(No Model.) 3 Sheets—Sheet 1.

E. W. CORNELL.

AUTOMATIC GRAIN WEIGHER.

No. 346,728. Patented Aug. 3, 1886.

Fig. 4

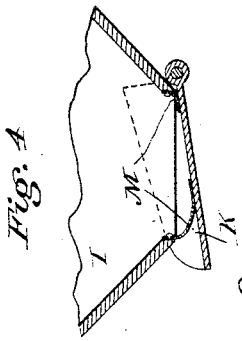

Fig. 9.

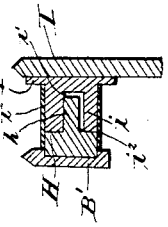

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

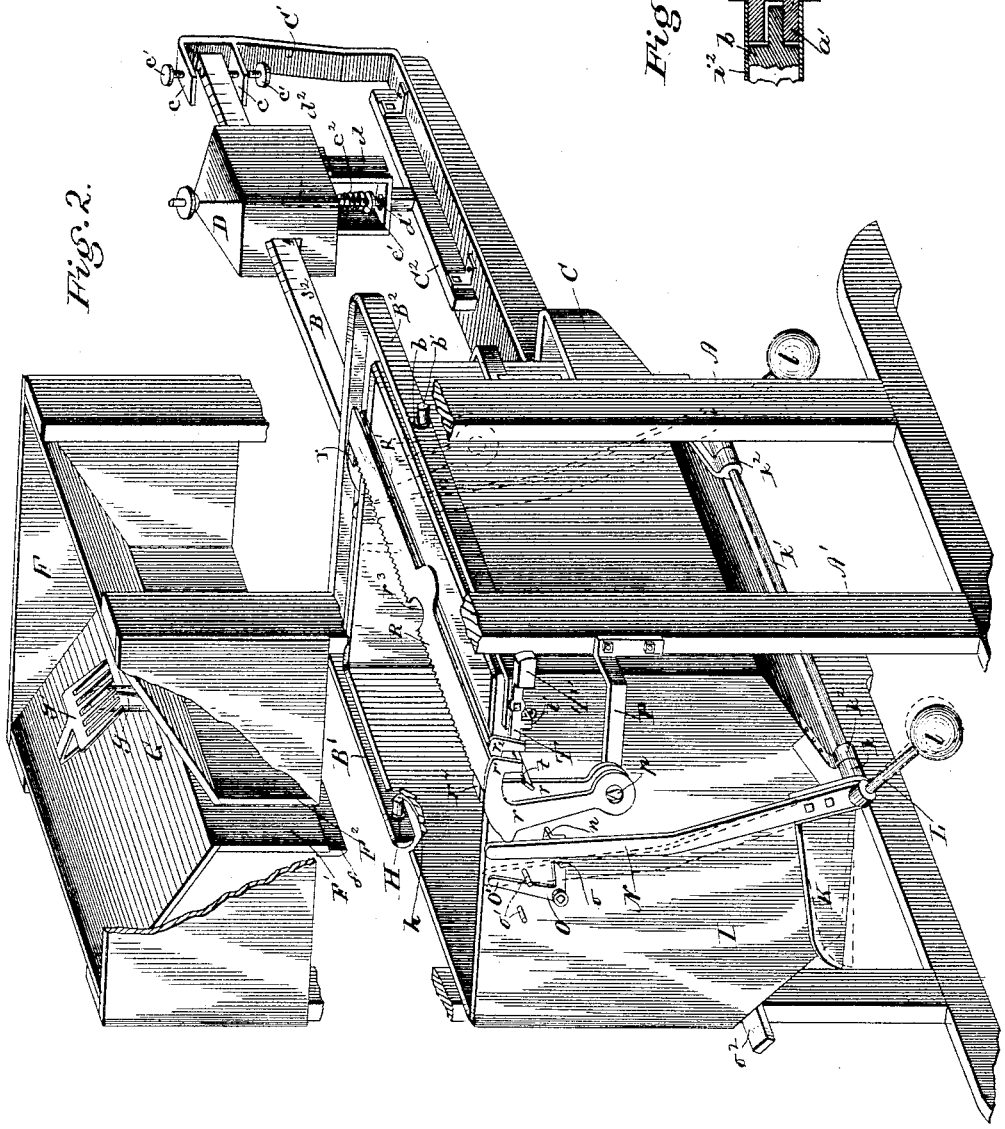
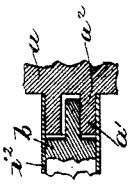


Fig. 8.



Witnesses

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AUTOMATIC GRAIN WEIGHER.

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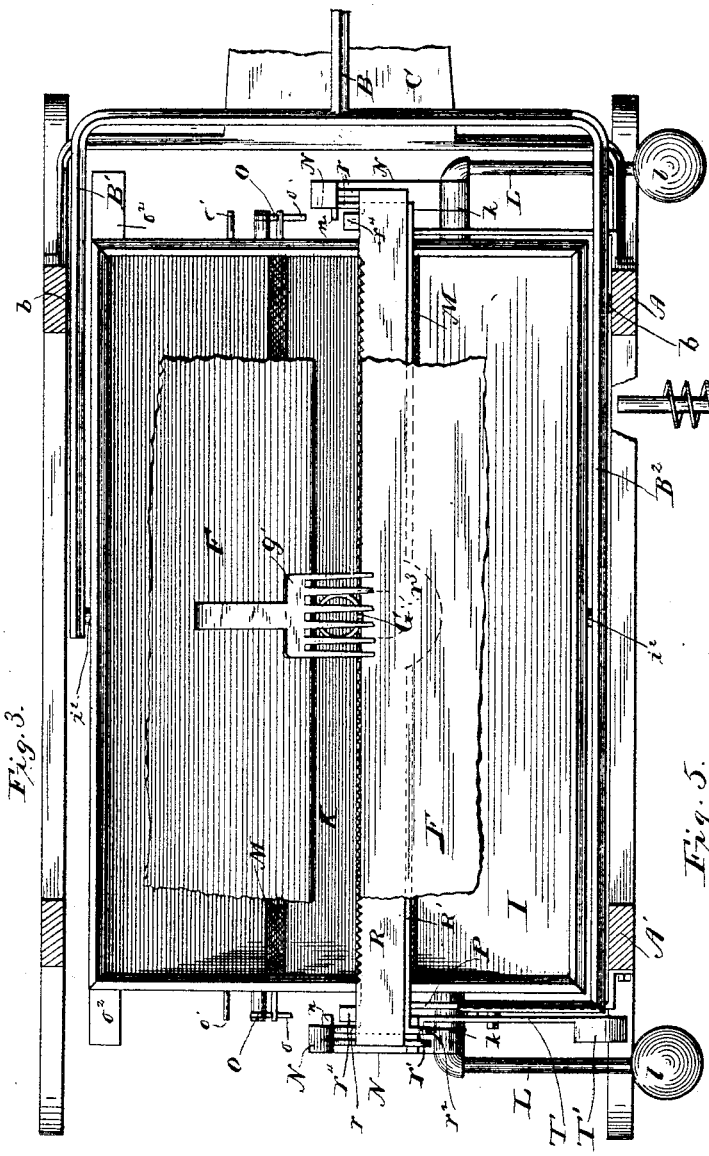

Fig. 3.

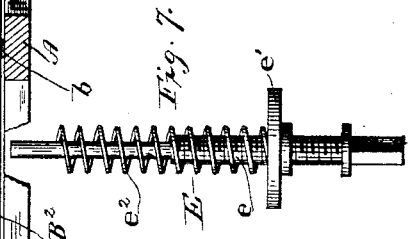

Fig. 7.

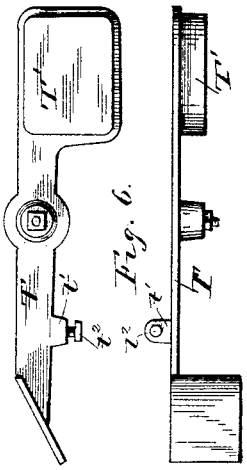

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

EVAN W. CORNELL, OF ADRIAN, MICHIGAN.

AUTOMATIC GRAIN-WEIGHER.

SPECIFICATION forming part of Letters Patent No. 346,728, dated August 3, 1886.

Application filed January 14, 1886. Serial No. 188,585. (No model.)

To all whom it may concern:

Be it known that I, EVAN W. CORNELL, a citizen of the United States, residing at Adrian, in the county of Lenowee and State of Michigan, have invented certain new and useful Improvements in Automatic Grain-Weighers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to automatic weighers for grain, flour, or other similar substances, in which the apparatus is operated solely by the weight of the grain or other substance which is being weighed.

It consists in certain novelty of construction and arrangement of the various parts of the apparatus, all of which I will now proceed to point out and describe, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective of my invention, parts of the same being broken away. Fig. 2 is a perspective, partly broken away, the hopper being raised so as to show the cut-off gates. Fig. 3 is a top plan view, part of the hopper being broken away. Fig. 4 is a detail showing one end of the discharge-gate; and Figs. 5, 6, 7, 8, and 9 are details of various parts of my invention.

Referring to said drawings, A A′ are suitable uprights forming the frame of the apparatus.

B is a graduated scale-beam having a bifurcated or forked end composed of the arms B′ B².

b b are bosses on the arms B′ B², from which project the knife-edges *b′ b′*.

a a are castings secured to the uprights A.

a′ a′ are bosses projecting from the castings *a*, said bosses *a′* being of the same diameter as the bosses *b*.

a² a² are knife-bearings in the bosses *a′ a′*, in which the knife-edges *b′* rock, thus pivoting the arms B′ B² to the uprights A. The bosses *a′* fit snugly against the bosses *b*, and are covered by pieces of cloth *i²* or other suitable material, thus effectually protecting the bearings from dust.

C is a bracket secured to the uprights A and projecting out under the scale-beam.

C′ is an upwardly-projecting arm on the end of the bracket. Said arm is provided with a bifurcated end formed by the projections *c c*, between which the end of the scale-beam vibrates.

c′ c′ are set-screws for regulating the vibration of the scale-beam.

D is an adjustable sliding weight on the scale-beam.

d is a bracket secured to the under side of the weight.

E is a vertical stem, mounted in a bearing, *d′*, in the bracket *d*, and projecting up into a vertical opening, *d²*, in the weight D.

e is a screw-thread on the stem E. *e′* is a nut or collar screwed on said stem.

C² is a support on the bracket C, on which support the lower end of the stem E rests.

e² is a spiral or other suitable spring surrounding the stem and bearing against the under side of the weight and top of the collar *e′*. The tension of the spring is regulated by turning the collar. When the outer end of the scale-beam is down the spring *e²* will relieve said scale-beam of portion of the weight of weight D, and said weight D does not exercise its full power until it rises sufficiently to permit the spring *e²* to force the collar *e′* down and seat it on the upper side of the bracket *d*.

F is a hopper secured to the top of the uprights A A. The sides of said hopper are inclined toward its center, leaving an opening between the lower edges of said sides.

F′ F² are vertical walls secured to the lower edges of the sides of the hopper, forming a vertical passage, through which the grain passes to the weighing-receiver. By constructing the hopper with a vertical opening, as above described, the grain is prevented from choking up said hopper and a prompt discharge of the same is insured when the cut-off gates are opened. One of the walls, F′, is extended below the other, or is provided with a projecting portion, *f*, with which the cut-off gates engage, as hereinafter described.

G is a vertical tube, secured between the walls F′ F² and projecting up nearly to the top of the hopper. The top of the tube is beveled.

g is a spiral slot in the tube; *g′*, a comb-shaped grating or screen secured to one side of the hopper and projecting over the top of the tube G. The object of the tube will be hereinafter described.

H H are bosses on the inner sides of the arms B′ B².

h h are knife-edges projecting from the bosses H H.

I is the measuring-receiver.

I′ are castings secured to the upper part of the receiver.

i i are bosses on the castings I′, said bosses *i i* being of the same diameter as the bosses H H.

i′ i′ are knife-bearings in the bosses in which the knife-edges rock, thus pivotally suspending the receiver from the bifurcated end of the scale-beam. The bosses *i i* and H H are covered with cloth or other suitable material, *i²* *i²*, which protects the bearings from dust.

The receiver hangs directly under the hopper. The lower portion of the sides of said receiver incline in toward each other, its bottom being formed by a hinged discharge-gate, K. Said gate extends the whole length of the bottom of the receiver, its ends being fastened to the castings *k k*, to which is secured a rod, *k′*, having its bearings in castings *k² k²*, which are fastened to the lower part of one side of the receiver, thus hinging the discharge-gate to said receiver.

L L are arms secured to the castings *k k*. Said arms are provided with weights *l l*, which operate to close the discharge-gate when the grain is discharged from the receiver. To the lower edges of the sides of the receiver are hung cloths M, which prevent any leakage of grain when the gate is partially opened.

N N are upwardly-projecting bent arms secured to the castings *k k* and extending nearly to the top of the receiver.

n n are projections on the inner sides of the arms.

O O are gravity or spring latches, pivoted to the ends of receiver, and having notched ends *o o*, with which the projections on the arms N N engage when the discharge-gate is partially opened by the weight of the grain on the same, overcoming the weights *l l*. These latches limit the downward movement of the arms N, and prevent the gate from opening any farther until the arms are released from said latches.

O′ O′ are upwardly-projecting lever-arms on the latches O.

o′ o′ are pins projecting from the ends of the receiver. Said pins engage with the lever-arms, and limit the movement of the latches. If desired, the latches may be placed on the arms, and the stops or projections on the receiver.

o² is a stop, which limits the downward movement of the arms N when they are released from the latches.

P P are brackets secured to the uprights A A′ on the same side of the receiver as the weights *l l*.

p p are knife-edges projecting from the brackets.

R R′ are gravitating cut-off gates located just below the bottom of the hopper. Said cut-off gates are secured to suitable weighted arms, *r r*, which are pivoted and rock on the knife-edges *p p*. If desired, gates may be used, the supporting-arms for which could be pivoted above said gates instead of below; or spring-actuated gates may be used.

r′ r² are hooks on the arms, which engage with a latch, hereinafter described, and hold the gates open until released from said catch. The hook *r²* is longer than the hook *r′*.

The center of gravity of the gates is to one side of a vertical line drawn through the knife-edges *p p*, and toward the center of the receiver. When said gates are released from the catch, they will fall toward the center of the receiver and under the opening in the bottom of the hopper, the wall F′ or its projecting portion *f* limiting the downward movement of said gates. When the gates strike the wall F′, they close the opening in the bottom of the hopper and cut off the stream of grain. The gate R is made with a recess or hole, *r³*, near its center, and is adapted to close all of the openings between the vertical walls F′ F² except under the tube G, under which tube the recess *r³* comes. The gate R when closed will therefore only effect a partial cut-off of the stream of grain as it permits a small quantity to flow through the tube G and recess *r³* into the receiver. When the gate R′ closes, it passes under the bottom of the tube G and completely closes the opening in the bottom of the hopper, and cuts off the stream of grain.

r⁴ r⁴ are projections on the gate R′, which engage with the arms O′ O′ as the gate falls, raising the latches O O and releasing the arms N N. Instead of raising the latches by gate R′, said gate may be operated by gravitating or spring-actuated arms independent of the cut-off gate. The lower edges of the gates are serrated. This prevents grain from getting between the gates and wall F′ as they close and holding said gates open. If desired, the lower projecting portion of the wall may be serrated instead of the edges of the gates; or both wall and gates may be serrated. Said gates R R′ are also made lowest in the center, so that any grain that remains on the same will work toward their centers. The arm B² is extended around the end of the receiver. On the extension of said arm is pivoted a latch, T, having a weighted end, T′, and a beveled hook end, *t*.

t′ is a projection on the latch, having an adjacent screw, *t²*, which engages with the under side of the end of the arm B² and limits the upward movement of the hook end of said catch. The hooks *r′ r²* engage with this latch and hold the cut-off gates open. Instead of a weighted latch a spring-latch can be used, or a stationary latch may be placed on the end of the arm B², and said arm be so arranged that it will not rise until the cut-off gates are opened; or the cut-off gates may be arranged to slide over said stationary latch.

The operation of my invention is as follows: Grain, flour, or other similar substance to be weighed is poured from a suitable spout into

the hopper and over the tube G. Some of the grain will pass through the screen into and through the tube to the receiver while the great bulk of grain will fall outside of said tube and pass between the vertical walls of the hopper to the receiver. When a sufficient quantity of grain to overcome the weights *l l* has entered the receiver, the discharge-gate will partially open. The cloth on the lower edges of the sides of the receiver, being held against the inside of the gate by the weight of the grain, will prevent any leakage. As said discharge-gate opens it causes the arms N N to move downward until the projections *n n* come in contact with the notched ends of the latches O O, which latches stop the downward movement of said arms and prevent the discharge-gate from opening any farther until the arms are released from the latches. As the relief-spring e^2 relieves the scale-beam of part of the weight of the weight D, said beam and weight will commence to rise before the required quantity of grain is in the receiver, and as the outer end of the arm B^2 lowers, the hook r' of the gate R slips off the hooked end of the latch T, and said cut-off gate falls downward until it strikes the projecting portion of the wall F', the recess in said gate coming under the bottom of the tube G, thus effecting a partial cut-off of the stream of grain, a small stream still passing through the tube. By this time the scale-beam has raised sufficiently to permit the spring to force the collar e^2 against the upper face of the bracket *d* and the full power of the weight is exerted. When the required weight of the grain has passed into the receiver, the outer end of the scale-beam will rapidly rise to its full limit, and the end of the arm B^2 will fall and release the hook r^2 from the latch T. The gate R' will then fall until it strikes the wall F', passing under the bottom of the tube G, closing the entire opening in the bottom of the hopper, and completely cutting off the stream of grain. As said gate falls the projections r^4 r^4 on the same strike the arms O' O' of the latches O O and release the arms N N from said latches. When said arms N N are released from the latches, the weight of the grain in the receiver will open the gate K and discharge the grain from the receiver. When the grain has been discharged the weights *l l* will close the gate K, and as the arms N N move up they engage with the arms *r r* and open the cut-off gates, the hooks on the arms *r r*, engaging with the beveled hook end of the latch T, forcing it down until the hooks pass over the hook end, the weight on said latch then causes it to engage with the hooks and hold the cut-off gates open. Grain again flows into the receiver and the operation is repeated. In order to prevent dust from accumulating on the scale-beam and its bifurcated end and on the edges of the receiver, the upper edges of said parts are made wedge-shaped or round. The discharge-gate being hinged to one side of the bottom of the receiver and commencing to open on the opposite side, will cause the grain to be discharged laterally from said receiver, which will prevent the same from rocking after the discharge has taken place. If desired, a suitable automatic registering device can be attached to the scale-beam.

I do not wish to be understood as limiting myself to the specific construction herein shown and described, as various changes can be made in the parts of the weigher without substantially changing my invention. Instead of constructing the receiver as shown in the drawings, it may be arranged to oscillate or rotate and discharge the grain as said receiver oscillates or rotates. In such a construction it is held in position to receive the grain by suitable retaining-latches, similar to the latches O O, said latches being secured to an independent frame and engaging with projections or stops on the receiver; or the latches may be on the receiver and the stops on the independent frame, the cut-off gate or gates engaging with said latches as they close and release said receiver, permitting it to oscillate or rotate.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic grain-weigher, a weighing-receiver provided with retaining-latches holding the discharge mechanism normally closed, and means, substantially as described, connected with and operated directly by the discharge mechanism for opening the cut-off mechanism, in combination with a cut-off gate or gates engaging with the retaining-latches of the discharge mechanism as said gate or gates close, all arranged and operating to the end that as the cut-off gate or gates close they will release the discharge mechanism and effect the discharge of the grain, and as said discharge mechanism closes it will reopen the cut-off gate or gates, substantially as set forth.

2. In an automatic grain-weigher, a weighing-receiver provided with a discharge-gate and a suitable retaining-latch holding the same normally closed, and means, substantially as described, connected with and operated directly by the discharge-gate for opening the cut-off mechanism, in combination with a cut-off gate engaging with the retaining-latch of the discharge-gate as said cut-off gate closes, all arranged and operating to the end that as the cut-off gate closes it will release the discharge-gate from its retaining-latch and effect the discharge of grain, and as said discharge-gate closes it will reopen the cut off gate, substantially as set forth.

3. In an automatic grain-weigher, a weighing-receiver provided with a discharge-gate and a suitable retaining-latch holding the same normally closed, and means, substantially as described, connected with and operated directly by the discharge-gate for opening the cut-off gate, in combination with a gravity cut-off gate or gates engaging with the retaining-latch of the discharge-gate as said cut-off gate or gates close, all arranged and operating to the

end that as the cut-off gate or gates close the discharge-gate will be released from its latch and effect the discharge of grain, and as said discharge-gate closes it will reopen the cut-off gate or gates, substantially as set forth.

4. In an automatic grain-weigher, pivoted scale-beam B, having bifurcated end composed of the arms B′ B², a receiver, I, provided with the hinged discharge-gate K, having upwardly-projecting arms N N and weights *l l*, and the latches O O, in combination with the cut-off gate R′, having the hook r^2, and the latch T, all arranged and operating substantially as shown and described.

5. In an automatic grain-weigher, a weighing-receiver and suitable cut-off gate or gates, in combination with a scale-beam provided with a suitable latch engaging with and holding the cut-off gate or gates normally open, all arranged and operating to the end that the cut-off gate or gates will be released from the retaining-latch and will close as the weighted end of the scale-beam rises, substantially as shown and described.

6. In an automatic grain-weigher, a pivoted scale-beam, a weighing-receiver pivoted to the scale-beam, and a hopper located above the receiver and provided with an opening in its bottom, in combination with a cut-off gate, a latch on the scale-beam engaging with the cut-off gate and holding the same normally open, all arranged and operating to the end that as the weighted end of the scale-beam rises the latch on said scale-beam will release the cut-off gate and permit it to close the opening in the bottom of the hopper, substantially as shown and described.

7. In an automatic grain-weigher, a pivoted scale-beam, a weighing-receiver pivoted to the scale-beam, and a hopper located above the receiver and provided with an opening in its bottom, in combination with a gravity cut-off gate, a latch on the scale-beam engaging with and holding the cut-off gate normally open, all arranged and operating to the end that as the weighted end of the scale-beam rises the cut-off gate will be released from the retaining-latch and will fall and close the hopper, substantially as shown and described.

8. In an automatic grain-weigher, the hopper F, having a discharge-opening in its bottom, and provided with the tube G, in combination with the cut-off gate R, having the recess r^3, and the cut-off gate R′, all arranged and operating substantially as shown and described.

9. In an automatic grain-weigher, a pivoted scale-beam provided with a suitable weight, a receiver, I, pivoted to the scale-beam, and provided with a hinged discharge-gate, K, having upwardly-projecting arms N N and weights *l l*, and latches O O, engaging with the arms N N, in combination with a hopper, F, located above the receiver, and provided with a tube, G, and the cut-off gate R, having the recess r^3, and the cut-off gate R′, and latch T, all arranged and operating substantially as shown and described.

10. In an automatic grain-weigher, a hopper having the tube G, in combination with the cut-off gate R, having the recess r^3, all arranged and operating substantially as and for the purpose shown and described.

11. In an automatic grain-weigher, the cut-off gate R′, and scale-beam provided with a suitable latch holding said cut-off gate open, in combination with the weighing-receiver and retaining-latches O O, holding the discharge mechanism normally closed, substantially as shown and described.

12. In a grain-weigher, a suitable hopper provided with the tube G, in combination with the screen *g′*, projecting over the top of said tube, substantially as shown and described.

13. In an automatic grain-weigher, the combination, with the scale-beam and weighing-receiver, of a suitable weight provided with a stem mounted in an opening in said weight, a relief spring surrounding the stem, and an adjustable collar mounted on said stem for regulating the tension of the spring, substantially as and for the purpose shown and described.

14. The combination of the weight D, having the bracket *d*, the vertical stem E, provided with the adjustable nut *e′*, and the spring e^2, substantially as shown and described.

15. In a grain-weigher, a scale-beam, a weighing-receiver pivoted to said scale-beam, a sliding weight, D, mounted on the scale-beam, and having the vertical opening d^2, and bracket *d*, provided with the bearing *d′*, in combination with the vertical stem E, provided with the adjustable collar *e′*, the spring e^2, and the support e^2, all arranged and operating substantially as and for the purpose shown and described.

16. In a grain-weigher, a flexible covering surrounding the knife-edge bearings of the scale-beam and weighing-receiver, substantially as and for the purpose set forth.

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

EVAN W. CORNELL.

Witnesses:
W. F. CORNELL,
R. B. ROBBINS.