(No Model.) 3 Sheets—Sheet 1.

C. W. HADLEY.

AUTOMATIC GRAIN MEASURE.

No. 377,936. Patented Feb. 14, 1888.

Fig. 1.

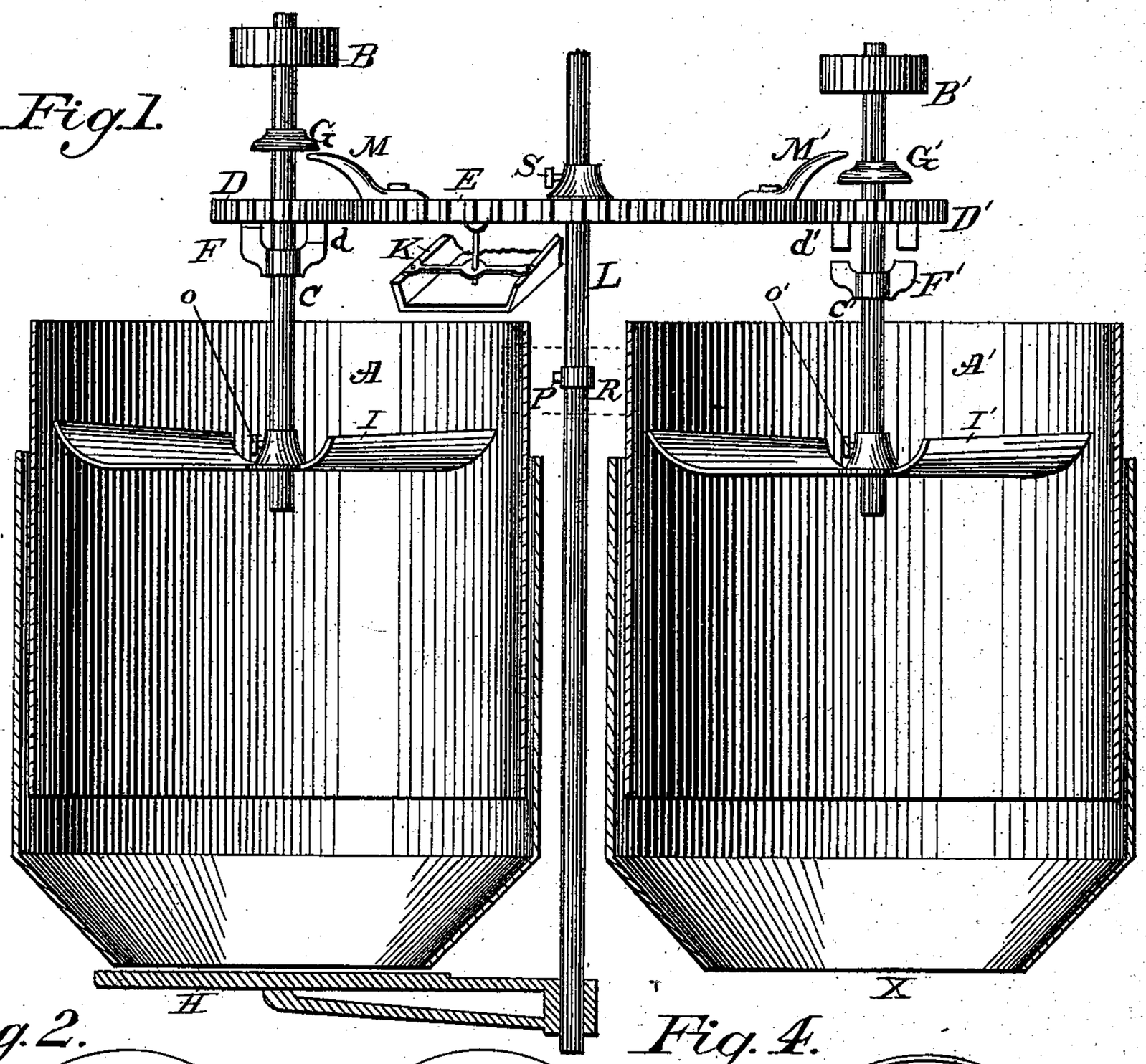


Fig. 2.

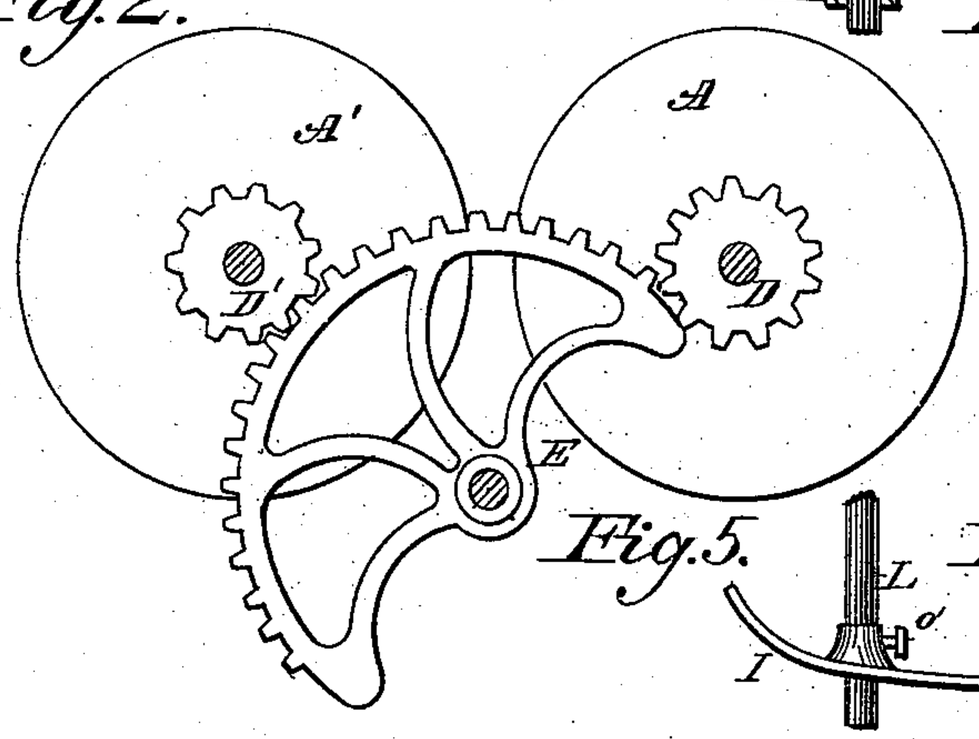


Fig. 4.

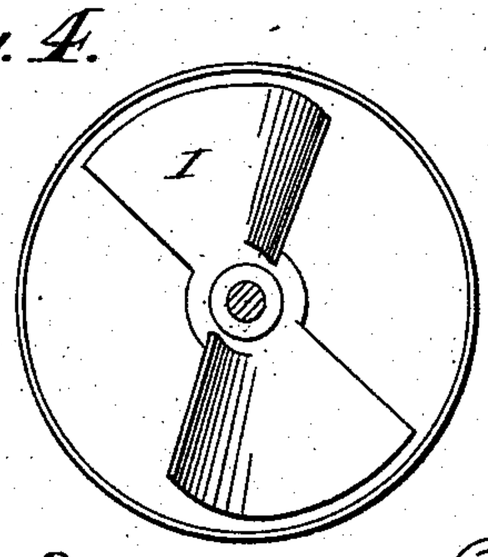
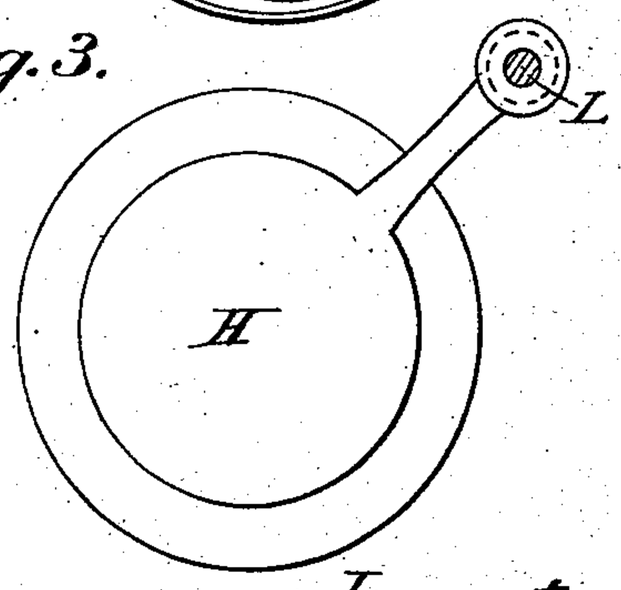


Fig. 5.

Fig. 3.



Witnesses:
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(No Model.) 3 Sheets—Sheet 2.

C. W. HADLEY.

AUTOMATIC GRAIN MEASURE.

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Fig. 6.

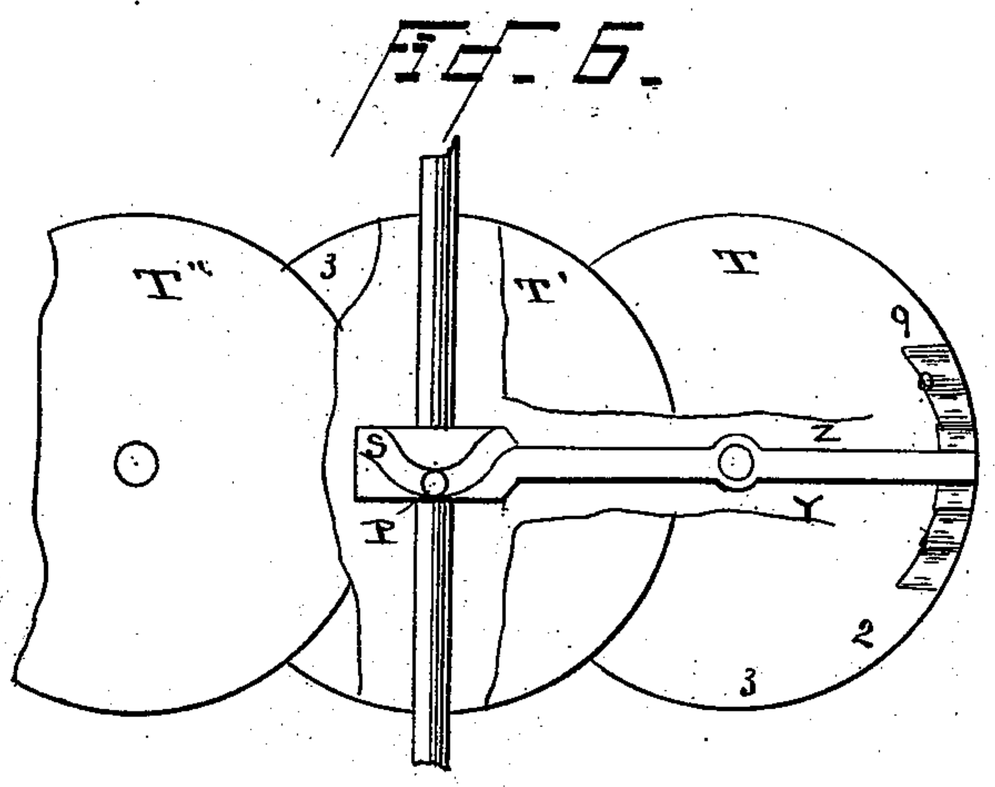


Fig. 7.

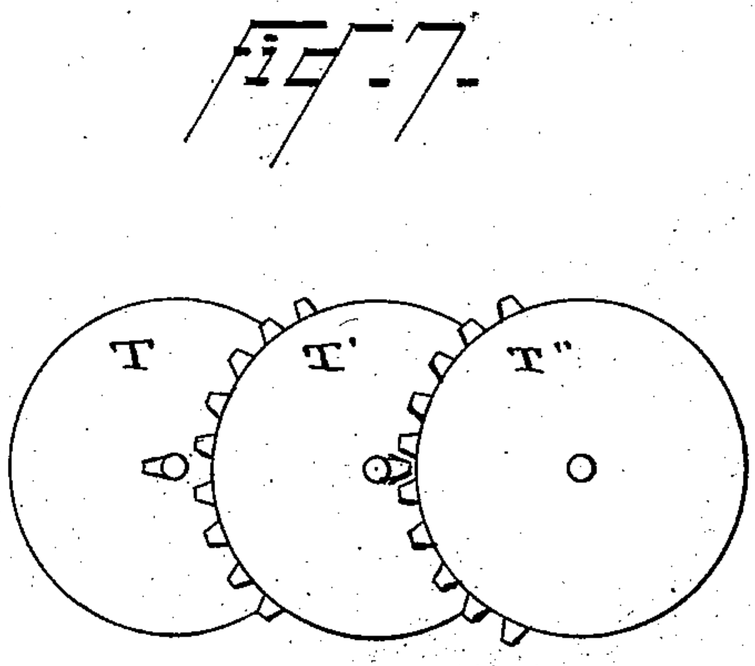
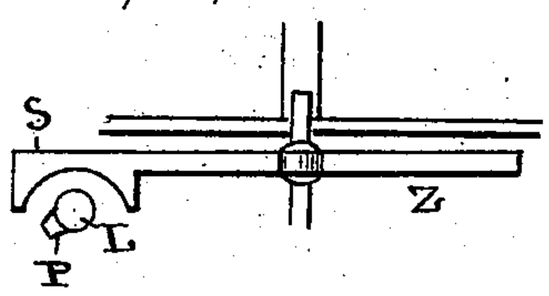


Fig. 12.



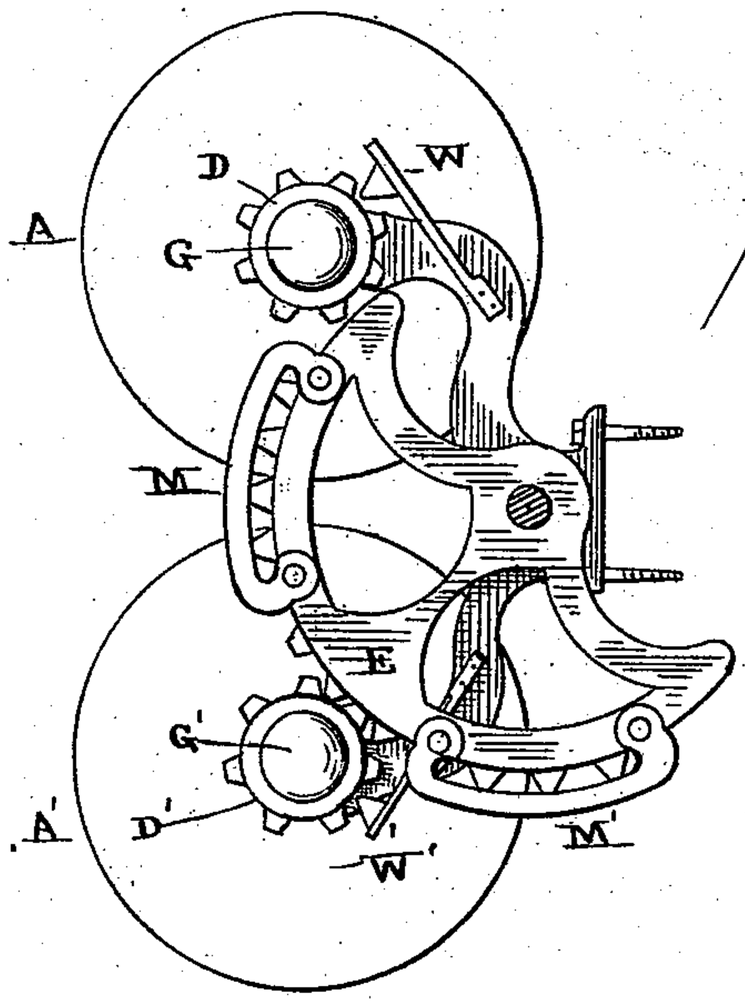
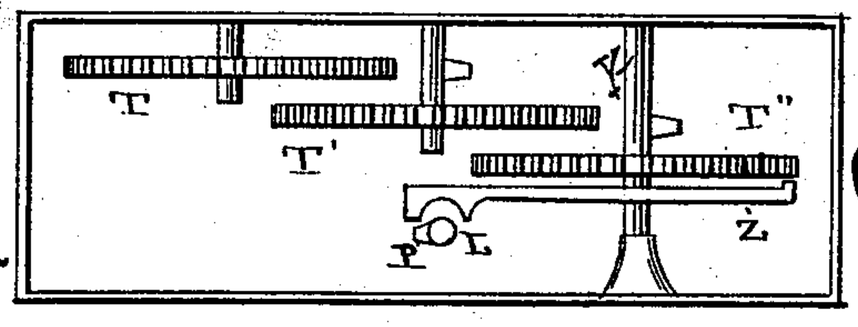


Fig. 11.

Fig. 13.



WITNESSES

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(No Model.) 3 Sheets—Sheet 3.

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AUTOMATIC GRAIN MEASURE.

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Fig. 8.

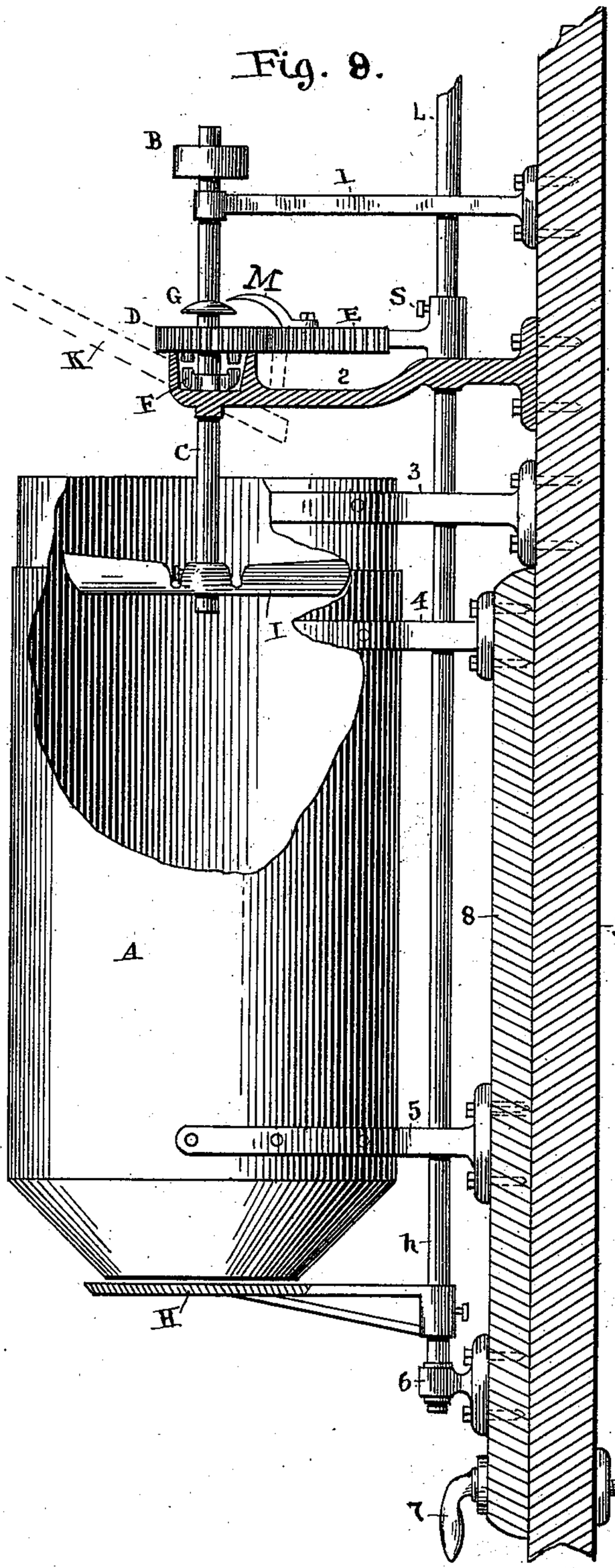


Fig. 9.

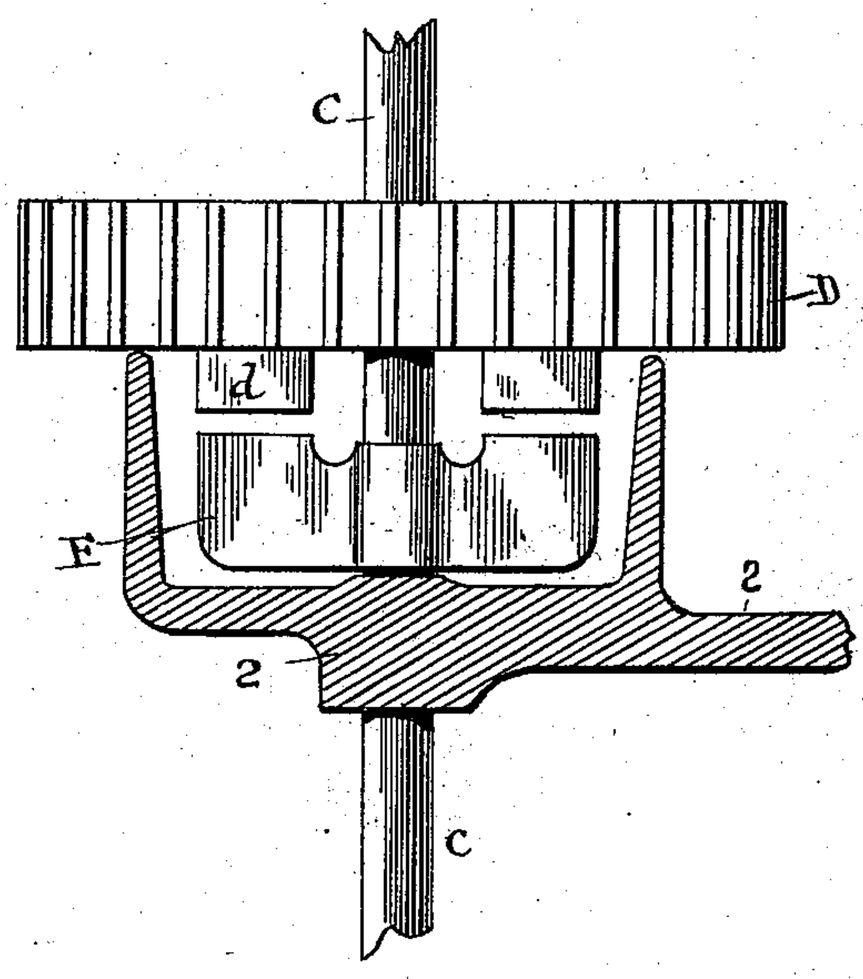
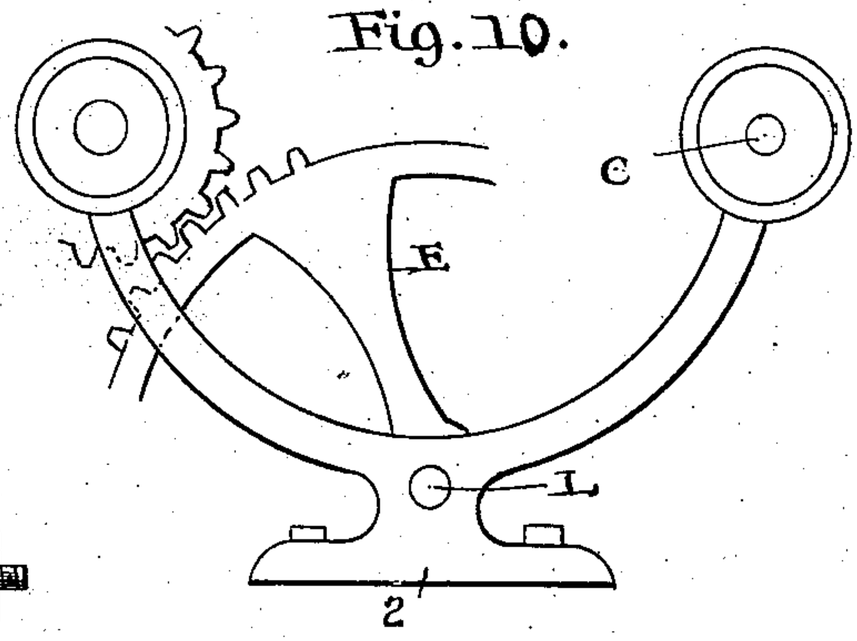


Fig. 10.



Witnesses.
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Inventor
Charles W. Hadley

UNITED STATES PATENT OFFICE.

CHARLES W. HADLEY, OF OWATONNA, MINNESOTA.

AUTOMATIC GRAIN-MEASURE.

SPECIFICATION forming part of Letters Patent No. 377,936, dated February 14, 1888.

Application filed November 16, 1886. Serial No. 219,103. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. HADLEY, a citizen of the United States, residing at Owatonna, in the county of Steele and State of Minnesota, have invented a new and useful Grain-Measuring Machine, of which the following is a specification.

The main features of my invention consist in constructing a machine that is perfectly automatic in its operation, simple in its construction, and reliable in its results.

The following is a clear and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 is a vertical central section of the entire machine. Fig. 2 is a top view showing the geared parts D, E, and D′, and their relative action. Fig. 3 is a bottom view showing the movable (or shifting) bottom H, covering the lower end of cylinder A, and its relative position to both cylinders. Fig. 4 is a top view of one of the winged wheels (or floats) and its position in the cylinder. Fig. 5 is an end view of one of said wings; Figs. 6 and 7, details representing the registering device. Fig. 8 shows, partly in section and partly in elevation, the various parts of the machine; Fig. 9, a detail showing the loose pulley and shaft; Fig. 10, a detail in plan, showing the bracket and segment. Fig. 11 is a detail in plan, showing the spring-cogs in connection with the pinion, also the brackets and cams. Figs. 12 and 13 are details in further illustration of the registering device.

In Fig. 1, A and A′ represent two receptacles for grain to be measured. They may be of round, square, or other shape and of any capacity desired, and may be made of wood or metal. The ones illustrated for the purposes of this description are of sheet metal and of a cylindrical form and of the capacity of one bushel each. Both cylinders are open at top and bottom.

H represents a shifting bottom so attached to the perpendicular shaft L that by the operation of the machine it will alternately cover the bottoms of cylinders A and A′ at the proper time, so as to prevent the passage of the grain.

The shaft L is situate between and rearwardly of the cylinders A and A′, as shown by Fig. 2, and extends above and below them, carrying at the lower end, as has been above stated, the shifting bottom H and at the upper end the segment of a wheel, E.

E represents the segment of a geared wheel, which is alternately engaged by pinions D and D′, as fully shown in Fig. 2.

C and C′ represent perpendicular shafts hung from above and extending downward a short distance into cylinders A and A′, and carrying at their lower ends winged wheels I and I′.

B and B′ are pulleys fast on the upper ends of shafts C and C′, by means of which motion and power are transferred from the separator to the shafts C and C′ in such a way as to cause them to revolve in opposite directions to each other.

D and D′ are cogged pinions, with clutches *d d′* on their under sides. They are loose on shafts C and C′ when not engaged by clutches F and F′, and are situated a short distance above the top of cylinders A and A′.

F and F′ are clutches fast to shafts C and C′ and situated about an inch below the pinions D and D′, and so arranged that when the shafts C or C′ shall be raised (sliding through the pinions D or D′) the clutches F or F′ will engage the clutches *d d′* on the under side of pinions D or D′, and transfer motion to them so long as engaged.

The segment E, as will be seen by referring to Fig. 1, is in a plane with and between the pinions D and D′, and alternately engages and receives motion from each of said pinions, as will be more fully explained hereinafter. The pinions D and D′ do not at all times engage the segment E, as will be seen by referring to the positions shown in Fig. 2. The pinion D engages the segment E, but the pinion D′ can revolve without affecting the segment E; but when the pinion D shall have revolved in the direction of its arrow the segment E will at once be brought into engagement with pinion D′, and the pinion D become itself disengaged as to segment E, until by the revolution in its turn of pinion D′ in the direction of its arrow

pinion D again becomes engaged. Both pinions are loose as to their respective shafts, except when the shafts are raised so as to engage the clutches, but are only alternately loose as to segment E.

I and I′ represent winged wheels or floats consisting of one or more wings (see Fig. 4) firmly attached to the lower end of shafts C and C′, and revolving horizontally. The front edges of the wings are turned up, Fig. 5, so as to present an inclined surface to the grain in the cylinder, and thus in the first instance allow the grain to pass readily through or over them; but when the cylinder has filled with grain so as to reach them the tendency of the wheel is to continually rise to the surface of the accumulating grain, and thereby raise the shafts C and C′, so as to cause the clutches F and F′ to engage the clutches on the pinions D and D′ and revolve said pinions.

The winged wheels can best be constructed of sheet metal.

K (shown only in Fig. 1) is a movable spout which conveys grain from the separator to the grain-measure. It is so attached to segment E (or to shaft L, if desired) as to be shifted with and in the same direction as the segment, thereby conveying grain into the cylinder, whose bottom is covered by H.

G and G′ are flanges fast on the shafts C and C′, located a short distance above pinions D and D′.

M and M′ are cams fast on the upper face of segment E and extending over the pinions D and D′ in such a position (see M in Fig. 1) that after the shaft C has been raised, the clutch F has engaged the clutch *d* on pinion D, and the segment E has commenced to revolve, the cam M will pass under the flange G, so as to prevent the shaft C from dropping out of engagement with pinion D until the shaft L has shifted the bottom H fairly under the cylinder A′.

The operation of cam M′ is the same in its relation with flange G′.

R represents a register. The units-wheel is marked T, the tens-wheel T′, and the hundreds-wheel T″. Others may be added. Fig. 6 shows the ratchet-teeth on back of units-wheel T, also ratchet-lever Z, pivoted at Y, with a double cam, S, at the (left) end, which engages a point on shaft L in such a manner as to turn the units-wheel one point each vibration of the shaft L.

Y is a shaft fast to the casing holding the register machinery. On this shaft is units-wheel T and ratchet-lever Z, loose as to each other, and also the shaft Y; but by each vibration of shaft L, Fig. 6, the cam-pin P on shaft L in passing through the cam S on the ratchet-lever Z raises and lowers the cam end of the said lever, and also at the same time lowers and raises the ratchet (or other) end of said lever Z. As the ratchet end of Z drops, it engages a ratchet-tooth on the units-wheel T, and in its upward motion carries the wheel T along one notch or number, and so on. The ratchet end of Z is made flexible, so as to pass over the ratchet-teeth of T as the ratchet end of the lever drops, (or the teeth may be engaged by a pawl on the end of Z.)

The spring detent-pawls W W′ are fixed, as seen in Fig. 11, to one of the brackets conveniently to engage with the cogs D and D′.

In order to vary the capacity of the cylinders A and A′, they are constructed double, so that by dropping the outside casing of the cylinders the capacity of the cylinders is proportionately increased. The bottom H drops with the extension of the cylinders by the sliding of the shaft L through the segement E, to which it is fastened by a set-screw, *s*, (or shaft L may be double and slide within itself.) The capacity may also be varied by raising or lowering the winged wheels I and I′ on their shafts, to which they are fastened by set-screws *o* and *o′*, respectively.

The lower part of the cylinders may be contracted, as shown in Fig. 1, or not, as desired.

Fig. 9 shows the bearing and supports of the various parts of the machine.

Bracket 1 is a bearing for the upper end of shafts C and C′, and is of the same general shape of 2. (See Fig. 10.) Bracket 2 is a bearing and support for shaft C and shaft L, and also a support by means of its cup shape for the loose gear D and D′, holding said gear out of engagement with the clutches F and F′ until the shafts C and C′ are raised, as shown in Fig. 9. Fig. 10 shows the shape of this bracket. Bracket 3 is a support for the inside portion of cylinders A and A′. Brackets 1, 2, and 3 are firmly fixed to a permanent support, 9. Brackets 4 and 5 are supports for the outside part of cylinder A′. 6 is a bearing for the lower end of shaft L. 4, 5, and 6 are fixed to a sliding post, 8, which moves in grooves in 9. 7 is a tightening-bolt to increase capacity of cylinders A and A′ by raising or lowering same. To do this, loosen bolt 7 and loosen set-screw *s* in gear E, and drop post 8, with its various attachments, as desired, sliding shaft L through segment E. When adjusted, tighten bolt 7 and set-screw *s*. Set-screw *s* engages a groove cut in shaft L, so that shaft L is always in engagement with segment E.

The various parts of the machine having been explained in detail, I will now explain the operation of the machine as a whole, to wit:

The shafts C and C′, by means of pulleys B and B′, at all times revolve, each forward and toward the shaft L, as shown in Fig. 1 by arrows.

As shown in Fig. 1, the spout K pours grain into cylinder A, which grain is stopped from passing through by shifting bottom H. The grain has continued to rise in the cylinder until it has reached the winged wheel I, the action of which upon the grain, as before explained, has caused the shaft to rise until the clutch F has engaged the clutch on pinion D, which now must revolve with shaft C, and, being in engagement with segment E, will revolve the segment to the end of the geared post. In the meantime shaft L, being fast to

the segment E and revolving with it, shifts the bottom H from under cylinder A to under cylinder A′, and the grain leaves cylinder A. The segment E having revolved till the cogs of the segment disengage the cogs of pinion D, the bottom having shifted, the cylinder emptied, and there being no support for the wheel I, the shaft C falls out of engagement at the clutches with pinion D, which pinion becomes a loose pinion in all respects.

Referring to Fig. 2, it will be seen that as segment E revolves until disengaged from the pinion D it brings itself into engagement with pinion D′. The spout K having shifted with bottom H, the grain pouring into cylinder A′ raises the winged wheel I′, which engages the clutch F′ with pinion D′ and revolves the segment E till pinion D′ is disengaged, and the bottom H shifted under cylinder A, and cylinder A′ emptied of grain, when, the spout K having shifted, the operation continues indefinitely.

The pinions D and D′ each time after disengagement with segment E and shaft are stopped in proper position to again engage the segment by means of the spring-pawls. Each time the bottom H is shifted the register advances one number.

For the purposes of this description the measurer is supposed to be attached to a grain-separator.

It is doubtless a fact that some of the principles of my machine have been used in machines for other purposes; but I do not believe they have ever been combined for the construction of a grain-measure.

The new and novel features of this automatic grain-measure upon which I wish to obtain Letters Patent are—

1. In combination with the cylinders A and A′, the shafts C and C′, pinions D and D′ on said shafts, the segment E, and the horizontally-revolving wings I and I′, respectively, at the ends of said shafts C and C′ and having their front edges turned up.

2. In combination with the vertical shafts C and C′, flanges G and G′, and pinions D and D′, each provided with a clutch on its under surface, the clutches F and F′, the cams M and M′, and the segment E, substantially as and for the purpose set forth.

3. The cylinders A and A′, and shaft L, and the movable bottom H, attached to its lower end, in combination with the vertical shafts C and C′, each having on its lower end a horizontally-revolving wing with upturned edges, and mechanism, substantially as described, whereby said bottom alternately covers the lower end of one or the other cylinder, substantially as set forth.

4. In combination with the shafts C and C′, each having a flange, G or G′, the pinions D and D′, loosely placed on said shafts, the cams M and M′, and the segment E, to which the said cams are secured, and the clutches whereby the said pinions are alternately held fast to be alternately engaged with said segment, substantially as and for the purpose set forth.

5. The combination of the detent-pawls W W′, fixed to the bracket, the shafts C and C′, and cogs or pinions D D′, loosely mounted thereon, the clutches *d d′* on the pinions and the clutches F F′ on the shafts, whereby the pinions alternately engage with their operative mechanism, substantially as set forth.

6. In an automatic grain-measurer, extensible cylinders, combined with horizontally-revolving wings secured to the operative mechanism, substantially as described, whereby when the cylinders are lengthened the wings can be correspondingly moved, substantially as and for the purpose set forth.

7. In a grain-measuring device, in combination with a movable shaft, horizontally-revolving wings adapted to be raised by the inflowing grain as it fills the cylinder in which the said wings revolve, and the mechanism operating said shaft, whereby said shaft is automatically thrown into and out of gear with the mechanism which moves it, substantially in the manner and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES W. HADLEY.

Witnesses:
R. H. JOHNSON,
J. H. LUERS.