(No Model.) 2 Sheets—Sheet 1.

# D. J. O'CONNOR.

## AUTOMATIC GRAIN WEIGHER.

No. 481,810. Patented Aug. 30, 1892.

Fig. 1.

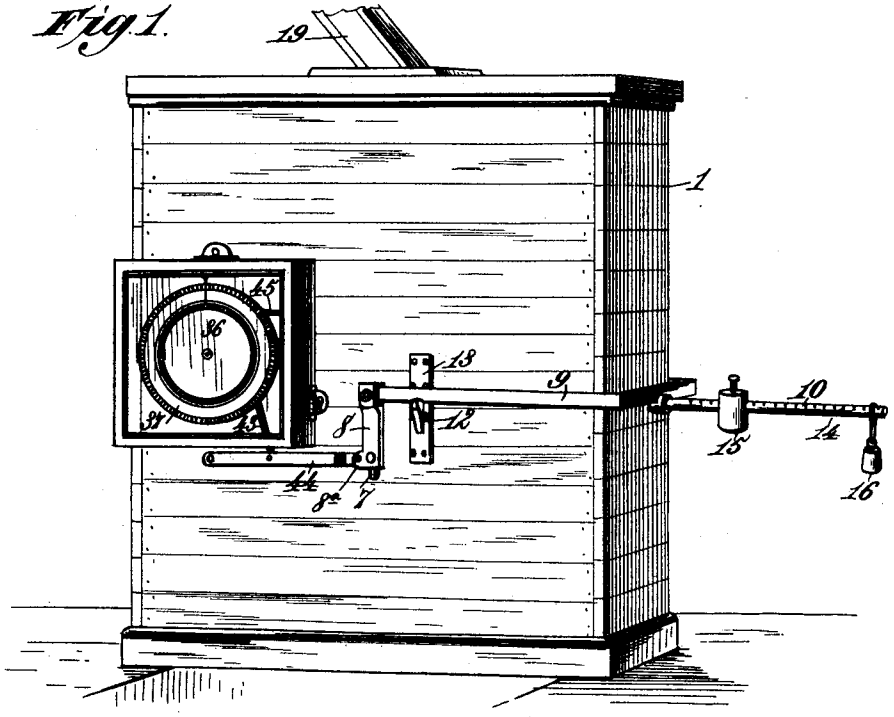
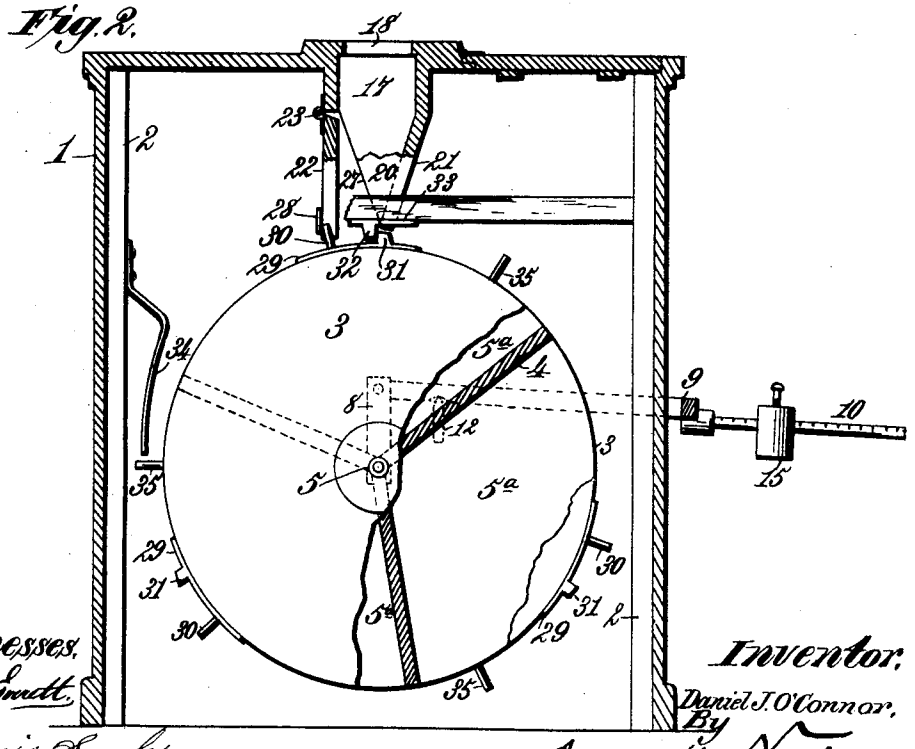



Fig. 2.




Witnesses,
Abbot Gould,
Dennis Sumby.

Inventor,
Daniel J. O'Connor,
By
James L. Norris,
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

# D. J. O'CONNOR.

## AUTOMATIC GRAIN WEIGHER.

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Fig. 3.

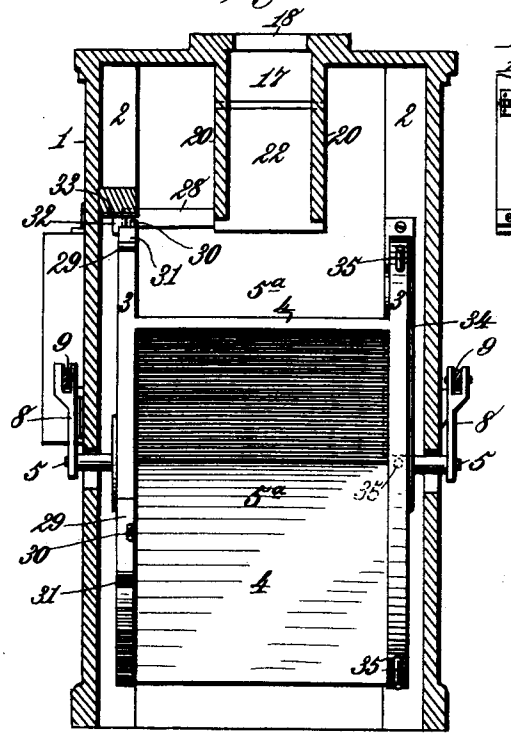



Fig. 4.

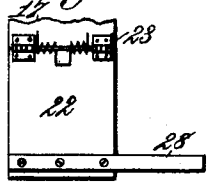



Fig. 5.

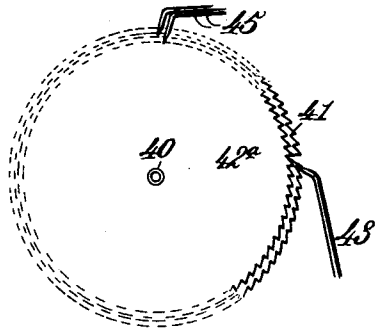
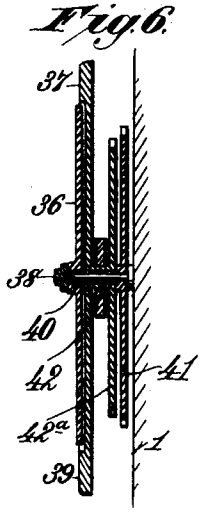



Fig. 6.




Witnesses.
Robt Ernett.
Dennis Bumby.

Inventor.
Daniel J. O'Connor.
By James L. Norris.
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

DANIEL J. O'CONNOR, OF COLUMBUS, GEORGIA.

## AUTOMATIC GRAIN-WEIGHER.

SPECIFICATION forming part of Letters Patent No. 481,810, dated August 30, 1892.

Application filed April 21, 1892. Serial No. 430,051. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL J. O'CONNOR, a citizen of the United States, residing at Columbus, in the county of Muscogee and State of Georgia, have invented new and useful Improvements in Automatic Weighing-Machines, of which the following is a specification.

My invention relates to automatic grain-scales, the purpose thereof being to provide a mechanism of this type in which the automatically-operated gate-valve for the admission of the material to be weighed shall be so operated as to avoid overweights or accumulations of stock after the weight of material becomes sufficient to tilt the scale-beam.

It is my purpose, also, to provide a mechanism of this type which shall be suitable for the weighing of flour and other soft material, which shall have a construction especially adapted to the prevention of dust-escape after the material has been spouted, and in which there shall be a material simplification and improvement in the construction, organization, and operation of the weighing mechanism; to insure a perfect balance or equilibrium between the empty cylinder and the scale-beam without regard to the particular position of the cylinder, and to provide for the quick and clean discharge of the material passing through the apparatus.

The invention consists to these ends in the several novel features of construction and new combinations of parts hereinafter fully described, and then more particularly pointed out and defined in the claims which conclude this specification.

To enable others skilled in the art to make, construct, and use my said invention, I will now proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the entire apparatus. Fig. 2 is a vertical section taken from end to end of the machine-frame in a substantially central plane. Fig. 3 is a transverse vertical section of the machine frame or housing, the cylinder being shown in elevation. Fig. 4 is a detail view of the gate-valve for the hopper removed from the machine to show the manner of hanging and operating the same. Fig. 5 is a detail view showing the ratchets operating the register-disks. Fig. 6 is a central vertical section of the registering mechanism.

In the said drawings, the reference-numeral 1 indicates the machine frame or housing, which is substantially rectangular, its several dimensions being governed by the proportions of the interior parts. The housing is usually formed of boarding secured to corner-posts 2 in any preferred manner.

Within the interior of the housing 1 is the weighing-cylinder, which is composed of the parallel disks or cylinder-heads 3, between which are arranged three radial divisional wings 4, extending from the axis 5 of the cylinder-heads to their peripheries. These wings being separated by equal intervals, the interior of the cylinder is divided into three similar and equal chambers $5^a$, each comprising a sector of the cylinder including one hundred and twenty degrees of arc, measured upon the circumference.

The cylinder is provided with an axis 5, the journals thereof projecting from each cylinder-head 3 sufficiently to pass through slots 7, cut in the side walls of the housing at such point that the cylinder shall have a suitable rise and fall to operate the scale-beam and may turn without contact with the floor upon which the housing stands. The extremities of said journals project beyond the outer walls of the housing and enter openings in link-plates 8, the forked upper ends of the latter being pivotally connected to the end of a yoke-lever 9, forming part of the scale-beam 10. The fulcra for the yoke-lever consist of knife-edged brackets 12, projecting from plates 13, screwed or otherwise secured to the exterior of the housing at suitable points relatively to the vertical plane of the axis of the cylinder. Upon the central beam of the yoke is mounted the graduated portion 14 of the scale-beam, having a balancing-weight 15 and a movable weight 16.

The material to be weighed is introduced to the housing by way of a hopper 17, hanging from the under side of the top or cover of the housing and communicating with an

opening 18 therein. Usually a spout 19 will open into the hopper through this opening 18, as shown in Fig. 1; but any other means for supplying the cylinder with the material to be weighed may be substituted for a spout.

In Fig. 2 I have shown the hopper 17 broken partly away, the upper portion being sectioned to show the means for attaching the gate-valve of the hopper. The hopper consists of side walls 20, parallel with the sides of the housing. Of the end walls of said hopper one is inclined at a small angle, as shown at 21, Fig. 2, in order to give a direction to the inflowing current of material, whereby it shall be thrown to one side of the axis of the cylinder, and for a similar reason the central line of the hopper is arranged a little to the forward side of the vertical plane of the axis 5, in order to insure the shifting of the center of gravity to the forward side of the axis. The other end wall consists of a gate-valve 22, having a hinged or pivotal connection 23, provided with any suitable spring to close the gate-valve, one form of which is shown in Fig. 4. The tension of the spring is such that the gate-valve is normally closed, for which purpose the edges of the side walls 20 are cut away at an angle, their straight edges 27 intersecting the lower end of the opposite inclined wall 21.

Upon the lower end of the gate-valve 22 is mounted a laterally-extending rigid arm 28, which projects into the plane of rotation of one of the cylinder-heads, its end lying just above the periphery thereof, upon which is mounted a plate 29, having a projecting tripping-pin 30. This pin is so arranged that the revolution of the cylinder will bring said pin into contact with the end of the arm 28 and open the gate-valve 22 at such a point that when said gate-valve is fully opened the radial wings 4 of the cylinder inclosing the chamber receiving the material from the hopper shall form unequal angles with a vertical plane passing through the axis, Fig. 2. The purpose of this arrangement is to aid in throwing the center of gravity of the load in front of the axis. Upon the same plate 29, a little in rear of the trip-pin 30, is a stop-lug 31, which is engaged by the revolution of the cylinder with a lug 32, mounted on a stop-bar 33, which projects from the end wall of the housing to a point opposite the lower end of the hopper. Its lug 32 is so arranged, however, that the tripping-pin 30 may pass the same without obstruction and engage the end of the arm 28. As it swings the gate-valve open to the proper point, the stop-lug 31 engages the lug 32 and arrests the revolution of the cylinder. As the material accumulates in the compartment and reaches the weight denoted on the scale-beam, the latter tilts upon its fulcra and lowers the cylinder far enough to disengage the tripping-pin and stop-lug simultaneously. The gate-valve 22 instantly snaps into its closed position and the cylinder rotates until a second chamber $5^a$ is brought beneath the hopper and the operation is repeated.

In order to avoid shock or such force of impact as might injure or fracture the stop-lug and carry the tripping-pin beyond its point of engagement with the arm 28, I mount upon the end wall an elastic friction-brake 34, consisting of a spring-plate attached by one end, the other end being free and curved to approach the periphery of the cylinder-head opposite that on which the tripping-pin and stop-lug are mounted. Upon the periphery of said cylinder-head I attach projecting pins 35, which engage the elastic friction-brake before the tripping-pin 30 and stop-lug 31 make their engagements and traversing and passing off the plate 34 just as the stop-lug 31 arrests the rotary movement, which is thereby retarded to such a degree that the arrest of movement of the cylinder is gentle and easy and without noise or shock in any noticeable degree.

The action of the scale is registered by dials 36 and 37, mounted on the same axis 38, the dial 36 being of somewhat less diameter than the other to provide a margin 39, on which the required figures or characters are placed. The smaller dial 36 is mounted on the end of a sleeve 40, loose on the shaft or axis 38 and rigid with its actuating-ratchet 41, mounted on the other end of the sleeve 40. The dial 37 is rigid with a separate sleeve 42, lying between the axis 38 and the sleeve 40. Said dial 37 is driven by a ratchet $42^a$ on the end of the sleeve 42 and lying in front of but close to the ratchet 41, which is a little greater in diameter, so that the points of the teeth of the smaller ratchet $42^a$ extend about as far as the base of the teeth of the larger ratchet 41. The register is operated by a push-pawl 43, mounted on an arm 44, pivotally connected at one end to the housing below the register and at the other end to an ear $8^a$ on the link-plate 8, as seen in Fig. 1. The outer and smaller dial 36 is rotated a single step to each complete revolution of the other dial 37, this being effected by cutting one of the teeth upon the larger ratchet 41 so deep that the nose of the push-pawl 43 in entering said tooth will also engage one of the teeth of the other ratchet $42^a$ and move both ratchets in unison, as shown in Fig. 5. Each dial is held against backlash by a stop-pawl 45.

By my invention I connect the scale-beam or that part of it represented by the yoke-lever 9 to the cylinder by the interposed link-plates 8, and am thereby enabled to preserve the acting distance of the yoke-lever accurately under all positions of the cylinder. This is a material advantage, as it insures equilibrium of the scale-beam and cylinder in all positions of the latter, provided the weight 16 is so placed on the scale-beam as to correctly represent the weight in the cylinder. By the manner of connecting the scale-beam and cylinder I practically exclude all dust from the weighing devices, as the only aper-

tures through which dust can issue are the slots 7, in which the journals of the cylinder lie. These slots are nearly covered by the link-plates 8, and they are so far removed from the graduated part of the scale-beam that they cause no material deposit thereon. I am able, also, to so far simplify the construction and reduce the number of parts of mechanism of this kind as to effect a very material economy in the cost of manufacture, while the operation of the mechanism is more certain and accurate, is carried on with less wear and tear, and may be conducted by boys or by any person without special knowledge.

What I claim is—

1. In an automatic weighing mechanism, the combination, with a cylinder having sector-chambers, of a yoke-lever forming part of the scale-beam and having fulcra upon the side walls of the housing, its ends being connected by link-plates to the journals of the cylinder lying in slots in said housing, and a hopper having a spring-closed gate-valve provided with an arm the end of which lies in the path of a tripping-pin on the periphery of one of the cylinder-heads, substantially as described.

2. In an automatic weighing mechanism, the combination, with a cylinder having sector-chambers, of a scale-beam composed in part of a yoke-lever fulcrumed upon the outside of the housing, its ends connected by link-plates to the journals of the cylinder, a hopper having a spring-closed gate-valve provided with an arm extended in the path of a tripping-pin on the periphery of one of the cylinder-heads, and a stop-bar projected from the wall of the housing over the cylinder and having a lug lying in the path of a stop-lug on the cylinder-head, substantially as described.

3. In an automatic weighing mechanism, the combination, with a cylinder having sector-chambers, of a yoke-lever having its arms connected at their ends to the journals of the cylinder by link-plates, a hopper having a spring-closed gate-valve provided with an arm lying in the path of a tripping-pin on one of the cylinder-heads, a stop-bar projected from the wall over the cylinder and having a lug lying in the path of a stop-lug on the cylinder a little in rear of the tripping-pin, and an elastic friction-brake consisting of a plate on the wall of the housing having its free end converged toward the periphery of the cylinder-head, on which is a pin arranged to engage with and traverse said plate, passing off the same as the gate-valve is opened, substantially as described.

4. The combination, with a frame or housing, of a chambered cylinder having a tripping-pin, a yoke-lever forming part of a scale-beam fulcrumed on the frame or housing and having its ends connected with the journals of the cylinder, a register, devices actuated by the yoke-lever to operate the register, and a hopper having a spring-closed gate-valve provided with an arm the end of which lies in the path of the tripping-pin on the cylinder, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

DANIEL J. O'CONNOR. [L. S.]

Witnesses:
VAN MARCUS,
GEO. T. CURRY.