(No Model.) 2 Sheets—Sheet 1.

C. WAIS.

AUTOMATIC GRAIN WEIGHING MACHINE.

No. 257,418. Patented May 2, 1882.

Fig. 1.

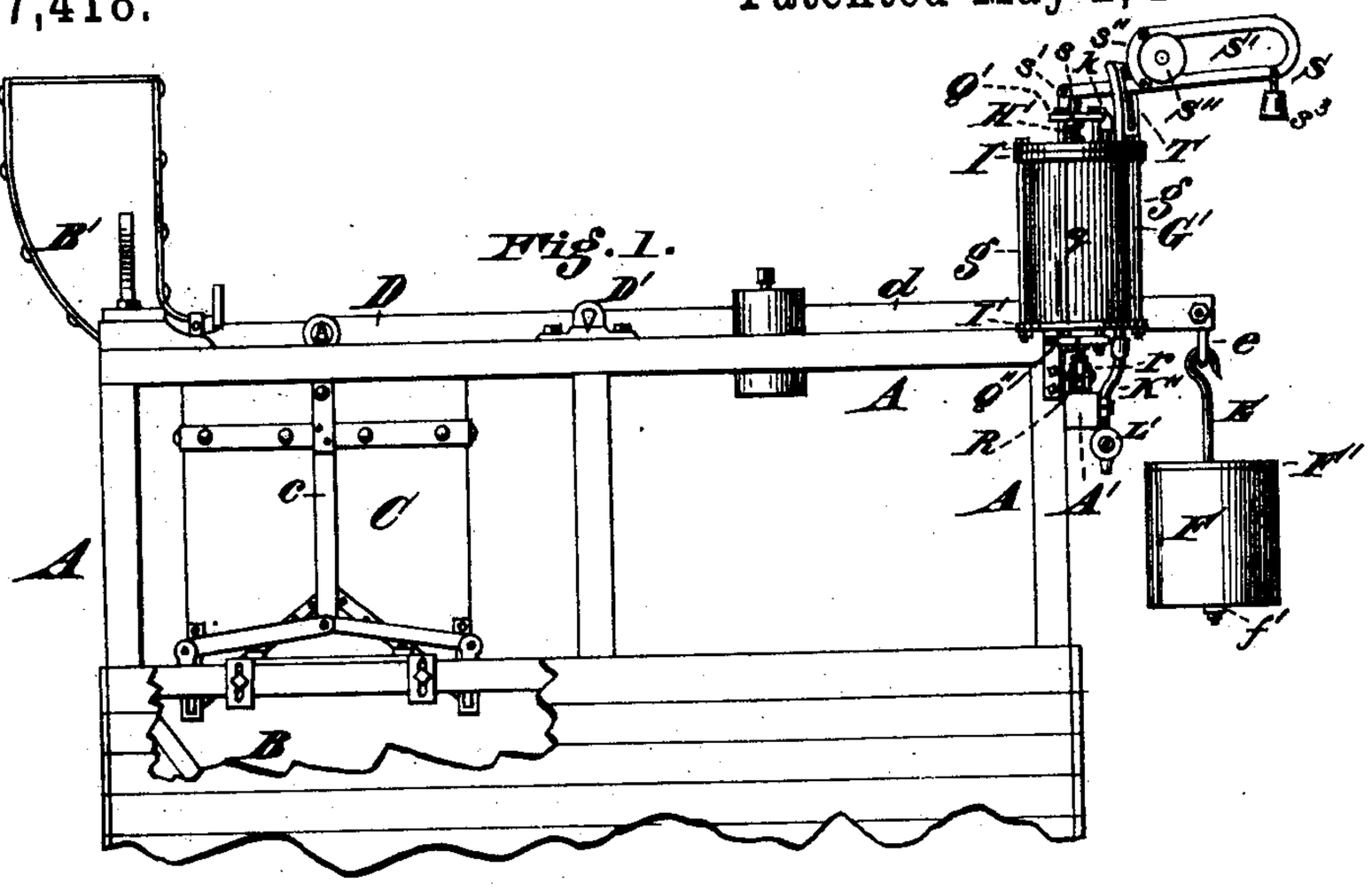

Fig. 2.

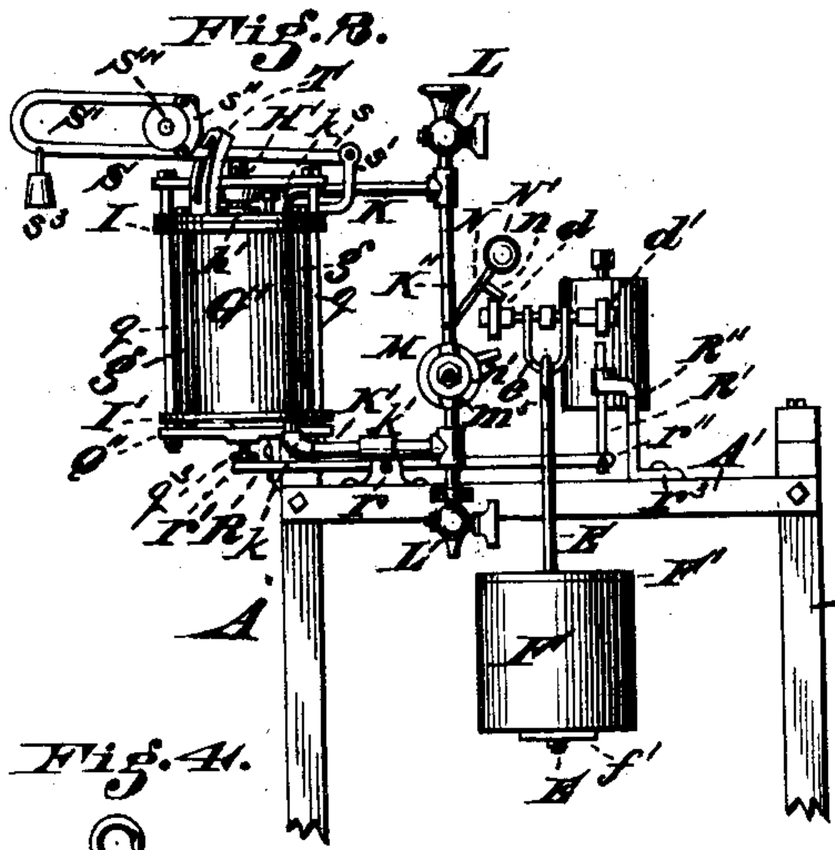

Fig. 3.

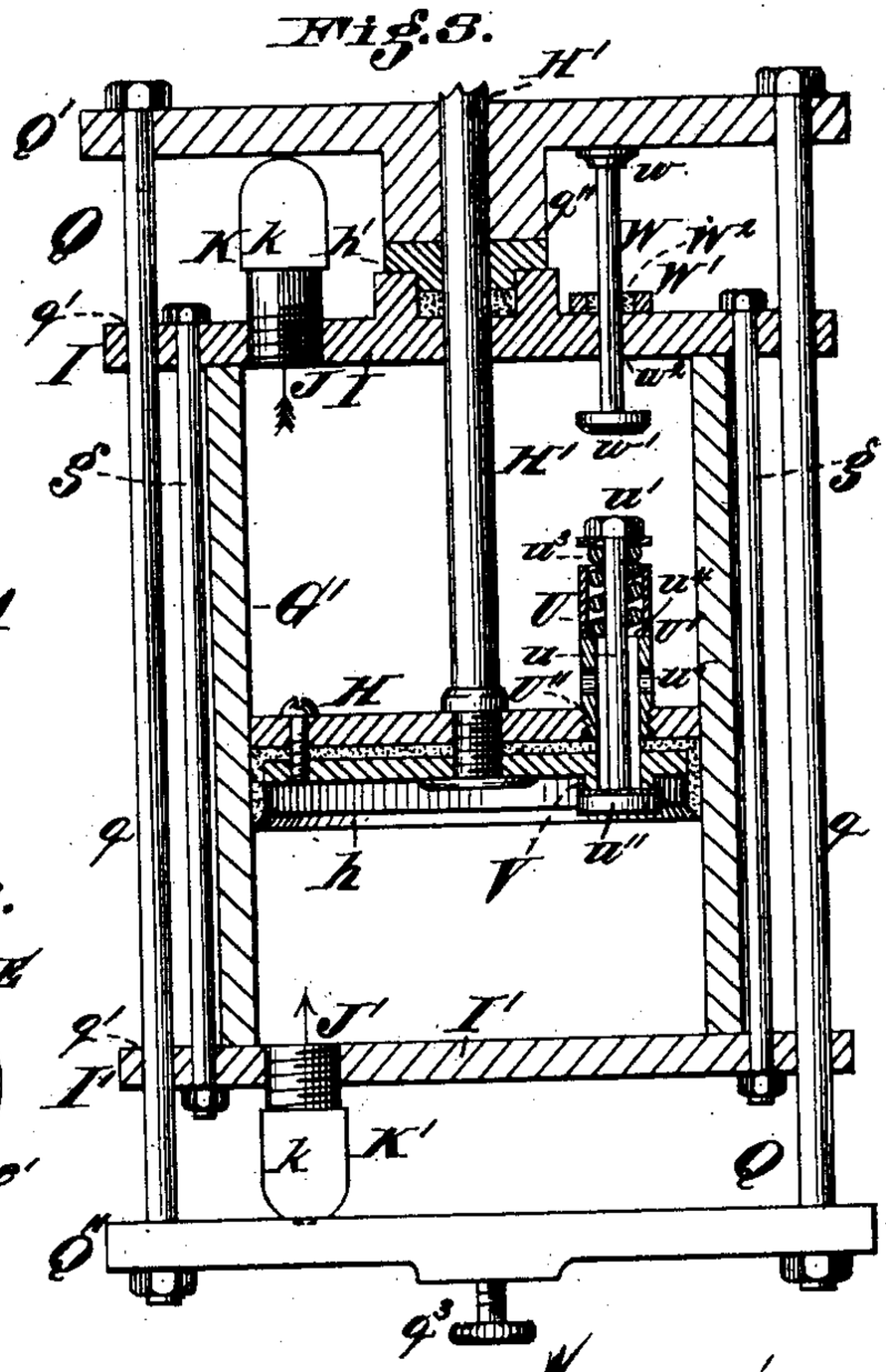

Fig. 4.

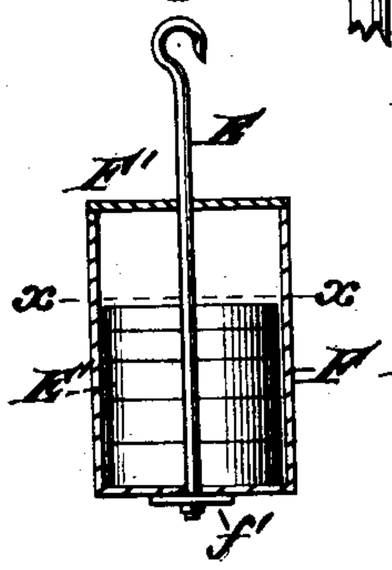

Fig. 5.

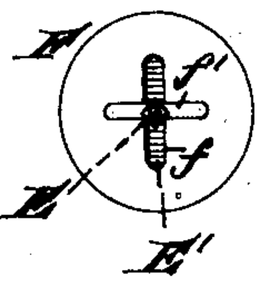

Fig. 6.

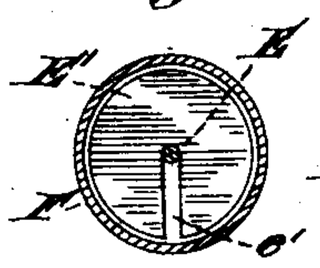

Fig. 7.

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C. WAIS.

AUTOMATIC GRAIN WEIGHING MACHINE.

No. 257,418. Patented May 2, 1882.

Fig. 8.

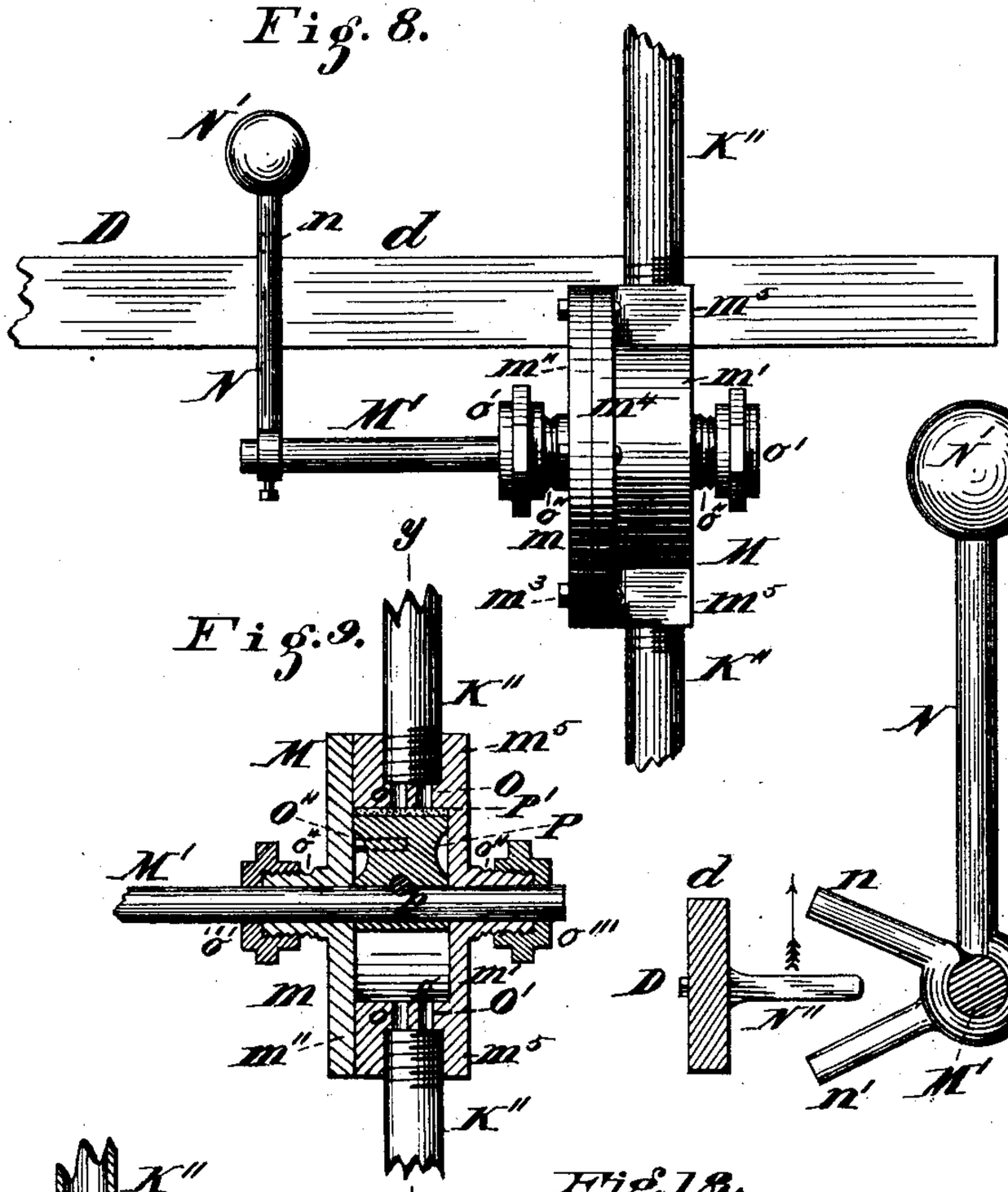


Fig. 9.

Fig. 10.

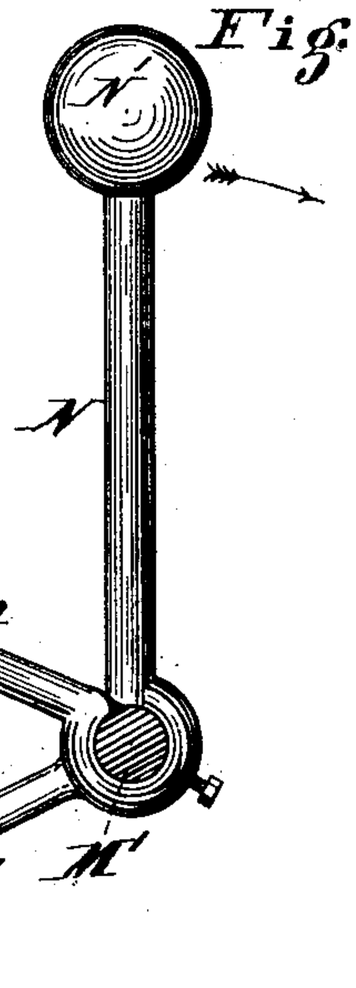


Fig. 11.

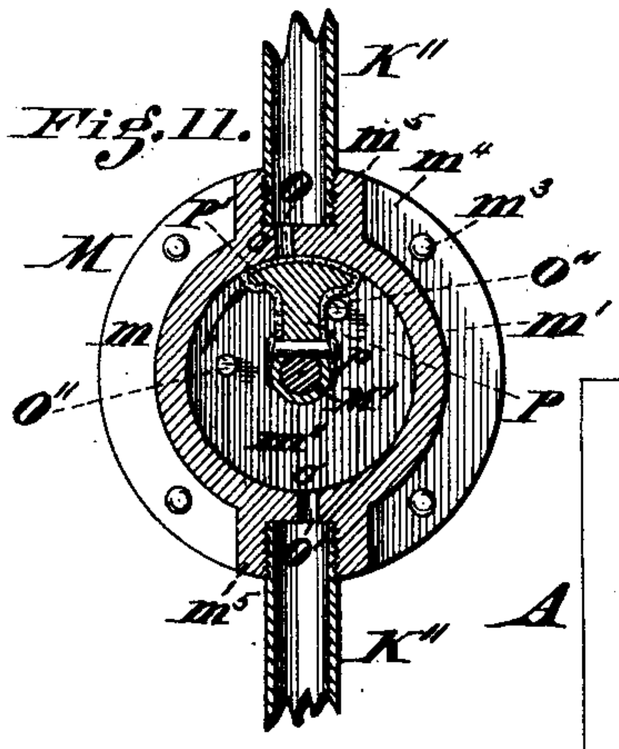
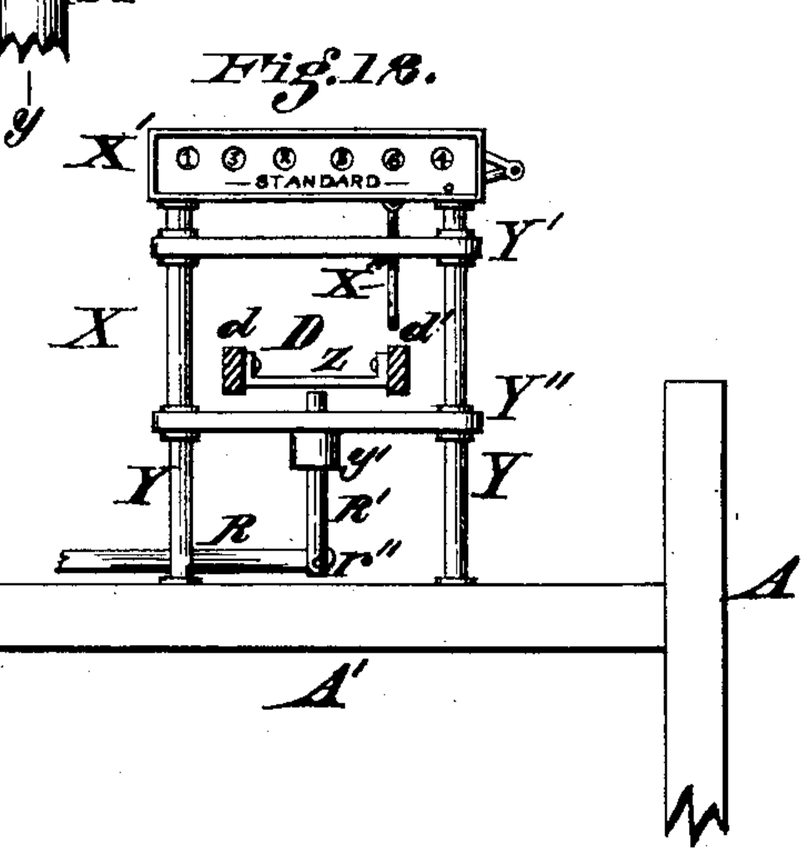


Fig. 12.



Attest
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UNITED STATES PATENT OFFICE.

CHRISTIAN WAIS, OF NEWPORT, KENTUCKY, ASSIGNOR TO SIMPSON & GAULT, OF CINCINNATI, OHIO.

AUTOMATIC GRAIN-WEIGHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 257,418, dated May 2, 1882.

Application filed October 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN WAIS, a citizen of the United States, and a resident of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Automatic Grain-Weighing Machines, of which the following is a specification.

My invention relates to an improvement in an automatic grain weighing or measuring machine, and it relates more particularly to that class which employ a pivoted bucket suspended on a weighted scale-beam having automatically-operating gates to open and close the hopper-bottom bucket.

It will not be necessary for me to describe in detail the general features of this machine, as they are fully set forth in my application for Letters Patent of the United States filed July 5, 1881.

The main object of my invention is to provide a brake mechanism for retarding the operation or movement of the scale-beam a sufficient length of time to permit the complete emptying of the bucket.

The various features of my invention will be fully set forth in the following description of the accompanying drawings.

Figure 1 is a longitudinal elevation of my improved grain-weigher, with the lower portion of the receiving-hopper shown broken off, and showing the position of the weighing devices and brake mechanism when the bucket is filling. Fig. 2 is a rear end view of the same. Fig. 3 is a central sectional elevation of a portion of the brake mechanism with the conducting-pipes and operating mechanism removed. Fig. 4 is an elevation of the weights and suspending-rod, showing their surrounding cover in cross-section. Fig. 5 is a bottom plan view of the weight-cover, showing the device for adjustably securing it in position. Fig. 6 is a transverse sectional view on line *x x*, Fig. 4. Fig. 7 is an elevation of the grooved weight for operation in connection with the brake devices. Fig. 8 is an elevation of the valve which controls the operation of the brake mechanism by its trip-lever connection with the scale-beam, which is shown broken off. Fig. 9 is a vertical central section of the valve shown in Fig. 8. Fig. 10 is an elevation of a modified form of weighted trip-lever, secured on one end of the valve-stem, and showing its operative connection with the scale-beam, which is shown in transverse section. Fig. 11 is a vertical longitudinal section of the valve on line *y y*, Fig. 9. Fig. 12 is an elevation of the upper rear end of the machine, showing the construction and arrangement of the preferred form of devices for mounting and operating the indicator.

A A′ represent the frame of the machine.

B represents the hopper or discharge-chute in which the grain is dumped from the weighing devices.

B′ represents the feed-spout.

C represents the weighing or measuring bucket, provided with ears or straps *c c*, by which it is suspended on knife-edge bearings on the forward forked ends of the scale-beam D. Scale-beam D is pivoted on knife-bearings D′ D′ on the frame A, and has preferably two yards, *d d′*, extending rearwardly.

E represents the hook weight-rod, which engages in a loop, *e*, at the ends of the scale-beams *d d′*.

E′ represents the weights on rod E, which are constructed, in the ordinary manner, with the open slots *e′*.

F represents a cylindrical cover for weights E′. It is open at one end, and provided with a central slot, *f*, in the other end, which forms its bottom. On the lower end of rod E a cross-bar, *f′*, is secured, which is of the proper size and shape to pass through slot *f* in the bottom of the cover F.

F′ represents a flat plate or disk, centrally perforated to slide on the rod E and to fit the top of cylinder F. In using the cover F F′ the weights E′ are first placed upon the rod E with the plate F′ on top. The cylinder F is then slid upward around the weights, with the slot *f* on a line with the cross-bar *f′*, which passes through the slot, and with a half or slight turn of the cylinder retains it in position. The cover F F′ serves to prevent the shifting and displacement of the weights occasioned by the shock due to the rise and fall of the scale-beam, and as much as possible obviate the corrosion of the weights and the

lodging of grain or other matter upon or between them or in the slots e', which frequently occurs in the employment of weights in common use without a guard or cover, which materially affects the accurate operation of the machine.

G represents a metal cylinder mounted on the frame A A′, at or near the end thereof, and provided with a piston, H, and rod H′, which work water-tight by means of packing h on the piston and stuffing-box h', in which the piston-rod operates vertically.

I I′ represent the upper and lower heads of the cylinder G′. They are secured in place by rods or bolts g g, as shown, or in any other well-known manner.

J represents the orifice or port in the upper head, I, of the cylinder, and J′ represents a like orifice in the lower head, I′, of the cylinder. Through these orifices J J′ the water or other fluid passes into and from the cylinder G′.

K K′ K″ represent conducting or circulating pipes, in which the fluid passes to and from the cylinder G′. The pipes K K′ are connected with the cylinder at orifices J J′ by elbows k or other suitable means, and made preferably in sections united by couplings k', as shown in Fig. 2, to facilitate the adjustment of parts when necessary. T-couplings connect the ends of pipes K K′ with pipes K″, at the upper and lower ends of which are attached supply and discharge openings governed by valves or cocks L L′, of ordinary construction.

M represents a valve connecting two sections of the pipe K″, and governing the circulation of fluid through the brake mechanism by its automatic connection with the weighing devices. The valve M is shown as closed in all figures in which it appears in the drawings, or in the condition when the weighing-bucket is filling.

M′ represents the rod or stem of valve M. It is extended beyond the outer face of the valve-shell m, on which extension a trip arm or lever, N, is secured, the preferred form of which being shown in Figs. 2 and 8.

N′ represents a weight on the end of lever N.

n represents a lug or arm on the lever N, near its upper end. (Shown in Fig. 2, and in dotted lines, Fig. 8.) This lug n, when at rest, and when the valve M is closed, projects immediately above the scale-beam d, in close proximity thereto, and is engaged by said scale-beam in its ascent, and thereby caused to swing backward, with the assistance of weight N′, and open the valve for the circulation of the fluid through the pipes and cylinder.

n' represents an arm on the lower end of lever N, projecting immediately below scale-beam d, which it follows in its ascent. In descending, the scale-beam d engages the arm n' and swings the weighted lever N forward, thereby closing the valve.

The trip-lever N may be constructed as shown in Fig. 10—that is, with the two arms n and n' arranged respectively above and below a lateral projection or lug, N″, on the yard d of the scale-beam. The preferred form of valve is shown in Figs. 2, 8, 9, and 11. Its shell m is composed of a valve-chamber, m', and a cover or plate, m'', the plate m'' being secured to the chamber m' by rivets or screws m^3 passing through the plate and the flange m^4 on chamber m'.

O O′ represent the upper and lower ports of valve M, which preferably consist of one or more apertures, o, to permit the gradual or slow inlet and outlet of fluid during the opening and closing of the valve. O″ represents pins or studs projecting from the inner face of plate m'' or chamber m'.

P represents the valve proper.

P′ represents the packing around the valve P, the whole being secured on the stem M′ by a rivet or screw, p. The valve P oscillates in the space between the pins O″, which are at the proper distance apart to serve as rests or stops for the said valve at each end of its oscillation, the packing P′ on the sides thereof acting as a cushion to obviate the shock that might be occasioned by the operation of the valve mechanism. It will be seen from the foregoing description that it will require but a quarter of a revolution of the valve P to open and close the port O, and therefore necessitate but a slight movement of the weighted trip-lever N. The two sections of pipe K″ are suitably secured in bosses m^5 on the valve-chamber m', which contains the ports O O′.

o''' o''' represent stuffing-boxes for the valve-stem M′, which are secured on screw-threaded bosses o^4 o^4 on the central outer faces of valve-chamber m' and plate m''.

Q represents a vertically-reciprocating frame on the cylinder G′. It is composed of two horizontal cross-heads, Q′ Q″, connected or united by vertical rods q q, which travel in perforations q' q', made in the flanges or heads I I′ of the cylinder G′.

q'' represents a boss on the under side of cross-head Q′, in which the upper end of piston-rod H′ is rigidly secured, with its extreme upper end extending a little beyond the upper face of cross-head Q′.

q^3 represents a regulating-screw turned centrally into the bottom of cross-head Q″.

R represents a horizontal lever, pivoted at or near its center in a bracket or box, r. The free end r' of lever R rests against the screw q^3, which regulates the distance of its movement. At the opposite end, r'', of lever R is pivoted a vertical rod, R′, which moves in a perforated guide arm bracket, R″. The upright guide-bracket R″ is provided with a foot, r^3, by which it is secured, by means of a bolt or otherwise, on the cross-beam A′ of frame A.

S represents a horizontal lever, hinged at one end, s, on an upright bracket-arm, s', which is secured to the cylinder-head I. The other end of the lever S is bent over to form a slot, S′, in which travels a circular weight, S″, the extreme end of the metal forming the slot being united with the main body of the lever by a curved tie-bar, s'', adjustably secured in position, so as to permit the entrance and removal

of weight S″. The weight S″ is of circular form, the face of its periphery being centrally grooved, as shown at s^4, Fig. 7, which groove engages the inner sides of the slotted lever S. The inner faces of the ends of slot S′ may be faced with rubber to receive the force of weight S″ at each end of its movement and prevent jar or shock.

s^3 represents a supplemental weight on the free end of lever S, acting as an accessory to traveling weight S″ and assisting to start its movement. The body of lever S passes through an upright slotted guide, T, which is shown as of curved form, the lever at its center, or thereabout, resting and bearing upon the upper end of piston-rod H′.

U represents a spring or puppet valve on the piston H. (Shown in cross-section in Fig. 3.)

u represents the stem of the valve, having a head, *w′*, at its upper end and a valve-plate, *w″*, at its lower end.

U′ represents a vertical cylinder secured in the orifice or port U″ of piston H. The valve-stem is mounted on a coil-spring, w^3, within the cylinder U′. The spring w^3 rests on a shoulder, w^4, and serves to keep the valve-plate *w″* up to its seat V on the under side of piston H.

w^5 represents the port-holes or inlet-openings in the lower end of cylinder U for the passage of fluid from above to below the piston, and vice versa.

W represents a vertical rod provided preferably with an upper and lower head, *w w′*. It passes through a perforation, w^2, in the head I of cylinder G′, in a direct line with the stem *u* of valve U.

W′ represents a stuffing box or plate secured on the inner or outer face of head I, and through which the rod W passes.

W² represents a gasket, of rubber or other similar material, which is packed so closely around rod W as to firmly grip the rod and suspend it in position for operation in connection with the valve U, and offer sufficient resistance to spring w^3 to open the valve when the head *u′* abuts head *w′* on the rise of the piston H at the completion of its upward stroke, and permit the passage of fluid from below to above the piston for slowing the operation of the piston and the weighted lever S, bearing upon its rod H′, when closing the gates of the weighing-bucket, ready for filling.

X, Fig. 12, represents the preferred construction of frame for mounting and operating the indicator X′, provided for registering the amount of grain weighed or passed through the machine.

Y Y represent uprights or posts secured in the cross-beam A′ of frame A. The indicator X′ is mounted on the upper ends thereof.

Y′ Y″ represent cross bars or ties binding the uprights Y Y. The cross-bar Y″ is centrally perforated, at which point a boss, *y′*, is constructed for the passage of the vertical rod R′, which, when in operation, engages a cross-bar, Z, connecting the yards *d d′* of the scale-beam, as shown in Fig. 12; but instead of this arrangement the said rod may in operation engage the yard *d′*, as shown in Fig. 2.

X″ represents a pendent arm connecting with the operating mechanism of indicator X′. This lever engages the scale-beam D on its ascent when the bucket is discharging.

The operation of the brake mechanism is as follows: While the weighing-bucket is filling, the various operating parts of the machine are in the position shown in the drawings. When the bucket is full or has the requisite amount of grain in it and ready for discharging, the scale-beam D rises at its rear end, the yard *d* coming in contact with the arm *n* on lever N, which moves backward, thereby opening the valve M and permitting the circulation of fluid through the pipe K″ upward, and from thence through pipe K into the cylinder G, and the weight S″, rolling to one end of the slot S′ in the lever S, causes the piston and frame Q to descend, when the screw q^3 at the lower end of the frame will act upon the lever R, thereby causing the rod R′ to rise, so that it can be struck and forced down by the beam in its downward travel when the bucket at the other end of the beam is rising, and by these means the said rod is retarded in its fall by the delay mechanism, so as to retard the scale-beam in its fall. When the bucket is empty the weights E′ on the end of the scale-beam bear, through the agency of yard *d′* or cross-bar Z, on rod R′, and it in turn operates lever R, which is in contact at its end *r′* with the regulating-screw q^3 on traveling frame Q, and raises the piston, thereby causing the valve-stem H′ to lift the lever S. The weight S″ then rolls back to its former position. At the same time the yard *d* engages the arm *n′* on the lower end of lever N, moving the lever forward, and thereby closes the valve and the circulation of fluid through the pipes. The bucket C is then raised in position for filling, with its gates closed. Fluid is fed into the pipes and cylinder through the inlet on top of pipe K″ by opening cock L. It may be discharged, when necessary, by opening cock L′ at the lower end of the pipe K″.

While I have shown the invention as combined with a single rising and falling bucket having gates to open and close the same, it is obvious that this invention can be used with any weighing or measuring device which employs a rising and falling scale-beam to trip the valves and stop and start the discharging and filling operation of the bucket. It may be applied to a revolving or reciprocating bucket, as well as to the class of automatic measuring device shown and described herein.

I claim—

1. In an automatic weighing and measuring machine, the combination, with a rising and falling scale-beam and a receiving-bucket, of a fluid brake mechanism, such substantially as described, for retarding the movement of the scale-beam a sufficient length of time to per-

mit the complete emptying of the bucket, as set forth.

2. In an automatic weighing or measuring machine, the combination, with the rising and falling scale-beam and receiving-bucket suspended therefrom, of a retarding brake mechanism for the scale-beam, composed substantially of a cylinder, G′, a valved piston, H H′, pipes K, K′, and K″, and valve M, arranged for operation substantially as and for the purposes described.

3. The combination, with the scale-beam and brake mechanism composed of a cylinder, G′, a valved piston, H, piston-rod H′, and pipes K, K′, and K″, and valve M, of the lever S, resting on said piston-rod, and provided with a traveling weight, S″, a movable frame, Q, a pivoted lever, R, and a rod, R′, arranged for operation substantially as and for the purpose described.

4. In an automatic weighing or measuring machine, the cylinder G′, having orifices J J′, and valved piston H H′, in combination with a vertically-movable frame, Q, and pipes K, K′, and K″, and valve M, arranged for operation substantially as and for the purpose described.

5. The combination of the weights E′, the cover F′, and the cylinder F, adapted to slide vertically over the weights, and provided with a slotted bottom to engage and disengage a cross-bar on the rod which is suspended from the scale-beam, substantially as described.

6. The combination of the rod suspended from the scale-beam, the weights E′ thereon, and the cover F′ of the removable and replaceable cylinder F, adapted to slide vertically over the weights, and means for confining it in position to cover said weights, substantially as described.

7. In an automatic weighing apparatus, the combination of the rising and falling scale-beam and the pivoted trip-lever N, having projecting lugs or arms *n n′*, arranged to be acted on by the scale-beam, with the valve P, the shell *m*, having the ports O O′, the pins or stops O″, the stem M′, on which the valve is mounted between the stops, and the pipes K″, said members being organized for operation substantially as shown and described.

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

CHRISTIAN WAIS.

Witnesses:

JOHN E. JONES,

EUGENE L. FIRNKOESS.