(No Model.) 3 Sheets—Sheet 1.

S. N. CHAPIN.

AUTOMATIC WEIGHING MACHINE.

No. 584,035. Patented June 8, 1897.

Fig. 1.

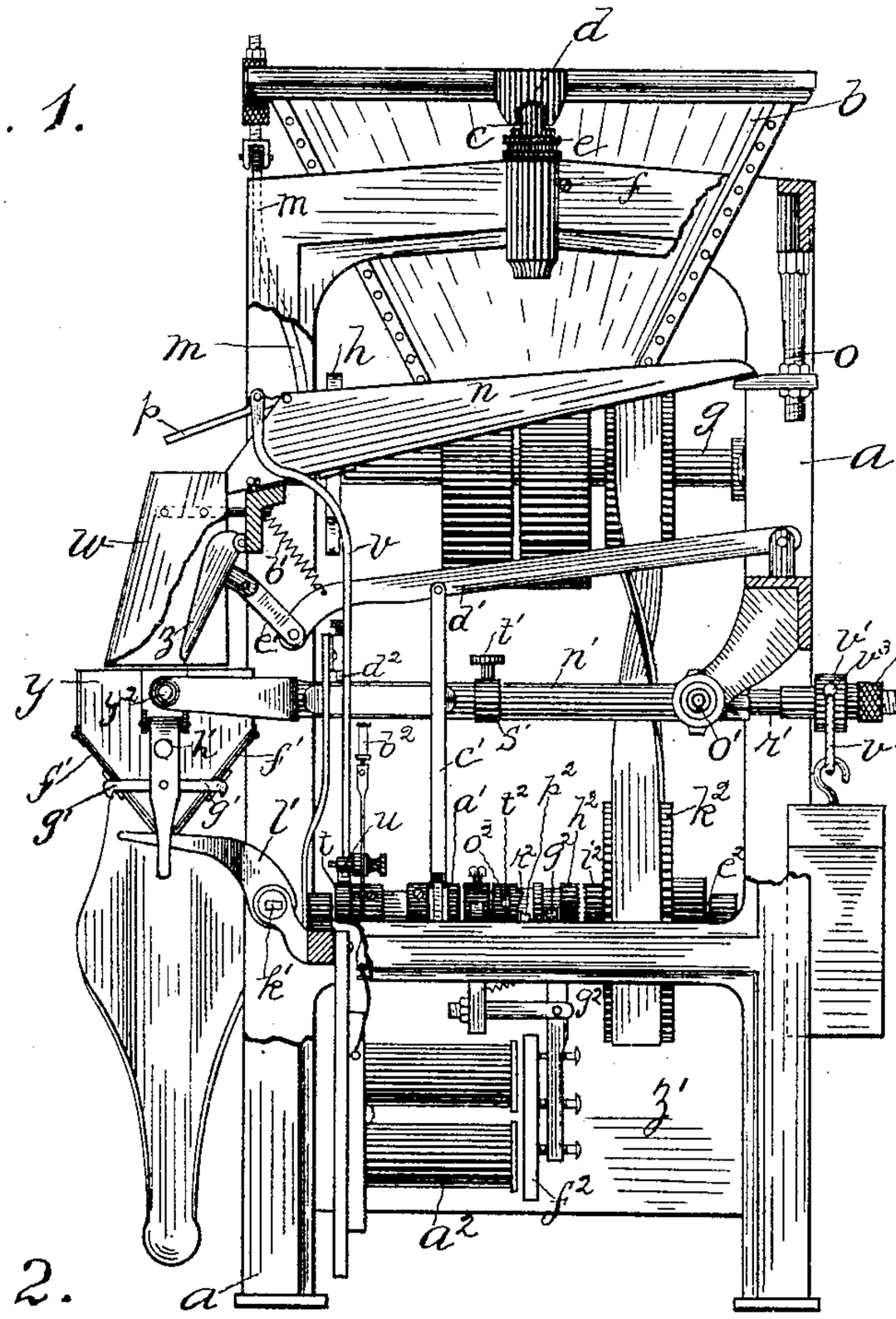

Fig. 3.

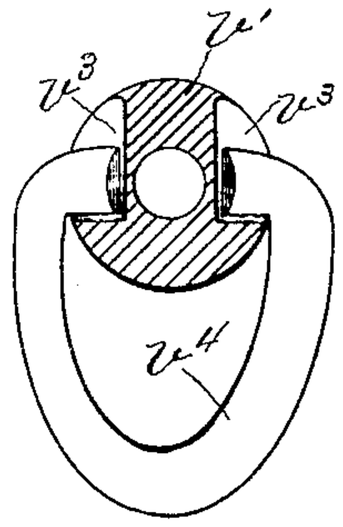

Fig. 2.

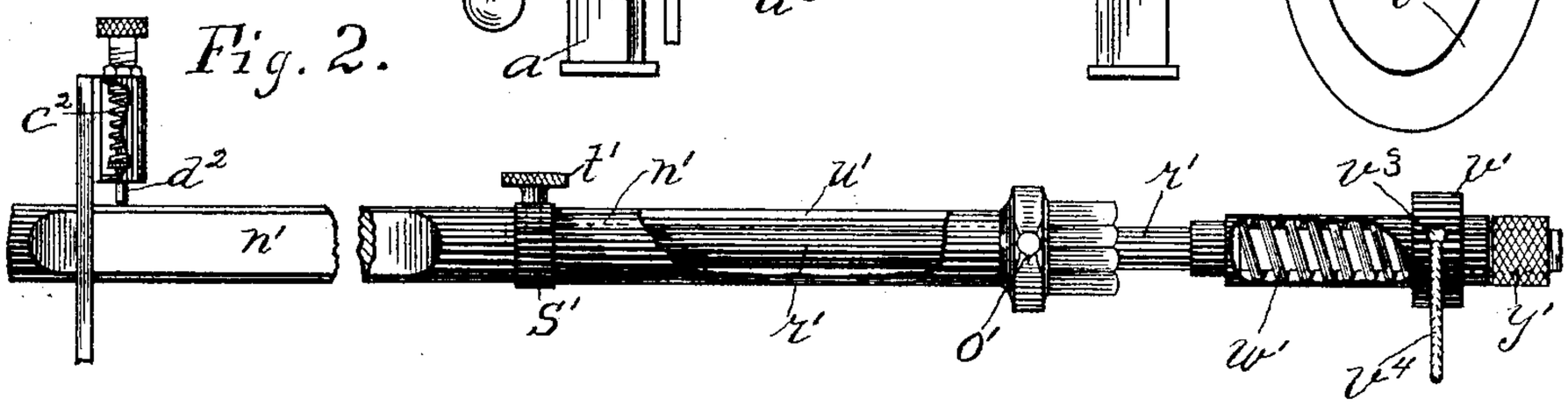

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Fig. 4.

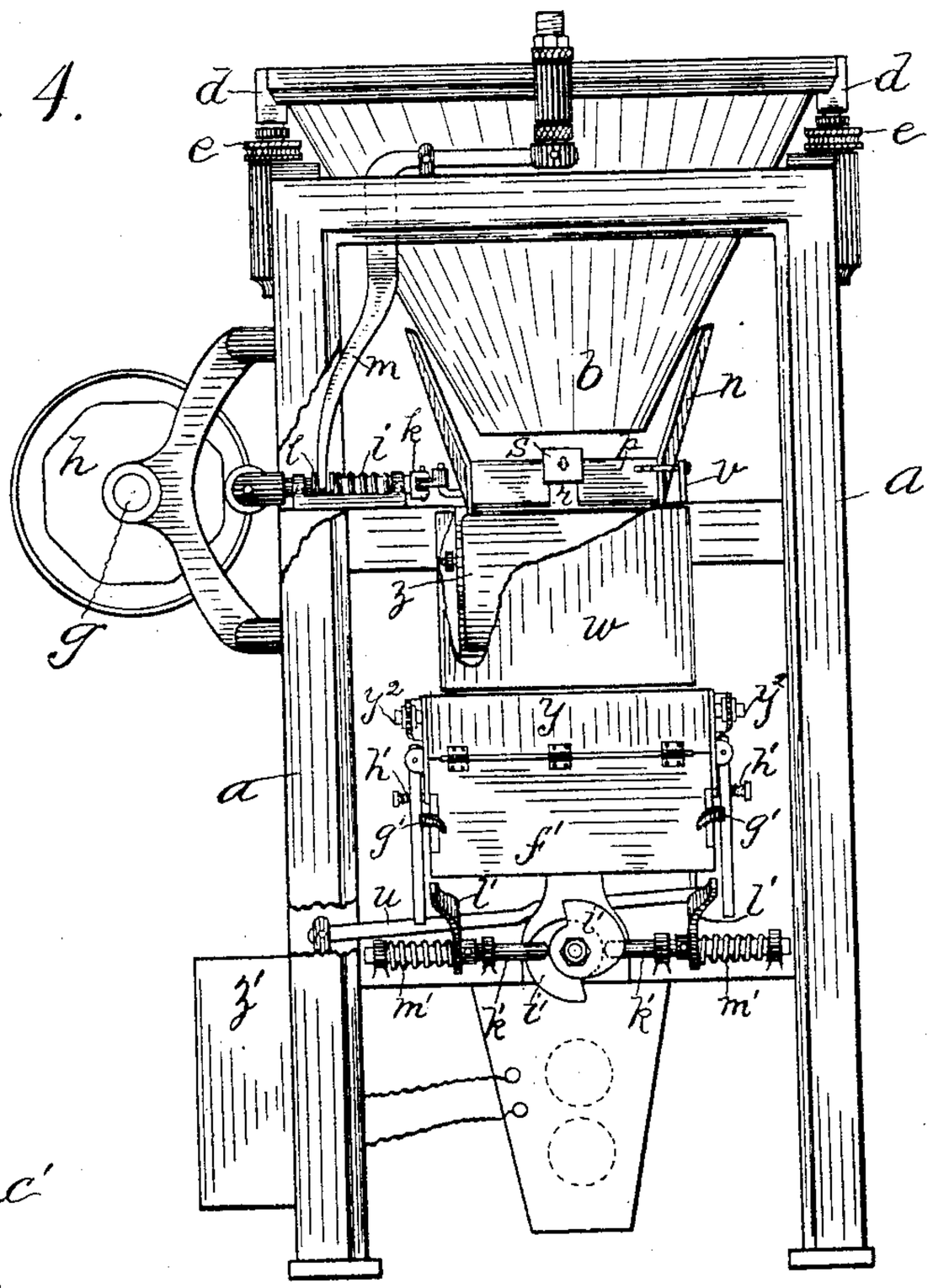

Fig. 5.

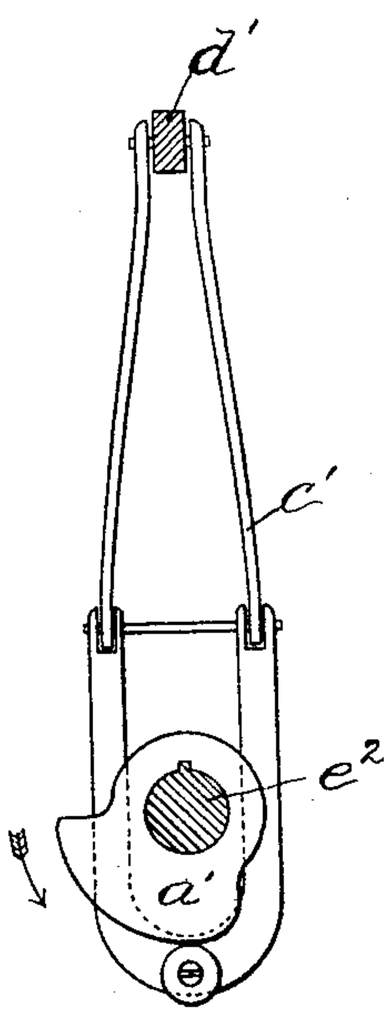

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Fig. 6.

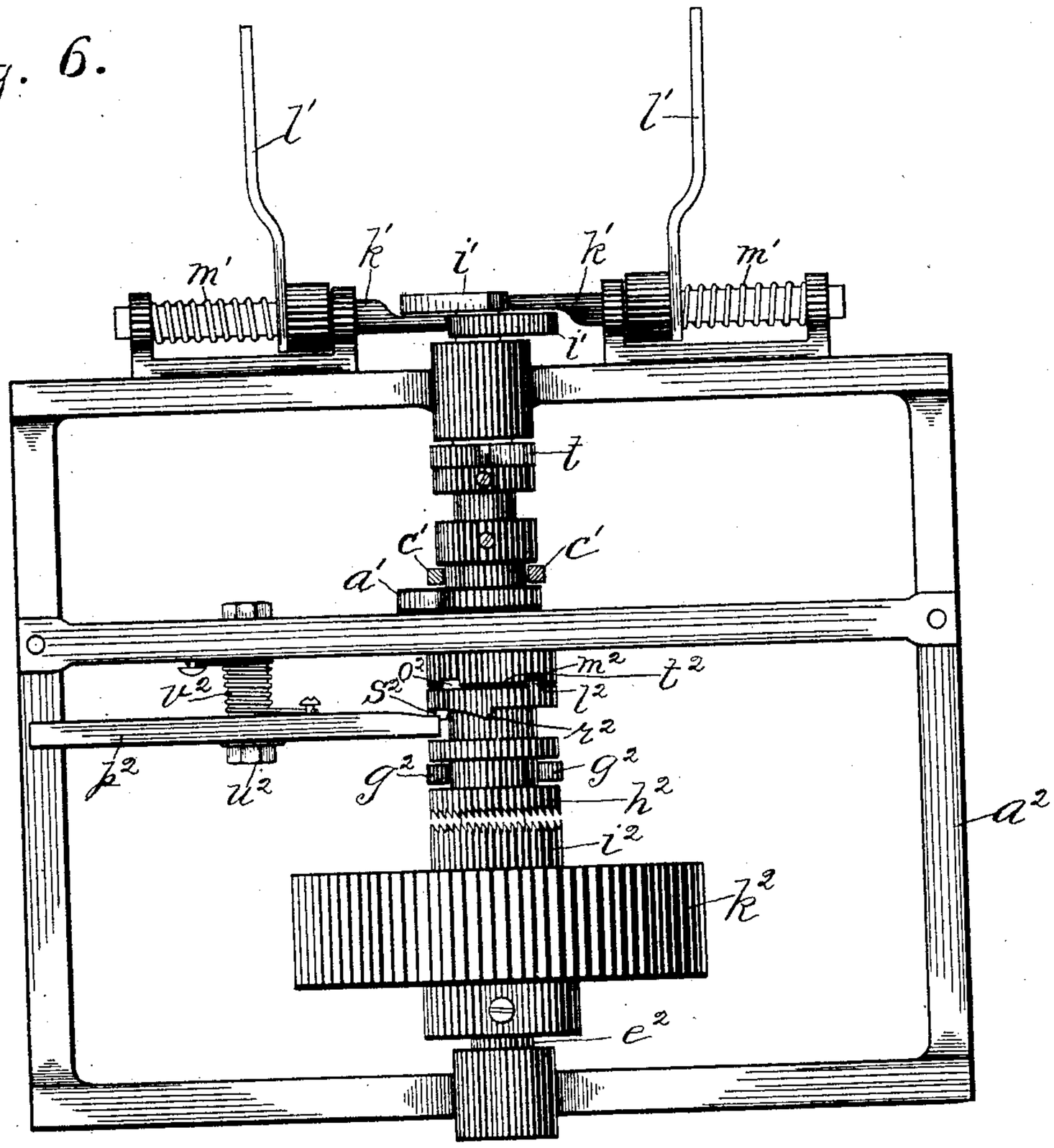
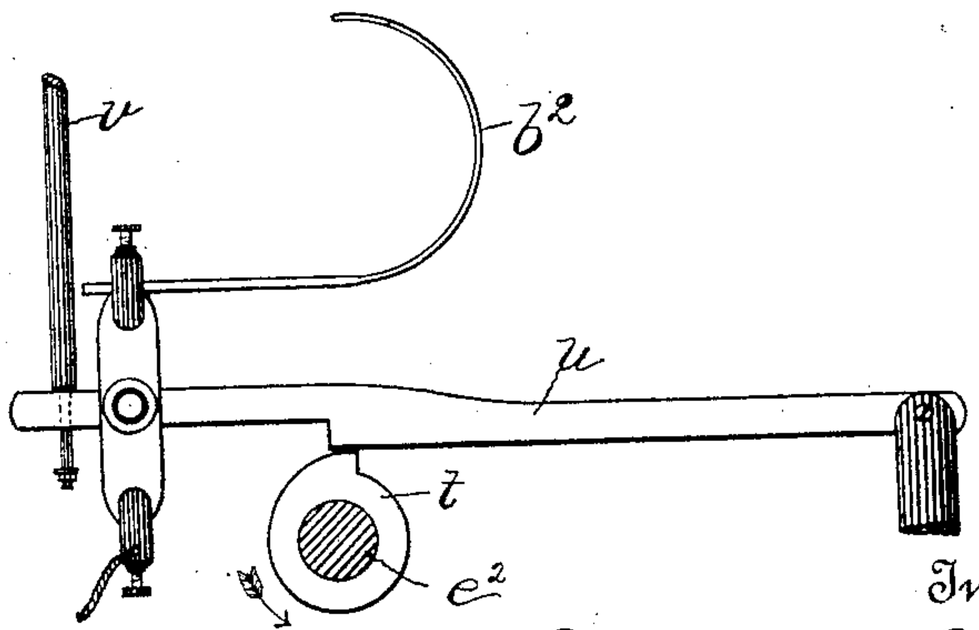


Fig. 7.



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UNITED STATES PATENT OFFICE.

SAMUEL N. CHAPIN, OF NEW BRITAIN, CONNECTICUT.

AUTOMATIC WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,035, dated June 8, 1897.

Application filed July 14, 1896. Serial No. 599,094. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL N. CHAPIN, a citizen of the United States of America, residing at New Britain, in the county of Hartford and State of Connecticut, have invented a certain new and useful Improvement in Automatic Weighing-Machines, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a detail front view of the machine with parts of the frame broken away. Fig. 2 is a detail view of the scale-rod with parts broken away to show the adjustable head. Fig. 3 is a sectional view of the sleeve carrying the weight-yoke. Fig. 4 is a left-hand end view of the machine as shown in Fig. 1. Fig. 5 is a detail view of the cam which operates the chute-gate. Fig. 6 is a detail plan view looking into the interior of the machine from above. Fig. 7 is a detail view of the cam and lever operating the trough-gate with contact-spring.

The object and purpose of the improvement, stated in a general way, is the production of a machine into the receiving receptacle of which articles—such, for instance, as tacks—may be placed in a mass with the result that the machine will, in operation, automatically deliver them in smaller masses, all of practically the same predetermined weight.

In the accompanying drawings, the letter *a* denotes the frame of the machine generally, and *b* denotes the receiving-hopper, which serves as a receiving-receptacle for the articles to be parceled and weighed—as, for instance, tacks. The hopper *b* has a pendulous or rocking motion to facilitate and assist the delivery of the tacks in something like a continuous stream through the open bottom of the hopper. To that end the letter *c* denotes round-headed rocking pins, and *d* denotes corresponding and coöperating rocking forks appurtenant to the hopper. These rocking pins enter the frame of the machine to get lateral support, and they get vertical support by means of the adjusting-nuts *e*, resting on the frame. By rotating these adjusting-nuts a vertical adjustment of the hopper *b* is attained. The pins *c* are secured in any desired adjustment by the set-screws *f*.

The letter *g* denotes what may be termed the "rotary driving-shaft" of the machine. It carries the rotary cam *h*, which, with the spring *i*, gives longitudinal reciprocation to the rod *k*, which carries a fork *l*, taking hold of one end of the crank-lever *m*, the other end of which takes hold of the hopper *b* and gives the said pendulous or rocking motion thereto.

The letter *n* denotes a shaking trough, one that shakes from side to side, located under the open lower end of the hopper *b* to receive the tacks therefrom. It is hung at the rear on the pivot-pin *o*, and the front end shakes constantly from side to side on this center, such shaking motion being imparted by the longitudinal reciprocating rod *k*. This trough pitches downward a little from rear to front, so that the tacks it receives are delivered at the front end in something like a continuous stream.

The letter *p* denotes a gate for the front or delivery end of trough *n*. It is pivotally attached to the trough, and at certain times—just before enough of the tacks have been delivered to form a parcel of the desired size—this gate shuts and stops the delivery of tacks meanwhile, except through a small central opening *r*, the size of which may be regulated by the adjustment of the slide *s*, carried on the gate *p*. The rotary cam *t* controls the falling and closing of the gate *p*. This cam is stationary during the time that the gate *p* is open. The communication between cam *t* and gate *p* is through the medium of the vibratory lever *u* and the connecting-rod *v*. The lever *u* rides and lies on the periphery of the cam *t*. This lever *u* is held at the top of its vibratory play while the gate *p* is open. When it is time for the gate *p* to close, the cam *t* starts to rotate, the lever *u* drops off the shoulder of the projection on the cam, and the gate *p* closes through the gravity of the parts. As has just been said, the gate *p* closes just before enough of the tacks have been delivered to form a parcel of the desired size. The balance of the tacks needed to complete the desired size and weight dribbles through the opening *r*. The tacks delivered from the trough *n* fall through the chute *w* into the delivery-hopper *y*. This chute *w* has a chute-gate *z* hung therein pivotally. This chute-gate closes when the full complement of tacks for a single parcel has

been delivered from the trough n, and it remains closed while the delivery-hopper y is delivering its charge. The chute-gate z is held open for the proper time by the rotary cam a' and is closed, when the cam permits, by the spring b'. The connection from chute-gate z to cam a' is through the medium of the cam-connecting rod c', lever d', and connecting-rod e'. The cam a' remains stationary while the chute-gate z is open and starts to rotate and close the chute-gate z when a full complement of tacks for a single parcel has fallen into the delivery-hopper y.

The letter f' denotes two corresponding doors of the delivery-hopper y, pivotally attached thereto. They are held shut while the tacks are falling into this delivery-hopper by the stops g', which are pivotally attached to the ends of this delivery-hopper and pressed to the position which holds the doors f' closed by the springs h'. At the proper time these stops are moved to release the doors by the rotation of the cams i' acting on reciprocatory rods k', carrying fingers l'. The spring m' holds rods k' to contact with cam i', which cam is stationary except at the times when the doors f' are to be opened. The delivery-hopper y is initially made to deliver its charge of tacks at the proper time by the weight of that load of tacks, and this delivery action does not begin until just the right weight of tacks is in this hopper. This delivery-hopper is hung by pivot edges y^2 on the end of the scale-rod n', which is pivotally supported on the pivot edges o'.

The letter p' denotes the balance-weight, which hangs from rod r', entering the hollow scale-rod n', an arrangement which permits the weight p' to be adjusted to balance, within reasonable limits, any desired load of tacks in the delivery-hopper. The scale-rod n' is graduated exteriorly with weight-marks. The letter s' denotes a marker for these weight-marks. It is a sleeve encompassing and sliding on the scale-rod and connected to the weight-rod r' by the screw t', the top of the scale-rod having suitable mortise u' for that purpose. The weight-rod r' carries a sleeve v', having notches v^3, to which sleeve the weight p' is hung through the medium of yoke u^4. The letter w denotes a spring interposed between that weight and a shoulder on the weight-rod.

The letter y' denotes an adjusting-nut by means of which the scale-rod and its appurtenances may be "balanced" before setting the weight to balance any desired load of tacks in the delivery-hopper.

The letter z' denotes a box carrying a voltaic cell, (or cells,) wherefore z' is allowed to denote such voltaic cell, (or other source of electrical energy.) The wires from this voltaic cell constitute an electric circuit comprehending the electromagnet a^2 and contact-spring b^2. They operate the electromagnet a^2, the frame of the machine—or at least the rod n', supporting the delivery-hopper—being in the circuit. When the delivery-hopper is empty, it is held at the top of its vibratory play by the weight p'. When nearly a desired complement of tacks has fallen into the delivery-hopper, that hopper moves downward through gravity, bringing the scale-rod into contact with the spring b^2, which closes the electric circuit, with consequences shortly to be described hereinafter. The fall of the delivery-hopper to this point is accomplished mainly by the weight of the tacks it contains; also, in a slight degree by the spring c^2 (or a weight) pressing downward on the scale-rod through the medium of the sliding pin d^2, this being an arrangement for attaining a good degree of accuracy in dividing the tacks into parcels of the same weight. The delivery-hopper is generally caused to complete the remainder of its downward movement by the weight of a few additional tacks, which now drop therein through the opening r, the trough-gate p being closed almost simultaneously with the said closing of the electric circuit. While the tacks are dropping, as aforesaid, into the delivery-hopper, the electric circuit being open meanwhile, the rotary cams t a' i', which all rotate with the shaft e^2, are quiescent. When the circuit closes, as already described, the movement of the armature f^2, acting through the medium of the lever g^2, throws the clutch-half h^2 into mesh with the clutch-half i^2, which is fast to pulley k^2, the clutch-half h^2 being connected to the shaft e^2 by feather and spline, and that shaft e^2 and the cams t a' i' are put into rotation. This meshing of the clutch-halves just described unmeshes stop-boss l^2 from stop-mortise m^2, with the result that stop-boss l^2 as it rotates takes bearing against the surface t^2, which preserves the meshing of the clutch-halves positively till stop-boss l^2, after about a quarter-rotation, arrives coincident with stop-mortise o^2. Meanwhile normally a few more tacks have dropped into the delivery-hopper, carrying scale-rod n' downward to make another contact with contact-spring b^2, thus bringing the electromagnet again into play to exert its influence to keep the clutch-halves meshed, and if enough additional tacks have dropped into the delivery-hopper during the said quarter-rotation to make this second electrical contact then when stop-boss l^2 and stop-mortise o^2 become coincident in position they, being thereto prevented by the electromagnet, do not mesh, but clutch-half h^2, with shaft e^2 and cams i' t a', continues to rotate without stoppage at this point, and the delivery-hopper dumps its load. Now take the case where enough additional tacks do not fall into the delivery-hopper during the said quarter-rotation to cause said second electrical contact. Then when stop-boss l^2 and stop-mortise o^2 become coincident the electromagnet is not exerting its influence to keep the clutch-halves h^2 i^2 in mesh, and the pivoted lever p^2, bearing sidewise against the cam projection r^2, forces stop-boss l^2 into stop-

mortise o^2, thus unmeshing the clutch-halves h^2 i^2 and stopping the rotation of shaft e^2 and cams i' t a' until enough additional tacks have fallen into the delivery-hopper to make up the desired weight, whereupon such hopper and the scale-rod fall, the second said electrical contact is made, the clutch-halves h^2 i^2 are meshed, shaft e^2 and cams i' t a' rotate, and the delivery-hopper dumps its load. When stop-boss l^2 arrives at stop-mortise m^2, the lever p^2, striking sidewise against cam projection s^2, throws stop-boss l^2 and stop-mortise m^2 into mesh, the electrical current having been broken meanwhile by the rising of the scale-rod after the delivery-hopper is freed from its load. The lever p^2 is pivoted on pivot-pin u^2 and pressed to the position of rest by the spring v^2. When the lever p^2 is not to force the stop-boss l^2 into mesh with the stop-mortise m^2 or o^2, its operative end rides over the appurtenant cam projection r^2 or s^2.

I claim as my improvement—

1. In a weighing-machine, the combination of the frame a, round-headed vertically-adjustable rocking pins c, in sockets on the frame, downward-projecting rocking forks d, supported on said round-headed rocking pins, and the rocking pendulous hopper b, supported by the said rocking forks, substantially as specified.

2. In combination, the machine-frame a, the hopper b, the round-headed rocking pins c, the adjusting-nuts e, and the rocking forks d, all substantially as described and for the purposes set forth.

3. The combination of the pendulous hopper b, suspended on rocking supports above its center of gravity, laterally-shaking trough n, rotary cam h, spring-actuated rods k, and lever m, all substantially as and for the purpose specified.

4. The combination of the pendulous hopper b, suspended on rocking supports above its center of gravity, laterally-shaking trough n, gate p closing the mouth of said trough, with means for automatically operating the same, chute w, chute-gate z, with means for automatically operating the same, delivery-hopper y with duplicate inclined doors f' f', means for automatically operating said doors, and scale-beam n', all substantially as and for the purpose specified.

5. In combination, the delivery-hopper y borne on pivoted scale-rod n', the weight p', weight-rod r', adjusting-sleeve v', and spring w', all substantially as described and for the purposes set forth.

6. The combination of the pivoted scale-beam n', extensible weight-rod r', adjustable marker s', sliding sleeve v', spring w, and pendulous counterbalance p', all substantially as and for the purpose specified.

7. In combination, the delivery-hopper y borne on pivoted rod n', the hopper-doors f', stops g', springs h', rotary cams i', reciprocatory rods k', and springs m', all substantially as described and for the purposes set forth.

8. The combination of the pendulous hopper b, downward-projecting rocking forks d, carrying the said hopper, vertically-adjustable round-headed rocking pins c, supporting said rocking forks, laterally-shaking trough n, with means for operating the same, trough-gate p, and connecting-rod v, lever u, and rotary cam t, all substantially as specified.

9. The combination of the pendulous hopper b, laterally-shaking trough n, gate p, chute w, chute-gate z, automatically operated by cam a' through connecting-rod c', lever d', spring b' and link e'; and delivery-hopper y, provided with duplicate inclined doors and means for operating the same, all substantially as and for the purpose specified.

10. The combination of the pivoted scale-beam n', pendulous counterbalance p', delivery-hopper y, contact-spring b^2, the voltaic circuit and means for energizing the same, the electromagnet and its armature, the lever g^2, the clutch-sections h^2 i^2, on the rotary shaft e^2, and the rotary cams t a' i', on the said shaft, the gate p, the chute-gate z, and the inclined doors f' f', and connections between the said rotary cams t, a', i', and the said gate p, chute-gate z, and the inclined doors f' f', whereby the latter are operated, substantially as and for the purpose specified.

11. The combination of the pendulous hopper b, the laterally-shaking trough n, the chute w, the pivoted scale-beam n', the pendulous counterbalance p', delivery-hopper y, contact-spring b^2 borne on but insulated from the lever u, the voltaic circuit and means for energizing the same, the electromagnet and its armature, the lever g^2, the clutch-sections h^2 i^2, on the rotary shaft e^2, and the rotary cams t a' i', on the said shaft, the gate p, the chute-gate z, and the inclined doors f' f', and connections between the said rotary cams t a' i', and the said gate p, chute-gate z, and inclined doors f' f', whereby the latter are operated, substantially as and for the purpose specified.

12. In combination, the delivery-hopper y borne on pivoted rod n', the contact-spring b^2 borne on but insulated from lever u, the voltaic cell z', the electric circuit, the electromagnet a^2, armature f^2, lever g^2, clutch-halves h^2 i^2, stop-boss l^2, stop-mortises m^2 o^2, cam projections r^2 s^2, and spring-pressed lever p^2, all substantially as described and for the purposes set forth.

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