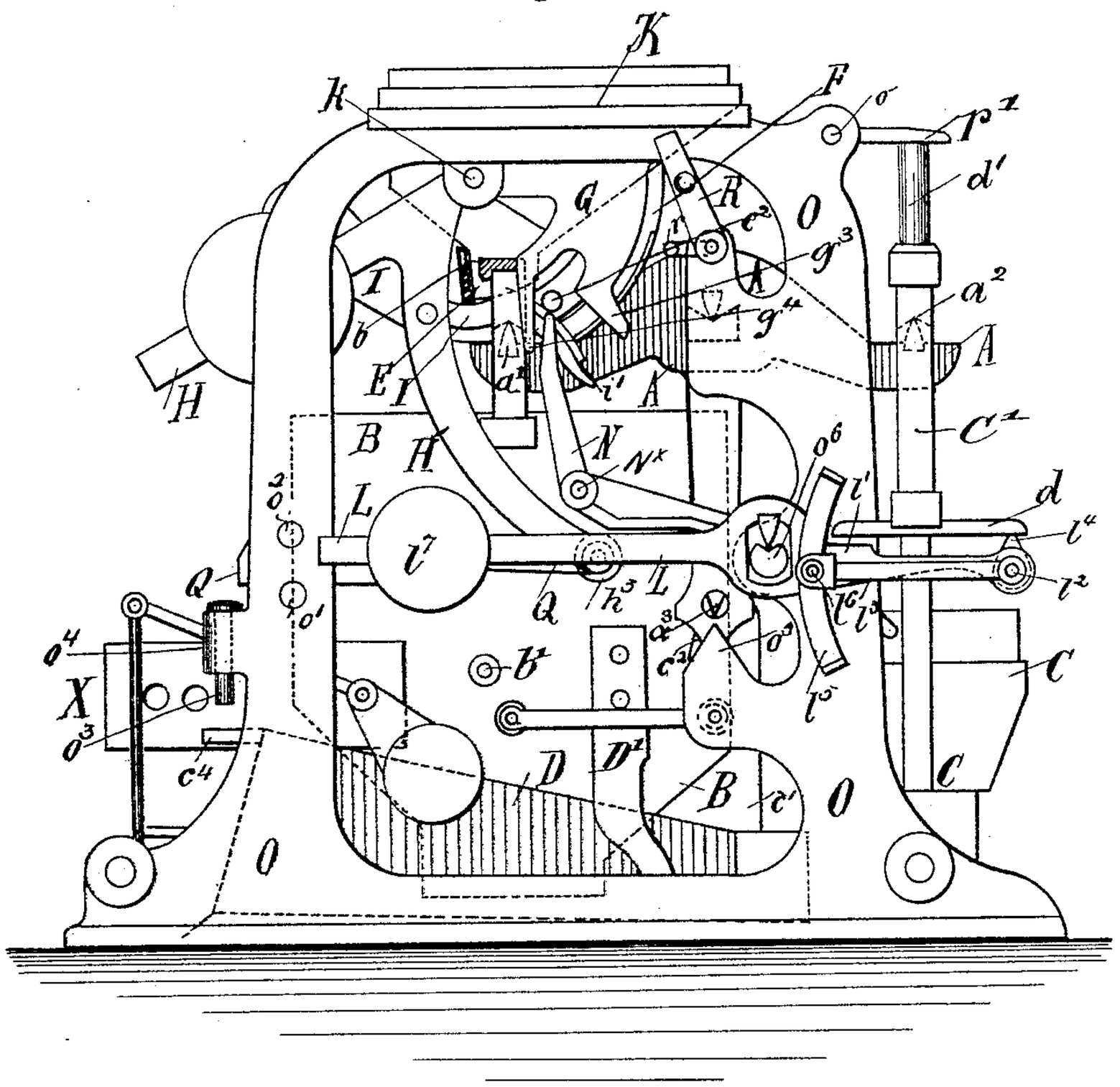
(No Model.) 4 Sheets—Sheet 1.

C. SCHMIDT.

AUTOMATIC WEIGHING SCALE.

No. 583,268. Patented May 25, 1897.

Fig: 1.



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(No Model.) 4 Sheets—Sheet 2.

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AUTOMATIC WEIGHING SCALE.

No. 583,268. Patented May 25, 1897.

Fig: 1ª

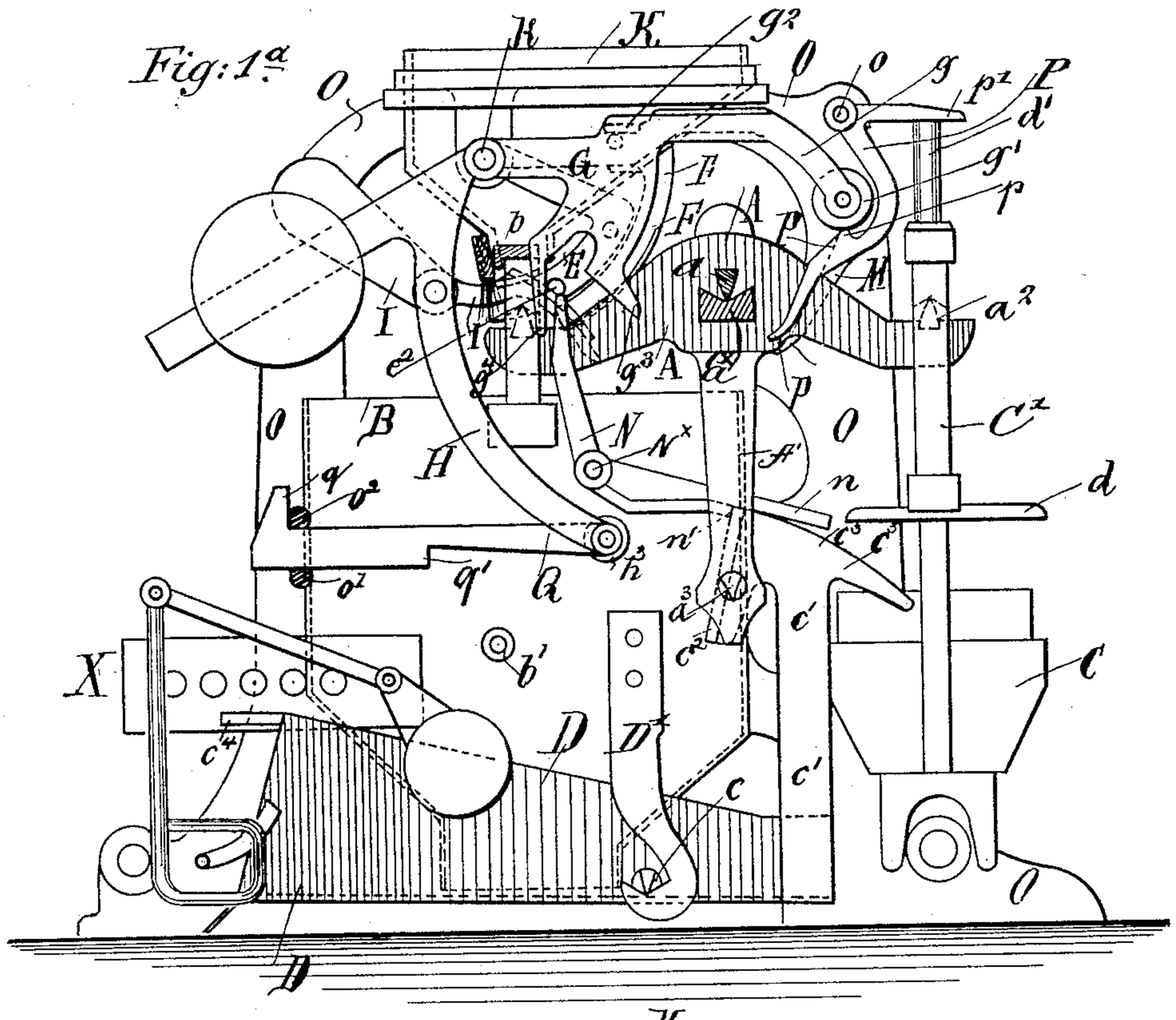
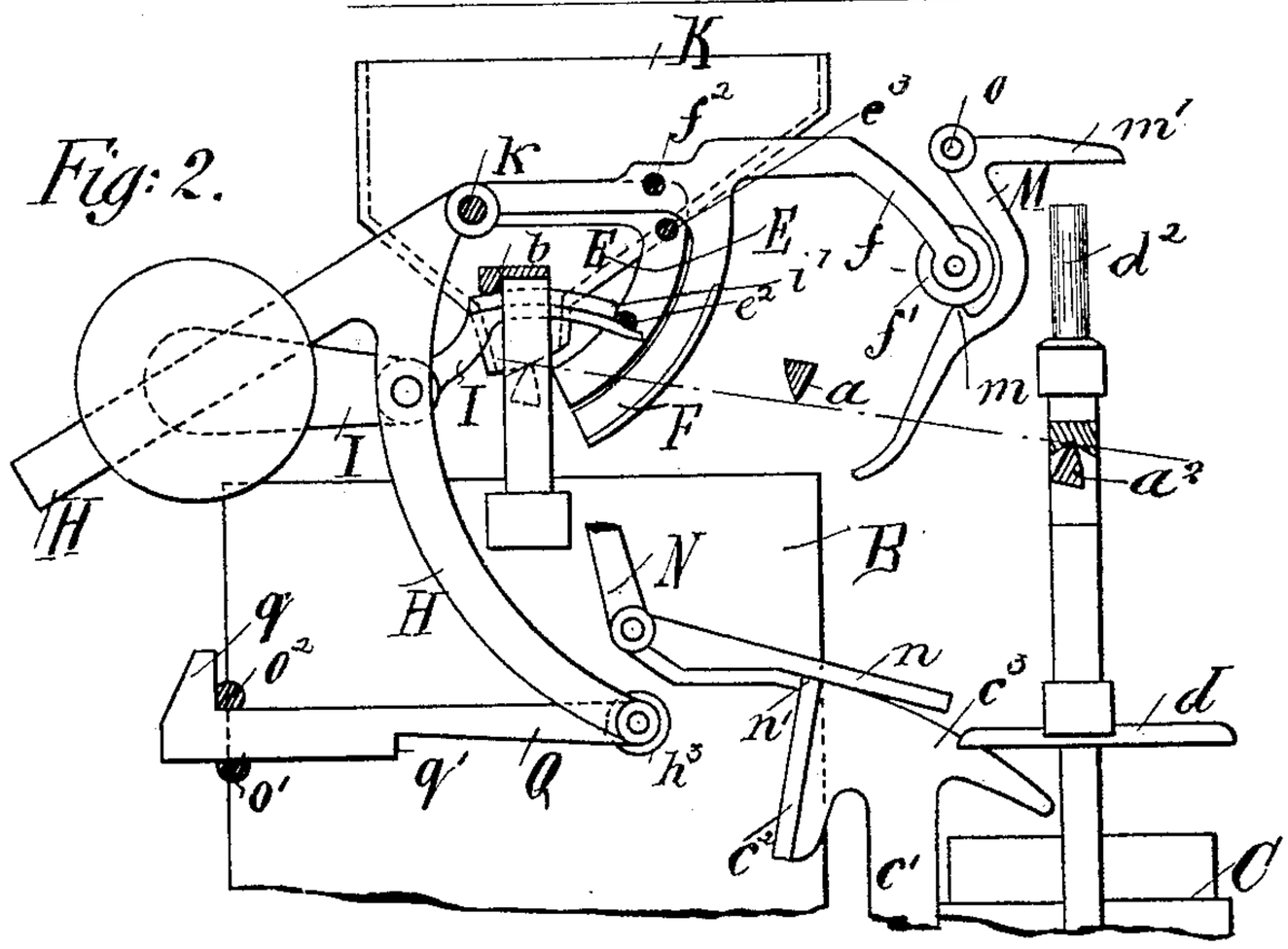


Fig: 2.



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(No Model.) 4 Sheets—Sheet 3.

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AUTOMATIC WEIGHING SCALE.

No. 583,268. Patented May 25, 1897.

Fig. 3.

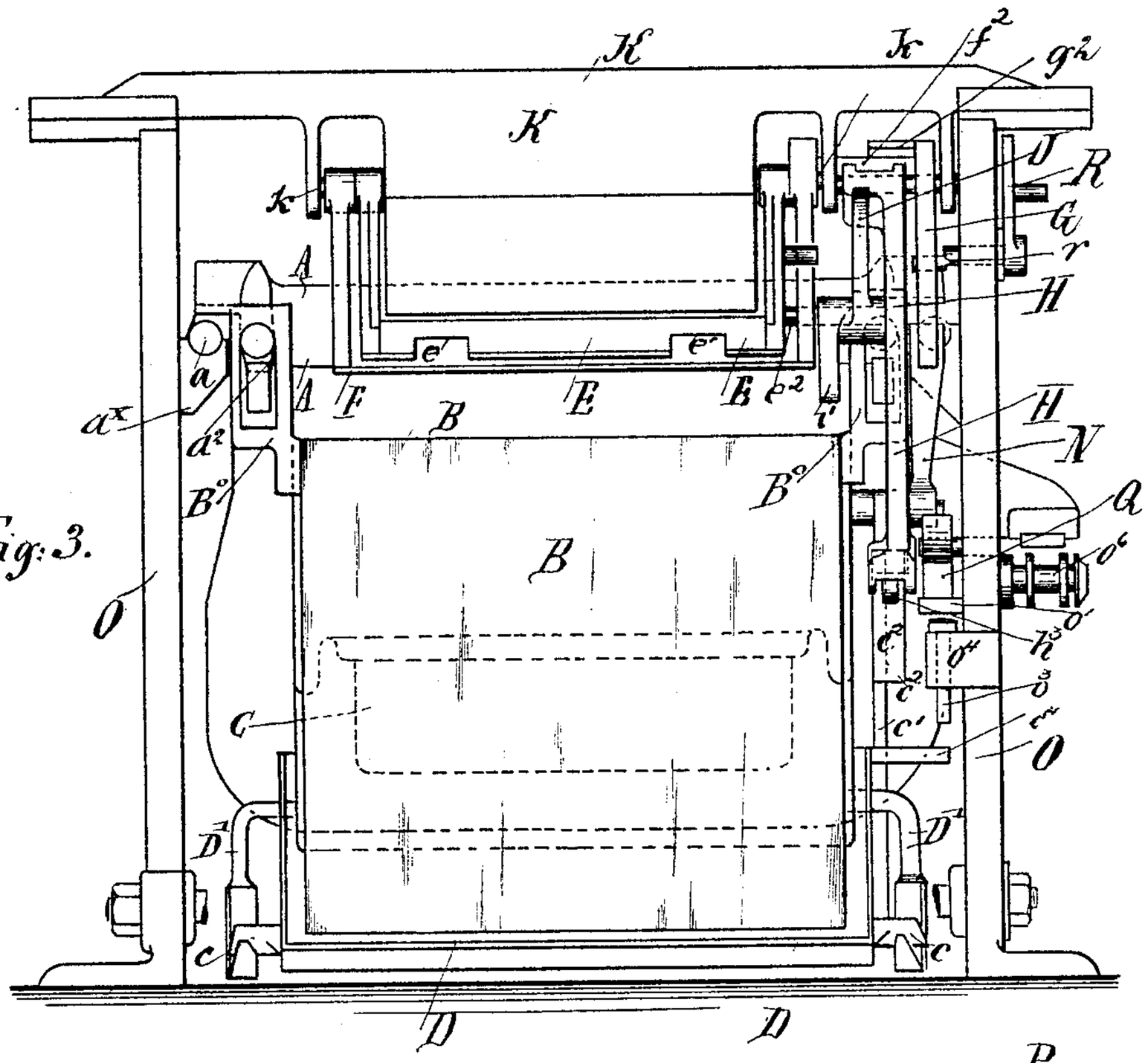
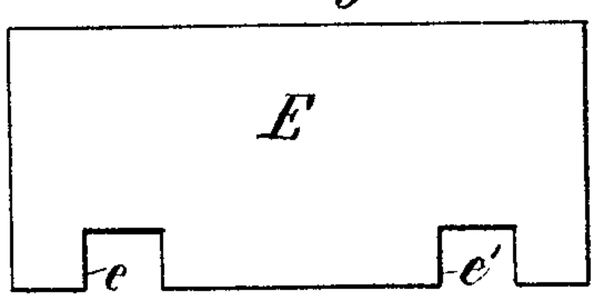


Fig. 5.



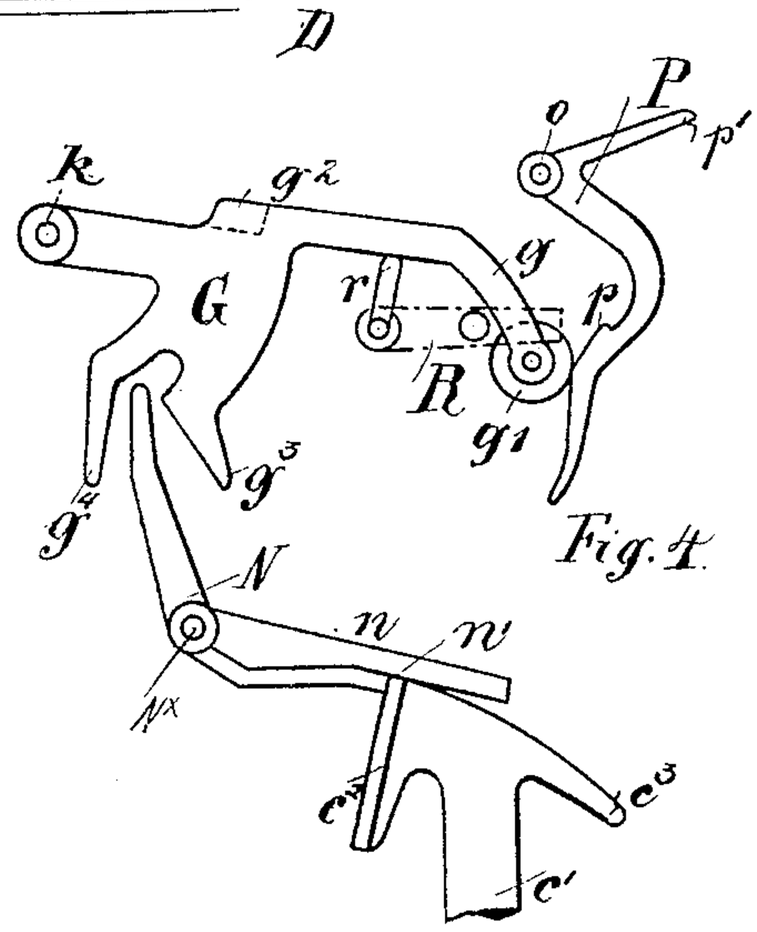


Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

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AUTOMATIC WEIGHING SCALE.

No. 583,268. Patented May 25, 1897.

Fig. 7.

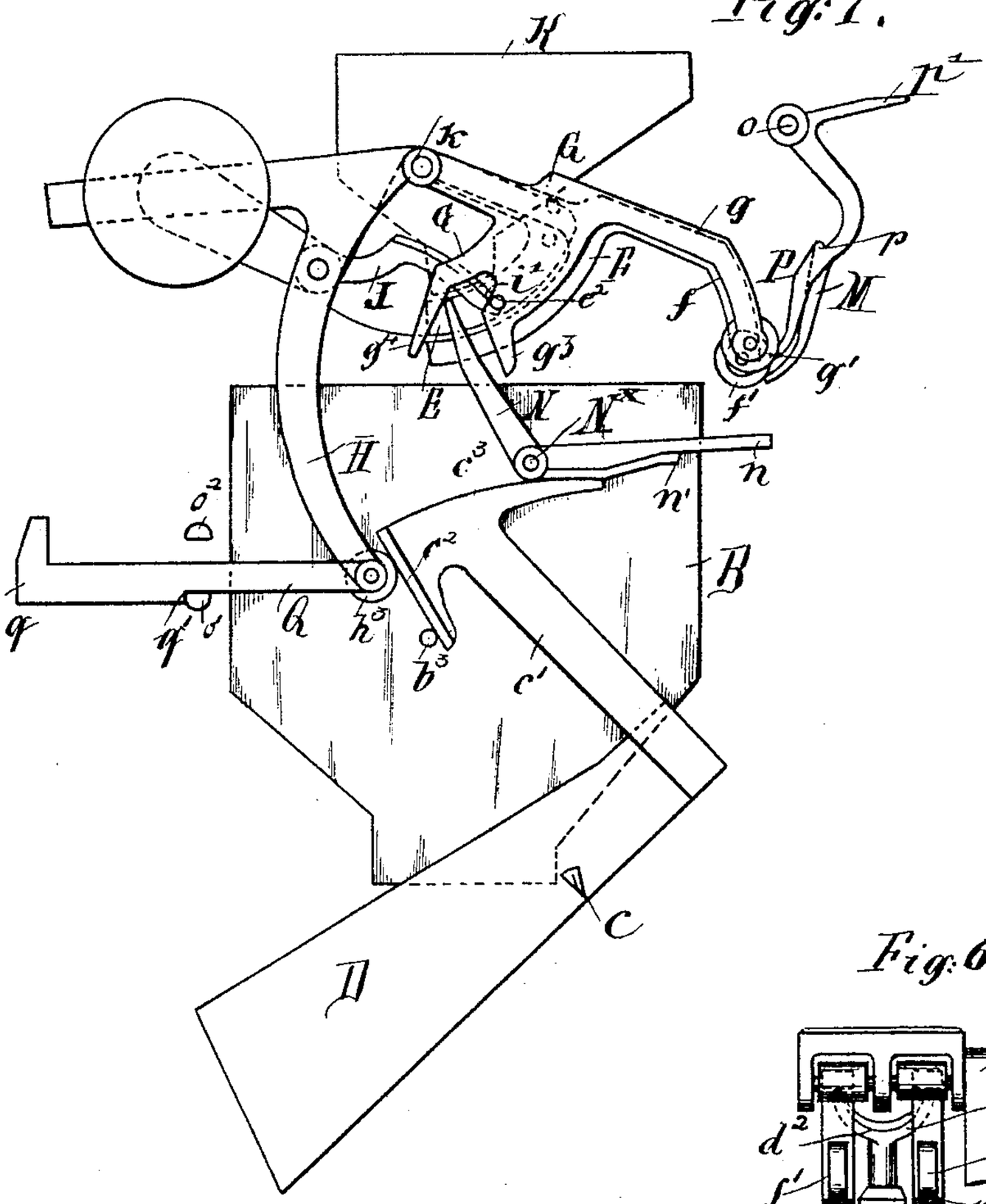
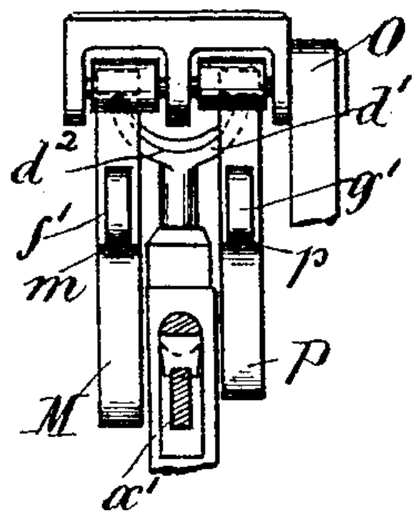


Fig. 6.



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UNITED STATES PATENT OFFICE.

CARL SCHMIDT, OF BERLIN, GERMANY.

AUTOMATIC WEIGHING-SCALE.

SPECIFICATION forming part of Letters Patent No. 583,268, dated May 25, 1897.

Application filed January 31, 1895. Serial No. 536,774. (No model.) Patented in Germany June 15, 1894, No. 80,163; in France July 21, 1894, No. 240,206; in England January 10, 1895, No. 670; in Austria May 25, 1895, No. 45/1,837; in Hungary June 12, 1895, No. 3,002, and in Belgium July 15, 1896, No. 122,519.

To all whom it may concern:

Be it known that I, CARL SCHMIDT, a citizen of Germany, residing at Berlin, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Automatic Weighing-Scales, (for which Letters Patent have been obtained in the following countries: in Germany, No. 80,163, dated June 15, 1894; in Belgium, No. 122,519, dated July 15, 1896; in France, No. 240,206, dated July 21, 1894; in Austria, No. 45/1,837, dated May 25, 1895; in Hungary, No. 3,002, dated June 12, 1895, and in England, No. 670, dated January 10, 1895,) of which the following is a specification.

This invention has reference to certain improvements in automatic weighing-machines for weighing grain and similar substances and in which, by the improved construction of the operating mechanisms, a back action or concussion is entirely avoided after the discharge of the material to be weighed and at the same time a safety mechanism is furnished by which the opening of the supply-gate is impossible as long as the discharge-gate is open, and vice versa.

The invention consists of an automatic weighing-machine in which a counterbalanced scale-pan is arranged below a supply-hopper provided with oscillating supply-gates and a drop-lever, the main supply-gate being retained by a latch-lever and the auxiliary supply-gate and the drop-lever by suitable mechanisms, which are released by the rising of the counterbalancing-weight, so that by the intermediate mechanism the discharge-gate is opened, the opening motion being retarded by the resistance exerted by a weighted lever oscillating at the same point as the supply-gates. In connection with the weighing mechanisms is arranged a regulating-lever, with means for adjusting the same, so that the proper quantity to be weighed in the scale-pan can be accurately controlled.

The invention consists, further, of certain details of construction and combination of parts which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved automatic weighing-machine, showing the same immediately before the discharge of the quantity to be weighed. Fig. 1ª is a side elevation with one side of the frame removed and parts of the machine being in section. Fig. 2 is a detail sectional side elevation showing the position of the supply-gates and the operating-levers at the beginning of the supply. Fig. 3 is a front elevation of the weighing-machine. Figs. 4, 5, and 6 are different details of the same; and Fig. 7 is a side elevation of parts of the machine, showing the position of the same during the discharge of the material after the same has been weighed.

Similar letters of reference indicate corresponding parts.

The weighing-machine proper consists of a weighing-beam A, which is fulcrumed by knife-edges a on a suitable support $a^{\times}$ of the frame O, and which carries at one end on knife-edge a' the scale-pan B and at the opposite end on knife-edge a^2 the suspension-rod C′ of the counterbalancing-weight C. The knife-edges a' a^2 are preferably arranged in one line with the straight knife-edge a. The scale-pan B is provided with a discharge-gate D at its lower end, which fulcrums by knife-edges c on stationary hangers D′, that are attached to the side walls of the scale-pan B. Above the scale-pan B is arranged on the frame O the supply-hopper K, to the side walls of which are fulcrumed at k the supply-gates E and F, the drop-lever G, and the weighted lever H. To one arm of the oscillating and weighted lever H is further pivoted a weighted latch-lever I. In the lower edge of the supply-gate E are formed the recesses e e', (shown in Figs. 3 and 5,) through which the material to be weighted passes during the latter part of the filling operation of the scale-pan. The main supply-gate E is supported, when in its open position, by the pin e^2, attached to the same, which abuts against a nose i' of the latch-lever I. The closing of the supply-gate E is effected during the lowering of the scale-pan by means of a take-up lug b, projecting from the ears B^0 at the top of the scale-pan, which engages the inner end of latch-lever I and depresses the same, whereby the supply-gate E loses its support and drops by gravity in downward direction.

The auxiliary supply-gate F is arranged parallel with the main supply-gate E and serves for the entire closing off of the supply after the filling of the scale-pan is completed. An arm f is rigidly connected with the supply-gate F, said arm carrying at its free end an antifriction-roller f', as shown in Fig. 2. On the supply-gate F is arranged a carrier-pin f^2, which serves for the purpose of raising the drop-lever G by engaging, during the opening of the supply-gates, a lug g^2 of said drop-lever, so as to exert a pressure in upward direction on the same. The antifriction-roller f' rests, during the open position of the supply-gate F, on a shoulder m of an elbow-lever M, which is fulcrumed at o on the supporting-frame O. During the upward motion of the counterbalancing-weight C an arm d^2 at the upper end of the suspension-rod C' strikes against the upper arm m' of the elbow-lever M and moves the shoulder m of the same away from the roller f', so that the supply-gate F is liberated and dropped by its own weight.

The drop-lever G (shown in Fig. 4) is, like the auxiliary supply-gate F, provided with an arm g, having at its outer end a roller g', which engages a shoulder p of a second elbow-lever P, which is likewise fulcrumed at o to the supporting-frame O. Besides the upwardly-extending arm d^2 on the suspension-rod C' of the counterbalancing-weight C is arranged a second arm d', (shown in Fig. 1,) which, during its upward motion, strikes against the upper arm p' of the elbow-lever P, so as to oscillate the same and liberate thereby the roller g' of the drop-lever G, so that the latter can drop.

The weighted lever H carries at its lower end a roller h^3, which lower end is pivoted to a stop-lever Q, provided at its end with an upwardly-extending nose q and at its lower middle part with a downwardly-extending shoulder q', which serve for the purpose of limiting the motion of the weighted lever H in opposite directions, as will be fully described hereinafter. To the side wall of the scale-pan B is pivoted an elbow-shaped latch-lever N, while on the rear end of the discharge-gate D is arranged an upwardly-extending arm c', the upper part c^3 of which is made arc-shaped and provided with a straight face c^2 at one side, as shown in Figs. 2, 4, and 7. The lower arm n of the latch-lever N abuts with its nose n' against the upper part of the face c^2, and holds thereby the discharge-gate D in closed position. The releasing of the discharge-gate D is accomplished by the drop-lever G, which, during its downward motion, strikes by its finger g^3 against the upper arm of the latch-lever N, so as to oscillate the same on its fulcrum $N^\times$ and release the nose n' from the inclined part c^2 of the arm c', so that the latter is released and the supply-gate liberated and dropped on its fulcrum c in downward direction.

The supporting-frame O carries at o^6 the fulcrum for a regulating-lever L, (shown in Fig. 1,) one arm of which carries the adjustable weight l^7, while the other arm has, besides the short horizontal portion l' at its outer end, a pivoted arm l^3, that is provided with a toe-piece l^4, which turns around the pivot l^2. The opposite end of the pivoted arm l^3 is guided on a fixed arc-shaped guide-piece l^5 on the regulating-lever L and can be adjustably secured to the same by means of a clamping-screw l^6. To the suspension-rod C' of the counterbalancing-weight C is applied a horizontal arm d, which serves for the purpose of transferring the pressure of the weight l^7 of the regulating-lever L to the weighing mechanism.

For ascertaining the accuracy of the quantities to be weighed by the machine the supporting-frame O is provided with a stationary indicator o^5, which has to meet a counter-indicator a^3, located on the downwardly-extending arm A' of the weighing-beam A, which indicators o^5 and a^3 indicate the accurate counterbalancing of the weighing-machine when they are located vertically one above the other. For controlling the scale-pan it is necessary to have some means to prevent the same from being discharged immediately after the count erbalancing with the weight C is obtained. For this purpose the supporting-frame O is provided at its upper part with a pivoted lug r, which can be turned in upward direction by its handle R, so that the drop-lever G can be locked in the raised position shown in Fig. 4, whereby the weighing-machine can be made to play freely into the required counterbalanced position, but by which the releasing and dropping of the discharge-gate is prevented, as the drop-lever is supported in raised position and prevented from dropping down to strike latch-lever N. It is obvious that during the controlling or testing of the machine the toe-piece l^4 has to be released from the horizontal arm d on the suspension-rod of the counterbalancing-weight C by the lifting of the regulating-lever L.

For recording the number of fillings of the scale-pan a registering device may be connected with the same, which is operated by any movable part of the machine, for instance, by the discharge-gate D, which register is indicated in Fig. 1.

My improved automatic weighing-machine is operated as follows: During the supply of the material through the discharge-opening of the hopper K the weighing-beam A assumes the position shown in Fig. 2. The scale-pan B is in this position of the weighing-beam A in its highest and the counterbalancing-weight C in its lowermost position. The short horizontal portion l' of the regulating-lever L abuts against the inner end of the horizontal arm d of the suspension-rod of the counterweight C, while between the opposite end of the arm d and the toe-piece l^4 a small space is formed. The material to be weighed passes through the outlet-opening of the hop-

per K freely into the scale-pan B until the latter commences to move in downward direction. By the downward motion of the scale-pan the take-up lug *b* of the scale-pan strikes the inner end of the elbow-lever I and releases the supply-gate E from the position in which it is held by disengaging its pin e^2 from the nose i' of the elbow-lever I. The supply-gate E now moves in downward direction and closes the outlet-opening of the hopper K sufficiently so that the material to be weighed can only flow through the recesses *e e'* at its lower end. The interruption of the full supply causes the retarding and arresting of the downward motion of the scale-pan B. Simultaneously with the downward motion of the scale-pan B the toe-piece l^4 forms contact, together with the shoulder l' of the regulating-lever L, with the horizontal arm *d* of the counterbalancing-weight C, so that the lever L also exerts a pressure on the balancing mechanisms. As soon as a sufficient quantity of material has passed through the recesses *e e'* of the supply-gate E that the entire quantity of material in the scale-pan corresponds to the counterbalancing-weight C another motion of the scale-pan takes place, so that the horizontal shoulder l' of the regulating-lever L is moved away from the horizontal arm *d* of the suspension-rod C', while the toe-piece l^4 alone remains in contact with the arm *d*. As the effective pressure of the shoulder l' of the regulating-lever L on the arm *d* is greater than the pressure exerted by the toe-piece l^4 on said arm, consequently the pressure exerted by the regulating-weight l^7 on the scale-pan B is less than before, which is due to the different distances of the toe-piece l^4 and the shoulder l' from the fulcrum of the regulating-lever L.

The just-mentioned motion of the weighing mechanism and scale-pan has the additional effect that the upwardly-extending arm d^2 of the suspension-rod C' of the weight C is raised sufficiently so that it abuts against the arm m' of the elbow-lever M and oscillates the latter, so as to liberate the roller f' of the auxiliary supply-gate F, whereby the latter is released and dropped by gravity, thus closing the supply-recesses *e e'* and interrupting the supply of material to the scale-pan B. The roller f' of the auxiliary supply-gate F moves simultaneously the lower arm of the elbow-lever M sidewise sufficiently so that a free space is obtained between the arm m' and the upper end of the arm d^2 of the suspension-rod of the weight C, as shown in Fig. 2. In exactly the same manner as the dropping of the auxiliary supply-gate F, but slightly after the same, follows the release of the drop-lever G by the second upwardly-extending arm d' of the suspension-rod of the weight C, which arm d' strikes against the elbow-lever P, so that the roller g' of the drop-lever G is released and the latter dropped by its own weight. The finger g^3 of the drop-lever G exerts a certain blow on the latch-lever N, by which the connection between the shoulder or nose n' and the flat face c^2 of the arm c' of the discharge-gate D is broken and thereby the discharge-gate D immediately dropped by the weight of the material resting on the same, so that the material can flow freely from the scale-pan B into a suitable receptacle to which it is to be transferred. By the downward motion of the discharge-gate D the flat face c^2 of the arm c' strikes against the roller h^3 of the weighted lever H and forces the latter sidewise, so that the nose i' of the latch-lever I engages again the pin e^2 of the main supply-gate E, while simultaneously the shoulder q' of the stop-slide Q engages the stationary pin o' on the supporting-frame O. By the lifting of the weighted lever H during the downward motion of the discharge-gate D the downward motion of the latter is somewhat retarded, so that the discharge of the material in the scale-pan takes place slowly until the parts of the scale-pan move easily into their initial positions. As soon as the material in the scale-pan is entirely discharged the discharge-gate D is closed by means of a suitable counterweight, which is not shown in the drawings. Toward the end of the return motion of the discharge-gate D a finger c^4 at the outer end of the same (shown in Fig. 1) strikes a sliding pin o^3, which is guided in a stationary sleeve o^4 of the supporting-frame O, so that the pin o^3 is caused to strike against the outer end of the stop-slide Q, which is at the time above the same, and releases thereby its shoulder q' from the pin o', so that the slide Q, under the influence of the counterweight of the lever H, moves in inward direction until the nose *q* at the outer end of the slide Q abuts against the second pin o^2 on the supporting-frame O, as shown in dotted lines in Fig. 1 and in full lines in Fig. 2. This motion of the weighted lever H produces, by means of the nose i' on the fulcrumed elbow-lever I, an upward pressure on the pin e^2 on the supply-gate E, so that not only the latter, but also, by means of the carrying-pin e^3, the simultaneous opening of the auxiliary supply-gate F, and, by means of the pin f^2 and the lug g^2, the lifting of the drop-lever G is produced, so that the supply-gate E is supported in position by the elbow-lever I and the auxiliary supply-gate F locked in position by the reëngagement of the elbow-lever M with the roller at the outer end of its arm *f*, and the locking of the drop-lever G by the reëngagement of the elbow-lever P with the roller g' at the outer end of its arm *g*. Lastly, it has to be stated that by the closing motion of the discharge-gate D also the reengagement of its upwardly-extending arm c' with the elbow-lever N is reëstablished. The operative parts of the weighing-machine have thereby reassumed the position which is necessary for the filling of the scale-pan and the weighing off of the next quantity of material. It must be mentioned that at the lower end of the drop-lever G is arranged a

second finger g^4 back of the finger g^3, which has the function of preventing the discharge-gate D, during the period of the filling of the scale-pan, from being opened by accidental blows or concussions.

For obtaining the required degree of accuracy in the weighing off of the material, the inner end of the arm l^3 can be shifted on the arc-shaped guide-piece l^5 on the regulating-lever L, as required, so that the effective pressure of the toe-piece l^4 can be regulated by the shortening or elongating of the outer arm of the regulating-lever L. If, for instance, the quantity weighed off is found to be less than required, then the inner end l^6 of the arm l^3 has to be shifted somewhat in upward direction on the guide-piece l^5, so that the pressure on the counterbalancing-weight C is thereby diminished, whereby the closing off of the supply of material takes place at a slightly later period. In case the quantity weighed in the scale-pan is somewhat more than required then the inner end l^6 of the arm l^3 has to be shifted in downward direction on the arc-shaped guide-piece l^5, so that the toe-piece l^4 is moved inwardly, whereby the closing off of the supply takes place slightly in advance than before. By the playing in of the movable indicator a^3 on the weighing-beam A relatively to the fixed indicator o^5 on the frame O the correct weighing of the machine is readily obtained, while for the proper controlling of the machine the scale-pan can be prevented from discharging after the required quantity is supplied to the same, which is accomplished by preventing the release of the drop-lever G, by which also the release of the discharge-gate D is prevented.

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

1. In an automatic weighing-machine, the combination of a supply-hopper, a pivoted scale-beam, a scale-pan supported by said scale-beam, a gate for said supply-hopper, a pivoted weighted lever, a holding-lever pivoted to said weighted lever for holding said gate open, a discharge-gate for said scale-pan provided with an arm adapted to engage said weighted lever whereby the opening of the discharge-gate is retarded.

2. In an automatic weighing-machine, the combination of a supply-hopper, a gate therefor, a pivoted scale-beam, a scale-pan supported on said scale-beam, a pivoted weighted lever, a holding-lever pivoted to said weighted lever for holding the said gate open, means for releasing said holding-lever on the descent of the scale-pan, a discharge-gate for said scale-pan provided with an arm for engaging said weighted lever, a latch-lever for engaging said arm to hold said discharge-gate in closed position, and means for releasing said latch-lever.

3. In an automatic weighing-machine, the combination of a hopper, a gate therefor, a weighing-beam, a scale-pan supported on said scale-beam, a pivoted weighted lever, a holding-lever pivoted to said weighted lever for holding the main gate open, means for releasing said holding-lever on the descent of the scale-pan, a discharge-gate for the scale-pan provided with an arm engaging said weighted lever, a slide pivoted to said weighted lever, and stop devices for said slide for locking said weighted lever in stationary position.

4. In an automatic weighing-machine, the combination of a supply-hopper, a main gate for said hopper, an auxiliary gate for said hopper, a drop-lever, arms attached to said auxiliary gate and drop-lever, similar elbow-levers M and P engaging said arms to hold the gate and lever open, and slide-rods operated by the weighing mechanism and engaging said elbow-levers.

5. The combination with a hopper, a main supply-gate controlling the bottom opening of the hopper, a weighted lever pivoted to the hopper, and a latch-lever pivoted to the weighted lever for supporting the gate in raised position, of weighing mechanism provided with a scale-pan having a take-up lug for engaging the latch-lever, a discharge-gate pivotally supported by the scale-pan, and provided with an upwardly-extending arm, a latch for engaging the latter and holding the discharge-gate up, and mechanism operated from the weighing mechanism and adapted to engage said latch for releasing the arm of the discharge-gate and permitting it to engage the weighted lever, substantially as set forth.

6. The combination with a hopper, a main supply-gate controlling the bottom opening of the hopper, a weighted lever pivoted to the hopper, and a latch-lever pivoted to the weighted lever for supporting the gate in raised position, of weighing mechanism provided with a scale-pan having a take-up lug for engaging the latch-lever, a discharge-gate pivotally supported by the scale-pan and provided with an upwardly-extending arm, a pivoted latch provided with a nose adapted to engage the arm of the discharge-gate, a pivoted drop-lever provided with fingers for engaging one end of the latch, and means operated from the weighing mechanism and adapted to engage said drop-lever, substantially as set forth.

7. The combination with a hopper, a main supply-gate controlling the bottom opening of the hopper, a weighted lever pivoted to the hopper, and a latch-lever pivoted to the weighted lever for supporting the gate in raised position, of weighing mechanism provided with a scale-pan having a take-up lug for engaging the latch-lever, a discharge-gate pivotally supported by the scale-pan and provided with an upwardly-extending arm, a pivoted latch adapted to engage the arm of the discharge-gate, a pivoted drop-lever provided with fingers for engaging one end of the latch, and a pivoted elbow-lever engaging at one

end with the drop-lever, said elbow-lever being operated by its other end from the weighing mechanism, substantially as set forth.

8. The combination with a frame, a hopper, a supply-gate controlling the bottom opening of the hopper, a weighted lever pivoted to the hopper, a stop-slide provided with shoulders and guided between pins on the frame, and a catch-lever pivoted to the weighted lever for supporting the gate in raised position, of weighing mechanism provided with a scale-pan having a take-up lug for engaging the latch-lever, a discharge-gate pivotally supported by the scale-pan and provided with an upwardly-extending arm, a latch for engaging the latter and holding the discharge-gate up, mechanism operated from the weighing mechanism and adapted to engage said latch, and a sliding pin guided in the frame and adapted to strike the stop-slide, said discharge-gate having a finger for striking the sliding pin, substantially as set forth.

9. The combination of a weighing-beam fulcrumed between its ends, a scale-pan supported at one end, a suspension-rod at the other end provided with a horizontal arm, a counterbalance-weight on the suspension-rod, a fulcrumed regulating-lever weighted at one end and adapted to act with different degrees of leverage on different points of said horizontal arm for imparting different lengths of stroke to said rod.

10. The combination with a weighing-beam, fulcrumed between its ends, a scale-pan supported at one end, a suspension-rod at the other end provided with a horizontal arm, and a counterbalance-weight on the suspension-rod, of a fulcrumed regulating-lever weighted at one end, and provided at its other end with a shoulder for engaging one end of the horizontal arm, and with a toe-piece adapted to engage the other end of the horizontal arm, substantially as set forth.

11. The combination with a weighing-beam, fulcrumed between its ends, a scale-pan supported at one end, a suspension-rod on the other end, provided with a horizontal arm, and a counterbalance-weight on the suspension-rod, of a fulcrumed regulating-lever weighted at one end, a second arm pivoted at one end to the opposite end of the regulating-lever and provided with a toe-piece, and means for adjusting the position of the second arm so as to change the pivot of contact of the toe-piece with the horizontal arm, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CARL SCHMIDT.

Witnesses:
CHAS. H. DAY,
CARL TELLSCHOW.