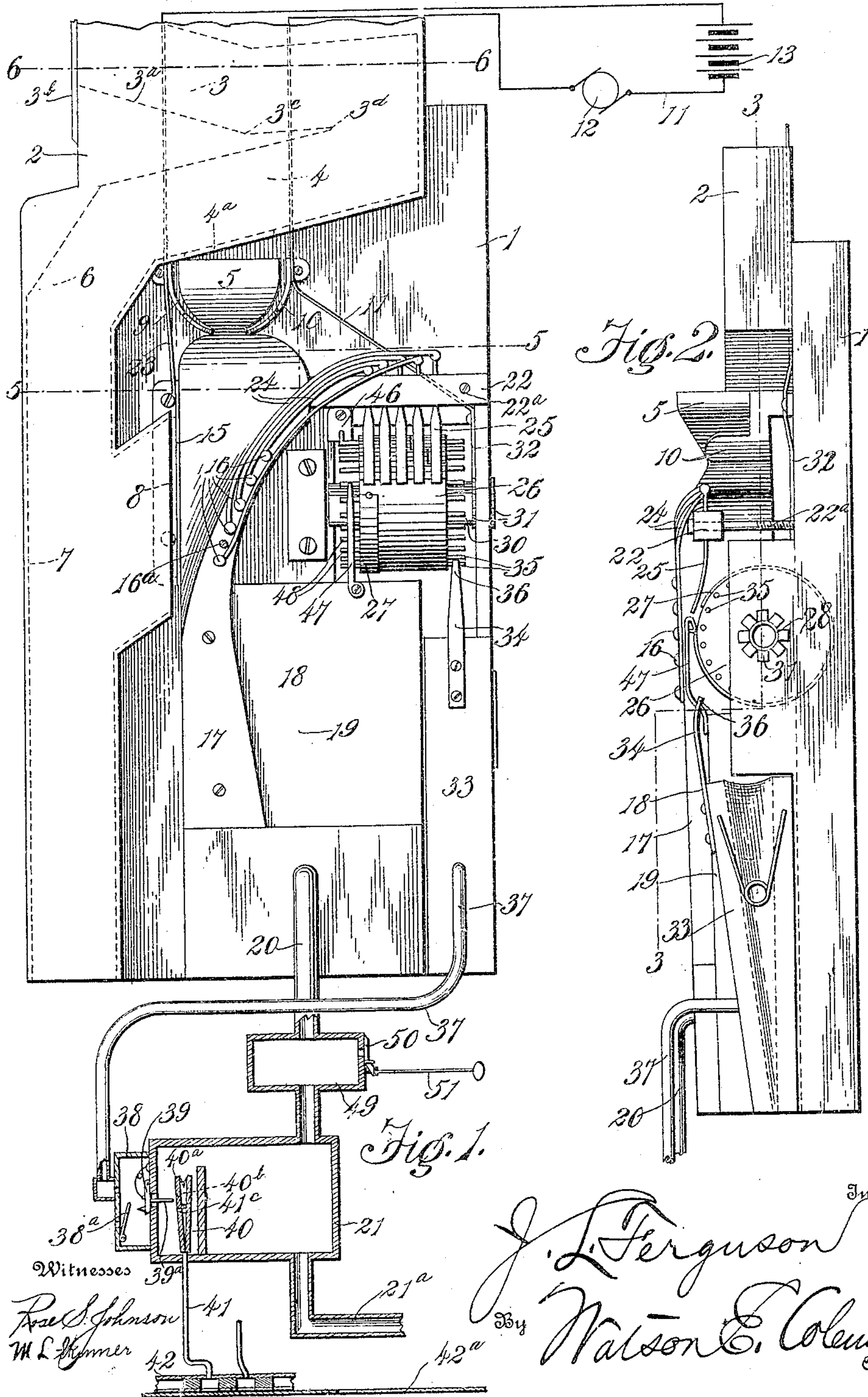


J. L. FERGUSON.  
 COIN CONTROLLED MECHANISM.  
 APPLICATION FILED MAY 2, 1908.

917,277.

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3 SHEETS—SHEET 1.



Witnesses  
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 W. L. Kemmer

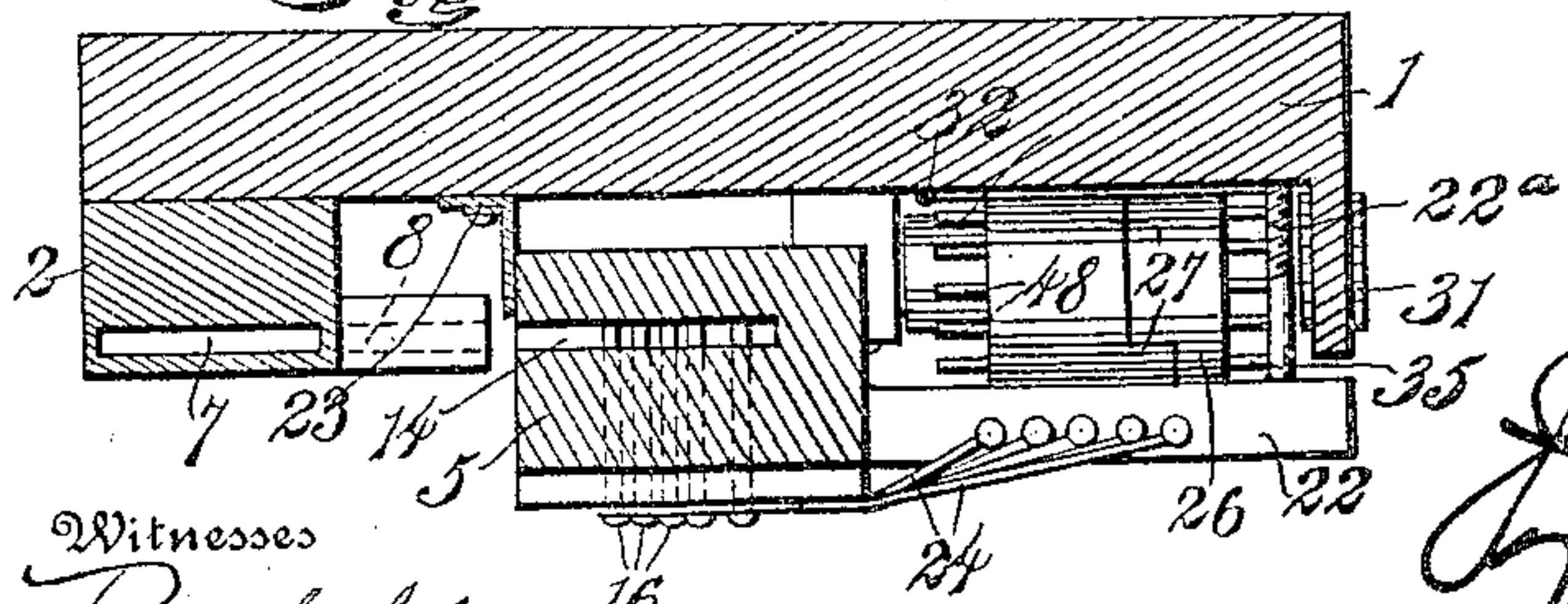
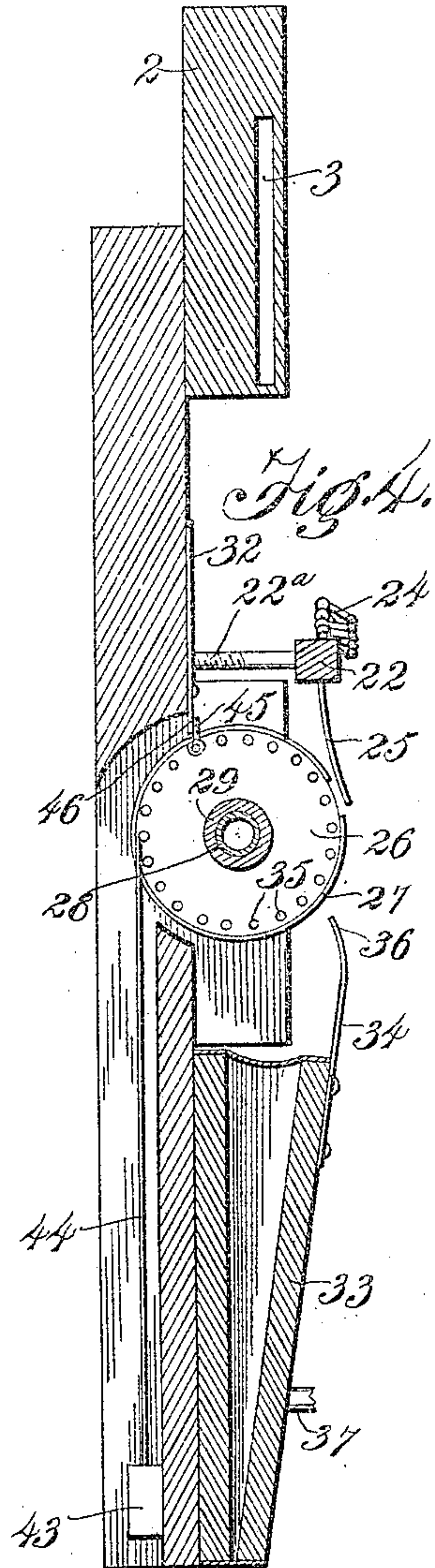
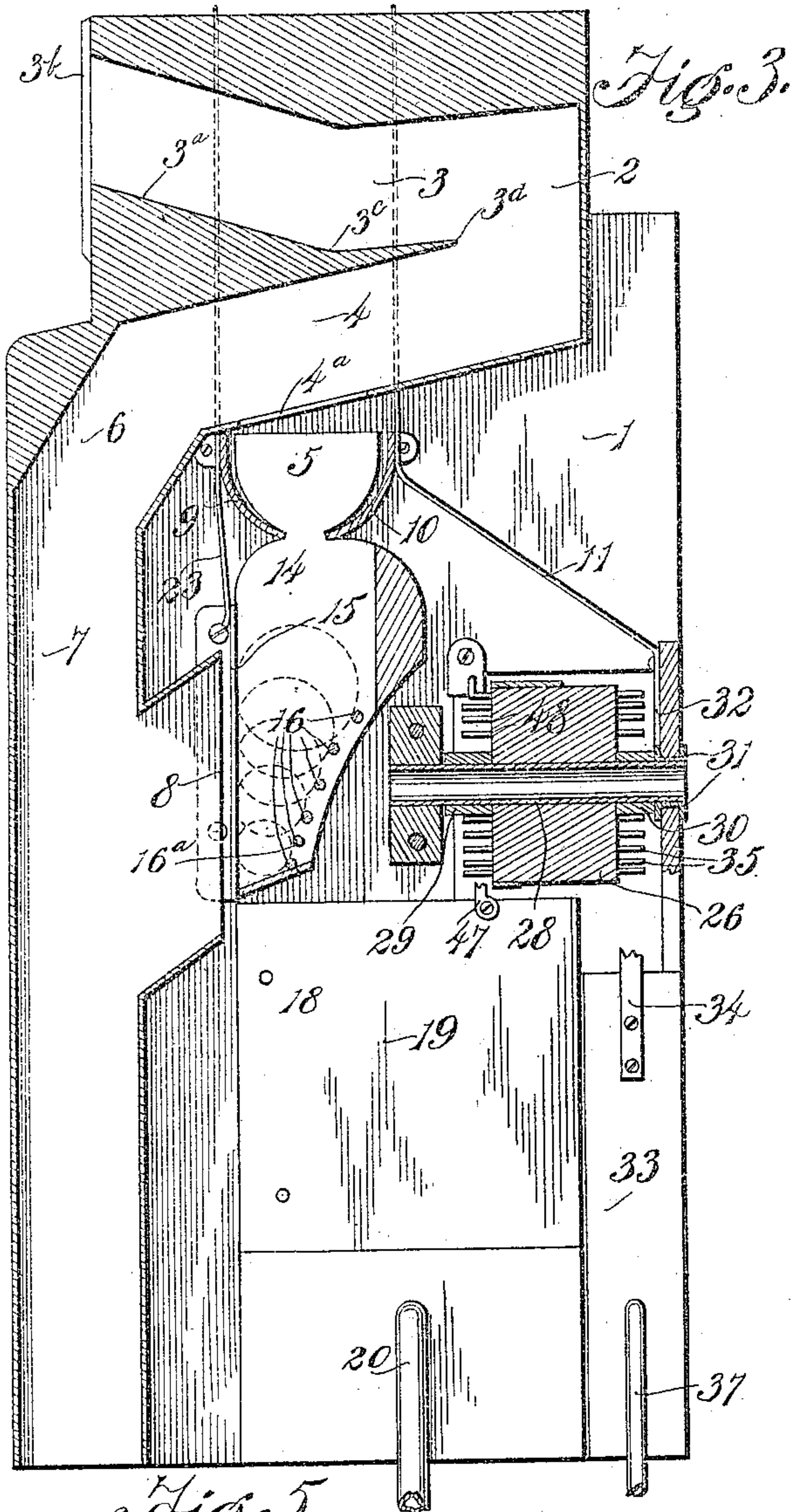
J. L. Ferguson  
 By Watson E. Coleman  
 Attorney



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Patented Apr. 6, 1909.

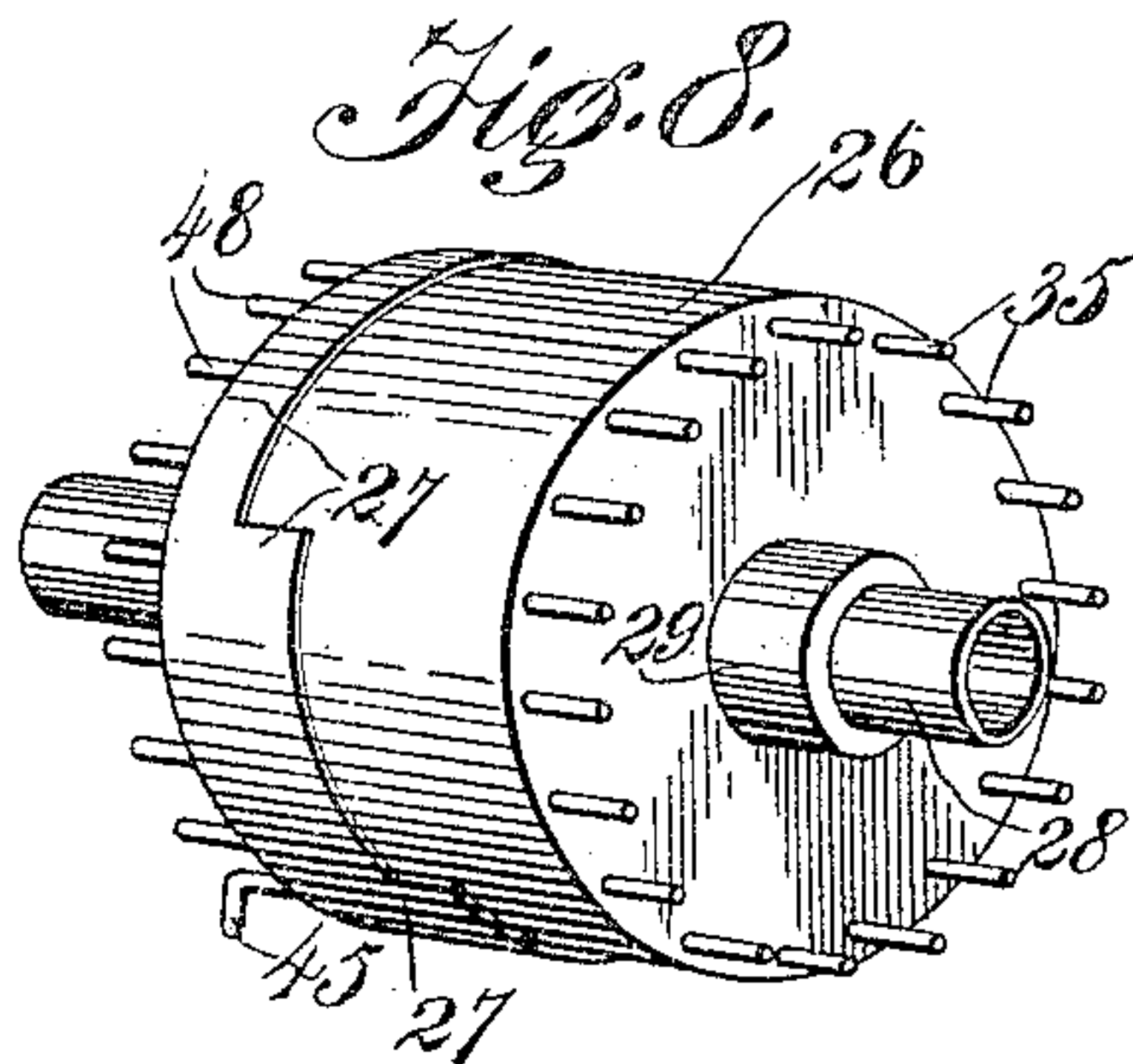
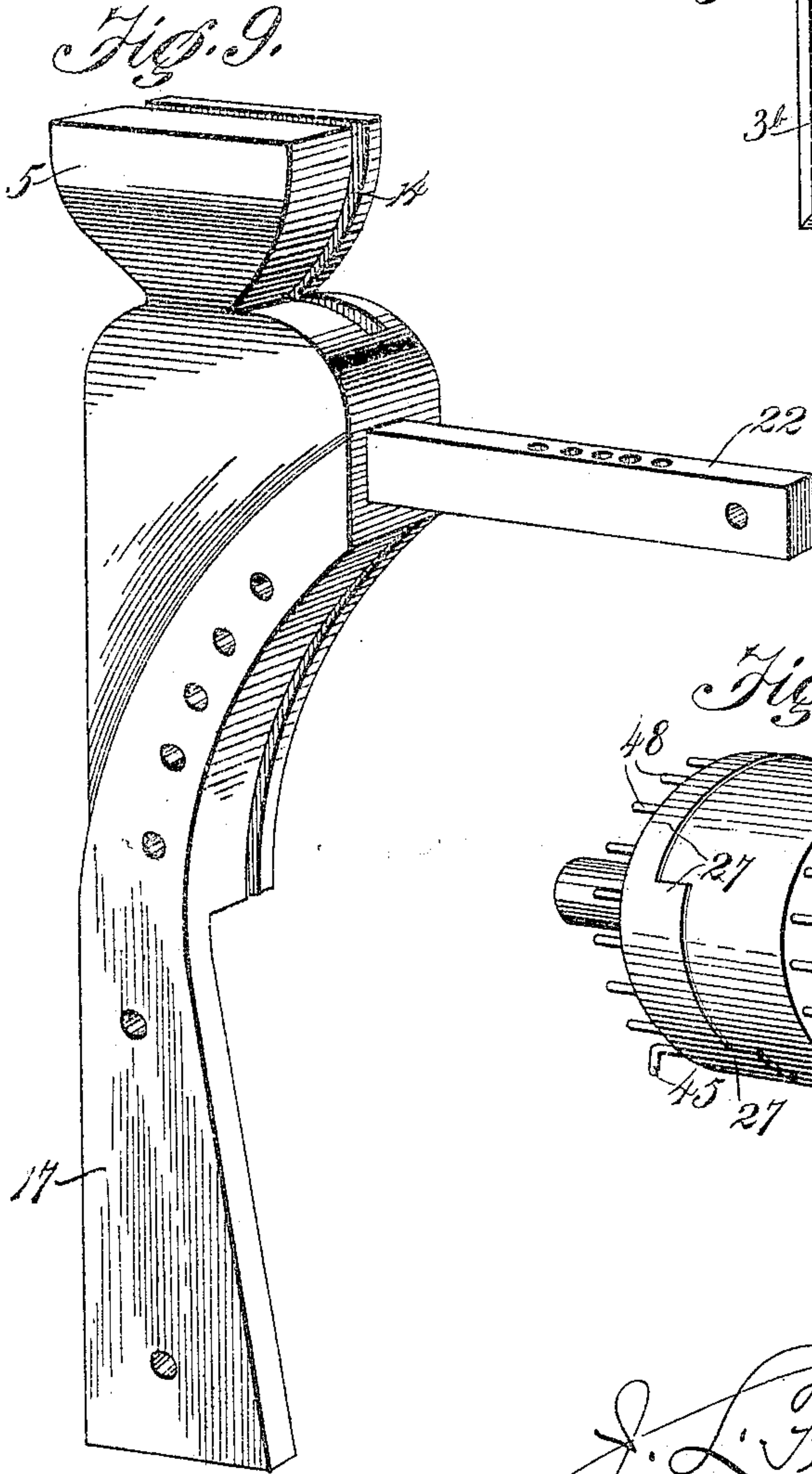
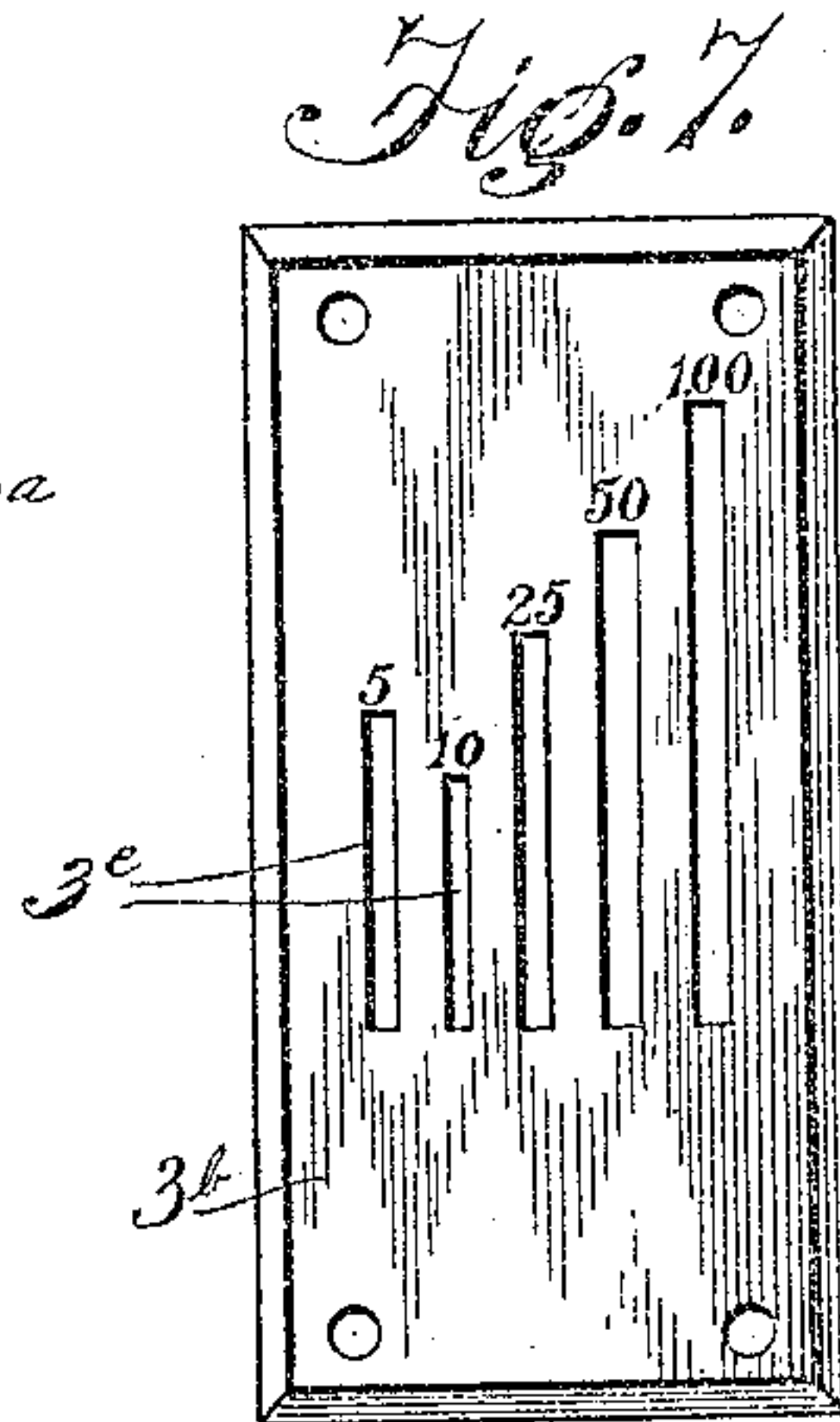
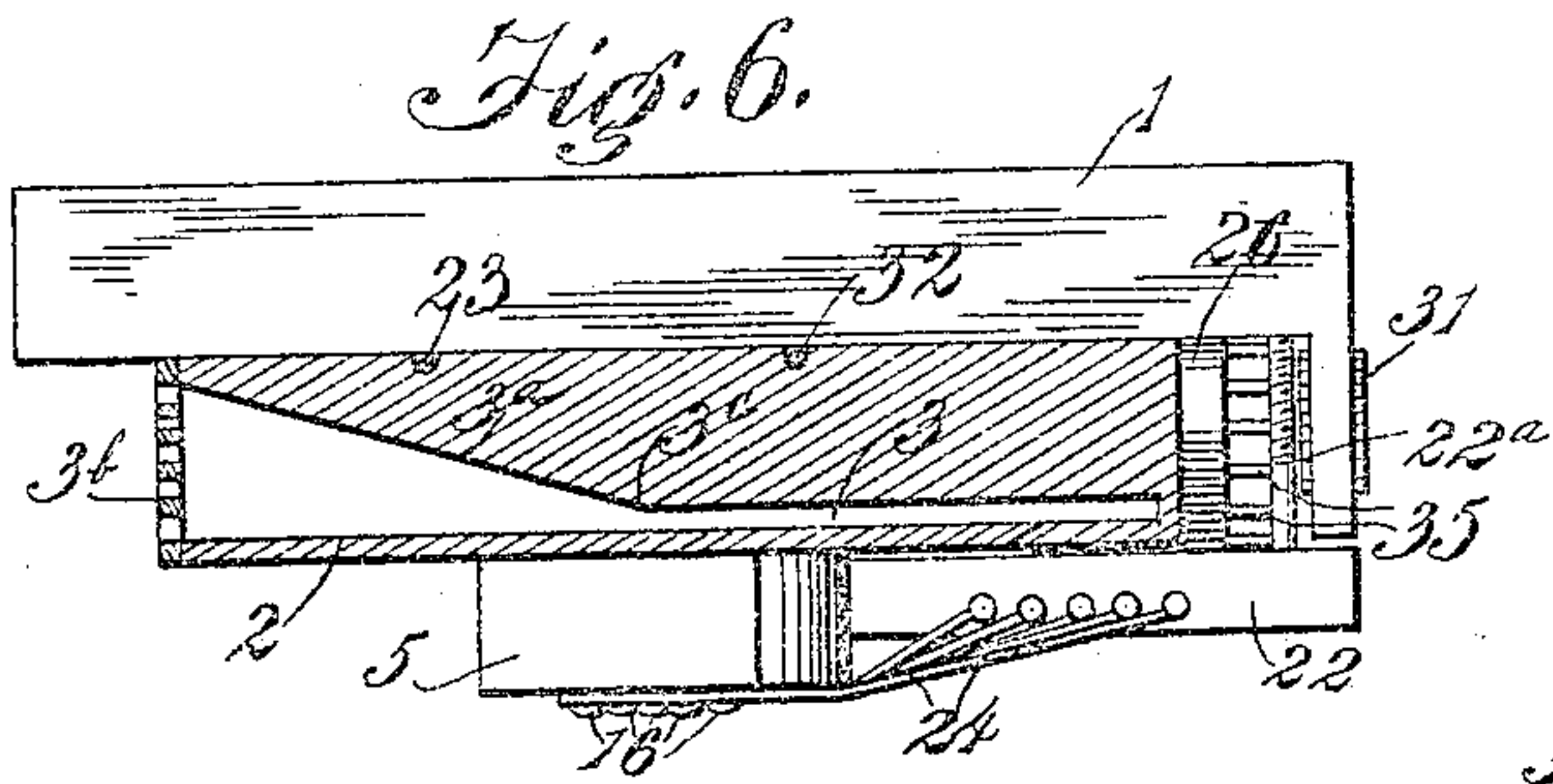
3 SHEETS—SHEET 2.



Witnesses  
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917,277.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JAMES L. FERGUSON, OF PARKERSBURG, WEST VIRGINIA.

## COIN-CONTROLLED MECHANISM.

No. 917,277.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed May 2, 1908. Serial No. 430,576.

*To all whom it may concern:*

Be it known that I, JAMES L. FERGUSON, a citizen of the United States, residing at Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Coin-Controlled Mechanism, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in coin or check controlled mechanism and more particularly to one especially adapted for controlling the operation of an electrically driven instrument or an analogous machine.

The principal object of my invention is to provide a mechanism of this character adapted to receive coins of different denominations or values and to control the operation of the piano so as to enable it to play a tune a greater or less number of times according to the value of the coin deposited.

With the above and other objects in view, as will hereinafter more fully appear, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of my improved check controlled mechanism, the electric circuit and the operating mechanism for the pneumatics being diagrammatically illustrated; Fig. 2 is a side elevation; Figs. 3 and 4 are detailed vertical sections taken, respectively, on the planes indicated by the lines 3—3 and 4—4 in Figs. 1 and 2; Figs. 5 and 6 are detail horizontal sectional views taken, respectively, on the planes indicated by the lines 5—5 and 6—6 in Fig. 1; Fig. 7 is a detail view of the coin receiver; Fig. 8 is a detail view of the commutator or tappet wheel; and Fig. 9 is a detail perspective of the coin receiver.

While my invention relates to coin controlled apparatus generally, the embodiment illustrated is especially adapted for controlling the actuating mechanism of an electrically operated piano or musical instrument, and in the drawings 1 denotes a suitable upright support or base board which may be arranged within or form a part of the casing of the instrument. On the support 1 is a coin chute 2 containing an upper branch or passage 3, a lower passage 4 arranged above a coin receiver 5, and an

angular passage 6 between the lower end of the passage 4 and the upper end of a vertical passage or hopper 7, which latter receives the coins and conducts them to a suitable box or collecting receptacle (not illustrated). The passage or section 7 of the chute is vertically disposed and has upon one side opposite the coin receiver 5 an open portion 8 to receive the coins from the latter, as presently explained.

The upper passage 3 of the coin chute has a forward portion 3<sup>a</sup> inclined downwardly and inwardly from a slotted plate 3<sup>b</sup>, arranged over its outer end, to a point 3<sup>c</sup> from which latter the passage extends upwardly to a point 3<sup>d</sup> where it is in communication with the rear end of the lower passage 4. The latter is inclined downwardly to the angular passage or portion 6 and at a point above the coin receiver 5 its bottom is removed to provide an opening 4<sup>a</sup> which permits the coins to pass into said receiver. The forward end of the downwardly and inwardly inclined portion 3<sup>a</sup> of the upper passage 3 is flared, as shown in Fig. 6, so as to include all of the plurality of coin slots 3<sup>e</sup> formed in the plate 3<sup>b</sup>. It will be noted, upon reference to Fig. 7, that the coin slots 3<sup>e</sup> in said plate are of different sizes and are adapted to receive nickels, dimes, quarters, half-dollars and dollars. When a coin is deposited in one of the slots 3<sup>e</sup> it will roll down the incline 3<sup>a</sup> and gain sufficient momentum to carry it up the upwardly inclined rear portion of the passage 3 so that it will drop off of the latter and into the passage 4. Should, however, a coin with a string attached to it be deposited in the passage 3 the string will prevent it from moving up the upwardly inclined rear portion of the passage 3 and it will pass inwardly no farther than the lowest point 3<sup>c</sup> in said passage. This construction of the chute therefore prevents a coin with a string attached from being inserted in the instrument to start and operate it and being then drawn out by the attached string.

On opposite sides of the upper portion of the coin receiver 5 are arranged two opposing stop contacts 9, 10 adapted to arrest a coin passing through the opening 4<sup>a</sup> and into the receiver so that the coin will complete an electric circuit 11 which includes an electric motor 12 and a battery or other electrical generator 13. The stop contacts 9, 10 are in the form of metal plates suitably fixed to



the support 1 and have their lower ends curved or inclined inwardly and spaced apart a distance sufficient to cause them to stop a coin of the smallest size.

5 The electric motor 12 may be suitably connected to the mechanism which operates the sound producing parts of the piano.

10 The coin receiver 5 is provided with a coin slot or passage 14 adapted to be disposed normally beneath and in register with the lower end of the coin passage 3 so as to receive and hold the coin as it is arrested by the stop contacts 9, 10 and said receiver is mounted for sliding or swinging movement 15 so that it can be retracted to shift the coin off of the stop contacts 9, 10 and permit it to drop into engagement with a main contact 15 and one of a plurality of opposing contacts 16, as presently explained. Said 20 coin receiver is preferably pivotally or hingedly mounted to permit it to be thus retracted and while it may be mounted for movement in any suitable manner and operated by any suitable means, I preferably 25 fix its lower end, as shown at 17, to the hinged board 18 of a bellows or pneumatic 19, which latter is connected by a pipe or duct 20 to the main suction chest 21 of the piano.

30 The coin receiver 5 has an enlarged upper portion provided with a laterally projecting arm 22 and on its opposite sides above said arm with inwardly extending notches or recesses to receive the lower ends of the stop 35 contacts 9, 10 and to provide the upper portion which is disposed between said contacts. The coin passage 14 in the receiver 5 is formed in said upper portion or end and also in its central part and the lower portion 40 of the passage 14 opens upon that side of the receiver opposite the chute section or hopper 7 and is adapted to register or aline with the opening or slot 8 in the latter when the coin receiver is in its normal position.

45 When said receiver 5 is retracted to move the coin off of the stop contacts 9, 10 the lower portion of the coin passage 14 in said receiver moves out of alinement with the opening 8 in the side of the hopper 7 and 50 is adapted to be closed by the main contact 15 which is in the form of a metal plate disposed vertically between the hopper 7 and receiver 5 and having its inner vertical edge formed with an attaching flange secured to 55 the base or support 1 and its outer edge terminating short of the opening or slot 8 in said hopper. The contacts 16 which oppose and co-act with the main contact 15 are in the form of metal rods arranged in a row in 60 the inclined bottom of the coin passage 14 in the receiver 5 and in a plane at an angle to the vertical plane of the main contact plate 15 so that each of said contacts 16 is disposed at such a distance from the main 65 contact plate as to support a coin of a par-

70 ticular size and denomination between it and said main contact plate. The main contact 15 is electrically connected by a conductor 23 to the stop contact 9 and each of the con- 75 tacts 16 is electrically connected by a conductor 24 to one of a series of contact brushes 25 carried by the arm 22 of the coin receiver 5. The lowermost contact 16 is so arranged 80 as to stop a dime, the next to stop a nickel, the next a quarter, the next a half-dollar, and the uppermost one a dollar. In order to prevent a penny from being inserted in the machine and engaging the lower- 85 most or dime contact 16 I arrange between the latter and the nickel contact 16 a penny contact 16<sup>a</sup> which has no electrical connections. The brushes 25 which are 90 in the form of spring metal plates are adapted to co-act with a commutator or tappet wheel 26 having a body of non-con- ducting material provided upon its periph- 85 ery with a plurality of electrically connected segments or contact strips 27 adapted to be engaged by said brushes. Said segments 27 are preferably formed from a single piece 90 of metal and are of different lengths but all start from the same point which is normally disposed just opposite the ends of the brushes so that when the coin receiver is 95 actuated inwardly all of the brushes will simultaneously engage their respective seg- ments and as the wheel 26 is rotated they will successively slip off of them as herein- after more fully explained. The arm 22 is 100 guided in its swinging movement by a pin 22<sup>a</sup> which also serves as a stop to limit its outward movement. The segments 27 are electrically connected to the axle or shaft 28 of the wheel 26, which axle is metal and 105 mounted in suitable bearings 29, 30 upon the support 1. The bearing 30 contains a metallic bushing 31 which is electrically connected by a conductor 32 to the stop con- tact 10.

110 The commutator 26 may be intermittently operated by any suitable means but I preferably employ a bellows or pneumatic 33 and provide its hinged board with a detent 115 finger 34 adapted to engage tappet pins 35 arranged in an annular row upon one end of the wheel 26. The finger 34 has a rigid body portion at one end of which is a spring 36, which latter engages and actuates the 120 tappet 35 in one direction and owing to its resiliency is permitted to slip beneath the tappet pins when the finger moves in the op- posite direction. The pneumatic 33 is con- 125 nected by a pipe or duct 37 to a valve chest 38 arranged upon the main suction chest 21. A valve 38<sup>a</sup> in the chest 38 is adapted to ad- mit air into said chest and this valve is adapted to be closed by a valve 39 also ar- 130 ranged in the chest 38 and adapted to control communication between it and the chest 21. The valve 39 is spring actuated to its



closed position and carries a pin 39<sup>a</sup> which projects into the chest 21 and is adapted to be actuated by a small pneumatic 40 arranged within the latter. This pneumatic 40 is connected by a pipe or duct 41 to the tracker board 42 of the automatic piano playing mechanism and it has a hinged board 40<sup>a</sup> actuated by a spring 40<sup>b</sup> and provided with a small bleed hole 41<sup>c</sup>. The usual perforated tune sheet 42<sup>a</sup> actuated by the motor 12 passes over the board 42 and when a suitably positioned opening in the sheet passes over the outlet of the pipe 41 in said board 42, air is admitted to the pneumatic 40 which, in expanding, opens the valve 39 so that the suction in the main chest 21 will be extended to the chest 38, the pipe 37 and the pneumatic 33, the latter being thereby actuated. It will be understood that the motor 12 also actuates the suction pump or mechanism which is connected to the chest 21 by the pipe or duct 21<sup>a</sup>.

The pneumatic 33 is actuated each time the piano plays a tune and it consequently intermittently actuates the commutator in one direction. This commutator or wheel may be rotated in the opposite direction and held in its normal position so that all of the segments 27 are disposed opposite the contact brushes, by any suitable means but I preferably employ the one illustrated which comprises a weight 43 mounted in a suitable guide connected to one end of a cord 44 the other end of which latter is attached to a stop finger or pin 45 adapted to engage a stop plate or projection 46 to limit rotation of the commutator wheel and the descent of the weight. The wheel is adapted to be held or locked against casual movement by a spring detent 47 carried by the hinged board 18 of the pneumatic 19 and having a curved end adapted to project between two of the pins 48 which are arranged in an annular row at that end of the commutator wheel 26 opposite the end containing the tappet pins 35.

In order to permit the piano to be instantly stopped at any time I preferably arrange in the pipe or duct 21 a chest 49 having an air inlet opening controlled by a pivoted valve 50. This valve is adapted to be actuated to its open position by a push rod 51 or any other suitable operating means. It will be seen that when said push rod is actuated to open the valve, air will be admitted into the pneumatic 19 to release its hinge board and permit its actuating spring to move the latter and hence the coin receiver outwardly to permit the coin between the contacts 15, 16 to drop into the coin chute or hopper 7, thereby breaking the motor circuit and stopping the piano.

The operation of the invention is as follows. When a coin is dropped into the coin chute 2 it passes through the passages 3, 4, as

above explained, and drops into the passage 14 in the receiver 5 and is arrested by the stop contacts 9, 10. Owing to its engagement with the latter, it completes the main or starting circuit 11 so that the motor 70 actuates the pumping mechanism which creates a suction in the chest 21 and consequently in the pneumatic 19. The motor also starts and actuates the tune sheet operating mechanism. When the pneumatic 19 75 is actuated the coin receiver is carried inwardly so that the coin will be moved laterally off of the stop contacts 9, 10 and drop into the lower portion of the passage 14 in the receiver and rest between the main contact plate 15 and one of the contacts 16, according to the size and denomination of the coin. When the latter engages the contacts 15, 16 it completes the circuit 11 through one of a plurality of shunt or branch circuits, 85 each of which includes the conductor 23, the contact 15, the coin, one of the contacts 16, one of the conductors 24, one of the brushes 25, one of the segments 26, the axle 28, the bushing 31 and the conductor 32. Since the brushes 25 are carried by the coin receiver they will move inwardly with the latter and will simultaneously contact their respective segments 27 and since the detent 47 is carried by the pneumatic 19 it will move inwardly 95 with the same and the receiver, and will engage two of the stop pins 48 to hold the commutator wheel 26 against casual rotation. Each time the tune is played an opening in the tune sheet exposes the inlet end of the pipe or duct 41 so that the pneumatic 40 will be actuated to permit the suction in the chest 21 to extend to the chest 38 and the pneumatic 33. The latter being thereby actuated causes its finger 34 to engage one of the tappet pins 35 and rotate the commutator wheel the distance of one tooth. The lengths of the segments 27 vary according to the disposition of the contacts 16 with respect to the main contact 15 and the latter are disposed 11 at a greater or less distance from the main contact according to the size and value of the coin which they are designed to arrest. I preferably provide five of the contacts 16 and position them so that the lowest one will 11 arrest a dime, the next a nickel, the next a quarter, the next a half-dollar and the next a dollar, but it will be understood that they may be arranged for coins of other size and denomination and that the segments 27 may 12 be of such length as to allow the motor circuit closed by the coin to remain closed until the piano has played to the full extent of the value of the coin deposited. Each time the wheel 26 is actuated by the tappet finger 12 34 the detent 47 will slip over one of the pins and hold it in its new position. The instant the particular brush through which the circuit is completed slips off of its co-acting segment 27 the motor circuit will be broken 13



and the pneumatic 19 will restore the coin receiver 5 to its normal position in which the upper part of the coin passage 14 in it is disposed beneath the coin passage 3 and the lower part of said passage 14 is disposed opposite the slot or opening 8 in the coin hopper 7 so that the coin resting against one of the stops 16 may pass into the hopper 7 as said coin slips off of the contact 15. When the coin receiver assumes its normal position it is ready to receive the next coin deposited in the passage 3 and should a coin be deposited in the latter while said receiver is in its retracted position and the piano is in operation, said coin will pass on through the lower section 4 of the chute and through the inclined portion 6 into the chute or portion 7. Should a coin be deposited in the machine when another is in the receiver the latter coin will serve to bridge the opening 4<sup>a</sup> so that the first mentioned coin will pass on down into the section or hopper 7.

My improved mechanism will greatly increase the earning capacity of a piano or other instrument since coins of any denomination may be dropped into it and the machine will play to the full extent of the value of the coin deposited. Since the coin receiver returns to its normal position and discharges the coin into the hopper the instant the electric motor circuit is broken, it will be seen that should a burn out occur the piano will be instantly stopped and there will be no danger of injury to the latter. Should it be desired to permanently stop the instrument at any time it is only necessary to actuate the push rod or other device 50 to open the valve 49.

While in the embodiment of the invention illustrated I have shown and described pneumatics for operating the coin receiver and the commutator, it will be understood that they may be operated by electrical magnets or any mechanical devices.

It will also be understood that various other changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention what I claim is:

1. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, means actuated by the motor in said circuit for operating the coin receiver, a shunt circuit having a plurality of branches, a main contact in said shunt circuit, a plurality of contacts to co-act with the main one and forming terminals of the branches of said shunt circuit, a circuit making and breaking device included in the branches of the shunt circuit and means for operating said device.

2. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, means actuated by the motor in said circuit for operating the coin receiver, a shunt circuit having a plurality of branches, a main contact in said shunt circuit, a plurality of contacts to co-act with the main one and forming terminals of the branches of said shunt circuit, a commutator wheel having segments of different lengths arranged in the shunt circuit, contact brushes adapted to co-act with said segments and forming the other terminals of the branches of said shunt circuit and means for operating said commutator wheel.

3. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, means actuated by the motor in said circuit for operating the coin receiver, a shunt circuit having a plurality of branches, a main contact in said shunt circuit, a plurality of contacts to co-act with the main one and forming terminals of the branches of said shunt circuit, a commutator wheel having segments of different lengths arranged in the shunt circuit, contact brushes adapted to co-act with said segments and forming the other terminals of the branches of said shunt circuit, and means for intermittently rotating said commutator wheel.

4. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, means actuated by the motor in said circuit for operating the coin receiver, a shunt circuit having a plurality of branches, a main contact in said shunt circuit, a plurality of contacts to co-act with the main one and forming terminals of the branches of said shunt circuit, a commutator wheel having segments of different lengths arranged in the shunt circuit, contact brushes adapted to co-act with said segments and forming the other terminals of the branches of said shunt circuit, means for intermittently rotating said commutator wheel in one direction, means for rotating said wheel in the opposite direction, means for limiting the rotation of said commutator wheel, and means for retaining it against casual rotation.

5. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, a pneumatic for operating said coin receiver, means actuated by the motor in said circuit for operating said pneumatic, a shunt circuit having a plurality of branches, a plurality of contacts arranged in the coin receiver and forming terminals of said branches, a main contact included in the shunt circuit and adapted to co-act with said contacts in the coin receiver and to retain a



coin in the latter, a plurality of contact brushes carried by the coin receiver and forming the other terminals of said branches of the shunt circuit, a commutator wheel in the shunt circuit and having segments of different lengths to co-act with said brushes, means operated by the motor in the motor circuit for intermittently rotating the commutator wheel in one direction, and means for rotating said commutator wheel in the other direction.

6. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, a pneumatic for operating said coin receiver, means actuated by the motor in said circuit for operating said pneumatic, a shunt circuit having a plurality of branches, a plurality of contacts arranged in the coin receiver and forming terminals of said branches, a main contact included in the shunt circuit and adapted to co-act with said contacts in the coin receiver and to retain a coin in the latter, a plurality of contact brushes carried by the coin receiver and forming the other terminals of said branches of the shunt circuit, a commutator wheel in the shunt circuit and having segments of different lengths to co-act with said brushes, tappet pins upon the commutator wheel, a pneumatic provided with a spring detent finger to co-act with said tappet pins to rotate said wheel in one direction, means for rotating said wheel in the other direction and means actuated by the motor in said motor circuit for operating the last mentioned pneumatic.

7. The combination of a coin chute, a motor circuit, stop contacts in said circuit for arresting a coin in the chute, a coin receiver, a pneumatic for operating said coin receiver, means actuated by the motor in said circuit for operating said pneumatic, a shunt circuit having a plurality of branches, a plurality of contacts arranged in the coin receiver and forming terminals of said branches, a main contact included in the shunt circuit and adapted to co-act with said contacts in the coin receiver and to retain a coin in the latter, a plurality of contact brushes carried by the coin receiver and forming the other terminals of said branches of the shunt circuit, a commutator wheel in the shunt circuit and having segments of different lengths to co-act with said brushes, tappet pins carried by said wheel, a pneumatic provided with a spring tappet finger to engage said pins to rotate the wheel intermittently in one direction, means for rotating said wheel in the opposite direction, means for limiting the rotation of said wheel, a detent for frictionally holding said wheel against movement, and means operated by the motor in said motor circuit for operating the last mentioned pneumatic.

8. The combination of a coin chute having

a flared inlet, a receiving plate arranged over said inlet and formed with a plurality of different sized slots to receive coins of different denominations, a coin receiver in communication with the other end of the chute and provided with a main contact and a plurality of contacts arranged at different distances from the main one and adapted to serve as stops for the coins, a circuit making and breaking device, a motor circuit, and a shunt circuit having a plurality of branches and including said circuit making and breaking device and said contacts and means for operating said device.

9. The combination of a coin chute, stop contacts to arrest a coin deposited therein, a movable coin receiver arranged between said stop contacts and having a coin passage, a plurality of contacts arranged in the passage of the receiver, a main contact plate to co-act with the last mentioned contacts and to close one side of the coin passage in the receiver when the latter is retracted, a motor circuit including all of said contacts and means controlled by the motor in said circuit for actuating said receiver.

10. The combination of a coin chute, stop contacts to arrest a coin deposited therein, a movable coin receiver arranged between said stop contacts and having a coin passage, a plurality of contacts arranged in the passage of the receiver, a main contact plate to co-act with the last mentioned contacts and to close one side of the coin passage in the receiver when the latter is retracted, a motor circuit including all of said contacts, a circuit making and breaking device, and means controlled by the motor for operating said device and said coin receiver.

11. The combination of a coin chute, stop contacts to arrest a coin deposited therein, a movable coin receiver arranged between said stop contacts and having a coin passage, a plurality of contacts arranged in the passage of the receiver, a main contact plate to co-act with the last mentioned contacts and to close one side of the coin passage in the receiver when the latter is retracted, said main contact being electrically connected to one of the stop contacts, a commutator wheel having a plurality of segments of different lengths electrically connected to the other stop contact, a plurality of brushes carried by the coin receiver and electrically connected to the contacts in the passage in the coin receiver, a motor circuit having said stop contacts included in it, means for actuating the coin receiver and means for intermittently rotating said commutator wheel.

12. The combination of a mechanism to be operated, an electric motor for operating the same, a circuit for the motor, a coin receiver, a shunt circuit having a plurality of branches, a main contact in the shunt circuit and carried by the receiver, a plurality



of contacts to co-act with the main one and arranged at different distances from the same to serve as stops for coins of different sizes, a circuit making and breaking device  
5 included in the branches of the shunt circuit and means for operating said device.

13. The combination of a mechanism to be operated, an electric motor for operating the same, a main circuit for the same, a coin  
10 receiver, a main contact, a plurality of contacts arranged at different distances from the main contact and adapted to serve as

coin stops, a circuit making and breaking device, means for operating said device, and a shunt circuit having a plurality of  
15 branches and including said circuit making and breaking device, the main contact and certain of the other contacts.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 20

JAMES L. FERGUSON.

Witnesses:

LYLE L. JONES,  
H. R. McCLUER.