No. 744,162. PATENTED NOV. 17, 1903.

C. T. BROWN.

AUTOMATIC WEIGHING MACHINE.

APPLICATION FILED MAR. 12, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1

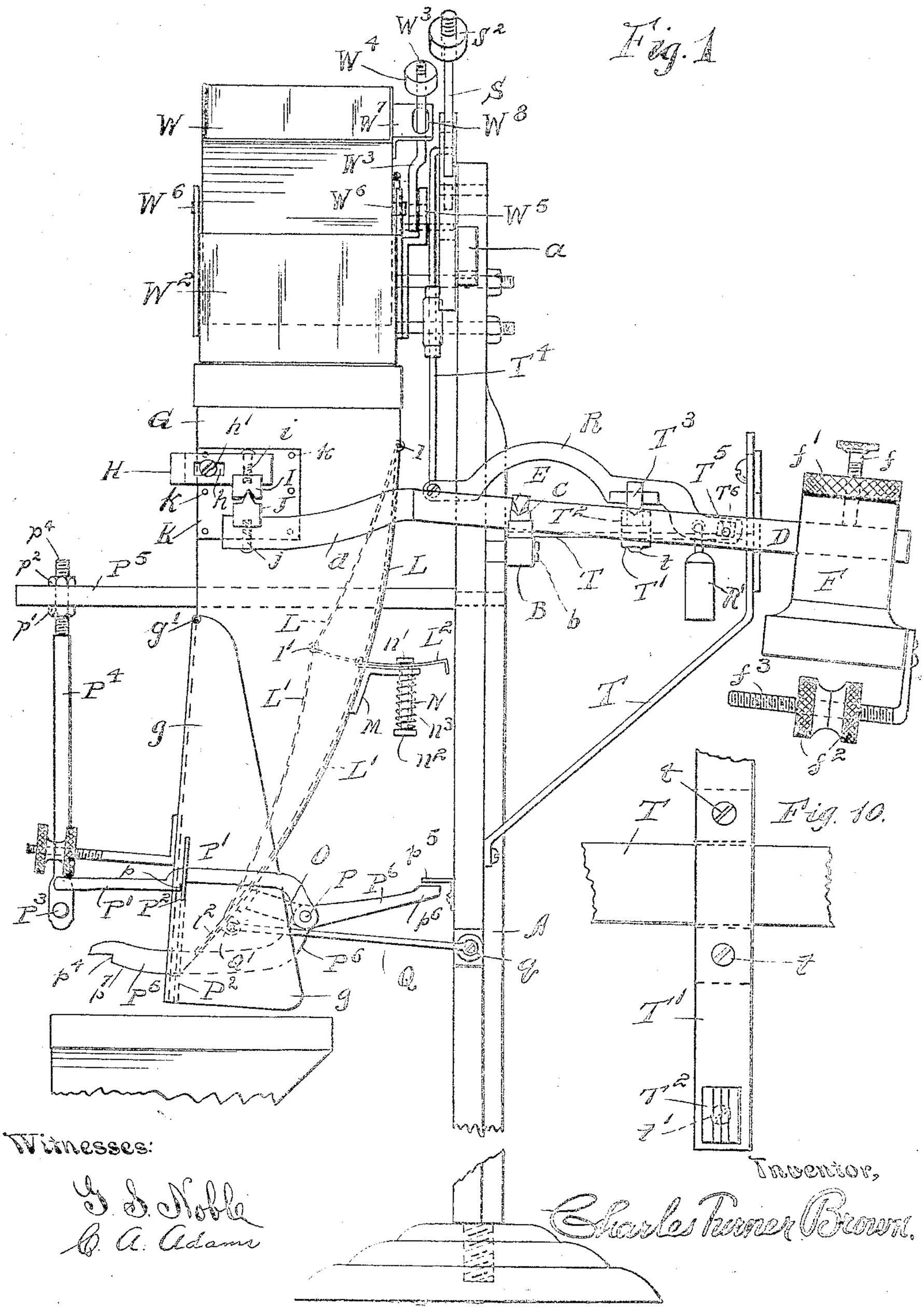

Fig. 10.

Witnesses:

G. S. Noble

C. A. Adams

Inventor,

Charles Turner Brown.

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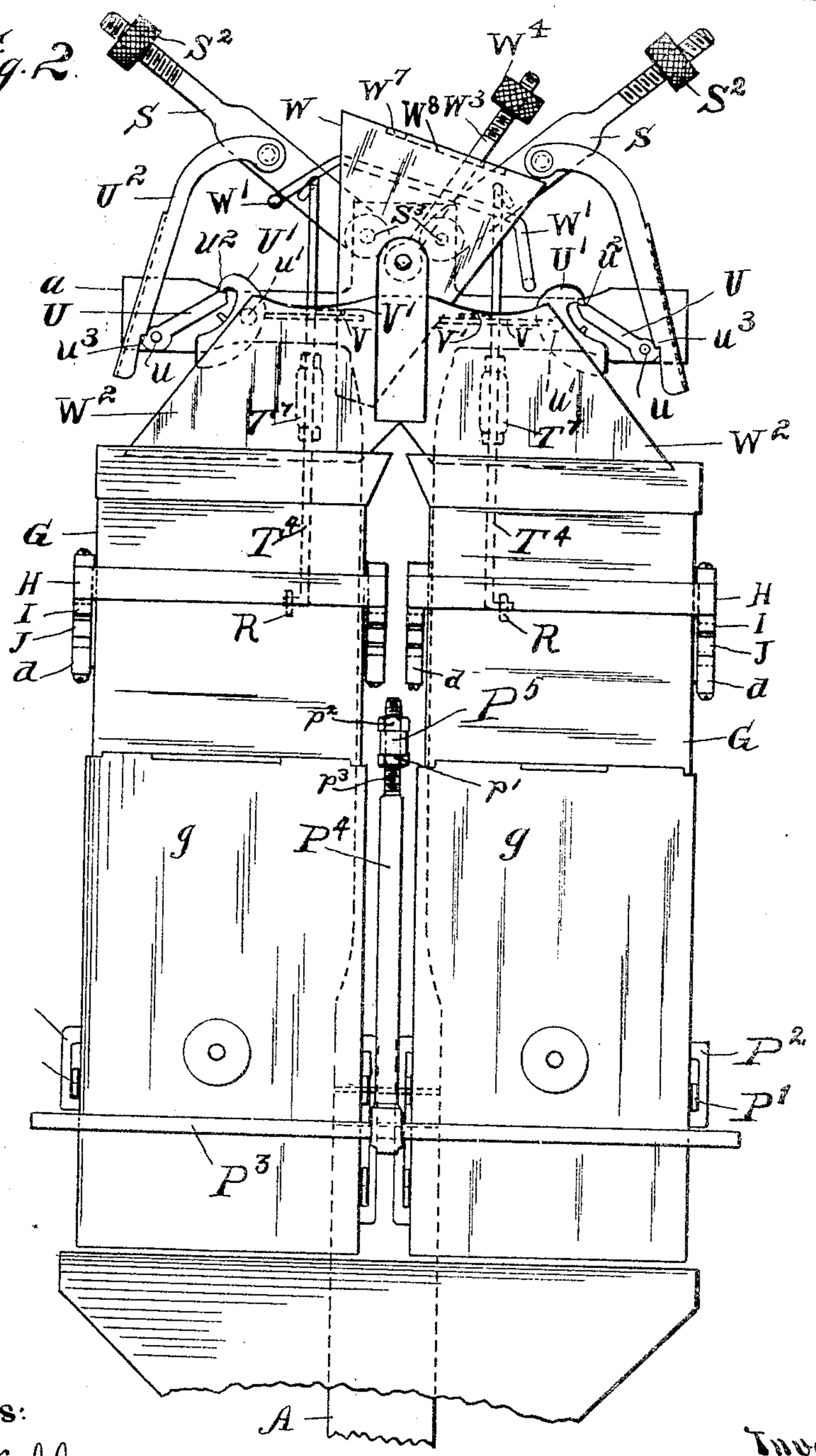
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3

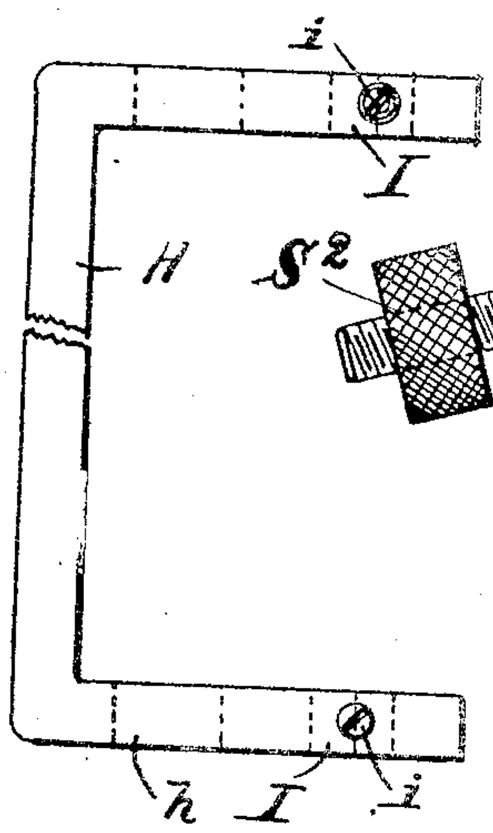


Fig. 4

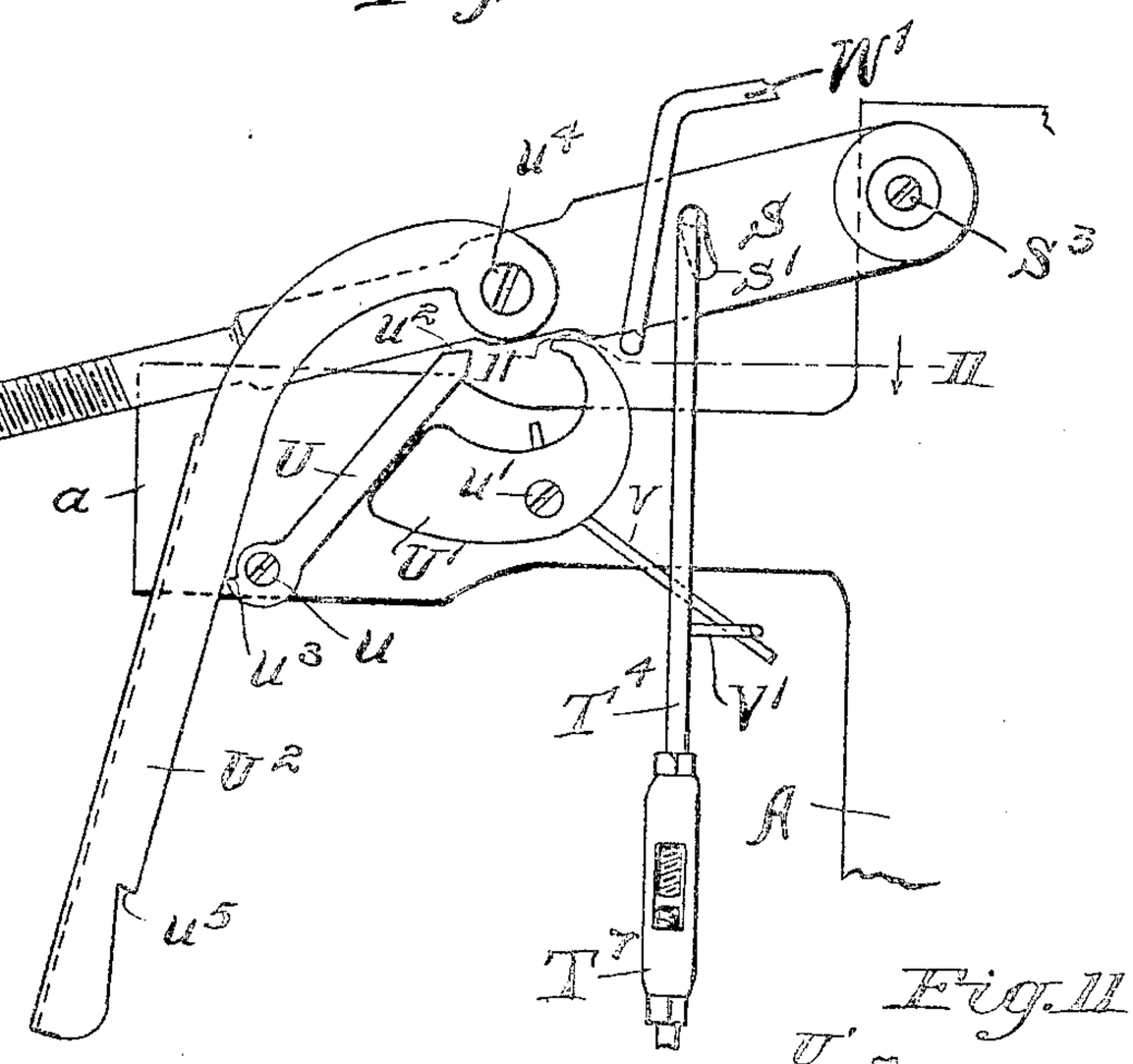


Fig. 5

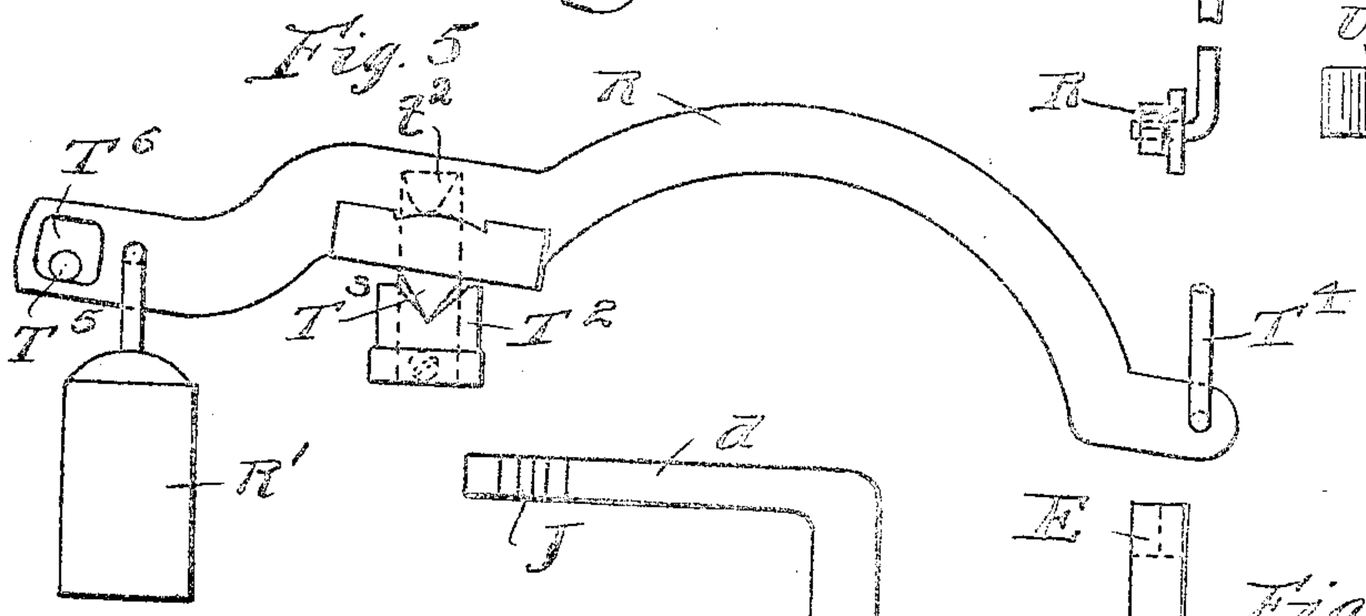


Fig. 11.

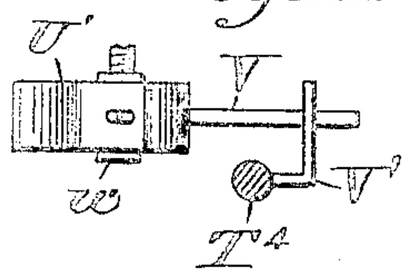
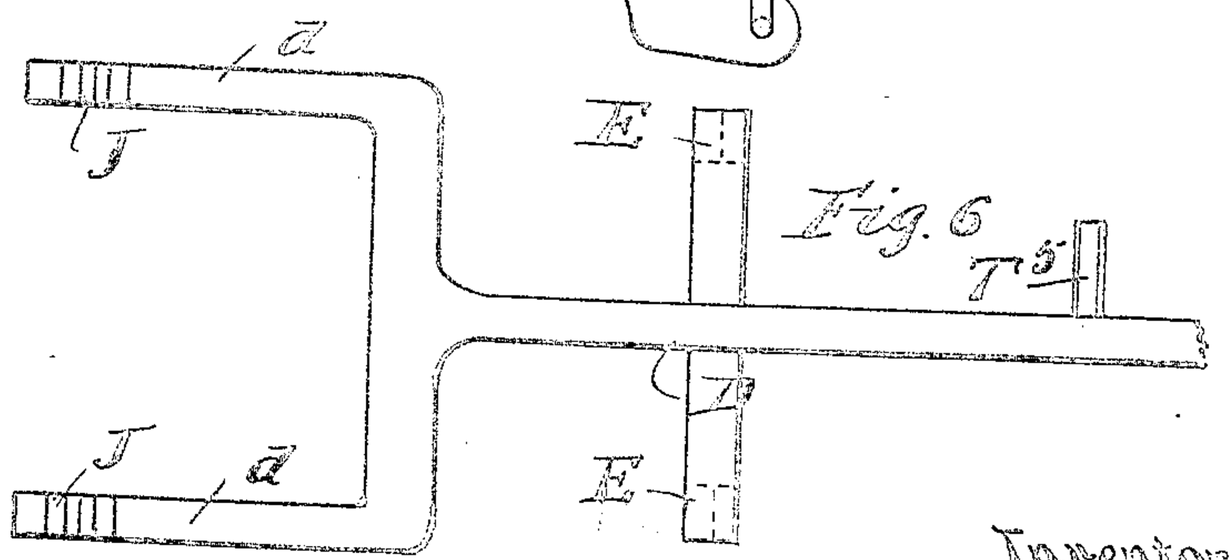


Fig. 6



Witnesses:

B. S. Noble

B. A. Adams.

Inventor,

Charles Turner Brown.

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AUTOMATIC WEIGHING MACHINE.

APPLICATION FILED MAR. 12, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 1

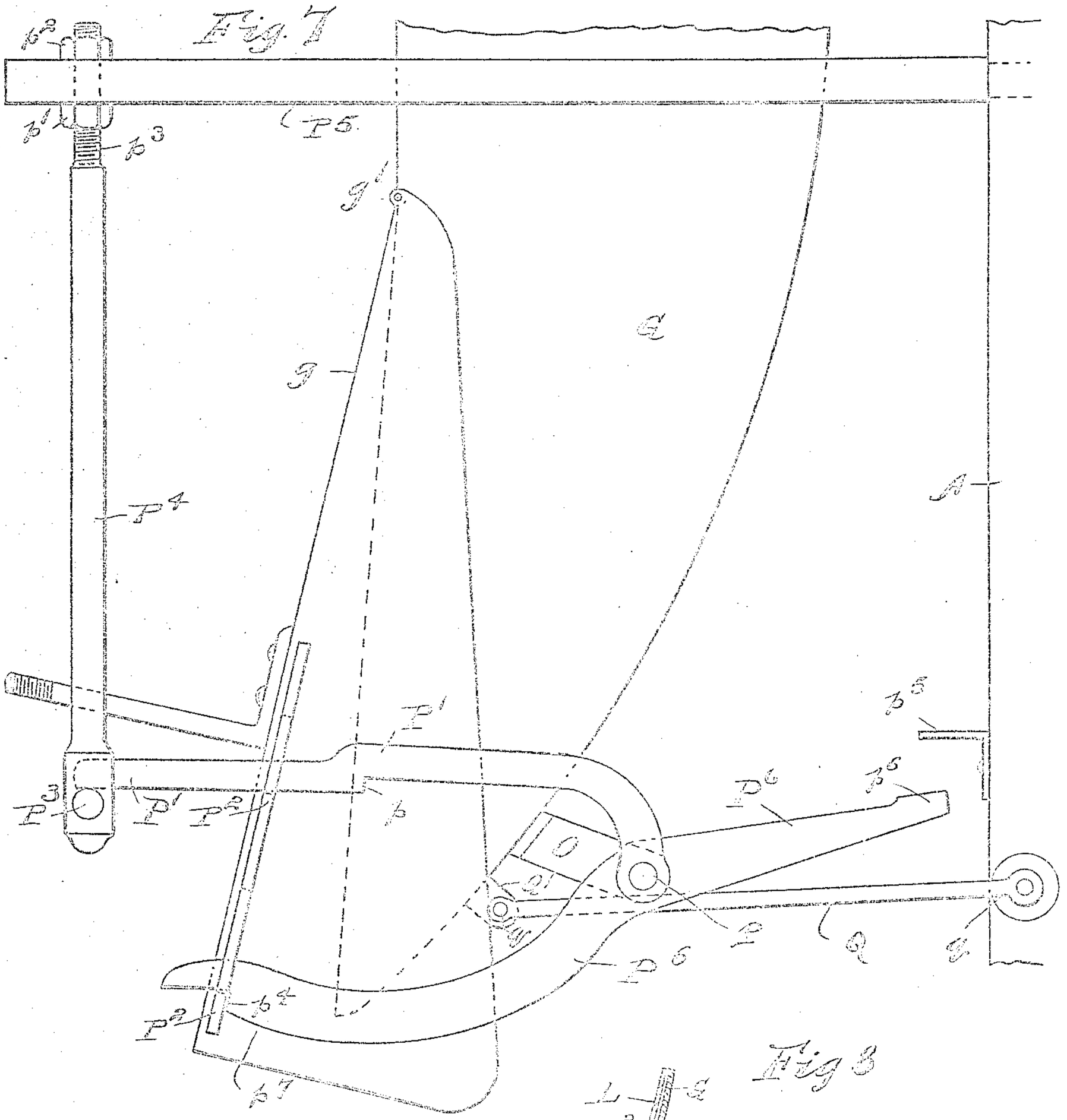
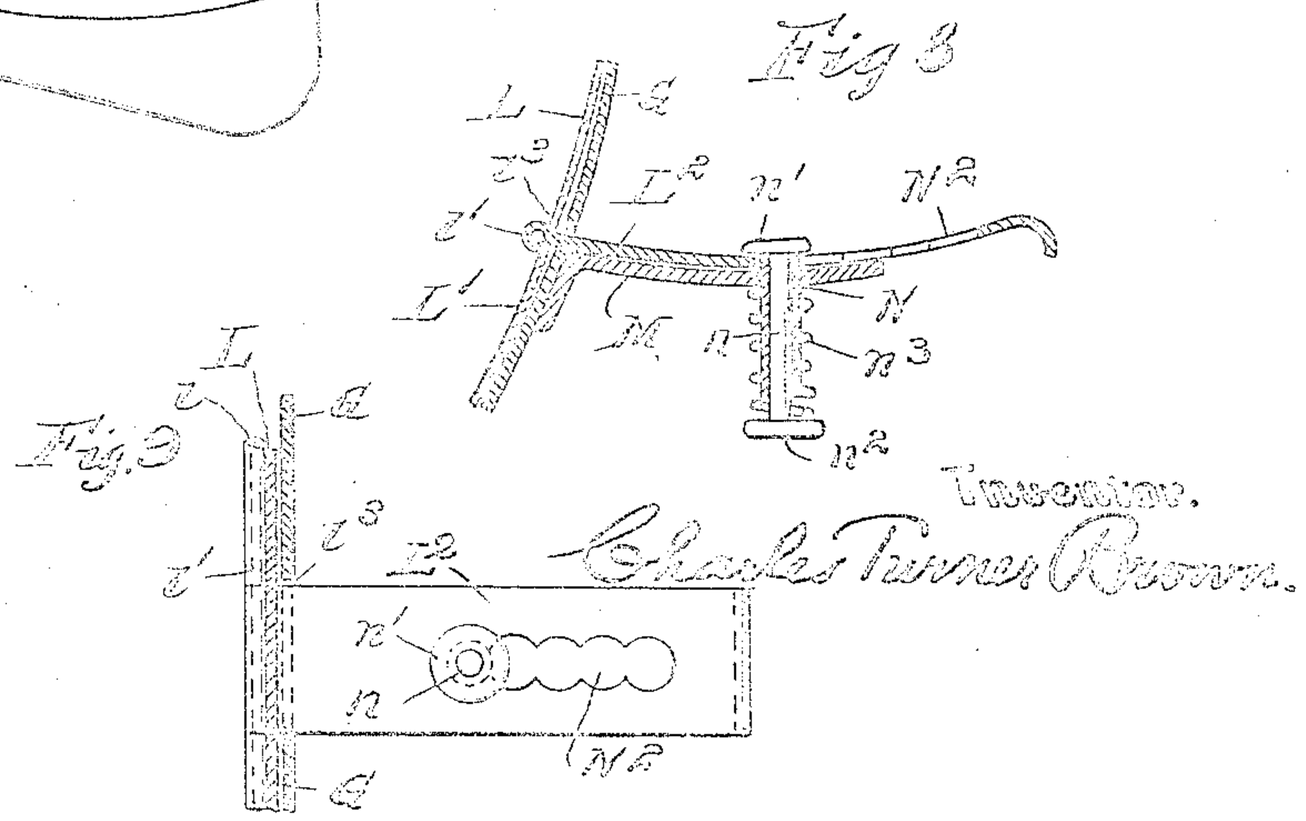


Fig. 3



Witnesses.

W. S. Noble

G. A. Adams.

Inventor.

Charles Turner Brown.

No. 744,162. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

CHARLES TURNER BROWN, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM F. GROWER, OF CHICAGO, ILLINOIS.

AUTOMATIC WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 744,162, dated November 17, 1903.

Application filed March 12, 1903. Serial No. 147,462. (No model.)

To all whom it may concern:

Be it known that I, CHARLES TURNER BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Weighing-Machines, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to improvements on the automatic weighing-machine for which Letters Patent of the United States were issued to Eugene H. Macoy and Frank R. Sleeper, dated the 4th day of March, 1902, on the invention of George W. Lottridge; and the object of this invention is to increase the efficiency of the automatic weighing-machine set out and described in said Letters Patent, to render the action thereof more uniform in weighing certain kinds of material—as, say, coffee—and to obtain a more durable and sightly machine.

In the drawings hereinbefore referred to, Figure 1 is a side elevation of an automatic weighing-machine embodying this invention, and Fig. 2 is a front elevation of such automatic weighing-machine. Fig. 3 is a top plan view of a U-shaped piece, duplicates whereof are adjustably attached to the weighing-buckets of the apparatus, such U-shaped piece forming the connection between the respective buckets and the weighing-beams of the apparatus. Fig. 4 is a front elevation, on an enlarged scale, of a latch and release forming elements of the machine embodying the invention, showing also the parts adjacent thereto. Fig. 5 is a side elevation, on an enlarged scale, of a fulcrumed lever and counterweight thereon forming an element in the machine. Fig. 6 is a top plan view of one of the weighing-beams of the apparatus. Fig. 7 is a side elevation, on an enlarged scale, of the lower end of one of the load-receivers of the machine with the latching-levers thereon and the abutments adjacent thereto, by means of which such levers are operated. Fig. 8 is a vertical sectional view, on an enlarged scale, of latching mechanism attached to the load-receiver whereby the adjusted capacity of such load-receiver is maintained, such figure also showing a short section of the rear wall of the load-receiver and of the movable abutment within the load-receiver. Fig. 9 is a top plan view of the latch shown in Fig. 8, with a horizontal sectional view of a portion of the rear wall of the load-receiver and of a portion of the movable abutment within the load-receiver which is controlled by such latch. Fig. 10 is a top plan view of a portion of a horizontal bar which is rigidly attached to the standard of the machine with a part of an adjustable bar secured to such rigidly-attached bar. Fig. 11 is a horizontal sectional view, on an enlarged scale, on line 11 11 of Fig. 4, of a connection shown in Fig. 4, such connection consisting of a vertical adjustable rod and a dog actuated thereby.

A reference-letter applied to designate a given part is used to indicate such part throughout the several figures of the drawings wherever the same appears.

A is the standard on which the several parts of the machine are supported.

a is a cross-bar of standard A.

B is a horizontal bar rigidly secured, as by bolt *b*, to standard A.

C is an abutment on the horizontal bar B provided with a V-shaped face.

D is the weighing-beam of the machine and E is a knife-edge rigidly secured to the weighing-beam D, such knife-edge E forming in connection with the abutment C, the fulcrum of the weighing-beam.

F is a counterweight on weighing-beam D. The counterweight F is secured in a determined position on the weighing-beam D by means of the set-screw *f* and binding-nut *f*. To slightly vary the quantity of material weighed in the load-receivers of the apparatus, adjustable nuts f^2 f^2 are placed on the screw f^3 on weight F. (See Fig. 1.)

G G are buckets forming the load-receivers of the apparatus, and *g g* are the covers of buckets G, such covers being hinged to the buckets by the wire *g'*. The buckets G are attached to the forked end *d* of the weighing-beam D by adjustably attaching the U-shaped piece H to such buckets G and securing the

abutment I to the U-shaped piece H, so that the V-shaped base on the under side of such abutment I will rest on the knife-edge of the abutment J on the fork *d* of the weighing-beam D. The U-shaped piece H is made adjustable on the bucket G by making slots (lettered *h*) in the ends of the U-shaped piece and passing the set-screw *h'* therethrough and into the plate K, secured on the side of the buckets. Abutment I is secured to the U-shaped piece by means of the set-screw *i*. Abutment J is secured to the weighing-beam D by means of set-screw *j*. The buckets G are preferably made of sheet metal, and hence to obtain a base into which the set-screw *h'* may be screwed I use the plate K, Fig. 1.

To vary the capacity of the bucket G, I place therein the movable abutments L L'. The abutment L is pivotally connected at its upper end, as by pivot *l*, to the bucket. The abutments L L' are pivotally joined together, as by wire *l'*, Fig. 1, and the lower end of the abutment L' allowed to rest on the inclined back of such bucket G, as is indicated by the broken lines lettered l^2 in Fig. 1. To control the position of the movable abutments L L', the handle L^2, Figs. 1, 8, and 9, is attached to the wire *l'*, which joins the abutments L L' together, and such handle is extended out from such wire *l'* through slot l^3 in the rear wall of the bucket G.

M is an abutment rigidly secured to the rear wall of the bucket G.

N is a tube rigidly secured in abutment M, so as to extend below such abutment and a short distance above it.

n is a rod longitudinally movable in tube N. Rod *n* is provided with head *n'* at the upper end thereof and head n^2 at its lower end.

n^3 is a spring on tube N, yieldingly holding the head *n'* close to contact with the upper face of the handle L^2. The handle L^2 is provided with a slot N^2, (see Figs. 8 and 9,) and the edges of such slot are corrugated to proximately fit the periphery of the portion of the tube N which extends above the abutment M. By this construction the handle L^2 may be moved longitudinally by simply raising the free end thereof, and thereby raising the head *n'* of the rod *n*, and when the handle is adjusted it is held in position by lowering it onto the tube N, so that such tube is in the corrugations in slot N^2. The handle L^2 is maintained in its adjusted position by the head *n'* of rod *n* because of the resiliency of spring n^8 in contact with head *n'*.

O, Figs. 1 and 7, is an abutment rigidly attached to the rear wall of the bucket G, near the lower end thereof, and P is a shaft extending through abutment O.

P' is a latch provided with shoulder *p*, pivotally mounted on the shaft P. When the bucket G has its cover *g* closed, the shoulder *p* engages with the abutment P^2 on such cover and holds it latched in its closed position. To unlatch the cover, (when a load is contained in the bucket,) I secure horizontal bar P^3 in an adjusted position relative to the bucket, so that as the bucket with its load descends the lever or latch P' is brought into contact therewith before the bucket has reached its extreme depressed position, and such end of the latch is thereby raised off from engagement with the shoulder P^2.

P^5 is a horizontal bar attached to standard A, and P^4 is a vertical bar adjustably secured in bar P^5 by nuts p' p^2 on screw-threads p^3. Bar P^3 is rigidly attached to vertical bar P^4. When the end of the latch P' which is adjacent to the bar P^3 is brought into contact therewith in the descent of the loaded bucket G and raised relative to the abutment P^2 on cover *g* so as to be out of engagement therewith, the contents of the bucket will open the cover and flow from the bucket. To maintain the cover *g* open so that all the contents of the bucket G may flow therefrom, latch P^6 is pivotally mounted on shaft P, and such latch is provided with the shoulder p^4 to engage with the lower end of the abutment P^2, as is illustrated in Fig. 7 of the drawings. To release the latch P^6 from engagement with the lower end of abutment P^2 as the bucket G is about to regain its raised and load-receiving position, (and thereby permit cover *g* to close,) I provide the abutment p^5 on standard A, into engagement with which abutment the end p^6 of the latch P^6 is brought during the ascent of such bucket. The under side of latch P^6 is curved adjacent to the shoulder p^4, so that as the cover *g* closes the end of the latch resting thereon is raised and the end p^6 correspondingly depressed, such depression being sufficient to take such end p^6 out of contact with abutment p^5 when the cover *g* is closed and the bucket raised to receive a load. Bucket G is prevented from swinging or swaying in fork *d* of weighing-beam D by connecting-link Q, such link being pivotally attached to standard A at end *q* thereof and to abutment Q' at end *q'*. Abutment Q' is secured to bucket G.

S S are levers pivoted to frame A, as at S^3 S^3, and S^2 S^2 are adjustable weights on levers S S, respectively.

To obtain uniform weights from this machine, it is necessary to obviate movement or jar of the bucket G in fork *d* of the weighing-beam D as much as possible, and to this end I have so constructed the machine as to make connection between the weighted end of the weighing-beam D and the levers S S (lettered F and F' in Letters Patent No. 694,487) instead of making such connection at the load-receiving end of the weighing-beam, (as is done in such Letters Patent.) This connection comprises fulcrumed lever R, Figs. 1 and 5, connection T^4, and pin T^5.

T is an abutment rigidly secured to standard A, and T' is an adjustable bar on bar T. Bar T' is maintained in an adjusted position by the screws *t t*.

T² is an abutment provided with the V-shaped face at its upper end, in which the knife-edge T³ is fulcrumed.

t' is a set-screw by means of which the abutment T² is attached to the adjustable bar T'.

t² t², Fig. 5, are broken lines indicating guards which maintain the knife-edge T³ in place in the V at the upper end of the abutment T². Knife-edge T³ is rigidly secured to the bar R, (heretofore termed a "lever.") Bar or lever R is attached to the pivoted bar S by the adjustable connection T⁴, such adjustment being secured by the turnbuckle T⁷. Lever R is connected to the weighing-beam D by pin T⁵ on the weighing-beam in slot T⁶ in lever R.

R' is a counterweight on lever R.

By the connections last above described between the weighing-beam D and the lever S the weighing-beam is entirely free from connection with the lever R when the bucket G is in a raised and load-receiving position until load-receiving end (the fork *d*) of the weighing-beam descends sufficiently to raise the pin T⁵ so as to come in contact with the top of the slot T⁶, (see Figs. 1 and 5,) and a sensitive scale is thus obtained. Continued downward movement of the load-receiving end of the weighing-beam D (and consequent further upward movement of the weighted end of the weighing-beam) moves upward therewith the slotted end of the lever R, thus producing downward movement of the end of such lever R, which is connected (by means of the adjustable connection T⁴) with the lever S.

Before proceeding to describe the action obtained by the last above-described downward movement of the connecting-link T⁴, I will describe the improved construction invented or discovered by me of the mechanism maintaining the levers S S in operative position and releasing such levers from such operative position. To this end I provide the pivoted lever U, attached to the cross-arm *a* of standard A by the post *u*, and the latch or dog U', also pivotally attached to such cross-arm *a*, as by pivot or post *u'*, to engage with the end *u²* of the pivoted lever U, and I provide the shoulder *u³* on the pivoted lever U adjacent to the pivot thereof to form a step on which the shoulder *u⁵* of the latch U² may rest. The latch U² is pivotally connected to the lever S by the screw *u⁴*.

u⁵ is a shoulder on latch U², which is brought into engagement with the shoulder *u³* on the lever U when the lever S is in an operative position.

V is an arm extending out from the dog U', and V' is an arm on the connection T⁴, coming into engagement with the arm V when connection T⁴ is drawn downward, thereby drawing the dog U' back from engagement with the end *u²* of lever U, thus releasing the lever U, whereupon the weight of the lever S and the latch U² will cause the lever U to turn on its pivot *u* from the position thereof illustrated in Fig. 2 of the drawings into substantially the position thereof illustrated in Fig. 4 of the drawings, at which time the shoulder *u⁵* will slide off the step formed by the shoulder *u³* on such lever U, thereby releasing the latch U² and permitting the lever S to fall from the operative position thereof illustrated in Fig. 2 of the drawings into the position thereof illustrated in Fig. 4 of the drawings. As the lever S falls it tends to force the connection T⁴ down and so depress the end of the lever R connected thereto and raise the slotted end of such lever R against the pin T⁵ on weighing-beam D, thus tending to raise the weight F on such weighing-beam and to accelerate the movement of such weighing-beam in the direction caused by the load contained in the descending bucket G. Sufficient downward movement of the connection T⁴ to release the dog U' from lever U is provided by placing the bent end of such connection T⁴ in slot S'. Before the lever S is drawn down by the connection T⁴ to the bottom of such slot S' the latch has been operated.

In this machine, as in the machine set out, described, and claimed in Letters Patent No. 694,487, the article to be weighed is continuously delivered into a swinging hopper, (hereinafter lettered W,) the position of such swinging hopper being determined by the levers S S.

W' is a wire attached to the hopper W and extending therefrom, so that its ends are underneath the receiving-levers S S. (See Fig. 1 of the drawings.)

The material delivered from the discharge end of the swinging hopper W is received in the stationary hopper W², provided with a plurality of depending spouts, as illustrated in Fig. 2 of the drawings, and arranged so that one or the other of the buckets G G will receive such material, according to the position of the swinging hopper W. To yieldingly maintain the swinging hoppper W in the position thereof in which it is set by the descending one of the levers S S, I provide the arm W³, with weight W⁴ thereon, to swing on a shaft or pivot W⁵ (substantially in axial line of the pivotal supports W⁶ of the swinging hopper) and secure the abutment W⁷, provided with slot W⁸, to the swinging hopper W, so that such lever W³ extends through such slot W⁸, the slot being of sufficient length so that when the swinging hopper is moved from one to the other of its positions the weight W⁴ will be thereby carried over its center. Such weight will then fall as far as the slot will permit it, thus holding the swinging hopper more securely in position than if such lever W³ is rigidly attached to the swinging hopper. The flow of material through the swinging hopper tends to move it from a set position, and I have found it very advantageous to obtain the stability secured to such swinging hopper by the construction of the lever W³ and its connection to the swinging hopper herein described. The material which is weighed passes into

the automatic weighing-machine embodying this invention in a continuous stream, and there is in the practical operation of the machine a "suspended" stream, as it is termed in the art, which extends from the discharge end of the movable hopper W to the upper surface of so much of the material which is being weighed as rests in the bucket G, (and causes the bucket to descend,) and hence when the movable abutments L L' in such bucket are adjusted to raise or lower the upper surface of the quantity of material contained in the bucket, which is sufficient to cause such bucket to descend, the length of the suspended stream is thereby varied, and a variation in the quantity of material delivered from the bucket is thereby produced. It therefore occurs that a change in the adjustment of the movable abutments L L' by means of the handle L^2, as hereinbefore described, will produce a variation in the quantity of material discharged from a given bucket in precisely the same manner as a change in the adjustment of the weights f^2 f^2 on screw f^3 will produce such a variation, and hence to that extent the function of the movable abutments L L' is the same as is the function of such weights f^2. In addition to the last above-described function of the movable abutments L L' such abutments serve to maintain a suspended stream of a determined length in cases where the specific gravity of the material being weighed varies, as is the case in different brands of coffee and even in different roasts of the same brand.

The operation of this automatic weighing-machine is substantially the same as is the operation of the machine set out in Letters Patent No. 694,487, hereinbefore referred to, and, briefly stated, is as follows: A descending stream of the material to be weighed continuously flows through the swinging hopper W and is therefrom successively discharged into the depending spouts W^2 W^2 and from thence deposited in the load-receivers, (buckets G G,) and when a sufficient quantity of material is deposited in either of such buckets the bucket descends, turning the lever D on its fulcrum E, thereby raising the weight F. Pin T^5 on such lever D is thereby raised, and when such pin is raised a sufficient distance to come in contact with the upper edge of slot T^6 in lever R the lever R is thereby turned on its fulcrum T^3, and the connection T^4 is thereby drawn downward, the drawing down of the connection T^4 carrying therewith the arm V', which is in engagement with arm V, and so turns the dog U' on its post or pivot u' out of engagement with the end u^2 of the lever U. Upon the release of the end u^2 of lever U, as last above described, such lever is turned on its pivot or post u by the weight of the lever S and latch U^2, (resting on step u^3,) and such latch will slip off of the step u^3, and thereupon the lever S will fall, and the blow of its fall will be received on the upper end of the connection T^4, thereby forcing such connection down, together with the end of the lever R, to which such connection is attached. The slotted end of such lever R is thereby raised, so that the lower edge of the slot T^6 in such lever is brought into contact with the under side of the pin T^5 on lever D, pressing upward on such pin, thereby tending to maintain the weighted end of such lever D raised and the forked end of such lever (containing bucket G) depressed. The descent of the bucket G is thus accelerated by the lever S, and in its descent the latches P' P' are brought into contact with the horizontal bar P^3, and such latches are loosened, permitting the cover g of the bucket G to open. Such cover will be opened by the contents of the bucket and will be held open by latch P^6, as hereinbefore described, until the bucket has nearly regained its upward and load-receiving position. As the bucket ascends to its load-receiving position and the weight F descends to regain the position thereof in which it is illustrated in Fig. 1 of the drawings the lever R is thereby turned on its fulcrum T^3 and connection T^4 and lever S is again raised to its elevated and operative position. In the raising of the connection T^4 the dog U' will regain a position engaging with the end u^2 of the lever U, and such lever U will be thereby locked in substantially the position thereof illustrated in Fig. 2 of the drawings, and so that the shoulder u^5 on latch U^2 will engage with (to rest on) the step u^3 of such lever U, and thereby such lever S will be maintained in a raised position until the dog U' is again moved out of engagement with the end u^2 of the lever U by the bucket G again descending, as before stated. The lever S in its descent as above described, in addition to accelerating the movement of the weighing-beam D will engage with the wire W', and will thereby turn or rock the movable hopper W, so that such hopper will discharge into the other one of the buckets G G.

The above-described operation is repeated so long as the flow of material is continued into and through the movable hopper W.

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

1. In the weighing-bucket of an automatic weighing-machine, movable abutments, a handle attached to the movable abutments, such handle extending through one of the walls of the bucket and provided with a slot having corrugated side edges, an abutment on the outside of the bucket, a projection on the abutment, such projection extending through the slot in the handle, a spring on the projection underneath the abutment and a rod extending through the projection, such spring abutting against the rod and such rod provided with a head yieldingly holding the handle in place with the projection in the slot of the handle, substantially as described.

2. In an automatic weighing-machine, a

fulcrumed weighing-beam, a load-receiver and a counterweight on the weighing-beam, a pivoted lever, means for latching such pivoted lever in an operative position, a fulcrumed bar, a connection between one end of the fulcrumed bar and the pivoted lever and between such fulcrumed bar and the latching mechanism and a connection between the other end of the fulcrumed bar and the weighing-beam, such last-named connection made at the point on the weighing-beam between the fulcrum thereof and the counterweight thereon, substantially as described.

3. In an automatic weighing-machine a fulcrumed weighing-beam, and weighing-bucket and a counterweight on the weighing-beam, a projection on the weighing-beam between the fulcrum thereof and the counterweight thereon, pivoted levers, latches maintaining the levers in an operative position, a fulcrumed bar, a connection between one end of the fulcrumed bar and the pivoted lever, and also between such end of the fulcrumed bar and the latches maintaining the pivoted lever in an operative position, such fulcrumed bar provided with a slot near one end thereof in which slot the projection on the weighing-beam fits loosely, to move such fulcrumed bar after the weighing-beam has moved a determined distance; substantially as described.

4. In an automatic weighing-machine, the combination of a pivoted lever, an arm attached to the pivoted lever, such arm provided with a shoulder, a movable step with which, when in one of its positions, such shoulder engages to hold the pivoted lever in an operative position, and with which, when in another of its positions, such shoulder will not engage and when in engagement will be released therefrom, means to hold the step in an engaging position, and means to release it from such engaging position, substantially as described.

5. In an automatic weighing-machine the combination of a pivoted lever provided with a slot therein, an arm attached to the pivoted lever, such arm provided with a shoulder, an additional pivoted lever, a dog to engage with the additional lever and maintain it in a determined position and to disengage from the additional lever and permit movement thereof, such additional lever provided with a shoulder on one end thereof to form a step on which the shoulder on the arm of the first-named pivoted lever may rest, a vertically-movable connection fitting loosely in the slot of the first-named lever, and a connection between the vertically-movable connection and the dog to release the dog from engagement with the lever adjacent thereto on the downward movement of the vertical connection; substantially as described.

6. The combination, with a weighing-beam provided with a load-receiver and a counterweight, of a fulcrumed bar, a connection between one end of the fulcrumed bar and the weighing-beam adjacent to the counterweight, a pivoted lever, a latch to the pivoted lever, and a connecting-link between the remaining end of the fulcrumed bar and the pivoted lever; the weighing-beam, the fulcrumed bar, the pivoted lever, the latch and the connecting-link, relatively positioned so that when a load is placed in the load-receiver the weighing-beam is free to move a short distance before engagement with the fulcrumed bar, and the fulcrumed bar and connecting-link are free to jointly move a short distance to actuate the latch and release the pivoted lever before engagement of such pivoted lever with such connecting-link to accelerate the downward movement of the load-receiver end of the weighing-beam; substantially as described.

7. The combination, with a weighing-beam provided with a load-receiver and a counterweight, of a fulcrumed bar provided with a slot therein, a projection on the weighing-beam fitting loosely in the slot in the fulcrumed bar, such projection forming a connection between one end of the fulcrumed bar and the weighing-beam adjacent to the counterweight, a pivoted lever, an adjustable connecting-link between the remaining end of the fulcrumed bar and the pivoted lever; substantially as described.

CHARLES TURNER BROWN.

In presence of—
HENRY J. PIEPER,
T. G. KEEPIS.