
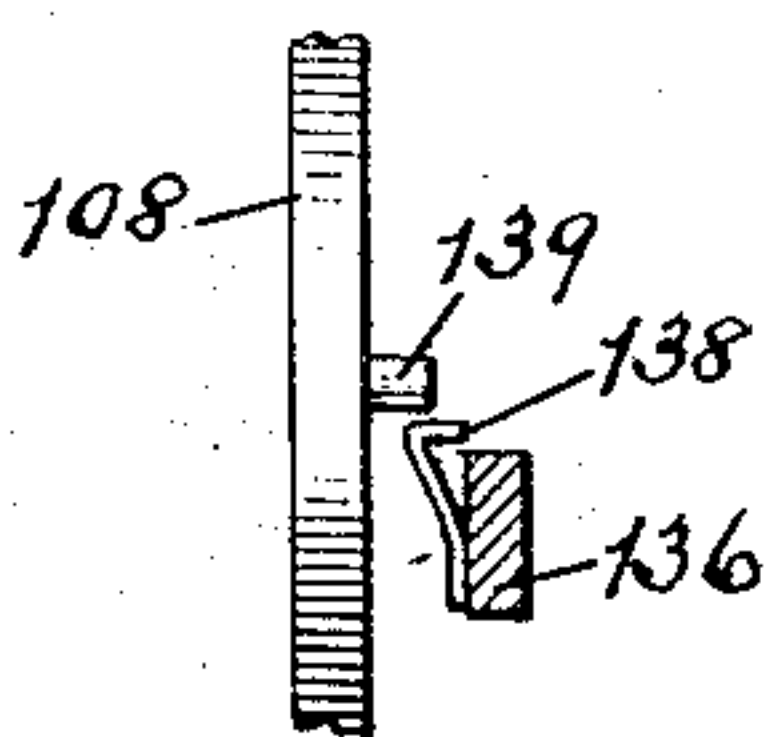


Fig. 16.



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UNITED STATES PATENT OFFICE.

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CHANGE-DELIVERING MACHINE.

978,713.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JURGEN J. DUBBELDE, a citizen of the United States, residing at West Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Change-Delivering Machines, of which the following is a specification.

This invention relates to improvements in machines for deducting various amounts from the amount of a coin deposited therein and delivering the correct change.

While the inventive idea here employed may be utilized in machines for various purposes the machine herein shown and described is especially adapted for use in connection with railway fare registers.

One object of the invention is to provide a machine into which a coin or circular disk having the size of the various coins now in use may be deposited,—the number of fares to be deducted therefrom then manually indicated, without regard to the denomination of the coin deposited, and which will then automatically deliver the proper change.

Another object is to provide a machine which will deliver the proper change without any mental calculation whatever on the part of the operator who merely operates the machine to indicate the number of fares to be deducted.

A further object of the invention is to provide a machine that will automatically deliver the correct change in the least possible number of coins after the number of fares to be deducted has been indicated.

A still further object of the invention is to provide an improved construction of mechanism that will recharge the various coin pockets or receptacles as the coins are delivered into the machine.

Another object is to provide an improved construction that will prevent the delivery of change after fare values equal to the amount of the coin deposited has been indicated.

With these and other objects in view, the invention is illustrated in the accompanying drawings in which,—

Figure 1 shows a rear elevation of the mechanism, the rear wall of the case being removed. Fig. 2 illustrates a vertical longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 shows a front elevation of the mechanism within the case. Fig. 4 illustrates a vertical longitudinal section through the same,—the section being taken on the line 4—4 of Fig. 3. Fig. 5 shows an exterior side elevation of the complete case. Fig. 6 illustrates another vertical longitudinal section, which latter is taken on the line 6—6 of Fig. 3,—the parts however being shown in the operated position. Fig. 7 shows a horizontal or plan view of the mechanism as the same would appear when viewed on the line 7—7 of Fig. 1. Fig. 8 illustrates a sectional plan view through the mechanism and case,—this section being taken on the line 8—8 of Fig. 1. Fig. 9 shows a similar view,—the section however in this case being taken on the line 9—9 of Figs. 1 and 2. Fig. 10 illustrates a sectional elevation through the coin chute and a side elevation of the coin bar. Fig. 11 shows a sectional plan view of the same,—the section being taken on the line 11—11 of Fig. 10. Fig. 12 shows a vertical cross-section through the coin bar and chute,—the section being taken on the line 12—12 of Fig. 10. Fig. 13 illustrates perspective views respectively of the cams employed to operate the coin discharge slides. Fig. 14 illustrates a vertical sectional view through the center of the case and shows one of the pivoted levers that operates a coin slide in position to be moved by the carriage. Fig. 15 shows a rear elevation of the cams and levers operated thereby. Fig. 16 illustrates a detail of the cam for returning the carriage. Figs. 17 and 18 show two views of the coin receptacles and the slides for discharging coins therefrom.

Referring to the drawings by numerals, 1, designates a case which may be of any suitable or preferred design and having a front wall, 2; a rear wall, 3; side walls, 4, and, 5, respectively; a top, 6, and a bottom, 7. A crank shaft, 8, extends horizontally across the case between the side walls, 4, and, 5, and the outer end of said shaft is provided with a hand crank, 9, while the opposite end of said shaft loosely carries a gear, 10, having one or more pawls, 11, at one side thereof. A ratchet wheel, 12, is mounted rigidly on the crank shaft at the side of the gear, 10, so that the pawls on said gear may engage said ratchet when the shaft is

revolved in one direction by the crank but ride freely over the ratchet and permit said gear to remain idle when the shaft is turned in a reverse direction, as and for a purpose hereinafter to be described.

Above the crank-shaft and also extending horizontally between the side walls, 4, and, 5, there is provided a cam-shaft, 13, which has bearings in the side walls and one end of which carries a gear, 14, which meshes with and is driven by a pinion, 15, on the crank shaft. One end of this cam-shaft projects through the side wall, 4, of the case and carries a disk, 16, having a plurality of radially-arranged lines or graduations, 17, spaced apart at regular intervals, as clearly shown in Fig. 5. This disk is preferably inclosed in a circular case, 18, having a covering of some suitable transparent material so that the radial lines on the disk may be seen, and the transparent covering is provided with a single line, 19, at a fixed point with respect to the disk so that when the cam-shaft, 13, and disk, 16, are turned the radial lines on the latter will register successively with the stationary line, 19, on the cover and form an indicator as will presently be fully explained. A third horizontal shaft, 20, is also mounted between the side walls, 4, and, 5, and one end of this shaft carries a pinion, 21, which meshes with and is driven in one direction by the loose gear, 10, on the crank shaft, 8. A large gear, 22, is also mounted on this third shaft, 20, and said latter gear meshes with a rack, 23, on the bottom of a horizontally-movable frame or carriage, 24. This carriage is mounted at its opposite ends in horizontal guides, 25, that are secured at the inner sides of the walls, 4, and, 5.

In a horizontal plane beneath the cam-shaft, 13, and the guides, 25, there is a stationary cross-bar, 26, which is supported at opposite ends by the side walls, 4, and, 5. This cross-bar has position in a vertical plane between the cam-shaft, 13, and the front wall, 2, of the case and it sustains a plurality of pivoted levers, 27, 28, 29, 30, 31, and 32, all of which project rearwardly toward the rear wall, 3, of the case and have their ends free. These levers are provided with lugs, 33, on their bottom surfaces and are to be operated,—that is, have their free ends raised and lowered, by means of cams on the cam-shaft, 13.

By reference to Figs. 1, 3 and 15 it will be seen that the cam-shaft carries spaced-apart cams, 34, 35, 36, 37, 38, and 39, which revolve in vertical planes beneath the respective pivoted levers,—each cam serving as a support for the free end of a lever. As all the cams are rigid on the shaft they turn therewith, each time the crank shaft is operated, and during their revolution they raise

and lower the free ends of the said levers. The operation of the pivoted levers by these cams will not effect a result except when other devices that are set into operation by the coin are brought into operative relation therewith.

The frame or carriage, 24, is provided with a horizontal cross-bar, 40, at its front side which extends parallel with and in a plane above the stationary bar, 26, as clearly shown in Figs. 2 and 9 of the drawings. This horizontal bar, 40, carries a plurality of pivoted levers, 41, 42, 43, 44, 45, and, 46, which extend rearwardly from the bar, 40, and have their free ends, 47, bent upwardly. These levers are spaced apart so that each will have position directly over one of the pivoted levers that project rearwardly from the bar, 26. It will thus be understood that over the working face or periphery of each cam there is provided a pivoted lever to contact therewith, while over each of said levers there is another pivoted lever that rests upon the lever beneath it, but which is movable longitudinally by and with the frame or carriage, 24, as clearly readable in Fig. 2. When the frame or carriage is moved horizontally the upper set of pivoted levers will slide over the lower set of levers and obviously when any of the lower levers are raised by the projecting portions of the cams the upper levers on top of said raised lower levers will have their upwardly-projecting free ends, 47, elevated through and above the top surface of the carriage, as shown in Fig. 6.

Above the carriage and extending cross-wise of the case between the walls, 4, and, 5, I provide a coin holder, 48. This coin holder is provided with a plurality of circular receptacles or pockets, 49, 50, 51, 52, 53, 54, and, 55, for the storage of silver coin ranging from a silver dollar down to a five cent piece. The pockets, 49, being of a size to receive a silver dollar; pocket 50, to receive a half dollar; pocket, 51, for quarter dollars; pockets 52 and 53 for nickels and pockets, 54, and, 55, for the storage of dimes.

The machine is designed to at all times deliver change in the smallest number of coins possible,—for example if a quarter is deposited in the machine and one fare or the purchase of goods made to the extent of five cents, the machine will deliver two dimes in change rather than two nickels and one dime, as will hereinafter be more fully described.

A plate, 56, fits close against the bottom of the coin holder, 48, and said plate is provided with channels, 57, which extend cross-wise of the holder and at opposite sides of the pockets, see Figs. 14, 17 and 18. Slides, 58, 59, 60, 61, 62, and, 63, extend horizontally through the holder and at the bottom of the pockets and the coin-transfer end of

each slide is provided with a circular opening, 64, which corresponds in size to the opening or pocket beneath which it operates. The rear end of each slide is provided with a bracket, 65, which extends upwardly and laterally as clearly seen in Figs. 1, 2 and 8, and the lateral end of each bracket is provided with a slot, 66, which opens vertically therethrough. A lug, 67, is provided at the bottom side of each slide which depends therefrom and which projects into the path of a bar, 68, that is carried by and moves horizontally with the frame or carriage, 24.

At the upper end and adjacent the front wall, the case is provided with a cross bar, 69, which is sustained at its ends by the side walls, 4, and, 5. The office of this bar is to sustain a plurality of horizontally-extending plates or bars, 70, 71, 72, 73, and, 74, all of which may be clearly seen in Fig. 7. In the present instance these bars are of a flat plate form so they may yield or spring in a vertical plane,—their outer ends preferably being rigidly connected to the under side of the horizontal bar, 69, while their opposite ends are free and unsupported, as seen in Fig. 2. The free or unsupported ends of these yielding bars are connected with the upper ends of depending swinging arms, 75, 76, 77, 78, 79, and, 80, see particularly Fig. 1. By reference to Figs. 1 and 7 it will be seen that the yielding bars, 72, and, 74, are rigidly connected by means of a plate, 81. This plate and the side bars may be formed integrally as shown in the drawing or they may be separately formed and afterward connected during assembling. It will also be seen by reference to said figures that the bar, 74, is wider than the other bars and that the depending swinging arms, 77, 79, and, 80, are all carried by the rigidly-connected plates or bars, 72, and, 74, so that when either of said plates or bars are depressed as will presently be explained all three of the depending arms, 77, 79, and, 80, will be depressed vertically.

The lower ends of the swinging arms, 75, to 80, inclusive pass through the slots, 66, in the brackets, 65, on the coin transfer slides thus effecting a loose mechanical connection between the depending arms and the respective coin slides, as shown in Figs. 1, 2 and 8 of the drawings.

By reference to Fig. 7 it will be seen that on top of the yielding bar, 70, I provide an arm, 82, which is rigidly secured to said bar and extends laterally therefrom and over the next adjoining bar, 71, while a similar arm, 83, is carried by yielding bar, 71, and projects over the bar, 72. As bars, 72, and, 74, are rigidly connected by plate, 81, and bars, 70, 71, and, 72, are also operatively connected under certain conditions by arms, 82, and, 83, it will be seen that bars, 72, and, 74, may be depressed at one time; bars, 71,

72, and, 74, depressed at another time and bars, 70, 71, 72, and, 74, may all be depressed at still another time, but at no time can bar, 70, be depressed without depressing bars, 71, 72, and 74. It will also be seen that bar, 73, and swinging arm, 78, may alone be depressed without operating any other bar or arm.

The depression of the yielding bars is effected through the medium of the coin that has been deposited in the machine and by reference to Figs. 3, 4, 10, 11 and 12 the coin receiving and handling device will now be described.

A chute, 84, extends across the interior of the case above the coin holder, 48, and is sustained in an inclined position between the walls, 4, and, 5, of the case. The higher end, 85, of this chute projects through the wall, 4, and is closed on its sides, end and bottom but has an opening, 86, in its top for the reception of the coin. This chute is composed of side plates, 87, which are spaced apart so as to provide a channel, 88, between them, which channel gradually decreases in width as it extends toward the wall, 5, as clearly illustrated in Fig. 11.

A coin bar, 89, fits edgewise in the channel of the chute and said bar is also thicker at one end than at its opposite end, so as to conform to the taper or variation in the width of the channel 88. At the lower thinner end, this coin bar is mounted on a pivot, 90, while the upper thicker end thereof is free to be raised or lowered in a vertical plane in said channel and between the side plates, 87. The lower edge of the coin bar is provided with a plurality of stepped surfaces or portions, 91, 92, 93, 94, and, 95, so as to produce shoulders, 96, at the lowermost end of each portion or step as shown in Fig. 10. The relative positions of these stepped portions are such that a coin placed in the upper open end of the chute will roll down the channel until it is stopped by one of the shoulders, 96,—the smallest coin which in this instance will be considered a ten cent piece will roll beneath all the stepped portions until it arrives at the lowest step, 95, as shown by the smallest circular broken line in Fig. 10; the next larger coin in size being five cents will be stopped by the shoulder at the end of the step, 94,—the next larger coin being a quarter will be stopped beneath the step, 93; the next larger fifty cent coin will be stopped beneath step, 92, and the largest coin or dollar will merely roll beneath the first step, 91, and be held there.

Beneath the various stepped portions of the coin bar, the chute is closed at the bottom by a plurality of hinged or movable traps, 97, 98, 99, 100, and, 101. By reference to Figs. 2, 3 and 12, it will be seen that these movable traps are pivotally connected

to an inclined stationary bar, 102, which extends along the outer side of the chute and which is supported by the opposite walls, 4, and, 5.

5 By reference to Figs. 1 and 3 it will be seen that the trap, 97, is connected by a rod, 103, with the upper horizontal yielding plate, 70, the trap, 98, by rod, 104, connects plate, 71; the trap, 99, by means of rod, 105, connects plate, 72, and trap, 101, connects plate, 73, by means of rod, 106. It will thus be understood that these four rods, 103, to, 106, inclusive serve to mechanically connect the traps, 97, 98, 99, and, 101, with the yield-
10 ing horizontal plates, 70, 71, 72, and, 73. It will also be seen that trap, 100, is not connected with any of the yielding plates for the reason that this trap controls the entrance of the coin of the least denomination, to wit, a five cent piece into the coin pocket, 52, and, 53, and no change is to be returned upon the deposition of such a coin. This trap, 100, is yieldingly held up against the bottom of the chute by means of a flat
15 spring, 107, which is carried by the bar, 102, so as to sustain the five cent coin until it is forced down by the lowering of the coin bar, 89, as will presently be explained.

By reference to Figs. 1, 3 and 4 it will be
20 seen that the cam-shaft, 13, carries a cam, 108, which has position between the gear, 14, and the cam, 34, and that said cam has a notch or cut-away portion, 109, at its periphery. A lever, 110, has its lower end
25 pivoted in a bracket, 111, on the bottom of the case and said lever carries a laterally-projecting bifurcated arm, 112, with a roller, 113, at its upper end which contacts with the periphery of the cam, 108. At the outer
30 end the lever, 110, is guided between vertically-projecting arms, 114, of a stationary bracket, 115, so as to prevent said lever from springing or yielding laterally. An upright or substantially vertical rod, 116, has its
35 lower end pivotally connected to the lever, 110, while the upper end, 117, of said rod is turned horizontally so as to project toward and pivotally engage the coin bar, 89. By this arrangement it will be seen that the
40 revolution of the cam, 108, causes a depression or pulling down of the rod, 116, and the coin bar, 89. If a coin is in the chute, say a twenty-five cent coin, the downward movement of the bar will cause the trap, 99, to be
45 depressed and the coin pushed through the opening made by the opening of the trap and the falling coin will drop into the circular opening or pocket, 51, directly beneath said trap, 99. The depression or opening of the trap, 99, will cause a depression or downward movement of the rod, 105, and will also cause the yielding plate, 72, which is attached to the upper end of rod, 105, to spring down carrying with it the bar,
50 81, and plate, 74. It will thus be seen that

whenever the twenty-five cent coin trap, 99, is depressed, because of a coin of that denomination resting on the upper side is depressed by coin bar, 89, the plates, 72, and, 74, will both be depressed and vertical de-
55 pending arms, 77, 79, and, 80, will all be moved downward. This downward movement of arms; 77, 79, and, 80, will project the lower ends thereof at the rear of the horizontal coin slides, 60, 62, and, 63, where
60 they may be engaged by the up-turned ends, 47, of levers, 43, 45, and, 46, if all of said levers at that movement were elevated by the cams, 36, 38, and, 39. But if the cam shaft is turned so that only the two levers, 45, and, 46, are raised, as would be the case if only one fare is to be deducted from the twenty-five cent coin deposited, then only
65 levers, 79, and, 80, would be engaged by the up-turned ends, 47, of levers, 45, and, 46, so as to push the two ten cent coin slides, 62, and, 63, forward to discharge twenty cents in change. This latter operation taking place as will be hereinafter described.

An arm, 118, projects laterally from the
70 rod, 116, and a coiled spring, 119, is connected to said arm and is stretched between the latter and a stationary arm or pin, 120, above it, so as to exert a constant upward pull on the rod and coin bar, and keep them
75 elevated when not held down by the cam, 108.

In order to operate the five cent coin trap, 100, to release the coin from the chute and at which time no change is to be delivered, I provide a lever, 121, which I pivotally
80 mount at one end to the side of the chute and the upper end of which is provided with a slot, 122, through which the end, 117, of the rod, 116, projects. This lever will swing in a vertical plane close against the side of
85 the chute as clearly seen in Figs. 2 and 6 so that the downwardly-projecting lug, 123, will contact with the upper side of the trap, 100, and depress the latter as the coin bar is depressed by the cam, 108, as heretofore
90 explained.

Referring to Figs. 2, 3 and 6 it will be seen that the bottom side of each yielding plate, 70, 71, 72, 73, and, 74, is provided with a
95 downwardly-inclined hook or finger, 124, which projects toward the rear of the case and that when said plates are depressed said fingers are also depressed. These fingers are provided so that when the coin pushes down a coin trap and causes a depression of one of
100 the vertical rods designated 103 to 106 inclusive and the yielding plate to which the said rod is attached, the finger, 124, on such depressed plate may be engaged so as to hold
105 said plate down and also to keep in the lowered position the arm or arms of the series designated by the numerals, 75, to, 80, inclusive, until the coin slides have been operated to eject the coins to make the change, as
110 presently to be described. The device for

engaging said fingers is illustrated in Figs. 1, 2, 3, 4, 6 and 7, and has the form of a swinging frame comprising the lower horizontal bar or rod, 125, which is mounted in the opposite walls, 4, and, 5, and one end of this rod carries a bell crank lever, 126, while the opposite end thereof carries an arm, 127. The lever, 126, and the arm, 127, together sustain a horizontal bar, 128, at their upper ends and when in its normal position this bar lies in a vertical plane between the wall, 3, of the case and the free ends of the inclined hooks, 124, so that when any of the hooks are depressed through the deposition of a coin the bar, 128, when swung forward, will take over the free end of said hooks and hold the latter down (see Fig. 6) during the operation of ejecting and delivering the change. By reference to Figs. 1, 4 and 7 it will be seen that the upper end of the coin bar, 89, carries a pin, 129, that projects horizontally and rearwardly therefrom and that the end thereof sustains the upper end of a link, 130, while the lower end of said link is pivotally connected with the bell crank, 126, so that as the coin bar is depressed by the action of cam, 108, the bell-crank lever will be rocked on the rod, 125, and the bar, 128, will be swung forward beneath and engage any of the depressed hooks, 124 by passing over the free ends of the latter.

It has heretofore been explained that the carriage or frame 24, and the bar, 40, thereof are to be moved horizontally so that one or more of the pivoted levers, 41, to, 46, inclusive may be raised by the cams beneath them to engage their upturned ends, 47, with the lower ends of such swinging arms, 75, to, 80, inclusive, that may have been drawn downwardly by the movement of a coin trap. It has also been explained that this carriage is provided with a rack, 23, into which a gear, 22, on the shaft, 20, meshes so as to move the carriage horizontally in one direction to push the coin slides out and eject the coins in change. This gear, 22, does not however return or retract the carriage and slides, but by reason of the fact that the gear, 10, on shaft, 8, is free to be reversed the pinion 21, shaft, 20, and rack gear will all be reversed by the return of the carriage through other mechanism, which will now be described.

By reference to Figs. 1 and 4 it will be seen that the walls, 4, and, 5, of the case pivotally sustain a horizontal rock bar, 131, and that each end of this bar is provided with a downwardly-extending or depending arm, 132, which is rigid with the rock bar. The lower ends of these arms, 132, project over and contact with a cross-bar, 133, of the carriage or frame, 24. At one end, and adjacent the case wall, 4, the rock bar, 131, carries a lever, 134, which is rigid with respect to said rock bar and which may swing in a vertical plane. A long rod or

bar, 135, has its upper end pivotally connected with the free end of the lever, 134, while the lower end thereof is pivotally engaged with a substantially horizontal lever, 136. This latter lever has one end mounted on a stud or bracket, 137, that projects laterally from the case wall, 4, and said lever has position at the side of the cam, 108, on shaft, 13, see particularly Figs. 1 and 16. The lever, 136, carries a spring finger, 138, at the side facing the cam, 108, and the cam carries a pin, 139, which normally projects over said spring finger so that when the cam, 108, turns in the direction indicated by the dart in Fig. 4, the pin, 139, will project over the spring finger and depresses the free end of lever, 136, and thus pull down bar, 135, and lever, 134, and thereby rock the bar, 131, and swing the lower ends of arms, 132, backward toward the rear wall, 3, of the case. As the lower ends of these arms project over the carriage or frame bar, 133, their rearward motion will cause the said carriage or frame to be retracted and in making this stroke the bar, 68, on the upper side of the carriage will contact with the pins, 67, on the projected coin slides and retract or return them. It will thus be understood that the carriage and coin slides are moved to discharge the coins by means of rack gear, 22, while the return movement of the carriage and coin slides is effected by the depression of the lever, 136, by the pin, 139, on the cam, 108.

By reference to Fig. 2, it will be noted that one side of the cam, 34, is provided with laterally-projecting pins, 140, and that these pins are spaced at equal distances apart. It will also be seen that the front wall, 2, of the case is provided with a pivoted lever, 141, that will swing upwardly only while the end of said lever is provided with an independently pivoted finger, 142, that will yield downwardly. A hammer, 143, is carried by the lever, 141, while a bell, 144, has position adjacent the hammer so that as the upper part of cam, 34, is turned toward the rear of the case the pins, 140, will successively operate the lever, 141, and hammer carried thereby to strike the bell. Each pin, 140, indicates a fare and as the cam revolves to indicate the number of fares to be registered the pins will operate to sound the bell upon registering each fare.

In the practical operation of the machine it is found desirable to lock the cam shaft at certain periods when the coins of the twenty-five and fifty cent denominations have been deposited in the machine, to avoid the delivery of change when the maximum number of fares for which those coins will pay have been registered,—it having been found in practice that under certain conditions during the registration of fares from coins of these two denominations it was pos-

sible to give the cam shaft a revolution that would deliver change when none should have been delivered. To overcome this I have provided pins, 145, and, 146, on the sides of the cams, 35, and, 36, respectively. These pins have a particular location on the cams and are to coact with certain hook-levers which are thrown into their path when the coin-traps are opened. Beneath the cams, 35 and 36, the case is provided with a bracket, 147, having a short horizontal shaft, 148, and this shaft carries two independently pivoted levers, 149 and 150. The forward ends of these levers are provided with upturned hooks, 151 and 152, which when swung upwardly, as seen in Fig. 6, will project into the path of the pins on the cams so as to engage said pins and lock the cams against further rotation.

The means for operating the hook levers 149 and 150, to lock the cams 35 and 36, after they have registered the number of fares equal in value to the coins deposited will now be described reference being made to Figs. 1, 2, 6 and 7. On top of the plates, 71, and, 72, I provide supplemental plates, 153, and, 154. These plates lie flat on top of plates, 71, and, 72, but project beyond the free ends of the latter and said projecting ends carry vertical bars, 155, and, 156. By reference to Figs. 1, 2 and 6 it will be seen that these vertical bars, 155, and, 156, extend downwardly adjacent the rear wall, 3, of the case and the lower end of bar, 155, pivotally connects with the hook lever, 149, while the lower end of bar, 156, pivotally connects with the hook lever, 150, so that whenever either of said bars is depressed it will throw one or the other of the hooks, 151, or, 152, as the case may be, upward into the path of the pins, 145, and, 146, on the revolving 25 and 5 cent cams. While the supplemental plates, 153, and, 154, are on top of the plates, 71, and, 72, they are not always depressed with said latter plates for the reason that the coin-trap rods, 104, and, 105, pass freely through the plates, 71, and, 72, and then through the plates, 153, and, 154, so that said plates, 71, and 72, may be depressed with plate, 70, for example, without depressing the plates, 153, and, 154. These plates, 153, and, 154, therefore are only depressed whenever the traps, 98, and, 99, and the rods, 104, and, 105, are depressed.

As the change is discharged by the coin slides it will drop into a trough, 165, in the front wall, 2, where it can be removed.

When crank, 9, is turned in the direction of the dart shown in Fig. 5, the shaft, 8, pinion, 15, gear, 14, and cam shaft, 13, all turn. The movement of the cam-shaft is in a direction reversed to that of the crank shaft, 8. During this movement however the gear, 10, does not revolve because the pawls, 11, thereon simply ride over the teeth

of the ratchet wheel, 12, consequently shaft, 20, remains idle during the operation of the cam shaft to set the cams.

It should be noted that the pinion, 15, is much smaller in diameter than the gear, 14, with which it meshes, and therefore one revolution thereof would not effect a complete revolution of the cam shaft, 13. In a machine now in operation the crank shaft makes a three-quarter turn while the cam-shaft makes one-sixth of a revolution. This one-sixth revolution is utilized to set the certain levers that are to directly operate the coin slides before the actual number of fares are determined or recorded, as will now be described.

When a coin, say for example a ten cent coin is placed in the opening, 86, of the chute it will roll downwardly, passing beneath all the stepped portions on the coin bar, 89, until it reaches the lowermost shoulder, 96, at the lower end of stepped surface, 95, as seen in broken lines Fig. 10. This ten cent coin will therefore rest upon the hinged trap, 101, which is connected to yielding plate, 73, by the rod, 106. If it is desired to register one fare and thus deliver a five cent coin in change from the ten cent coin deposited the operator will grasp the crank, 9, and turn it in the direction of the dart in Fig. 5. The cam shaft, 13, immediately begins to turn, and cam, 108, (see Fig. 4) will depress lever, 110; rod, 116, and coin bar, 89, and thus effect a depression of the hinged trap, 101; rod, 106, and plate, 73. As the plate, 73, is depressed carrying the finger, 124, with it, the bar, 128, because of the downward movement of the coin-bar, 89, will swing forward over the finger and hold the plate, 73, down. It will be understood that the depression of plate, 73, will also cause the depending swinging arm, 78, to be depressed at the rear of the five cent coin-ejector slide, 61, and in front of the pivoted lever, 44, that is reciprocable with the carriage, 24. All of the movements take effect instantly upon the initial movement of the crank, 9, and crank-shaft, 8, and immediately before the registration of the first fare. During the preliminary movement of the crank the cam-shaft, 13, is revolved and when the dial plate (see Fig. 5) has turned sufficiently to present the first radial line, 1, beneath the indicator line, 19, the signal device or bell will be operated by the first pin, 140, on the side of cam, 34, and the operator will then know that one fare has been registered and will therefore stop the movement of the crank. At this period in the operation the cam, 37, will have its single lug turned to a position in a vertical line through the axis of the cam-shaft, 13, where it will contact with and elevate the lug, 33; lever, 30, and pivoted lever, 44, which latter will project its rear end, 47, upwardly be-

hind the lowered end of the depressed swinging arm, 78, and also behind the five cent coin-ejector slide, 61. It will be understood that while the cam-shaft is being turned to set the cams to operate the coin slides the carriage, 24, will be retracted and in the position shown in Fig. 6 and will have this retracted position when the crank-shaft is stopped during the setting or registering operation. The operator now reverses the rotation of the crank-shaft and the pawls, 11, on gear, 10, will engage the ratchet wheel, 12, and revolve the latter, thereby imparting a reverse rotation of the shaft, 20; gear, 22, thereon and the latter by meshing with rack, 23, on the carriage will slide the same forward carrying the lever, 44, with it. This forward movement of the lever, 44, will cause the end, 47, thereof to engage the depressed end of swinging arm, 78, and swing it forward thus horizontally sliding the five cent coin-ejector slide, 61, and discharging a five cent coin into the trough, 155. When the carriage is returned by the pin, 139, on cam, 108, pressing the lever, 136, down, the bar, 68, on the carriage will engage the bottom lugs, 67, on any coin-slide that has just previously been operated and thereby return said slides.

As another example suppose a twenty-five cent coin be deposited and one five-cent fare is to be deducted, and change to the amount of twenty cents is to be discharged, the operation would then be as follows: The twenty-five cent coin is deposited in the upper end of the coin chute and rolls downwardly by gravity until it arrives at a point over trap, 99, where it will be retained between said trap and stepped surface, 93, on the coin bar, 89. The operator will now turn the crank, 9, first in the direction of the dart in Fig. 5, and thereby effect a revolution of cam shaft, 13, and all the cams, 34, to 39, inclusive on that shaft. When the numeral, 1, (see Fig. 5) on the disk, 16, registers with stationary line, 19, on the transparent covering, the bell, 144, rings once, thus indicating that the cams and other mechanisms are in position to deduct one fare from the coin deposited. Fig. 6 of the drawing shows the parts in the position they assume when a twenty-five cent coin has been deposited and one fare has been registered. By reference to Figs. 6 and 15 it will be noted cams, 34, 35, 37, 38, and, 39, are in such a position that a circumferential projection on each of them will have position at the highest point and that those projections will elevate the free ends of levers, 27, 28, 30, 31, and, 32, which in turn will raise levers, 41, 42, 44, 45, and, 46, so that the free ends 47, of those levers will be projected upwardly through the carriage, 24, and behind the rear ends of the coin slides, 58, 59, 61, 62, and, 63. All of these movements take place as the cam projections ride under the levers, 27, 28, 30, 31, and, 32, but prior to this and during the first three fourths of a revolution of the cam shaft the lever, 110, in Fig. 4, is depressed by cam, 108, and rod, 116, and coin bar, 89, both drawn down so as to push the twenty-five cent coin downwardly and thereby depress the coin trap, 99; pull down rod, 105, and bars, 72, and, 74, because of their connection with plate, 81, and cause a depression of vertical arms, 77, 79, and, 80 so as to project the lower ends of arms, 79, and, 80, in front of the upturned ends of raised levers, 45, and, 46. It will be noted by reference to Figs. 6 and 15 that while vertical arm, 77, has also been depressed the levers, 43, and, 29, have not been elevated during this operation, and that no connection will be made between the lower end of lever, 77, and upturned end of lever, 43, during the next operation, which will eject the change as will now be described, but that only the vertical arms, 79, and 80, are in position to be operated.

It will be noted, by reference to Figs. 8 and 15 that the vertical arms, 79, and, 80, depend at the rear of coin slides, 62, and, 63, which control the ten cent coin pockets, 54, and, 55. At this particular movement in the operation of the machine the crank arm, 9, has been turned in the direction of the dart in Fig. 5, as far as it should be turned to register one fare, and during such revolution all parts in the machine will have been set to deduct one fare and made ready to effect the discharge of the change. This ejection of change is then accomplished by a reversal of the direction of revolution of the crank shaft, which reverse movement causes the ratchet, 12, see Figs. 2, 3, 4 and 6, to engage gear, 10, by means of pawls, 11, and said gear, 10, by meshing with gear, 21, will revolve shaft, 20, and gear, 22, thereon, while at that moment said gear, 22, will be in engagement with rack, 23, on bottom of carriage, 24, so as to move the carriage horizontally and draw the up-turned ends of levers, 45, and, 46, against the depressed lower ends of vertical arms, 79, and, 80, which latter pass through the brackets at the rear ends of the coin slides, 62, and, 63. By means of the forward horizontal movement of the carriage the coin slides, 62, and, 63, are pushed outwardly from the bottom of the ten cent coin pockets, 54, and, 55, and two ten cent coins will be discharged into the trough, 165. Now suppose the twenty-five cent coin just above described has been deposited in the coin chute and five five-cent fares are to be deducted, the said coin will roll by gravity until it is stopped over coin trap, 99, as previously described. As soon as the crank shaft, 8, begins to turn, the coin bar, 89, will swing down and depress trap, 99, while rod, 105, which has its lower end

connected to trap, 99, and its upper end passing through the yielding plate, 72, and engaging supplemental plate, 154, will draw said latter plate down and depress vertical bar, 156, and raise hook, 152, on lever, 150, so that said hook will be elevated at the side of cam, 36. While this operation is taking place the operator will continue to turn the crank shaft to register the fares, one after another, the bell being sounded as each fare is registered, and in doing this, cam, 36, will turn so as to move the pin, 146, toward the hook, 152, on lever, 150,—the hook having been moved up into the path of that pin, 146, upon the depression of the coin trap, 99. The location of the pin, 146, on the side of cam, 36, is such that when the cam has moved during the registration of the respective fares it will come in contact with the hook, 152, as the fifth fare is registered and will be held against further travel in the registering direction by said hook. Thus it will be seen that when the total fares for which the coin deposited will pay have been registered, the cam shaft will be locked and prevented from registering further fares.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,—

1. In a machine of the character described the combination with a plurality of coin receptacles, of a cam shaft; a plurality of cams on said shaft; means for turning the shaft to determine the amount to be deducted from a coin deposited; a coin chute to receive all coins entering the machine; coin ejector means for each coin receptacle; means operating between the cams and coin ejectors and means operating between the coin deposited in the chute and coin ejectors to mechanically deliver the proper change without a knowledge of the value of the coin deposited.

2. In a machine of the character described the combination with a plurality of coin receptacles, of a cam shaft; a plurality of cams on said shaft; means for turning the shaft to determine the amount to be deducted from a coin deposited; a coin chute to receive all coins entering the machine; movable coin supports along the chute to sustain the coin deposited therein; coin ejector means for each receptacle; means operating between the movable coin supports and the coin ejectors and means operating between the cams and coin ejectors whereby the turning of the cam shaft will set the devices to operate the ejectors without a knowledge of the value of the coin deposited.

3. In a machine of the character described the combination with a plurality of coin receptacles, of a cam shaft; a plurality of cams on said shaft; means for turning the shaft to determine the amount to be deducted; a coin chute to receive all coins en-

tering the machine; a coin bar in said chute and having stepped portions at one side; movable coin supports at the bottom side thereof of the chute opposite the stepped portions of the coin bar; means operated by the cam shaft for moving the coin bar; coin ejector means for each receptacle; means operating between the movable coin supports and the coin ejectors and means operating between the coins and coin ejectors whereby the turning of the cam shaft will deliver the proper change without the operator having a knowledge of the value of the coin deposited.

4. In a machine of the character described the combination with a cam shaft, of a plurality of cams on said shaft; means for revolving said shaft; a reciprocable carriage; a plurality of coin receptacles over the carriage; a coin ejector for each receptacle; levers operating between the carriage and coin ejectors; means operating between the cams and levers; a coin chute; a plurality of coin traps in said chute and means operating between the coin traps and coin ejectors and coacting between the operating means between the cams and coin ejectors to eject coins from the receptacles.

5. In a machine of the character described the combination with a cam shaft, of a plurality of cams on said shaft; a plurality of coin receptacles; a coin chute; a plurality of coin traps in said chute; a coin ejector for each receptacle; means for operating between the coin traps and the coin ejectors; means for turning the cam shaft to determine the amount to be deducted from a coin deposited in the coin chute and means operated by coin traps to limit the rotation of the cam shaft when it has been turned to indicate values equal to the coin deposited.

6. In a machine of the character described the combination with a case, of an inclined coin chute; a plurality of movable coin supports at the bottom of the chute; a single bar in the chute and having a coin stop adjacent each coin support; coin receptacles to receive the coins from the chute; a coin ejector for each receptacle; connections between the movable coin-supports and the coin ejectors; a shaft carrying a plurality of cams; means operating between the cams and the said connections that operate between the coin-supports and ejectors, and means to actuate the bar in the chute by the rotation of the cam shaft and to move those coin-ejectors that will discharge the change.

7. In a machine of the character described the combination with a case, of an inclined coin chute; a plurality of movable coin supports at the bottom of the chute; a single bar in the chute and having a coin stop adjacent each coin support; coin receptacles to receive the coins from the chute; a coin ejector for each receptacle; connections be-

5 tween the movable coin-supports and the coin ejectors; a reciprocating carriage; levers carried by and movable independently of the carriage to effect a movement of the said connections and coin ejectors; a shaft carrying a plurality of cams, means operated by the cams to move certain of said levers, and means for rotating the shaft to

first set the said devices and then move the ejectors to discharge the change.

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

JURGEN J. DUBBELDE.

Witnesses:

CHARLES B. MANN, Jr.,

G. FERDINAND VOGT.