(No Model.) 2 Sheets—Sheet 1.

J. B. BARTHOLOMEW.

GRAIN MEASURER.

No. 454,898. Patented June 30, 1891.

Fig. 1.

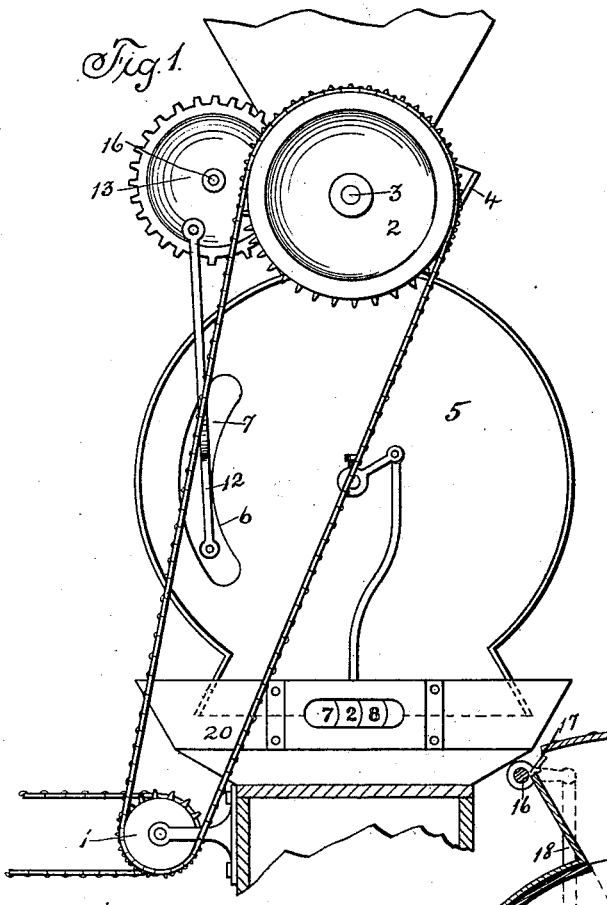


Fig. 3.

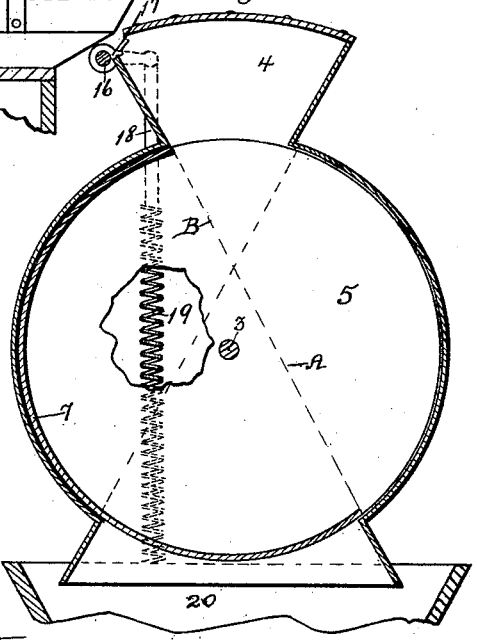
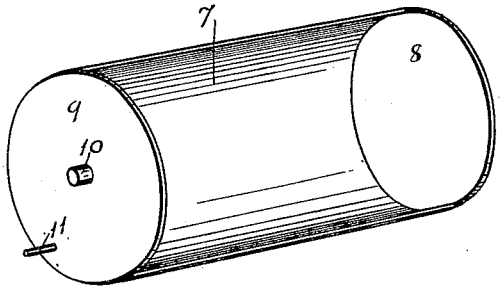


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

J. B. BARTHOLOMEW.

GRAIN MEASURER

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Fig. 4.

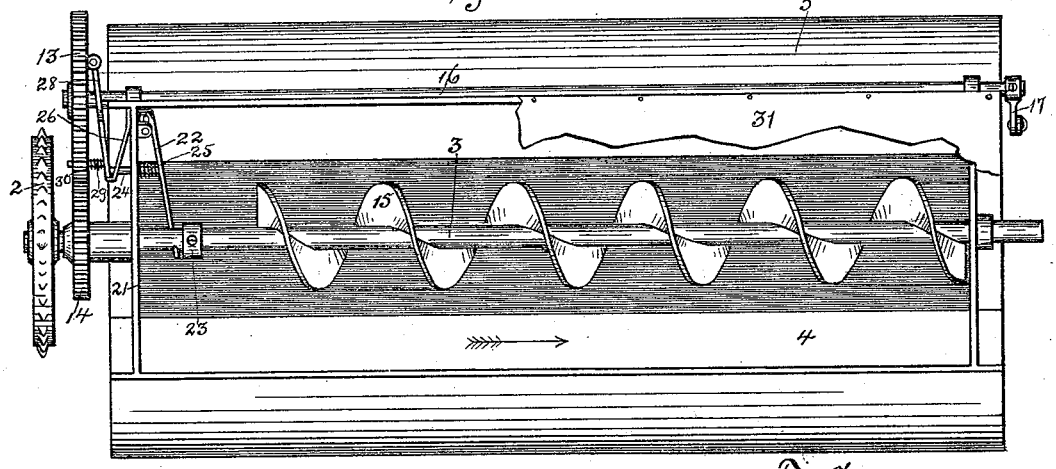


Fig. 7.

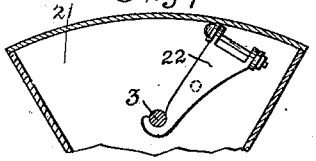


Fig. 6.

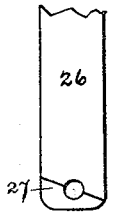


Fig. 5.

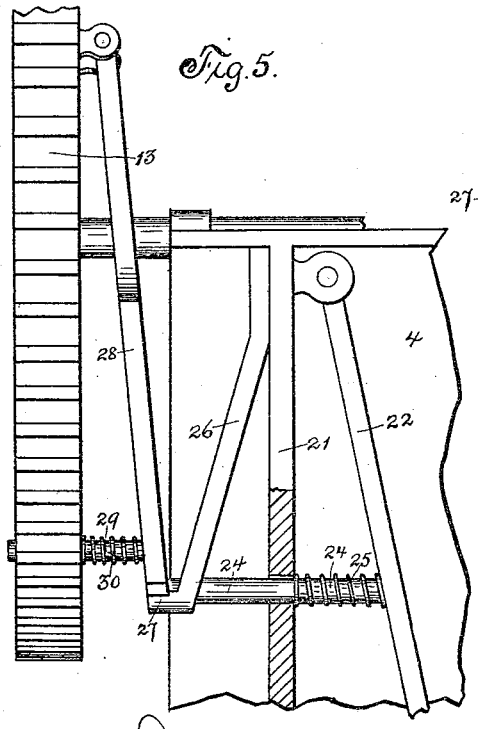
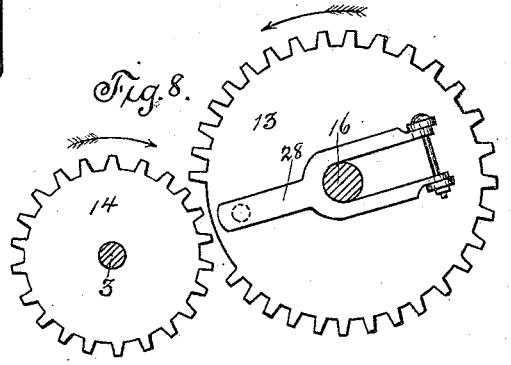


Fig. 8.



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C. C. Buckley.

Inventor: John B. Bartholomew,
By Thomas G. Orwig, Atty.

UNITED STATES PATENT OFFICE.

JOHN B. BARTHOLOMEW, OF DES MOINES, IOWA.

GRAIN-MEASURER.

SPECIFICATION forming part of Letters Patent No. 454,898, dated June 30, 1891.

Application filed December 11, 1890. Serial No. 374,398. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. BARTHOLOMEW, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Improvement in Grain-Measures, of which the following is a specification.

Heretofore in the operation of automatic grain-measures it has been found necessary, so far as possible, to make allowance for that additional quantity or portion of incoming grain which falls into and accumulates within the measuring-receptacle and passes out with the measured quantity or portion during the interval which elapses between the cutting off of the incoming grain and the discharge of the whole of the measured quantity or portion, said additional quantity of grain being caused to so accumulate within the measuring-compartment by the cutting into and the closing off of a stream of incoming grain at a point above the mechanism acting upon the body of accumulated grain, which mechanism automatically and at predetermined intervals provides or opens a way for the discharge of the measured grain and synchronously therewith cuts off the incoming grain. It has also been found in practice that the necessity of making this allowance renders one and the same measuring-machine inadequate to automatically and accurately measure grain of differing character or kind.

The object of my invention, primarily and broadly, is to obviate the necessity of making such allowance as has hereinbefore been described by such a disposition of the mechanism actuated to automatically discharge the measured grain and also to cut off the incoming grain as that the incoming grain is cut off immediately upon the opening of the discharge-exit in such a manner as that no further quantity of grain enters into the measuring-receptacle to and upon the accumulated quantity of grain after the latter is of the desired predetermined amount and is discharging or discharged and the discharge-exit closed to again accumulate the grain to be measured.

My object, further, is to provide mechanism by which the foregoing result may be accomplished which shall be simple in construction, positive in action, and rapid in operation.

My invention consists in an arrangement and disposition of the mechanism, acting upon the accumulated grain to automatically discharge the measured quantity and cut off incoming grain above the cut-off of the incoming grain.

My invention consists, further, in the disposition of an actuated shaft within a grain-receiver, said shaft carrying disks or a worm-screw which, compressing the grain, imparts an additional or auxiliary movement to the shaft other than its normal movement of rotation, by which mechanism actuating the cut-off and discharge is tripped into operation or permitted to operate.

My invention consists, further, in the form and disposition of the cut off and discharge valve or valves within a measuring-receptacle.

My invention consists, further, in the construction of the tripping mechanism, or that mechanism which at certain intervals withholds the driving mechanism from operating the discharge and cut-off, said mechanism being of such an arrangement and character as to be positive in action and invariably accomplish its desired function.

My invention consists, further, in certain details of construction hereinafter fully described, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of my improved measuring-machine. Fig. 2 is a detail perspective view of the cut-off and discharge-valve. Fig. 3 is a cross-section of the machine, the position assumed by the cut-off and discharge-valve being indicated by the dotted lines. Fig. 4 is a top plan view. Fig. 5 is an enlarged detail side view of the tripping mechanism. Fig. 6 is a detail view of the stop or ledge. Fig. 7 is a detail view of the arm directly acted upon by the rotated shaft laterally by the compression of the grain. Fig. 8 is a detail view of the mutilated gear-wheel, the tripped latch, and the pinion or gear-wheel on said rotated shaft.

The driving-wheel belted with the driving mechanism is designated at 1, the latter be-

ing belted with a sprocket-wheel 2, fixed on the worm compression-shaft 3. (Shown fully in Fig. 4.)

The hopper which receives the grain from the elevator-carrier is designated at 4, fixed to or formed with the cylindrical measuring-compartment 5, a curved slot 6 being formed or cut in one of the end plates of the latter, Fig. 1.

Referring now to Fig. 2, it will be observed that the valve 7 for cutting off incoming grain and discharging measured grain is semi-cylindrical in form, having circular end plates 8 and 9 and also trunnions 10 projected from the outer centers of said end plates, together with a wrist-pin 11 on the end-plate 9. The said semi-cylindrical cut-off and discharge valve 7 is of such dimension as to admit of its being disposed concentrically within the cylindrical measuring-compartment 5, the trunnions 10 finding bearings in the center of the end plates of said compartment and constituting the pivots of said valve 7, the wrist-pin 11 projecting through and beyond the slot 6, Fig. 1. A connecting-rod 12 is attached at its lower end pivotally to the wrist-pin 11, its upper end being pivotally secured to the face of the mutilated gear-wheel 13, which latter is adapted at predetermined intervals to gear with a pinion or gear-wheel 14, fixed upon the shaft 3, Figs. 1, 4, and 8. Upon said shaft 3 is located a worm or screw 15, which may be extended along said shaft 3 for approximately its whole length within the hopper 4, if found necessary, or only for a portion of its length. A horizontal shaft 16, mounted in journals projected from the hopper, and on which the mutilated gear-wheel 13 is fixed, is extended on the outer side of the machine from one end thereof to the other, the end of said shaft 16 opposite to that end carrying the mutilated gear-wheel 13 having fixed thereto a crank-arm 17, carrying pivotally a bar 18, Fig. 3, to which is secured a spring 19, which latter is also in turn fixed to the hopper 20 of the conveyer. Pivoted to the end piece 21 of the hopper 4 is a depending arm 22, the lower end of which is so formed as to partially embrace the shaft 3, Fig. 7, which latter is provided with a collar 23, adapted to impinge against said depending arm 22. Fixed to said depending arm 22 is a lug 24, extending through the end piece 21 of the hopper, a spring 25 being coiled about said lug 24 and interposed between said end piece 21 and the depending arm 22. Fixed rigidly to said end piece 21 of the hopper is a stationary depending arm 26, perforated at its lower end and provided with a projecting ledge or stop 27, Fig. 6, said lug 24 being extended through a perforation in the end piece 21 and through the perforation in the stationary arm. Pivoted to the inner face of the mutilated gear-wheel 13 is a bifurcated latch 28, the bifurcations of which straddle the shaft 3, Fig. 8, the end of the said latch opposite its pivot having fixed thereto a lug 29, extending through the mutilated gear-wheel 13, a spring 30 being coiled about said lug 29 and interposed between the said gear-wheel 13 and the latch 28. The top of the hopper 4 may be covered by a suitable shield 31, which may extend over the worm or screw 15, either entirely or partially, as found most practicable, to aid in compressing the grain. The bottom of the hopper 4 opens directly into the measuring-compartment and the discharge-opening at the bottom of the latter is preferably twice the size of entrance-opening.

The operation of my improved measurer is as follows: The semi-cylindrical cut-off and discharge valve 7 is of such dimensions as to fit closely concentrically within the cylindrical measuring-compartment, and normally while grain is being discharged into said compartment is in the position indicated by the dotted line designated by the letter A, Fig. 3, the discharge-opening being closed and the entrance to said compartment open and the grain filling into the latter. When now the grain has filled the measuring-compartment and accumulates within the hopper 4 about the rotated worm or screw the latter tends to feed the grain against the end piece of the hopper in the direction indicated by the arrow, Fig. 4, and the grain finding no exit reacts by compression against the said screw or worm, which in turn acts upon its shaft 3, moving the latter laterally in the opposite direction to the movement of the grain. The gear-wheel 13 is normally inoperative or idle while the grain is filling the measuring-compartment, not being in gear with the constantly-rotated gear-wheel or pinion 14, its mutilated portion being opposite said pinion 14. The spring 19 and the crank-arm 11 normally exert a pull upon the shaft 16 to rotate the same and the mutilated gear-wheel 13 carried thereby in the direction of the arrow, Fig. 8, during the filling of the measuring-compartment, which tendency to rotate is overcome by the bifurcated latch 28, pivoted to said gear-wheel 13, resting on the ledge or stop 27 of the stationary arm 26. When, however, the shaft 3 is moved laterally, in the manner hereinbefore described, toward the end piece 21 of the hopper 4, the collar 23 engages against the lower end of the pivoted depending arm 22, carring the lug 24, which latter then impinges against the bifurcated latch 28, pivoted on the gear-wheel 13, pushing the said latch from off the ledge or stop 27 of the stationary arm 26, said gear-wheel 13 being then left free to rotate by virtue of the action of the spring 19 thereon, and its teeth caused to mesh with those of the constantly-rotated pinion or gear-wheel 14, which latter then continues to rotate said gear-wheel 13 in the same direction for approximately one complete revolution, during which operation the connecting-rod 12 draws upwardly upon the semi-cylindrical valve 7, causing the latter to assume the position in-

dicated by the dotted lines designated by the letter B in Fig. 3, discharging the measured grain and closing the entrance-opening against the incoming grain, the mutilated gear-wheel 13 having performed approximately one-half of its revolution. In the further rotation of said gear-wheel 13 and on the downward stroke of the connecting-rod 12 the valve is returned to the position shown by A, opening the entrance to the grain and closing the discharge-opening. As soon as the bifurcated latch 28 is disengaged from the stationary arm 26 the spring 29 acts upon the bifurcated latch to cause the latter to assume a position in which to engage and be again held by the ledge or stop 27 of the stationary arm 26, when the shaft 3 and pinion 14 again rotate free of the said mutilated gear-wheel 13 as the blank portion thereof is again opposite the said pinion 14, the operation being again repeated when the same quantity of grain has accumulated within the measuring-compartment and the hopper.

It is now apparent from the foregoing description that the shaft 3 and worm or screw 15 are located above the entrance-opening or valve which cuts off the entrance of the grain into the measuring-compartment and acts upon the grain to actuate the tripping mechanism at a point above such entrance-opening and valve, and by virtue of this fact does not cut into and close off a stream of incoming grain, a portion of which then falls into the measuring-compartment and passes out with the measured quantity, the effect of which renders it impossible for one and the same machine to accurately measure cereals of different-sized grains.

In the practical operation of grain-measures it has been found that in cutting off the grain the latter banks up within the nose of the elevator-carrier, often resulting in the stoppage of the latter and necessitating manipulation in order to cause a resumption of the flow of the grain, this being especially the case where the grain is wet and heavy.

It is apparent that the worm or screw, being constantly rotated within the grain accumulated in the hopper, agitates and maintains the same in the desired loose condition ready to resume its flow when the entrance to the measuring-compartment is opened.

The arrangement of the tripping mechanism is of the most positive character, since, if for any reason the lug 24 should be caught or not retire with sufficient rapidity from the ledge 27, the bifurcated latch 28 would still engage upon said lug, and upon the withdrawal of the latter would immediately engage the ledge.

In addition to its various other functions the worm or screw 15 on the shaft 3 performs the office of a distributer of the grain within the measuring-compartment.

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

1. In a grain-measuring machine, a measuring-compartment, a valve for cutting off the incoming grain, releasing mechanism disposed above the cut-off valve and acted upon by the grain, and connected mechanism released or brought into action to operate said valve.

2. In a grain-measuring machine, a measuring-compartment, a valve for cutting off the incoming grain and discharging the measured grain, releasing mechanism disposed above the cut-off and discharge valve and acted upon by the grain, and connected mechanism released or brought into action to operate said valve.

3. In a grain-measuring machine, a measuring-compartment, a cut-off valve for cutting off the incoming grain, releasing mechanism continuously operated, disposed above said cut-off valve, and acted upon by the grain, and connected mechanism intermittently released or brought into action to operate said valve at predetermined intervals.

4. In a grain-measuring machine, a measuring-compartment, a cut-off and discharge valve for cutting off the incoming grain and discharging the measured grain, continuously-operated releasing mechanism disposed above the said cut-off and discharge valve and acted upon by the grain, and connected mechanism intermittently released or brought into action to operate said valve at predetermined intervals.

5. In a grain-measuring mechanism, a measuring-compartment, a cut-off and discharge valve operated within said compartment, a continuously-operated rotated shaft arranged approximately horizontally, having a worm or screw thereon acting upon the grain to impart to said shaft an auxiliary movement supplemental to its movement of rotation, and connected mechanism intermittently released or brought into action to operate the cut-off and discharge valve at predetermined intervals.

6. In a grain-measuring machine, a measuring-compartment, a cut-off and discharge valve operated within said measuring-compartment, a continuously-operated shaft acted upon laterally by the compression of the grain, and connected mechanism comprising a mutilated gear-wheel, a continuously-rotated gear-wheel, and means for automatically, by the auxiliary movement of said shaft at predetermined intervals, gearing said mutilated gear-wheel with the continuously-operated gear-wheel to actuate the cut-off and discharge valve.

7. In a grain-measuring machine, a measuring-compartment, a cut-off and discharge valve operated within said compartment, a continuously-operated shaft disposed above the cut-off and the discharge valve, acted upon by the grain accumulated above the cut-off valve to produce an auxiliary movement of the shaft, and connected mechanism comprising a mutilated gear-wheel normally inopera-

tive while the grain is filling the measuring-compartment, a continuously-operated gear-wheel, and intermediately-disposed mechanism acted upon by the auxiliary movement of said shaft to gear said mutilated gear-wheel with said continuously-operated gear-wheel at predetermined intervals, said mutilated gear-wheel being connected with the discharge and cut-off valve.

8. In a grain-measurer, a measuring-compartment having entrance and exit openings, and a semi-cylindrical cut-off and discharge valve located therein, and means for operating said valve at predetermined intervals.

9. In a grain-measurer, the combination, with the measuring-compartment having entrance and exit openings, of a cut-off and discharge valve within said compartment, a continuously-rotated shaft disposed over said entrance and exit openings and above the cut-off and discharge valve, a worm or screw mounted upon said shaft, which latter is given an auxiliary movement by the reactive influence of the accumulated, confined, and compressed grain, and connected mechanism adapted to be released by the movement of said shaft to operate the said valve.

10. In a grain-measurer, a measuring-compartment, a cut-off and discharge valve mounted therein, a mutilated gear-wheel inoperative during the filling of the measuring-compartment connected with said valve, a continuously-rotated shaft disposed over said cut-off and discharge valve, a screw or worm carried by said shaft, adapted to act upon the grain above the cut-off to produce an auxiliary movement of said shaft, and mechanism actuated by said auxiliary movement of the shaft, causing said mutilated gear-wheel to gear with a continuously-rotated gear-wheel to operate the cut-off and discharge valve at predetermined intervals.

11. In a grain-measurer, a measuring-compartment, a cut-off and discharge valve operated therein, a rotated shaft acted upon by the grain to produce a movement of said shaft auxiliary to said movement of rotation, mechanism connected to the cut-off and discharge valve carrying a swinging latch, and a stop adapted to engage said swinging latch and hold the mechanism actuating the valve inoperative during the filling of the measuring-compartment, said latch being disengaged intermittently by the auxiliary movement of the shaft to operate the valve.

12. In a grain-measurer, a measuring-compartment, a cut-off and discharge valve, a rotated shaft, a swinging arm engaged by said shaft when the latter is acted upon by the grain to produce an auxiliary movement, a pin acted upon by said arm, a stop, a swinging latch pivotally carried by a mutilated gear-wheel adapted to be engaged by said stop and disengaged by the action of the pin, and a continuously-rotated gear-wheel and yielding pressure normally tending to cause said mutilated gear-wheel to mesh with the continuously-rotated gear-wheel.

13. In a grain-measurer, a measuring-compartment, a rotated shaft, a mutilated gear-wheel, a cut-off and discharge valve connected with said gear-wheel, yielding pressure acting upon the said gear-wheel, by which the latter normally tends to mesh with a continuously-rotated gear-wheel, a stop, a latch carried by and pivoted to the mutilated gear-wheel, adapted to be engaged by the stop during the filling of the measuring-compartment, and mechanism acted upon by the grain by which the latch is disengaged from the stop.

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