

No. 673,740.

Patented May 7, 1901.

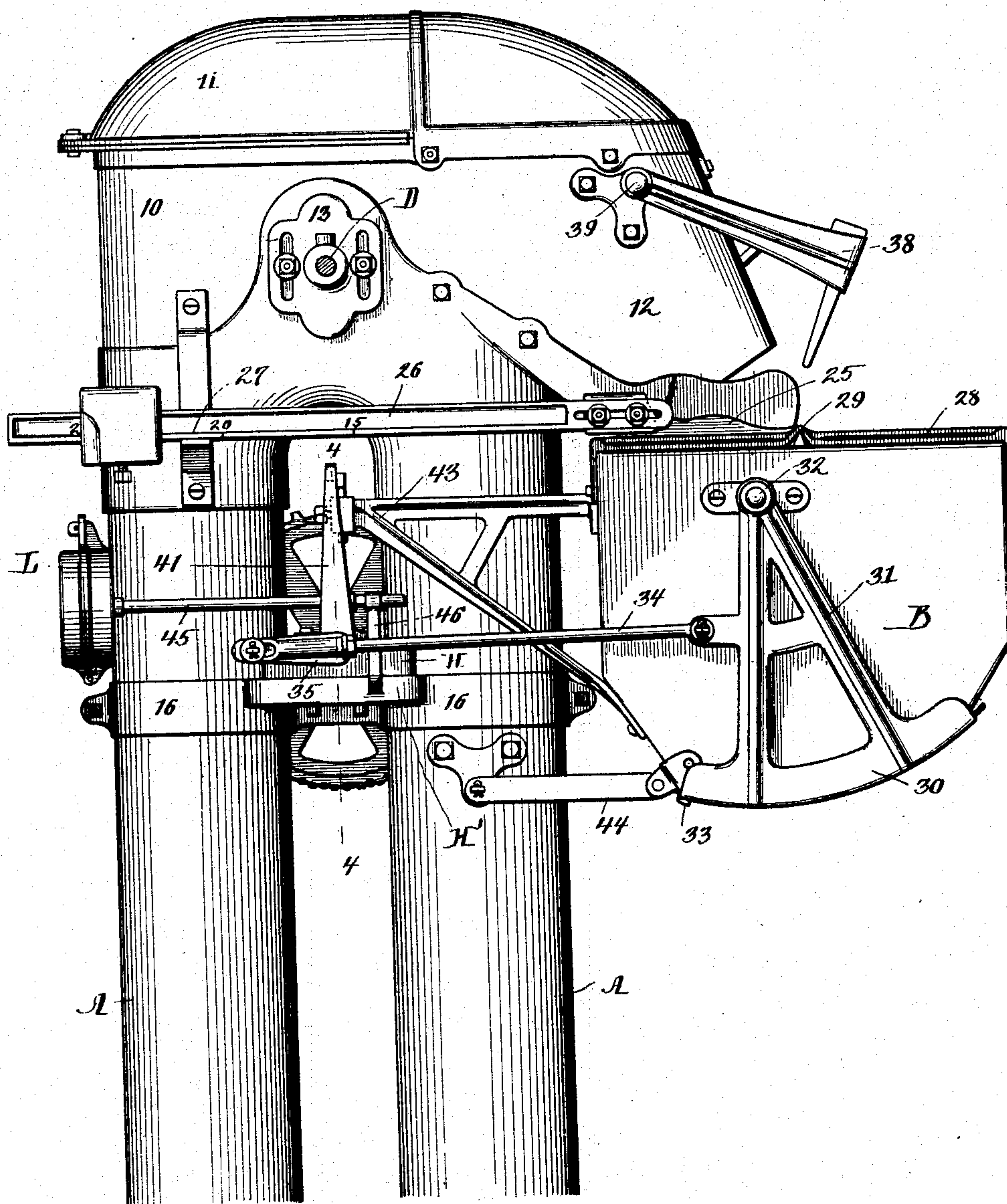
F. C. STUCKEL.
AUTOMATIC WEIGHER.

(Application filed Dec. 26, 1900.)

3 Sheets—Sheet 1.

(No Model.)

Fig. 1.



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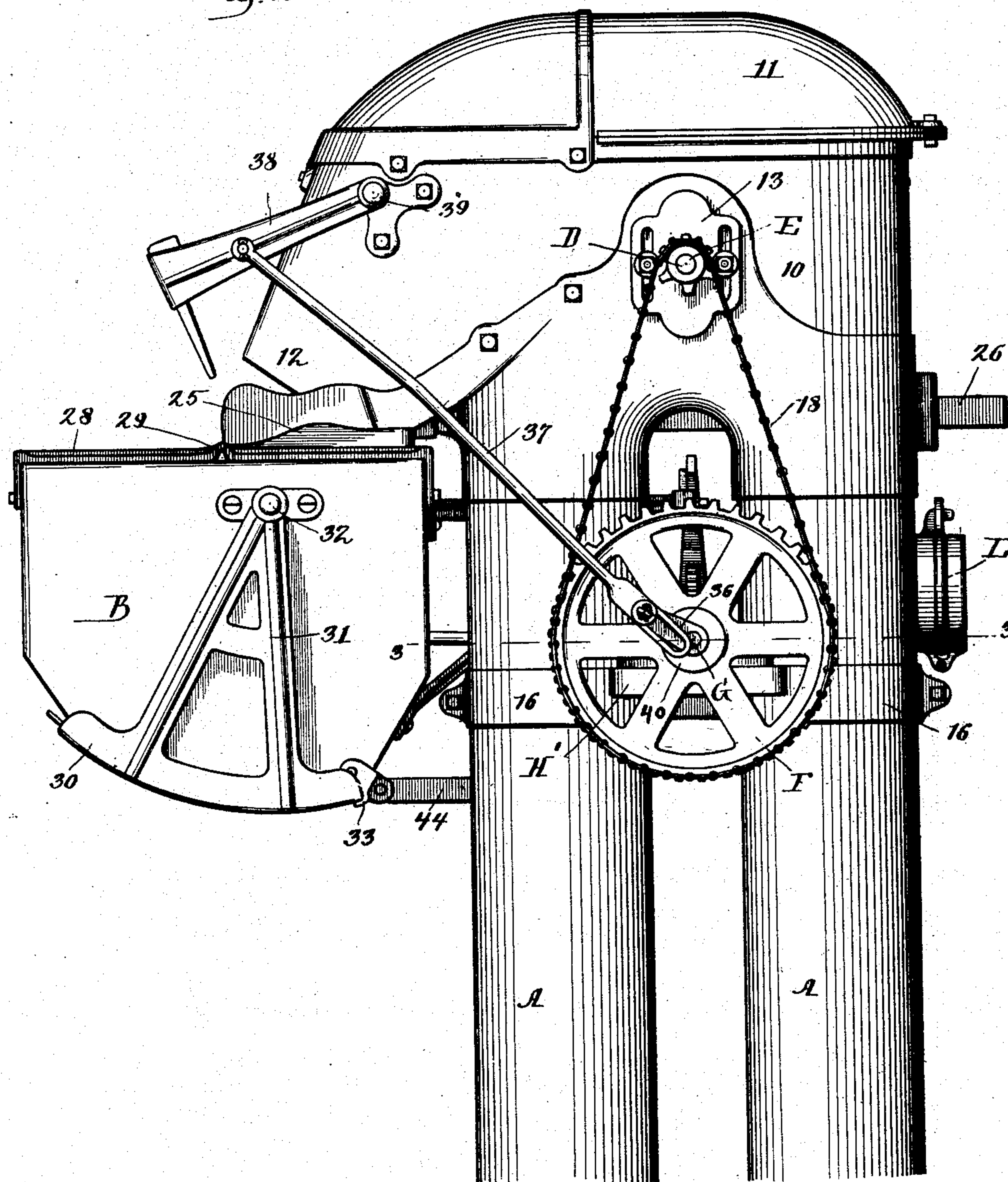
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Fig. 2.



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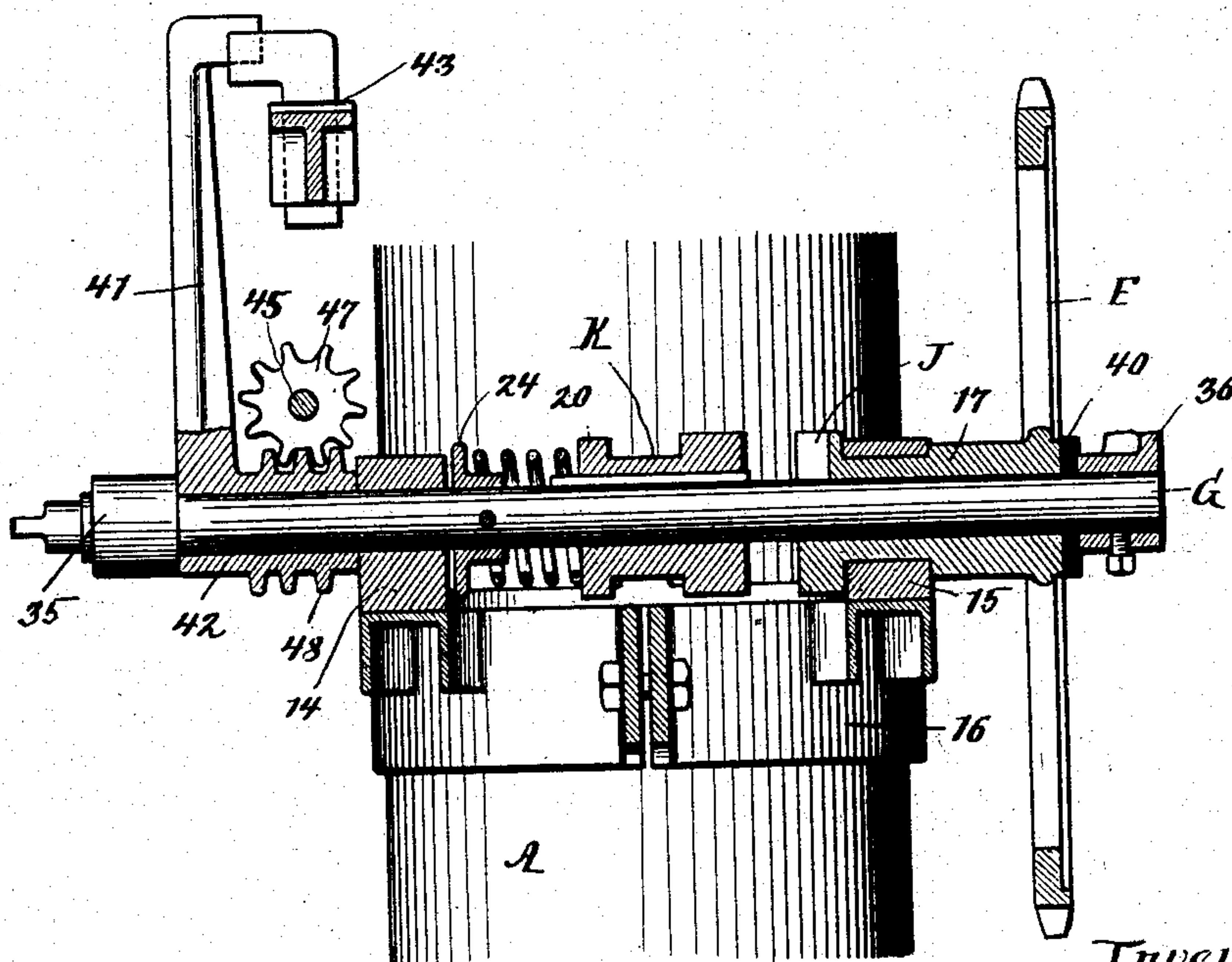
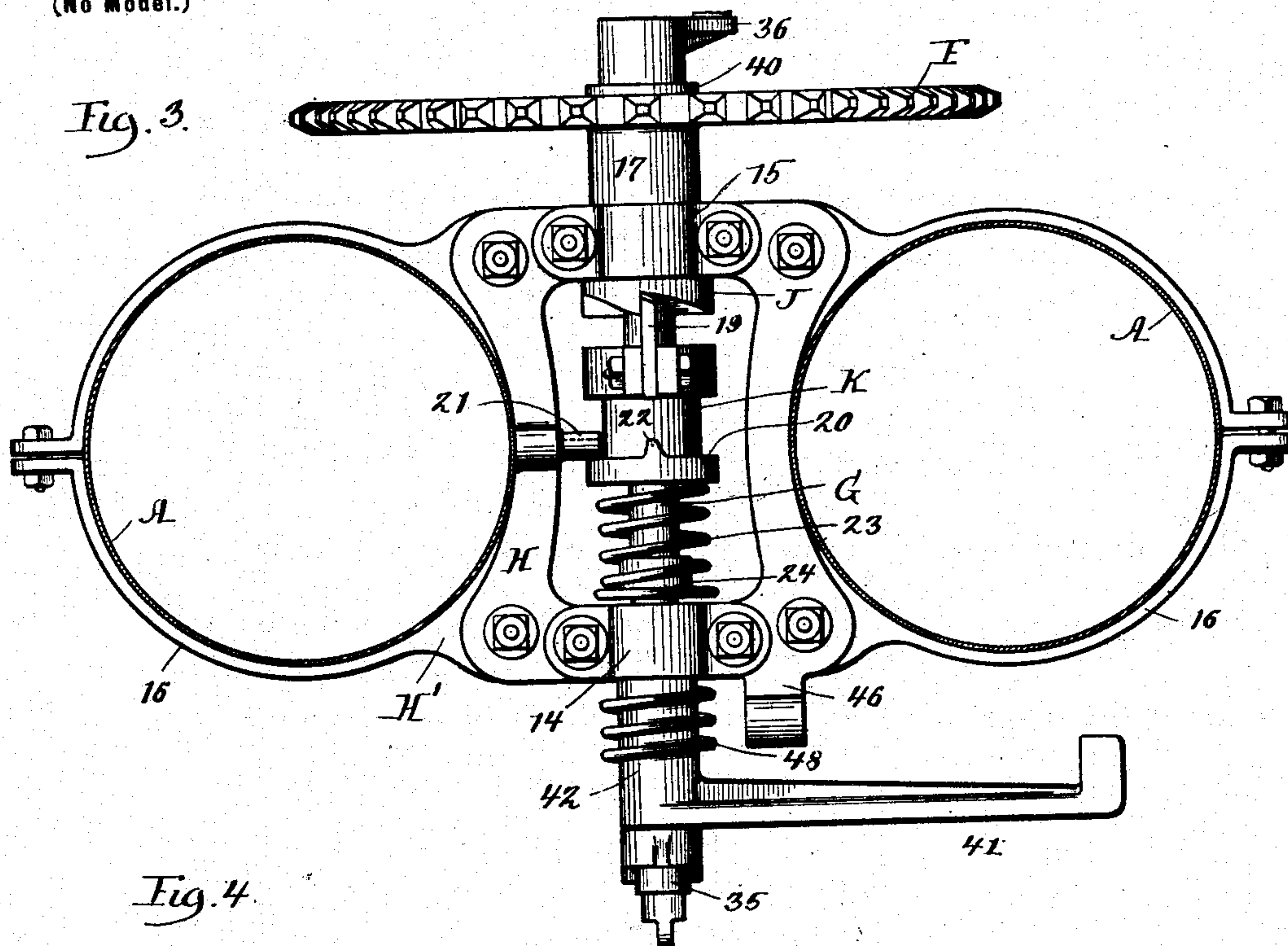
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC WEIGHER.

SPECIFICATION forming part of Letters Patent No. 673,740, dated May 7, 1901.

Application filed December 26, 1900. Serial No. 41,073. (No model.)

To all whom it may concern:

Be it known that I, FRANK C. STUCKEL, a resident of the city and county of Racine, State of Wisconsin, have invented certain new and useful Improvements in Automatic Weighers, of which the following is hereby declared to be a full, clear, and exact description.

The invention relates to apparatus especially suited for weighing grain or other granular material, and is designed as an improvement upon my prior construction set forth in Letters Patent No. 634,375, granted October 3, 1899. In that construction a counterpoised open bucket or receiver is hung beneath the spout of an elevator. Successive charges freely flow from the spout into the open bucket, and when the load attains a given weight the bucket overbalances and slightly shifts, releasing thereby the intermediate mechanism, which promptly shuts off any further inflow and opens the bucket-bottom to let the load fall. As the bucket rises again under the influence of the counterpoise the weighted load has dropped out, the bucket-bottom closes, and the shut-off gate no longer obstructs the entry of the next succeeding charge.

The object of the present invention is to improve the construction of the intermediate mechanism coacting with the counterpoised bucket for automatically admitting, weighing, and discharging separate portions of material.

The exact nature of the invention will appear in detail from the description following and be pointed out by the claims at its conclusion.

In the drawings, Figure 1 is a side view showing the weigher-bucket at normal position suspended in counterpoise beneath the outlet-spout of a threshing-machine elevator. Fig. 2 is a similar view of the opposite side of the construction. Fig. 3 is a horizontal sectional view taken on the line 3 3 of Fig. 2. Fig. 4 is a vertical sectional view taken on the line 4 4 of Fig. 1.

The elevator-tubes A fasten to a head 10, having a removable crown 11 for ready access and side outlet-spout 12, through which the grain escapes. The upper sprocket for the

elevator-chain is supported, as usual, on cross-axle D, which journals in slotted bearing-plates 13, adjustably secured by bolts at opposite sides of head 10. Cross-axle D is constantly driven through the medium of a chain-wheel at its outer terminal or by other suitable means and carries on its inner end the chain-pinion E, which revolves with the axle.

Beneath the head 10 and between the elevator-tubes A A extends the horizontal counter-shaft G in parallel relation with the cross-axle D. The counter-shaft G is mounted in suitable bearing-blocks 14 and 15, bolted to the plate H, which in turn is bolted to the supporting-frame H'. This frame H' is supported upon the elevator-tubes A A by the split rings 16. A hub 17 is loosely mounted upon one end of the counter-shaft D and is interposed between the counter-shaft G and the bearing-block 15. This hub 17 is revolvably held in place and against longitudinal motion by shoulders engaging either side of the bearing-block 15, as clearly shown in Fig. 4. Preferably cast integral with the hub 17 is a sprocket-wheel F on its outer end and a ratchet-wheel J upon its inner end, which ratchet-wheel forms one of the members of a suitable clutch mechanism. The hub 17, together with the ratchet-wheel J and sprocket F, is continuously rotated by a drive-chain 18, passing over the sprocket F and the chain-pinion E. (See Fig. 2.) The other member of the clutch mechanism comprises a sleeve K, keyed to the counter-shaft G, so as to be longitudinally moved thereon, and provided with a dog 19 for engaging the teeth of ratchet-wheel J, adjustably bolted to the sleeve to compensate for wear. The sleeve K is also provided with a cam-shoulder 20, which engages a friction stop-roller 21, mounted on a stud horizontally projecting from plate H. The cam-shoulder 20 is provided with a cam-lug 22. The sleeve K is held with its cam-shoulder 20 against the roller 21 and moved to bring dog 19 into engagement with ratchet-wheel J by a cushion-spring 23, interposed between the sleeve and a collar 24, pinned to the shaft. The end of the cam-lug 22 is normally in engagement with the roller 21 to hold the dog 19 out of engagement with the ratchet J, so

that the latter is free to revolve without affecting the counter-shaft G. This shaft remains at a standstill unless it is first slightly shifted to disengage the cam-lug 22 from the stop-roller 21, so that the dog 19 may be brought into engagement with ratchet J by the spring 23.

Weigher-bucket B is hung beneath the outlet-spout 12 by means of a part 25, fulcrumed, as usual, to the outlet-spout and furnished on one side with a graduating scale-beam 26, adjustably secured thereto and normally resting against a stop-lug 27. Side bails 28, fastened to the bucket, afford fulcrum-seats 29 for pivotally suspending the bucket from the part 25. A valve 30, curved to conform to the bucket sides, is sustained by hangers 31 at pivots 32 and serves to close the open bottom of the bucket. This valve is slightly overhung with reference to pivots 32, so that it tends always to swing shut in the contact with stop 33, thus keeping the bucket-bottom closed even against the weight of the accumulating load.

A pitman 34 is pivotally joined at one end to one of the hangers 31 and at its other end is provided with a slot engaging the pin of a crank-arm 35, which is secured to one end of the counter-shaft G. When this shaft begins to revolve, crank-arm 35 shifts pitman 34; but owing to the slot therein valve 30 remains unaffected until the lost motion is taken up. Thereupon the pitman operates to move the valve 30 to uncloze the bucket-bottom and discharge the load. At such juncture shaft G, with crank-arm 35, has described about a one-half revolution. During the further traverse the shaft G gradually restores the crank-arm 35 to normal position, the slotted end of the pitman 34 bearing against the pin of the crank-arm 35 and retreating with it by reason of the overhung weight of valve 30. The valve is finally checked by stop 33, completely shutting the bucket-bottom, while the crank-arm 35 proceeds a slight distance farther and then comes temporarily at rest to await the discharge of the next load. At the opposite end of the horizontal counter-shaft G, outside of the sprocket F, is mounted a crank-arm 36, the pin of which crank-arm engages the slotted lower end of a pitman 37, which is pivotally connected at its upper end to the yoke-like gate 38. The gate 38 is pivoted, as at 39, on the outside of the elevator-head 10 and serves at intervals to close the exit-spout 12 for the grain. The weight of the gate 38 is not only sufficient to hold the slotted end of pitman 37 against the pin of crank-arm 36, but is also sufficient to move the gate to a closed position as soon as the shaft G and crank-arm 36 have moved through a partial revolution; but, as shown in Fig. 2, when the gate is in its normal open position the crank-arm 36 is adjacent its dead-center, and in order that the weight of the gate may be brought into operation to close it the shaft G must receive an initial partial rotation.

Between the hub of crank-arm 36 and hub 17 on the counter-shaft G is a friction-washer 40, which is preferably of leather or similar yielding material. This friction-washer is firmly pressed against the collar 17 (which is held against longitudinal movement by the bearing-block 15) by the hub of crank-arm 36, which is strained toward the left by the pressure of spring 23 between the sleeve K (which is held against stop-roller 21) and the collar 24, which, as shown, is located slightly apart from the bearing-block 14 in order that such pressure upon the friction-washer 40 may be effective. (See Fig. 4.) By this means considerable friction is developed between the continuously-rotating hub 17 and the hub of crank-arm 36 and is sufficient to impart to the counter-shaft G an initial partial rotation if the latter is free to move. A dog or stop-arm 41 is mounted on a hub 42, secured to the end of the counter-shaft G, which stop is normally engaged by a trip-off 43, (see Figs. 1 and 4,) projected, as shown, from bucket B, and thereby retains the shaft G at a standstill. The stop-arm 41 is so located with reference to the cam-lug 22 that when it is retained stationary by the trip-off 43 the end of the cam-lug engages the stop-roller 21, thus holding the dog 19 out of engagement with the ratchet J. Once the bucket is loaded it promptly overbalances the scale-beam and turns down far enough for the trip-off 43 to clear stop 41. Counter-shaft G thus stands released and experiences a minor impulse forward due to the friction between the continuously-rotating hub 17 and the hub of crank-arm 36. This impulse is sufficient to disengage the cam-lug 22 from the stop-roller 21 and the dog 19 is immediately thrown into the path of the teeth of the revolving ratchet-wheel J, and the shaft G thereupon proceeds to describe a single revolution. The cam-lug on the spring-pressed clutch member K may also, if desired, be arranged to cooperate with the roller 21 to assist in giving this minor impulse to the counter-shaft. With the movement of the shaft the spout-gate 38 commences to close by its own weight, and the parts are so related that a slight forward motion of the crank-shaft is sufficient to enable the gate to completely close the opening of the spout 12. The pin of the crank-arm 36 then moves for about a one-half revolution inactive in the slot of the pitman 37 until it finally engages the upper end of the slot and restores the gate through the medium of pitman 37 to its normal open position. Meanwhile the pitman 35 has opened and closed the bucket-bottom. The movements of the spout-gate and the bucket-bottom valve are readily timed and, besides, are very rapid, so that practically the bucket receives no late excess and loses no premature surplus grain. When the bottom-valve 30 begins to open, the bucket-weight is at once lessened and the counterpoise proceeds to lift the bucket to normal position. This movement restores the trip-off 43 to the path

of the stop 41, which stop it promptly encounters at the end of the single revolution of the crank-shaft G. Simultaneously the cam-lug 22 engages the stop-roller 21 and
 5 withdraws the dog 19 from the teeth of the ratchet J, while the encounter of stops 41 and 43 at once brings shaft G to a standstill. A link 44, pivoted at its ends to bucket B and elevator-tube A, prevents the bucket from
 10 swaying as it moves up and down.

A tally-box L is mounted upon one of the elevator-tubes A and is operated by a shaft 45, journaled in a bearing on the end of a lug 46, which lug projects from the frame H'.
 15 Shaft 45 is provided with a worm-gear 47, which engages a worm 48 upon the hub 42. By this means the shaft 45 is intermittently rotated by the weigher-operating mechanism.

The location of the counter-shaft beneath
 20 the head and between the elevator-tubes enables said shaft to easily control by its terminal connections both the spout-gate and the bucket-valve. The stop-block is carried by the shaft to encounter the trip projected
 25 from the bucket, while the tally is in immediate connection with the actuating-worm on the shaft. Compactness and simplicity of organization are thus assured. The chain-drive for the counter-shaft allows for ready
 30 readjustment of the elevator-chain, the shift of cross-axle D for such purpose being effected by means of the bracket-plates 13.

Obviously the details of structure can be followed according to the mechanic's skill
 35 without departure from the essentials of the improvement.

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

40 1. In automatic weighers, the combination with an outlet-spout having a control-gate and a counterbalanced weigher-bucket having a valved bottom, of mechanism for operating said spout-gate and said bucket-bottom valve
 45 comprising a rotatable shaft, clutch members, one keyed to and the other loose on said shaft, for throwing the latter into operation intermittently, a fixed, rigid stop for holding one of said clutch members out of engagement
 50 with the other, suitable means for imparting a slight initial movement to said mechanism for disengaging said clutch member from said stop, a trip-off operated by the bucket and a stop on said mechanism governed thereby.

55 2. In automatic weighers, the combination with an outlet-spout having a control-gate and a counterbalanced weigher-bucket having a valved bottom, of mechanism for operating said spout-gate and said bucket-bottom valve
 60 comprising a rotatable shaft, clutch members, one keyed to and the other loose on said shaft, for throwing the latter into operation intermittently, one of said clutch members being spring-pressed, a camming-surface on said
 65 spring-pressed clutch member cooperating with a fixed, rigid stop, a trip-off operated

by the bucket and a stop on said mechanism governed thereby.

3. In automatic weighers, the combination with an outlet-spout having a control-gate and
 70 with a counterbalanced weigher-bucket having a valved bottom, of a rotatable shaft having operative connections with said spout-gate and said bucket-bottom valve, a continuously-rotating clutch member loose on said
 75 shaft, and a spring-pressed clutch member carried by said shaft and rotatable therewith, a camming-surface on said spring-pressed clutch member cooperating with a fixed, rigid stop for normally holding said clutch members
 80 apart, suitable means for imparting a slight initial revolution to said shaft, a trip-off operated by the bucket and a stop on said shaft governed thereby.

4. In automatic weighers, the combination
 85 with the outlet-spout having a control-gate and the counterpoised weigher-bucket having a valved bottom, of a counter-shaft provided with operating connections joined to the spout-gate and to the bucket-bottom valve,
 90 respectively, a continuously-driven clutch member loose on said shaft, a second, longitudinally-movable clutch member keyed thereto and provided with a cam-lug normally engaging a fixed stop, suitable means for giving
 95 an initial partial revolution to the counter-shaft, a trip-off operated by the bucket and a stop on said shaft governed thereby, substantially as described.

5. In automatic weighers, the combination
 100 with the outlet-spout having a control-gate and the counterpoised weigher-bucket having a valved bottom, of a counter-shaft provided with operating connections joined to the spout-gate and to the bucket-bottom valve,
 105 respectively, a continuously-driven ratchet-wheel loose on said shaft, a longitudinally-movable, spring-pressed sleeve keyed on said shaft, provided with a dog for engaging said ratchet-wheel and with a cam-lug cooperating
 110 with a fixed stop for holding the dog out of engagement with said wheel, suitable means for giving an initial partial revolution to the counter-shaft for disengaging the cam-lug from said stop, a trip-off operated by the
 115 bucket and a stop on said shaft governed thereby, substantially as described.

6. In automatic weighers, the combination with the elevator-tubes, the elevator-head
 120 connecting said tubes and provided with a cross-axle for the endless belt, the outlet-spout having a control-gate and with the counterpoised weigher-bucket provided with a valved bottom, of a bearing-frame mounted
 125 between the elevator-tubes and carrying a counter-shaft in parallel relation to the cross-axle, said counter-shaft having terminal connections joined to the spout-gate and to the bucket-bottom valves respectively, clutch
 130 members one keyed to and the other loose on the counter-shaft, the latter of which is operatively geared to the cross-axle, a cam-lug

engaging a fixed rigid stop for holding the clutch members apart, suitable means for imparting an initial partial revolution to the counter-shaft, a trip-off operated by the bucket and a stop on said shaft governed thereby, substantially as described.

7. In automatic weighers, the combination with an outlet-spout having a control-gate and with a counterpoised weigher-bucket having a valved bottom, of a rotatable shaft operatively connected to said spout-gate and to said bucket-bottom valve, a clutch member carried by said shaft and rotatable therewith, a stop for holding said clutch member in its disengaged position, means for imparting an initial partial revolution to said shaft for disengaging said clutch member from said stop, said means comprising a continuously-rotating part loose on said shaft and a friction-surface carried by said shaft and engaging said continuously-rotating part, a trip-off operated by the bucket and a stop carried by said shaft governed thereby.

8. In automatic weighers, the combination with the outlet-spout having a control-gate and with the counterpoised weigher-bucket having a valved bottom, of a counter-shaft having operating connections joined to the spout-gate and to the bucket-bottom valve, a

clutch member mounted on said shaft and normally held in its disengaged position by a cam-lug coöperating with a fixed stop, suitable means for imparting an initial partial revolution to the counter-shaft comprising a continuously-rotating part loose on said shaft and a friction-surface spring-pressed against said continuously-rotating part, a trip-off operated by the bucket and a stop on said shaft governed thereby, substantially as described.

9. In automatic weighers, the combination with the outlet-spout having a control-gate and with the counterpoised weigher-bucket provided with a valved bottom, of a counter-shaft having operating connections joined to the spout-gate and to the bucket-bottom valve, a continuously-rotating part loose upon the counter-shaft, a longitudinally-movable clutch member keyed to said shaft and provided with a cam-lug normally engaging a fixed stop, a friction-washer interposed between said continuously-rotating part and a collar fixed to said shaft, a trip-off operated by the bucket and a stop on said shaft governed thereby, substantially as described.

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