

F. E. THOMPSON.  
WEIGHING MACHINE.

(Application filed Apr. 17, 1896.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.

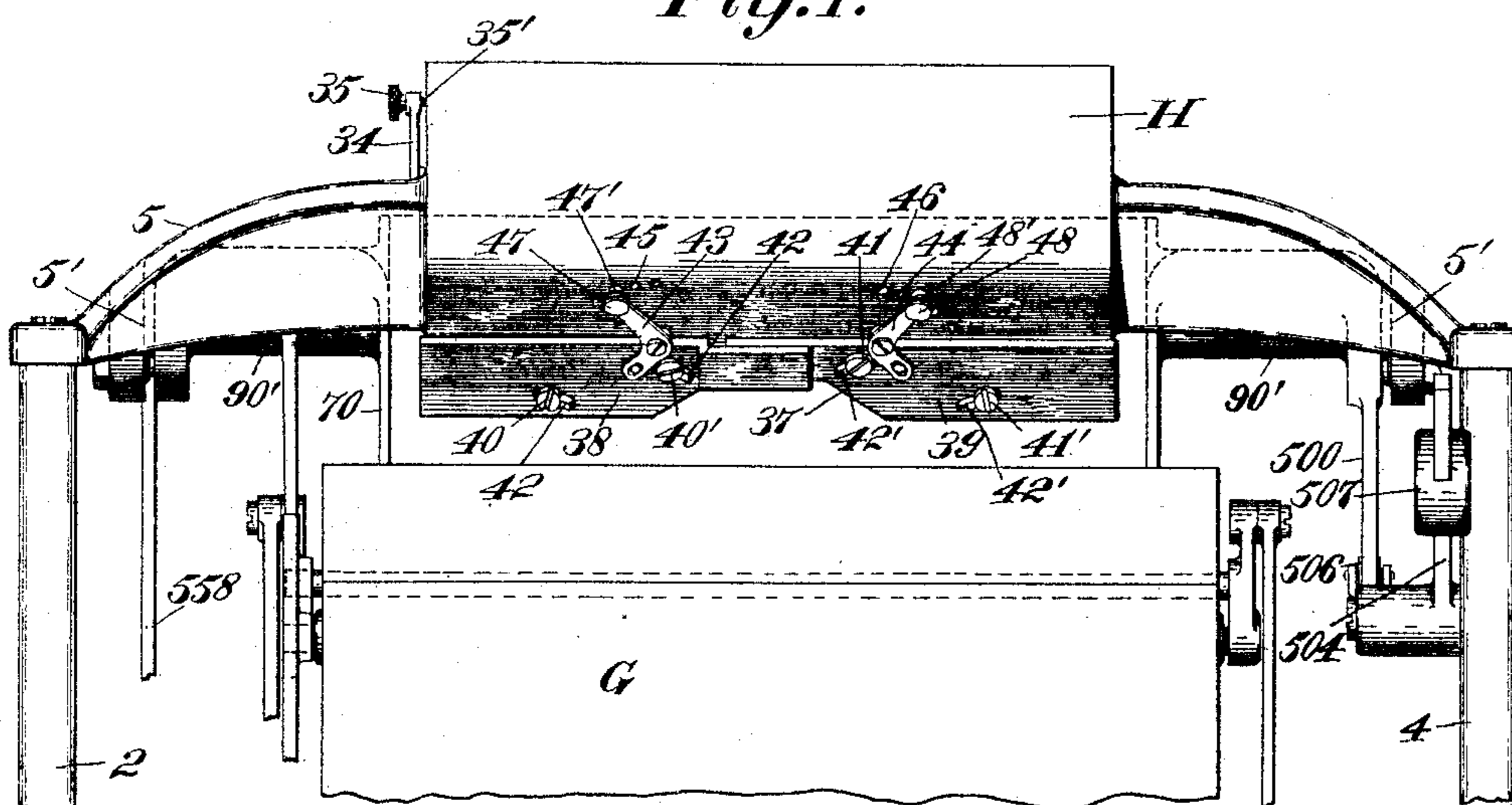
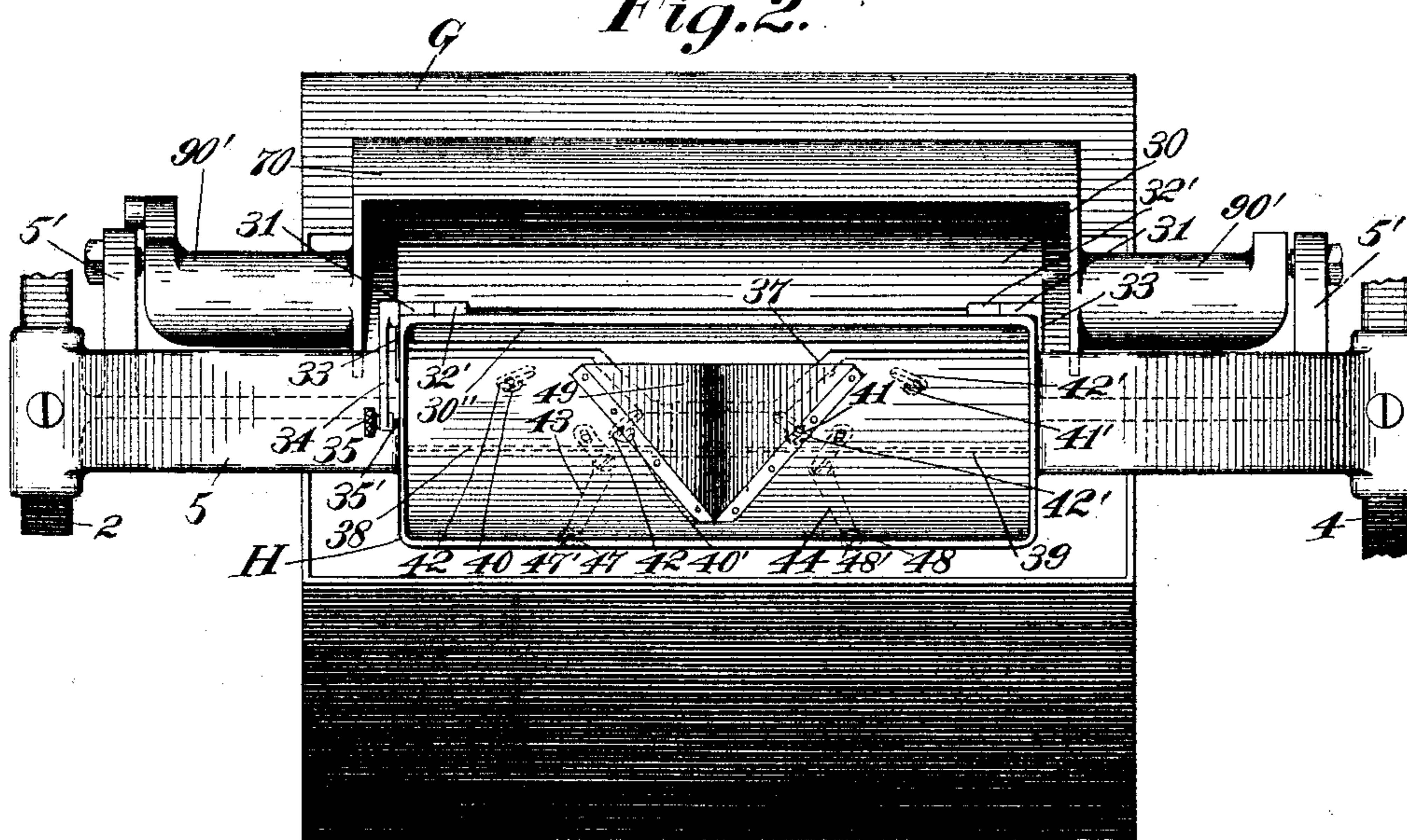


Fig. 2.



Witnesses:

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Inventor:

Frank E. Thompson;

By his Attorney,

J. A. Richard.

No. 616,851.

Patented Dec. 27, 1898.

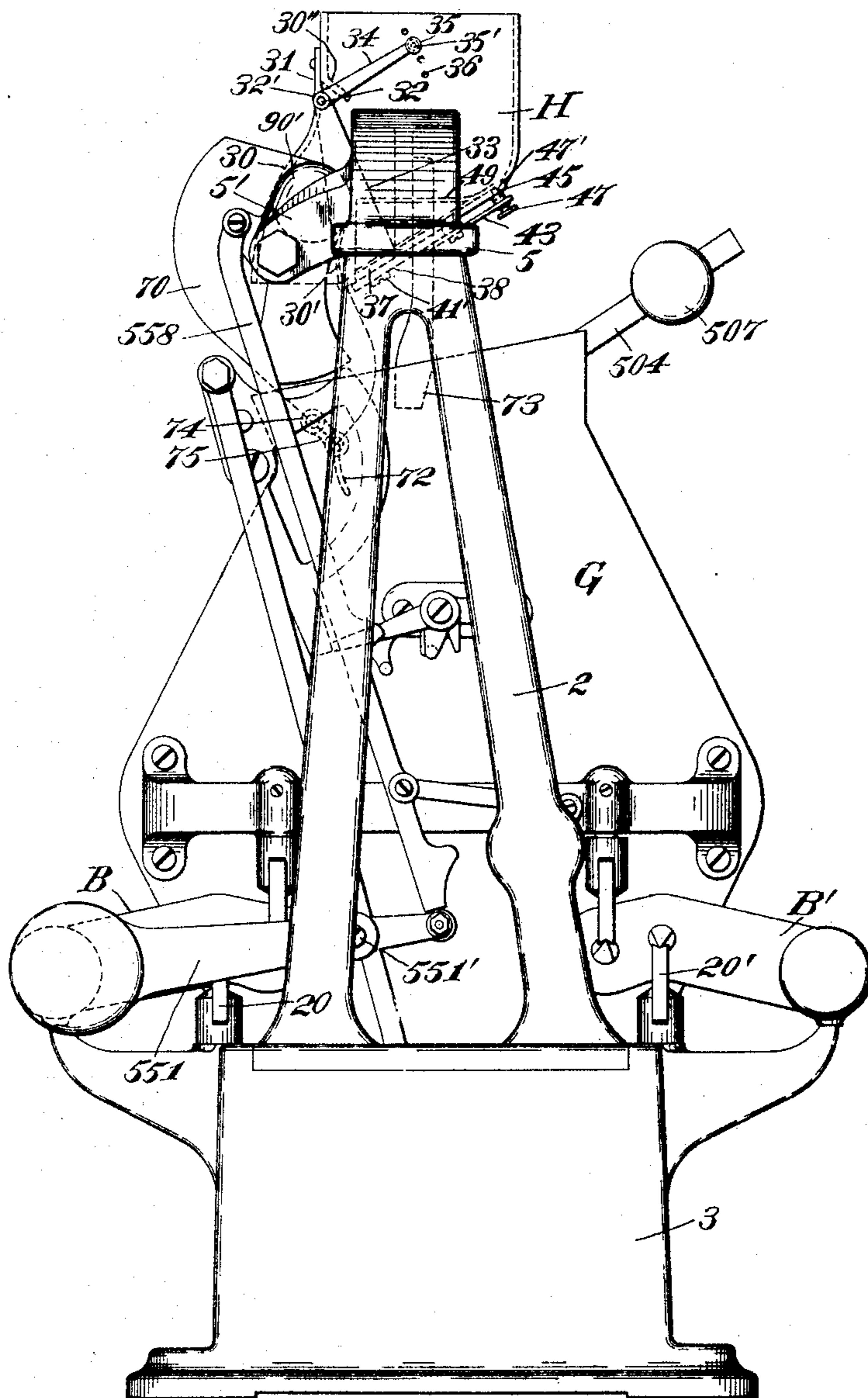
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5 Sheets—Sheet 2.

*Fig. 3.*



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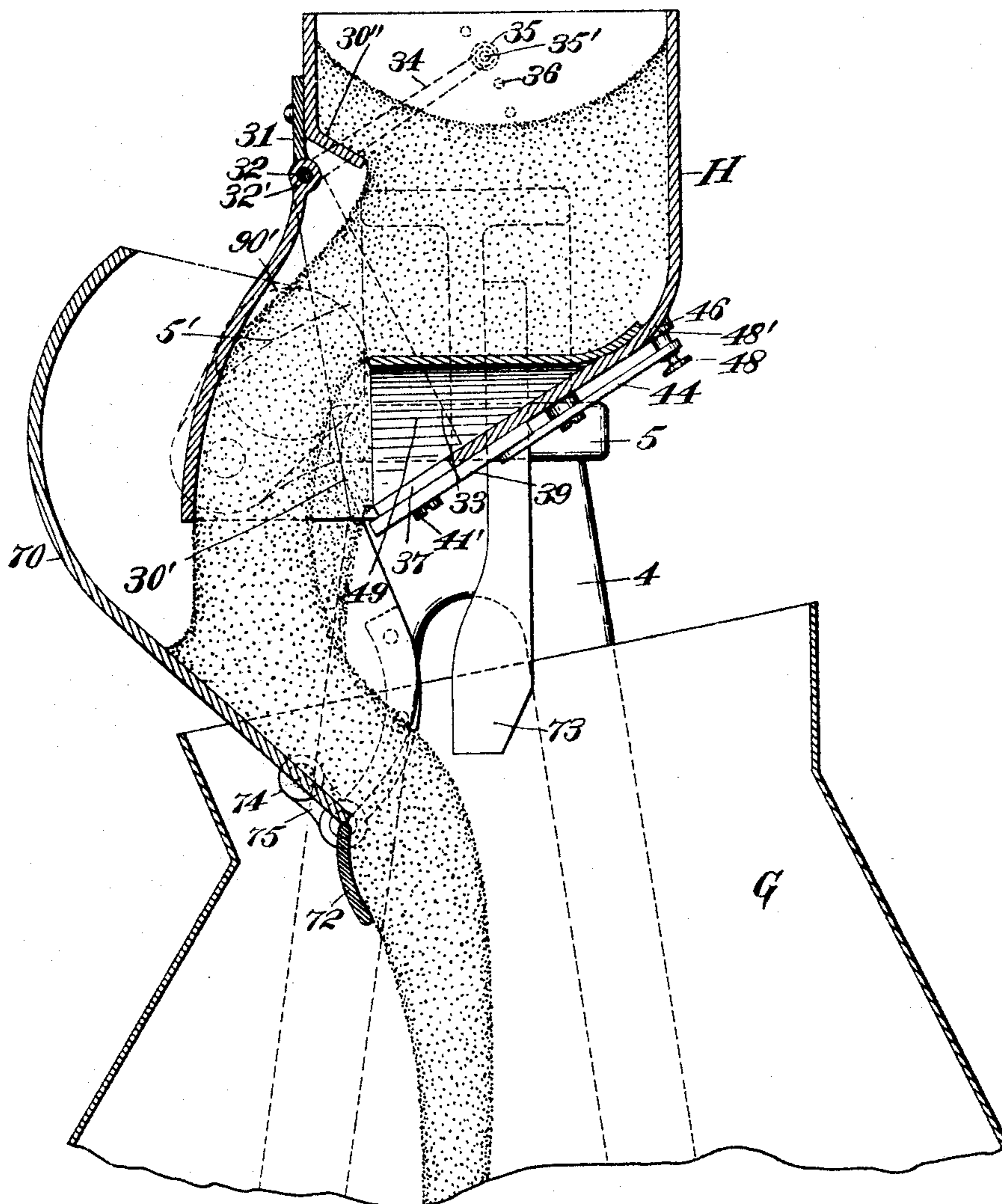
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5 Sheets—Sheet 3.

*Fig. 4.*



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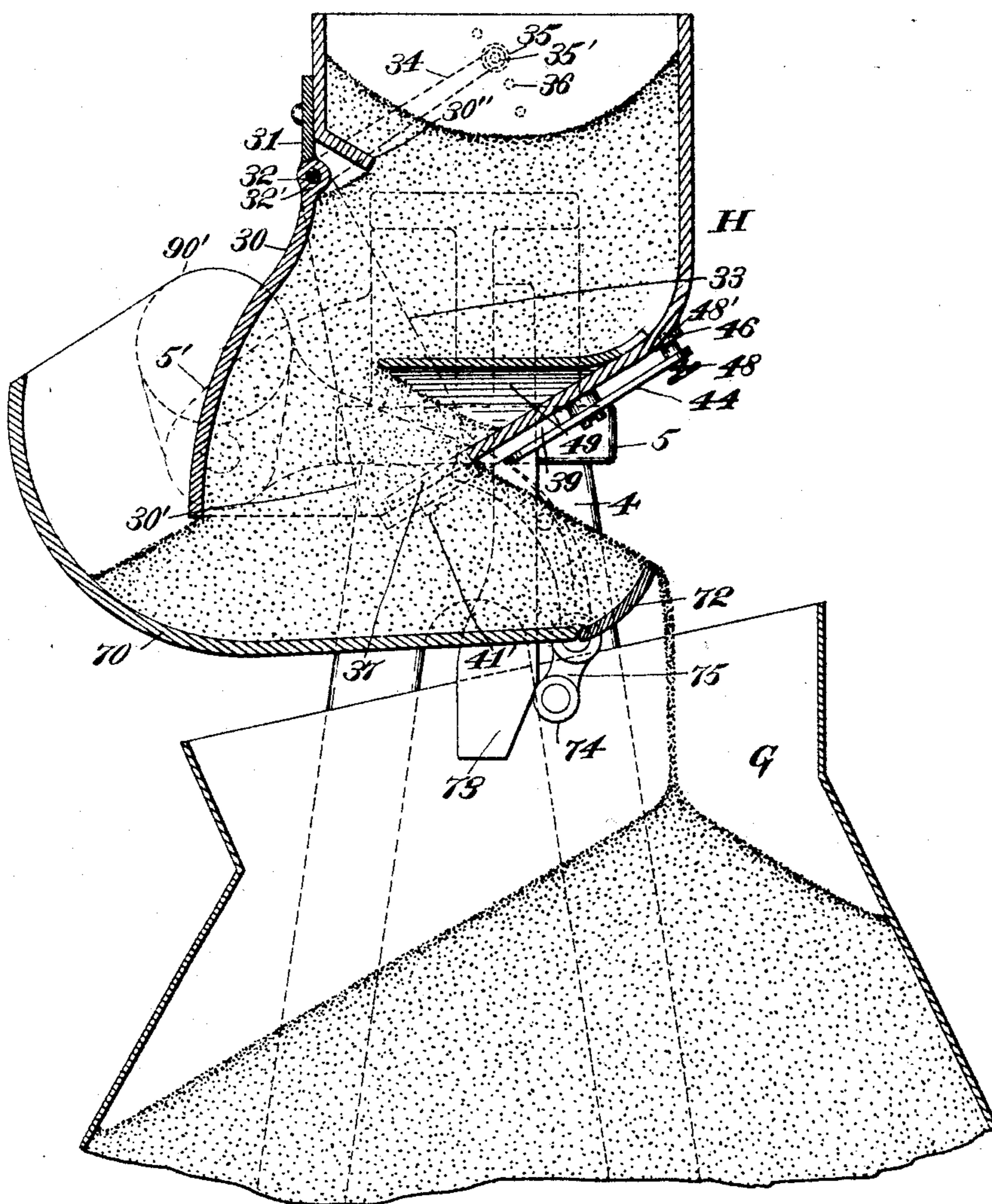
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5 Sheets—Sheet 4.

*Fig. 5.*



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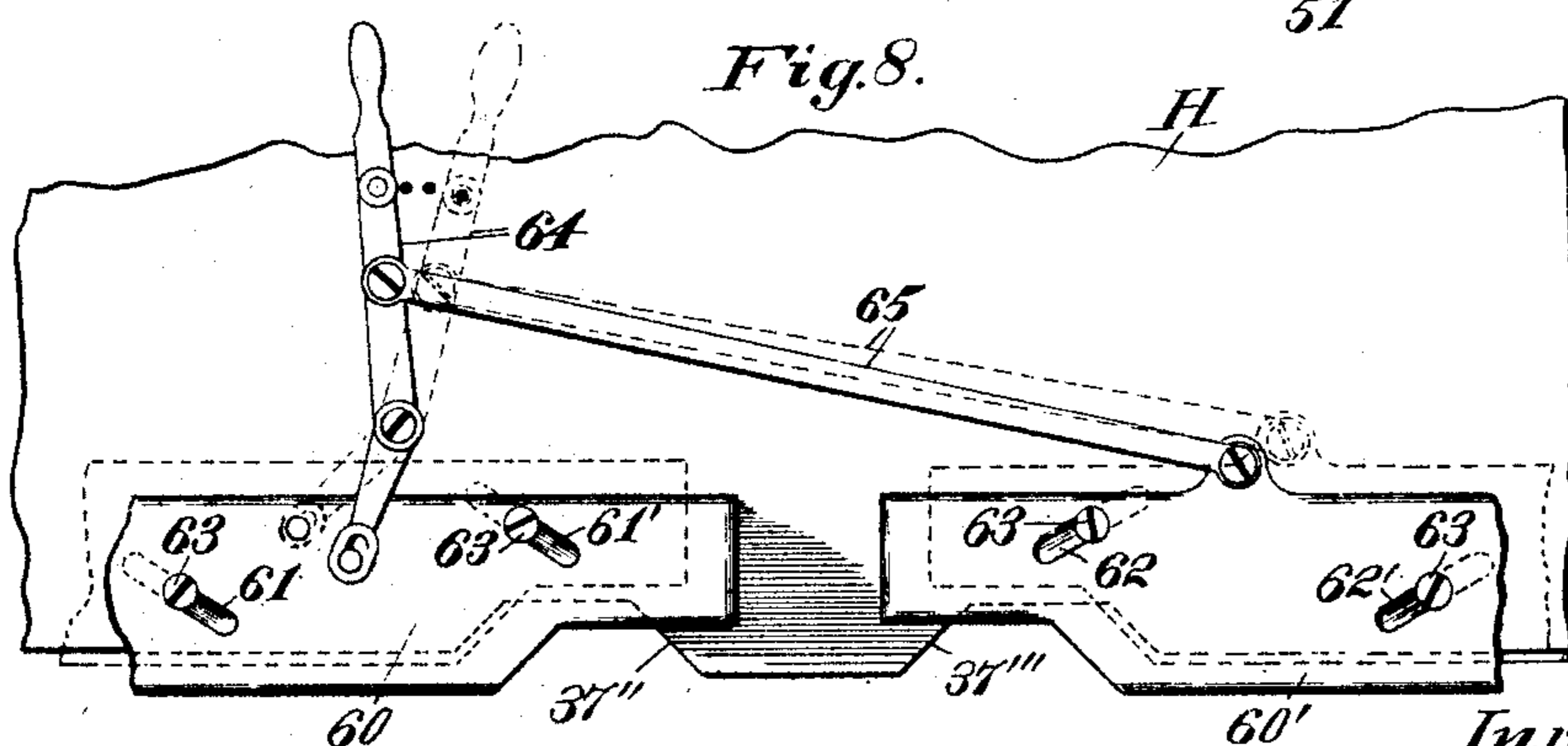
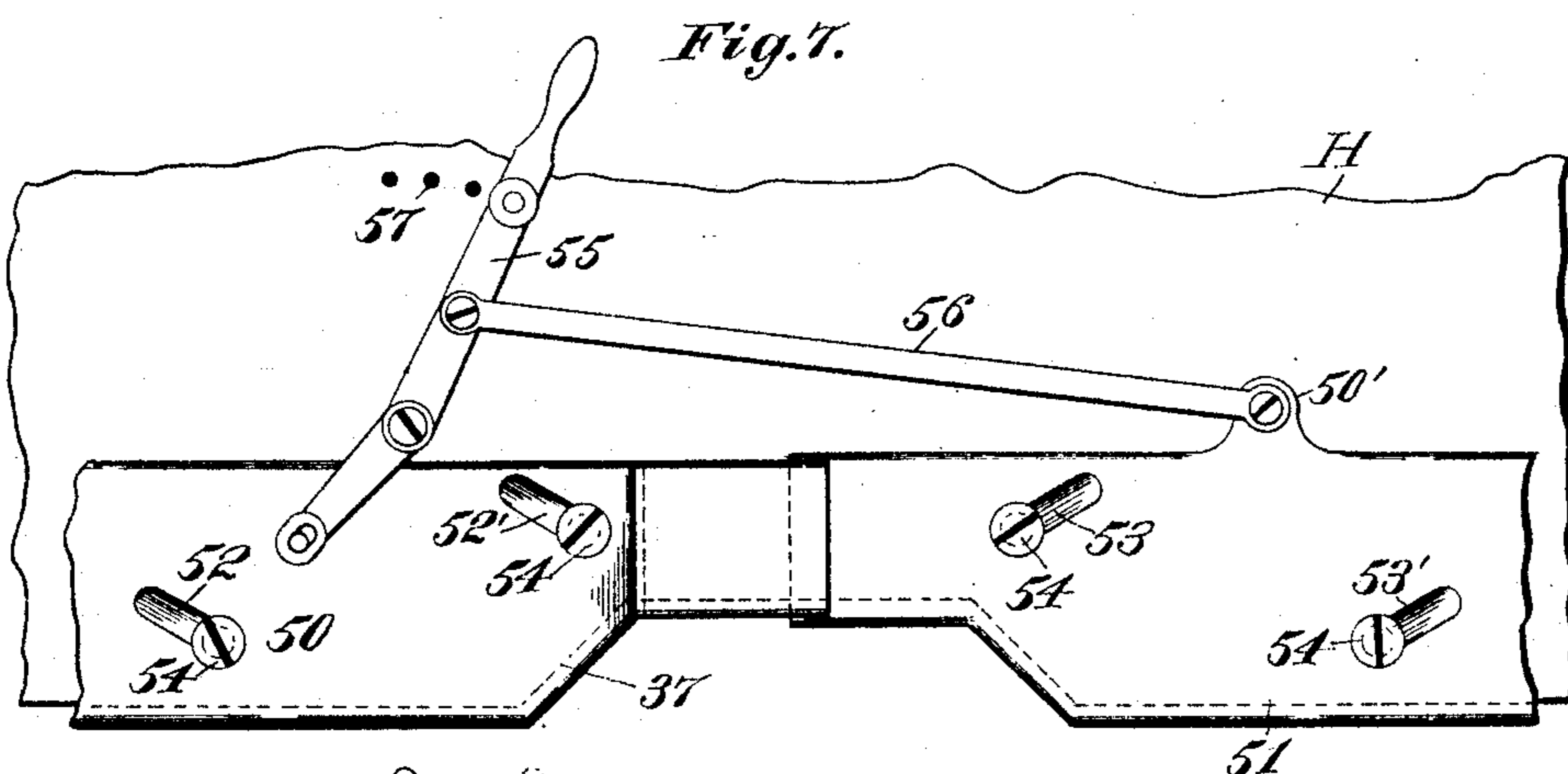
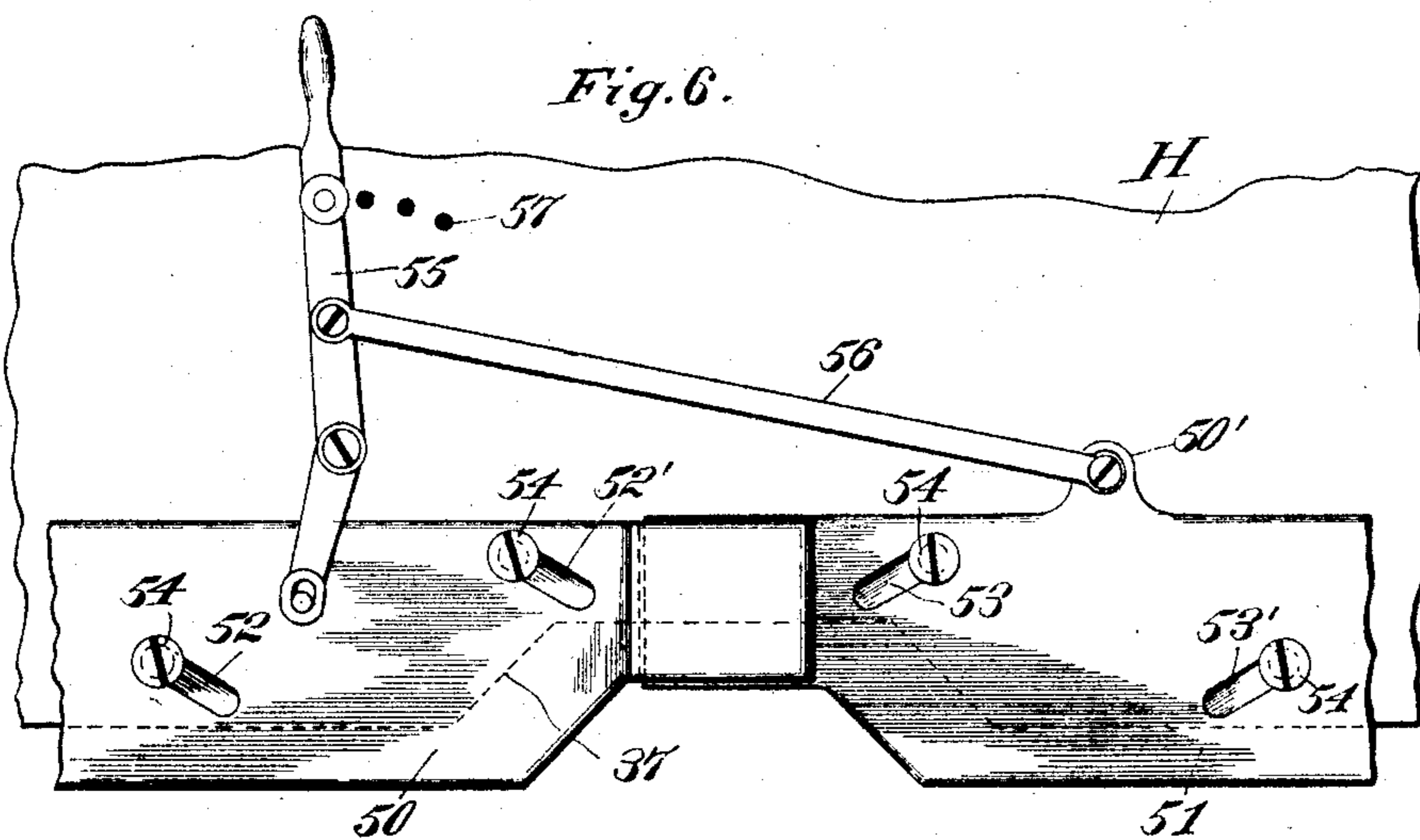
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5 Sheets—Sheet 5.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

FRANK E. THOMPSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE  
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## WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 616,851, dated December 27, 1898.

Application filed April 17, 1896. Serial No. 587,980. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK E. THOMPSON, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, one of the objects thereof being to provide improved means for regulating and controlling a stream or streams of material issuing or flowing from a chute or hopper, which means are so organized that the machine is readily adapted for weighing materials possessing different characteristics.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of the upper part of a weighing-machine embodying my invention in its preferred embodiment. Fig. 2 is a plan view of the same. Fig. 3 is a right-hand end elevation of said weighing-machine and its various operative parts. Fig. 4 is a vertical central section of the chute, the duplex valve, and the upper part of the bucket, said valve being open to permit the flow of the full supply-stream into the bucket. Fig. 5 is a similar view illustrating the position occupied by said valve near the close of the poising period. Figs. 6 and 7 are detail face views of a portion of the chute and a modified form of stream-regulating plates and operating means therefor, and Fig. 8 is a similar view of another modification.

Similar characters designate like parts in all the figures of the drawings.

My present invention is in the nature of an improvement upon the organization disclosed in Letters Patent No. 548,844, granted October 29, 1895, to Francis H. Richards; and for convenience in illustrating the nature and purpose of said invention it is herein shown in connection with a weighing-machine of the type shown, described, and claimed in Letters Patent No. 548,840, granted to said Richards on the same date. Certain of the operative mechanisms of said machine which bear no patentable relation to my present improvements will be hereinafter briefly described, and reference may be had to said last-mentioned Letters Patent for a more ex-

tended description of said machine. It is to be distinctly understood, however, that the invention is not limited to such an application, as it is capable of efficient use in connection with other types of weighing-machines.

The framework for supporting the operative parts of the machine may be of any suitable or preferred construction, and is herein shown comprising the two side frames or members 2 and 4, mounted upon the chambered supporting-base 3 and connected at their top by the plate or beam 5, which suitably carries the supply chute or hopper H, to be hereinafter more specifically described, Figs. 1, 2, and 3.

The beam mechanism comprises the oppositely-disposed scale-beams B and B', respectively, suitably mounted upon the chambered supporting-base 3, and also carrying for movement therewith the bucket or load-carrying receptacle G, which intermittently discharges its loads of material into the chamber of the supporting-base 3.

The weighing-machine embodies the usual poising and counterpoising mechanisms. All that part of the beam mechanism located between the beam-supports 20 and 20', which are herein shown as V-shaped bearings, and the bucket G constitutes the poising mechanism, and all that part of the beam mechanism located outside of said supports constitutes the counterpoising mechanism.

The chute H is adapted for containing the mass of material to be weighed, which may be supplied thereto in any suitable manner and which is directed by said chute in the form of a supply-stream to the bucket G.

As a means for controlling the supply-stream the duplex supply-valve herein illustrated will be preferably employed, said valve being of the type disclosed in Letters Patent No. 548,850, granted to Francis H. Richards on October 29, 1895. Said duplex valve is shown comprising a main valve 70 and a supplemental valve 72, preferably pivotally supported at the discharge edge of said main valve. The main valve 70 is shown pivoted for oscillatory movement between the arms or brackets 5', depending from the top plate or beam 5, and when in its closed position

will project sufficiently far beyond the front wall of the chute to support the descending column or stream of material, as clearly illustrated in Fig. 5. The valve employed will be  
 5 also preferably balanced, so as to have normally no tendency to either open or close, the balance-weight 90', extending from the opposite ends of the valve, being shown for this purpose.

10 As a means for actuating the valve to close the same the mechanism shown, described, and claimed in Letters Patent No. 548,843, granted to Francis H. Richards on October 29, 1895, will be preferably employed and  
 15 which will now be briefly described. (See Figs. 1 and 3.)

A valve-closing cam, shown at 500 as oscillatory with the valve 70, is formed with or carried by the balance-weight 90'. A valve-closing lever is shown at 504 having a counterweight 507 preferably adjustable along its  
 20 forward arm, its rear arm being shown provided with an antifriction-roll 506, which is adapted to successively engage two cam-faces 25 (not shown) on the cam 500, whereby the valve-closing oscillation may be effected through the medium of the counterweighted lever 504.

As a means for opening the main valve 70 the mechanism shown will be preferably employed and which will now be described.

A relatively long connecting-rod is shown at 558, pivotally connected with the valve at a point to the rear of the pivot or center of movement thereof and having its lower end  
 35 positioned for engagement by a suitable valve-opening actuator. The scale-beam B is shown carrying a counterweighted lever or valve-opening actuator 551, pivoted at 551' on the poising side thereof, the weight of  
 40 which, however, is normally exerted on the counterpoising side thereof, a suitable stop or stops (not shown) being employed for maintaining said counterweighted lever or valve-opening actuator in its normal position.

45 At a predetermined point in the operation of the machine this lever is so shifted that the force thereof is transferred from the counterpoising to the poising side of said scale-beam, the connecting-rod 558 descending therewith.  
 50 It will be evident that on the return stroke of said lever or as it resumes its normal position an upward thrust will be imparted to the connecting-rod 558 and transmitted to the valve sufficient for effecting the opening  
 55 movement or return oscillation thereof to cause the supply-stream to flow into the bucket G.

It is important that the time consumed in completing a bucket-load should be reduced  
 60 to a minimum, the idea being, of course, to obtain the greatest amount of work possible, consistent with accuracy, in a given period.

With the ordinary types of weighing-machines the time consumed in filling a bucket  
 65 varies considerably with different materials. It is therefore one of the aims of my present invention to overcome this disadvantage by

the provision of means for regulating the volume of the supply-stream as it emerges from its confining chute or hopper, it being understood that a stream of a given volume of one  
 70 sort of material will fill a bucket in a certain time, while a stream of like volume of a different material will consume more or less time in accordance with the peculiarity of the  
 75 particular material to be weighed. By the provision of the stream-regulator or stream-regulating plate, herein shown in its preferred form, the volume of the supply-stream as it emerges from the chute or hopper II may  
 80 be readily varied and at will when it is desired to change the work of the machine.

The stream-regulator or regulating-plate is designated by 30, and is shown supported by the back or rear plate or wall of the chute II  
 85 for oscillatory movement thereon and adjacent to the supply opening or outlet 30' of said chute. The plate 30 will be also preferably curved, so as to offer the least possible resistance to the onflowing stream, and so as  
 90 to also prevent spattering or scattering, and consequent waste of the material.

The back plate or wall of the chute II is shown provided with the brackets or hinges 31, which support for rocking movement the  
 95 shaft 32, and thereby the plate 30, said shaft 32 being shown passed through and suitably secured to lugs or ears 32', illustrated formed on the plate 30 on the upper edge thereof. The plate 30 is also shown provided with the  
 100 end walls or wings 33 of such a width that when said plate is in one of its extreme shifted positions said end walls will still overlap the end walls of the chute, so that lateral flow of the supply-stream will be thereby prevented.  
 105 Means will also be provided for adjusting the plate 30, whereby the volume of the supply-stream may be correspondingly varied, and for also maintaining said plate in an adjusted position.  
 110

One of the pins of the stream-regulating plate 30 (see Figs. 1 and 2) is shown carrying the crank-arm 34, which is suitably secured thereto and by which said plate may be swung  
 115 either inward or outward relatively to the chute II to either decrease or increase the volume of the supply-stream which flows from the relatively large supply opening or mouth 30' of the chute. The means herein shown for maintaining said plate 30 in an adjusted  
 120 position will now be described. The left-hand end wall of the chute is illustrated, having formed therein a series of circular recesses or openings 36 of any suitable number, herein shown as four, the centers of which  
 125 are intersected by an arc struck from the axis of movement of the crank-arm 34. Said crank-arm is shown having a finger-piece 35, in which may be located a spring or other pin 35', adapted to seat itself in any one of the  
 130 series of recesses 36, whereby the plate 30 may be held against movement.

To vary the volume of the supply-stream, the finger-piece 35 is grasped and the pin or

other device therein withdrawn from its engaged recess, so that the crank-arm may be swung in either direction and the connected stream-regulating plate 30 oppositely moved.

5 When the plate has been moved to the desired adjusted position, the spring-pin or other device in the finger-piece 35 may be thrust into and will seat itself in the proper recess of the series, and the plate will thus be held in said  
10 position.

The lower edge of the back wall or plate of the chute is shown deflected or terminating in an inclined flange 30'', so that it serves practically as a guard and prevents ingress  
15 of the material into the bearings of the plate 30, the bearings of said plate being located under said flange.

In connection with a chute having a drip-opening in a wall a drip regulator or regulators will be employed, which will be so supported by the chute and adjacent to its drip-opening as to have a movement below the discharge edge of said chute-wall and across the drip-opening formed therein, so that, for  
20 the reasons hereinbefore mentioned, the volume or depth of the main stream as it is delivered by the valve into the bucket may be increased or decreased and the drip-stream (the supply-stream reduced in volume by the  
25 valve in closing) may be proportionately varied.

The front wall or drip-plate of the chute II is shown provided with a drip-opening 37 intersecting the lower edge thereof and preferably intermediate its ends and of a suitable height and width, said chute-wall serving, practically, as a drip-plate.  
35

The means herein shown for regulating the depth of the main and the width of the drip or reduced stream comprises the two plates 38 and 39, which constitute drip-regulating valve-plates and which have an inclined movement toward and from each other across the drip-opening 37 for regulating the area  
40 thereof and simultaneously therewith a movement below the plane of the lower edge of the front wall of the chute II for regulating the depth of the main stream. The two plates 38 and 39 will be so recessed at their meeting edges as to form, when assembled, an intervening space or opening which in shape is similar to that of the drip-opening, which, though, is regulable. One of the plates will overlap the other, as shown, and it is obvious  
45 that when said plates are moved toward each other the space between the same is decreased and when oppositely moved said space is increased, the volume of a drip-stream which flows through the drip-opening 37 being similarly affected. The drip-opening 37 also is preferably of a width equaling the distance between the inner edges of the two plates 38 and 39 when the latter are in their extreme distended positions.  
50

65 As a means for effecting the peculiar movement of the two plates or valves 38 and 39, the latter are shown provided with obliquely-

formed guide slots or openings 42 and 42', through which are passed plate-guiding devices, herein shown as headed screws 40 and 40' and 41 and 41', each pair being for one of said plates, said screws being also fixed in the front wall of the chute and the heads thereof serving as a suitable means for preventing lateral displacement of said plates.  
70 By tightening the screws or studs 40 and 40' and 41 and 41', which pass through the plates 38 and 39, said plates may be firmly supported against the front wall of the chute when they are in the assembled positions thereof.  
75 80

As a means for operating the two plates 38 and 39 to obtain the reduction in volume of the two streams of material the devices shown may be employed.

The chute is illustrated carrying the two angle-levers 43 and 44, pivotally supported at their angles thereon, the short arms of said levers being suitably connected to the two plates.  
85

The front wall of the chute II is shown having formed therein the two series of circular recesses or openings 45 and 46, respectively, each of which series is on a curved line concentric with the axis of movement of the respective angle-levers. Each of said levers is also provided with a finger-piece, the one for the lever 43 being designated by 47 and the other being designated by 48, in which finger-pieces the spring-pins or other devices 47' and 48', respectively, are located, and which may be seated in any one of the series of recesses 45 and 46 to thereby hold the two plates against movement when in operative position. The operation of these plates will be readily understood. Said plates being at a certain adjustment and it being desired to alter the respective positions thereof for the purpose hereinbefore specified, one of the angle-levers will be grasped—for example, the lever 43—and the spring-pin or other device 47' in the finger-piece 47 thereof withdrawn from the recess in which it may be seated, so that the connected plate 38 may be moved by said lever either upward and outward for increasing the volume of the main and the width of the drip-stream of material, or downward and inward for diminishing the same, and when said plate is in its adjusted position said spring-pin 47' may be thrust into the proper recess of the series and the plate 38 thus held.  
90 95 100 105 110 115 120

When said plate 38 is in its proper position, this operation will be repeated with the other plate 39.  
A stream-shed is shown at 49, disposed interiorly of the chute and in the line of flow of the supply-stream. This stream-shed, in the form shown, consists of a plate which is substantially of inverted-V shape in cross-section, being suitably secured to the front inclined wall of the chute II. Said inclined wall of the chute tends to direct the supply-stream toward the rear and away from the front or discharge edge of the valve, so that the power necessary for actuating the same  
125 130

is minimized. The cross-sectional area of the stream-shed 49 gradually decreases as it approaches the vertical portion of the front wall, the widest part of said device being located over the drip-opening 37, so that it effectually prevents the vertical descent of a stream of material through the drip-opening 37 and against the valve, the force of which materially resists the closure of said valve when exerted thereagainst.

As the valve 70 closes, the sustained mass thereon is shifted rearward, and when the valve has reached the main-stream cut-off position or is approximately horizontal a bank of material will be formed thereon which extends from the lower edge of the chute-wall to the discharge edge of said valve, so that when said valve has reached such position a drip-stream may flow through the drip-opening 37 from the body of material within the chute over the banked-up mass on the valve and into the bucket G.

As a means for actuating the supplemental valve 72 to close the same, whereby it holds back or reverses the flow of the drip-stream, a depending cam is shown at 73, in the path of movement of an antifriction-roll 74 on one end of the crank-arm 75, carried by the supplemental valve. When the cam-surface of said cam 73 engages said roll, an upward movement will be imparted to the supplemental valve 72, so that it becomes operable for reversing the flow of or cutting off the drip-stream.

In Figs. 6 and 7 a modification of the means for operating the stream-regulating plates or drip-regulators is illustrated. These plates are designated by 50 and 51 and are shown having the obliquely-formed guide-slots 52 and 52' and 53 and 53', respectively, through which slots are passed the plate-guiding devices, herein shown as headed screws or studs, which are also fixed to the front wall of the chute. The object of the means illustrated in Figs. 6 and 7 is to effect a simultaneous movement of the two plates 50 and 51 for regulating the width of the drip-stream flowing through the drip-opening 37 and the depth of the main stream. The chute is shown pivotally supporting the angle-lever 55, the short arm of which is connected to the plate 50, which latter is shown operatively connected with the other plate 51 by means of the rod 56, which is illustrated as pivotally connected, respectively, with said lever 55 and with an ear or lug 50', formed on the plate 51, so that when said first-mentioned plate is moved for effecting the hereinbefore-described result the companion plate may be moved in synchronism therewith. The means shown for maintaining said plate in the adjusted positions thereof consists of the series of recesses 57, in which may be seated a suitable pin or other holding device carried by the lever 55.

In Fig. 8 I have illustrated another modification, in which the front wall or plate of

the chute is shown having a plurality of drip-openings, herein shown as two in number and designated, respectively, by 37'' and 37''', and a plurality of operatively-connected drip-regulating valve-plates, also shown as two in number, supported adjacent to such openings and simultaneously movable across the same for regulating the area thereof. These plates are designated, respectively, by 60 and 60' and are shown having the guide-slots 61 and 61' and 62 and 62'. A corresponding series of plate-guiding devices is shown at 63 in the form of headed screws passing through said slots and fixed in the chute. The means for operatively connecting the two plates and for operating the same are the same as shown in the modification illustrated in Figs. 6 and 7, consisting of an angle-lever 64, pivotally supported by the chute and connected with the plate 60, a rod 65 being shown as operatively connecting said lever 64 with the plate 60', so that through said lever and connecting-rod 65 the plates may be simultaneously operated, the two extreme positions being clearly illustrated by the full and dotted lines, respectively.

Having described my invention, I claim—

1. In a weighing-machine, the combination with a chute having a back wall which terminates in an angular flange; of an oscillatory plate carried by said wall, the bearings of which are located under said flange.

2. The combination, with a hopper for containing material, of a wall-plate for said hopper, provided with two channels or openings; valve-plates so supported with reference to each of said openings as to be capable of movement in a vertical plane so as to project a greater or less distance below the lower edge of the wall-plate, and to be capable of movement in a direction across the opening; means for operating said valve-plates in unison, consisting of a rod pivoted directly to one of said valve-plates and operatively connected with the other valve-plate; and means for locking said rod against movement in any position to which it may be adjusted, substantially as described and for the purpose set forth.

3. In a weighing-machine, the combination, with a hopper for containing material and having a channeled wall, of means coöperating with said wall and serving to regulate the depth of the main stream and the width of the drip-stream.

4. The combination, with a hopper a wall of which is channeled to permit the passage of a drip-stream, of a series of movable valve-plates mounted to project a greater or less distance below the lower edge of said wall and serving to regulate the depth of the main stream and the width of the drip-stream, and means for operating said valve-plates in unison.

5. The combination, with a hopper for containing material, one wall of which is channeled thereby to permit the passage of a drip-

supply, of a series of valve-plates supported for movement in the plane of the drip-supply wall and mounted to project a greater or less distance below the edge of said wall to regulate the depth of the main stream, and also for movement in a direction for regulating the width of the drip-stream; a link pivoted to one of the valve-plates; and an operating device jointed to said link and also to the other valve-plates, whereby when said operating device is moved the plates will be adjusted in unison; and means for locking said valve-plates in an adjusted position.

6. The combination, with a hopper for containing material, one wall of which is channeled thereby to permit the passage of a drip-supply, of a series of valve-plates supported for movement in the plane of the drip-supply wall and mounted to project a greater or less distance below the lower edge of said wall to regulate the depth of the main stream, and also for movement in a direction for regulating the width of the drip-stream; a link jointed to one of the valve-plates, a lever mounted upon the hopper and connected, respectively, with the other valve-plate and with said link, said lever serving to operate the valve-plates in unison; and means for locking said valve-plates in an adjusted position.

7. The combination, with a hopper for containing material, one wall of which is channeled thereby to permit the passage of a drip-supply, of a series of valve-plates supported for movement in the plane of the drip-supply wall and mounted to project a greater or less distance below the lower edge of said wall to regulate the depth of the main stream, and also for movement in a direction for regulating the width of the drip-stream; a link pivoted to one valve-plate; and a lever connected with the other plate and with said link, said lever having a series of pins adapt-

ed to fit in openings in the hopper to hold the plates in an adjusted position.

8. The combination, with a hopper for containing material, one wall of which is channeled thereby to permit the passage of a drip-supply, of a series of valve-plates, each having a pair of openings obliquely formed therein and fitting over studs on the drip-supply wall of the hopper, whereby said plates may be moved below the lower edge of said wall and also in a direction for regulating the volume of the drip-supply; a link jointed to one of said valve-plates; and a plate-operating device jointed to the other valve-plate and to said link.

9. The combination, with a hopper including a wall-plate having two channels or openings, of a valve-plate for each opening, supported for movement in the plane of the wall-plate to regulate the depth of the main stream, and also for movement across the channels or openings to control the width of the drip-stream; means directly connected to one of said valve-plates and operatively connected with the other valve-plate for operating the same in unison; and means for locking said valve-plates in an adjusted position.

10. In a weighing-machine, the combination with a chute having a drip-opening in a wall thereof; of a stream-shed located over said opening; a valve for said chute; and valve-actuating mechanism.

11. In a weighing-machine, the combination with a chute having an inclined wall provided with a drip-opening, said inclined wall directing a stream of material rearward; of a valve for said chute; valve-actuating mechanism, and a stream-shed located over said drip-opening.

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