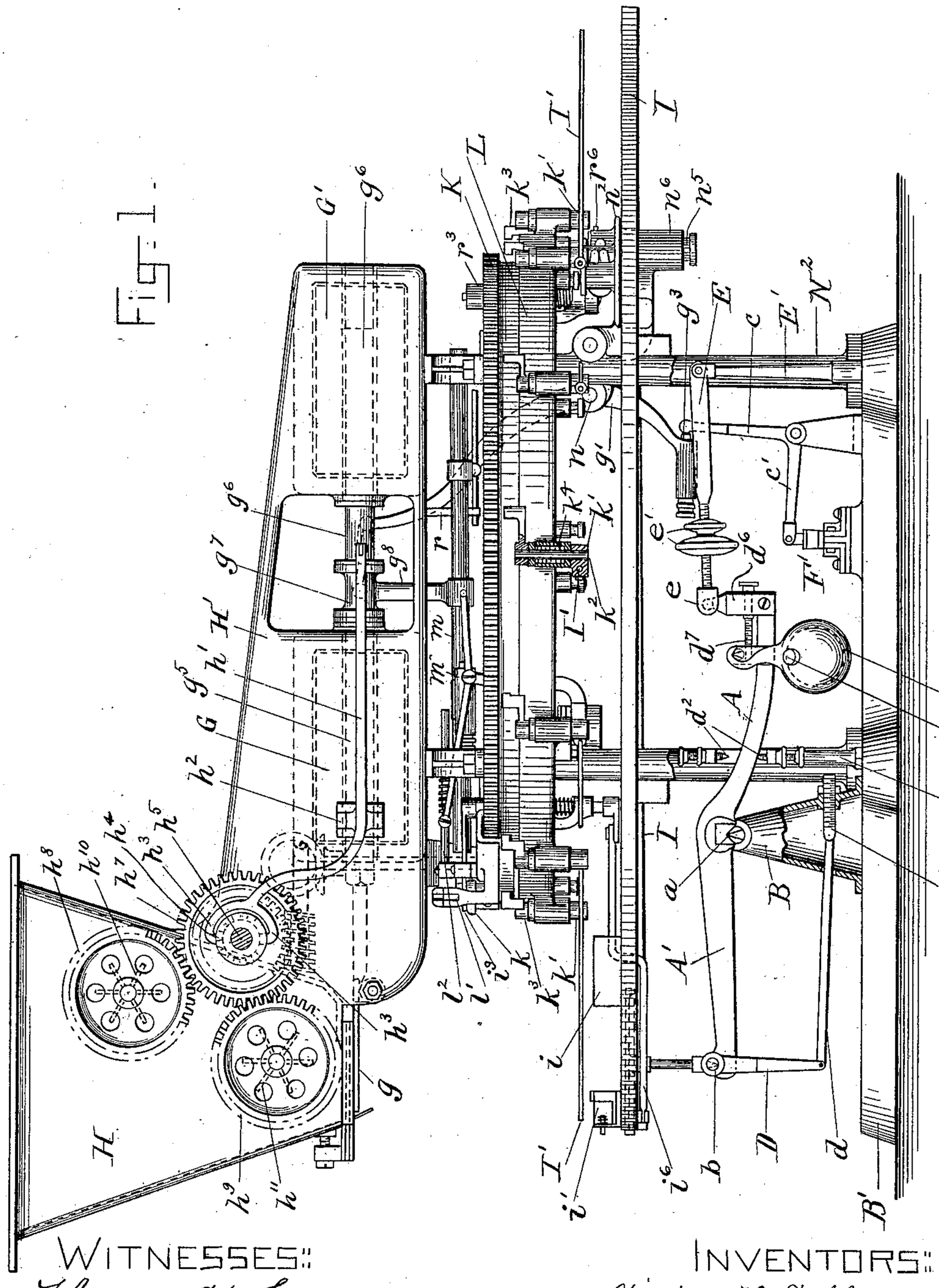
(No Model.) 8 Sheets—Sheet 1.

W. H. DOBLE & G. W. WATSON.

AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

No. 556,258. Patented Mar. 10, 1896.

Fig. 1.



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(No Model.) 8 Sheets—Sheet 2.

W. H. DOBLE & G. W. WATSON.

AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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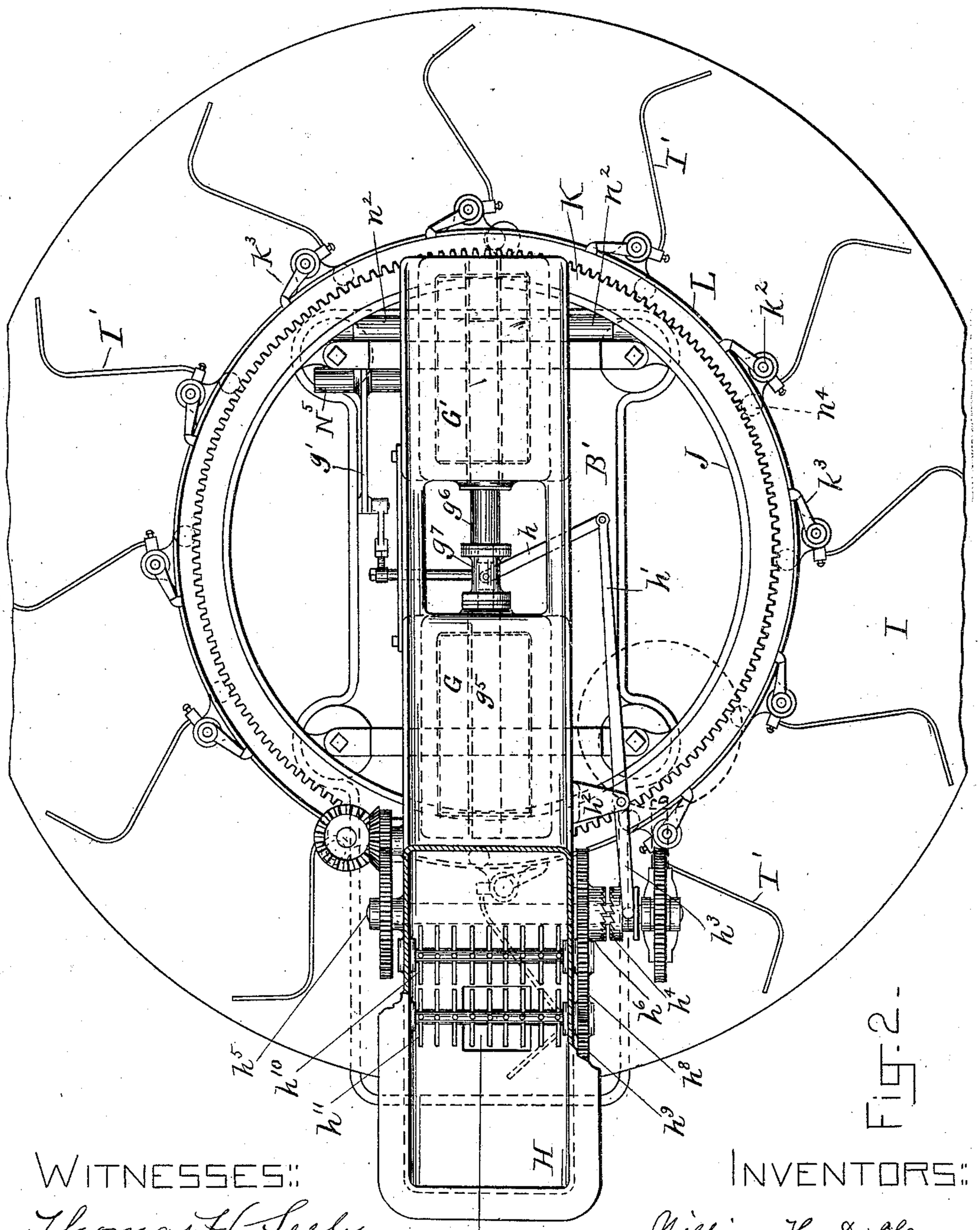

Fig. 2.

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(No Model.) 8 Sheets—Sheet 3.

W. H. DOBLE & G. W. WATSON.

AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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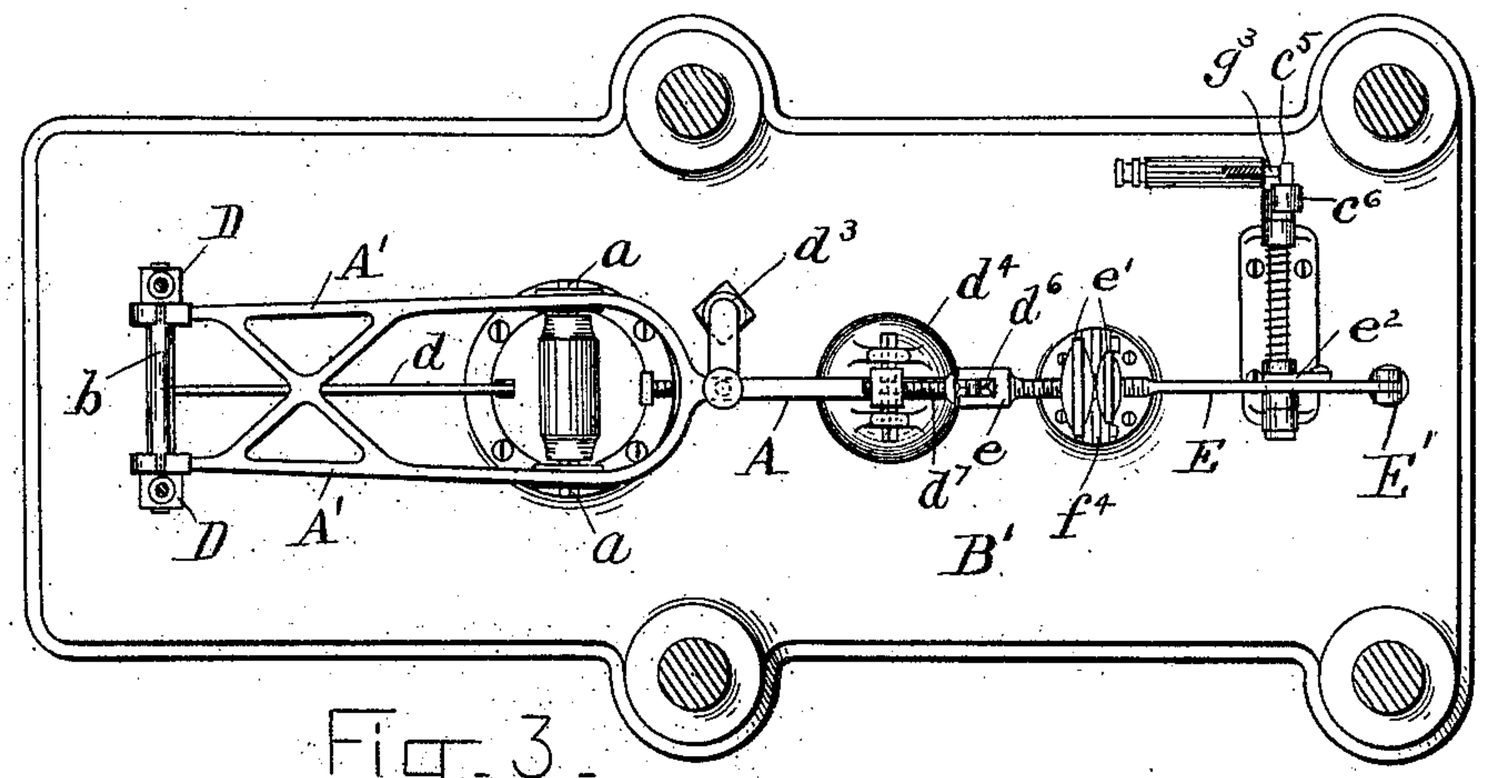

Fig. 3.

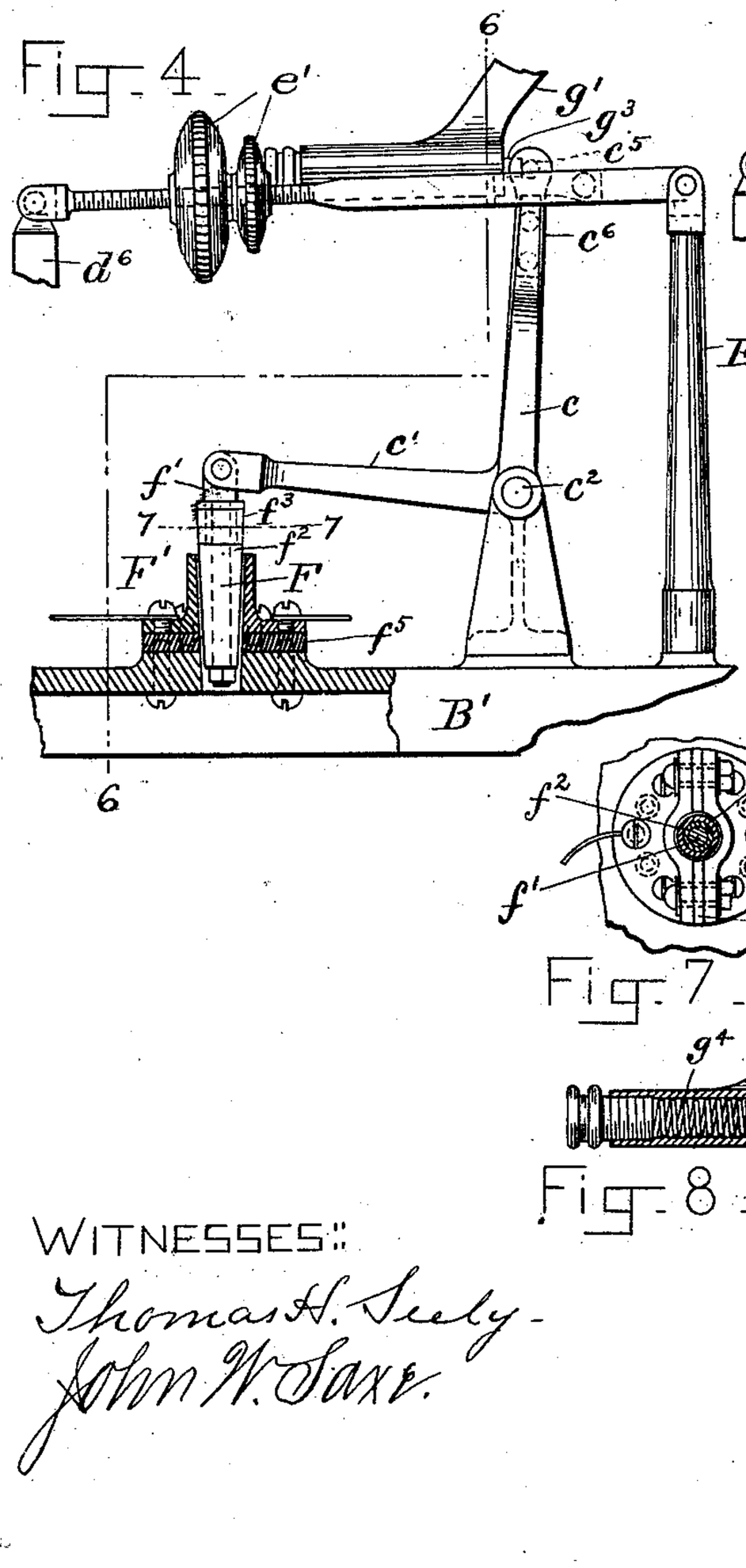

Fig. 4.

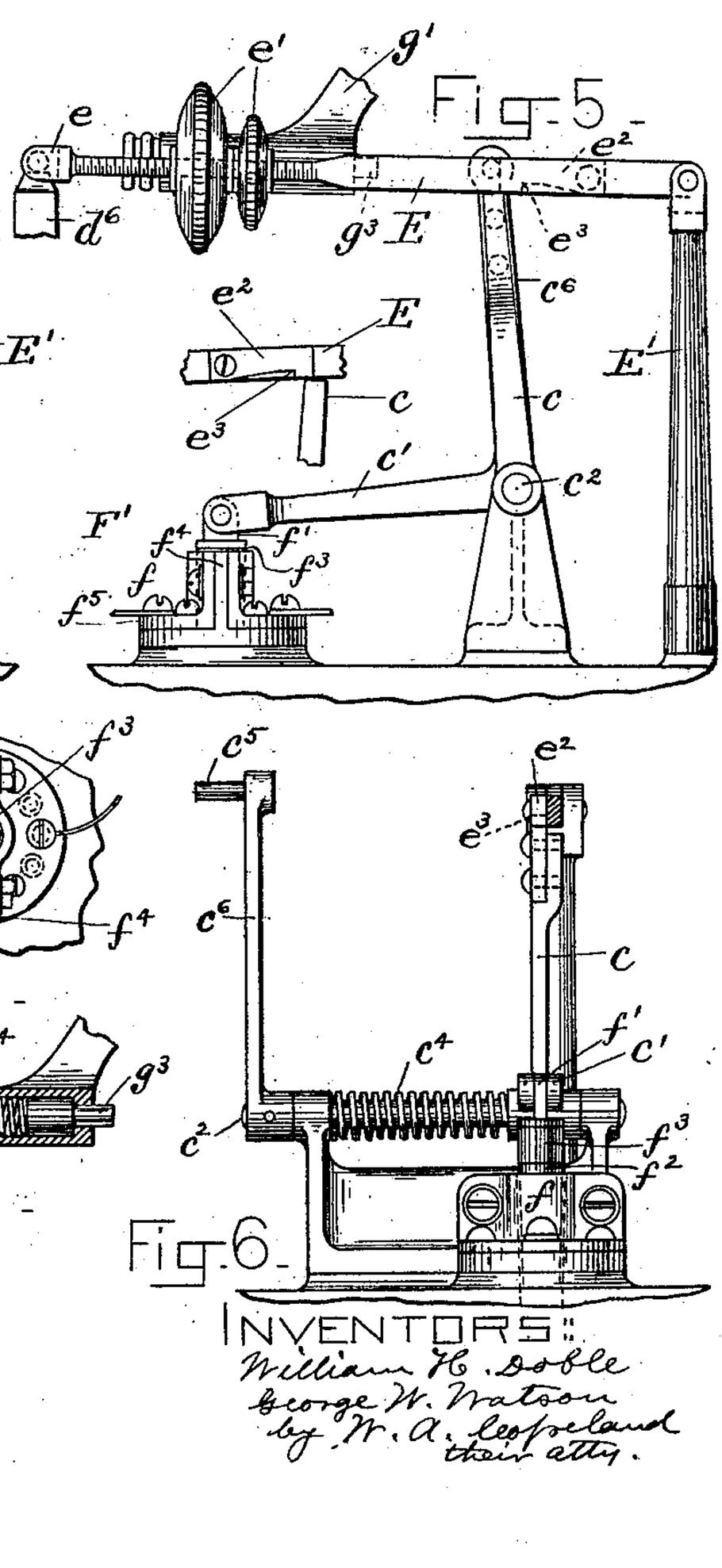

Fig. 5.

Fig. 7.

Fig. 8.

Fig. 6.

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W. H. DOBLE & G. W. WATSON.

AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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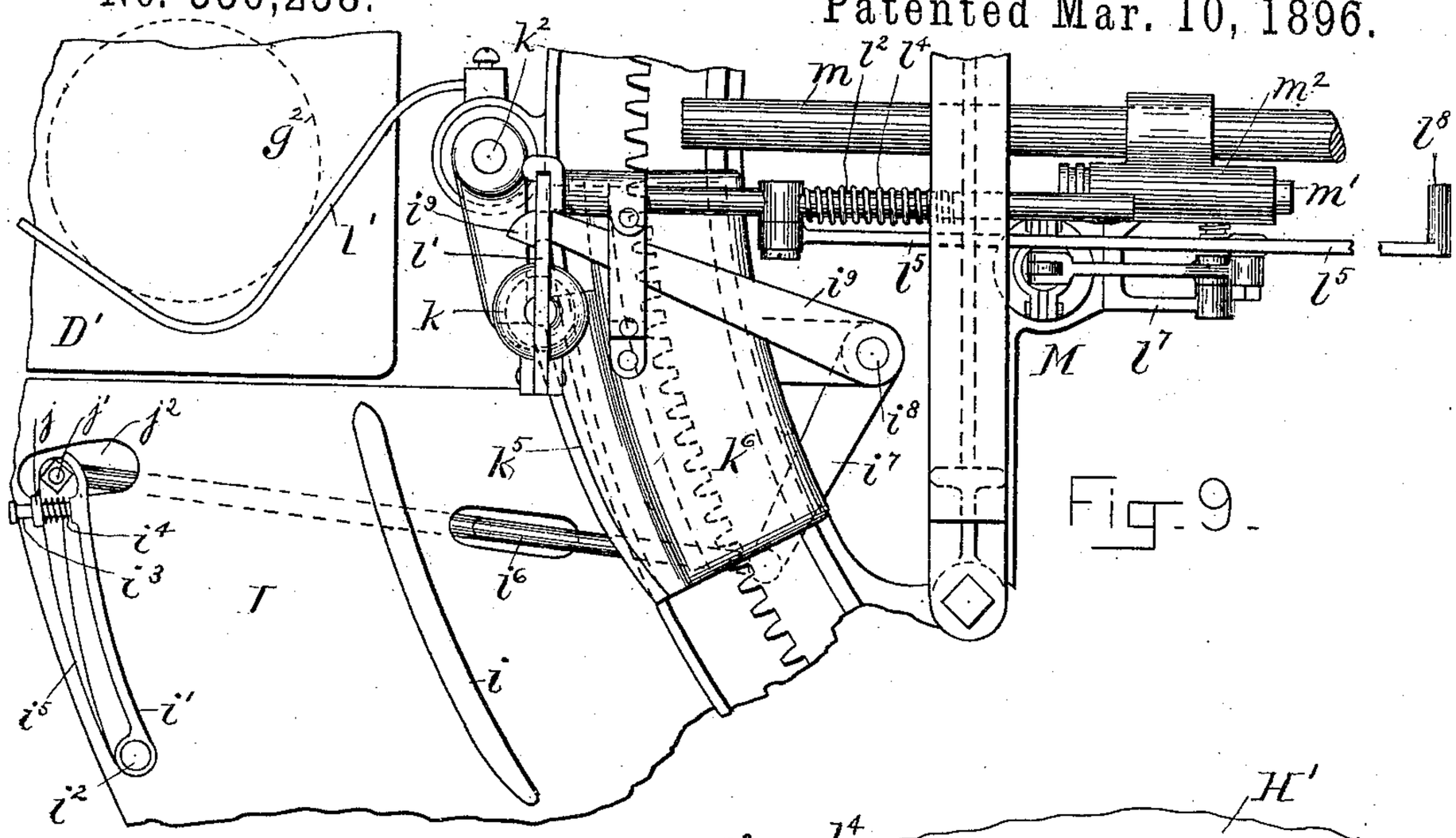

Fig. 9.

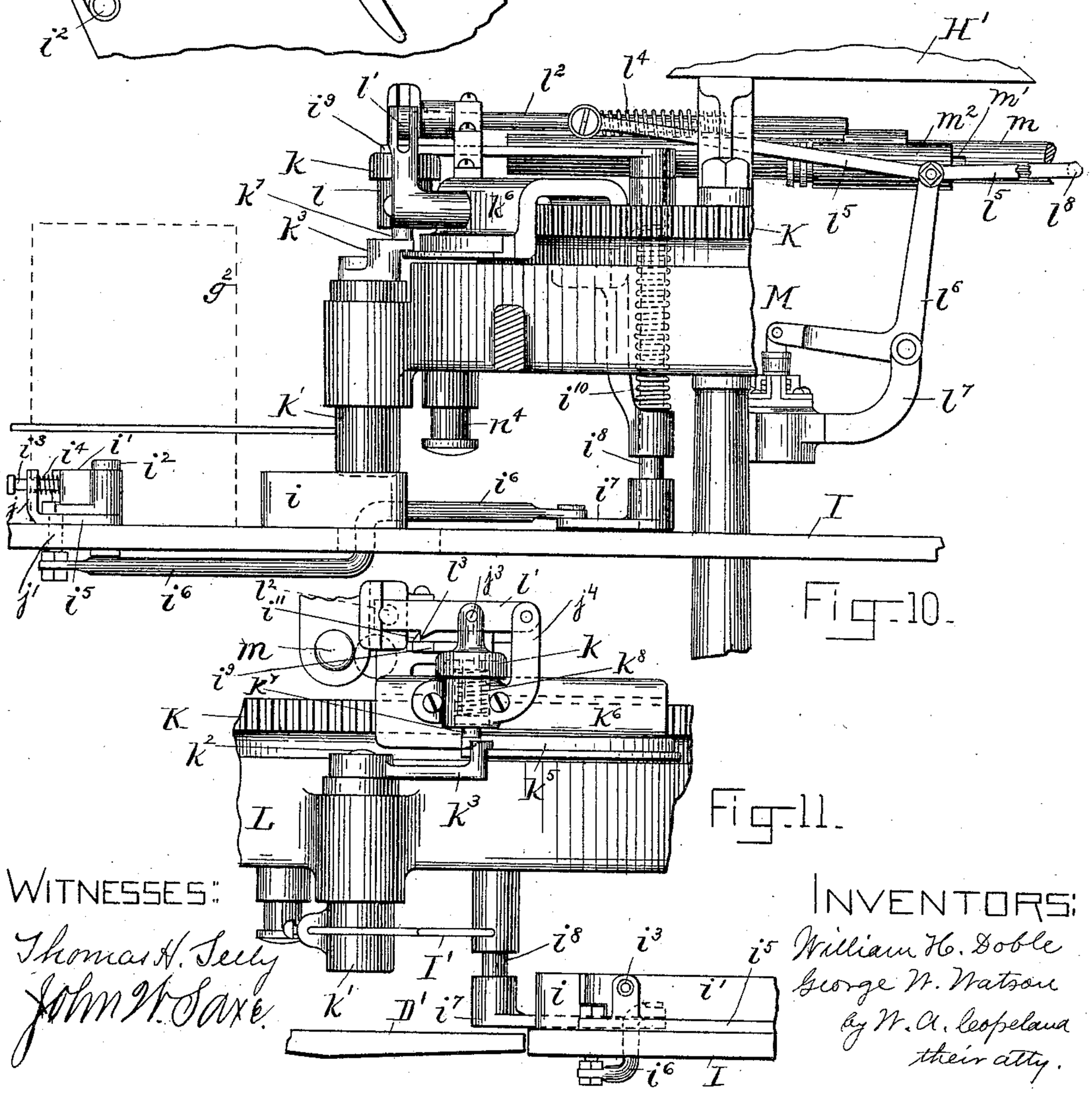

Fig. 10.

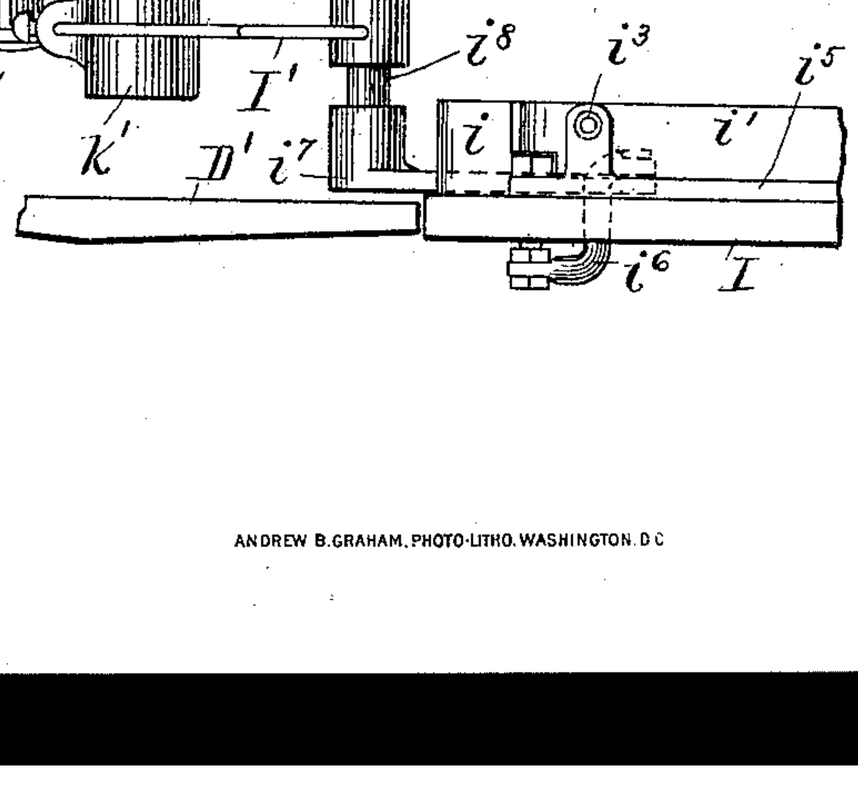

Fig. 11.

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AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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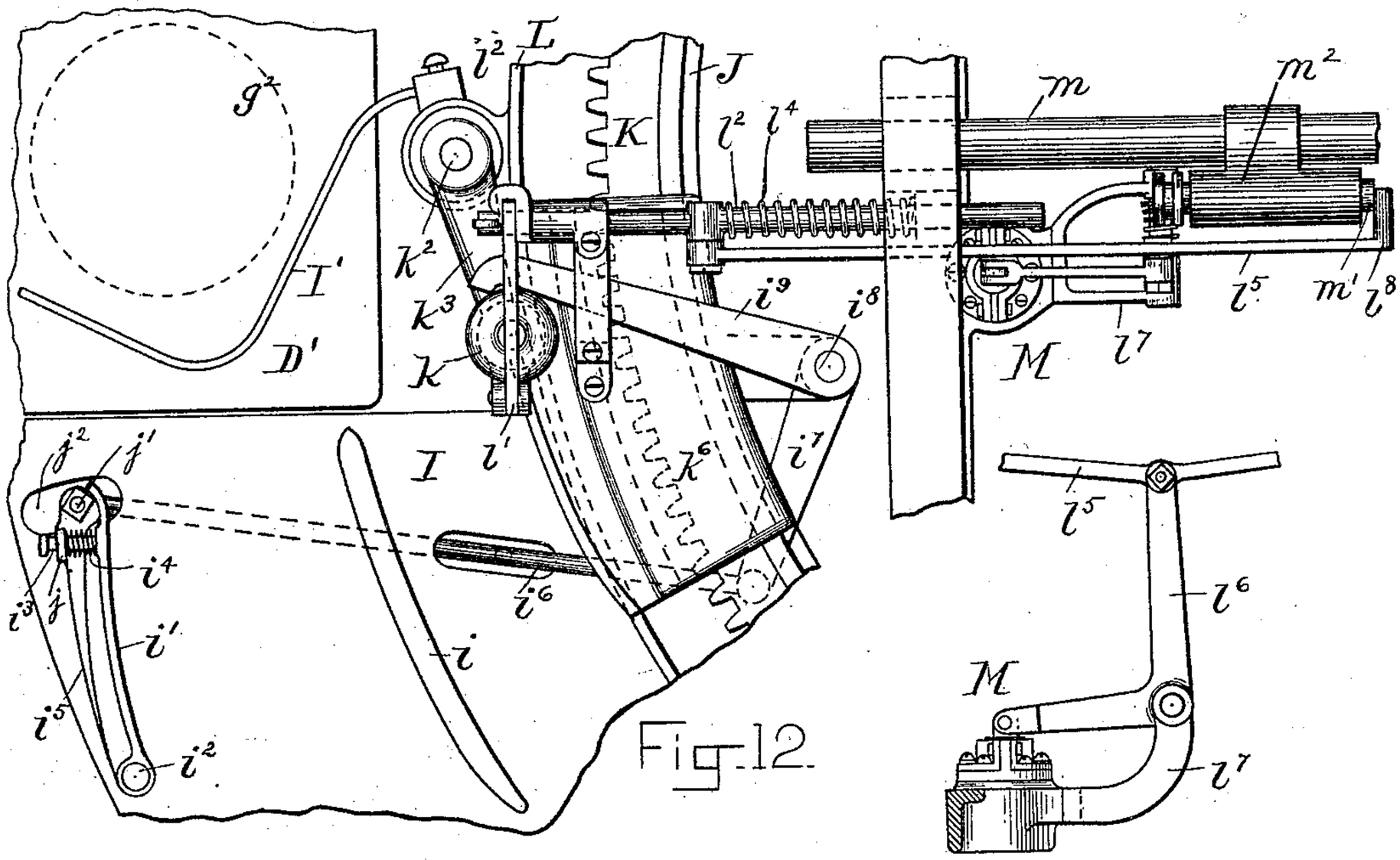

Fig. 12.

Fig. 14.

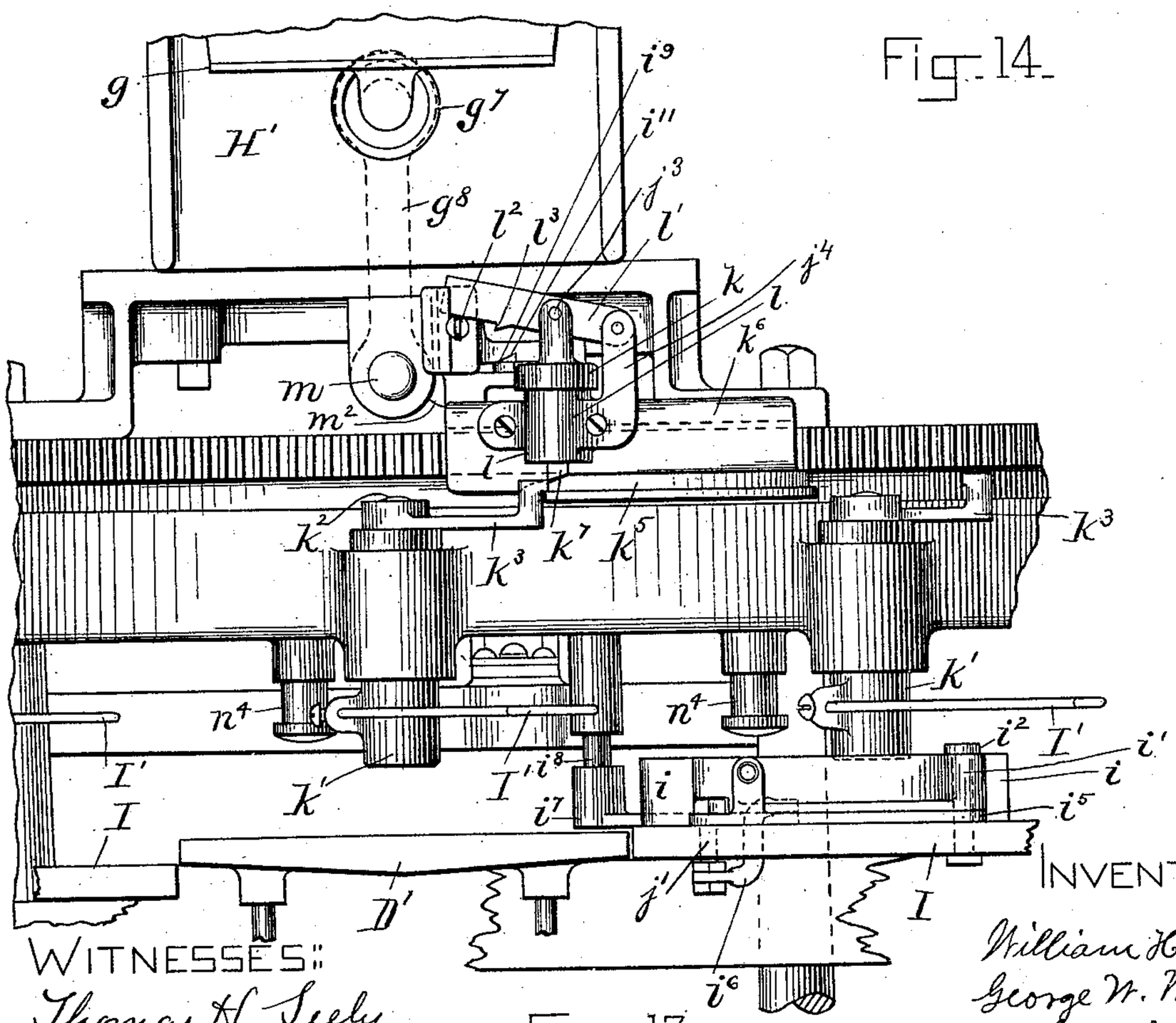

Fig. 13.

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AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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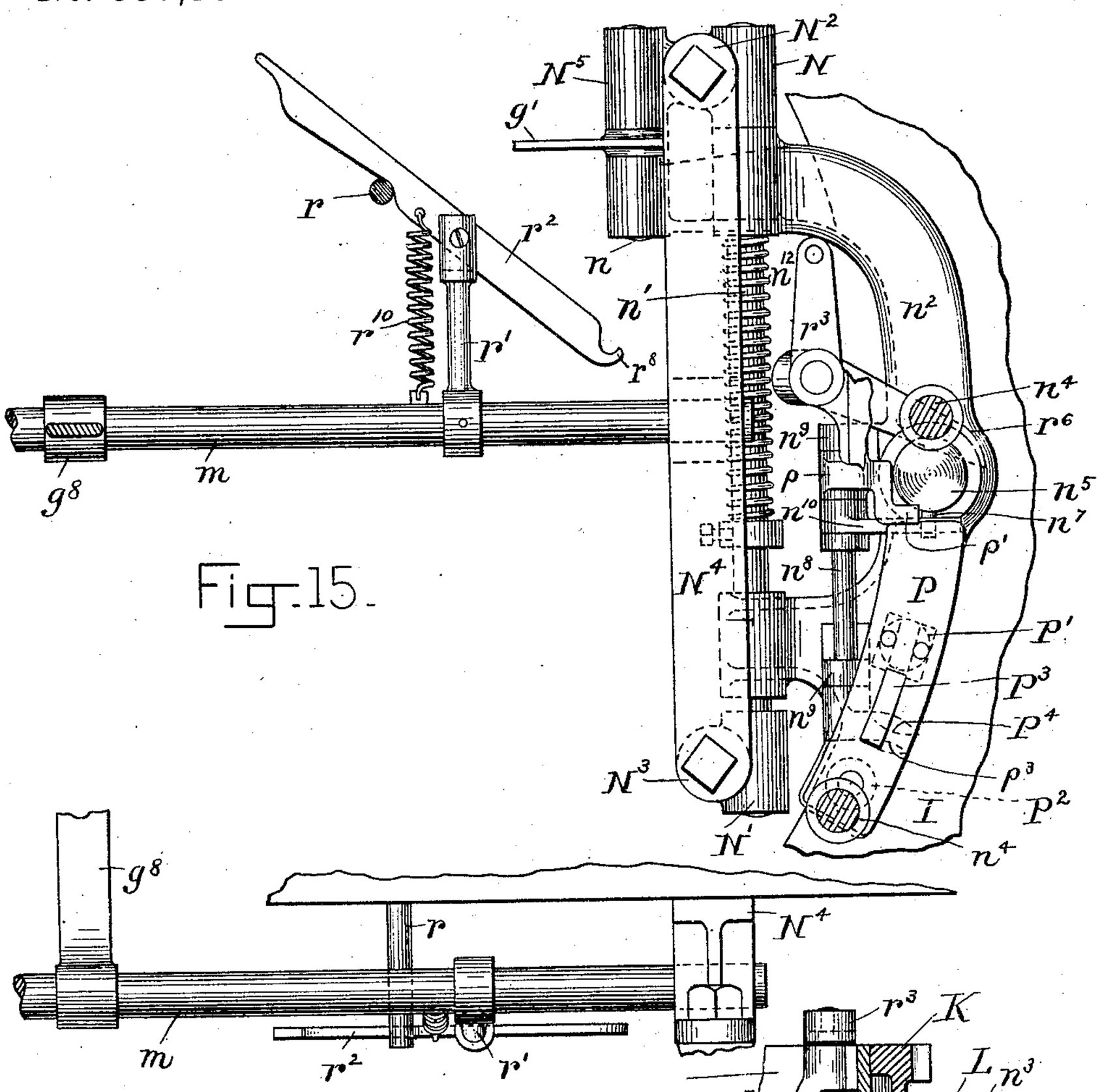

Fig. 15.

Fig. 16.

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AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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Fig. 17.

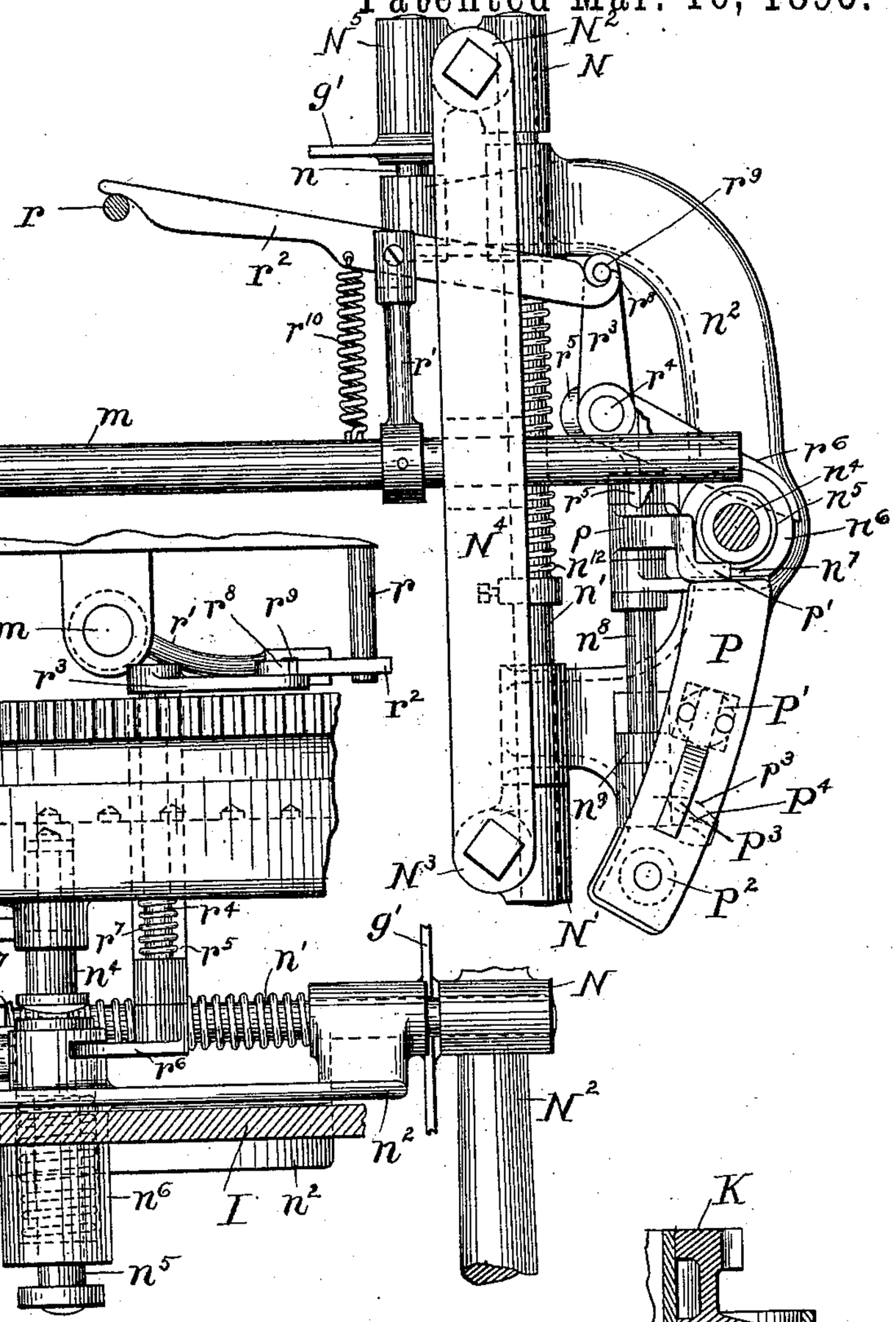

Fig. 18.

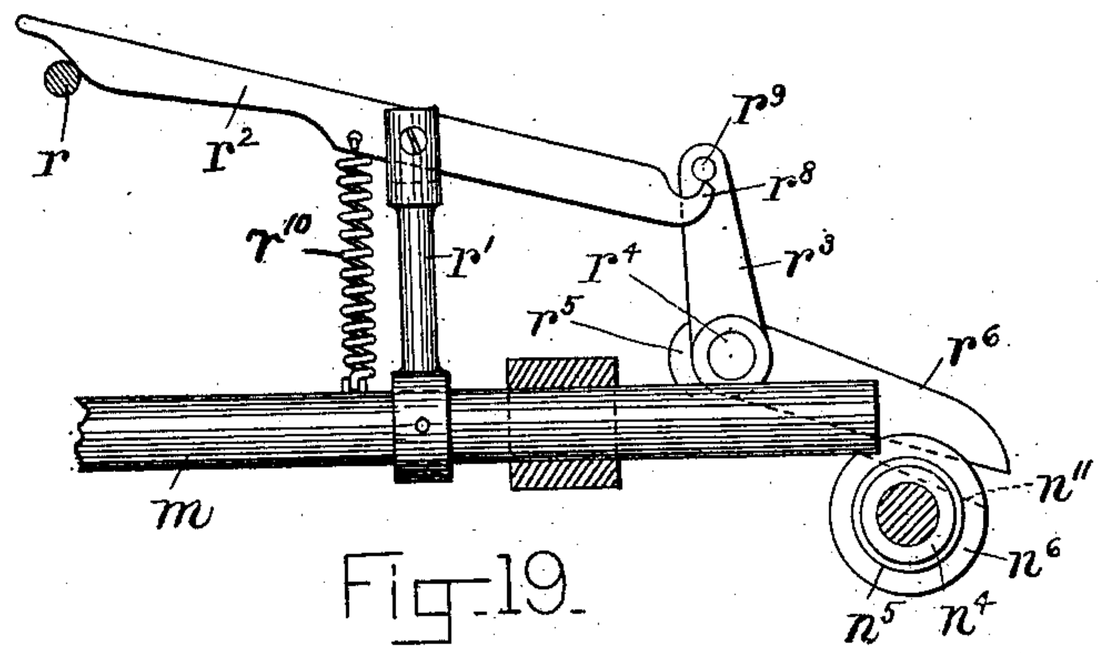

Fig. 19.

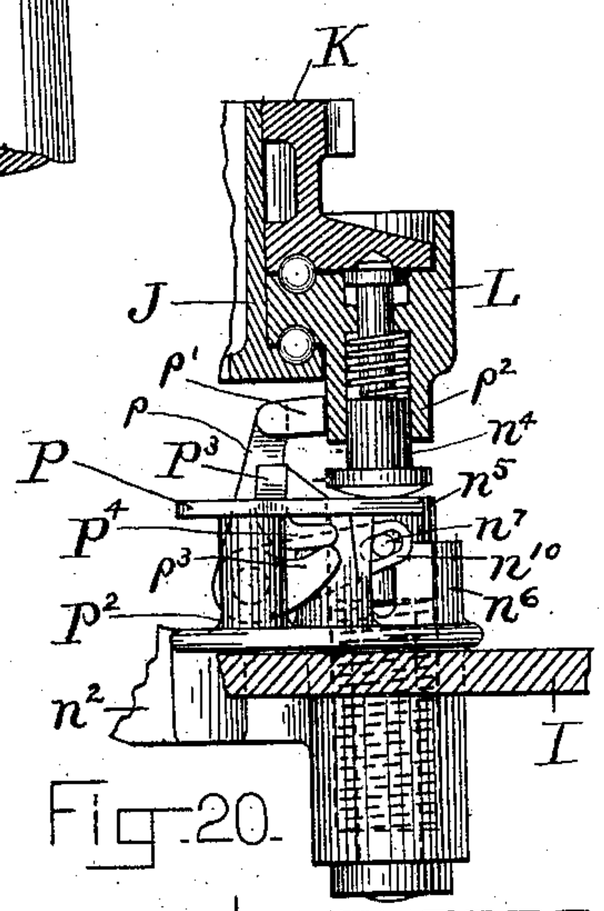

Fig. 20.

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(No Model.) 8 Sheets—Sheet 8.

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AUTOMATIC WEIGHING AND PACKAGE FILLING MACHINE.

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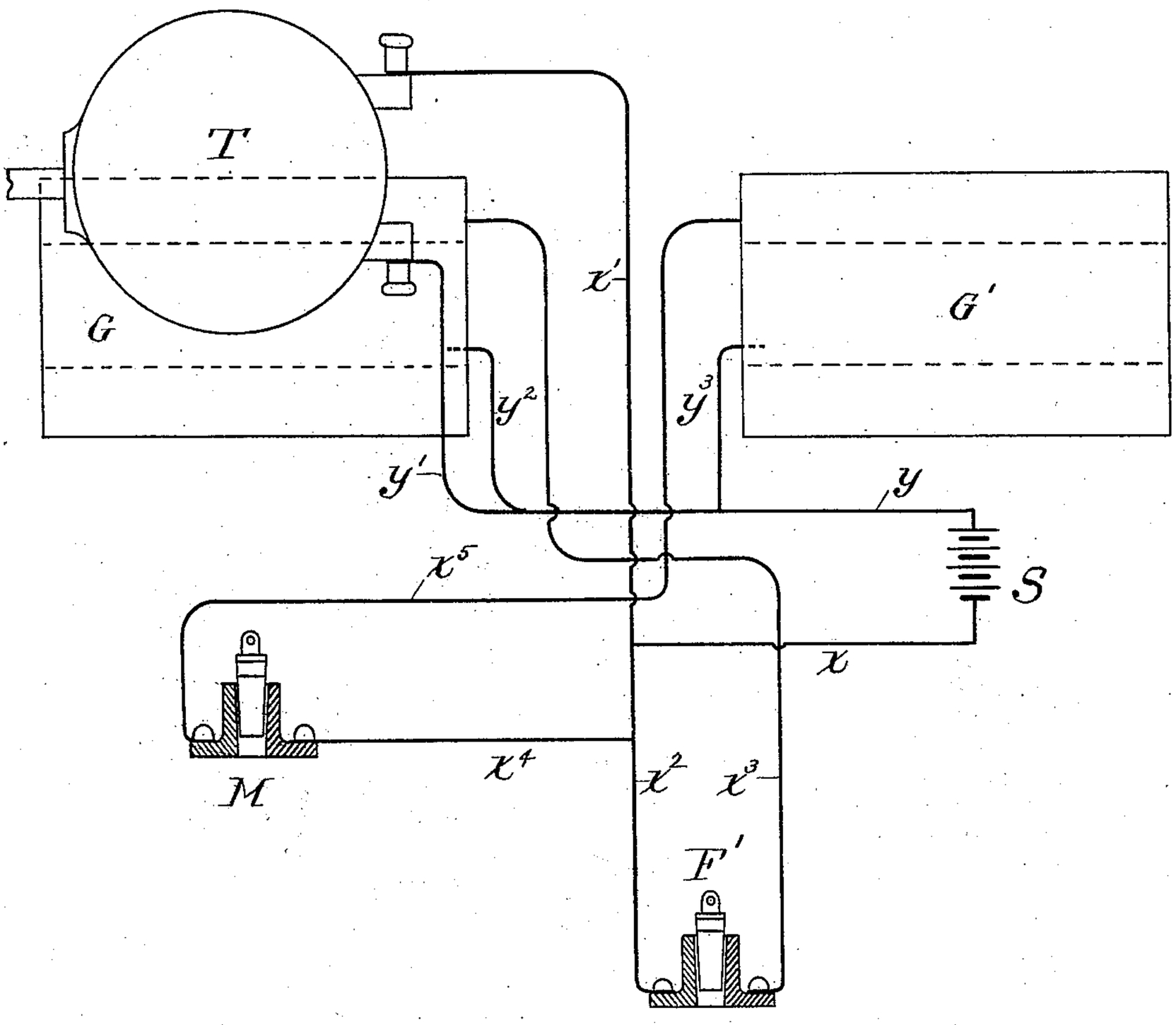

Fig. 21.

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UNITED STATES PATENT OFFICE.

WILLIAM H. DOBLE, OF QUINCY, AND GEORGE W. WATSON, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE ELECTRIC SCALE COMPANY, OF KITTERY, MAINE.

AUTOMATIC WEIGHING AND PACKAGE-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,258, dated March 10, 1896.

Application filed March 5, 1895. Serial No. 540,573. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. DOBLE, residing at Quincy, in the county of Norfolk, and GEORGE W. WATSON, residing at Boston, in the county of Suffolk, Commonwealth of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Weighing and Package-Filling Machines, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

Our invention relates especially to that class of weighing-machines known as "automatic weighing and package-filling machines," and has particular reference to the scale-beam and its connections, the electrical contacts, and the mechanism for feeding the goods and moving the packages.

The invention is especially adapted for a machine operated by electricity, and the machine shown in the drawings and particularly described in the specification will be of that class; but some features of the invention are applicable to machines operated in other ways, and it is not intended herein to limit to electrically-operated machines the claims for features that are adapted for use in other kinds of weighing-machines.

It is found in practice that where the scale-beam is constructed as one continuous beam the jarring of the machinery in a large factory causes the scale-beam to vibrate, so that when the package is filled to about the required weight the vibration prevents the electrical contact from being made as quickly as it should be made, and the gate is slow in closing, and there is consequently an overweight in the package.

The main feature of our invention consists in gate-opening and gate-closing mechanism in combination with an automatic package-carrier, the gate-opening mechanism being actuated by the package to open the gate when a package is brought to the scales, and the gate-closing mechanism being actuated to close the gate by the tipping of the scales, either gate-moving mechanism becoming inoperative before the other becomes operative.

Another feature consists in a carrier which carries the package to the scales and withdraws from contact with the package while it is on the scales and removes the package when filled.

Another feature consists in the novel contact mechanism.

Our invention further consists in numerous other features which will be more particularly described and claimed.

In the drawings, Figure 1 is a side elevation of a machine embodying our invention. Fig. 2 is a plan. Fig. 3 is a plan of the scales and gate-closing contact. Fig. 4 is a side view of the auxiliary beam and of the gate-closing contact, partly in section, with the contact open. Fig. 5 is a similar view with the contact closed. Fig. 6 is an end view, partly in section, on lines 6 6 of Fig. 4. Fig. 7 is a plan view of the contact on line 7 7 of Fig. 4. Fig. 8 is a detail section through the spring push-pin. Fig. 9 is a plan view of a portion of the table and scale-pan and rings and adjacent parts in detail, showing their position when a can has just reached the scale and before the gate is opened. Fig. 10 is a side view of Fig. 9. Fig. 11 is an end view of Fig. 9. Fig. 12 is a plan view of the parts shown in Fig. 9 immediately after the gate is opened. Fig. 13 is an end view of the same. Fig. 14 is a side view of the gate-opening contact when the contact is closed. Fig. 15 is a plan view of a part of the machine, showing the locking mechanism for locking the package-carrying ring to the revolving gear when the package-ring is locked to the gear-ring. Fig. 16 is a side view of the locking mechanism and section through the ring and gear, showing one of the locking-pins unlocked. The rings are supposed to be locked, however, by the other pin, which is partly broken away. Fig. 17 is a plan view of the parts shown in Fig. 15 when the rings are unlocked. Fig. 18 is an end view. Fig. 19 is a detail plan of the hooked lever freeing the spring-plug connected with the locking mechanism just after a can is filled. Fig. 20 is a side view of the mechanism, partly in section, with the rings locked. Fig. 21 is a diagram showing the wire connections. The wires are omitted from the most of the drawings for greater clearness in showing the other parts;

but the proper connections will be understood by reference to the diagram.

G G′ are two solenoids whose cores g^5 g^6 are connected by a block or union g^7. The core of the forward solenoid, G, is connected with the gate g, which controls the outlet of the hopper H, and the circuit is made alternately through the two solenoids, so that the gate is opened and closed by the reciprocation of the core at the proper times for feeding and for stopping the flow of goods, as will be more particularly described hereinafter.

H′ is the frame. A link h is pivoted at one end to the union g^7, and at its other end it is pivoted to the lever h', which is fulcrumed in the bracket h^2 attached to the frame. The lever h' has forked ends h^3 h^3, which have pins sliding in a groove in the clutch h^4. This clutch is keyed to the driving-shaft h^5, upon which it is free to move laterally and is adapted to engage with a clutch h^6 on the hub of the pinion-wheel h^7 mounted on the main driving-shaft h^5. This main shaft may be driven by any suitable power. In the diagram shown in Fig. 21 we have represented the power as being supplied by an electric motor. Pinion-wheel h^7 engages with the two pinion-wheels h^8 h^9, which drive the revolving combs h^{10} h^{11}, which serve as feeders and keep the sticky or moist goods from lumping and break up the lumps if already formed. When the gate is closed, as shown in Figs. 1 and 2, the clutches h^4 and h^6 are disengaged and the combs are not in motion, as it is not desirable to stir the goods except during the feeding. When the gate is opened the clutches will be brought into engagement and the combs will be set in operation.

I is a stationary circular table on which the empty cans or boxes are placed in front of the hooked fingers I′ as fast as the full cans are removed.

J is a fixed inside ring which supports the ring L.

The gear-ring K is supported on ball-bearings in the finger-ring L and is geared to the main driving-shaft and revolves constantly while the power is applied.

The ring L, which carries the package-feeding fingers I′, is revolved intermittently to bring the empty cans to the scale-pan as fast as the full ones are removed by means which will be explained in detail hereinafter.

For convenience of distinction from the other rings the ring L is called the "finger-ring."

The main forked scale-beam A having the two arms A′ A′ is pivoted on the knife-edge pivots a a resting on the hollow post B rising from the base B′. We prefer to make the beam of aluminium for lightness. On the forward end of these arms is pivoted the cross-bar b of the forked frame D, which supports the scale-pan D′. The frame D is hinged at its lower end to the arm d, which is pivoted in a slot in the adjustable screw d' in the inside of the hollow post B. The screw d' being adjustable horizontally allows the arm d to be adjusted to the same length as the forward arm of the main scale-beam, so as to secure a parallel movement of the arm d and forward arm of the scale-beam and also keep the poise and the scale-pan supporting-frame parallel and vertical. The rear arm of the scale-beam A has its up-and-down stroke limited by the adjustable set-screw stops d^2 d^2 set in the brackets on the upright post d^3. The poise d^4 is made hollow, with an opening in which is a plug d^5, and the poise is partially filled with mercury, shot or other heavy easily-removable material to bring it to the desired weight. Mercury is preferable because it is heavy and also more readily maintains a level when the scale-beam rises or falls.

The auxiliary scale-beam E is hinged at the rear end in the upper end of standard E′, and during certain periods of the operation the block e on the forward end rests on the block d^6 on the rear end of the main scale-beam. The weights e' are adjustable lengthwise on the auxiliary beam, so that the desired resistance to the main beam may be secured, and the position of the poise d^4 is adjusted by the screws d^7. The auxiliary beam has on one side a ratchet-piece e^2, with which the upper end of angle-bar lever c c' engages. This angle-bar is pivoted on the fixed shaft c^2. At the forward end of the horizontal arm c' of the angle-bar is pivoted the drop f', which forms the core of the tapered plug or plunger F. This plug is adapted to fit into the cup f, forming the contact mechanism F′, which will be referred to hereinafter as the "gate-closing contact mechanism." The core f' of the plug is inclosed in a tapered cylinder f^2, made of some non-conducting material. We prefer to make it of wood fiber, as being easily molded to the desired shape and excellent for the purpose. It is made in two sections, like two collars end to end. One of the sections is made with an offset at the inner end, and the two sections when put together form a cylinder with tapering walls and a groove around the periphery. Within the groove is a ring or collar f^3, of brass or other good conducting material, whose outside is flush with the surface of the fiber-cylinder, so that the outside appearance of the whole is as of a plug tapering downward. The cup f is composed of two semicircular sections, of brass or other good conducting material, to each of which is clamped one of the wires. The two sections of the cup are insulated from each other and from the base B′ by the strips of fiber f^4 f^5. The inside of the cup flares to form a snug fit for the tapered plug F. When the plug drops into the cup the circuit is closed through the rear solenoid as soon as contact is made by the metal collar on the plug wedging into the cup and coming into contact with the two metal sections of the cup. When the upper end of the vertical arm c of the angle-bar rests in the notch e^3 of ratchet-piece e^2 the plug is held out of contact. This is its posi-

tion when an empty can first reaches the scale-pan and the gate is closed, as in Fig. 1 and in most of the other drawings, except where it is specially mentioned that the figure represents a different stage in the operation. At this stage the electric current is not passing through either solenoid, both contacts being open, the gate being closed when the upper contact was last made and left closed when that contact was broken. As soon as the circuit is made through the rear solenoid, G′, the gate g slides open, the bent lever g', connected with the core of the solenoid, is turned on its pivot n, carrying back the spring-seated pin G³, and the goods flow into the can.

When the can contains the required weight, the scale-pan drops, the rear end of the main scale-beam lifts the auxiliary beam, raising the ratchet-piece e^2 from the end of the angle-bar, and the coil-spring c^4 around the shaft of the angle-bar throws the angle-bar forward on its pivot, and the plug F is forced into its cup, making the contact and closing the circuit through the forward solenoid, which closes the gate. As the core of the solenoid slides in this closing movement it turns the bent lever g' on its pivot, and the spring push-pin g^3 pushes against the stud c^5 projecting from the upright arm c^6 on the other end of shaft c^2 from the arm c, thereby tipping up the angle-bar $c\,c'$ again and lifting the plug, immediately breaking the circuit. The moment the circuit is broken the package-moving ring L carrying the fingers I′ is locked to the constantly-moving gear-ring K by means which will be described hereinafter, and the full can is removed from the scale-pan and an empty can is moved toward the scale-pan. As soon as the can g^2 reaches the middle of the scale-pan the circuit is made through the rear solenoid by means of the upper contact, as will be explained. The gate is thereby opened and the goods begin to flow, as already described.

The position of the poise on the main scale-beam and of the weights on the auxiliary beam is determined experimentally according to the proposed weight of goods for each package before the machine is set in operation. The length of arm of the main scale-beam and of the auxiliary beam from the respective pivots should be different, so that the vibrations will be in different times and neutralize each other.

The push-pin g^3 is spring-seated, its spring g^4 being a little more powerful than the spring c^4 on the shaft of the angle-bar, which tends to hold the plug in the cup; but the spring c^4 is powerful enough, taken together with the friction caused by the snug fit of the plug, so that the spring of the pin is nearly all taken up during the first part of the movement of lever g' on its pivot before the push-pin begins to lift the plug. Then, when the core of the solenoid has nearly completed its forward stroke, the spring of the push-pin is all taken up and the power of the now compressed spring is sufficient to enable the lever g' to overcome the spring c^4, and as the core of the solenoid completes its movement the plug is quickly lifted, breaking the contact.

Referring now especially to Figs. 9 to 13, $i\,i'$ are guides between which the empty can is carried just before it reaches the scale-pan. The inner guide, i, is fixed to the table, and the outer guide, i', is pivoted at the entrance end on the pivot i^2, which also serves as a pivot for the lever i^5 immediately beneath the guide i'. Fixed to one side of the guide i', near its exit end, is a pin i^3, which projects through a slot in an ear j upon the lever i^5, and around the pin is a spring i^4. Normally the exit-opening is narrower than the entrance and does not permit the can to pass through without pressing against the guides and spreading the outer one, i', thereby compressing spring i^4 and also spreading out the lever i^5, which in its first position does not lie quite as far inward as the guide i', and therefore does not come directly in contact with the can.

A stud j' on the exit end of the lever i^5 projects down through a slot j^2 in the table I, and to this stud j' is pivoted the bent rod i^6, which is pivoted at its other end to the lever i^7, said lever i^7 being fast to the shaft i^8. To the upper end of this shaft is fixed the arm i^9, which in its normal position rests upon the top of the cap k, in which position it is held by the torsion-spring i^{10} around the shaft i^8 to prevent the cap k from rising. There is a series of package-moving fingers I′, each of which is held in a bracket k', which is fast to the lower end of the shaft k^2, and the cam-lever k^3 is fast to the upper end of said shaft. The shaft turns in a boss upon the ring L, and around it is a torsion-spring k^4. (Shown in Fig. 1.) This spring is to keep the cam end of lever k^3 against the ring L until it reaches the cam-track k^5 shortly before the can reaches the scale-pan. This cam-track is a curved flange-piece supported on a bent bracket k^6, which arches over the gear-ring K and is fastened to the inner side of the stationary ring J. The lever k^3 has a beveled end which, as the finger-ring L revolves, comes in contact with the beveled lower end of stud k^7, which projects downward from the under side of cap k. The coil-spring k^8 around the stud k^7 tends to hold the stud down against the cam-track. The stud moves up and down in a boss l fastened to the side of the arched bracket k^6 above the cam-track k^5. This boss l has an upwardly-extending arm j^4, to the end of which is pivoted the arm l', which is also pivoted to the cap k. The tooth-latch l^3 on the under side of lever l' engages with tooth i^{11} on the arm i^9 at a certain stage in the operation after the arm i^9 is removed from the cap k to prevent the spring i^{10} from pulling the arm i^9 back against the cap k until the proper time arrives. The lever l' forms a bar to prevent the forward thrust of the sliding rod l^2 under pressure of spring l^4. Link l^5 is pivoted to the side of rod l^2, the pivot forming a stop for the spring

l^4. Link l^5 is also pivoted to the upper end of angle-bar contact-lever l^6, supported in the bracket l^7, which is attached to the supports of the machine. The angle-bar l^6 operates the plunger of the contact mechanism M, which forms a part of the circuit through the rear or gate-opening solenoid, G′, and which is similar to the gate-closing contact mechanism F′ already described.

When in operation a can approaches the scales, it passes through the guides i i' and spreads the outer guide, i', and also the lever i^5 slightly, which, acting through rod l^6 and lever i^7, moves the arm i^9 to one side away from the cap k, allowing the inclined back of the tooth i^{11} on the upper side of arm i^9 to push against the inclined back of tooth l^3 on the under side of lever l' and ride under it, raising lever l' and stud k^7 and cap k slightly in so doing, but not sufficiently to allow the rod l^2 to be thrust forward. The spring around stud k^7 immediately pulls it down again, and the two teeth engage and prevent the arm i^9 from being pulled back by its spring i^{10}. This is the position shown in Figs. 9, 10 and 11. The beveled end of cam-lever k^3 riding on the cam-track k^5 has now reached the stud k^7, and the arm i^9 being removed from the top of cap k lever k^3 raises the stud k^7 and cap k, thereby raising lever l' from the front of the rod l^2 and allowing the latter to be thrust forward by the spring l^4. At the same time the tooth i^{11} is released from engagement by the tooth l^3, and the arm i^9 is drawn part way back; but as the cap k is now raised arm i^9 will bear against the side of the cap, as shown in Figs. 12 and 13, instead of resting on top. As the rod l^2 shoots forward it carries the link l^5, which pulls the angle-bar contact-lever l^6 forward on its pivot, and the plug in the contact mechanism M is forced into its cup, making the contact and completing the circuit through the rear solenoid, G′, and opening the gate.

The shaft m is rigidly attached to the arm g^8 projecting from the union g^7 betweeen the solenoids. The spring-seated push-pin m is held in a barrel m^2 fixed to the side of the shaft m. As the core of the solenoid slides back, opening the gate, it carries back with it the shaft m, and the push-pin m' strikes the lug l^8 on the end of link l^5, tipping up the angle-bar l^6 and opening the contact M, so that the gate is now open and both contacts are open, leaving the circuit broken through both solenoids. This backward movement of the shaft m also draws back the rod l^2 from under the lever l', compressing spring l^4 again and allowing the spring k^8 to pull the cap k and its stud k^7 and the arm l' down to their normal positions. As soon as cap k descends, the arm i^9 will be drawn back by its spring i^{10} to its position of rest on top of cap k.

As soon as cam-lever k^3 passes the stud k^7 and runs off of cam-track k^5 onto the periphery of the finger-ring L again, the spring k^4 turns the shaft of the cam-lever slightly backward and thereby causes the finger I′ to be drawn back from contact with the can which has now reached its place on the scale-pan beneath the feed-chute of the hopper. The withdrawing of the finger from contact with the can prevents any friction of the finger from interfering with free movement of the scales. As soon as the can contains the required weight, the scale-pan drops and gate-closing contact F′ is closed, making the circuit through the forward solenoid, G, and closing the gate, as already described. The surface of the table I on which the cans stand is lower at the exit side of the scale-pan than at the entrance side, so that when the scale-pan drops it will not fall below the level of the exit side, and when the finger-ring is again set in motion the full can will be pushed along off the scale-pan onto the table on the exit side and the scale-pan will rise again ready for another can.

If by chance a finger passes around with no can in front to spread the guide i', the rod i^6 and lever i^7 and arm i^9 will remain stationary with arm i^9 still resting on top of cap k. Therefore the cam-lever k^3 cannot lift the stud k^7 and has to ride past outside of it. Lever l' will continue to bar the end of rod l^2 and gate-opening contact M will remain open, so that the gate will remain closed and prevent the flow of goods when no can is in place to receive them.

If the rod i^6, lever i^7, shaft i^8 and arm i^9 are omitted, it is obvious that the cam-lever k^3 will lift the stud k^7 directly and open the gate whether there is any can in place to receive the flow of goods or not, and therefore these elements are not essential to the operation of the machine, but are preferable in order to save wasting the goods in the event of carelessness of the operator in leaving out a can.

The mechanism for locking the finger-ring to the gear-ring will now be described, special reference being made to Figs. 15 to 20.

N N′ are bosses on the rear legs N^2 N^3 of the machine.

N^4 is a horizontal bracket connecting the legs and supporting the rear solenoid, G′. The boss N^5 holds a shaft n, which forms the pivot for the bent lever g'. The flanged bracket-plate n^2, bowed outward, has bearings by which it is mounted on the parallel shafts n n', which allow a slight lateral movement to the plate. This bracket is located at the rear end of the machine below the rings.

In the under side of the gear-ring K is a series of holes n^3 adapted to receive the spring-seated pins n^4 set in the bosses p^2 on the finger-ring L. There should be one of these spring-pins n^4 to correspond with each finger I′. The holes n^3 may be placed at shorter intervals than the pins to make sure of speedy engagement at the proper time. A plug n^5 is spring-seated within the boss n^6 projecting from the under side of the bracket-plate n^2, and a pin n^7 projects from the side of the plug. A shaft n^8 is pivoted in bearings n^9 n^9 fixed

to the bracket n^2. A forwardly-projecting lever n^{10} is fixed to the shaft n^8 and has near its free end an elongated slot through which projects the pin n^7, whereby the spring-plug n^5 is given a vertical movement when the lever n^{10} rocks with its shaft. Upon the shaft n^8 is also fixed an upwardly-projecting lever p having a hook p' upon its upper end, said lever rocking with the shaft n^8 and bringing the hook p' in front of one of the bosses p^2 to stop the rotation of the finger-ring at the proper time.

p^3 is another forwardly-projecting lever fixed to the rock-shaft n^8 and lifts the inclined cam P^3 by bearing up against the lug p^4 on the under side of said cam when the shaft rocks backward. A plate P is secured to supports P' P^2 extending up from the bracket-plate n^2. Pivoted in the support P' is a cam P^3, with a lug P^4, which rests upon the lever p^3. The inclined face of the cam is projected up through a slot in the plate P by the lever p^3 when the shaft n^8 rocks back, as shown in Figs. 18 and 20. A pin r fixed in the frame H', as shown in Fig. 1, extends downward and forms a guide for the hooked cam-lever r^2 pivoted in the arm r' attached to the shaft m. The cam-lever is held against the pin r by the spring r^{10}. A lever r^3 is fixed to the upper end of shaft r^4, supported in bracket r^5 attached to the stationary ring J. A knife-lever r^6 is fixed to the lower end of shaft r^4 and the torsion-spring r^7 around the shaft r^4 tends to hold the shaft so as to keep the knife-lever r^6 with its edge extending through a slot in the side of the boss n^6 and into a notch in the side of the spring-plug n^5, so as to prevent the latter from rising until the knife is withdrawn after a can is filled and the rings are to be locked again.

While a can is being filled, of course the rings K and L are not locked together, because the finger-ring L must then remain at rest and the gear-ring K is in constant motion. In Figs. 15, 16, and 20 the rings are supposed to be locked together (being locked in Fig. 16 by the pin which is partly broken away to clearly show the parts behind it) and the finger-ring has nearly completed its forward movement with a can approaching the scale-pan. When one of the bosses holding a spring-pin n^4 arrives against the hooked lever p, the contact for the rear solenoid will have formed, opening the gate and drawing back the shaft m and lever r^2 from the position shown in Fig. 15 to the position shown in Fig. 17. Lever r^2 rides back over the pin r and the hooked end r^8 hooks onto the pin r^9, but does not yet move the lever r^3, and the knife-lever r^6 still remains in the spring-plug n^5. These parts all remain stationary while the can is being filled.

As soon as the can is filled and the scale-beam drops and the gate begins to close, shaft m and lever r^2 are moved forward, pulling the levers r^3 and r^6 into the position shown in Figs. 19 and 20, with the stud r^9 on lever r^3 just about to slip off the hook and the knife-lever r^6 withdrawn from the slot n^{11} in the spring-plug. This allows the spring-plug to rise and throw the spring-pin n^4 into the hole in the gear-ring K. As the spring-plug rises, the pin n^7, projecting from the plug into the slot of lever n^{10}, causes the shaft n^8, on which the levers n^{10} and p and p^3 are fixed, to rock back, and carries them into the position shown in Fig. 20, withdrawing the hook p' from the boss p^2 and leaving it free to pass the hook p', and the two rings move together. The head of the spring-pin n^4 slides along the plate P, which keeps the pin from dropping down. When the pin comes to the cam P^3, which is now sticking up through the plate P, as shown in Fig. 20, the pin pushes the cam down, thereby pressing down lever p^3 and causing shaft n^8 to rock forward again, and the levers p^3, n^{10}, and p are restored to the position shown in Figs. 15 and 16, and depressing the spring-plug n^5 to its lower position, and knife-lever r^6 is again pressed by its torsion-spring r^7 into the slot in the side of the plug, as shown in Fig. 15, the hook of cam-lever r^2 having in the meantime entirely released its hold on the pin r^9. The two rings continue revolving together until the spring-pin n^4 leaves the plate P, when the pin is free to respond to the downward pull of its spring, and it is withdrawn from the hole in the gear-ring. At this time another boss p^2, inclosing a spring-pin, will have reached the hook p', which catches the boss and stops the revolution of the finger-ring. In the meantime, also, another can will have reached the scale-pan. In order to break the shock when the boss strikes the stop-hook p', as the two rings revolve quite rapidly, the bearings of the bracket-plate n^2 are allowed a little play laterally on the shafts n n', and a spring n^{12} on the shaft n' forms a cushion.

In Fig. 21, S represents a battery, and T an electric motor, G the forward solenoid, which closes the gate, and G' the rear solenoid, which opens the gate. Wire X, leading from one pole of the battery, has a branch wire X' leading to the motor, and a branch X^2 leading to one side of the cup of the closing contact mechanism F'. The line is continued by the wire X^3 from the other side of the cup up to the forward or closing solenoid, G. The wire X^4 tacked onto the wire X^2 leads to the opening-contact M, and the line is continued by the wire X^5 leading to the rear or opening solenoid, G'. Wire y leads from the other pole of the battery and has a branch y' leading to the motor, a branch y^2 leading to the forward or closing solenoid, and a branch y^3 leading to the rear or opening solenoid.

What we claim as our invention is—

1. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of

electrical supply, an electrical circuit through each solenoid, a contact mechanism forming a part of each circuit, automatic mechanism which carries a package to the scales, automatic mechanism which then closes the contact in the circuit through the gate-opening solenoid whereby the gate is opened, and mechanism which again opens said contact before the gate-closing solenoid becomes operative, automatic mechanism which closes the contact in the circuit through the gate-closing solenoid when the package is filled whereby the gate is closed, and automatic mechanism which opens said contact again before the gate-opening solenoid becomes operative, substantially as described.

2. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism forming a part of each circuit, automatic mechanism which carries a package to the scales, automatic mechanism which then closes the contact in the circuit through the gate-opening solenoid whereby the gate is opened, and mechanism which opens said contact again before the gate-closing solenoid becomes operative, automatic mechanism which closes the contact in the circuit through the gate-closing solenoid when the package is filled, whereby the gate is closed, and mechanism which opens said contact again before the gate-opening solenoid becomes operative, the package-carrying mechanism removing the package from the scales, substantially as described.

3. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism forming a part of each circuit, automatic mechanism which carries a package to the scales, automatic mechanism which then closes the contact in the circuit through the gate-opening solenoid whereby the gate is opened, and mechanism which opens said contact again before the gate-closing solenoid becomes operative, mechanism operated by the tipping of the scale-beam when the package is filled which closes the contact in the circuit through the gate-closing solenoid whereby the gate is closed, and mechanism which opens said contact again before the gate-opening solenoid becomes operative, substantially as described.

4. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism forming a part of each circuit, automatic mechanism which carries a package to the scales, automatic mechanism which then closes the contact in the gate-opening circuit, allowing the gate to be opened and mechanism which opens said contact again before the gate-closing solenoid becomes operative, mechanism actuated by the tipping of the scales when the package is filled, which closes the contact in the gate-closing circuit allowing the gate to be closed, and intermediate mechanism operated by the sliding core of the solenoid which again opens said contact, substantially as described.

5. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, automatic mechanism which carries a package to the scales, intermediate mechanism operated by the package as it moves to the scales which causes the gate to open, and intermediate mechanism operated by the tipping of the scales when the package is filled, whereby the gate is closed, substantially as described.

6. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, an automatic intermittently-moving package-carrier, mechanism actuated by the package-carrier as it moves to the scales which causes the gate to open, intermediate mechanism actuated by the tipping of the scales when the package is filled whereby the gate is closed, automatic mechanism which removes the filled package and mechanism which again presents an empty package to the scales, substantially as described.

7. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism in each circuit, an automatic intermittently-moving package-carrier, mechanism actuated by the package-carrier as it moves to the scales which closes the contact in the gate-opening circuit, allowing the gate to be opened, intermediate mechanism operated by the sliding core of the solenoid which opens said contact again before the gate-closing solenoid becomes operative, mechanism actuated by the tipping of the scales when the package is filled which closes the contact in the gate-closing circuit, allowing the gate to be closed, and intermediate mechanism operated by the sliding core of the solenoid to again open said contact, substantially as described.

8. In a weighing and package-filling machine, the combination of a hopper, a weigh-

ing-scale, a gate which controls the flow of goods from the hopper, an automatic package-carrier, mechanism actuated by the package-carrier as it moves a package to the scales which causes the gate to open, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, and mechanism actuated by the tipping of the scales when the package is filled, whereby the gate is closed, substantially as described.

9. In a weighing and package-filling machine the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, an automatic package-carrier, mechanism actuated by the package-carrier as it moves a package to the scales which opens the gate, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, mechanism actuated by the tipping of the scales when the package is filled whereby the gate is closed, and automatic mechanism which removes the filled package and again presents an empty package to the scales, substantially as described.

10. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism in each circuit, an automatic package-carrier, mechanism actuated by the package-carrier as it moves a package to the scales which closes the contact in the gate-opening circuit allowing the gate to be opened, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, mechanism operated by the sliding core of the solenoid which opens the contact in the gate-opening circuit before the gate-closing solenoid becomes operative, mechanism actuated by the tipping of the scales when the package is filled which closes the contact in the gate-closing circuit, allowing the gate to be closed, and mechanism operated by the sliding core of the solenoid to again open said contact, substantially as described.

11. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism in each circuit, an automatic package-carrier, mechanism actuated by the package-carrier as it moves a package to the scales which closes the contact in the gate-opening circuit allowing the gate to be opened, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, mechanism operated by the sliding core of the solenoid which opens the contact in the gate-opening circuit before the gate-closing solenoid becomes operative, mechanism actuated by the tipping of the scales when the package is filled which closes the contact in the gate-closing circuit, allowing the gate to be closed, mechanism operated by the sliding core of the solenoid to again open said contact, and mechanism to remove the filled package from the scales and again present an empty package to the scales, substantially as described.

12. In a weighing and package-filling machine the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate, and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the package-carrier which completes the circuit through said medium when a package reaches the scales so that the gate is then opened, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, and mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted through the other medium becomes operative, substantially as described.

13. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate, and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the package-carrier which completes the circuit through said medium when a package reaches the scales so that the gate is then opened, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted

through the other medium becomes operative, and mechanism to remove the filled package from the scales, substantially as described.

14. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the moving package which completes the circuit through said medium when a package reaches the scales so that the gate is then opened, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, and mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted through the other medium becomes operative, substantially as described.

15. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the package-carrier as it moves a package to the scales which completes the circuit through said medium so that the gate is then opened, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, and mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted through the other medium becomes operative, substantially as described.

16. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the moving package which completes the circuit through said medium when a package reaches the scales so that the gate is then opened, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted through the other medium becomes operative, and mechanism which removes the filled package from the scales, substantially as described.

17. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, mechanism actuated by the package-carrier as it moves a package to the scales which completes the circuit through said medium so that the gate is then opened, mechanism which prevents the gate-opening mechanism from being actuated except when a package is brought to the scales, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, mechanism actuated by the tipping of the scales when a package is filled which completes the circuit through the last-mentioned medium so that the gate then closes, the circuit through either medium being broken before the mechanism actuated by force transmitted through the other medium becomes operative and mechanism which removes the filled package from the scales, substantially as described.

18. In an automatic weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break de-

vice through which force is transmitted from said source of energy to the mechanism for opening the gate, a lever connected with said make-and-break device having a spring which tends to keep the circuit closed and a latch device which holds the circuit open, the latch being released by the package-carrier when a package is brought to the scales, the circuit then becoming closed and the reciprocating rod moving to open the gate, a device connected with the reciprocating rod which, when the gate opens, breaks the circuit and resets the latch, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, a lever connected with said make-and-break device having a spring which tends to keep the circuit closed, and a latch device which holds the circuit open, the latch being released by the tipping of the scales when a package is filled, the circuit then becoming closed, and the reciprocating rod moving to close the gate, a lever connected with the reciprocating rod, which when the gate closes, breaks the circuit and resets the latch, substantially as described.

19. In an automatic weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, mechanism which moves the rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate, a lever connected with said make-and-break device having a spring which tends to keep the circuit closed, and a compound latch device which holds the circuit open, the latch being partially released by mechanism actuated by the package as it moves toward the scales, after which the latch is further released by mechanism actuated by the package-carrier, the circuit then becoming closed and the reciprocating rod moving to open the gate, a device connected with the reciprocating rod which, when the gate opens, actuates the make-and-break lever to break the circuit, and resets the latch, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for closing the gate, a lever connected with said make-and-break device having a spring which tends to keep the circuit closed, and a latch device which holds the circuit open, the latch being released by the tipping of the scales when a package is filled, the circuit then becoming closed, and the reciprocating rod moving to close the gate, a lever connected with the reciprocating rod which when the gate closes, actuates the make-and-break lever to break the circuit and reset the latch, substantially as described.

20. In a weighing and package-filling machine, the combination of a reciprocating rod which opens and closes the feed-gate, a source of energy which supplies power to reciprocate said rod, an automatic package-carrier, a medium with a make-and-break device through which force is transmitted to close the gate, a lever connected with said make-and-break device having a spring which tends to keep the circuit closed, a slide-rod l^2 and a link l^5 connecting the make-and-break lever with said slide-rod, a cam-stud k^7 having pivoted thereto an arm l' which bars the forward movements of the slide-rod l^2 and prevents the closing of the make-and-break device, a cam-lever mounted in the package-carrier which lifts said cam-stud and the bar l' whereby the slide-rod l^2 is free to move forward under the bar l' and the make-and-break lever-spring is effective to close the circuit, guides between which a package passes before reaching the scales, one of said guides being pivoted at the entrance end and spread by the package as it moves toward the scales, pivoted arm i^9 which prevents the lifting movement of the stud k^7 until a package enters the guideway, intermediate mechanism actuated by the package in passing through the guideway which releases the arm i^9 and leaves the stud free to rise by the action of the cam-lever, and the circuit to be closed, whereupon the reciprocating rod opens the feed-gate, a push-pin carried with the reciprocating rod and actuating the make-and-break lever to open the circuit, retracting the slide-rod l^2 and allowing the cam-stud k^7 to return to its first-described position, and a spring which moves the arm i^9 back to its first-described position, substantially as described.

21. In a weighing and package-filling machine, an intermittently-moving carriage, a series of package-moving fingers fixed on shafts having bearings in the carriage, a cam-lever fixed on each of said shafts, a movable stud with which said cam-levers engage, mechanism set in operation by the movement of said stud which opens the feed-gate, a cam-track on which the cam-lever rides before engaging with the stud and during the engagement, a spring which holds the cam-lever on the track and causes the shaft on which the cam-lever and finger are fixed to rotate slightly backward and remove the finger from contact with the package when the cam-lever passes from the cam-track, substantially as described.

22. In a weighing and package-filling machine, the combination of a weighing-scale, a main scale-beam having one arm which sustains the load and another arm which sustains the weight, an auxiliary beam pivoted independently of the main scale-beam and having one end engaged by the weighted arm of the main scale-beam and lifted by it when the latter is tipped by a load, a gate which

controls the flow of goods to the scales, mechanism which closes said gate when the scale-beam tips, a source of energy and a medium with a make-and-break device through which force is transmitted from said source to operate the gate-closing mechanism, a pivoted lever to one arm of which is pivoted the make-and-break device of the gate-closing circuit, a spring which tends to hold the make-and-break device closed, a catch which holds the lever from yielding to its spring, the tipping of the scale-beam operating to trip the lever and allow the make-and-break device to close the circuit and thereby close the gate, substantially as described.

23. In a weighing and package-filling machine, an intermittently-moving package-carrier which carries a package to the scales and withdraws from contact with the package while the package is being filled, and then removes the filled package from the scales, substantially as described.

24. In a weighing and package-filling machine, the combination of a continuously-revolving driving-ring which drives the package-carrier, a package-moving ring, mechanism for automatically locking the package-moving ring to the driving-ring and unlocking them intermittently, a series of package-moving fingers attached to the package-moving ring, and a stationary package-supporting table on which the packages are moved by said fingers to the scales, substantially as described.

25. An electrical-contact mechanism consisting of a cup composed of two sections of conducting material insulated from each other and from the base and having outwardly-flaring interior walls, and a plunger of non-conducting material having a tapering collar of some conducting material which snugly fits in said cup, substantially as described.

26. In a weighing and package-filling machine, the combination of a continuously-revolving driving-ring, a package-moving ring, mechanism for automatically locking the two rings together and unlocking them whereby the two rings move together until a package reaches the scales when the two rings become unlocked, a detent which restrains the package-moving ring from movement while the package is being filled, and mechanism which releases the detent and allows the two rings to again become locked and move together after the package is filled and removed, substantially as described.

27. In a weighing and package-filling machine, the combination of a continuously-revolving driving-ring, a package-moving ring, a series of spring-seated pins on one of the rings, a series of sockets in the other ring, and mechanism which causes one of the spring-pins to enter one of the sockets and lock the two rings together and cause them to travel together until a package reaches the scale-pan, when the two rings become unlocked, a detent which stops the package-ring from further movement while the package is being filled, and mechanism which then releases the detent and allows the two rings to again become locked and move together, substantially as described.

28. In a weighing and package-filling machine, the combination of a continuously-revolving driving-ring, a package-moving ring, below the driving-ring, a series of sockets in the driving-ring, a series of spring-seated locking-pins in the package-moving ring which come into alignment with the sockets during the revolution of the driving-ring, a spring-actuated push-plug which aligns with the locking-pins in turn as the package-ring revolves, a detent which holds down said push-plug while a package is on the scales being filled, mechanism actuated by the tipping of the scales which removes the detent from the push-plug, a spring which then actuates the push-plug to thrust one of the locking-pins into a socket in the driving-ring, a track-plate which holds the locking-pin to its engagement so that the rings move together during a part of a revolution until another package reaches the scales, at which time the locking-pin leaves the track-plate and the rings become unlocked and a detent which at the same time stops the revolution of the package-ring, substantially as described.

29. In a weighing and package-filling machine the combination of a reciprocating rod which opens and closes the feed-gate, a continuously-revolving driving-ring which drives the package-carrier, a package-moving ring below the driving-ring, a series of sockets in the driving-ring, a series of spring-seated locking-pins in the package-moving ring which come into alignment with the sockets during the revolution of the driving-ring, a spring-actuated push-plug which aligns with the locking-pins in turn as the package-ring revolves, a spring-controlled lever 7^6 which holds back the push-plug while a package is on the scales being filled, a shaft 7^4 on which said lever is fixed, a lever 7^3 also fixed on said shaft, mechanism which slides the reciprocating rod and closes the gate when the package is filled, a hooked cam-lever 7^2 pivoted to an arm on a shaft attached to said reciprocating rod which, when the gate is opened by the reciprocating rod, engages with a stud on said lever 7^3, and which when the gate closes pulls the lever 7^6 from engagement with the push-plug, a spring which then actuates the push-plug to thrust one of the locking-pins into a socket in the driving-ring, a track-plate P which holds the locking-pin to its engagement so that the two rings move together during a part of a revolution until another package reaches the scales, at which time the locking-pin leaves the track-plate and the rings become unlocked, and a stop-lever $p\ p'$ fixed on a rock-shaft which is actuated by the push-plug through intermediate mechanism to remove its restraint when the rings are locked, and which is actuated by

the locking-pin through intermediate mechanism as it travels over the track-plate to return to its position in readiness to stop the package-ring when another package is on the scales, substantially as described.

30. The combination of a reciprocating rod, a source of energy which supplies power to reciprocate said rod, mechanism which moves said rod, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for reciprocating the rod, a pivoted angle-bar lever to one arm of which is pivoted the make-and-break device, a spring which tends to hold the make-and-break device closed, a lever fulcrumed at a point between its two ends, pivoted at one end to the reciprocating rod, and carrying a spring-seated push-pin at its other end, the push-pin lever operating to turn the make-and-break lever on its pivot and open the circuit when the rod reciprocates in one direction, the make-and-break lever-spring turning it back again and closing the circuit when the rod reciprocates in the reverse direction and withdraws the push-pin from its engagement, substantially as described.

31. In a weighing and package-filling machine, the combination of a hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a reciprocating rod which opens and closes said gate, a source of energy which supplies power to reciprocate said rod, mechanism which moves said rod in a direction to open the gate and mechanism which moves it in a direction to close the gate, a medium with a make-and-break device through which force is transmitted from said source of energy to the mechanism for opening the gate and a medium with a make-and-break device through which force is transmitted to close the gate, a pivoted angle-bar lever to one arm of which is pivoted the make-and-break device of the gate-closing circuit, a spring which tends to hold the make-and-break device closed, a catch attached to the scale-beam which holds the angle-bar from yielding to its spring, and a lever fulcrumed at a point between its two ends and pivoted at one end to the reciprocating rod and carrying a push-pin at its other end, the tipping of the scale-beam operating to trip the angle-bar and allowing it to yield to its spring, thereby closing the circuit through the gate-closing medium whereby the reciprocating rod moves to close the gate, and turn the push-pin lever which then operates to lift the make-and-break lever and open the circuit again, substantially as described.

32. In a weighing and package-filling machine, the combination of a feed-hopper, a weighing-scale, a gate which controls the flow of goods from the hopper, a gate-opening and a gate-closing solenoid, having cores connected with each other and with the gate, a source of electrical supply, an electrical circuit through each solenoid, a contact mechanism forming a part of each circuit, a package-moving ring, a continuously-revolving ring which drives the package-moving ring, mechanism for automatically locking the two rings together and causing them to move together until a package is moved to the scale-pan and then unlocking them and stopping the package-moving ring, mechanism which is actuated to close the contact in the gate-opening circuit when the package moves to the scale-pan, allowing the gate to be opened, intermediate mechanism operated by the sliding core of the solenoid which opens said contact again before the gate-closing solenoid becomes operative, mechanism actuated by the tipping of the scales when the package is filled which closes the contact in the gate-closing circuit, allowing the gate to be closed, intermediate mechanism operated by the sliding core of the solenoid to again open said contact, and mechanism for again locking the two rings together whereby the filled package is removed from the scales and an empty package is brought to the scales, substantially as described.

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Witnesses:
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