

No. 686,851.

Patented Nov. 19, 1901.

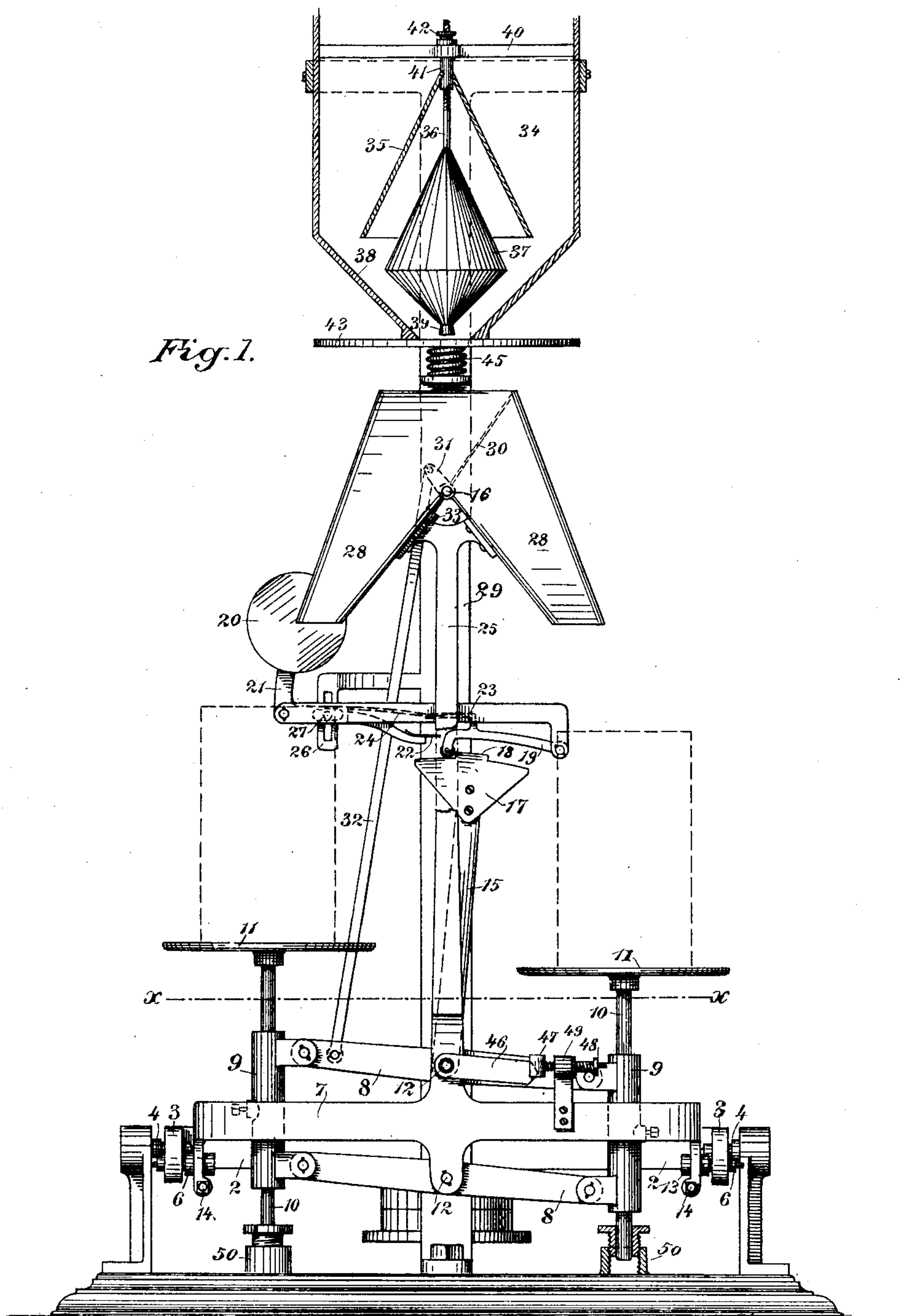
G. HOEPNER.
AUTOMATIC WEIGHING APPARATUS.

(Application filed May 31, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses,
J. H. Ames
J. F. Aschbeck

Inventor,
By George Hoepner
Dewey Strong & Co.
attys

No. 686,851.

Patented Nov. 19, 1901.

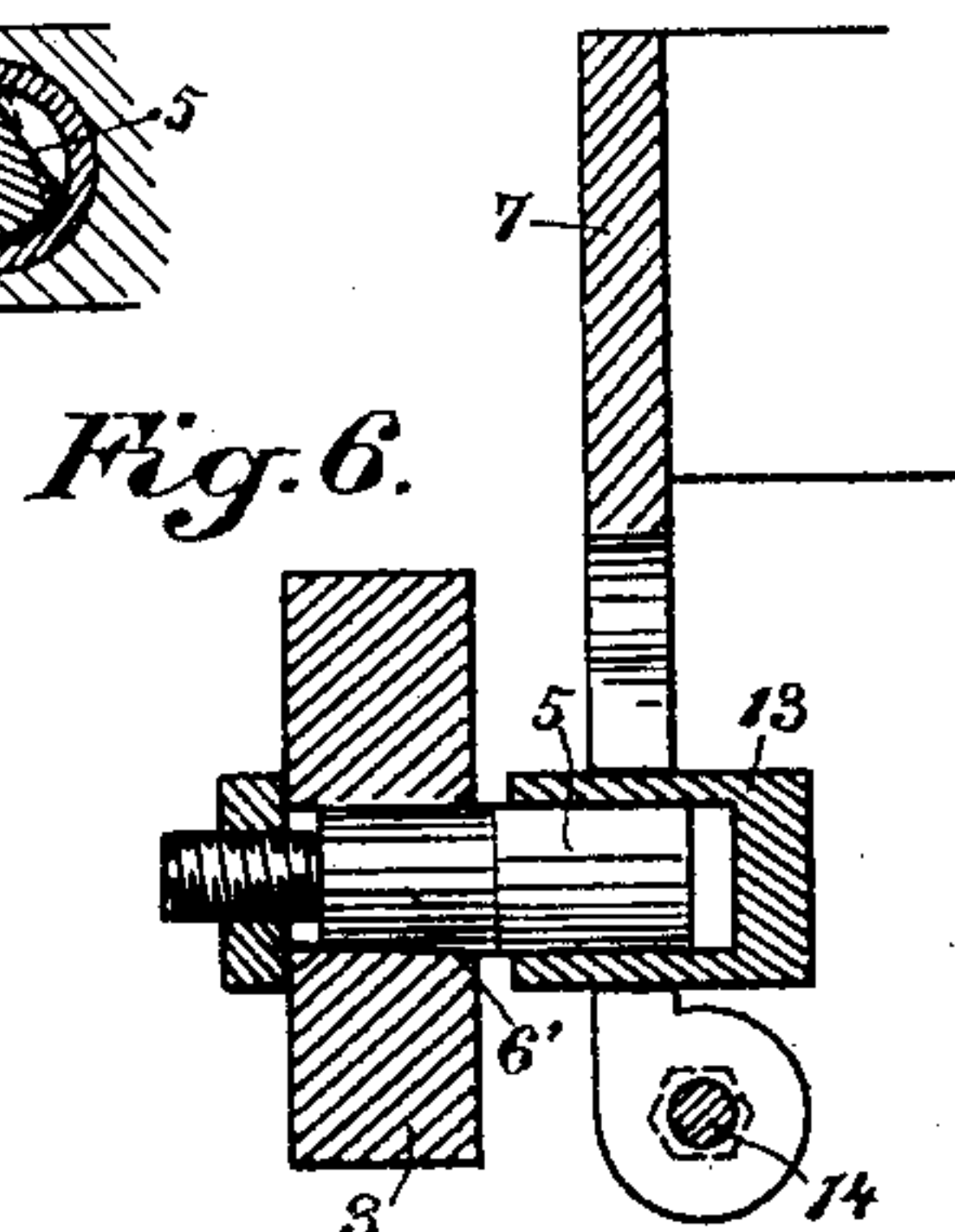
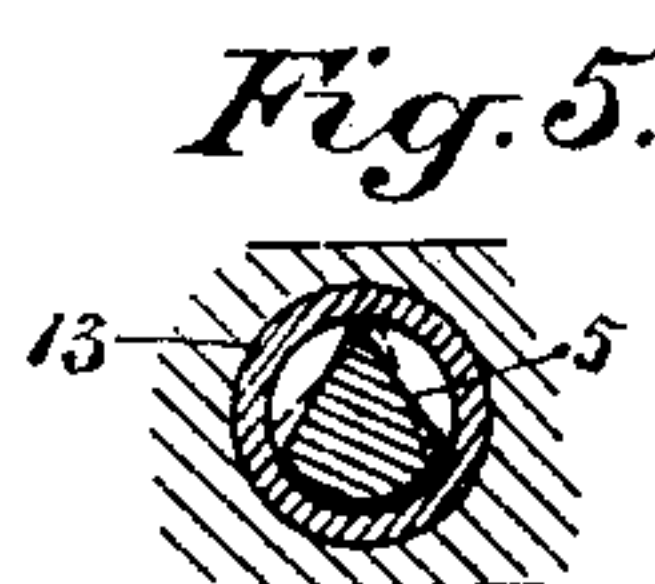
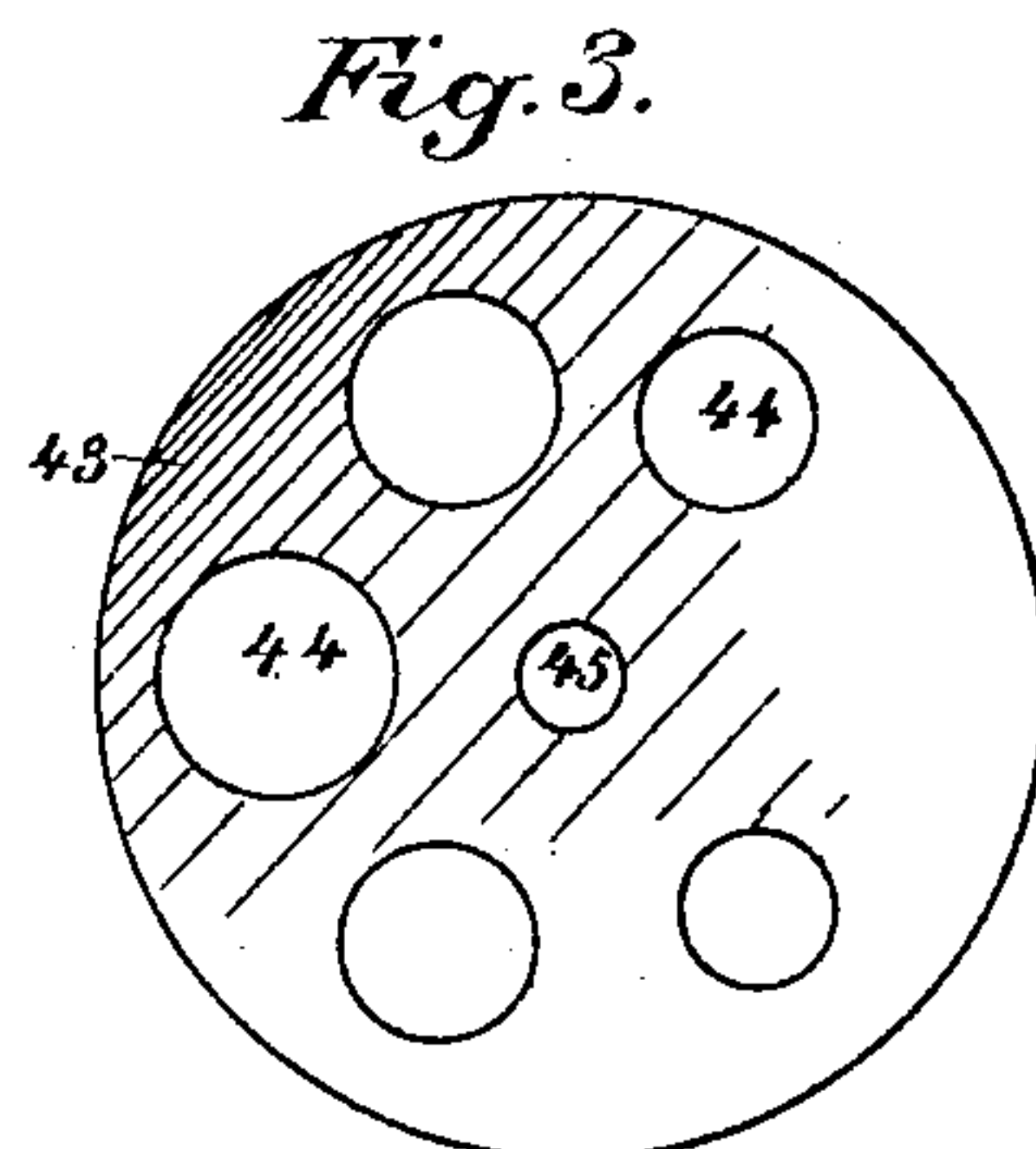
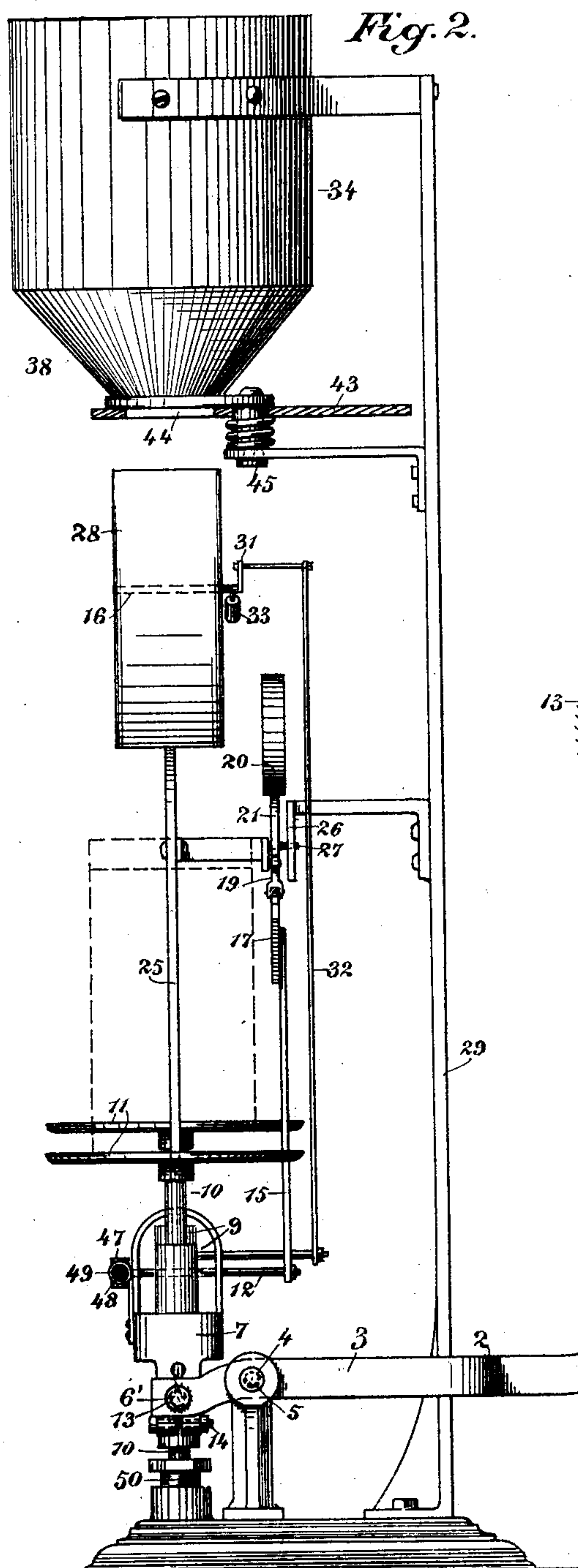
G. HOEPNER.

AUTOMATIC WEIGHING APPARATUS.

(Application filed May 31, 1900.)

(No Model.)

3 Sheets—Sheet 2.



Witnesses,

J. H. House
 H. F. Aschbeck

Inventor .

Inventor
B. George Hoepner
Dewey Strong & Co.
attys

No. 686,851.

Patented Nov. 19, 1901.

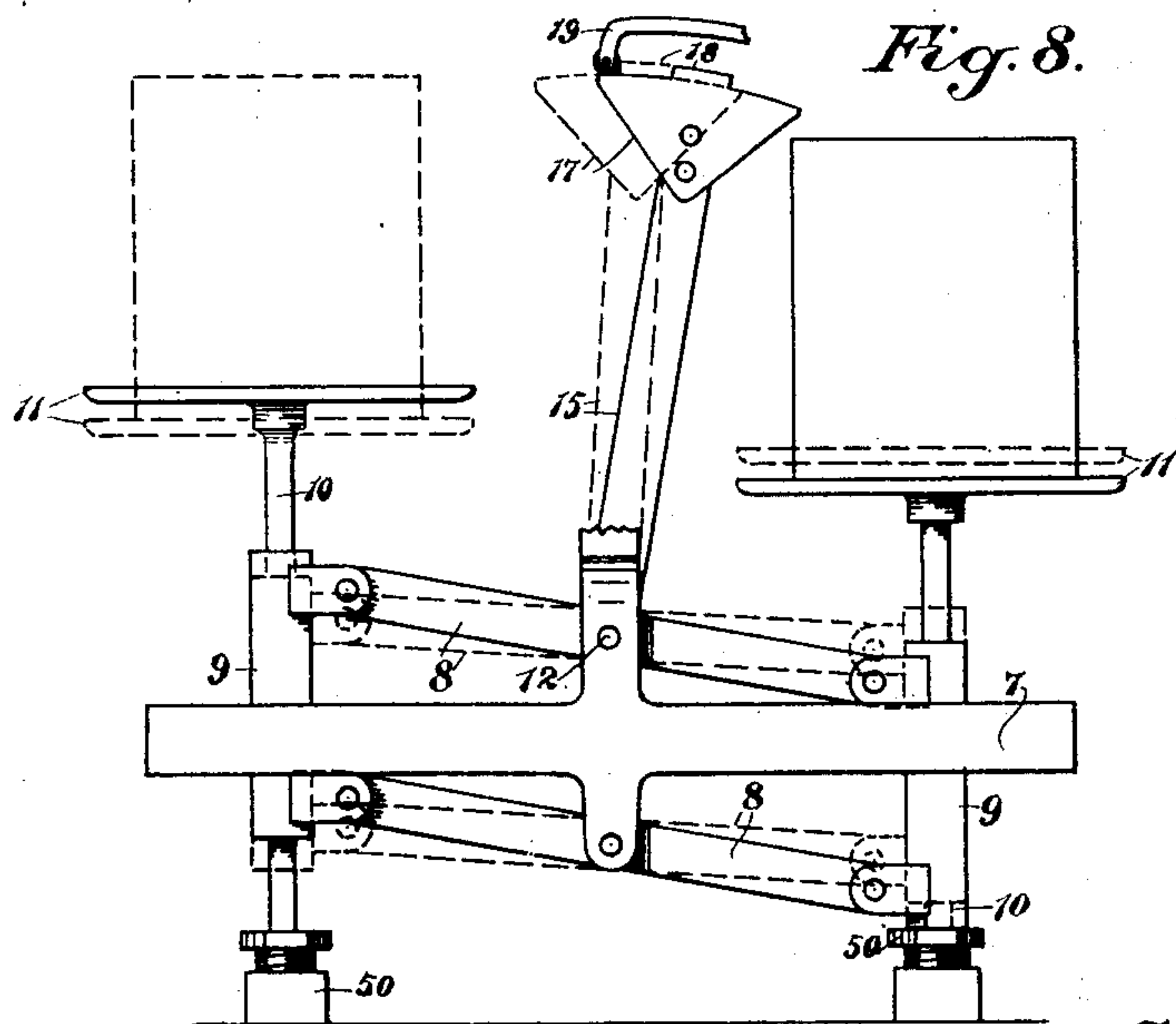
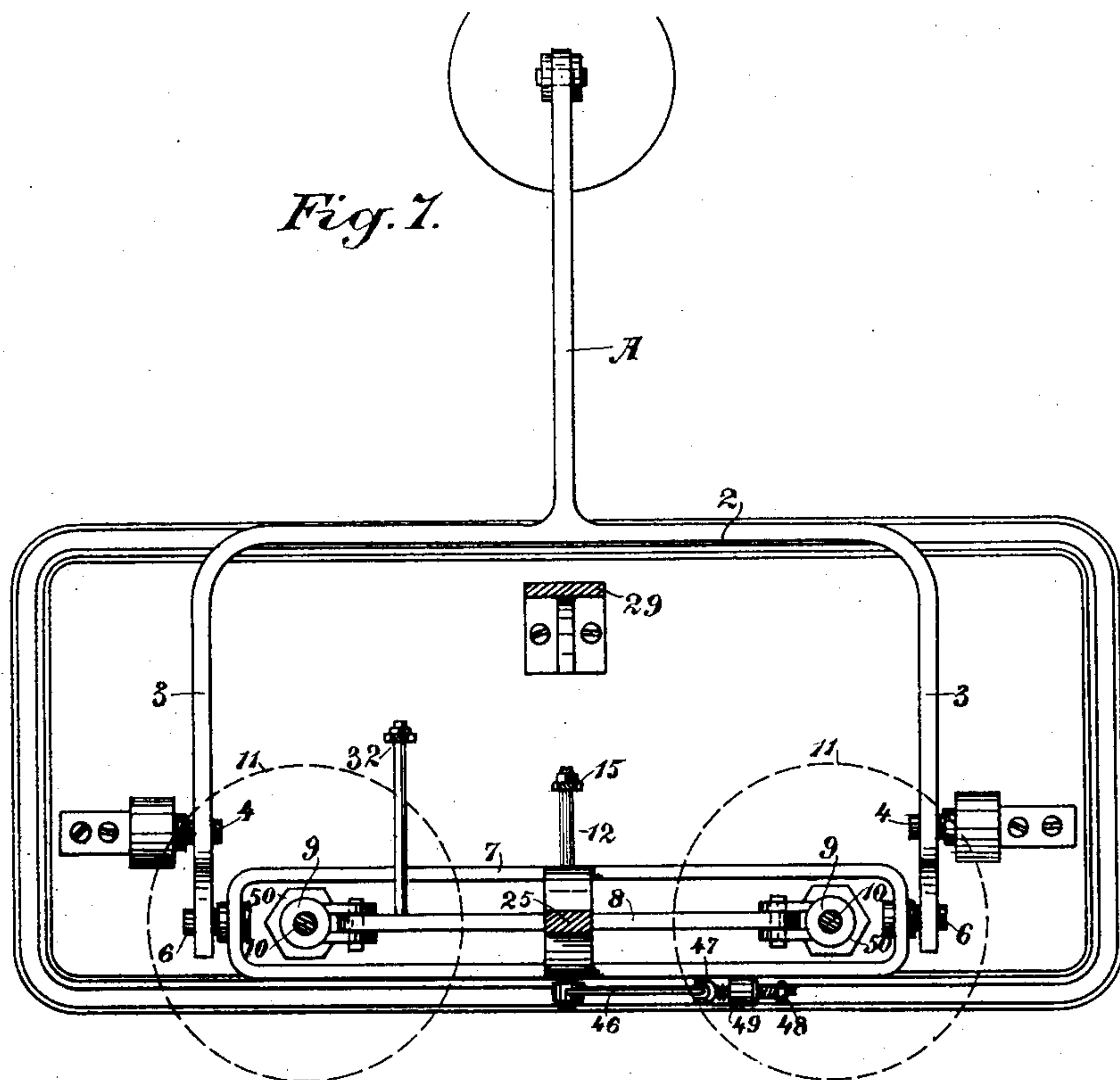
G. HOEPNER.

AUTOMATIC WEIGHING APPARATUS.

(Application filed May 31, 1900.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses,
H. F. Aschbeck

Inventor,
George Hoepner
Dewey Strong & Co.
attys

UNITED STATES PATENT OFFICE.

GEORGE HOEPNER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE UNION SCALE AND MANUFACTURING COMPANY, OF SACRAMENTO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

AUTOMATIC WEIGHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 686,851, dated November 19, 1901.

Application filed May 31, 1900. Serial No. 18,531. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOEPNER, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Automatic Weighing Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in machines of that class which are designed to weigh powdered, granular, or other similar substances and to deliver such substances in regular quantities into such receptacles as may be desired.

It consists of a plurality of scale-pans adapted to receive the containers into which the material is to be weighed, a beam or frame fulcrumed and tiltable with relation to a main frame or support upon which it is carried and which is in turn suspended from the scale-beam, so that while both have a certain movement in unison there is also an independent movement of the two. In conjunction with this is a rest or support upon which the end of the supplemental beam rests when the receptacle on that side has been filled, so as to cause the scale-beam to be depressed. Connected with the supplemental tilting beam is an oscillating lever carrying a segment and stop at its upper end, a latch adapted to engage said stop, and means by which the supported end of the supplemental beam is raised from the support when the filled package is removed from the scale-pan to place the apparatus in condition for again weighing. Combined with this apparatus is a chamber having a plurality of discharges corresponding with the number of scale-pans and packages to be alternately filled, a tilting partition, and connections with the supplemental beam, whereby it is turned to direct the flowing material alternately and successively to one or the other of the packages to be filled. In combination with this mechanism I employ a regulating feed hopper or supply of peculiar construction and a construction of the knife-edges of the scale-beam, whereby they may be accurately adjusted to cause both sides of the beam to exactly counterbalance.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of the scale. Fig. 2 is a side elevation of the same. Fig. 3 is a top view of the feed-disk. Fig. 4 is a detail of a fulcrum-pin. Fig. 5 is a transverse section of the same, showing it inside of a thimble. Fig. 6 is a section through the fulcrum in the end of the scale-beam and the carrier-frame. Fig. 7 is a horizontal section on line $x x$ of Fig. 1. Fig. 8 shows in full lines the tilting frame and filled receptacle resting on the support with corresponding position of segment-latch, and the dotted lines show position of the parts after the load has been removed.

My apparatus is designed to automatically and accurately weigh dry, pulverized, granulated, and other freely-flowing material into packages or receptacles supported upon scale-pans or the like in such a manner that the material delivered into one of the packages or receptacles until the weight is complete will by the action of the sinking of the suspended weighing device first bring the completed weight into contact with a fixed support, next will disengage the connected mechanism, so as to bring the opposite scale pan or support into condition to act upon the weighing-scale when the flowing material is turned into the receptacle upon that side, and upon the removal of the filled receptacle upon the other side will place the suspended framework in condition for weighing upon that side.

The apparatus may be variously constructed to suit the taste or mechanical requirements.

As herein shown, that portion of the scale-beam A upon which the counterbalance-weight is carried connects with or forms part of a yoke 2 , which diverges at approximately right angles from the center line of the beam A , thence extends forwardly in two arms 3 , which are essentially parallel with the beam A , but in different vertical planes. These arms are fulcrumed at 4 upon the knife edges or bearings 5 on a fixed support, and a sup-

plemental frame in which the scale pans or supports are tiltably mounted is suspended from the outer ends of the arms 3 of the scale, as shown, and upon similarly-constructed 5 bearings. Within the support or carrier 7, which is thus hung upon the arms 3, is fulcrumed a tilting frame composed of two bars 8, independently pivoted centrally in the carrier one above the other, as at 12, and the 10 outer ends of these bars carry the vertical sleeves 9, within which are fixed the stems 10. Upon these stems are the scale pans or platforms 11, which are adapted to receive the containers or packages in which the material 15 is delivered to be weighed. For the purpose of accurately balancing and adjusting the scale-beam and these supports the knife-edges 5 are formed upon the ends of tapering steel pins 6, and these pins fit in correspond- 20 ing tapering sockets in the supports and may have their inner ends screw-threaded to receive nuts by which they are firmly clamped when finally adjusted. Another form is to pass the pins 6 through thimbles or sleeves 25 13, and these are fitted into split arms, through which holes are bored in the plane of the split to receive the sleeves. After the sleeves have been properly adjusted the split, which is of 30 elastic, may be closed by means of a clamping-nut 14. By reason of the taper of the pins 6' they can always be fitted firmly in their sockets and any wear can always be taken up by driving them a little farther or by turning 35 the nuts upon the screw-threaded ends. The pins being made in this way and independent I am enabled to turn them, so as to move the knife or bearing edges 5 to one side or the other, and this is necessary because it will be seen that as the two scale 40 pans or platforms are suspended from the two arms 3 both these arms must necessarily be adjusted to weigh accurately, or one package or receiver would contain more than the other 45 when the scale-beam was counterbalanced. This construction also enables me to remove the pins to renew the supporting edges or for other adjustment without destroying any other part of the scale. The tilting supplemental frame, consisting of the bars 8 and 50 platform-supports, which is fulcrumed within the frame 7 by means of transverse pivot-shafts, is movable, as before described, so as to sink with the end of the scale-beam from 55 which the frame 7 is supported until the bottom of the stem 10 or the sleeve 9 on the side which carries the filled receptacle contacts with a fixed support. At or before the instant when the completed weight has come to a 60 state of rest the feed or supply mechanism is reversed, so as to deliver material into the receptacle upon the opposite scale-pan. This reversal takes place as follows: The arm 15 is fixed to the upper one of the pivot-shafts 12 65 of the arm 8, and this arm carries upon its upper end a segment 17, the upper edge of which has a curvature about the pivot-shaft as a

radius. The center of this segment has an upwardly-projecting lug or stop 18, and this stop is engaged by an antifrictional roller in 70 the end of a fulcrumed arm 19, which thus temporarily locks the tilting supplemental frame while the receptacle upon one side is being filled, and this lock is disengaged as follows: The weight 20 is fixed upon the up- 75 per end of a bent lever 21, fulcrumed at its angle, the opposite end of which extends horizontally to a point near the lever 19 and has upon the end a contact-plate 22. From the 80 lever 19 an arm 23 projects in line above the plate 22, and a spring 24, which is fixed to the weight-carrying lever 21, projects above this arm 23. These parts are all carried upon some suitable convenient support connected 85 with the carrier 7. As here shown, this support consists of a standard 25, extending upwardly from the carrier 7.

While the receptacle upon one of the scale-pans is filling, the tilting frame 8 will have a tendency to sink on that side, and this, acting 90 through the arm 15, presses the segment 17 to one side, so that the projection 18 contacts with the roller in the end of the arm 19, and thus holds the tilting frame in its normal position with relation to the frame 7, in which 95 it is fulcrumed, until the required weight has been received into the receptacle, when the scale-beam, the frame 7, and the tilting frame 8 all sink in unison.

26 is a fixed arm or stop, which is here shown 100 as slotted, and a pin 27, carried by the bell-crank lever 21, is freely movable in this slot. When the scale-beam, the weight, and supplemental frame sink, as just described, the pin 27 moves downwardly until it strikes the 105 bottom of the slot, and this acts to overbalance the weight 20 and cause it to fall outward, thus turning the lever 21 about its fulcrum-pin, and the end of the arm 22 tilting upwardly strikes the arm 23, and thus lifts 110 the arm 19 and disengages it from the stop 18. This allows the weighted scale to drop to the point of rest, as previously described, and as the weight is then supported independent of the scale-beam the latter will rise slightly, 115 and this rise carries the roller on the end of the arm 19 outwardly on the segment 17 and out of contact with the lug 18 as long as the scale-pan and full package are supported. In 120 this condition it will be manifest that no weighing could take place; but as soon as the filled package is removed from its scale-pan, the material already commencing to run into the package upon the other pan, the weight on that side will tilt the frame 8 enough to 125 bring the lug 18 against the roller on the end of the arm 19, where it is again locked until that receptacle is filled. This small movement, which brings the roller into contact with the lug, allows the opposite end of the tilting 130 frame to rise out of contact, and thus leave all parts freely suspended from the scale-beam and in readiness to again make an accurate weight. The essence of this feature is a suf-

ficient movement of the segment 17 to allow the supported scale-pan to rise from its support before the roller or latch on the arm 19 contacts with the lug 18.

5 The means for filling the packages upon the two scale-pans alternately are comprised in the two chutes 28, having a gate 30, fulcrumed at 16 in the lower meeting angle of these chutes and capable of being tilted, so as to
10 first close one chute and open the other and then to be reversed. This alternate tilting and reversal is effected by means of a crank-arm 31, fixed upon the end of the fulcrumed shaft 16 of the gate 30, and this crank-arm is
15 connected with the tilting frame 8 by a rod 32, so that when one end of the frame 8 sinks it immediately acts to reverse the position of the gate 30 and prevents any further flow of material into the receptacle upon that side,
20 at the same time opening the other chute, so that material can flow into a receptacle which has at that instant been placed upon the opposite scale. In order to assist in the movement of the gate 30, a small counterweight 33
25 may be employed, if desired.

In order to accurately regulate the flow of material which is delivered into the chutes 28, and also to regulate this flow to suit the character of the material which is being
30 weighed, I have shown a chamber 34, into which the material is first delivered. Within this chamber is a hollow cone 35, with its larger end downward and open. Centrally through this cone extends a stem 36, from
35 which is suspended a double cone 37. The upper part of this double cone extends upwardly into the hollow cone 35 and its sides diverge approximately parallel with the interior divergence of the cone 35. The lower
40 part of the cone 37 converges downwardly and is essentially parallel with the convergent or funnel-shaped lower part 38 of the chamber 34. From the lower end of the cone 37 projects a stem 39, which is slightly divergent
45 and extends close to the mouth of the funnel-shaped bottom 38. The whole of this interior mechanism of cones is suspended from a fixed cross-bar 40 or equivalent support and by means of a tubular shank 41. The stem
50 36, which supports the cone 37, extends through this sleeve, and the upper end is screw-threaded, and by means of nuts 42 the cone 37 may be raised or depressed with relation to the hollow cone 35. Pivoted with
55 relation to the bottom of the funnel 38 is a disk 43, having in it holes 44 of different sizes. This disk is pivoted, as shown at 45, so that any of the holes around its periphery may be brought into line with the discharge-
60 opening of the funnel 38. This enables me to regulate the delivery of the material to the feed-chutes of the weighing-machine, so that the rate at which the mechanism is operated can be adjusted at any time and to suit the different materials which may from time to time
65 be weighed. Thus coffee, wheat, oatmeal, and various other articles which are capable of be-

ing weighed with such an apparatus all have different rates of flow and are more or less liable to become packed during that flow; but by
70 the use of the regulating-cones and the perforated disk I am enabled to accurately adjust the flow of the material. The disk and hopper are all supported by brackets from a standard 29, which rises from the platform
75 of the scale.

In cases where heavy packages are to be weighed I have fixed to the upper shaft 12 on the tilting frame an arm 46, having its end beveled, and opposite to it a forked plate 47,
80 carried by a spring-pressed stem 48 and supported in a bracket 49 from the carrier 7. This forked plate is moved forward by a nut against the plate 46, so that when this arm 46 would tilt downward it must first push the
85 forked plate 47 backward, which requires a certain amount of force to overcome the pressure of spring on the stem 48, and therefore checks the downward tilting of frame 8,
90 which has the effect of preventing the completed weight from falling too heavily upon the supports 50. When smaller packages are weighed, the plate 47 is then simply pushed out of the way of arm 46 and held so by means
95 of the nut on the stem.

The supports 50, upon which the tilting frame and completed weight rest, consist of screw-threaded sockets with nuts turnable, so as to be raised or lowered therein. The stems
100 10 are slidable through these nuts, and the sleeves 9 rest upon them alternately at the completion of the load on each scale-pan.

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

1. In a weighing apparatus, a fulcrumed scale-beam, having a yoke-shaped inner end forming separated arms, a frame suspended therefrom and located between said separated
110 arms, a supplemental tilting frame extending transversely across the forked end of the scale-beam and fulcrumed in the main suspended frame, and carrying scale-pans, means for alternately supplying material to receptacles upon each scale-pan, and a latch
115 mechanism by which the tilting frame is retained in position until the load upon either side is completed, and means operated by the sinking of either scale-pan when its load is completed for disengaging said latch mech-
120 anism.

2. In a weighing apparatus, a main frame, a scale-beam from which it is suspended said beam having a yoke-shaped inner end forming separated arms between which the main
125 frame transversely extends, a supplemental frame tiltably mounted in the main frame and movable in unison therewith, scale-pans disposed above the fulcrum of the supplemental frame and carried upon opposite ends of
130 said supplemental frame, a latch mechanism by which said frame is held in position while one of the receptacles is being filled, mechanism by which the latch is disengaged by

the sinking of the scale-pan when the weight is completed, and a fixed support upon which the completed weight rests to allow the scale-beams in the main frame to return to their

5 normal positions.

3. In a weighing apparatus, a main frame, a scale-beam from which it is suspended said beam having a yoke-shaped inner end forming separated arms, a transversely-extending
10 supplemental frame tiltably mounted upon the main frame and having scale-pans upon opposite ends said supplemental frame including upper and lower transverse bars independently pivoted to the main frame,
15 means whereby material to be weighed is supplied alternately to receptacles carried by said scale-pans, a latch mechanism by which the loading scale-pan is retained in position until the load is complete, mechanism by
20 which the latch is disengaged by the sinking of the load, a fixed support upon which the loaded end of the tilting frame rests and the main frame and scale-beam are allowed to return to their normal position.

4. In a weighing apparatus, a transversely-extending main frame, a scale-beam from which it is suspended said beam having its inner end yoke-shaped and receiving the
30 transverse main frame, a supplemental frame including upper and lower transverse bars independently and centrally fulcrumed, carrying scale-pans at opposite ends and tiltable with relation to the main frame, a latch mechanism by which it is prevented from tilting
35 while material is being delivered into a receptacle upon one of the scale-pans, means operated by the sinking of said pan when its load is completed for releasing said latch mechanism, feed-chutes and a gate by which
40 the flow of material is alternately diverted from one to the other of said chutes, a connection between said gate and the tiltable frame whereby the releasing of the latch and the tilting of the frame when the load is completed
45 act to reverse the position of the gate so as to deliver material to the opposite scale-pan.

5. In a weighing apparatus, a transversely-extending main frame, a scale-beam in substantially the same horizontal plane as said
50 main frame from which it is suspended, said beam having its inner end yoke-shaped and receiving the transverse main frame, a supplemental frame including upper and lower transverse bars independently fulcrumed and
55 tiltably within the main frame, scale-pans carried upon opposite ends of the supplemental frame, chutes discharging in line above each of the scale-pans or receivers, a
60 tilting gate by which material is diverted alternately to one and the other of the chutes, a connection between said gate and the tilting frame whereby the sinking of one end or the other of the frame reverses the position of
65 the gate.

6. In a weighing apparatus, a main frame, a scale-beam from which it is suspended, a

supplemental frame fulcrumed and tiltable within the main frame, scale-pans carried upon opposite ends of the supplemental frame, 70 a latch mechanism for retaining the tilting frame in position while the weight at one end is being completed, consisting of a segment carried by an arm which is connected and tiltable with the frame, said segment having 75 a central projecting lug, a fulcrumed arm, the end of which engages the lug until the load is complete and the scale-pan sinks, a fulcrumed counterweighted lever rising and falling in unison with the movements of the 80 suspended frame, a stop by which said lever is tilted to throw the load out of balance, and contact-points by which the lever acts to disengage the latch-lever and allow the tilting frame to turn on its bearings at the instant of 85 the completion of the load.

7. In a weighing apparatus, a fulcrumed scale-beam, a main frame suspended therefrom, a tilting frame carried within the main frame, with scale-pans, a latch mechanism 90 consisting of a segment carried by the tilting frame and having a central projecting lug, a latch-lever engaging said lug and a bell-crank lever having a balanced weight carried upon its upturned arm, the horizontal arm projecting 95 in line with the latch-lever, a stop by which the bell-crank lever is tilted to throw its weight out of the line of support whereby the other arm is moved to disengage the latch-lever at the instant when the load is completed and release the tilting frame, and a 100 fixed support upon which the load rests whereby the scale-beam and main frame are relieved therefrom.

8. In a weighing apparatus, a fulcrumed 105 scale-beam, a main frame suspended therefrom, an independent tilting frame supported within the main frame and carrying scale-pans, a latching device consisting of an arm connected with and tiltable in unison with 110 the movements of the tilting frame, a segment carried upon the upper end of said arm with a central projecting lug, a latch-lever engaging said lug to retain one end of the tilting frame and its scale-pan in a raised position until the load thereon is completed, a 115 bell-crank lever carrying a weight on its upturned arm approximately in line above its fulcrum, means for tilting said lever to throw the weight out of balance whereby the horizontal arm is caused to disengage the latch-lever from the segment and allow the completed weight to drop, a fixed support upon which said weight is received whereby the 120 scale-beam and main frame are relieved therefrom and allowed to rise and to tilt the scale-frame and segment so that the latch-lever remains out of engagement with the lug until the load is removed from the scale-pan and the load upon the opposite pan raises 125 the tilting frame clear of its support.

9. In a weighing apparatus, a fulcrumed scale-beam, a main frame suspended therefrom, a tilting frame supported within the

main frame and carrying scale-pans, a latch mechanism by which one end of the frame and its receptacle is raised above the level of the other during the process of completing the weighing, a latch-lever by which the parts are retained in said position until the weighing is completed, mechanism by which the latch is disengaged and the frame allowed to tilt, a fixed support upon which the load is received when thus released whereby the main frame and scale-beam are allowed to rise, a segment carried by the movement of the tilting frame and having a lug with which the latch-lever engages to retain the tilting frame with either end alternately in weighing position, said segment having an independent movement sufficient to allow the tilting frame to rise from the support after the cam is removed, and before engaging the latch-lever whereby the parts are placed in condition for weighing on the opposite scale-pan.

10. In a weighing apparatus, a fulcrumed scale-beam, a main frame suspended therefrom, a centrally-supported tilting frame carried within the main frame and having scale-pans at opposite ends, a latch mechanism movable in unison with the tilting frame whereby the frame is locked with one of the scale-pans elevated above the other, means operated by the descent of said scale-pan for unlocking said frame, chutes into which the material to be weighed is delivered having the mouths adapted to discharge into receptacles upon either scale-pan, a fulcrumed tilting gate, a crank-arm and rod connecting it with the tilting frame whereby the tilting of said frame upon the completion of the weighing in one scale-pan acts to reverse the position of the gate and divert the flowing material to the other scale.

11. The combination in a weighing apparatus of a fulcrumed scale-beam with a main frame, a supplemental tilting frame with scale-pans carried upon the main frame, a receiver having chutes and a gate connected with the tilting frame whereby the flow of material is alternately diverted from one chute to the other by the completion of the load on the opposite scale-pan, a means for regulating the flow of material into said receiver consisting of a chamber with regulating-cones, a disk turnable horizontally across the discharge-mouth of said chamber and having openings of different sizes adapted to be brought into line with said discharge-mouth.

12. The combination in a weighing apparatus of the fulcrumed scale-beam, main and supplemental frames suspended therefrom and scale-pans, a receiver with chutes and reversible gate, a mechanism by which said gate is actuated to change the flow of material from the filled receptacle to the opposite one, a regulator delivering material into the receiver consisting of a chamber having a hollow cone diverging downwardly within it, a double cone, the upper portion of which

lies within the hollow cone, and with its sides approximately parallel therewith, and the lower cone having its sides approximately parallel with the converging sides of the lower part of the chamber.

13. A regulator for material which is supplied to a weighing apparatus consisting of a cylindrical chamber having a convergent funnel-shaped bottom, a hollow cone centrally supported and diverging downwardly within the cylindrical portion of the chamber, a second cone vertically adjustable within the hollow cone having its outer periphery approximately parallel with the inner periphery of the cone and projecting below its mouth, and a convergent cone forming a continuation of the interior suspended cone and having its periphery approximately parallel with the funnel-shaped exterior chamber.

14. In a weighing apparatus, a fulcrumed scale-beam, a frame suspended therefrom, a supplemental tilting frame fulcrumed in the main suspended frame, with scale-pans carried upon its ends, means for supplying material to be weighed to the receptacles, and means for reversing the flow, a latch mechanism by which the weighing side is held up until the weight thereon is completed, a disengaging device, and an adjustable support for the completed load.

15. A weighing apparatus consisting of main and supplemental frames, one fulcrumed within the other, and both suspended from a balanced scale-beam, receptacles carried upon opposite ends of the supplemental frame, a latch and disengaging mechanism by which each receptacle is alternately held in position to be filled, and released when the weight is completed and screw-threaded vertically-adjustable nuts forming supports upon which the filled receptacle rests when released.

16. A weighing apparatus consisting of transversely-extending main and supplemental frames, the latter carrying receptacles for the material, and fulcrumed and tiltable within the main frame and both suspended from a balanced scale-beam, said scale-beam having a yoke-shaped inner end forming separated arms between which the main and supplemental frames are located and said frames having a common movement in unison therewith, a latch by which the supplemental frame is held with relation to the main frame until the load upon one side is completed, a mechanism actuated by the sinking of the parts whereby the supplemental frame is released to tilt independently, and a fixed support upon which the load rests after such release.

In witness whereof I have hereunto set my hand.

GEORGE HOEPNER.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.