(No Model.) 2 Sheets—Sheet 1.

J. M. HAWLEY.

MACHINE FOR CLEANING, SEPARATING, AND GRADING GRAIN.

No. 253,380. Patented Feb. 7, 1882.

Fig. 1.

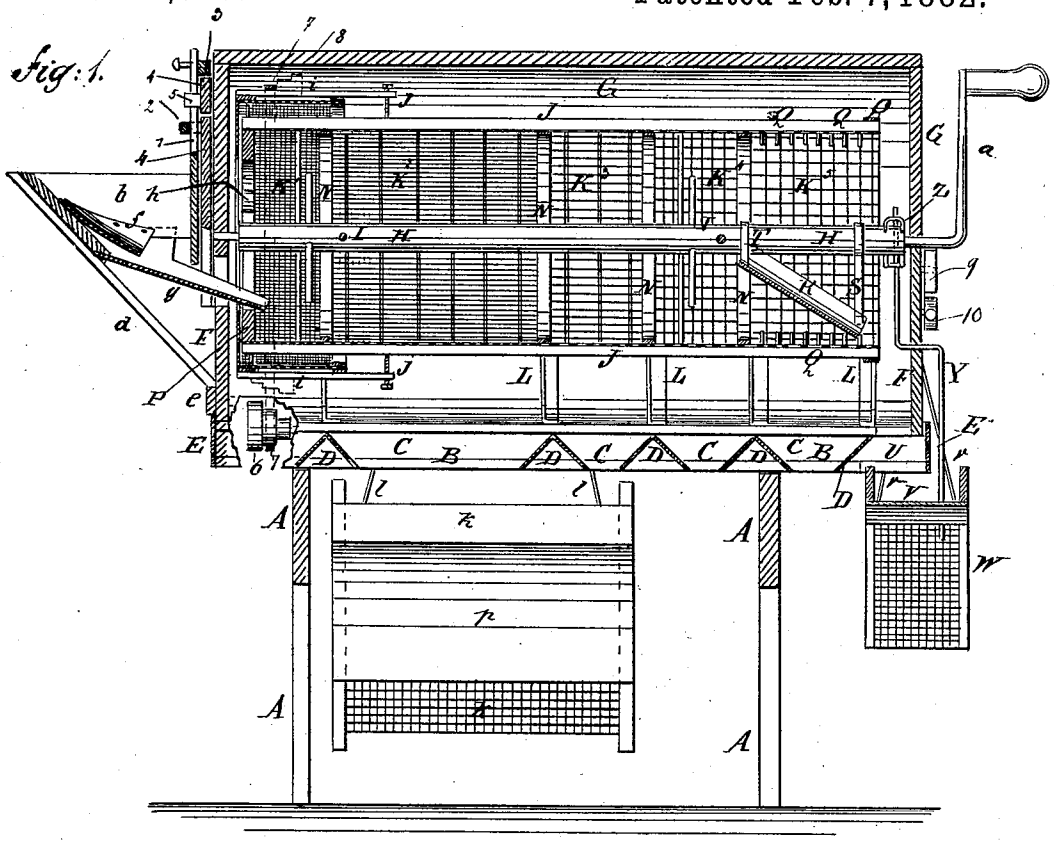
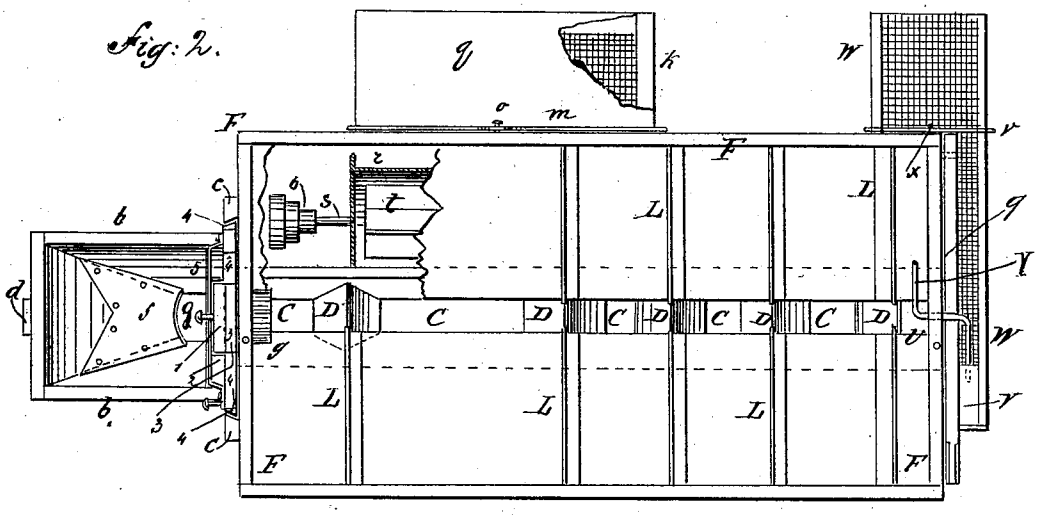


Fig. 2.



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Fig. 3.

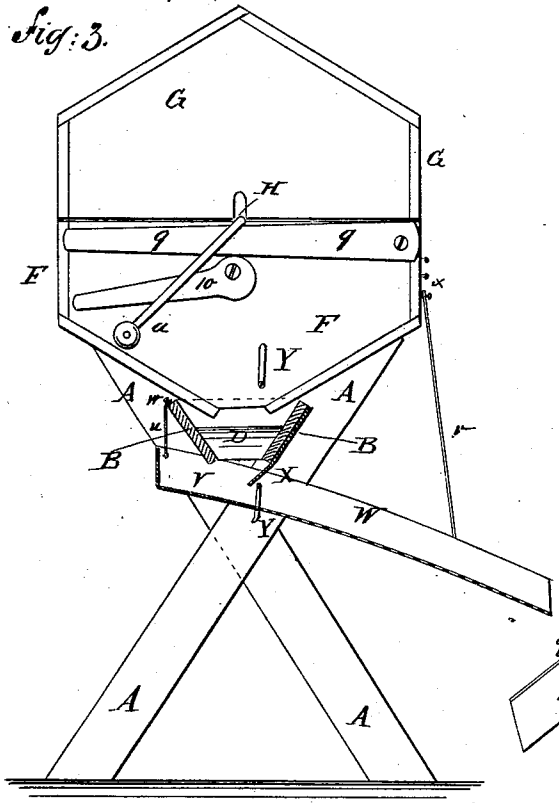


Fig. 4.

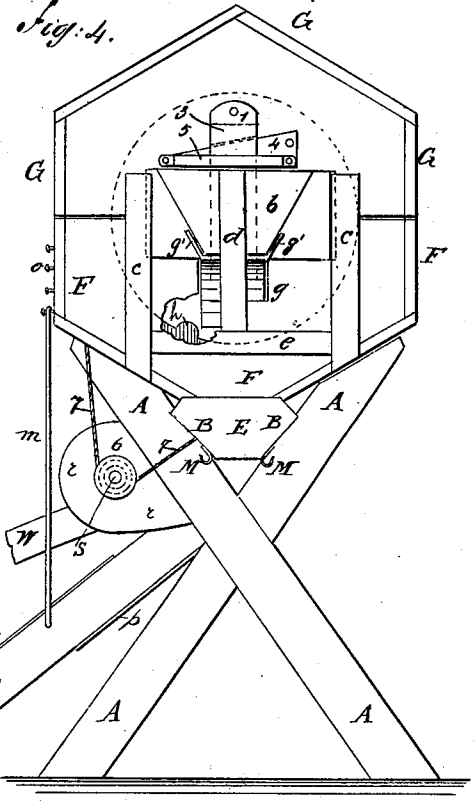
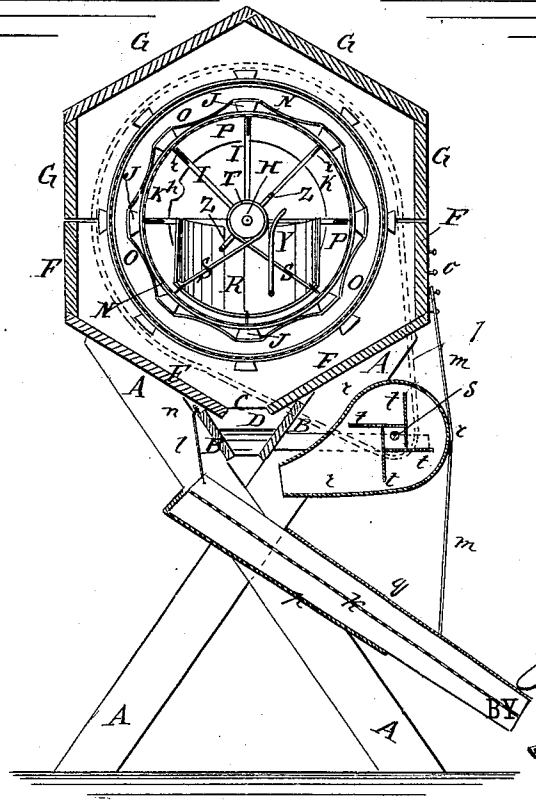


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES M. HAWLEY, OF ODIN, ILLINOIS.

MACHINE FOR CLEANING, SEPARATING, AND GRADING GRAIN.

SPECIFICATION forming part of Letters Patent No. 253,380, dated February 7, 1882.

Application filed October 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. HAWLEY, of Odin, in the county of Marion and State of Illinois, have invented certain new and useful Improvements in Machines for Cleaning, Separating, and Grading Grain and Seeds, of which the following is a specification.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of my improvement. Fig. 2 is a plan view of the same, the cover and reel being removed and parts being broken away. Fig. 3 is a rear end elevation of the same. Fig. 4 is a front end elevation of the same. Fig. 5 is a sectional end elevation of the same.

The especial object of this invention is to separate wheat from other grains and seeds and grade the wheat according to the size of its kernels, and also to separate timothy and red-top seeds.

The invention consists in a novel construction and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

A represents the legs of the machine, which are arranged in pairs, the legs of each pair crossing each other a little above their centers. To the inner sides of the upper parts of the legs A, a little above the points of intersection, are attached two boards, B, the lower edges of which are at a little distance from each other, and which, in connection with the legs A, form the frame of the machine. The space between the boards B is divided into a series of hopper-shaped discharge-spouts, C, by a number of V-shaped plates, D, attached to the said boards. The ends of the boards B are connected by plates E, attached to them.

The case of the machine is made in hexagonal form, as shown in Figs. 3, 4, and 5, and has an opening or slot along one angle, which angle fits into the space between the upper edges of the two boards B, as shown in Figs. 3 and 5. The case is made in two equals parts, F G, the plane of division extending along the central lines of the vertical sides of the said case.

In the centers of the adjacent edges of the ends of the parts F G of the case are formed notches to serve as bearings for the journals of the reel-shaft H. The notch in the tail end of the upper part, G, of the case is elongated, as shown in Fig. 3, so that the tail end of the reel can be raised and lowered to adjust the inclination of the said reel as the work to be done may require.

To the shaft H are attached pairs of radial arms I, and to the outer ends of each pair is attached a rib, J. The ribs J are made thin upon their inner sides, to which sides the reel wire-cloth is attached, so that the said ribs may occupy as little as possible of the said cloth. Five, more or less, different numbers or grades, K' K^2 K^3 K^4 K^5, of wire-cloth are used, the finest cloth being used at the head of the reel, and the said cloth gradually increases in coarseness toward the tail of the said reel. The cloth K' is made of such fineness of mesh that only seeds and substances smaller than cockle-seed and the smallest kernels of grain can pass through. The cloth K^2 allows cockle-seed, the smaller grains, and imperfect and shriveled kernels of wheat to pass through. The cloth K^3 allows large cockle-seed, larger kernels of rye, and the smallest kernels of wheat to pass through. The cloth K^4 allows the medium-sized kernels of wheat and any large kernels of other grain that may be with the wheat to pass through, so that only the largest kernels of wheat will pass to and through the cloth K^5.

If desired, the grain that passed through cloth K^4 can be again run through the machine, with the reel adjusted at a less inclination and revolved at a less speed, to further separate and grade the grain by taking out the largest kernels.

The inclination of the reel H I J is regulated by means of the lever 9 and the lever-cam 10. The lever 9 is pivoted at one end to the upper corner of the tail end of the lower part, F, of the case, and rests at or near its middle part upon the face of the cam 10, which is pivoted to the tail end of the said lower part, F, of the case.

In the middle part of the upper edge of the lever 9 is formed a notch or half-bearing to receive the journal of the reel-shaft H. The cam 10 is provided with a handle or lever for con-

venience in turning it to raise and lower the lever 9, and thus vary the inclination of the reel as the work to be done may require.

To the inner surface of the lower part, F, of the case are attached flanges L, to prevent the grain from the different cloths from mixing, and to guide each grade of grain to its own discharge-spout C, where it is received in bags suspended beneath the spouts C by hooks M, attached to the boards B or in other suitable receivers.

The joints between the different numbers of cloth are covered, strengthened, and protected by bands N, attached to the inside of the reel-ribs J. The tail end of the reel is strengthened and the outer edge of the cloth K^5 is supported by a band, O, attached to the outer sides of the ends of the ribs J, and to the edge of the cloth K^5, midway between the ribs J, as shown in Fig. 5.

To the inner side of the ends of the ribs J, at the head of the reel, is attached the outer edge of a ring-plate, P, which strengthens the reel and prevents any grain from escaping at the head of the said reel.

To the inner sides of the parts of the reel-ribs J, that carry the coarsest cloth, K^5, are attached pins or teeth Q, as shown in Fig. 1, which teeth stir up the grain as it passes upon and across the cloth K^5, so that the kernels of wheat will readily pass through the meshes of the said cloth. Straw and other coarse refuse that may enter the reel with the grain are raised by the teeth Q to a sufficient height to allow them to fall upon the inclined spout R, suspended from the reel-shaft H by the bars or straps S and collars T, as shown in Figs. 1 and 5. The spout R conducts the coarse refuse dropped into it to the tail end of the reel and discharges it through the opening U, between the tail ends of the boards B upon the plate V, attached to the upper end of the screen W, down which it slides to the floor or into a receiver placed at the lower end of the said screen.

To the end of the board B, next the discharge end of the screen W, is attached a plate, X, which projects partly across the opening U, so as to turn the coarse refuse passing through the said opening and cause it to fall upon the upper part of the plate V. The screen W is slightly curved downward, as shown in Fig. 3, to prevent straws or other long substances that may be passing lengthwise down the said screen W from catching in the meshes of the said screen. Any kernels of wheat that may pass out to the screen W with the coarse refuse drop through the meshes of the said screen into a receiver placed beneath it, so that all the wheat will be saved. The screen W is suspended by the bails *u v*. The ends of the bail *u* are attached to the upper ends of the side bars of the said screen W, and its center is hooked upon a hook or other support, *w*, attached to one of the boards B. The ends of the bail *v* are attached to the middle parts of the side bars of the screen W, and its center is hooked upon a hook or other support, *x*, attached to the side of the lower part, F, of the case. Several hooks *x* are attached at different heights to the side of the part, F, of the case, so that the inclination of the screen W can be adjusted by changing the bail *v* from one to another of the hooks *x*. The screen W is agitated by a lever, Y, the lower end of which is passed through the mesh at the upper outer corner of the wire-cloth of the screen W, or through a keeper attached to the said screen, or is connected with the said screen by a pivoted rod. The lever Y is made with an offset in its middle part, and at the said offset passes through and is pivoted to the end of the lower part, F, of the case. The upper end of the lever Y projects across the reel-shaft H at its tail end, so as to be struck and vibrated by staples Z or other projections or cams attached to the said shaft H. Upon the journal of the reel-shaft H is formed the crank *a*, by means of which the reel is revolved. The grain is fed into the reel H I J from the hopper *b*, the inner side of which is vertical, and has its side edges protected and beveled to fit against the beveled edges of the vertical cleats *c*, attached to the end of the lower part, F, of the case, so that the said hopper can be readily removed. The outer part of the hopper *b* is supported by the brace *d*, the upper end of which is attached to the inclined outer side of the said hopper *b*, and its lower end rests upon a horizontal cleat, *e*, attached to the end of the lower part, F, of the case, as shown in Figs. 1 and 4.

The hopper *b* is provided with a false bottom, *f*, to serve as a spout to guide the grain to the discharge-opening of the said hopper, and also to relieve the shoe *g* from having to support the weight of the said grain. The shoe *g* is pivoted by pivots *g'* at its upper end to the outer side of the hopper *b*, as shown in Fig. 4, and its lower end passes through an aperture in the end of the part F of the case, and projects into the head of the reel H I J, so as to deliver the grain within the said reel, and so as to be struck and agitated by a projection or cam, *h*, formed upon or attached to the inner edge of the ring flange or plate P, attached to the head ends of the reel-ribs J, as clearly shown in Fig. 4.

The escape of the grain from the hopper *b* is regulated by a gate, 1, which slides in a groove formed in, or in a keeper, 2, attached to the inner surface of the vertical inner side of the said hopper *b*.

To the upper part of the outer side of the gate 1 is attached a block, 3, which is inclined upon its lower edge to rest upon the inclined upper edge of a sliding bar, 4. The lower edge of the bar 4 is straight and rests upon the upper edge of the vertical inner side of the hopper *b*, so that the gate 1 will be raised and lowered by the longitudinal movement of the sliding bar 4. The sliding bar 4 is kept in place by a long keeper, 5, attached to it, and through which the gate 1 passes.

When the machine is to be used for sepa-

rating timothy-seed and red-top seed the reel H I J is replaced by a reel of about half the length of the reel H I J, and which is provided with a wire-cloth of such fineness of mesh that nothing larger than timothy and red-top seeds can pass through it; or the reel H I J for about half its length is covered with the said wire-cloth, and a short screen, *i*, of a little greater diameter than the reel H I J, is placed upon the head end of the said reel H I J, and is secured in place by screws or bolts *j*, passing through the projecting ends of its ribs and into or through the ribs J of the said reel. With this construction, when the grass-seed is fed into the reel H I J the timothy and red-top seeds and everything smaller than the said seeds will pass through the reel H I J and everything smaller than the said seeds will pass through the meshes of the screen or outer reel, *i*, and escape; but the timothy and red-top seeds will drop from the inner edge of the screen *i* through the hoppers C, and will be received upon the upper part of the screen *k*, placed beneath the said hoppers C.

The screen *k* is suspended from the machine by the bails *l m*. The ends of the bail *l* are attached to the upper ends of the side bars of the screen *k*, and its center is hooked upon a hook, *n*, or other support attached to one of the boards B. The ends of the bail *m* are attached to the middle parts of the side bars of the screen *k*, and its center is hooked upon a hook, *o*, or other support attached to the side of the lower part, F, of the case. Several hooks, *o*, are attached to the side of the case at different heights to receive the bail *m*, so that the inclination of the said screen *k* can be regulated by hooking the bail *m* upon a higher or a lower hook, *o*. The screen *k* is made of such fineness of mesh that the red-top seed can pass through it, but not the timothy-seed.

To the lower edges of the side bars of the screen *k* is attached a plate or cover, *p*, extending from the upper end of the said screen nearly to its lower end, and which is designed to receive the red-top seed and conduct it into a box or other receiver placed beneath the lower edge of the said cover *p*.

To the upper edges of the side bars of the screen *k* is attached a plate or cover, *q*, extending from the lower end of the said screen *k* nearly to its upper end, space being left between its upper edge and the upper end of the screen *k* to receive the seeds. The cover *q* is designed to prevent timothy-seeds from bounding or jumping out of the screen and to keep the seeds close to the wire-cloth of the said screen.

r is the casing, *s* is the fan-shaft, and *t* are the fans, of a fan-blower. The casing *r* and the bearings for the journals of the fan-shaft *s* are attached to supports secured to the frame A B of the machine in such positions that the air-blast will strike the seeds as they fall from the hoppers C and blow off any light impurities that may pass out of the machine with the said seeds. To the end of the fan-shaft *s* is attached a cone-pulley, 6, around which passes a band, 7. The band 7 also passes around a cone-pulley, 8, attached to the reel H I J, so that the fan-blower will be operated from the said reel.

The fan-blower *r s t* will not be necessary when the machine is used for grading grain.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the boards B, provided with the openings U and the plate X, the case F, spout R, and the reel, of the screen W, having plate V, the bails *u v*, and its operating mechanism, substantially as and for the purpose set forth.

2. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the reel, the reel-shaft H, and the rake-teeth Q, attached to the reel-ribs J, of the suspended spout R, substantially as herein shown and described, whereby coarse refuse raised from the lower part of the reel by the said rake-teeth is conducted out of the said reel, as set forth.

3. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the boards B, provided with the opening U, the case F, and the reel-shaft H, provided with the projection Z, of the screen W, suspended from the end of the case, and the lever Y, provided with an offset and projecting within the case, substantially as and for the purpose set forth.

4. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the hopper *b*, provided with the false bottom *f*, the apertured lower end of the case F, and the reel-flange P, having inwardly-projecting lugs *h*, of the shoe *g*, pivoted at its upper end by the pivot *g'* to the outer side of the said hopper and having its lower end projecting into the case F, substantially as and for the purpose set forth.

5. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the hopper *b* and its feed-gate 1, of the inclined block 3, the inclined bar 4, and the keeper 5, substantially as and for the purpose set forth.

6. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the hopper *b*, having the projecting edges of its vertical inner side beveled, and the lower part, F, of the case, of the beveled vertical cleats *c c*, the horizontal cleat *e*, and the inclined brace-bar *d*, substantially as herein shown and described, whereby the said hopper is secured to the said case detachably, as set forth.

7. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the reel H I J, of the exterior reel, *i*, detachably secured thereto by bolts or screws *j*, substantially as and for the purpose set forth.

8. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the lower part, F, of the case and the reel-

shaft H, of the lever 9, and the lever-cam 10, substantially as herein shown and described, whereby the inclination of the reel can be regulated, as set forth.

9. In a machine for cleaning, separating, and grading grain and seeds, the combination, with the fan-shaft *s* and the reel H I J, of the cone-pulley 6, the band 7, and the segmental cone-pulley 8, substantially as herein shown and described, whereby the fan-blower will be operated from the said reel, as set forth.

JAMES M. HAWLEY.

Witnesses:
JOHN PULESTON,
M. A. DACE.