(No Model.) 2 Sheets—Sheet 1.

K. H. SCHAPER.

AUTOMATIC GRAIN SCALE.

No. 364,964. Patented June 14, 1887.

Fig. 1.

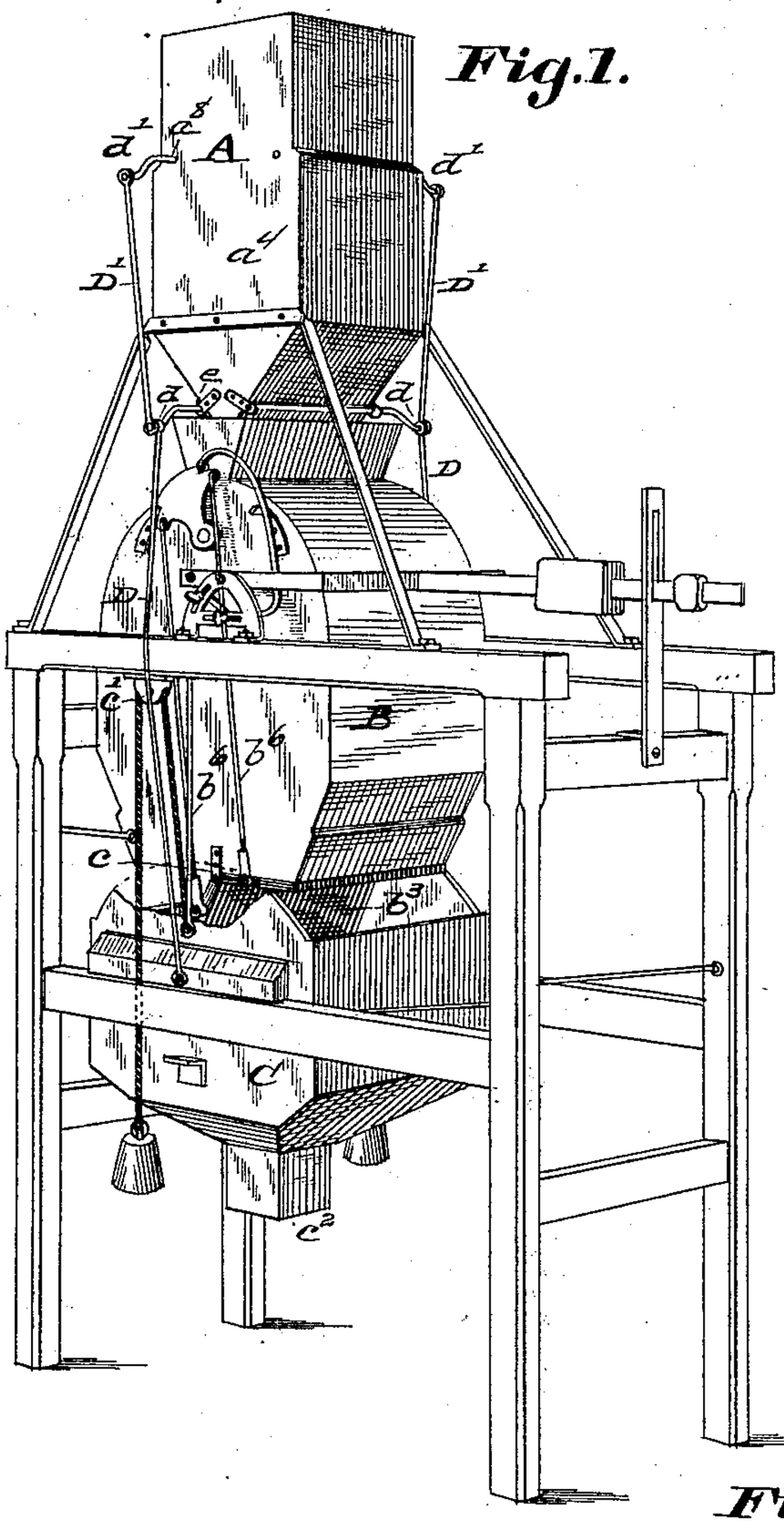


Fig. 2.

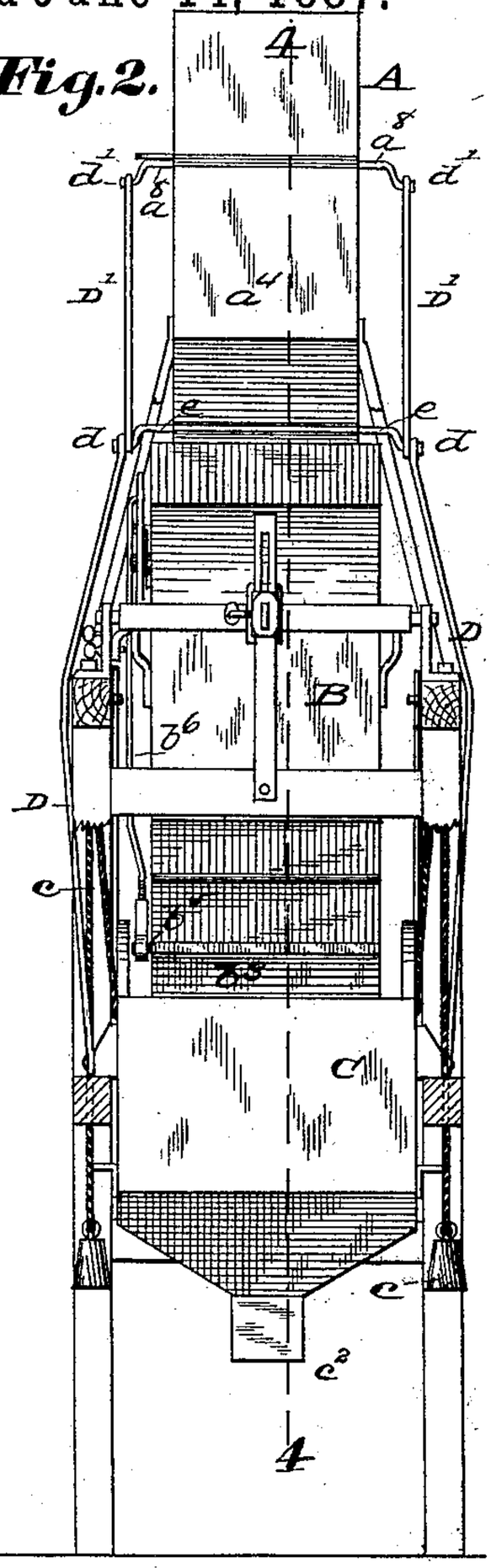
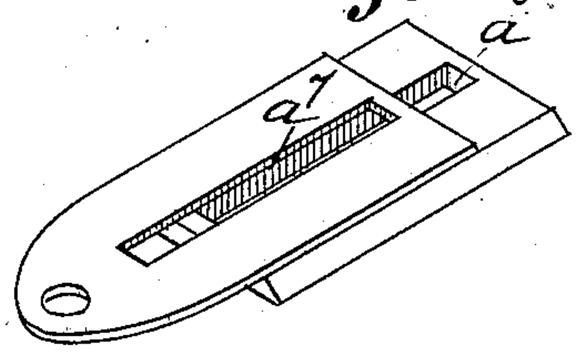


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

K. H. SCHAPER.

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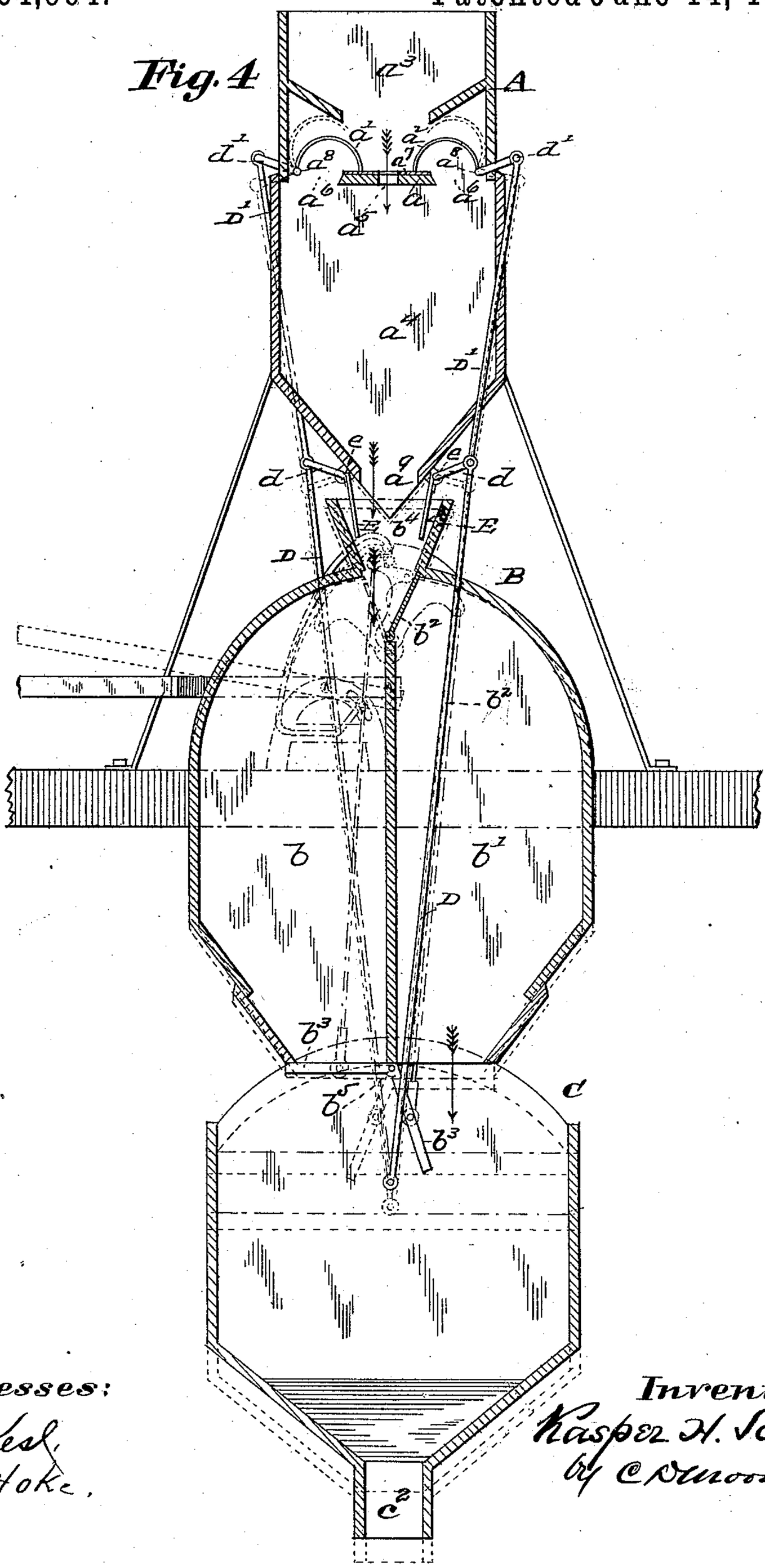
Fig. 4



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UNITED STATES PATENT OFFICE.

KASPER H. SCHAPER, OF LINN'S MILLS, MISSOURI.

AUTOMATIC GRAIN-SCALE.

SPECIFICATION forming part of Letters Patent No. 364,964, dated June 14, 1887.

Application filed January 13, 1887. Serial No. 224,244. (No model.)

To all whom it may concern:

Be it known that I, KASPER H. SCHAPER, of Linn's Mills, Missouri, have made a new and useful Improvement in Grain-Scales, of which the following is a full, clear, and exact description.

In operating grain-scales as hitherto made this difficulty is experienced: The stream of grain flowing to the scale is in practice a variable one, sometimes larger and sometimes smaller in cross-section, and in consequence the weights vary, it being impracticable to cut off a varying stream, as the weights are made so that the same amount of grain shall always enter the weighing-compartment.

The present improvement is designed to correct the difficulty referred to, as by means of it the grain is delivered into the weighing-hopper at a uniform rate, irrespective of the flow, before reaching the weighing-hopper, being uniform or not.

The most desirable mode of carrying out the improvement is exhibited in the annexed drawings, making part of this specification, in which—

Figure 1 is a view in perspective of the improved scale. Fig. 2 is an end elevation of the same. Fig. 3 is a view in perspective of the valve which may be used at the central opening at the upper end of the chamber above the weighing-hopper, and Fig. 4 is a vertical section on the line 4 4 of Fig. 2.

The same letters of reference denote the same parts.

The principal feature of the improvement is a chamber, A, above the weighing-hopper B, which receives the grain to be weighed, and is so constructed as to cause the grain at the times of weighing to be delivered in a uniform stream into the weighing-hopper, so that whether the grain flows into the chamber at a uniform rate or not it is always discharged therefrom at the same rate at the times of cutting off the delivery into the weighing-hopper. The most desirable means for effecting such a delivery into the weighing-hopper, as well as the preferable form of weighing-hopper, are as follows: The chamber A, by means of a valve-seat, *a*, and valves a' a^2, is divided into two compartments, a^3 and a^4. The grain is received in the upper compartment, a^3, and thence it falls through the openings a^5 a^6 a^6 in the valve-seat *a* into the lower compartment, a^4, thence into the weighing-hopper B, thence into a vertically-movable hopper, C, beneath the weighing-hopper, and from the sub-hopper the grain is delivered as desired.

So far as the weighing-hopper is concerned, I desire not to be restricted to any special form thereof, provided whatever form is adopted is such as to conform to and to permit of the operation of the improvement in question. I prefer, however, the particular weighing-hopper shown, and which, September 21, 1886, was patented to me. It has two similar compartments, *b* b', into which alternately, and by means of the pivoted valve b^2, the grain is delivered from the chamber A. When the complement has been delivered into one of the compartments—say the compartment *b*—the weighing-hopper drops slightly, as indicated by the broken lines, Fig. 4, and the compartment-bottom b^3 opens and allows the grain to drop from the compartment *b* into the sub-hopper C. The falling of the grain causes the sub-hopper to drop, (the movement is indicated by the broken lines, Fig. 4,) and in consequence thereof the valvular mechanism of the receiving-chamber A is actuated and the weighing operation is repeated, the grain now passing into the other compartment, b', of the weighing-hopper.

As the principal feature of the improvement is directly connected with the valvular mechanism of the chamber A, its construction and operation will be more particularly described.

Referring to Fig. 4, whatever grain that has previously accumulated in the lower compartment, a^4, is supposed to have dropped therefrom through the opening b^4 into the weighing-hopper and past the valve b^2 into the compartment *b*, and the filling of that compartment is being completed by means of such grain as falls through the central opening, a^5, in the valve-seat *a*. This opening a^5 is in practice smaller in area than the cross-sectional area of the grain-stream entering the chamber A when at its smallest, and hence the stream falling through the opening a^5 is always constant, and the cut-off for arresting the descent of the grain into the weighing-hopper

or either of its compartments at the times of weighing can, in consequence of the constancy of the stream of grain, be adjusted to admit the same amount of grain regularly into the weighing-hopper or either of its compartments.

To adapt the machine to different kinds or grades of grain, the opening a^5 is adapted to be enlarged or diminished to a limited extent; and a convenient procedure in this respect is to employ one or more slides, the openings a^7 in which vary somewhat in size from each other, and are smaller than the opening a^5, and when a particular kind or grade of grain is being run through the scale the slide belonging to that grade is inserted above the valve-seat, substantially as shown. The grain continues to fall through the opening a^5 into the compartment b until the proper weight has been received therein. The weighing-hopper then drops, as described, causing, by the means hereinafter referred to, the bottom b^3 to turn on its pivot b^4 and thereby provide for discharging the grain from the compartment b into the sub-hopper C. The movement is communicated to the valve b^2, causing the valve to turn on its pivot, and close the entrance into the compartment b and open that into the compartment b'. Immediately after this described movement of the valve b^2 the following occurs: The falling of the grain into the sub-hopper C causes that part (the sub-hopper C is suspended by means of the weighted cords c from the bearings c') to drop, as above described. The movement, by means of the rods D D D′ D′, is communicated to the cranks d d d' d', which are respectively attached to the shafts e e a^8 a^8 of the valves E E a' a^2, Fig. 4. The valves E E are for opening and closing the exit a^9 from the compartment a^4, and the valves a' a^2 serve to open and close the passages a^6 a^6, respectively, in the valve-seat a. The downward movement of the sub-hopper thus causes the exit a^9 to be closed and the passages a^6 a^6 to be opened. The grain then falls through all the openings in the valve-seat and accumulates in the lower compartment, a^4. Following this, the grain escapes through the outlet c^2, from the sub-hopper C, sufficiently to enable the sub-hopper to rise, whereupon the exit a^9 of the chamber A is opened and the passages a^6 a^6 closed again, leaving only the passage a^5 open, when the grain-weighing operation is repeated *via* the compartment b' of the weighing-hopper. The grain is then discharged from the compartment b' into the sub-hopper, the valve b^2 is turned back again to close the entrance into the compartment b', and to open that into the compartment b, the sub-hopper is moved again, and the valves of the chamber A operated again, and the grain is again weighed in the compartment b, and so on.

The weighing-hopper, so far as its individual movement is concerned, is operated substantially as in the previously-patented construction above referred to. Some minor features of the construction have been slightly modified. The compartment-bottoms in the present instance are made in a single piece, b^3, and the device upon the valve-shaft at the upper end of the weighing-hopper, and with which the rods b^6, leading upward from the part b^3, connect, has been somewhat changed, substantially as shown.

I claim—

1. The combination of the chamber A, the weighing-hopper B, and the sub-hopper C, said chamber A having the valve-seat a, in which are the openings a^5 a^6 a^6, the valves a' a^2, and the valves E E, said weighing-hopper having the compartments b b', the valve b^2, and the pivoted bottom b^3, and said sub-hopper having connections leading to the valves of said chamber A, substantially as described.

2. A grain-scale having above the weighing-hopper a chamber through which the grain flows to the weighing-hopper, said chamber having means—such as a valve—for arresting the grain-flow into the weighing-hopper at the times of weighing, and also having means—such as a valve—for graduating the inflow of the grain into said chamber at the times of weighing, substantially as described.

KASPER H. SCHAPER.

Witnesses:
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