(No Model.) 4 Sheets—Sheet 1.

W. S. DAVENPORT.

COIN CONTROLLED WEIGHING MACHINE.

No. 396,394. Patented Jan. 22, 1889.

Fig. 1.

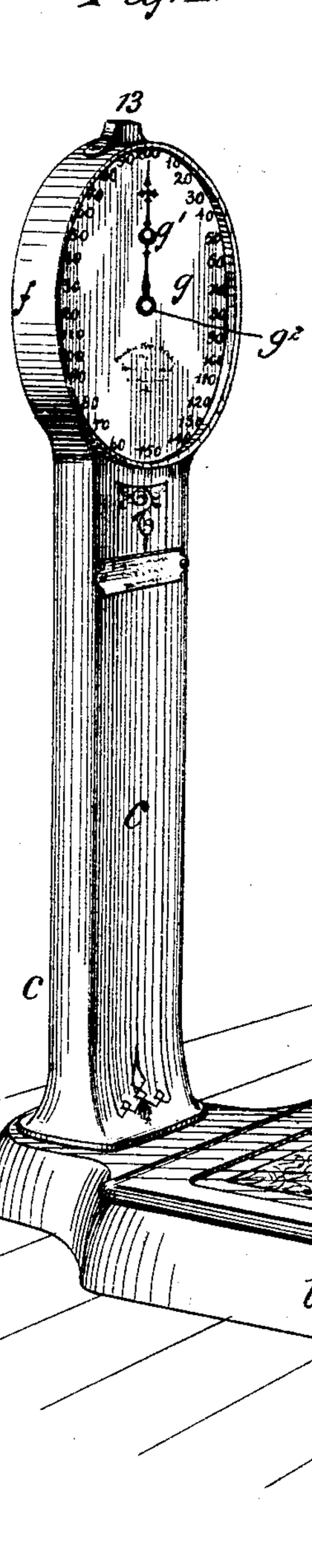

Fig. 2.

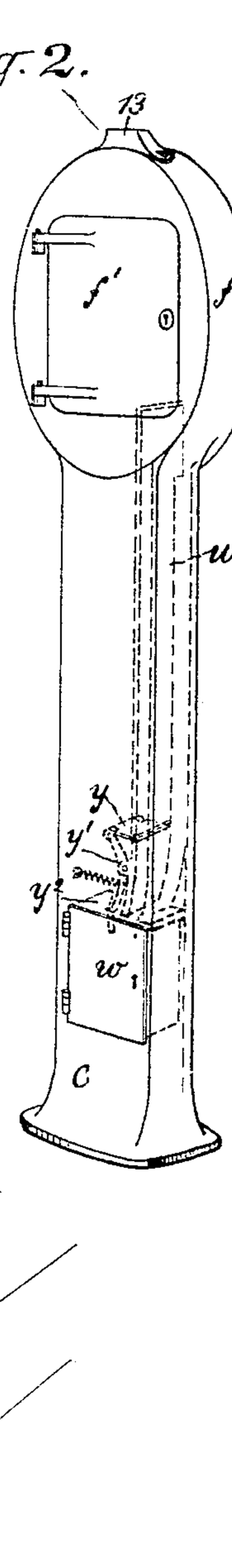

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Fig. 3.

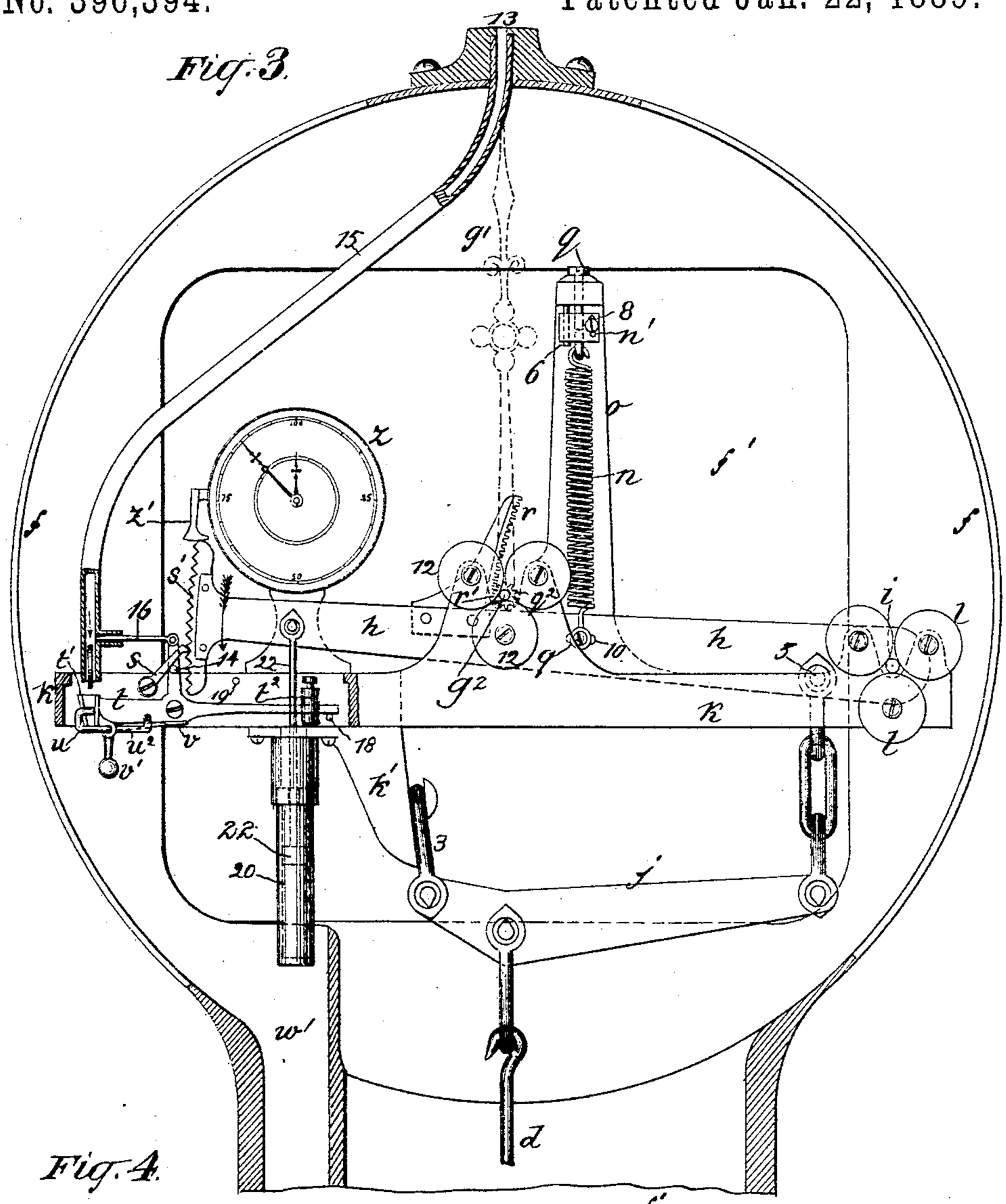

Fig. 4.

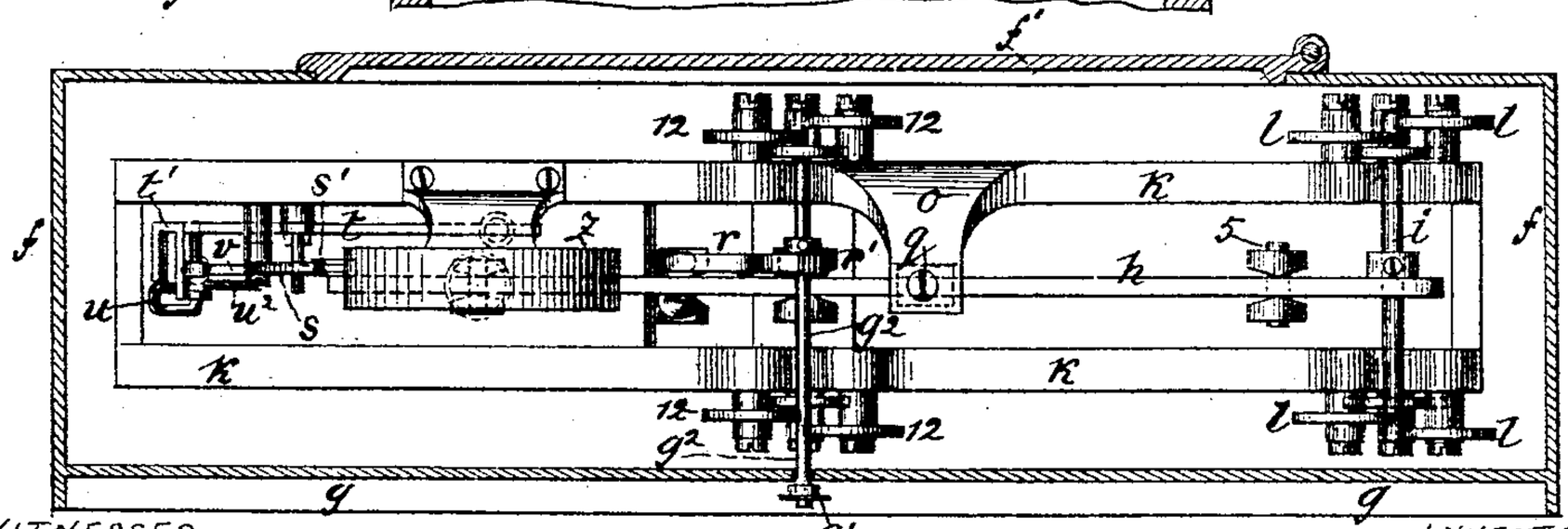

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Fig. 5.

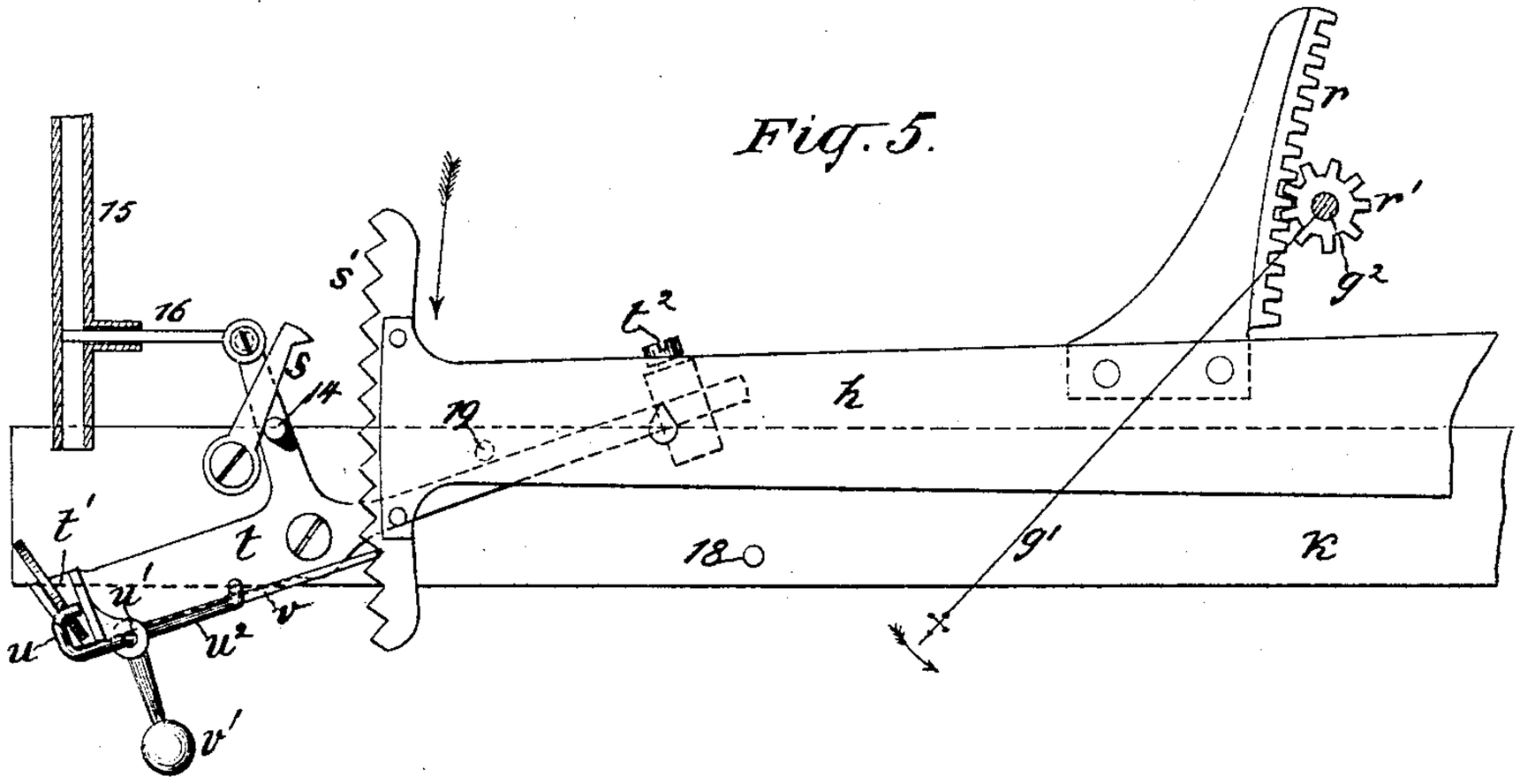

Fig. 6.

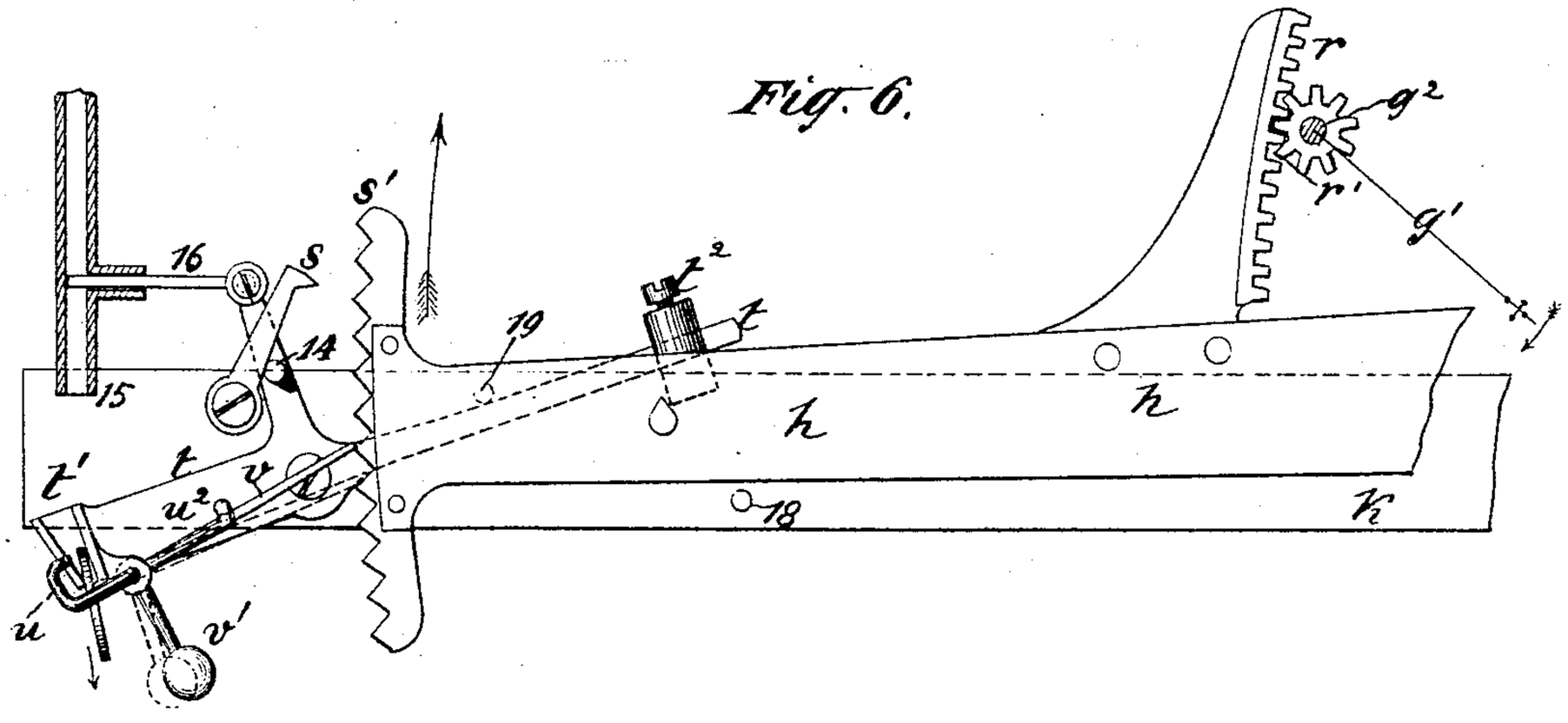

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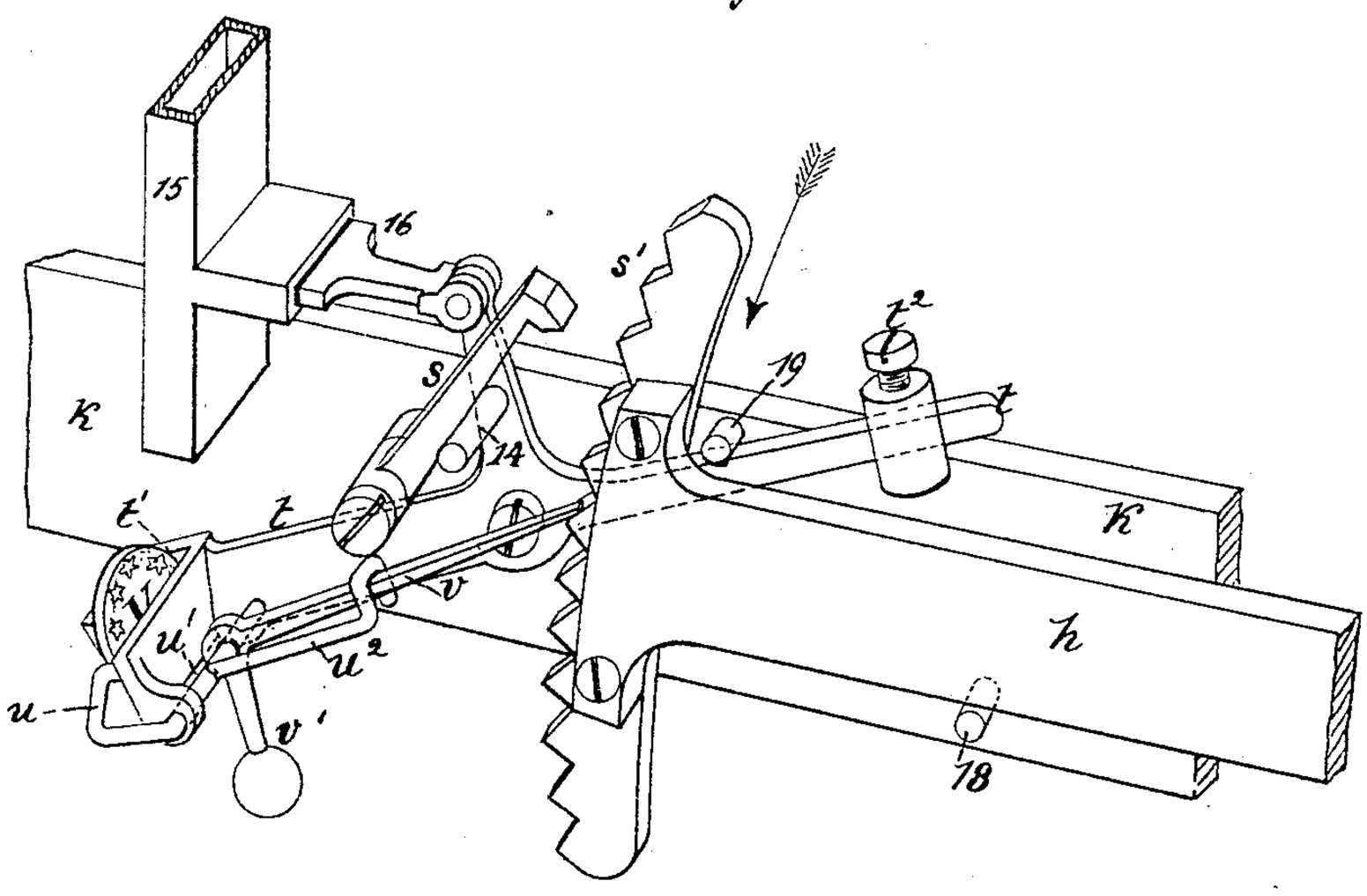
Fig. 7.



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UNITED STATES PATENT OFFICE.

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COIN-CONTROLLED WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 396,394, dated January 22, 1889.

Application filed March 4, 1887. Serial No. 229,672. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. DAVENPORT, of St. Johnsbury, Caledonia county, Vermont, have invented certain new and useful Improvements in Coin-Controlled Weighing-Machines, of which the following is a specification.

My invention applies more especially to that class of scales or weighing-machines usually made in the form of platform-scales, with their weighing mechanism inclosed and concealed, but having a visible dial and index-hand and an accessible coin-slot, the whole being so constructed that when a person stands on the platform or places a weight thereon and at the same time deposits a proper coin in the slot the gravitation of the coin will automatically set the internal mechanism into action and cause the index-finger to move on the dial and thus indicate the correct weight upon the platform.

The invention consists in the peculiar combinations and the novel construction, arrangement, and adaptation of parts, all as more fully hereinafter described and claimed.

In the drawings annexed, Figure 1 presents a perspective view of my improved weighing machine or scale. Fig. 2 is a perspective of the rear side of the pillar and dial-head of the scale. Fig. 3 is an enlarged front elevation of the mechanism embodying my invention within the dial-head with the dial-plate removed. Fig. 4 is a sectional plan of Fig. 3. Figs. 5 and 6 show enlarged fragmentary views of the essential parts of my invention—viz., the beam with its geared index, the detent, and coin-trip, &c. Fig. 5 shows the parts in the position when the coin-trip is deflected by the coin, the detent released, and the beam moving under the stress of the body being weighed, whereas Fig. 6 shows the parts in the positions assumed when the beam is returning to its normal position and the coin is dropped from the coin-trip. Fig. 7 is a perspective view showing the details of the coin-trip, detent, &c.

Referring to Fig. 1, *a* indicates the platform of the scale on which the body to be weighed is placed, and *b* indicates the platform frame or case, and *c* the pillar of the scales. All these parts are about as usual in platform-scales, the platform resting upon the usual arrangement of levers, which levers are connected with the scale-beam above the pillar by the steelyard-rod *d*, (see Fig. 3,) which rod rises in the pillar *c* to connect with the scale-beam, as usual in platform-scales. I have not therefore shown the details of the platform and its levers connecting to the steelyard-rod, as the same are presumed to be of the usual well known construction and form no essential part of my invention.

Now the scale-beam and other operative or weighing parts of the scale therewith connected, which are usually exposed above the pillar, are in this scale all inclosed and concealed in a head or case, *f*, on the top of the pillar, which is preferably of circular form, mounted centrally on the pillar, and provided with a hinged door, *f'*, on the rear, secured by a suitable lock. On the front wall of the case is formed a large circular dial, *g*, (see Fig. 1,) graduated around its circumference in figures representing different weights up to the limit which the scale is adapted to weigh.

Now *h* indicates the scale-beam, which is disposed about diametrically within the center of the circular dial-case *f*, as shown best in Figs. 3 and 4. A strong elongated rectangular frame, *k*, extends across the middle of the dial-case and is secured thereto and supports the beam *h* and its several adjuncts, as shown in Figs. 3 and 4.

i indicates the fulcrum-pivot of the beam, which is preferably a round steel pin, which is seated at each end in the grasp of a triangular group of steel rollers *l*, which are free to rotate on studs secured to each side of the supporting-frame *k*, thus making a very secure and easy-working pivot, which is much better adapted for this form of scale than the usual knife-edge pivot would be. The steelyard-rod *d*, (see Fig. 3,) extending from the platform-levers, is connected with the beam *h* by the intermediate lever, *j*, the short arm of which is fulcrumed in a loop, 3, hanging from a lug, *k'*, on the frame *k*, while the long arm is connected by the usual loops and links with the short arm or pivot 5 on the beam. The arrangement of leverage between the steelyard-rod or the platform and the scale-beam is therefore, of course, such that the motion is greally multiplied at the beam, as usual, so that comparatively little strain will bear on the

beam or its pivots, so that the same will move with great ease and nicety. Now at or near the middle of the beam a spring, n, is connected thereto, the upper end being connected to an adjustable block, n', which is hung by a screw, q, from an overhanging arm or bracket, o, which rises from the frame k. The lower end of the spring is connected to a stud, 9, which is adjustable to a limited extent longitudinally of the beam in a short longitudinal slot, 10. The block n' is guided vertically by a pin, 6, projecting from the bracket-arm o, and by a stud, 8, projecting through a vertical slot in the block and screwing into the arm o, so that the block is thus prevented from turning, but may be adjusted up and down by turning the screw q, so as to adjust the tension of the spring to balance the beam, as will be understood. A further adjustment for "balance" is provided by the stud 9 and slot 10, as will be readily understood.

Referring to Figs. 1, 3, and 4, it will be seen that the dial g is provided with an index-finger, g', which is rotatable around the same, and the axis g^2 of which finger passes centrally through the dial-case transverse to and above the scale-beam h, and is pivoted or journaled at each end in a triangular group of rollers, 12, which are mounted on studs on each side of the frame k, at the middle thereof, as best shown in Figs. 3 and 4. Now from about the middle of the beam there projects upwardly a finely-toothed segmental rack, r, which is curved concentric with the fulcrum-pivot of the beam, and which gears or meshes with a pinion, r', fixed on the shaft g^2 of the index-hand, thus gearing the scale-beam positively and directly with the index-hand, so that when the beam is swayed or deflected under the influence of strain or weight on the platform the index-finger will move around on the dial to the figures corresponding to such weight or strain, and when such weight or strain is removed the index-finger will move back to zero, as in the position shown in Figs. 1 and 3.

Now normally the beam and index mechanism and other operative parts of the scale are restrained from moving under the influence of the strain and weight on the platform, and are thus held or locked inactive at the zero or balance position (shown in Fig. 3) by means of a detent or pawl, s, which is pivoted on the frame k and engages a ratchet-rack, s', on the extremity of the beam. This detent will therefore normally hold the weighing and index mechanism inactive at the zero position, notwithstanding the fact that a person may stand on the platform or place a weight thereon, and will so remain inactive until a proper coin is inserted to automatically release the detent and allow the scale to act and indicate. This coin may be inserted in a slot, 13, in the top of the dial-case f, as shown in Figs. 1 and 3, from which slot a curved chute or guide-tube, 15, leads downward to one end of the frame k, (see Fig. 3,) where it terminates over one arm of the coin-trip or lever t. This coin-lever t is an elbow-lever with three arms, as also shown in Figs. 5, 6, and 7, the outer arm of which is terminated with the coin "bucket" or socket t', in which the coin falls as it drops from the tube 15, as illustrated in Figs. 3 and 5. The inner arm of this coin-lever is provided with an adjustable weight or counter-balance, t^2, while the vertical arm of the lever is provided with a pin or projection, 14, which approaches or abuts against the detent-pawl s, and this vertical arm is also connected to a valve or cut-off slide, 16, in the tube 15, as well shown in Figs. 3, 5, 6, and 7. The coin-bucket t' is open both at top and bottom, and also on one side, and this open side is guarded by an escapement-hook, u, which normally closes the open side of the coin-bucket, so that the coin when dropped into the bucket, as seen in Fig. 5, is supported edgewise between said escapement-hook and the opposite side of the bucket. The escapement-hook u extends from a rock-shaft, u', which is formed integral with the hook and is pivoted on the coin-lever just back of the coin-bucket, as best shown in Fig. 7. A counterbalanced trip or pawl lever, v, is pivoted freely on the rock-shaft u', and from the rock-shaft extends a counterbalancing-arm, u^2, which is hooked at the end and rests on the trip-lever v. The trip-lever v is an elbow-lever, its long horizontal arm projecting out to engage the ratchet-rack s' on the scale-beam, while its short arm is pendent and terminated with the counterbalance-ball v', which normally causes the long and unweighted arm of the trip-lever to stand horizontal or parallel with the coin-lever t, as shown in Figs. 3, 5, and 7. The counterbalance-arm u^2 of the rock-shaft and escapement-hook u normally gravitates against and rests on the trip-lever v and causes the point of the escapement-hook to rest against the side of the coin-bucket, as seen in Figs. 3, 5, and 7, thus retaining the coin. It will be readily seen, however, that if the trip-lever v is raised or deflected upward, as seen in Fig. 6, it will move the escapement-hook u with it and thus release the coin from the bucket, which will then fall into a coin-receptacle below.

The general construction of the mechanism of the scale having been now explained, the operation will be readily understood by referring to Figs. 3, 5, 6, and 7. Thus, when when the scale is at rest, the beam will be raised into its zero position, and the index-hand g' will stand at zero on the dial, as indicated in Fig. 3, and the detent-pawl s will engage the rack s' on the end of the beam h and hold the beam and other mechanism securely locked in said zero or balance position. The coin-lever t will also stand in the horizontal position shown in Fig. 3, the counterbalance-weight t^2 causing the lever to gravitate against the stop-pin 18, where it will remain while unloaded by a coin. If now a person stands upon the platform of the scale

or places a weight thereon, no action will take place, as both the weighing and index mechanisms are locked by the detent *s*. If, however, the proper coin, usually a nickel, (five cents,) is dropped into the slot 13, it will descend the tube 15, and finally drop into the coin-pocket *t'* on the lever *t*, the weight of which will now overbalance the lever and cause the bucket-arm to descend until the opposite arm is brought against the upper stop-pin, 19, as seen in Figs. 5, 6, and 7. This movement will force the pin 14 against the detent-pawl *s*, and thus move the same out of engagement with the beam, and at the same time the slide or cut-off 16 in the coin-tube 15 will be closed, and thus prevent the descent of any other coin. The beam will now be free to move under the influence of the strain from the platform-levers, and in descending, as indicated by the arrows in Figs. 3, 5, and 7, it will move the index *g'* around on the dial until the tension of the beam-spring *n* balances the weight on the platform, when the index-hand will then stand at the figure on the dial corresponding to such weight. It will be seen that as the beam thus descends the teeth of the ratchet-rack *s'* will engage the end of the trip-lever *r*, and the lever will slip or trip over said teeth in the manner of a pawl over a ratchet, and, such ratchet movements of the trip-lever being downward or away from the arm u^2 of the coin-escapement *u*, as shown by dotted lines in Fig. 7, it will hence not affect the coin-escapement, which will continue to hold the coin in the bucket. While, therefore, the weight remains on the platform the parts will remain in the position shown in Figs. 5 and 7, the coin still remaining in the depressed bucket and the index-finger standing at the proper weight-figure on the dial. As soon, however, as the weight is removed from the platform, the reaction of the beam-spring *n* will raise the beam to its normal position and bring the index-finger back to its zero-point, and it will be seen on reference to Fig. 6 that as the beam thus ascends, as indicated by the arrow, the teeth of the rack *s'* will engage and lift the trip-lever *r*, and at the same time lift the arm u^2, and thus move out the escapement-hook *u*, and thereby release the coin and allow it to drop from the bucket, as indicated in Fig. 6. The coin-lever, being thus relieved of the weight of the coin, will immediately fall back to its normal position against the stop 18, the cut-off slide 16 will be opened, and the detent-pawl *s* allowed to fall into engagement with the rack *s'*, and as the beam continues to rise the pawl *s* and lever *r* will slip over the ratchet-teeth *s'* until the beam reaches its zero-point, when the pawl *s* will engage the proper tooth and hold the mechanism inactive, as at first, and all parts will have returned to their normal positions, as in Fig. 3.

The coins, when dropped from the coin-bucket, descend a chute or passage, *w'*, in the pillar *c*, as shown in Figs. 3 and 2, and fall into a coin box or receptacle, *w*. This coin-box is hinged to the back of the pillar, as shown in Fig. 2, and swings into the pillar under the end of the chute *w'* to receive the coins, and is provided with a lock and key to secure it in its closed position in the pillar; but when it is desired to collect the accumulated coins the box is unlocked and swung out and the coins removed through an opening in the top or back of the box. The chute *w'* is provided with a cut-off valve, *y*, operated by a spring-lever, *y'*, which engages with a cam-notch, y^2, in the top of the coin-box, so that when the box is swung into its locked position the cam-incline y^2 sways the lever and opens the slide *y* to allow the coins to drop into the box; but when the box is swung out the spring of the lever acts to close the slide and prevent the fall of the coins while the box is out.

In order that each action of the scale may be automatically registered, so as to account for every coin, and thus act as a check on the the collector, a counter or registering device, *z*, as shown in Fig. 3, of any of the usual or suitable constructions, is arranged within the dial-head, so as to be operated by the movement of the beam or other movable part of the scale. I prefer to have the end of the rack *s'* operate the counter at every upstroke of the beam by striking the movable arm *z'*, which projects from the counter, so that every stroke of the beam will thus impart one impulse to the mechanism of the counter to register each action of the scale and the receipt of each coin, as will be readily understood.

In order to prevent any sudden or jerky motions of the beam in its up or down strokes, a dash-pot, 20, is affixed to the frame *k*, in which works a piston, 22, which is connected to the beam *h*, as well shown in Fig. 3.

It will be noted that the long curved or bent form of the coin-tube 15 renders it impracticable to insert anything to tamper with the mechanism of the scale and produce an action without the deposit of a coin, and it will be seen that as the scale cannot act unless either a coin of the proper denomination is inserted or a disk of the same size and weight as such coin fraudulent use of the scale is thus practically impossible.

I do not of course limit myself to the especial way of mounting the beam herein shown, nor to the special gearing or connection between the beam and the index-hand, nor to the special form of the coin-trip and detent mechanism, for although the special constructions of these parts form minor features of my invention, yet they may be varied considerably without departing from the principle of my invention.

It will be now readily appreciated that the mechanism of my machine has the advantage of simplicity, strength, and accuracy, as it is more conducive to certainty and accuracy to operate the index-hand by the motion of the beam than by the motion of the coin-lever, and by having the coin-lever release the de-

tent which holds the beam a very responsive, accurate, and reliable action is secured.

A weight or counter-balance might be substituted for the spring *n;* but the latter is preferable.

What I claim as my invention is—

1. The combination of the counterbalanced beam *h*, having the rack *r*, with the rotary index-shaft g^2, having the pinion *r'*, and the groups of rollers 12, supporting the index-shaft, substantially as shown and described.

2. The combination, with the pivoted beam *h*, of the counterbalance-spring *n*, attached at one end near the center of said beam, the non-rotating block *n'*, carrying the other end of said spring, frame *k* and support *o*, and adjusting-screw *q*, substantially as shown and described.

3. The combination of the frame *k* and support *o* and the pivotal beam-lever *h* with the counterbalance-spring *n*, connected to said lever near the center thereof, longitudinally-adjustable spring-stud 9, non-rotating vertically-adjustable block *n'*, and adjusting-screw *q*, substantially as shown and described.

4. In an automatic weighing-machine, a coin-receiving-trip device consisting of a counterbalanced lever, *t*, having coin bucket or socket *t'*, in combination with the escapement device u u^2, and counterbalanced trip-lever *v*, engaging the escapement device, substantially as shown and described.

5. In an automatic weighing-machine, the combination of the scale-beam *h*, a detent-rack, *s'*, attached to the scale-beam of the machine, with the detent-pawl *s*, engaging the same, the counterbalanced coin-lever *t*, operatively engaging said detent-pawl, the coin-recess *t'* on said lever, the coin duct 15, terminating over said recess, the escapement u u^2, and the trip-lever *v*, arranged and operating substantially as shown and described.

6. In an automatic weighing-machine, the combination of the coin-duct 15 and slide, a coin-lever, *t*, having a coin-bucket, *t'*, arranged under the end of said duct, the detent-pawl *s*, and a projection on the coin-lever engaging said pawl, with a cut-off valve, 16, arranged to close said slide and connected with said coin-lever, whereby the valve is closed in the duct when the coin-lever is swayed by the weight of the coin, substantially as shown and described.

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