

(No Model.)

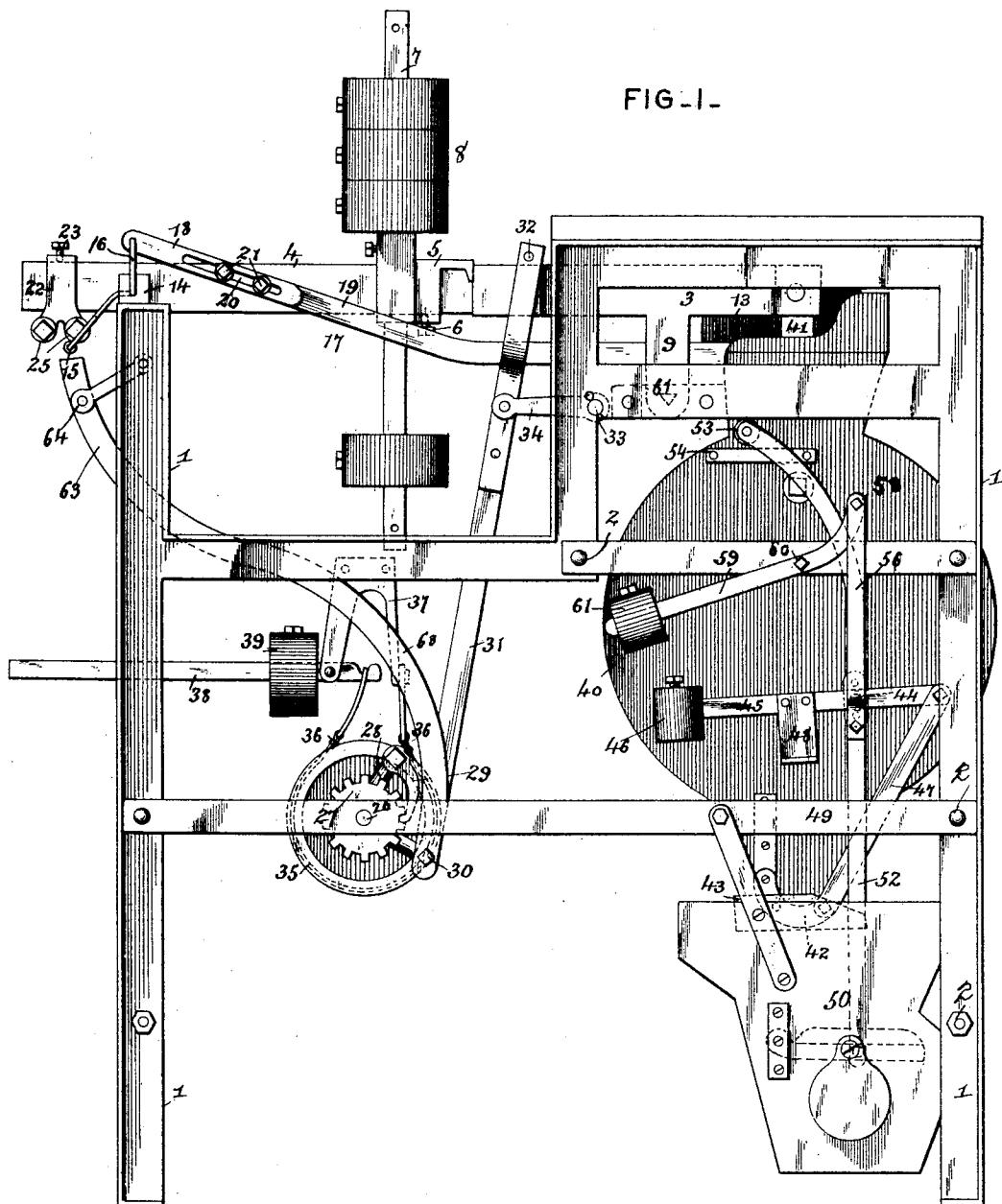
4 Sheets—Sheet 1.

H. E. HAWK.
GRAIN METER.

No. 461,336.

Patented Oct. 13, 1891.

FIG. 1.



Witnesses:

Jas. K. McElathnan

W. S. Duwall

Inventor

Hale E. Hawk

By his Attorneys,

Cashow & Co.

(No Model.)

4 Sheets—Sheet 2.

H. E. HAWK.
GRAIN METER.

No. 461,336.

Patented Oct. 13, 1891.

FIG. 4 -

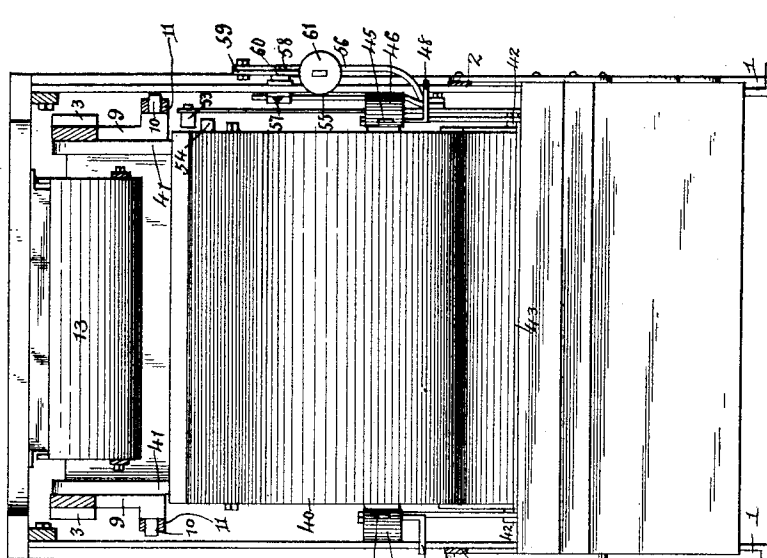
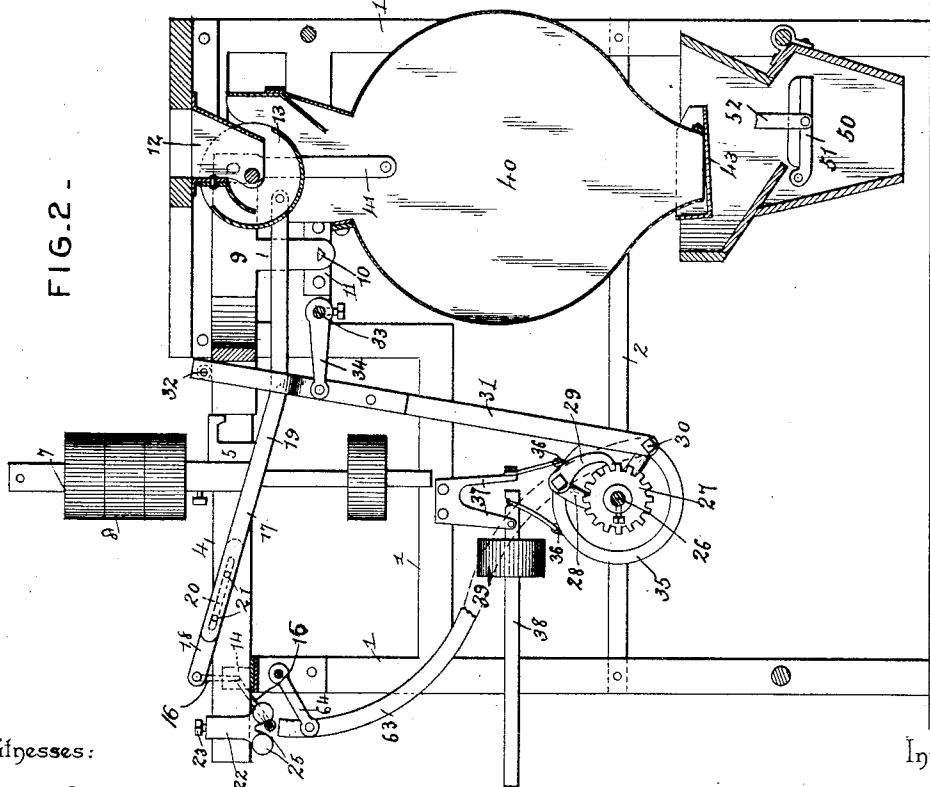


FIG. 2 -



Witnesses:

Jas. K. McElathman

W. S. Duwall,

By his Attorneys,

C. A. Snow & Co.

Inventor

Hale E. Hawk

(No Model.)

4 Sheets—Sheet 3.

H. E. HAWK.
GRAIN METER.

No. 461,336.

Patented Oct. 13, 1891.

FIG. 5 -

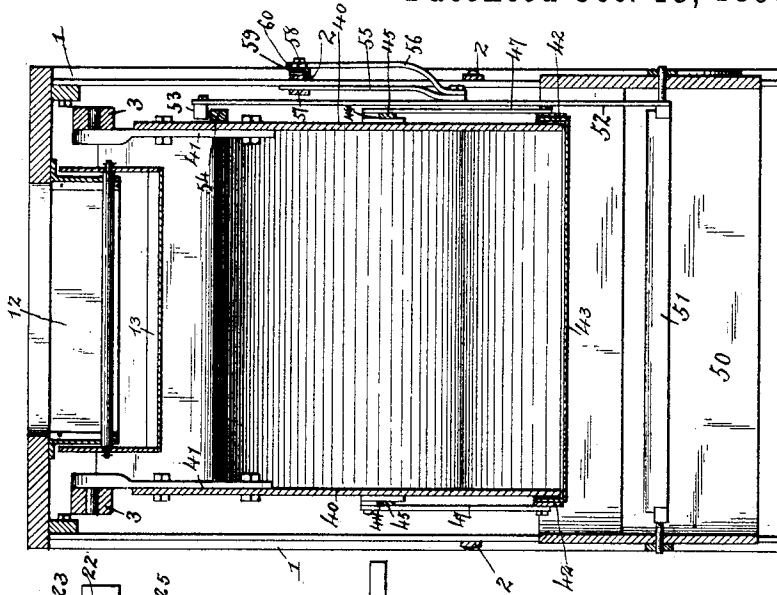
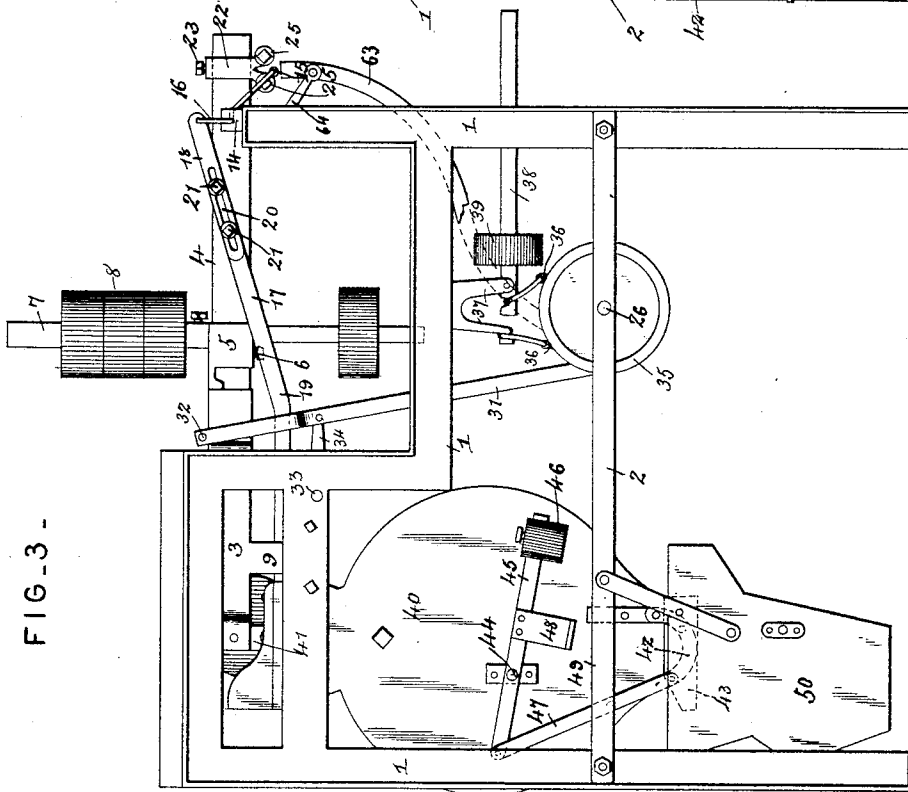


FIG. 3 -



Witnesses:

Jas. K. McElathran

W. S. Duwall

By his Attorneys.

Inventor

Hale E. Hawk.

C. A. Snow & Co.

(No Model.)

4 Sheets—Sheet 4.

H. E. HAWK.
GRAIN METER.

No. 461,336.

Patented Oct. 13, 1891.

FIG-6-

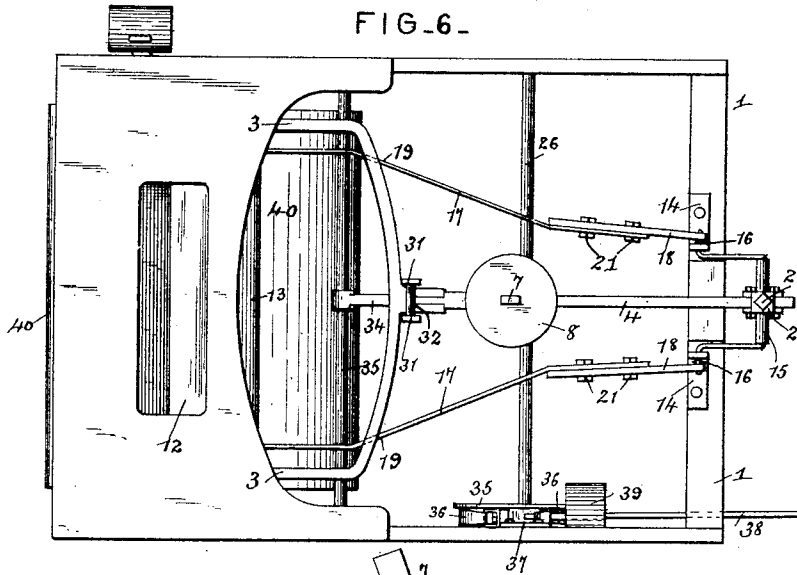
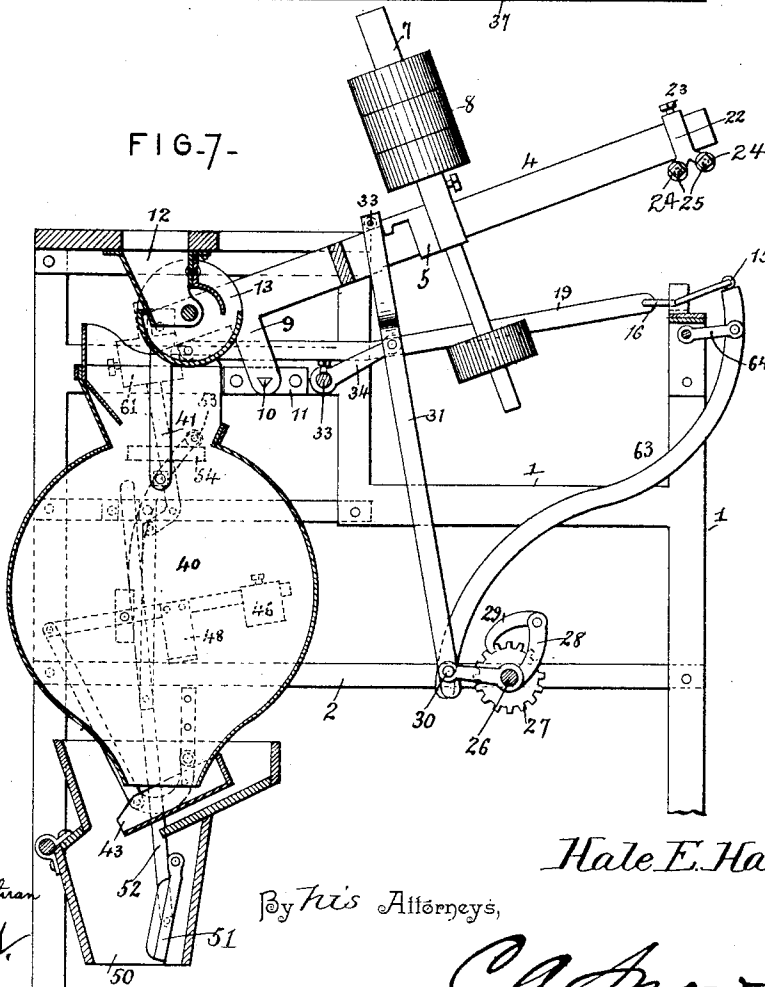


FIG-7-



Witnesses

Jan. R. McLachlan
J. H. Liggers.

By His Attorneys,

Inventor

Hale E. Hawk

Cashow & Co.

UNITED STATES PATENT OFFICE.

HALE E. HAWK, OF BUCYRUS, OHIO.

GRAIN-METER.

SPECIFICATION forming part of Letters Patent No. 461,336, dated October 13, 1891.

Application filed October 1, 1890. Serial No. 366,744. (No model.)

To all whom it may concern:

Be it known that I, HALE E. HAWK, a citizen of the United States, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented a new and useful Grain-Scale, of which the following is a specification.

This invention has relation to scales for measuring grain and other cereals or materials, and the objects in view are to provide a machine adapted to correctly and rapidly weigh grain in predetermined quantities, and to be so constructed as to deliver all particles of grain previous to the return of the weighing-receptacle for the purpose of receiving a fresh supply, and, furthermore, to accomplish the above by the weight of the grain and without sacrificing the simplicity and cheapness of the machine as a whole.

Various other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of the grain-scale constructed in accordance with my invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is an opposite side elevation. Fig. 4 is a transverse vertical section in front of the hopper. Fig. 5 is a similar view through the hopper. Fig. 6 is a plan view of the machine. Fig. 7 is a sectional view similar to Fig. 2, but showing the parts in their proper position when dumping.

Like numerals indicate like parts in all figures of the drawings.

In practicing my invention I construct the frame-work of the usual opposite side frames 1, connected at intervals by suitable tie-bolts 2, and mount the same upon a suitable base.

3 designates a bifurcated yoke which terminates at its front in a forwardly-disposed scale-beam 4, upon which is mounted a sleeve 5, made adjustable by a set-bolt 6, and in the sleeve is mounted for adjustment a poised bar 7, designed to receive a series of weights 8. From the opposite branches of the yoke or bail there depends fulcrumed arms 9, which terminate in bearings 10, mounted in bearing-brackets 11, secured to the inner faces of opposite side bars of the frames.

12 designates a feed-spout located verti-

cally opposite and depending into the receptacle hereinafter mentioned, and to the same is pivoted the semi-cylindrical-shaped cut-off 13.

14 designates a pair of brackets located upon the front bar of the frame-work, and in side brackets there is journaled a rock-shaft, which rock-shaft between the brackets is provided with a central cranked portion 15, and outside of the brackets with cranked arms 16, disposed at substantially a right angle to the central cranked portion. The outer cranked portions are connected to the cut-off of the feed-spout by means of a pair of connecting-rods 17, which rods are formed in sections 18 and 19, the former being slotted, as at 20, and connected to the latter by means of set-bolts 21, whereby said rods are made adjustable. Upon the central cranked portion of the rock-shaft just mentioned is designed to rest the front end of the scale-beam, over which end is adjustably mounted a saddle 22 by means of a set-bolt 23. The lower end of the saddle is V-shaped and is provided with opposite bearings 24, (see dotted lines, Fig. 7,) in which are journaled opposite pairs of rollers 25, over which rides the central cranked portion of the aforesaid rock-shaft.

In opposite pairs of side bars there is journaled a brake-shaft 26, which at its center is provided with a ratchet-wheel 27, fixedly mounted thereupon. An arm 28 is loosely mounted upon the shaft at one side of the ratchet-wheel and carries a loose gravity-pawl 29, the free end of which is designed to engage the teeth of the ratchet-wheel. The arm just mentioned is bell-crank in shape, and to the opposite end of the same, as at 30, is pivoted a vertical rod 31, the upper end of which is bifurcated and loosely embraces the scale-beam, above which the terminals of the bifurcations are connected by loose roller 32. Below the bifurcations the side bar is connected to the rock-shaft 33 by means of a rock-arm 34, as shown, whereby said bar is steadied in its movements.

Near one end of the brake-shaft there is mounted a brake-pulley 35, around which is passed a brake-strap 36, one end of which is fastened to the depending U-shaped bracket 37 and the opposite end to the inner end of

the weighted end of a lever 38, pivoted in the opposite branch of said bracket and carrying the weight 39 adjustably thereupon.

40 designates the main receptacle or hopper, which, by straps 41, is loosely suspended on the rear terminals or ends of the yoke or bail of the scale-beam. In opposite straps 42, secured to the opposite sides of the receptacle, there is pivoted a hinged cut-off or gate 43, adapted to close the mouth or lower end of said receptacle. Above said gate or cut-off there is pivoted, as at 44, opposite weighted levers 45, their outer ends carrying weights 46 and their inner ends pivotally connected to connecting-rods 47, the lower ends of which are pivotally connected to the opposite ends of the cut-off or gate. Between its weight and fulcrum-point the opposite levers are provided with depending L-shaped stops 48, designed to come in contact with opposite side bars 49 when said receptacle is being lowered, and the said levers are raised at their weighted ends and the free ends of the gate depressed or lowered, so as to uncover the opening or discharge in the lower end of the receptacle.

50 designates the receiving-hopper designed to discharge the grain into any receptacle placed thereunder, and said hopper is provided near its lower end with the hinged gate 51, adapted to be raised and lowered to uncover the opening in the hopper. The free end of the gate is pivotally connected to the lower end of a vertical connecting-bar 52, the upper end of which is inwardly bent, as at 53, and designed to take over and engage a projection 54, formed upon one side of the receptacle. Below its end the connecting-bar is provided with a pair of straps 55 and 56, the inner or former strap passing through a guide or eye 57, while the outer or latter strap is pivotally connected, as at 58, to the free end of the lever 59, fulcrumed, as at 60, upon one of the side frames, which lever at its opposite end carries a weight 61.

The above being the construction, the operation of my scale is as follows: The beam being lowered to its normal position and the weight adjusted, the valve or cut-off of the spout is opened to permit grain or other materials to be weighed to pass therefrom into the receptacle, the bottom of which is closed by the gate heretofore described. As the weight of the grain or other material approximates that of the weights, the receptacle begins to lower slightly, the cranked rock-shaft at the front end of the frame-work is freed or relieved of the weight of the scale-beam heretofore resting thereupon. The weight of the grain in the cut-off, which, it will be observed, is so constructed as to permit the grain to overflow therefrom into the receptacle, causes said cut-off to swing to nearly a closed position. As the cut-off swings toward its closed position, it balances with the beam, and the central cranked portion of the rock-shaft, just mentioned, rides over the inner roller of the

saddle and takes into the V-shaped recess formed upon the under side of the saddle between the rollers, and said cranked portion is thereby held in such position that but a few grains at a time can escape from the cut-off or overflow therefrom into the receptacle. When sufficient grain has thus passed into the receptacle and wholly counterbalances the weights upon the scale-beam, it depresses the receptacle and elevates the scale-beam to such a degree as to wholly liberate the crank-shaft and permit the cut-off of the feed-spout to entirely close. It will now be seen that the receptacle has received exactly the amount of grain desired, as determined by the weights upon the beam. As the receptacle descends, the depending stop upon the weighted lever, which controls the movement of the gate of the receptacle, comes in contact with one of the side bars of the opposite side frames, and the weighted end of the said lever is thus elevated against the influence of the weight. Consequently the free end of the gate is positively lowered or depressed, so that the mouth or discharge end of the receptacle is opened and the grain can escape therefrom. As the grain passes from the receptacle, it falls upon the gate pivoted within the discharge-hopper and depresses said gate, causing the weighted lever connected to the same, and which normally raises the gate, to be elevated against the influence of its weight. The downward movement of the gate also draws down the connecting-rod which connects the gate with the aforementioned weighted lever, and in so doing the upper bent end of the lever is drawn down upon the projection located upon the side of the receptacle. In this way the receptacle is prevented from returning to a raised position and thus closing the gate and arresting the discharge of grain until every grain has passed from the gate of the lower hopper, by which time it will be apparent that all grain has passed from the receptacle. The weight upon the scale-beam now returns the receptacle to an elevated position and the several gates before mentioned resume their normal position. By reason of the weighted arm connected to the connecting-rod the bent end of the connecting-rod is by said arm elevated above the projection upon the receptacle, so that its weight does not in any way affect the perfect balancing of the scale-beam, the receptacle, and the weights.

When the beam is in the act of descending, the gravity-pawl being in mesh with the ratchet upon the brake-shaft, said brake-shaft is rotated slowly or gradually by reason of the brake band or strap being snugly drawn upon the brake-pulley by the weight upon the brake-lever.

The connecting-rod 56, it will be observed, has its upper end forwardly curved, so that its bent extremity engaging with the receptacle traverses a line across the pivot of the valve and the connection to the valve, thus gaining on the leverage, so that it does not

lop and yet arrives at a normal position easily after the pressure of grain has left.

In practice I have found that owing to foreign matter—such as straws, &c.—being in the grain the cut-off 13 will refuse to automatically entirely close, and thus a small stream of grain continues to overflow the edge of the cut-off after the receptacle has been lowered. Oftentimes, also, dishonest persons tampering with the grain-scale may depress the crank-shaft 15, and thus continue the escape of grain into the receptacle after the same has lowered and received its proper quantity of grain. By my invention I avoid such contingencies above set forth, which part of my invention I will now proceed to describe.

63 designates a bar or rod compoundly curved, the lower end of the bar being mounted upon the bolt 30 and the upper end extending under the central crank 15 of the crank-shaft 14. Below its upper end the curved bar 63 is connected to the frame-work by a link 64, said link being pivoted to the frame-work. As the grain in the receptacle serves to lower the same and elevates the front end of the scale-beam, said scale-beam, as before stated, elevates the rod 31, and it will be observed it will also elevate the curved bar 63. When the scale-beam leaves the cranks 15, said crank is elevated by the closing of the cut-off. At the time that the crank is elevated the bar 63 is raised, so that its upper end swings up under and against the crank 15 and holds the same in that position, so that it is impossible for a person to tamper with the cut-off by lowering the crank or for the cut-off to be otherwise than perfectly closed when the receptacle is lowered.

Although shown and described herein, I do not in this application broadly claim the following: The crank-shaft and device connecting the same with the cut-off, the rotary brake mechanism and connections between the same and scale-beam, and the weighted and pivoted gate at the lower end of the receptacle, as such forms the subject-matter of separate pending applications bearing Serial Nos. 351,177 and 377,702.

Having described my invention, what I claim is—

1. In a grain-scale, the combination, with the frame-work and a bail fulcrumed in the frame and extended to form a scale-beam, of a receptacle suspended from the bail, a discharge-spout depending into the receptacle, a pivoted cut-off for the spout, a rock-shaft journaled in the frame-work and having its central portion cranked and its ends outside of its bearings cranked and disposed at an angle to the central crank portion, rods connecting the outer cranked portions with the cut-off, and a saddle mounted upon the end of the scale-beam and provided upon its under side with a recess adapted to receive the central cranked portion of the rock-shaft when the latter is slightly rotated, substantially as specified.

2. In a grain-scale, the combination, with

the frame-work and a pivoted scale-beam, of a receptacle loosely suspended from the beam, a discharge-spout depending into the receptacle, a pivoted cut-off for the spout, a rock-shaft journaled in the frame-work, cranked at its center and opposite ends, the opposite adjustable connecting-rods loosely connecting the outer cranks with the ends of the cut-off, and the saddle adjustably mounted upon the end of the scale-beam and provided with diverging branches, in which are journaled loose rollers, the space between which forms a recess adapted to receive the central cranked portion of the rock-shaft, substantially as specified.

3. In a grain-scale, the combination, with the frame-work, a scale-beam terminating in a bail fulcrumed in the frame-work, a receptacle loosely suspended from the bail, and the hopper arranged below said receptacle and receiving the material therefrom, of the gate located at the lower end of the receptacle and adapted to be actuated at each depression of the receptacle, a hinged gate located in the lower hopper, a connecting-rod 52, pivotally connected at its lower end to the gate, a stop 53, projecting from the rod, and a stop 54, mounted upon the side of the receptacle and adapted to take under the stop of the rod when said receptacle is lowered, substantially as specified.

4. In a grain-scale, the combination, with the frame-work, a bail terminating in a scale-beam fulcrumed in the frame-work, a receptacle loosely suspended from the bail, and a hopper arranged below the mouth of the receptacle, of a hinged gate secured to the lower end of the receptacle, means for closing said gate at each upward movement of the receptacle and opening the same when lowered, a gate hinged in the lower end of the hopper, a rod pivoted at one end to the gate, extending up, and inwardly bent opposite the receptacle, a stop secured to the face of the receptacle and adapted to engage said bent end, a weighted lever arranged at one side of the rod, and a pair of straps secured to the rod, one of said straps passing through a guide and the other pivotally connected to the unweighted end of the lever, substantially as specified.

5. In a grain-scale, the combination, with the frame-work, of the pivoted scale-beam, the receptacle loosely suspended from the scale-beam, the brake-shaft 26, provided with a ratchet-wheel 27, the arm depending from the scale-beam and carrying a pawl to engage the ratchet-wheel, the brake-pulley 35, the brake-straps 36, the brackets 37, to which one end of the strap is attached, and the weighted lever 38, attached to the other end of the strap, substantially as specified.

6. In a grain-scale, the combination, with the pivoted scale-beam, of the receptacle loosely suspended therefrom, the discharge-hopper 50 below the receptacle, and a hinged gate 51 for the said discharge-hopper, being also provided with weighted-lever connec-

tions, the latter being adapted to engage a stop on the receptacle to hold the latter down when in the act of dumping, as set forth.

7. In a grain-scale, the combination, with
5 the fulcrumed scale-beam, the receptacle supported thereby, and the supply above the receptacle and the pivoted cut-off, of the frame-work for the support of these elements, the shaft 26, having the arm extending therefrom,
10 the rod or bar 63, pivoted to the arms and loosely connected at its upper end to the frame-work, the crank-shaft having a crank located above the upper end of the bar 63 and in its path, and the rod 19, connected with
15 the crank-shaft and eccentrically with the cut-off, substantially as specified.

8. The combination, with the discharge 12, the cut-off 13, pivoted thereto, the frame-work, the scale-beam, the receptacle, the crank-shaft, and the rod 19, connecting the crank-shaft with the cut-off, of means for supporting positively said crank-shaft when the scale-beam is raised, substantially as specified.

9. In a grain-scale, the combination, with
25 the frame-work, a fulcrumed scale-beam, a chute, an oscillating cut-off, and a movable hopper suspended from the beam, of a bail located upon the frame-work and in the path of and adapted to be depressed by the scale-beam, connecting-rods between the cut-off or
30 valve and the bail at one side of the pivot of

the latter, a depending bar 31, loosely connected with the frame-work, and a push-bar 63, connected to the suspended bar and extending under the valve-operating bail, substantially as specified. 35

10. In a grain-scale, the combination, with the frame-work, the chute, the fulcrumed scale-beam, the loosely-suspended hopper, and the valve or cut-off pivoted under the chute,
40 of a bail or stirrup pivoted intermediate its ends to the frame-work, rods connecting the cut-off with the bail at one side of the pivot of the latter, a brake-shaft having the pawl-and-ratchet mechanism, a rod 31, loosely connected to the scale-beam and to the pawl-and-ratchet mechanism, a brake on the brake-shaft, a curved push-bar 63, pivoted to the lower end of the rod 31 and extending under
50 the valve-operating bail, a bearing-bracket located at the front end of the frame-work, and the short link 64, pivoted to the bracket and to the push-bar some distance below the end of the same, substantially as specified.

In testimony that I claim the foregoing as
55 my own I have hereto affixed my signature in presence of two witnesses.

HALE E. HAWK.

Witnesses:

M. J. MENNETH,
A. M. ENSMINGER.