

No. 635,036.

Patented Oct. 17, 1899.

S. L. BROWN.
LIQUID METER.

(Application filed July 3, 1899.)

(No Model.)

2 Sheets—Sheet 1.

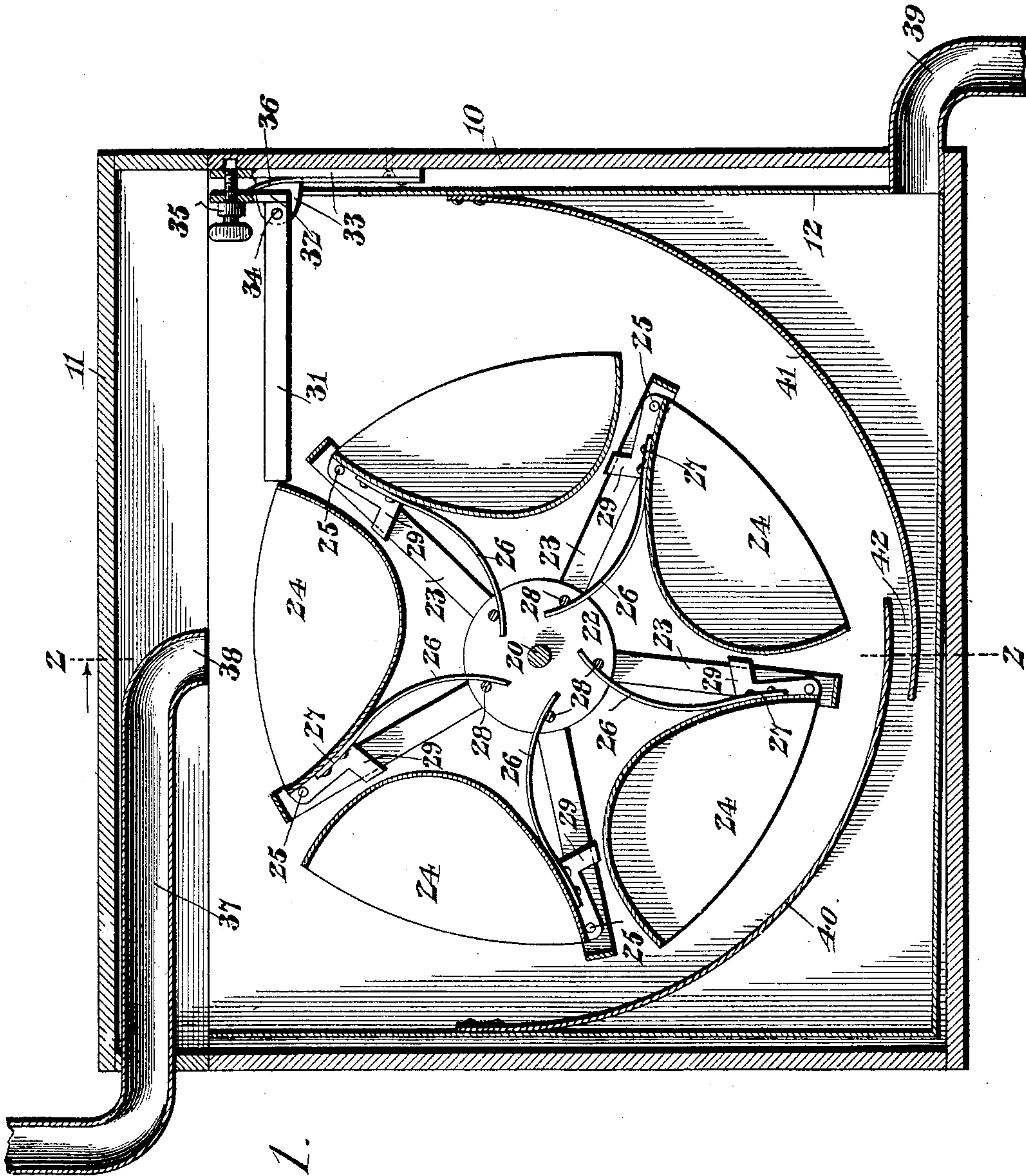


Fig. 1.

Witnesses
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2 Sheets—Sheet 2.

Fig. 3.

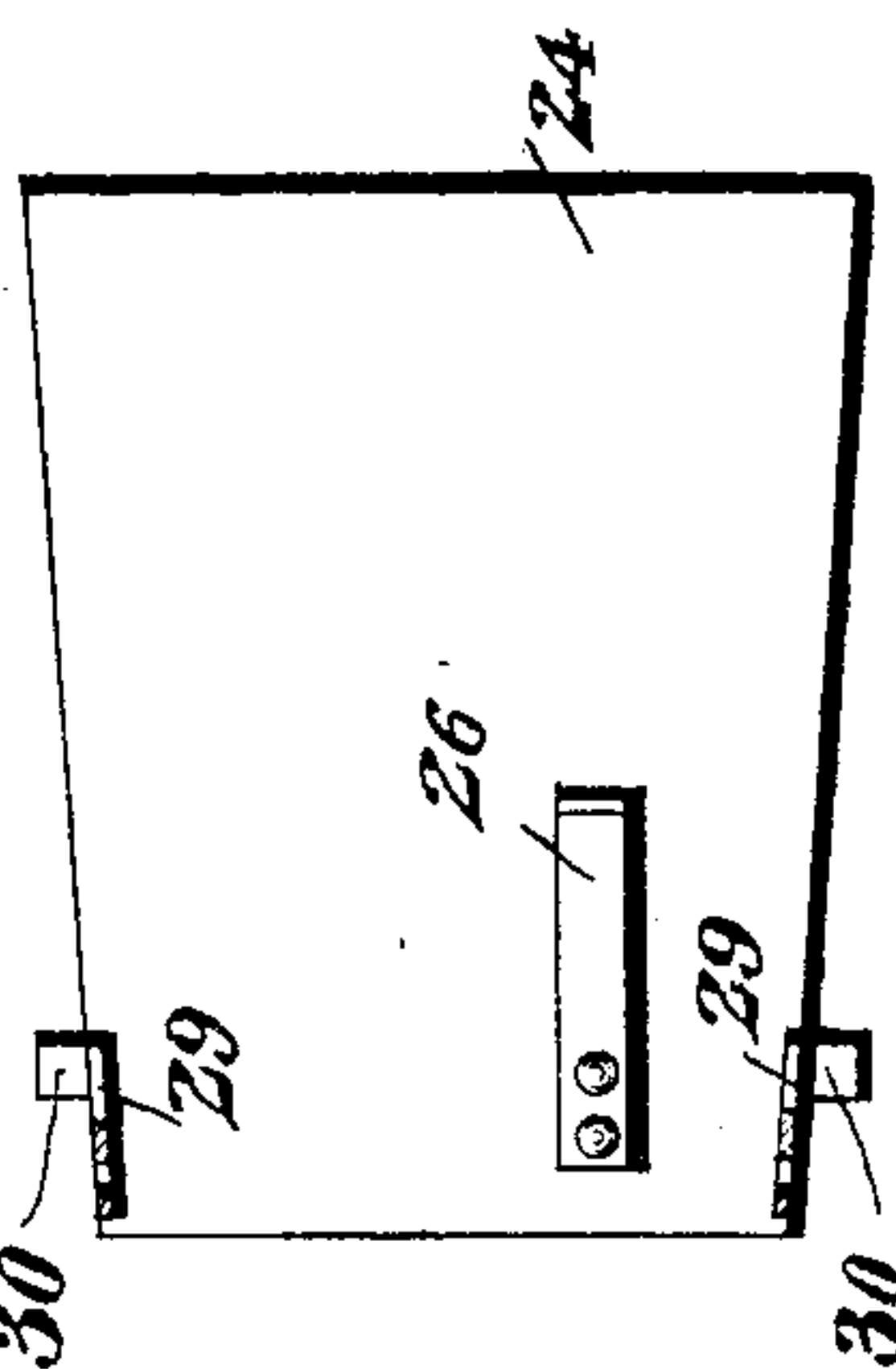
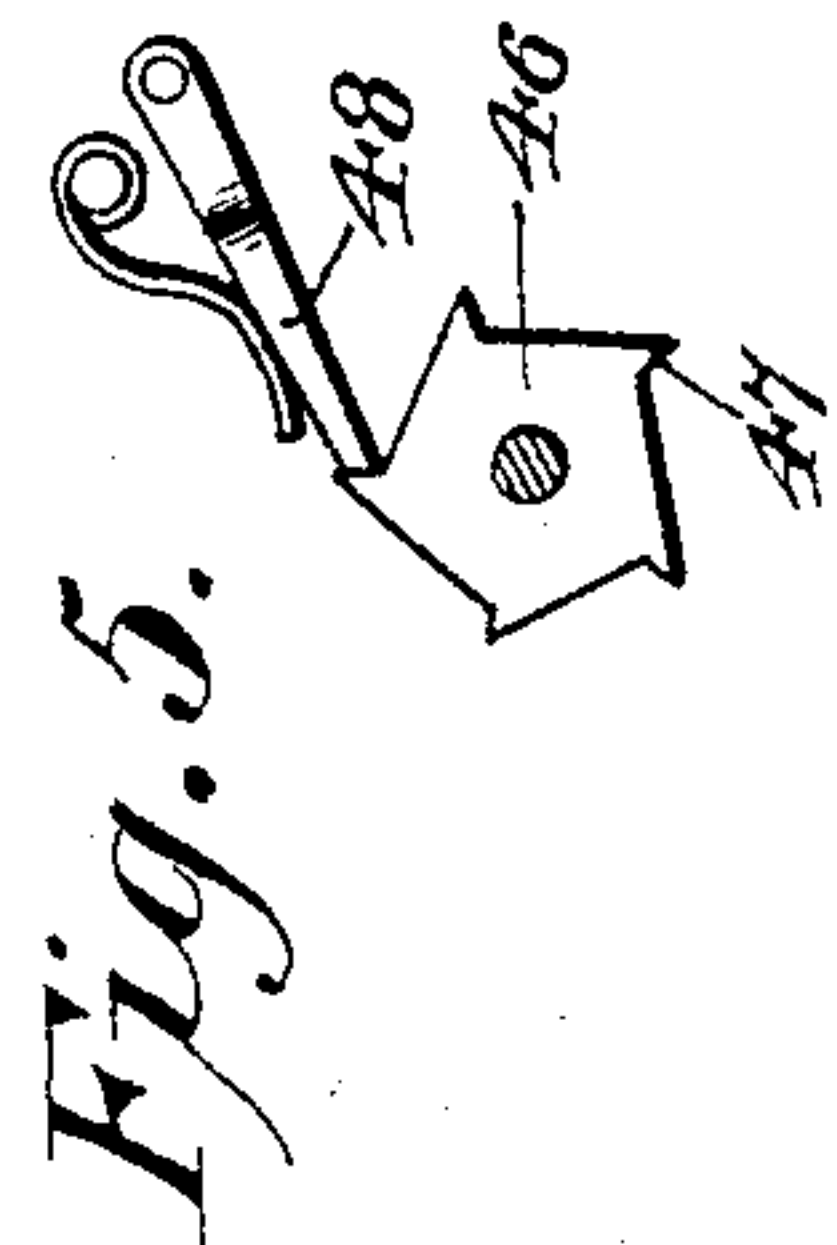
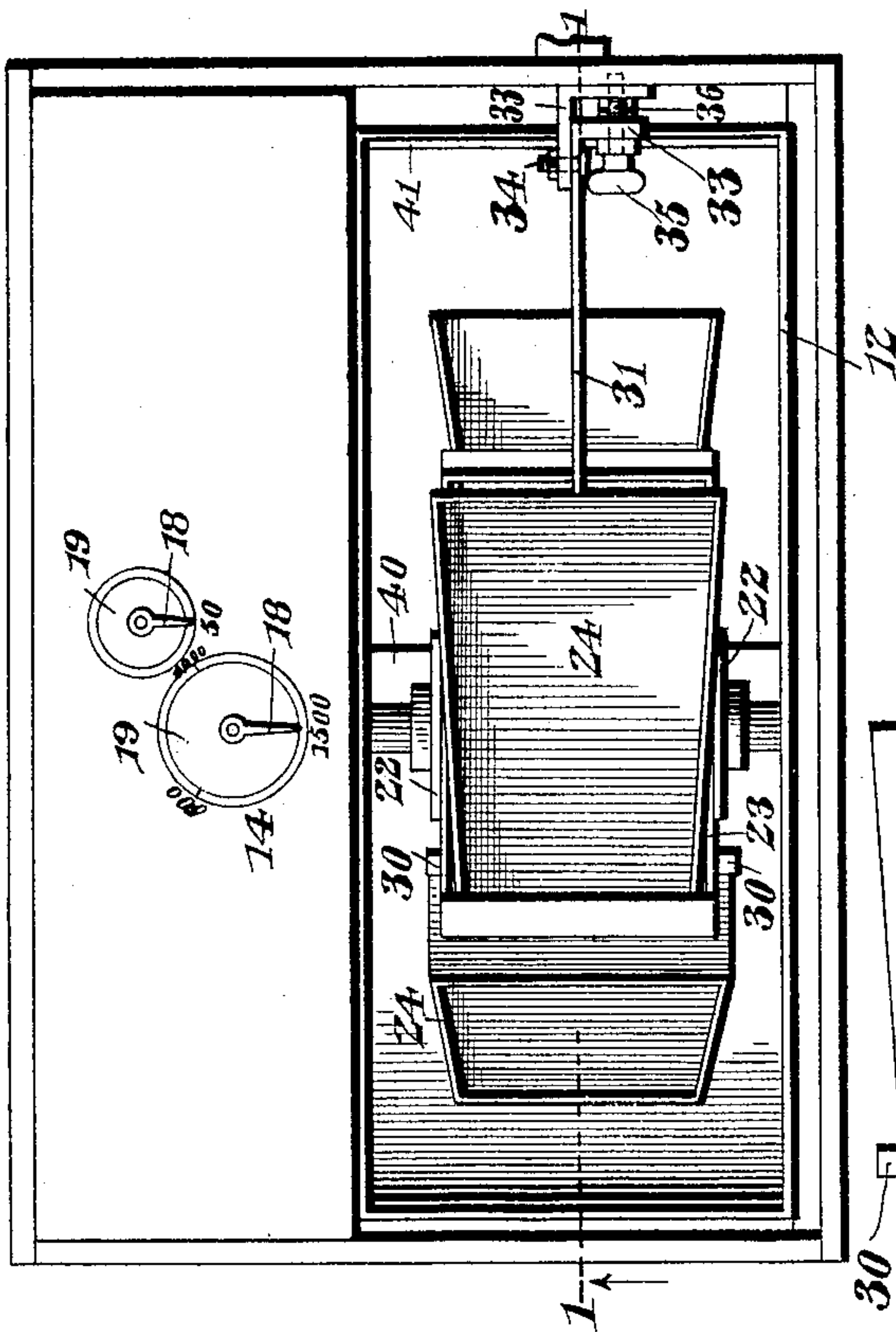


Fig. 2.

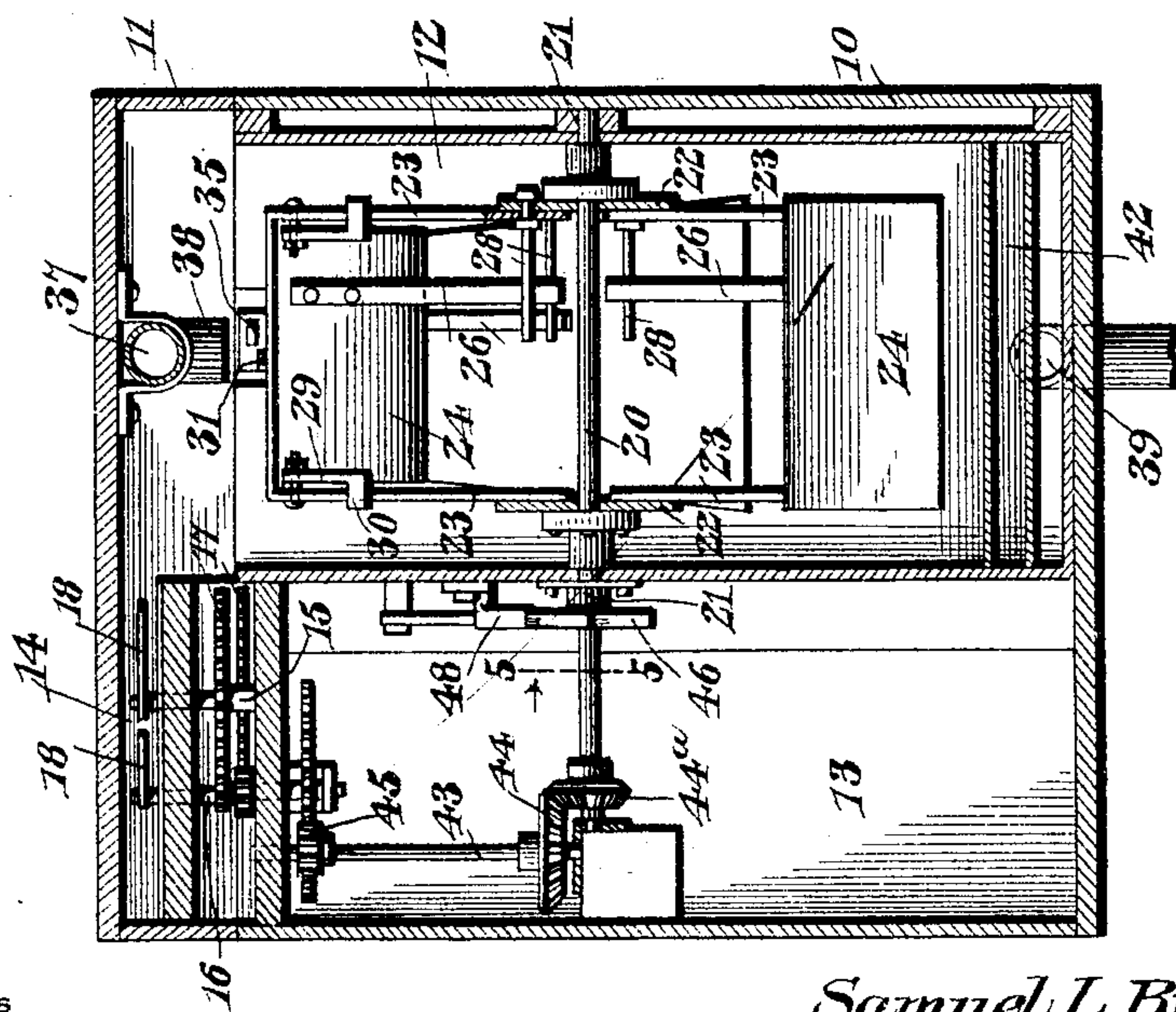


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL L. BROWN, OF DEVEREAUX, GEORGIA.

LIQUID-METER.

SPECIFICATION forming part of Letters Patent No. 635,036, dated October 17, 1899.

Application filed July 3, 1899. Serial No. 722,706. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. BROWN, a citizen of the United States, residing at Devereaux, in the county of Hancock and State of Georgia, have invented a new and useful Liquid-Meter, of which the following is a specification.

This invention relates to improvements in liquid-meters especially, although not exclusively, adapted for use in connection with a liquor-distilling apparatus for indicating or registering the quantity of liquor which may be discharged from the still.

The primary object of the invention is to provide a simple and automatic structure adapted to be inclosed within a locked or sealed casing and to be operative solely by gravity of the liquid which is supplied to the meter and delivered, subsequent to actuation of the register, therefrom.

A further object is to provide means which will afford protection to the register-actuating mechanism against being tampered with by thrusting a wire or implement through the liquid-delivery orifice of the apparatus.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a vertical sectional elevation through a liquid-meter embodying this invention on the plane indicated by the dotted line 1 1 of Fig. 3. Fig. 2 is a vertical sectional elevation taken transversely through the meter in a plane at right angles to Fig. 1, the view being a section on the line 2 2 of Fig. 1. Fig. 3 is a plan view of the casing with the cover removed, illustrating the arrangement of the detent and register mechanism with relation to the revoluble bucket-carrier. Fig. 4 is a detail view looking at the reverse or under side of one of the buckets to show the pressure-spring and the stop devices therefor. Fig. 5 is a detail sectional view on the line 5 5 of Fig. 2 to show the check device which prevents the bucket-carrier from turning in the wrong direction.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

In carrying the invention into practice the

register mechanism and the actuating devices therefor are housed or contained wholly within a suitable casing 10. Said casing may be of any suitable or preferred construction, and it is equipped with a removable cover 11, which is represented by the drawings as being seated upon the casing to conceal the register mechanism and the bucket-carrier. The cover may be fastened securely to the casing 10 by any suitable means to prevent any one from gaining access to the register or its actuating mechanism, and it may be here remarked that this cover may be locked in place on the casing or it may be sealed thereto in any way known to those skilled in the art. The drawings do not disclose a means for locking or sealing the cover to the casing, because it is desired to avail the services of a skilled mechanic in providing for the union of these parts together in any approved way.

The liquid is conveyed from a still to the meter for delivery into the buckets of the revoluble carrier, which will be hereinafter described in detail; and to prevent the escape and loss of the liquid a tight box or receptacle 12 is provided within the casing 10 below the removable cover 11 thereof. This liquid-tight receptacle or box is disposed within the casing to leave a compartment 13 at one side thereof, said compartment adapted to contain the register and the devices which are associated with the bucket-carrier shaft.

The register 14 may be of any suitable construction known to the art, and, as shown by Fig. 2, it is disposed in the compartment 13 at one side of the liquid-tight receptacle 12. The drawings illustrate one type of register mechanism consisting of the arbors 15 16, connected operatively by an intermediate gear-train 17. These arbors carry on their upper ends pointers 18, adapted to traverse the dials 19 for indicating the quantity of liquid which passes through the meter, and the prime register-shaft 15 has associated therewith a counter-shaft that is geared to the bucket-carrier shaft for propulsion intermittently thereby.

The revoluble carrier of this invention is equipped with a series of independent buckets arranged to travel with said carrier in its rotary movement and to be presented by said

carrier successively to the liquid-discharge from the still. Said carrier has each bucket hung thereto in a peculiar manner for the purpose of utilizing the weight of the liquid contents of the bucket to automatically free the carrier from restraint of the detent device and to utilize the gravity of said liquid as the means for rotating said carrier with a step-by-step motion. In the embodiment of this revoluble carrier shown by the drawings it is located within the compartment of the liquid-tight receptacle 12 for discharging the liquid from the buckets into the compartment, from which liquid flows without loss to a delivery pipe or spout. This revoluble carrier consists of a horizontal shaft 20, journaled in bearings 21 of the liquid-tight box 12, a pair of disks 22, and a plurality of radial arms 23, arranged in pairs to carry a series of buckets 24. The disks 20 are made fast with the shaft in any approved way at proper distances to accommodate the width of the buckets, and to these disks are firmly secured the radial arms 23, said arms being arranged in corresponding positions on the disks. In Fig. 1 of the drawings the revoluble carrier is shown as having five pairs of arms which accommodate a like number of buckets 24; but the number of arms and buckets is not material. Each bucket is constructed, preferably, of metal with a curved bottom, as shown more clearly by Fig. 1, and at one end this bucket is hung or pivoted, as at 25, to a pair of arms on the revoluble carrier. Each bucket is actuated by a spring to hold the same in position for properly receiving the liquid from a feed-pipe, but the movement of the bucket is arrested by a positively-acting stop device to prevent the spring from pressing the bucket to an abnormal or inoperative position. Each bucket is shown as having one end of a leaf-spring 26 fastened securely thereto at 27, near the pivotal point of the bucket to its pair of arms, and this spring is curved away from the curved bottom of said bucket, so as to have the free end of the spring bear against one of a series of pins or studs 28, said studs being fixed to one of the carrier-disks 22 in a manner to travel with the carrier and always maintain its proper relation to the buckets for the springs 26 to properly ride against said studs. Each bucket is equipped with stops 29, which are shown as secured near the end of said bucket, on opposite sides thereof, (see Fig. 4,) and these stops are provided with angular fingers 30, arranged to project from the sides of the bucket and to engage with the pair of arms 23 on which the bucket is hung. From this description, taken in connection with Fig. 1, it will be seen that each pivoted bucket is normally pressed in a direction away from the carrier-shaft 20 by a spring that is attached to the bucket and is seated on a part of the rotary carrier, but the movement of the bucket under the action of the spring is limited or arrested by the angular stops engaging with the arms of the car-

rier, whereby the stops are adapted to be moved away from the carrier-arms when the bucket is loaded with a sufficient quantity of liquid to be depressed thereby against the tension of its spring 26.

To arrest the rotation of the carrier during the period of supplying the liquid to each bucket, a detent device is employed, which is supported independently of the carrier and is disposed in the path of one of its parts, but as each bucket becomes filled with the proper quantity of liquid this detent ceases to restrain the carrier from movement, so that the weight of the contents in the bucket overbalances the carrier and causes it to rotate on its axis for the purpose of discharging the liquid from the filled bucket and of presenting an empty bucket in the path of the liquid discharged from the still. This detent is represented as consisting of a substantially horizontal arm 31, arranged within the casing 10 to lie in the path of the pivoted buckets 24. At one end this detent is provided with a finger 32, adapted to be engaged by an adjustable device which controls the position of the detent with relation to the path of the buckets on the revoluble carrier. A bracket or other support 33 is secured to one wall of the liquid-tight box 12, near the open upper end thereof, and in this bracket is pivoted at 34 the detent 31. A regulating-screw 35 is fitted to a threaded opening of the bracket 33 to be adjusted therein, said screw passing through an opening of the detent-finger 31, so as to act against the detent to raise or lower the same on its pivot, and thereby vary the position of the free end of the detent with relation to the path of the buckets. This detent is held against free movement by means of a spring 36, which is attached to the bracket or the box for its unconfined end to bear against the finger of the detent, all as shown by Fig. 1.

The liquid is conveyed from the distilling apparatus to the meter by a feed or inlet pipe 37, represented as attached to the cover 11 of the casing, said feed-pipe terminating in a discharge-mouth 38, which overhangs the revoluble carrier for discharging the liquid into the buckets thereon. The liquid is discharged from the buckets to the carrier into the tight box or receptacle 12, from whence the liquid flows into a delivery tube or spout 39, which is coupled to the lower end of this box or receptacle, so as to extend therefrom through the casing. The delivery-tube may be curved, as shown by Fig. 1, but the shape thereof is immaterial.

In a liquid-meter of this character it is desired to prevent unwarrantable interference with the operating elements in order that the register may indicate the exact quantity of liquid which is supplied to and discharged from the meter, and to prevent tampering with the bucket-carrier or the detent which controls the latter by a wire or other implement thrust through the delivery-tube 39 the guard-plates 40 41 are provided below the rev-

oluble carrier. The guard-plate 40 is secured to one wall of the box 12, so as to extend below the carrier, while the other guard-plate 41 is secured to the opposite wall of the box and arranged for its free end to extend below and overlap the corresponding end of the guard-plate 40. The free overlapping ends of the two guard-plates are spaced relatively to each other to provide an exit-passage 42, which permits the liquid discharged from the buckets to flow into the bottom of the receptacle 12, and thence to the delivery-tube 39; but these guard-plates prevent an implement which may be thrust through the tube 39 from having access to the revoluble bucket-carrier or the detent 31.

For transmitting the motion of the carrier-shaft 20 to the register mechanism a vertical counter-shaft 43 is employed. Said counter-shaft has a beveled gear 44, that intermeshes with a corresponding gear 44^a on an extended part of the bucket-shaft 20. The counter-shaft is also provided with a spur-gear 45, which meshes with a similar gear on the prime register-shaft 15, and thus the motion of the bucket-shaft is transmitted from the counter-shaft to the register mechanism.

In connection with the revoluble bucket-carrier are combined means which prevent the shaft 20 from rotating in a backward direction, said means consisting, preferably, of a ratchet 46, fixed to the shaft 20 and provided with teeth 47, with which engages the free end of the spring and pawl 48; but it will be understood that this specific check mechanism may be varied within wide limits.

In operation the detent 31 engages with one of the buckets on the revoluble carrier to prevent the latter from moving in the direction indicated by the arrow in Fig. 1 and also maintain one bucket in position below the mouth 38 of the feed-pipe 37, the check device preventing the bucket-carrier from turning in the opposite direction. The liquid is delivered from the still by the inlet-pipe 37 until a sufficient quantity shall have accumulated in the bucket 24 to overcome the pressure of the spring 26. At this period the bucket is depressed to move the stop-arms 29 away from the carrier-arms and lower the free edge of the pivotal bucket below the corresponding edge of the detent 31. The buckets are curved, as shown, and hung in the revoluble carrier in such manner that the detent will engage with the bucket and hold the carrier in position against rotation until the weight of the load of a predetermined volume of liquid will lower the bucket to free itself from the restraint of the detent. The bucket at this period overbalances the carrier, and the latter is turned on its axis through a segment of a circle. The operation of turning the carrier causes the loaded bucket to assume a position where the liquid therein will flow upon the guard-plate 41, and thence be delivered to the passage 42 into the receptacle or box 12, and at the same time an empty bucket will be

moved by the carrier to assume a position below the mouth of the inlet-pipe 37 and engage with the free end of the detent 31. This empty bucket is lifted by its spring 26 and restrained from assuming an abnormal position by its stops 29; but when the bucket becomes loaded with a quantity of liquid the weight of the latter will depress the bucket against its spring, so as to clear the detent 31 and again turn the carrier a certain distance. As the carrier turns the upper curved edge of the bucket rides against the pivoted detent, so as to slightly lift the latter against the pressure of its spring 36; but as the filled bucket clears the detent the spring of the latter lowers its free end into the path of the succeeding empty bucket, thereby again arresting the motion of the carrier. When the carrier is actuated, the counter-shaft 43 is driven by the intermediate gearing to actuate the register, and said register mechanism will thus indicate the number of times the carrier is operated, so as to make a true record of the quantity of liquid which passes through the meter.

Changes may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention embodied. Hence it is not desired to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what is claimed as new is—

1. In a liquid-meter, the combination of an intermittently-revoluble carrier, a series of buckets hung thereon, a spring acting against each bucket, means for arresting the movement of the bucket under the tension of its spring, means for supplying liquid to the buckets as they are presented successively thereto, and a detent mechanism to restrain the carrier for movement during the period of loading each bucket, substantially as described.

2. In a liquid-meter, an intermittently-revoluble carrier, a series of buckets pivoted therein independently of each other, a spring acting individually on each bucket to maintain the same normally in operative position for receiving its load, and a stop device engaging with each bucket and a part of the carrier to limit the play of the bucket under the tension of its spring, in combination with means for supplying liquid to the buckets as they are presented successively thereto, and a detent mechanism, substantially as described.

3. In a liquid-meter, the combination of an intermittently-revoluble carrier, a series of buckets mounted pivotally on the carrier and each controlled by a stop device and a retractor, and an adjustable detent supported in shiftable relation to the path of said buckets, for the purpose described, substantially as set forth.

4. In a liquid-meter, the combination of an intermittently-revoluble carrier, a series of

gravity-buckets each yieldably supported on the carrier, a shiftable detent mounted to lie normally in the path of each bucket as it is carried around with the wheel, and means for
5 adjusting the detent relatively to the path of each bucket, whereby the period of engagement between the detent and the bucket may be varied by shifting the position of the detent, substantially as described.

10 5. In a liquid-meter, the combination of an intermittently-revoluble carrier, a series of buckets pivotally supported thereon, retractors revoluble with the carrier and acting against the buckets to normally hold them in
15 operative positions, means to limit the yieldable play of the buckets under the action of the retractors, and a detent in the path of the buckets, substantially as described.

20 6. In a liquid-meter, the combination of a closed casing having means for supplying liquid thereto and conveying liquid therefrom, a register mechanism within said casing, an actuating mechanism also within the casing and connected operatively with the register
25 mechanism, and guard devices between said mechanisms and the liquid-ports to prevent unwarranted interference with the operation of the active elements of the meter, substantially as described.

7. In a liquid-meter, the combination of a 30 closed casing, a register therein, inlet and discharge pipes connected with the casing, a bucket-carrier within said casing in the path of the inlet thereto and connected operatively with the register, a detent for said carrier, 35 and guard-plates supported within the casing below the carrier and detent device, said guard-plates arranged to provide a liquid exit-passage from the carrier to the discharge-port, substantially as described. 40

8. In a liquid-meter, a revoluble carrier consisting of a shaft, arms fast with said shaft, a series of buckets pivoted independently to said arms, bearing studs fast with the carrier to rotate therewith, springs attached to 45 the pivotal buckets and bearing against said studs, and stop-arms fixed to the buckets and engaging with the carrier-arms, in combination with a liquid-feed pipe, a register, and a detent mechanism, substantially as described. 50

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL L. BROWN.

Witnesses:

R. H. THOMAS,
C. H. DUDLEY.