

No. 701,722.

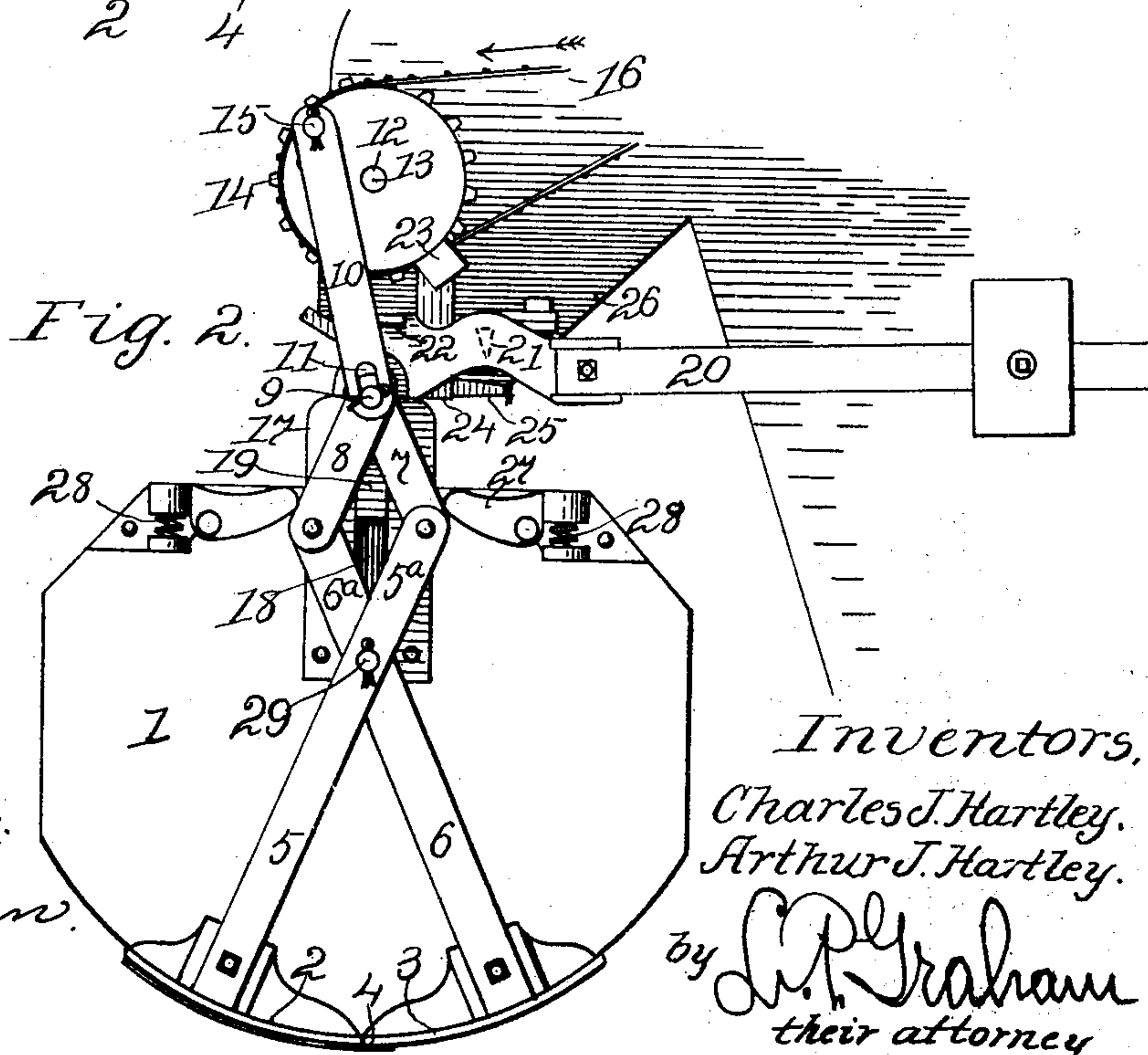
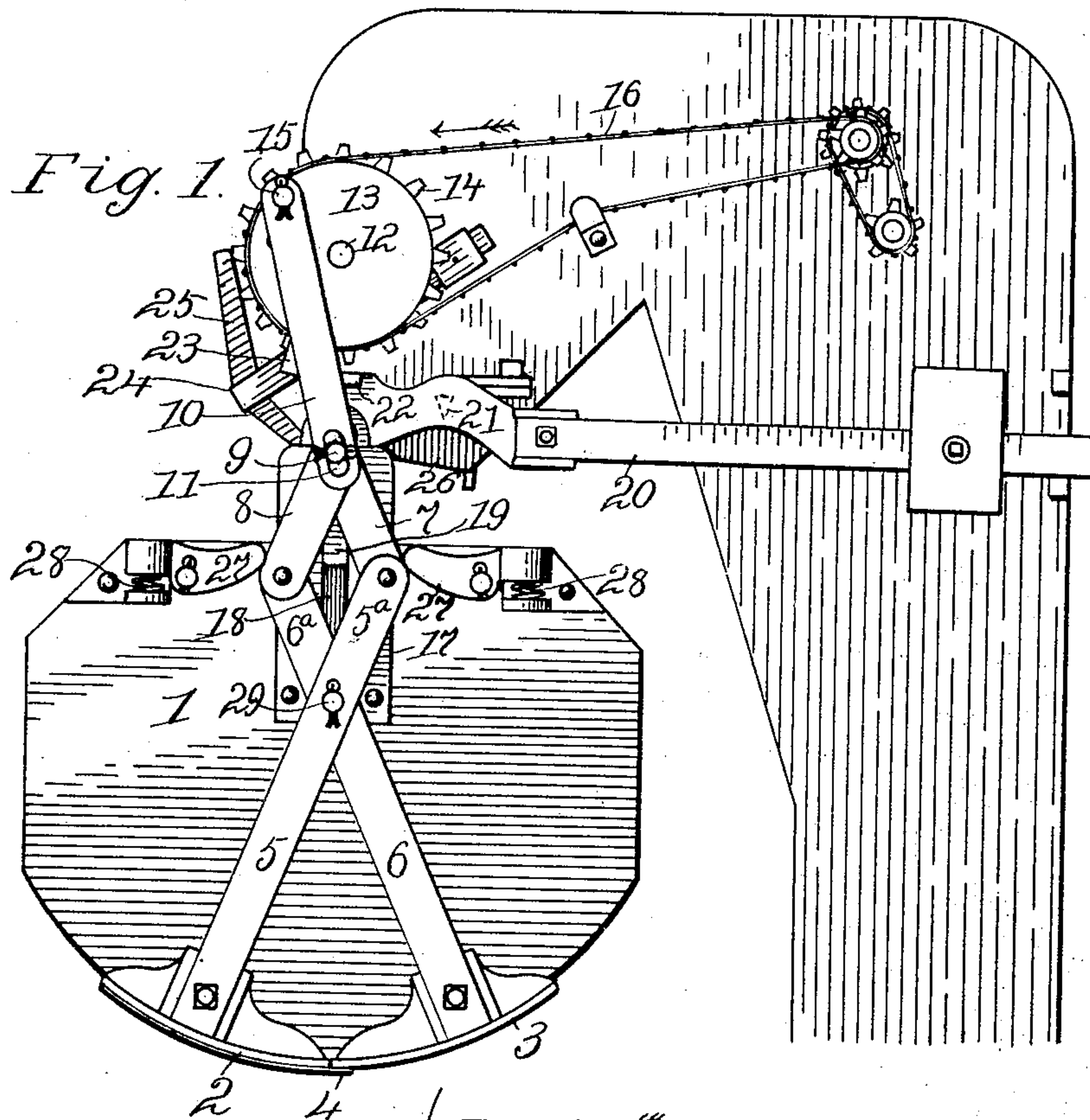
Patented June 3, 1902.

C. J. & A. J. HARTLEY.  
WEIGHING MACHINE.

(Application filed Nov. 29, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

Ina Graham.  
Nora Graham.

Inventors,  
Charles J. Hartley.  
Arthur J. Hartley.  
by *L. P. Graham*  
their attorney

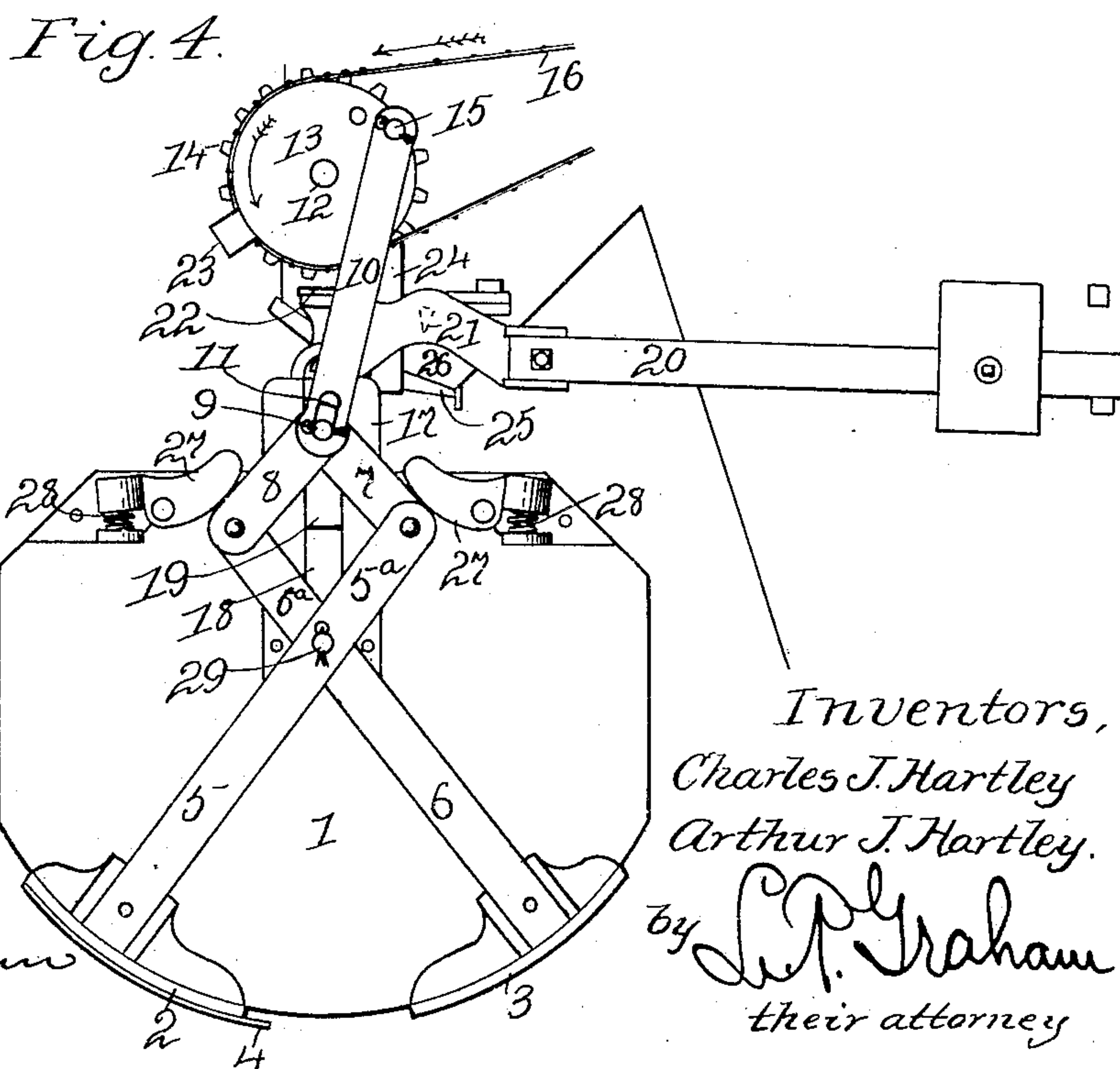
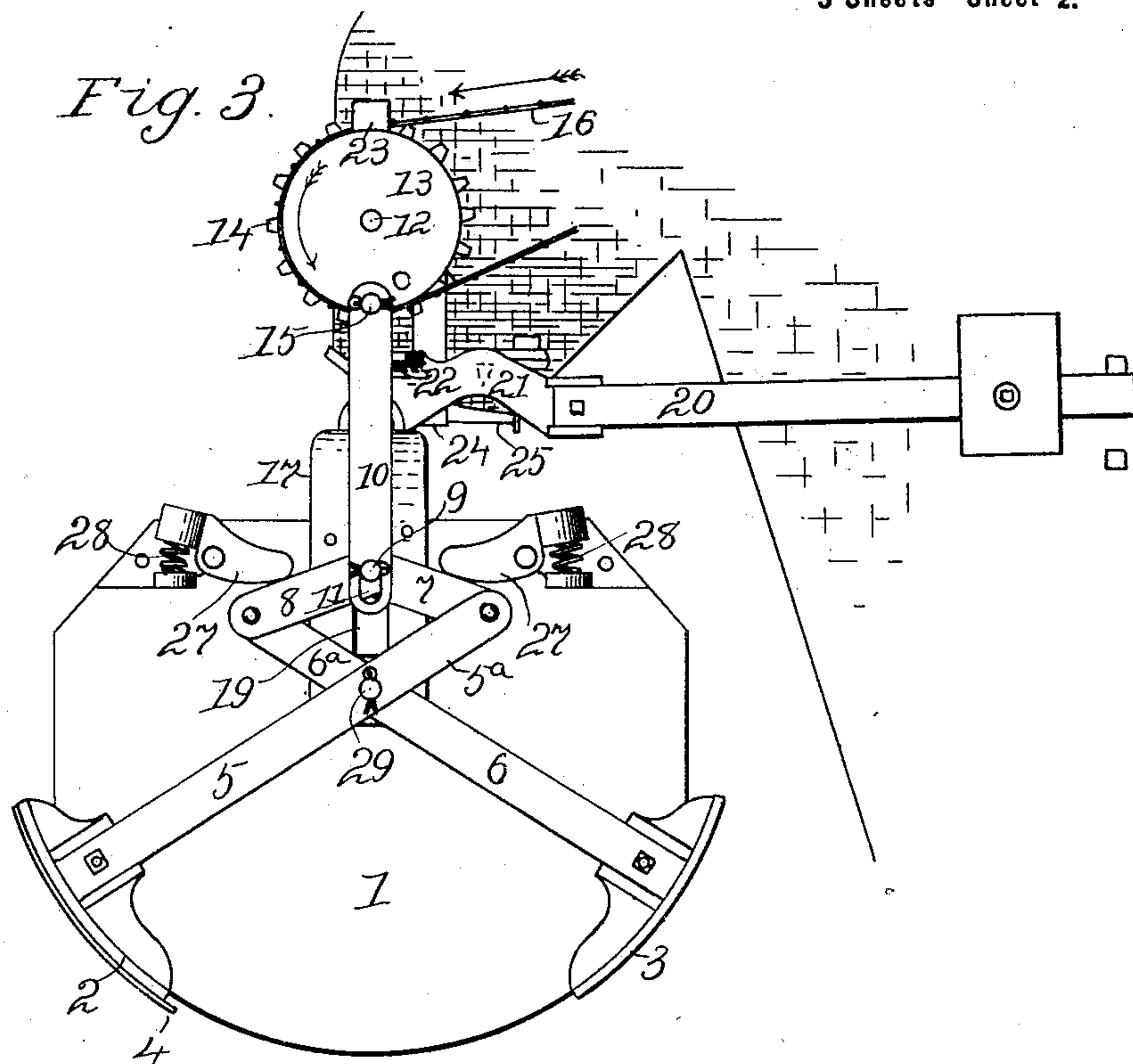
C. J. & A. J. HARTLEY.

WEIGHING MACHINE.

(Application filed Nov. 29, 1901.)

(No Model.)

3 Sheets—Sheet 2.



Witnesses.

*Ira Graham.*  
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WEIGHING MACHINE.

(Application filed Nov. 29, 1901.)

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3 Sheets—Sheet 3.

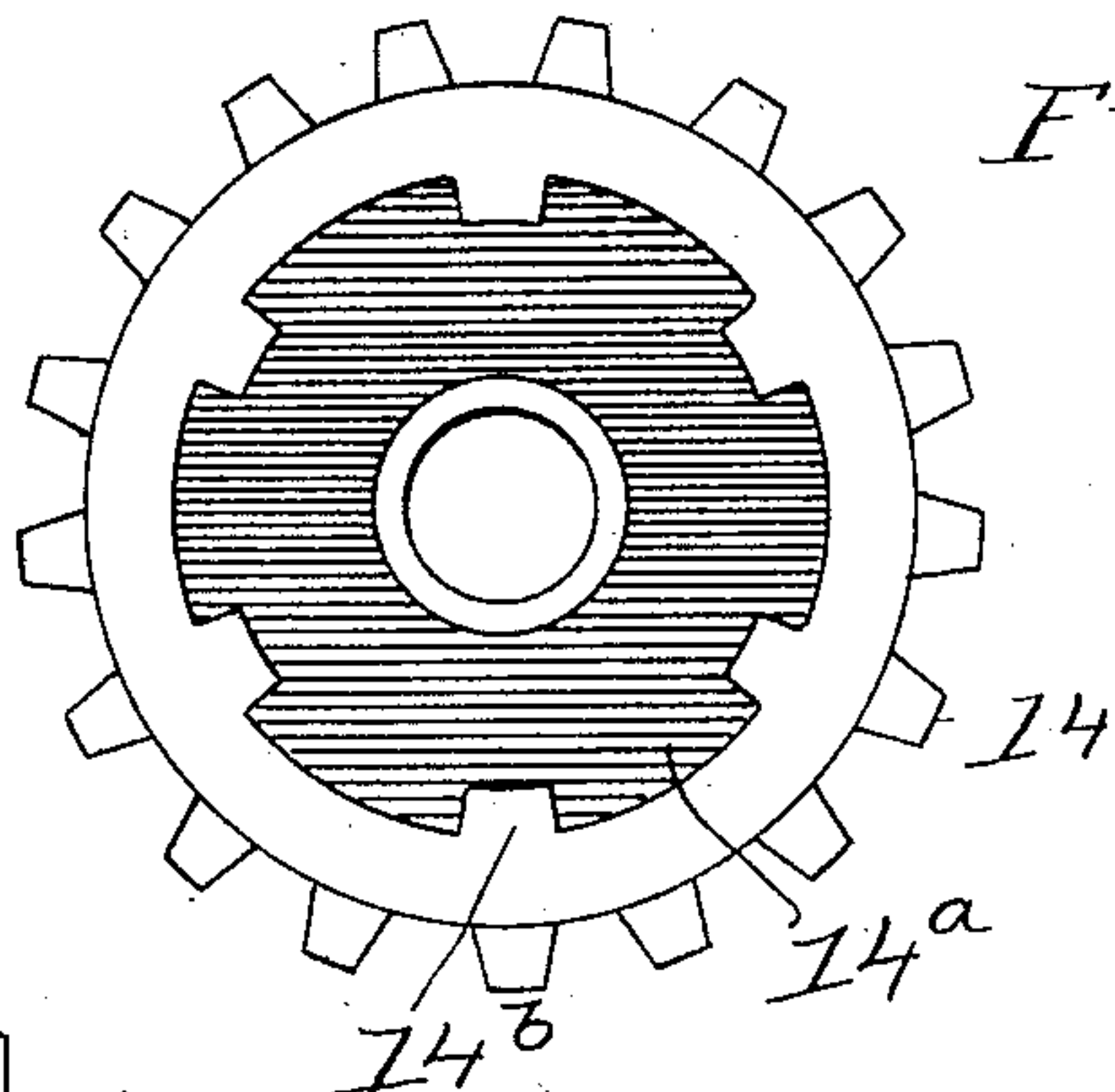


Fig. 5.

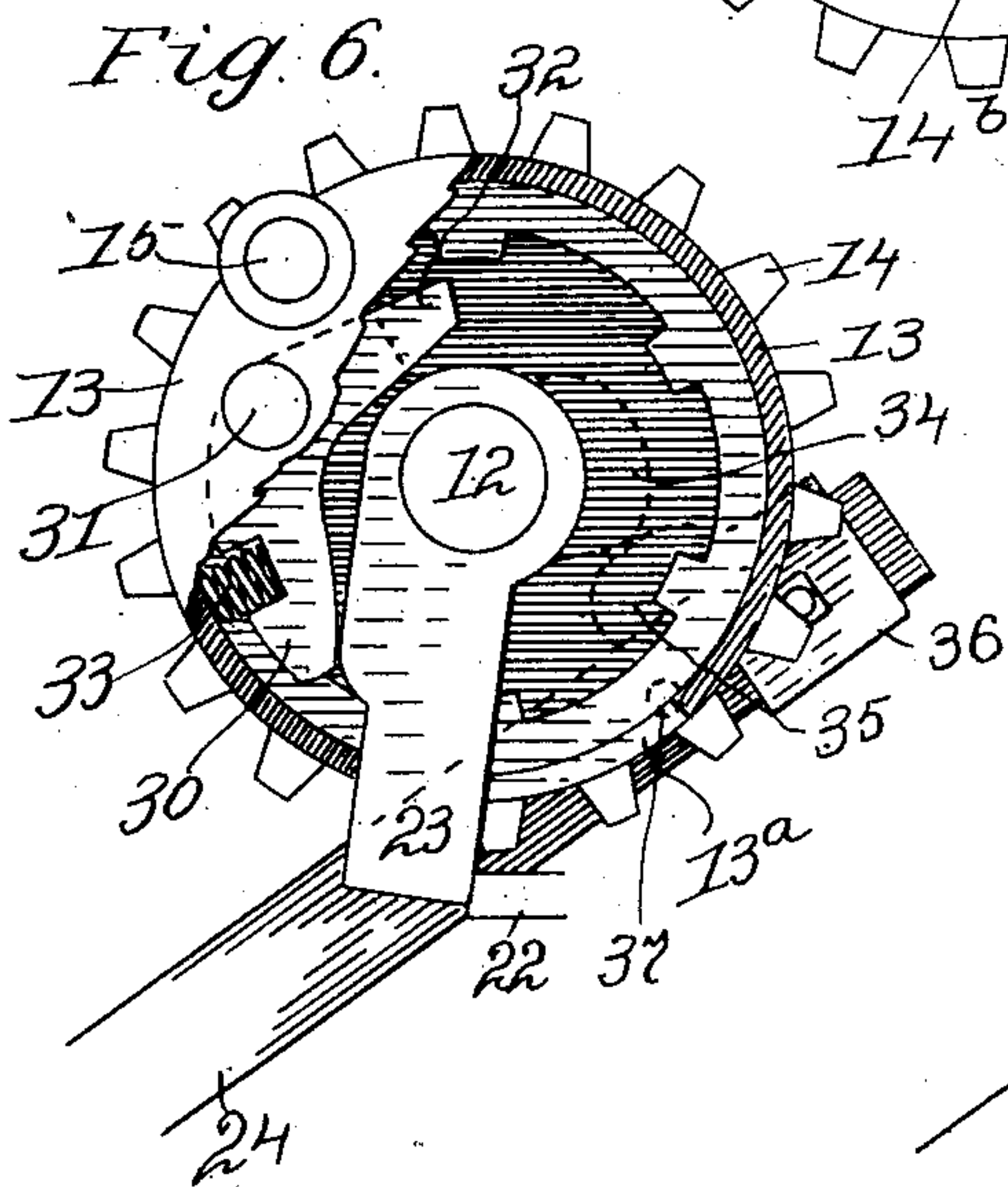


Fig. 6.

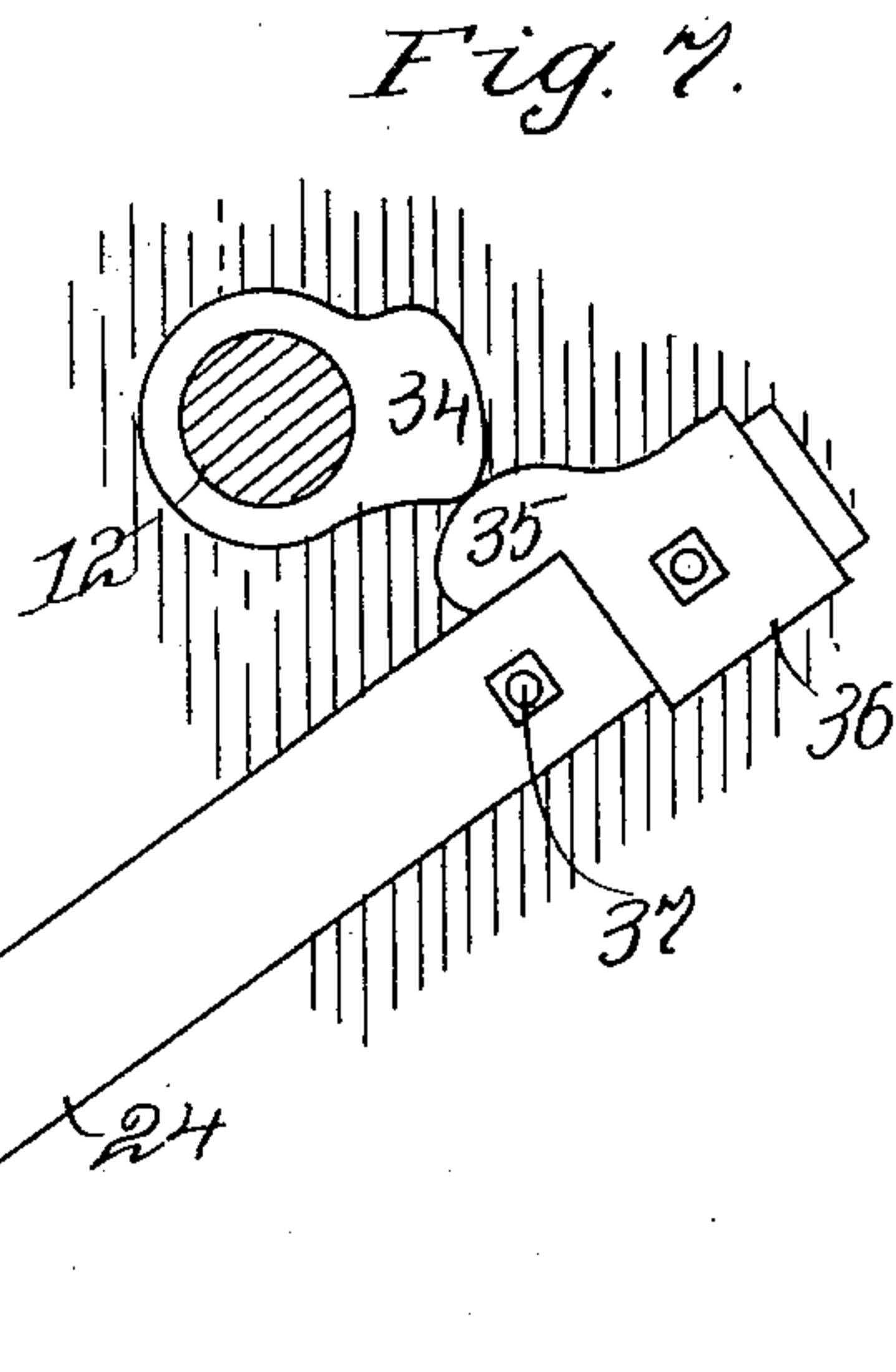


Fig. 7.

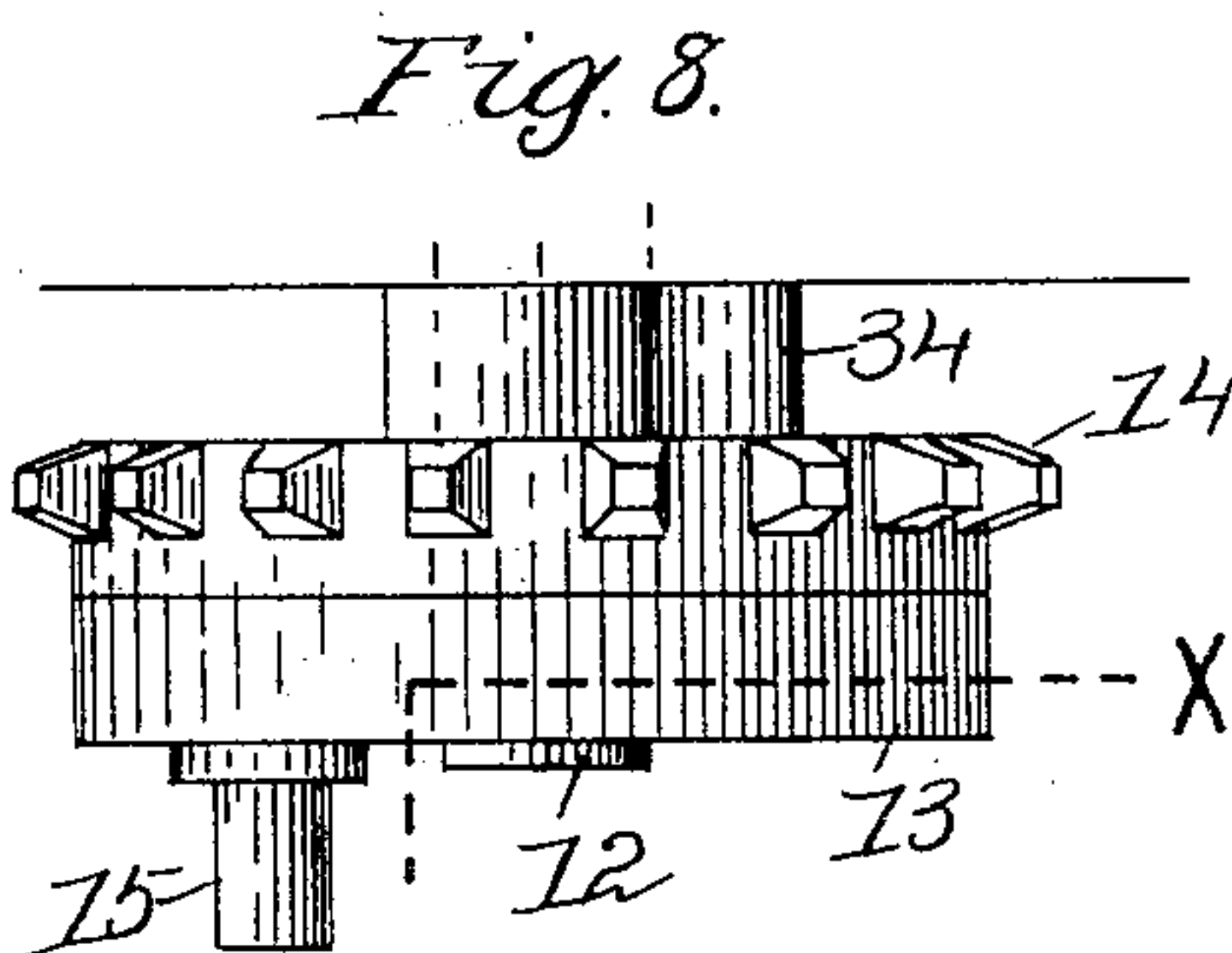


Fig. 8.

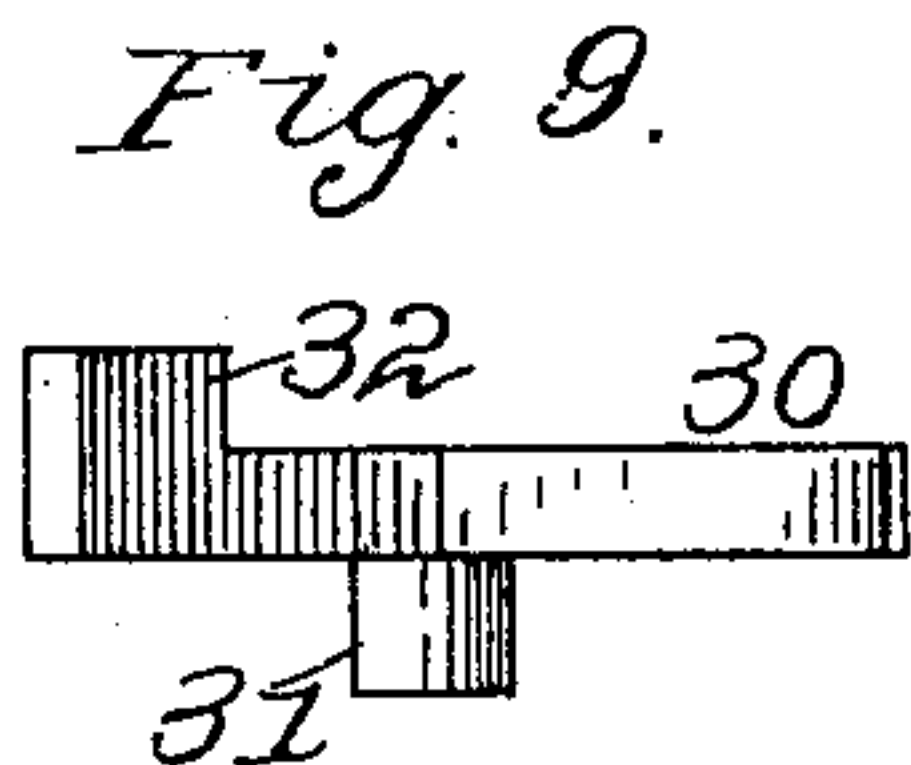


Fig. 9.

Witnesses.

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# UNITED STATES PATENT OFFICE.

CHARLES J. HARTLEY AND ARTHUR J. HARTLEY, OF DECATUR, ILLINOIS.

## WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 701,722, dated June 3, 1902.

Application filed November 29, 1901. Serial No. 84,154. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES J. HARTLEY and ARTHUR J. HARTLEY, of the city of Decatur, county of Macon, and State of Illinois, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to that class of weighing-machines in which the material weighed is discharged by force developed outside the machine. It is particularly applicable to the weighing of grain, although not confined to that use. It is exemplified in the structure hereinafter described, and it is defined in the appended claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a weighing-machine embodying our invention, the machine being attached to a grain-elevator and the parts being in the positions they occupy while the receptacle is filling. Fig. 2 is a side elevation of the machine, showing the changes that occur immediately after the scale-beam breaks. Fig. 3 is a side elevation showing the receptacle in the act of discharging its contents. Fig. 4 is a side elevation showing the doors of the receptacle nearing their closed positions and illustrating the point at which the supply cut-off begins to open. Fig. 5 is a detail of the sprocket-wheel, through which force is transmitted to open and close the doors of the receptacle and the cut-off that regulates the flow of grain or other material to the receptacle. Fig. 6 is a detail showing the elements that coact with the sprocket-wheel to impart motion to the doors and to the cut-off. This figure is an elevation with disk 13 broken away, as shown by section line X in Fig. 8. Fig. 7 is a detail of the mechanism used to control the cut-off. Fig. 8 is a detail in plan of the sprocket-wheel and adjuncts. Fig. 9 is a detail of the pawl that engages the sprocket-wheel during discharging operations of the weighing-receptacle and is disengaged from the wheel while the receptacle is filling.

The discharge end of the weighing-receptacle 1 forms an arc of a circle, and the bottom is cut away throughout the central part of the arc to permit the discharge of the weighed material. Arc-formed doors 2 and 3 fit against the lower end of the weighing-receptacle,

they conjoin at or near the center of the bottom of the receptacle when closed, and they are adapted to completely close the cut-away part of the bottom. One of the doors has a lip 4, that underlaps the edge of the opposite door when the doors are closed. A pin, as 29, projects outward from each side of the weighing-receptacle, at the center of the circle of which the bottom of the receptacle forms an arc. Door 2 is sustained by bars, as 5, which pivot on the pins, and door 3 is similarly supported by bars, as 6. On one side of the receptacle the door-supporting bars 5 and 6 extend above the pivot-pin, as shown at 5<sup>a</sup> and 6<sup>a</sup>, and link-bars 7 and 8 connect pivotally with the extensions and pivotally conjoin. Plates 17 are attached to opposite sides of the weighing-receptacle to form sustaining-hangers, and a vertical groove 18 is formed in one of the plates. A slide 19 is free to move in the groove of the hanger-plate, and pin 9 projects from the upper end of the slide and forms a pivot for the conjoining ends of links 7 and 8. A shaft 12 is journaled in relatively fixed bearings above the weighing-receptacle in approximate alignment with the center thereof, and it extends parallel with the pivot-pins 29. A disk 13 is rigidly attached to shaft 12, and a pin 15 projects laterally from the face of the disk. A link-bar 10 is pivoted at its upper end on pin 15, and its lower end is slotted, as shown at 11, to engage the pin 9. A sprocket-wheel 14 journals loosely on shaft 12 back of disk 13, a chain 16 drives the sprocket-wheel in the direction indicated by the adjacent arrows, and provision is made for engaging the wheel with the disk whenever a predetermined weight is given to the receptacle, as will be hereinafter explained.

The weighing-receptacle is carried on a scale-beam 20, which is fulcrumed at 21, and it is free to swing on its connection with the beam. A stop projection 22 is formed on the scale-beam above the point of suspension of the receptacle and below the disk 13. The disk has a flanged rim that is adjacent to the sprocket-wheel, and a part of the rim is cut away, as shown at 13<sup>a</sup> in Fig. 6. The face of the sprocket-wheel adjacent to the rim of the disk is recessed, as shown at 14<sup>a</sup> in Fig. 5, and has the internal teeth 14<sup>b</sup>. A pawl 30



is pivoted at 31 between its ends in disk 13, and one of its ends 32 projects laterally into the recess of the sprocket-wheel. A spring 33 tends to force the lateral extension 32 into engagement with an internal tooth of the sprocket-wheel. An arm 23 pivots on shaft 12 between the face of the disk and the sprocket-wheel. It extends through the cut-away part of the rim into position to engage the stop projection 22 of the scale-beam, and when it engages such stop projection it bears against pawl 30, compresses spring 33 and forces the engaging end 32 of the pawl out of the path of the internal teeth of the sprocket-wheel, as shown in Fig. 6.

The discharge end 26 of the elevator has a closing cut-off 25, which is carried by swinging bars, as 24, which are pivotally connected with the elevator. One of the bars is pivoted between the sprocket-wheel and the elevator on a pivot 37, and it has a casting 36 above the pivot. The casting has an extension 35, which projects inward toward shaft 12, and a cam 34 is fastened rigidly to the shaft in position to engage the extension of the casting, as shown in Figs. 6 and 7.

A pair of arms 27 are pivoted on the weighing-receptacle, near the upper end thereof, and they extend into contact with the links 7 and 8. Springs 28 press the arms yieldingly against the links.

Under the conditions illustrated in Fig. 1 the doors of the weighing-receptacle are closed and the cut-off 24 is held open by cam 34. The receptacle is held raised by the weight on the scale-beam, and the stop projection 22 is raised into the path of arm 23. The arm bears against the stop projection, holding the pawl out of engagement with the drive-wheel and the wheel turns ineffectively. The weighing-receptacle swings freely on its points of suspension while receiving its load, the link 10 hangs loosely on pin 9, which is approximately coincident with the points of suspension of the receptacle, and the arms 27 are pressed against links 7 and 8 with sufficient force to neutralize any tendency to jar apart the doors might develop. The receptacle receives and weighs its load entirely unaffected by any outside influence, and as soon as the weight of the scale-beam is overbalanced and the receptacle begins to descend the stop projection 22 passes out of contact with arm 23, the spring 33 throws the arm to the position shown in Fig. 2 and forces the engaging end of the pawl into the path of the internal teeth of the drive-wheel. As soon as the arm moves the disk is free to rotate also and the weight of the cut-off forces the cam, the shaft, and the disk around as far as the slot in link 10 will permit, which is far enough to permit the cut-off to swing closed. The disk begins then to partake of the motion of the drive-wheel, and the link 10 is pressed downward, carrying pivot-pin 9 downward along groove 18, forcing the toggle-links 7 and 8 to spread apart and to spread

the upper extensions 5<sup>a</sup> and 6<sup>a</sup> of bars 5 and 6, as shown in Fig. 3. The doors 2 and 3 are wide open by the time pin 15 has reached its lowest point, as shown in Fig. 3, and the spring-actuated arms 27 are pressing down on the toggle-links to hold the doors open. As soon as the play afforded by slot 11 is taken up by the travel of the disk the toggle-links are drawn upward against the downward pressure of the spring-arms, and the doors of the now empty receptacle are gradually drawn closed. When the position shown in Fig. 4 is reached, the cam is just engaging the extension on the cut-off arm, the doors are approaching a closed condition, the spring-actuated arms are shifting their stress on the toggle-links from downward to lateral, and the weight of the scale-beam has raised or is raising the receptacle and bringing the stop projection into the path of the pawl-controlling arm. Subsequently the cut-off is opened by the cam as the doors swing closed by the combined action of the disk and the arms 27, the arm 23 strikes the stop projection and is swung back as far as the cut-away space in the rim of the disk will permit, thereby disengaging the pawl from the drive-wheel and arresting the motion of the disk. All the parts assume the positions shown in Figs. 1 and 6 and everything is in readiness for a repetition of the operation. As the door-sustaining bars are hinged on the same pivot and the doors form arcs of the same circle, the closure is complete, no matter if the travel of one door is somewhat greater than that of the other and the meeting line is off the center of the receptacle, but the slide 19 will compel the doors to swing with approximate regularity and uniformity by holding its pivot-pin in a vertical line. When the arm 23 is pressed against stop projection 22, the disk bears against the arm and resists the tendency of the extension on the cut-off bar to force the cam around. The cam travels past the extension in raising the cut-off, the weight of the cut-off tends to force the cam around while the receptacle is filling, and the resistance of the arm 23 to this tendency causes the compression of the spring and the releasing of the pawl from the drive-wheel.

We claim—

1. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same and means for moving the extensions of the bars to and from each other to close and open the doors.

2. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle con-



centric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally conjoined and pivotally connected with the extensions of the bars, and means for moving the conjoining pivot of the toggle-joint up and down to close and open the doors.

3. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a vertically-movable slide above the pivot, a pair of toggle-links conjoined pivotally on the slide and pivotally connected with the extensions of the bars, and means for raising and lowering the slide to close and open the doors.

4. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally connected with the extensions of the bars, means for moving the conjoining pivot of the toggle-joint up and down to close and open the doors, and a pair of spring-actuated arms pivoted on the receptacle and exerting pressure against the toggle-links.

5. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally connecting with the extensions of the bars, means for moving the conjoining-pivot of the toggle-joint up and down to close and open the doors, and a pair of spring-actuated arms pivoted on the receptacle approximately in line with the conjunction of the toggle-links with the extensions of the bars, when the doors are closed, and extended toward each other into contact with the toggle-links.

6. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally conjoined and pivotally connected

with the upper ends of the bars, a rotatable disk journaled in relatively fixed bearings above the conjunction of the toggle-links and a pitman-link connecting the crank-pin on the disk with the toggle-joint.

7. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally conjoined and pivotally connected with the upper ends of the bars, a rotatable disk journaled in relatively fixed bearings above the conjunction of the toggle-links and a pitman-link connecting the crank-pin on the disk with the toggle-joint, one of the connections of the pitman-link being slotted longitudinally to give a limited amount of play.

8. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of arc-formed doors conforming to the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot and extended above the same, a pair of toggle-links pivotally conjoined and pivotally connected with the upper ends of the bars, a rotatable disk journaled in relatively fixed bearings above the conjunction of the toggle-links, a pitman-link connecting the disk with the toggle-joint, a drive-wheel journaled adjacent to and concentric with the disk, means for rotating the drive-wheel continuously and means for temporarily connecting the disk with the drive-wheel.

9. In a weighing-machine, the combination of a weighing-receptacle the discharge end of which forms an arc of a circle, a pair of doors for the bottom of the receptacle, a pivot on the receptacle concentric with the circle of which the bottom of the receptacle is an arc, a pair of door-sustaining bars swung on the concentric pivot, and extended above the same, a pair of toggle-links pivotally conjoined and pivotally connected with the upper ends of the bars, a rotatable disk journaled in relatively fixed bearings above the conjunction of the toggle-links, a pitman-link connecting the disk with the toggle-joint, a drive-wheel journaled adjacent to and concentric with the disk, means for rotating the drive-wheel continuously, a scale-beam sustaining the weighing-receptacle, and means controlled by the rise and fall of the beam for temporarily connecting the disk with the drive-wheel.

10. In a weighing-machine, the combination of a weighing-receptacle sustained by a scale-beam, doors for the bottom of the receptacle, means for opening and closing the doors and means for applying exterior door-opening force to the door-opening mechanism at a



point approximately in line with the points of suspension of the receptacle.

11. In a weighing-machine, the combination of a weighing-receptacle sustained by a scale-beam, doors for the bottom of the receptacle, means for opening and closing the doors, a rotatable disk journaled in relatively fixed bearings located above the points of suspension of the receptacle, means for intermittently rotating the disk and a pitman-link connecting with a crank-pin on the disk and with the door-shifting mechanism at a point approximately in line with the points of suspension of the receptacle.

12. In a weighing-machine, the combination of a weighing-receptacle, a scale-beam sustaining the receptacle, a stop projection on the receptacle-sustaining end of the scale-beam, doors for the bottom of the receptacle, a drive-wheel journaled on relatively fixed bearings above the stop projection on the scale-beam, a disk journaled concentric with and adjacent to the drive-wheel, a pawl on the disk adapted to engage projections on the drive-wheel, a spring tending to force the pawl into engagement with the drive-wheel, an arm bearing against the pawl and extending far enough to engage the stop projection when the weighing-receptacle is raised, and a connection between the disk and the doors of the receptacle whereby the doors are opened and closed by a rotation of the disk.

13. In a weighing-machine, the combination of a weighing-receptacle, a chute to deliver material to the weighing-receptacle, a cut-off

for the chute, doors for the bottom of the weighing-receptacle, a scale-beam to sustain the receptacle, a stop projection on the receptacle-sustaining end of the scale-beam, a disk fixed on the shaft journaled above the stop projection on the scale-beam, a drive-wheel journaled loosely on the shaft adjacent to the disk, a cam fixed on the shaft, a cut-off sustaining-bar pivoted near the shaft, an extension of the bar extending into the path of rotation of the cam when the cut-off is closed, a pawl on the disk tending to engage the drive-wheel an arm pivoted on the shaft contiguous with the pawl and extended to engage the stop projection on the scale-beam when the receptacle is raised and a connection between the disk and the doors of the receptacle.

14. Mechanism for actuating the cut-off of supply-chutes for weighing-machines, comprising a cut-off sustaining-bar pivotally supported, an extension on the bar, a rotatable shaft, a cam on the shaft to engage the extension and open the cut-off against gravity and a stop to arrest the rotation of the shaft as the cam rides past the extension and the weight of the cut-off begins to exert pressure tending to rotate the shaft forward.

In testimony whereof we sign our names in the presence of two subscribing witnesses.

CHARLES J. HARTLEY.  
ARTHUR J. HARTLEY.

Witnesses:

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CORWIN M. GUARD.