(No Model.) 2 Sheets—Sheet 1.

H. GRIFFITH & L. F. RAMSEY.

GRAIN METER.

No. 287,535. Patented Oct. 30, 1883.

Fig. 1.

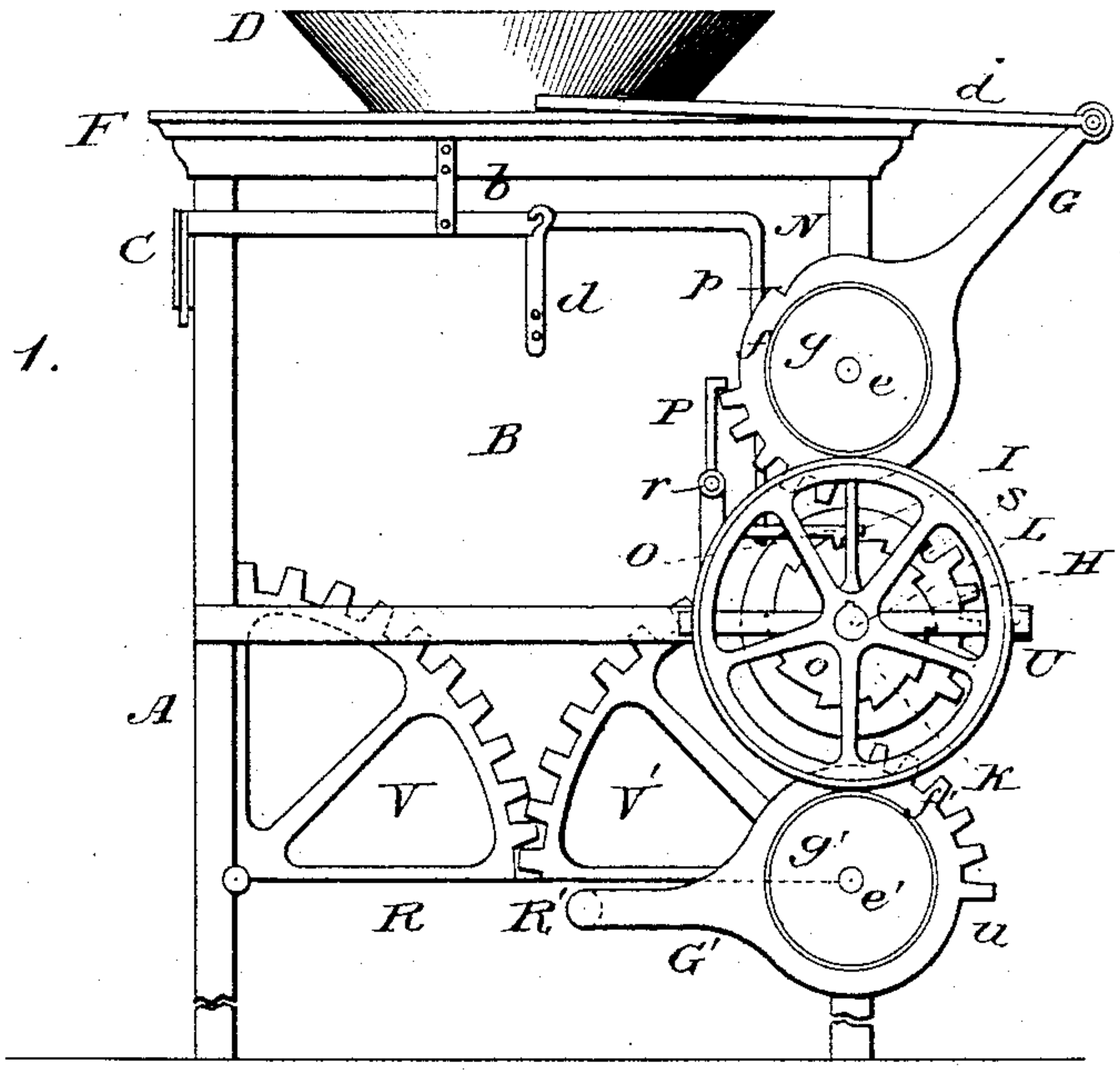


Fig. 2.

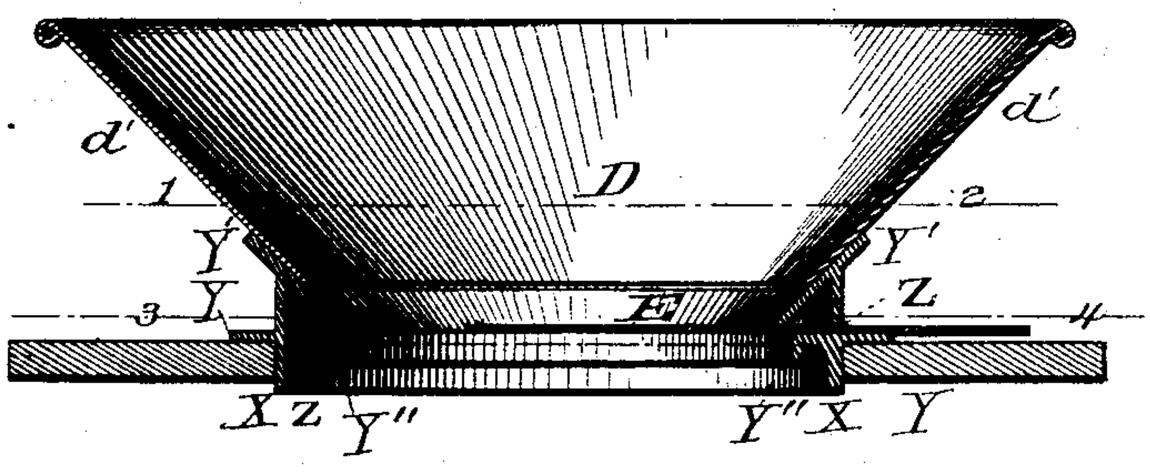


Fig. 3.

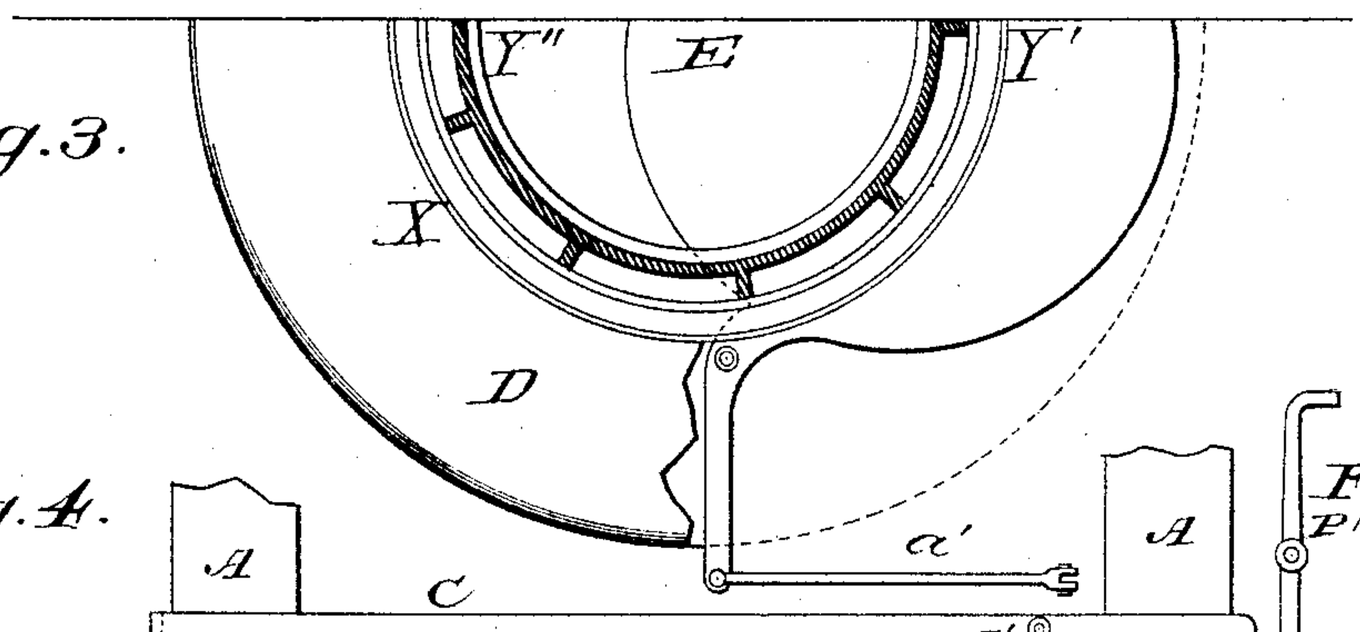


Fig. 4.

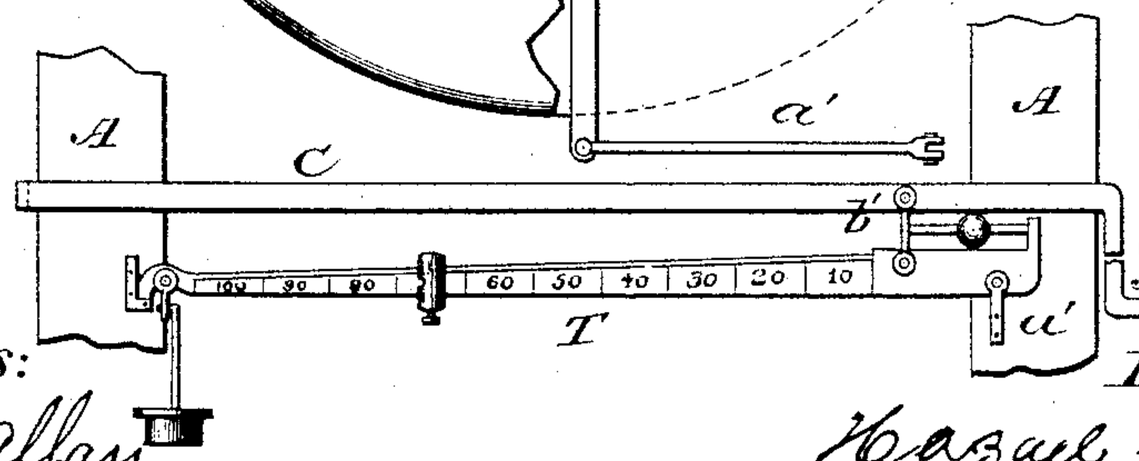
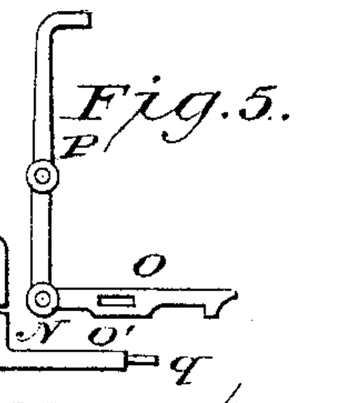


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

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GRAIN METER.

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Fig. 6.

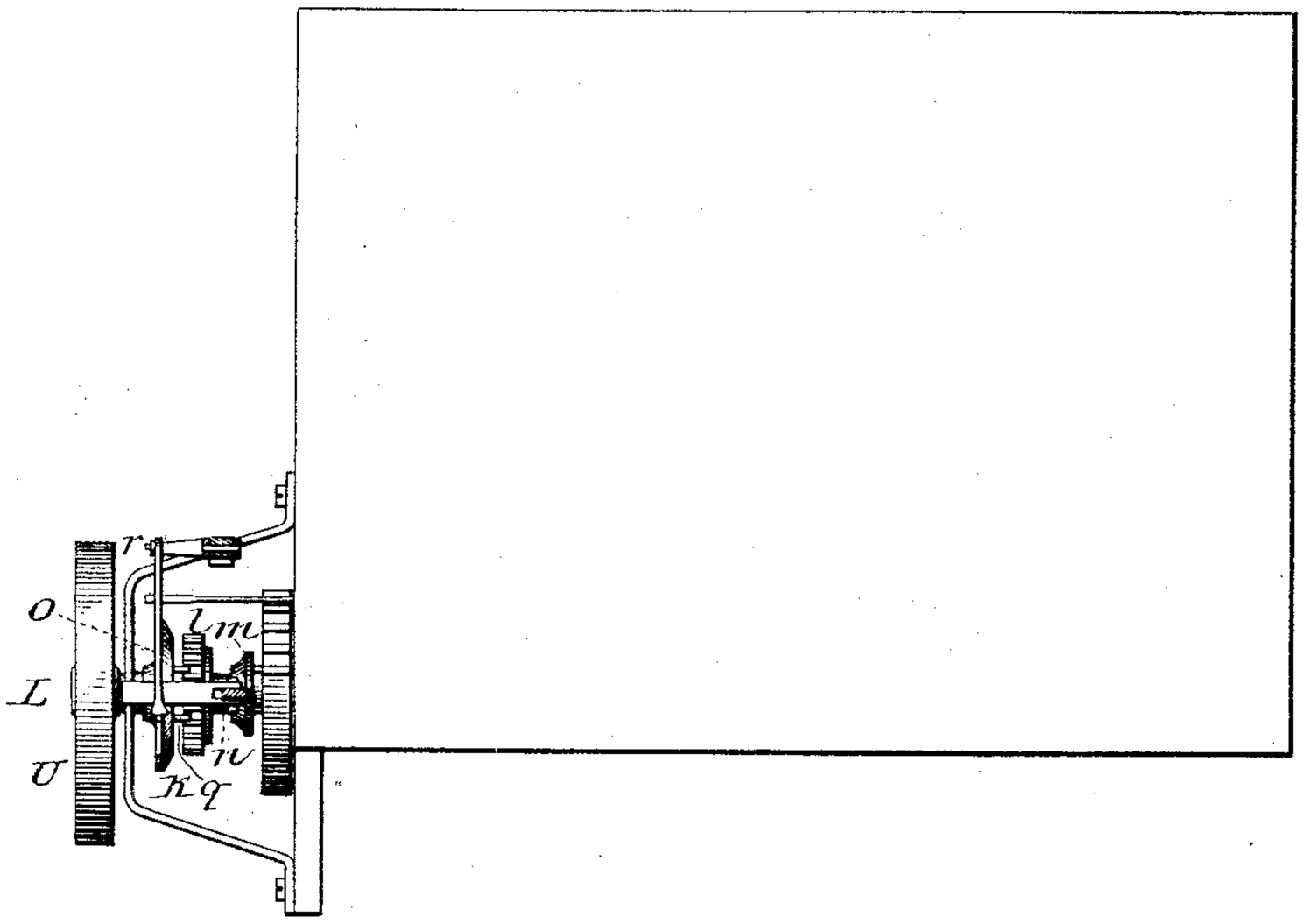


Fig. 7.

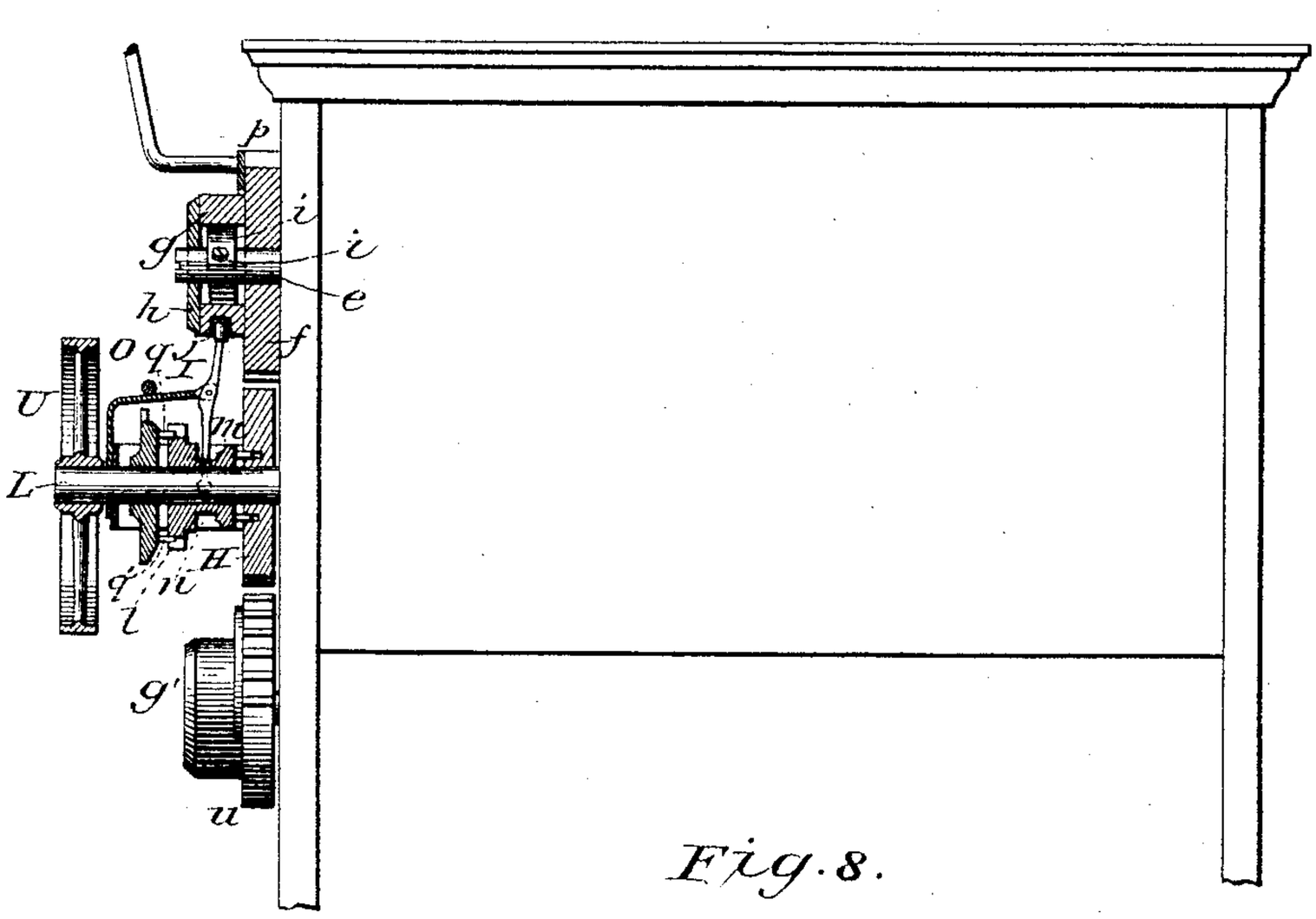
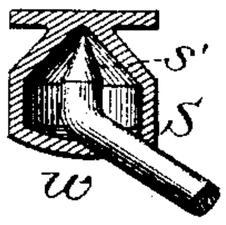


Fig. 8.



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UNITED STATES PATENT OFFICE.

HAZAEL GRIFFITH AND LEWIS F. RAMSEY, OF TERRE HAUTE, INDIANA.

GRAIN-METER.

SPECIFICATION forming part of Letters Patent No. 287,535, dated October 30, 1883.

Application filed April 17, 1883. (No model.)

To all whom it may concern:

Be it known that we, HAZAEL GRIFFITH and LEWIS F. RAMSEY, citizens of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented a new and useful Grain-Meter, of which the following is a specification.

Our invention relates to improvements in grain-meters; and the object of our invention is to provide a machine to measure grain by weight as it comes from a thrashing-machine, elevator, or chute.

The grain passes through the hopper into the measuring-box until the weight which the machine is set to register is attained, when the tilting of the beam liberates a spring, which closes the bottom of the hopper and connects gearing which opens the bottom of the measuring-box. As soon as the box is empty the bottom is closed by another spring, and the gearing, after opening the bottom of the hopper, is disconnected until the weight in the box shall again cause it to be connected. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine; Fig. 2, a vertical section of the hopper; Fig. 3, a plan and horizontal section of the hopper on the lines 1 and 2, 3 and 4, Fig. 2; Fig. 4, an elevation of the scale-beam in its connection with the double lever; Fig. 5, the dogs used in throwing in and out of gear parts of the machinery; Fig. 6, a plan view; Fig. 7, a side elevation and vertical section of upper lever and clutch; Fig. 8, a vertical section of cone-bearing and point of lower lever.

Similar letters refer to similar parts throughout the several views.

In a frame, A, Fig. 1, having a top, F, in the center of which is a circular opening fitted with a hopper, D, beneath the hopper and top, is a measuring-box, B, having a bottom, which is in two parts, R R′, the parts being hinged, one to either side of the box, at the lower edge, and open from the middle downward. In the middle of each end, and near the upper edge of the box B, are links *a a*, by means of which the box is hung on a double lever, C, which is attached or hung to the frame A by the links *b b*.

The hopper D, Fig. 3, has a removable bottom or oscillating cut-off slide, E, for the purpose of cutting off the flow of grain into the measuring-box B while the box is being emptied. The circular opening in the top F is fitted with a bush, X, having an exterior annular flange, *y*, resting on the top F, and secured thereto by means of bolts or screws passing through the flange into the top. On the upper edge of the bush X is an annular flange, *y′*, standing at an angle of about forty-five degrees, to the outer and upper part of which the sheet-iron part *d′* of the hopper is secured. The inner part of this flange serves as a shield to prevent grain falling or collecting on flange *y″*. Inside of bush X, below slide E, is an annular flange, *y″*, having slots or openings *z*. This flange forms a support for slide E, and the openings *z* allow any grain or other matter that would otherwise obstruct or prevent the perfect closing of the slide to escape into the box below, and also prevent slide E cracking grains by catching them between its edge and the inner surface of bush X. For the same purpose the edge of slide E is beveled on the under side. Just above the flanges *y* and *y″* a slot, *z*, is cut through the wall of bush X and extends throughout about one-half the circumference of the bush. This slot admits the passage of slide E to and fro, as it opens or closes the bottom of hopper D. The slide E is fixed to the top F by means of a pivot, *c*, Fig. 3, and is connected by a rod, *d*, with lever G.

The lever G, which operates the slide E, oscillates on a stud, *e*, which is bolted to the frame A. The lever G has a flange, *f*, bearing a section of cogs, which engage the cogs on wheel H, and also a notch, *p*, in which the dog P catches. On the back of the flange *f* on lever G is a lug, *x*, to lift up the spring-bolt W. On the face of the flanged lever G, and inclosing the stud *e*, is a circular case, *g*, with its cap or cover, *h*, which is secured in its place by means of a screw passing through a hole in the center of the cover into the end of the stud *e*. Inside the circular case *g* is a coiled spring, *i*, one end of which is fastened to the inside of the wall of the case and the other end to stud *e*, for the purpose of closing slide E and throwing the lever G in such a position that the cogs on flange *f* will engage those on the rotating wheel H, for the

purpose of opening the slide E. In the outside of the wall of case *g* is a cam, *j*, which operates the forked lever I.

The lever I, Fig. 7, is pivoted by a bolt or pin to an arm, *k*, of the iron frame J and operates the clutch K, which connects the wheel H with the driving-shaft L.

The frame J, Fig. 6, supports the outer end of the driving-shaft L, and has an arm, *k*, to which is fixed the lever I. The iron frame also has a standard, *r*, to which is pivoted the dog P. The shaft L is fitted with a drive-pulley, U, and may be driven by any suitable or convenient power. The wheel H and the clutch K are on this shaft.

The clutch K is in two parts, one part being loosely keyed to the wheel H, and consists of a cog-wheel, *l*, and a collar, *m*, having an annular groove, *n*, in which the fork end of lever I rests, by means of which this part of the clutch is connected or disconnected with the other part of the clutch. The other part of the clutch is a wheel, *o*, and is keyed fast to the driving-shaft L, and has a series of cogs or pins, *q'*, on one side, and teeth on its periphery. The cogs or pins *q'* on the side of wheel *o* operate with the cogs on wheel *l* to connect wheel H with the driving-shaft L, and the teeth on the periphery of the wheel *o* operate with dog O to throw dog P out of notch *p* in lever G. The dog P is pivoted to the standard *r* and drops in notch *p* on flange of lever G, for the purpose of holding the slide E open.

On one end of the double lever C, Fig. 4, is an arm, N, extending downward and outward, and is connected with dog O by means of a wrist, *q*, on the arm N, passing through a slot, *o'*, in dog O, which is hinged to dog P in such a manner that when the weight in the measuring-box B tips the double lever C the arm N presses dog O downward until it catches on one of the teeth of wheel *o*, when the motion of the wheel draws dog O forward and swings dog P on its pivot, so as to throw the upper end of the dog P out of notch *p*.

The wheel H revolves on the shaft L, and is loosely keyed to clutch K. It has on its periphery a section of cogs, which operate with those on the flange *f* of lever G to open slide E, and with those on flange *f'* of lever G' to open the bottom R R' of box B. The number of cogs on wheel H is equal to those on flange *f*, and occupy about one-fourth of the circumference of the wheel, the other three-fourths being cut away on a line with the base of the cogs. At the base of the last cog in the section is a notch, *s*, which receives the long cog *u*, and a little farther on is another notch, *t*, which allows cog *u* to slip by.

The lever G', for the purpose of opening and closing the bottom R R' of the measuring-box B, oscillates on a stud, *e'*, which is bolted to the frame A. The lever G' has a flange, *f'*, bearing a section of cogs, which engage those on wheel H, the cogs on flange *f'* being one more in number than those on the wheel. The last cog *u*, being longer than the others, drops into notch *s*. The lever G' then stops, and is held by the cog *u* pressing against the surface of wheel H as the wheel revolves, until the notch *t* reaches cog *u* and allows it to slip by, when the spring *i'* throws the lever G' back and closes the bottom R R' of the measuring-box. On the face of the flange *f'* of lever G', and inclosing the stud *e'*, is a circular case, *g'*, having a cap or cover, *h'*, which is secured in place by means of a screw passing through a hole in the center of the cover into the end of the stud *e'*.

Inside the circular case *g'* is a coiled spring, *i'*, one end of which is fastened to the inside of the wall of the case, and the other end to the stud *e'*, for the purpose of throwing back the lever G' and closing the bottom R R' of box B. The spring *i'* also acts as a spring-balance in connection with the weighing device, and serves to steady the weighing-beam.

The bottom R R' of the measuring-box B is in two parts, the parts being hinged one to either side of the box B at the lower edge of the box and open from the middle downward. On one end of each part of the bottom R R' is a quarter-circular flange, *v v'*, fitted with cogs working together to give simultaneous movement to the two parts R R'. To the under side of one part of the bottom R' is fixed a hollow conical bearing, S, Fig. 8, in such a position that when the bottom R R' is closed the bearing S will be exactly under the center of the measuring-box B. The cone-bearing S has a loop, *w*, which extends across and a little below the opening of the hollow cone. The arm of lever G' is bent backward and reaches underneath the measuring-box B to bearing S, and, passing through loop *w*, is bent upward and terminates in a point, *s'*, which rests in the hollow cone S, the loop *w* being the bearing in the downward movement and the cone S the bearing in the upward movement of lever G'. The arrangement is designed to form a self-centering rest for the measuring-box B and a self-centering bearing for the lever G' and avoid friction.

In connection with the working of the bottom R R', a spring-bolt, W, is placed on the end of the measuring-box just back of the flanged lever G in such a position that when the bottom R R' is thrown upward the lower end of the bolt W catches on one of the cogs on the flange *v'* and holds the bottom R R' up until the slide E closes the bottom of the hopper D, when a lug, *x*, on the back of flange *f*, lifts the spring-bolt from the cog on flange *v'*, so that the bottom R R' may be opened.

The weighing device consists of a double lever, C, Fig. 4, and a single lever, T, in connection with the spring *i'*. The double lever C is attached by means of links *a a* to the middle of either end of the measuring-box B, near the upper edge of the box. It is also attached to the frame A by means of the links *b b*, the links *b b* being the fulcrums. The single lever T is attached to the frame A by a link, *a'*, and is connected with the double lever C by the

link b'. The single lever is the scale-beam, and has a graduated scale marked on one side, and is provided with suitable weights and balancing device. The arrangement is designed to give compactness of form and admit of being cased and locked to prevent tampering with the parts while the machine is in operation.

The spring i' in lever G′ is part of the weighing device, one of its uses and purposes being that of a spring-balance. It is not intended to be of sufficient strength to register all the weight which the measuring-box will hold, and may be strong enough only to balance the empty box. Its use as a balance is to offer a slight but steady resistance to the weight in the box, so that when the required weight which the machine is set to register is almost attained any sudden shock or jar—such as might be communicated by the belt from the driving-power or from adjacent running machinery—cannot cause the weighing-beam to vibrate, and so discharge the measuring-box before the full weight registered shall have been reached. The tension of spring i' is balanced or indicated on the scale beam or lever T.

Any ordinary device for registering revolutions may be placed in connection with the rotating-wheel H, which makes one revolution for each time the measuring-box B is emptied.

We are aware that grain-meters have been made which measure by weight. We therefore do not claim the principle involved; but what we do claim, and desire to secure Letters Patent on, is the mechanism by which we attain the desired result.

We claim—

1. In a grain-meter, a frame, A, double lever C, links a a b b, cone-bearing S, and point s' of lever G′, in combination with a measuring-box, B, having a removable bottom which is in two parts, R R′, the parts R R′ being each fitted with a quarter circular flange, v v', and operating in connection with and by means of cog-flange f' of lever G′, bearing S, loop w, point s', and spring-bolt W, substantially as shown and described.

2. In a grain-meter, in combination with a frame, A, and measuring-box B, the hopper D, having a removable bottom or slide, E, which swings on a pivot, c, fixed in the top F, the bush X fitting in the circular opening in the top F and forming a base for the hopper D, the flange y, resting on the top F and secured to the same, the annular flange y', to which the sheet-iron part d' is secured, the interior annular flange, y'', having the slots z, the slot z' in the wall of bush X, to admit the passage of slide E through the wall of the bush, substantially as and for the purposes described and set forth,

3. In combination with hopper D, a lever, G, oscillating on a stud, e, which is bolted to the frame A, the rod d, connecting lever G with slide E, substantially as described, and for the purposes set forth.

4. In combination with the lever G, oscillating on a stud, e, the flange f, bearing a section of cogs, the notch p, the lug x on the back of flange f, the circular case g, and cover h, the coiled spring i, which throws back the lever G, and the cam j, which operates lever I, substantially as described, and for the purposes set forth.

5. In combination with frame A, the iron frame J, supporting the outer end of shaft L, the arm k, supporting lever I, and the standard r, supporting dog P, substantially as described, and for the purposes set forth.

6. In a grain-meter, in combination with frame A and frame J, the driving-shaft L, having a pulley, U, the clutch K, composed of a wheel, o, having cogs or pins q' on one side and teeth on its periphery, and a cog-wheel, l, collar m, and groove n, and the wheel H, with its section of cogs, notch t, and notch s, substantially as and for the purposes described and set forth.

7. In combination with clutch K, lever G, and double lever C, an arm, N, extending downward and outward, the wrist q, slot o, through which the wrist passes, the dog O, to connect with the teeth of wheel o, and the dog P, hinged to dog O and pivoted to standard r in such a position as to catch in notch p, substantially as described, and for the purposes set forth.

8. The notches s and t and that part of the periphery of wheel H between notches s and t, in combination with cog u on flange f' of lever G′, substantially as described, and for the purpose set forth.

9. A lever, G′, having a flange, f', bearing on its face a circular case, g', with its cover h', in combination with a stud, e', and spring i', substantially as described, and for the purposes set forth.

10. In combination with the bottom R R′ of box B, the lever G′, terminating in a point, s', the bearing S, and loop w, substantially as described and set forth.

11. The bottom R R′, having flanges v v', in combination with lever G′, spring i', point s', bearing S, loop w, box B, and spring-bolt W, substantially as described, and for the purposes set forth.

12. In a grain-meter, the spring-bolt W, in combination with the measuring-box B, the cog-flange v', spring i, and lug x, on the back of flange f, and lever G, as and for the purposes described and set forth.

13. In a grain-meter, as a weighing device, a single lever or scale-beam, T, in combination with spring i', lever G′, double lever C, links a a, b b, a', and b', frame A, box B, bottom R R′, cone S, and point s', substantially as and for the purposes set forth.

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