(No Model.) 3 Sheets—Sheet 1.

G. D. VAN HOESEN.

WEIGHING AND PACKAGING MACHINE.

No. 249,210. Patented Nov. 8, 1881.

Fig. 1.

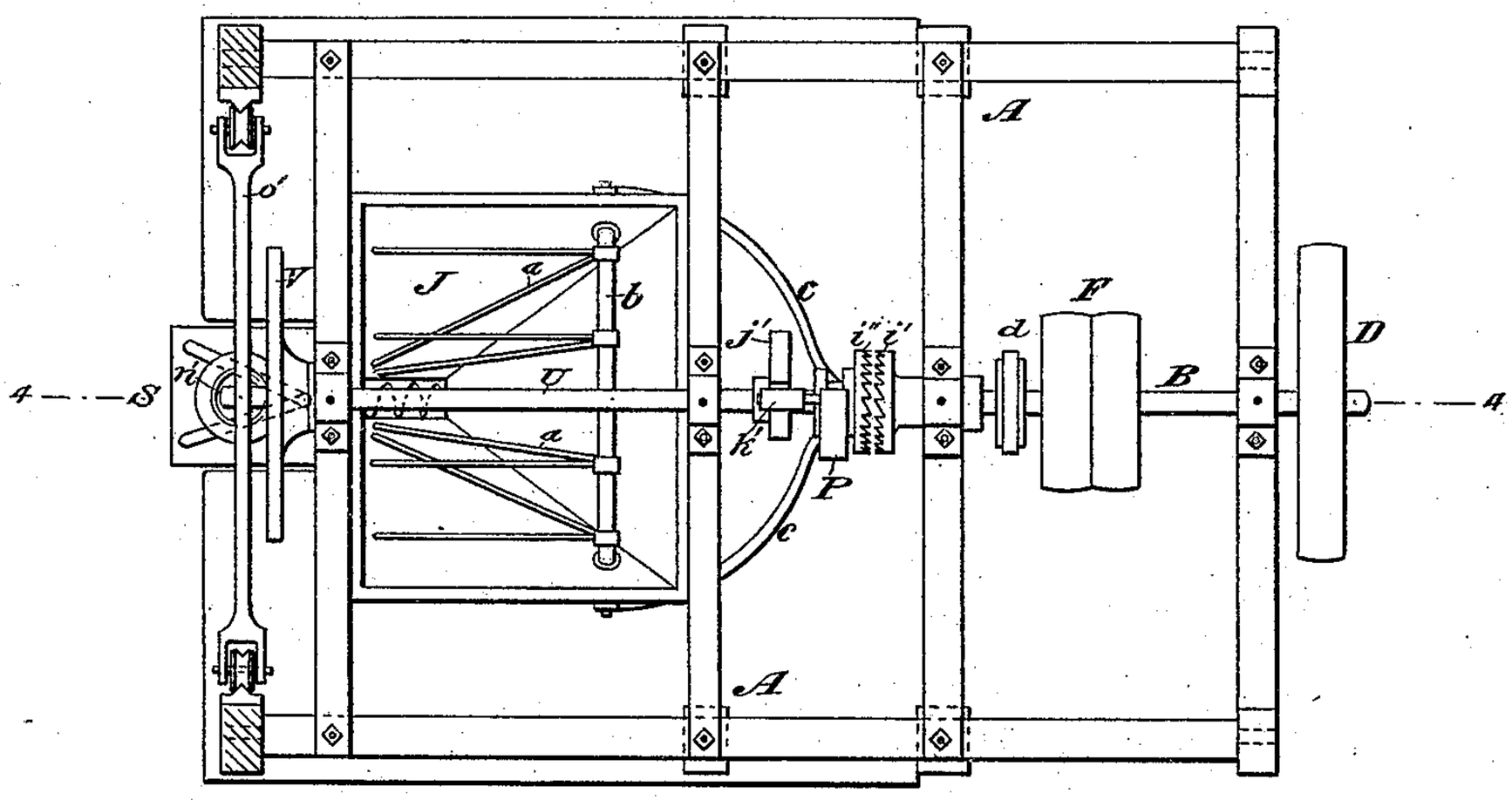


Fig. 6.

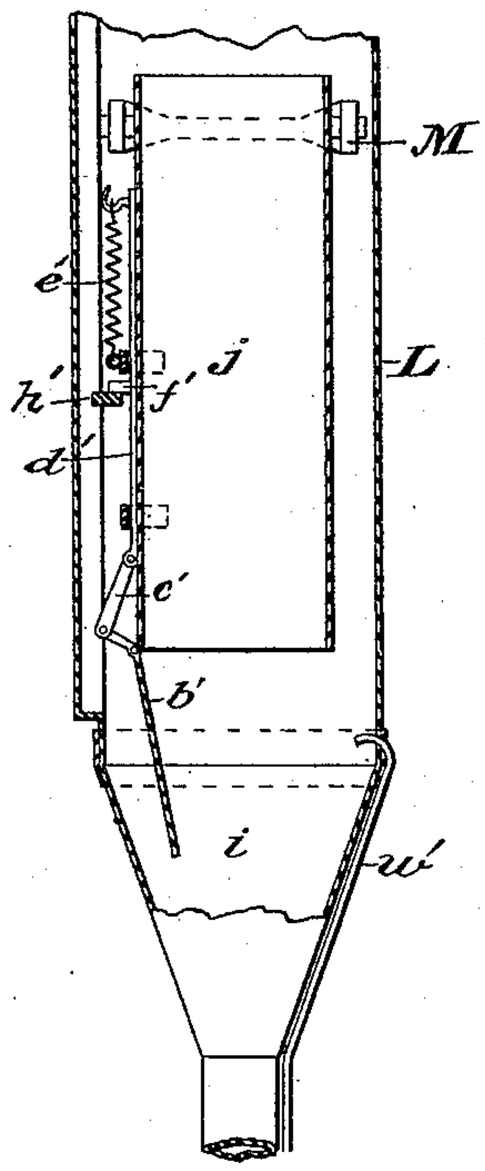


Fig. 8.

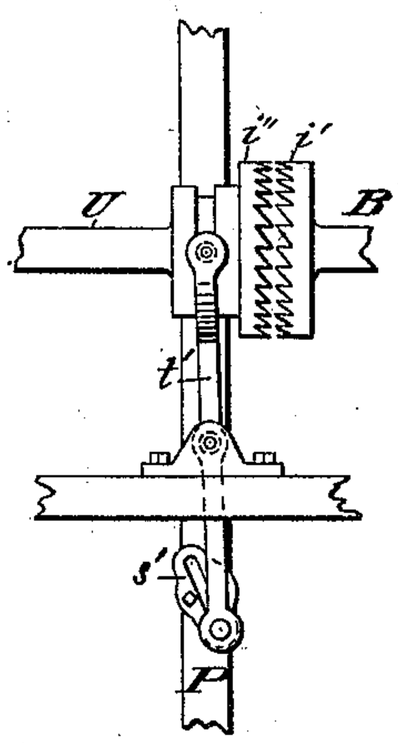
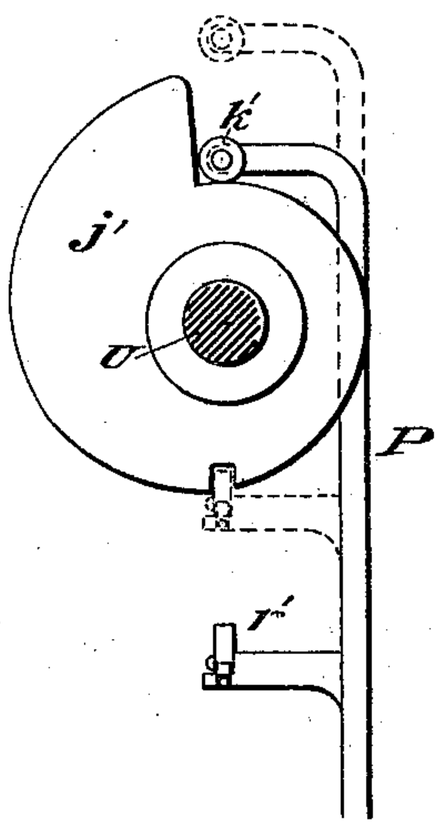


Fig. 7.



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(No Model.) 3 Sheets—Sheet 2.

G. D. VAN HOESEN.

WEIGHING AND PACKAGING MACHINE.

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Fig. 2.

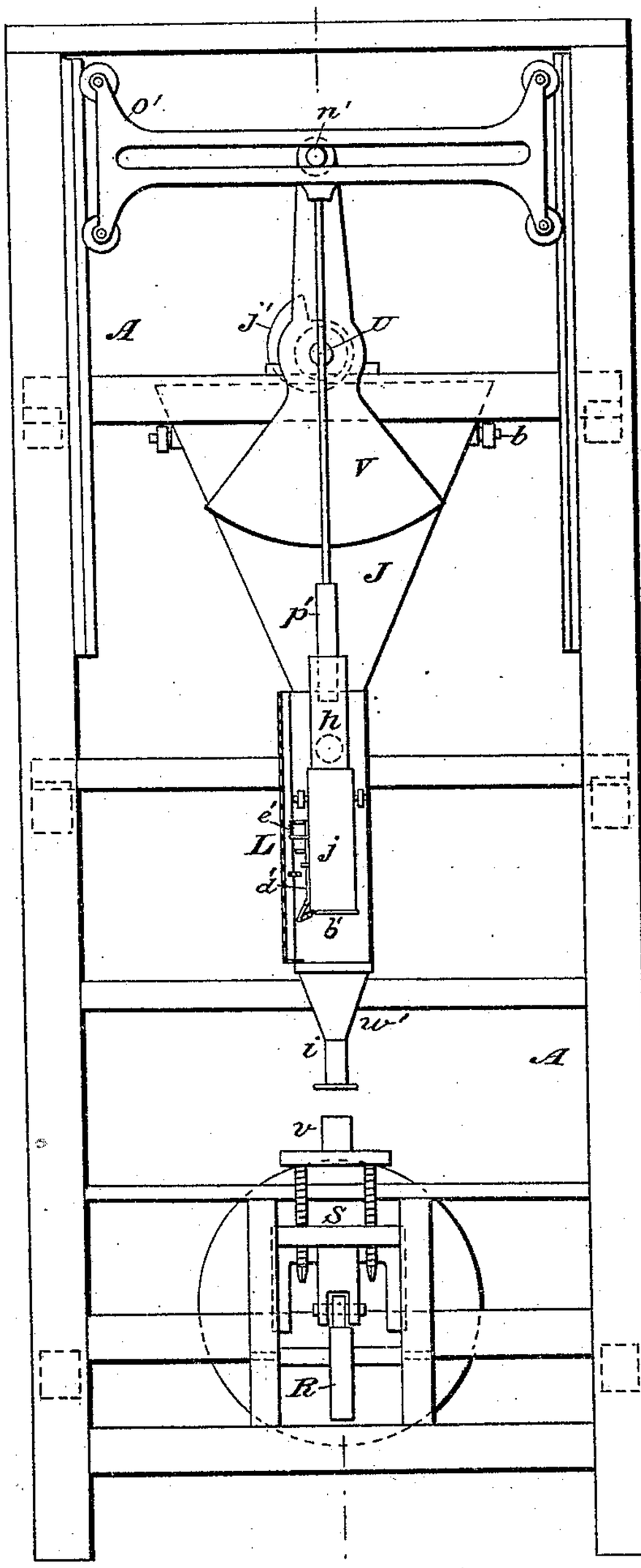

Fig. 3.

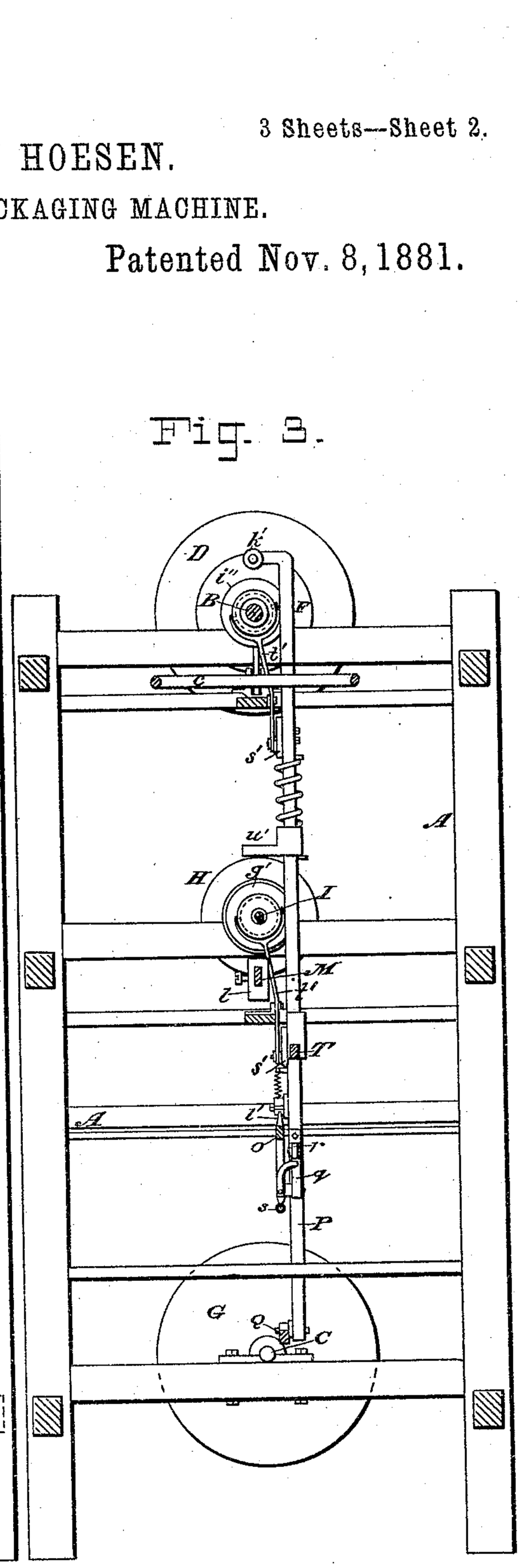

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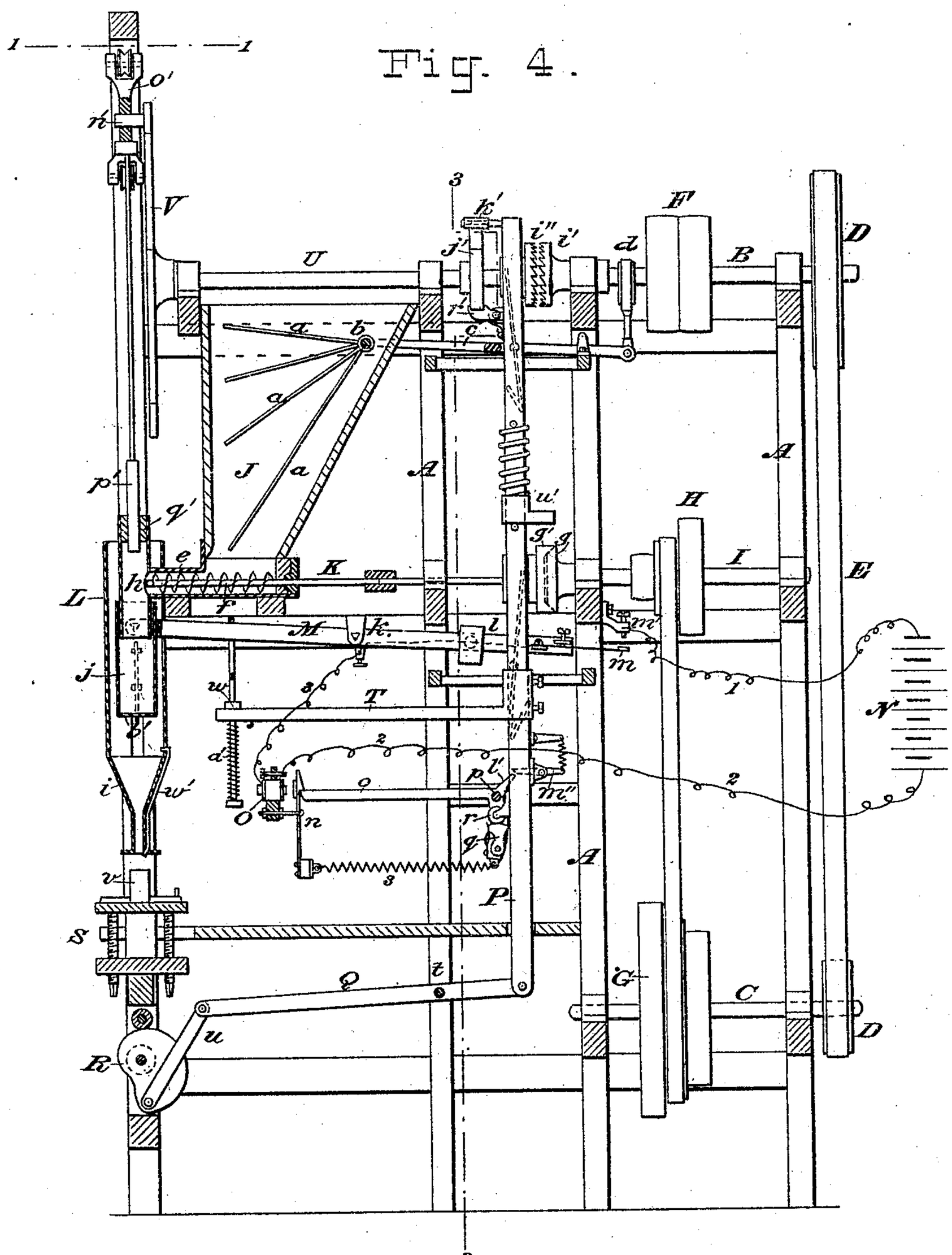
Fig. 4.



3

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UNITED STATES PATENT OFFICE.

GEORGE D. VAN HOESEN, OF BROOKLYN, NEW YORK.

WEIGHING AND PACKAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 249,210, dated November 8, 1881.

Application filed June 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. VAN HOESEN, a citizen of the United States, residing in Brooklyn, Kings county, New York, have invented certain Improvements in Weighing and Packing Machines, of which the following is a specification.

My invention has for its object a machine for weighing and packing in boxes, bags, cans, and other receptacles various substances, such as baking-powders, tobacco, &c. The machine is automatic in its action, and comprises a feeding device, a weighing device, and a pressing or packing device, all as will be more fully hereinafter set forth.

In the drawings, which serve to illustrate my invention, Figure 1 is a plan of the machine, the frame which projects above the top of the machine being in section on the line 1 1 in Fig. 4. Fig. 2 is a front elevation of the machine. Fig. 3 is a vertical transverse section in the plane of the line 3 3 in Fig. 4, looking toward the rear of the machine. Fig. 4 is a vertical longitudinal mid-section taken in the plane of the line 4 4 in Figs. 1 and 2. Fig. 5 is a detached view, enlarged, showing the weighing-cup and its attached mechanism. Fig. 6 is a detached view, enlarged, showing the mechanism for shifting the movable clutches. Fig. 7 is a detached view of the lifting-cam.

A represents a suitable frame-work to support the mechanism, which may be of wood or metal.

B is the main or driving shaft, which imparts motion to the other moving parts. C is a counter-shaft.

D D are pulleys on the shafts B and C, around which passes a belt, E.

F represents tight and loose pulleys, through which the main shaft is driven; and G is a cone-pulley on the shaft C, which is belted in the ordinary way to a cone pulley, H, on another counter-shaft, I.

J is a hopper to contain the substance to be weighed and packaged—as baking-powder, for example. The powder in the hopper is agitated and kept loose by means of arms *a a*, which radiate from a shaft, *b*, which extends across the hopper and has bearings therein. To the projecting extremities of this shaft are rigidly fixed the tips of the branches of a fork, *c*, the handle of which is coupled to the yoke of an eccentric, *d*, on the shaft B. Rotation of the eccentric imparts oscillation to the shaft *b*, and this oscillation causes the arms *a* to vibrate in and through the powder in the hopper. The hopper opens into a tubular casing, *e*, within which rotates a screw-conveyer, *f*. The shaft K of this conveyer is aligned with the shaft I, and motion is communicated from the latter to the former by means of a fixed clutch, *g*, on the shaft I, which engages at the proper time a sliding clutch, *g'*, on the shaft K. The casing *e* opens into a tubular conduit, *h*, which is arranged within an outer drum or shell, L, provided with a contracted tubular flanged outlet, *i*.

Inside the shell L, and arranged to slip freely over the lower end of the conduit *h*, is a weighing cup or receptacle, *j*, which is hung on knife-edge supports in a fork on the end of a scale-beam or lever, M. This beam plays in a slot in the casing L, and is mounted on knife-edge supports or fulcrums at *k*. On the free end of the beam M is an adjustable weight, *l*. When the proper quantity of powder has been fed into the cup *j* by the conveyer *f* the weight *l* is balanced, and the cup end of the lever falls. In so doing an elastic metallic contact, *m*, on its free or weighted extremity, touches another contact, *m'*, which closes an electric circuit formed by wires 1, 2, and 3, which includes a battery, N. In this circuit is also an electro-magnet, O, which becomes excited by the closure of the circuit and attracts its armature *n*. On the back of the armature is a projection which takes over the end of a lever, *o*, pivoted or fulcrumed at *p*. This lever has a downwardly-projecting arm which bears a pivoted spring-supported block, *q*, which takes under a roller projection, *r*, on a vertically-sliding bar, P, which is supported thereby. When the armature of the magnet is attracted the lever *o* is released, and the block *q* withdrawn from under the projection *r* by a retracting-spring, *s*. The bar P is then permitted to fall, and in doing so it performs several important functions simultaneously, which I will now describe.

To the lower end of the bar P is coupled one end of a lever, Q, fulcrumed at *t*, (see Fig. 4,) the other end of which connects by a link, *u*, with a cam, R, arranged under a vertically-

sliding platform, S, on which a can or receptacle, *v*, to be filled with powder is placed. The fall of the bar P acts through its connections to rotate the cam R and raise the platform S until the can *v* is pressed firmly up to the flange on the extremity *i* of the shell L.

T is an arm rigidly secured to the bar P through a hole, in the extremity of which passes a rod, *w*, the upper end of which is provided with a long slot through which the scale-beam M extends. The rod *w* has a nut or head on its lower end, and a nut or pin just above the arm T to serve as a stop, and around the rod, between the arm and the head, is a spiral spring, *a'*. This spring serves as a cushion. When the bar P falls the mechanism just described falls with it, and the slotted rod *w* carries the beam M and the cup *j* down with it. This cup has a hinged bottom, *b'*, (see Fig. 5,) which bottom has an arm that projects back from the hinge, and is coupled by a link, *c'*, with a sliding bar, *d'*, and a spring, *e'*, attached to the upper end of said bar, and a stud on the cup *j* draws down the said bar normally and keeps the bottom of the cup closed, so that no powder can escape; but when the cup is pressed down, as above described, a projection, *f'*, on the bar *d'* engages or strikes a shoulder, *h'*, on the inner wall of the shell L, and the bar is pressed upward and detained in such a manner as to throw open the hinged bottom of the cup and let the powder escape into the can below. This position of the parts is shown in Fig. 5.

Referring, now, to Figs. 2, 3, and 4, U is a shaft aligned with the main shaft B, and a fixed clutch, *i'*, on the main shaft engages at the proper time with a corresponding sliding clutch, *i''*, on the shaft U, by which means rotary motion is communicated from the former to the latter shaft. On the shaft U is fixed a snail-cam, *j'*, which takes under a roller projection, *k'*, on the upper extremity of the bar P, whereby when the shaft U is rotated the said bar will be raised and permitted to drop once for each revolution of the said shaft; but it will be observed that the cam *j'* does not uphold the said bar. This is accomplished by the block *q* on the pendent arm of the lever *o*. On the short end of this latter lever is a branch, *l'*, (see Fig. 4,) under which a spring-catch, *m''*, on the bar P takes, as the said bar is raised by the cam *j'*, whereby the lever *o* is returned to the position shown in Fig. 4. The block *q* is made to yield so that the projection *r* on the bar P may pass it, otherwise the two would rigidly engage and prevent the bar from being lifted. The lifting of the bar P serves to turn back the cam R, and permit the platform S to drop to its original position, and it also, by raising the slotted rod *w*, permits the weighing-beam M to rise.

On the outer or front end of the shaft U is fixed a crank, V, the wrist-pin *n'* of which engages a horizontal slot in a frame, *o'*, arranged to reciprocate vertically in the main frame of the machine. Rotation of the crank V causes alternate reciprocation of the frame *o'* in a well-known way.

Attached to the frame *o'* is a plunger, *p'*, which plays through a guide, *q'*, down through the shell L and its outlet *i*, and packs or presses the powder into the can *v*. At every revolution of the shaft U the plunger *p'* moves down and up, and when the highest point of the cam *j'* has passed from under the projection *k'*, so that the bar P may be free to fall, a spring-dog, *r'*, on the said bar catches in a recess in the cam *j'* and prevents further rotation of the shaft U until the bar P falls and releases it. It will be obvious, however, that to accomplish this the clutch *i''* must be disengaged from the clutch *i'* at the instant the dog *r'* engages the cam *j'*, as the shaft B rotates continuously. This mechanism for shifting the clutch is best shown in Fig. 6.

On the bar P is fixed a plate, *s'*, provided with a oblique groove or slot. A pivoted lever, *t'*, has a pin at its lower end, which engages the oblique groove in the plate *s'*, and the usual fork and pins at the upper end to engage a circumferential groove in the boss of the sliding cam. By means of this cam the fall of the bar P engages the clutches, and the dog *r'* is disengaged from the cam *j'* at the same instant. Thus the plunger *p'* is caused to descend and pack the powder in the can simultaneously with the operation just described. When the bar P is raised by the continued revolution of the cam *j'* the clutch is again disengaged, and the dog *r'* caused to engage the cam, and thus check any disengagement of the parts due to momentum.

The clutches *g g'* (which may be friction-clutches) are shifted into and out of engagement by the same mechanism as that employed by its clutches *i' i''*, except that the plate *s'* has the oblique groove inclined in the opposite direction, whereby the fall of the bar P disengages the clutches, and the lifting of the bar engages them. This is because the feeding of the powder into the cup should cease the moment the beam M falls, and should not begin again until the beam returns to its normal position.

To prevent rotation of the shaft K by acquired momentum a spring-brake, *w'*, mounted on the bar P, is arranged to fall upon the clutch *g'* and check further rotation as soon as the clutches are disengaged.

The platform S is provided with adjusting-screws to adapt it to cans or receptacles of different heights, and with suitable guide-strips on its upper face, to enable the operator to readily register the cans with the outlet *i*.

To prevent the escape of dust in filling receptacles with my machine, I close the top of the casing L by fitting snugly around the bearing *q'* of the plunger; and to permit the air in the can to escape therefrom as the powder enters I provide an air pipe or duct, *w'*, secured to the outlet *i* of the shell L and arranged to

open into said shell at its upper end and into the can being filled at its lower end, as shown.

Ducts for escape of air from cans have heretofore extended upward from the can to some point outside the casing, so that the air might escape outside the latter. My duct enters the casing, so as to convey the air, with any dust or powder which may be borne by it, into the casing above the powder therein, thereby preventing waste of powder.

To remove the spiral conveyer *f* for cleansing, a coupling may be provided in the shaft K, as shown, and gated openings be provided in the walls of the conduit *h*, and shell L aligned with said conveyer. I have not shown these openings, as they form no essential part of my machine.

Where bags are to be filled with smoking-tobacco, for example, the bag is placed in a box or mold of the proper size and its upper edge turned back over the edge of said mold. The flange on the outlet *i* may in this case be omitted and the end of said outlet be arranged to enter the bag to be filled. In lieu of affixing the flange directly to the outlet *i*, it may be attached to a sleeve made to fit over said outlet, and a cushion-spring may be employed behind or above said sleeve, whereby it may yield slightly to the upward pressure of the can in filling.

It will be observed that in the above description I have adhered to the precise construction and arrangement of mechanisms shown in the drawings; but it is obvious that equivalent mechanism may be substituted for those shown without departing materially from the principles upon which the operations are based—as, for example, the reciprocating frame *o'* might be connected with the wrist-pin *n'* by means of a connecting-rod; or the frame might be omitted altogether and the plunger *p'* connected with the wrist-pin by means of a connecting-rod or pitman. The battery N might also be replaced by other well-known devices for exciting the electro-magnet O. Therefore I do not wish to confine myself to the precise construction and arrangement herein shown and described.

I have shown the electric circuit as normally open and arranged to set the various mechanisms in motion by its closer; but the reverse arrangement may be employed as well, and the circuit be normally closed. This reversion will be well understood without further description.

One important feature of my invention lies in the arrangement whereby the feeding mechanism is arrested at the moment the proper quantity has been fed into the weighing-cup. This I effect by means of the electrical circuit, as described.

The arrangement of the spiral conveyer to feed horizontally into the conduit leading to the weighing-cup has an important advantage over such conveyers when arranged vertically, in that by my arrangement the feed is instantly arrested when the conveyer ceases revolving, while in those arranged vertically such accuracy cannot be attained, as more or less of the material will always fall from the conveyer after its rotation has ceased.

Having thus described my invention, I claim—

1. In a weighing-machine, the combination of a scale, the weighing-cup thereof, an electric circuit, including a circuit-closing device actuated to close the circuit by the descent of the weighing-cup, an electro-magnet included in said circuit, and dumping mechanism brought into operation by the charging of the said magnet, whereby when the weighing-cup is depressed by the predetermined weight of its contents the latter are automatically dumped, substantially as set forth.

2. In a weighing-machine, the combination of a feeding mechanism for directing the material to be weighed into the weighing-cup, the said cup, the weighing-scale thereof, an electric circuit, including a circuit-closing device operated to close the circuit by the descent of the said cup, an electro-magnet included in said circuit, and means for stopping the feeding mechanism, operated by the charging of said magnet, substantially as set forth.

3. In a weighing and packing machine, the combination of a scale, the weighing-cup thereof, means for feeding the material to be weighed into said cup, means for directing said material, when dumped from said cup, into the can or other packing-receptacle, mechanism for packing or compressing it therein, an electric circuit arranged to be closed by the descent of the weighing-cup to the predetermined point, an electro-magnet in said circuit, and means interposed between said magnet and the weighing-cup and packing mechanism whereby, when the magnet is charged, the cup is dumped and the packing mechanism started, substantially as set forth.

4. In a weighing-machine, the combination of a hopper, a spiral conveyer rotating on a horizontal axis arranged at one end beneath the bottom opening in said hopper, a weighing-scale, the weighing-cup thereof arranged to receive the substance falling from the delivering end of said conveyer, and means for stopping the rotation of said conveyer upon the depression of the weighing-cup to a predetermined point, substantially as set forth.

5. In a weighing-machine, the combination of a shell or casing terminating at its lower end in a mouth for engagement with the can or other packing-receptacle, a spout projecting downward into the upper portion of said shell, a feeding device for delivering a stream of the substance to be weighed through said spout, a weighing-cup of approximately cylindrical form arranged within said shell, with the lower end of said spout within it when elevated, capable of vertical motion in said shell, and provided with a hinged bottom for dumping, substantially as set forth.

6. In a weighing and packing machine, the

combination of a weighing-scale, the dumping weighing-cup thereof, a shell or casing within which said cup is arranged, terminating at its lower end in a mouth for engagement with the can or other packing-receptacle, a normally-upheld vertically-moving plunger arranged to move through said casing and to pack or compress the substance in said can or receptacle, and means for causing the forcible descent of said plunger upon the depression of the weighing-cup by the weight of its contents to a predetermined point and after the dumping of the latter, substantially as set forth.

7. The combination, of the main driving-shaft B, the shaft U, clutch i' i'', adapted to connect said shafts but normally disengaged, the bar P, arranged to drop by gravity and adapted to shift said clutch into engagement in falling, the crank V on the shaft U, the plunger p', and the reciprocating slotted frame o', or its equivalent, all arranged to operate substantially as set forth.

8. The combination of the hopper J, the conveyer f, its shaft K, the driving-shaft I, a clutch connecting said shafts, and the bar P arranged to fall by gravity, and adapted, in falling, to shift said clutch and disengage said shafts, substantially as and for the purposes set forth.

9. The combination, in an automatic machine for weighing and packaging substances, of the hopper, the feeding mechanism, the shell or casing L, provided with a contracted outlet, i, the conduit h, into which the powder is fed, the weighing-cup, the scale-beam provided with a weight, l, and an elastic contact, m, the contact m', arranged to touch the contact m when the weight is raised by the substance accumulated in the weighing-cup and thus close an electric circuit, the said circuit and the electro-magnet therein, the armature n, provided with a catch to engage the end of the lever o, the said lever provided with a block, q, to take under a projection on the bar P, and to uphold the same, the said bar provided with mechanism for shifting the clutch g' out of engagement with the clutch g when the said bar falls, the said clutches g g', and the shaft I, for driving the feeding mechanism, all arranged to operate substantially as set forth.

10. The combination, with the vertically-moving gravity-bar P and the shell or casing L, of the lever Q, link u, cam R, and platform S, all arranged substantially as set forth.

11. The combination, in a weighing and packaging machine, of the vertically-moving gravity-bar P, provided with an arm, T, the slotted rod w, arranged to engage the scale-beam, as described, the said beam bearing the weighing-cup, the said cup provided with a hinged bottom, b', the rod d', connected with the hinged bottom by a link and provided with a projection to engage a fixed stop when the cup is pressed down, and a spring, e', arranged to keep the hinged bottom b' closed, whereby, when the bar P falls the contents of the weighing-cup are dumped or discharged, substantially as set forth.

12. In a machine for weighing and packaging powders, the combination of a dumping weighing-cup, a closed shell or casing, L, containing it and terminating at the bottom in a mouth for engagement with the can or other packing-receptacle, and an air-duct, w', leading from said mouth where air may enter it from said packing-receptacle, extending upward and opening into the shell L above the level of the powder dumped thereinto from said cup, substantially as set forth.

13. The combination, with the shaft U and bar P, of the cam j', provided with a recess to receive the spring-dog r', the said dog pivoted to the bar P, and the projection k' on the bar P arranged to engage the cam j', whereby the said cam is arrested once in each revolution and cannot rotate again until the bar P drops, substantially as and for the purposes set forth.

14. The combination, with the shafts I and K and bar P, of the fixed clutch g g', means for disengaging said clutch by the fall of the bar P and the brake w' on the bar P, all arranged to operate as set forth, whereby, when the bar P falls, the rotation of the shaft K is arrested by the brake, substantially as and for the purposes set forth.

15. A machine for weighing and packaging powders and other substances, comprising the mechanism for feeding the substance into a weighing-cup suspended from a scale-beam, the said cup and beam, and an electric circuit arranged to be closed by a movement of the beam, whereby mechanism is set in motion which opens the bottom of the cup and discharges the substance into the can and presses or packs the powder in the can, all arranged substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

G. D. VAN HOESEN.

Witnesses:

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HENRY CONNETT.