(No Model.) 3 Sheets—Sheet 1.

F. W. HOWELL.

GRAIN SEPARATOR.

No. 266,258. Patented Oct. 17, 1882.

Fig. 1.

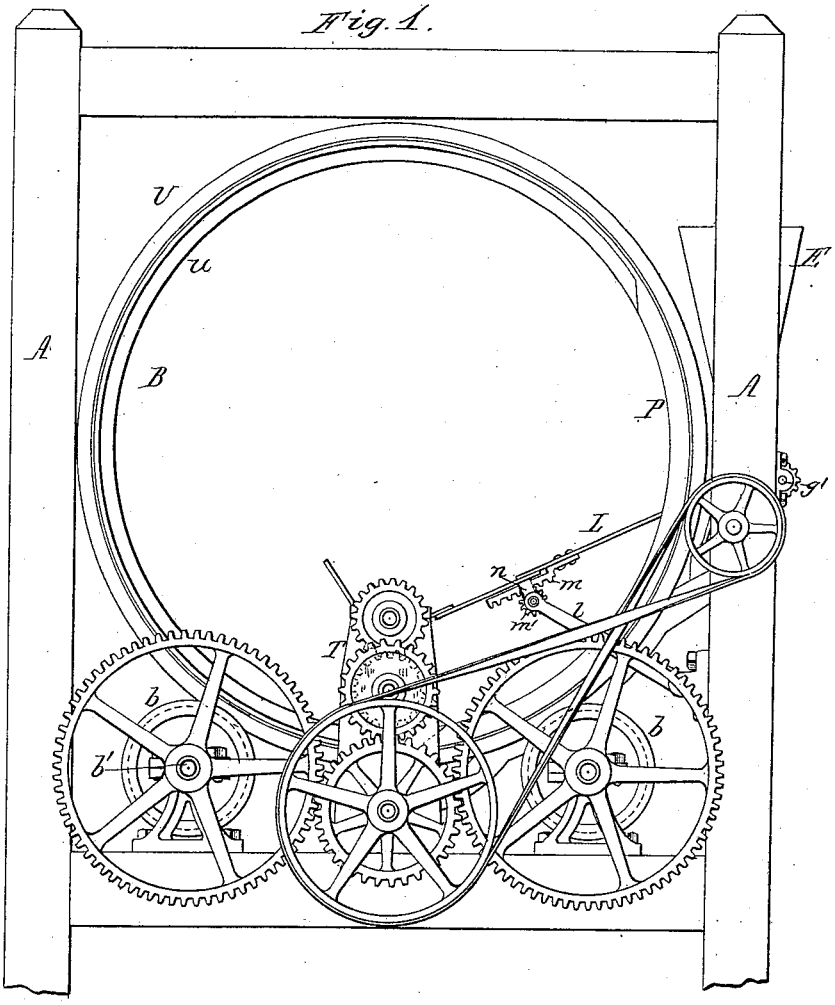


Fig. 5.

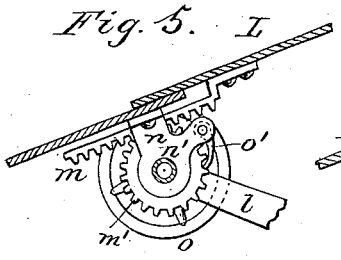


Fig. 6.

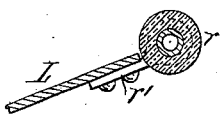
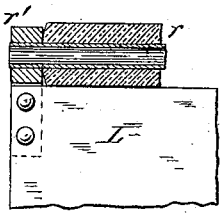


Fig. 7.



Witnesses.
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N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

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No. 266,258. Patented Oct. 17, 1882.

Fig. 2.

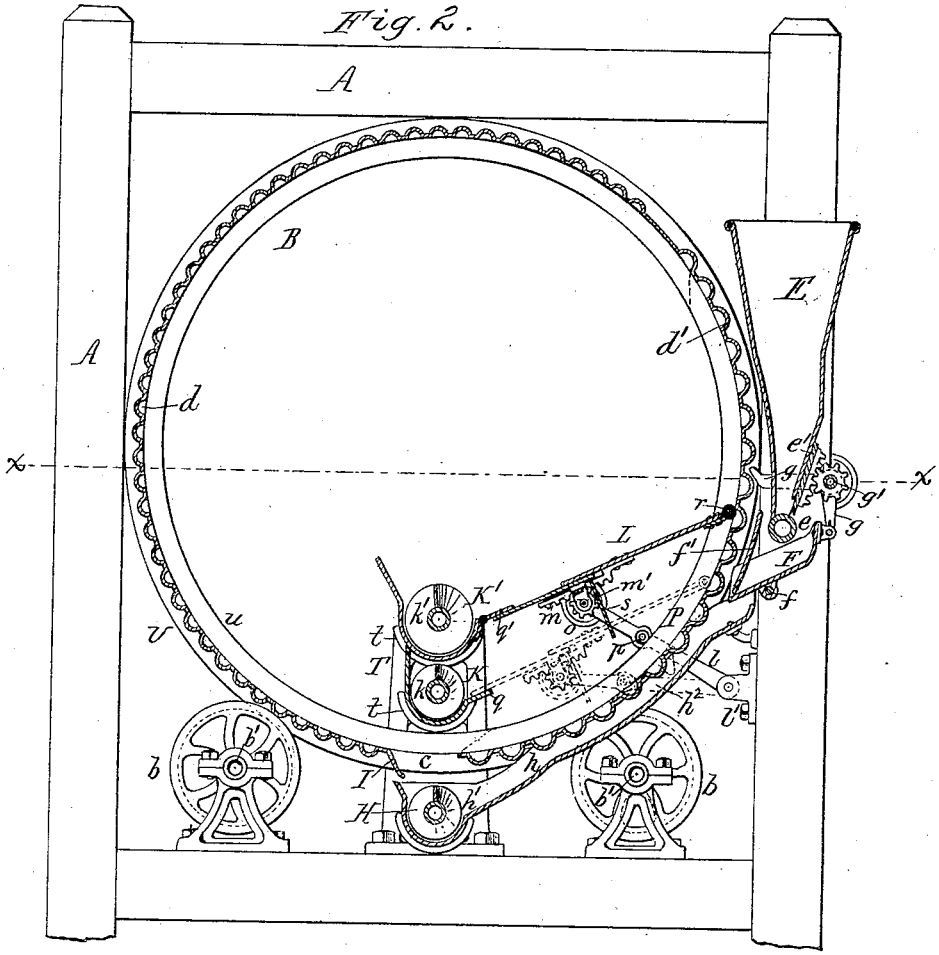
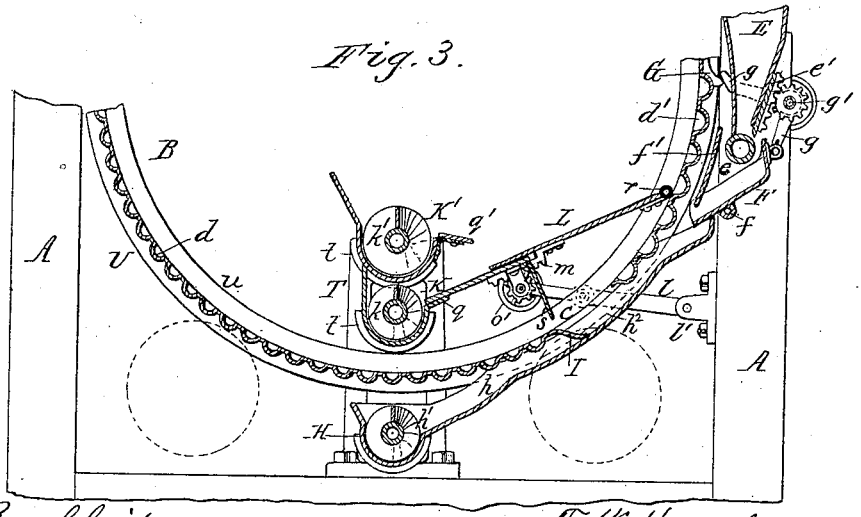


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

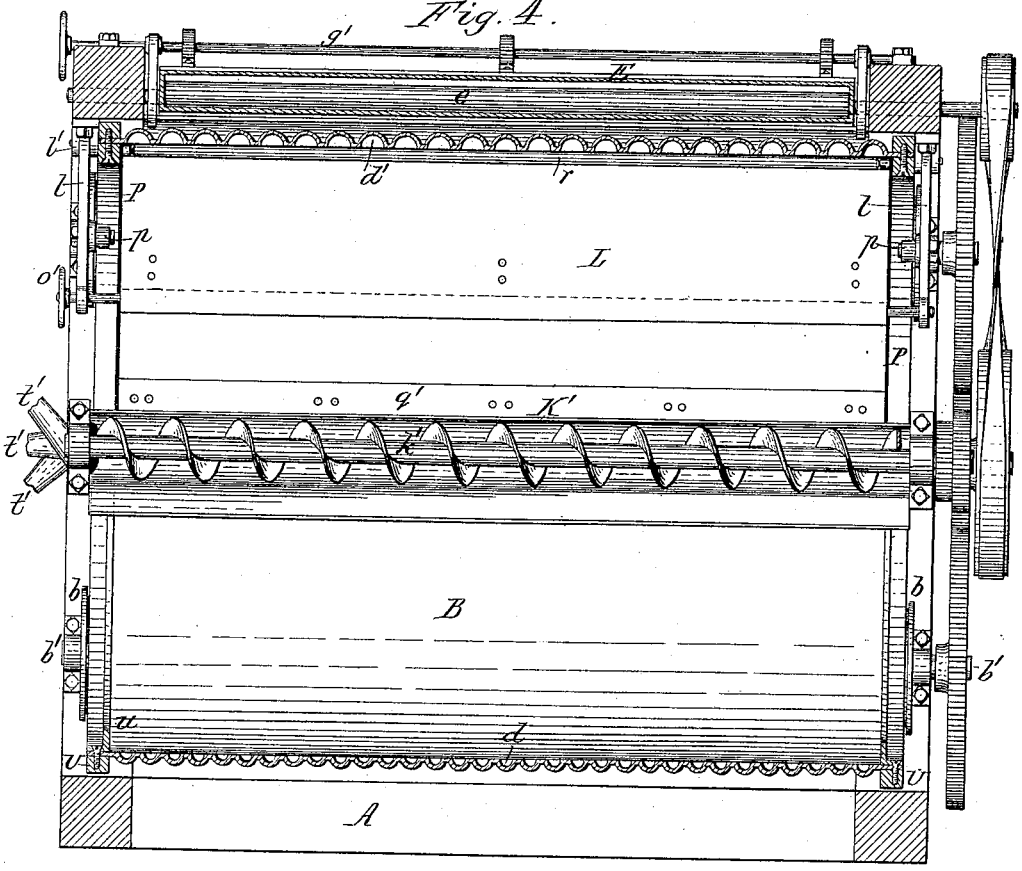


Fig. 9.

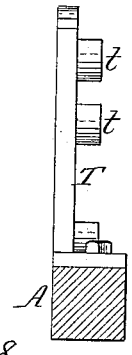


Fig. 10.

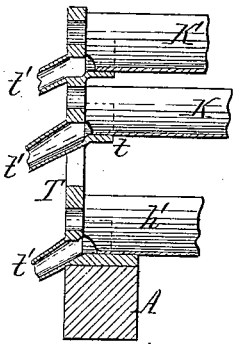


Fig. 12.

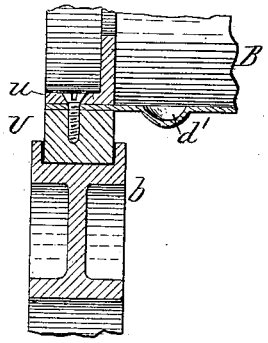


Fig. 11.

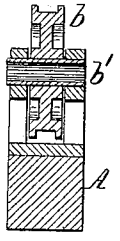
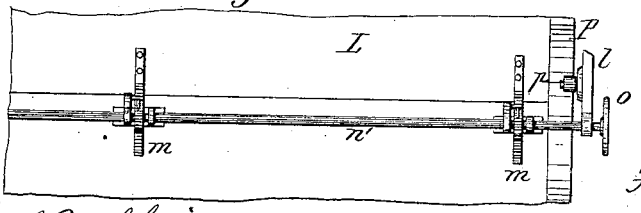


Fig. 8.



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UNITED STATES PATENT OFFICE.

FREDERICK W. HOWELL, OF BUFFALO, NEW YORK.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 266,258, dated October 17, 1882.

Application filed February 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HOWELL, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Inprovements in Grain-Separators, of which the following is a specification.

This invention relates to that class of grain-separators in which the separation of the different kinds of grain is effected by a rotating cylinder provided on its inner surface with cells or indentations, in which the smaller grains lodge and are elevated, while the larger grains are rejected and roll back as the cylinder rotates.

My improvements have reference more particularly to a separating-cylinder into which the grain is introduced through a longitudinal opening in its side, and have for their object to simplify the construction of the apparatus, and to render it more effective in its operation.

My invention consists of the improvements hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of three sheets, Figure 1 is an end elevation of my improved machine. Fig. 2 is a vertical cross-section of the machine, showing the movable catch-board in an elevated position. Fig. 3 is a similar view with the catch-board lowered. Fig. 4 is a horizontal section in line *x x*, Fig. 2. Fig. 5 is an enlarged side view, showing the means whereby both parts of the adjustable catch-board are connected. Fig. 6 is a cross-section, and Fig. 7 a fragmentary horizontal section, of the roller applied to the end of the catch-board. Fig. 8 is a fragmentary elevation, showing the under side of the catch-board. Fig. 9 is an elevation of one of the standards which support the conveyer-troughs. Fig. 10 is a vertical longitudinal section of the same. Fig. 11 is a sectional elevation of one of the rollers upon which the separating cylinder rotates. Fig. 12 is a longitudinal section of the end of the separating-cylinder.

Like letters of reference refer to like parts in the several figures.

A represents the stationary frame of the machine, and B represents the separating-cylinder, supported in the frame A by means of rollers *b*, mounted on shafts *b'*, or by any other suitable means, so that the cylinder can be rotated about its axis. The cylinder B is provided in its side with a longitudinal opening, *c*, through which the material to be separated is introduced into the cylinder, and through which such material as is not otherwise removed is discharged from the cylinder. The latter is provided on its inner surface with cells or indentations, whereby the different kinds of grain are separated in a well-known manner. These indentations may be all of one size or they may be of different sizes, according to the number of separations which are desired. As shown in the drawings, the cylinder is provided with small cells *d*, which receive cockle, grass-seed, and other like small grains, and larger cells, *d'*, which receive wheat; but the size and form of these cells may be varied in accordance with the nature of the grain to be separated.

E represents the feed-hopper, arranged opposite the ascending side of the cylinder, and provided with a feed-roller, *e*, and adjustable slide *e'*, or any other suitable mechanism, whereby the discharge of grain from the hopper is regulated.

F is a bucket or receptacle arranged underneath the hopper E and pivoted by a bolt, *f*, to the frame of the machine.

f' is a fixed plate, secured to the frame of the machine and arranged above the lower end of the bucket F, so that the lower side of the bucket rests against the lower edge of the plate *f'* when the lower edge of the bucket is raised.

g g represent two bell-crank levers, mounted loosely upon the shaft *g'*, whereby the feed-slide *e'* is operated. The lower slotted arms of the levers *g* are attached to the bucket F, and the upper arms thereof project toward the cylinder and are operated by a projection or cam, G, secured to the periphery of the cylinder near each end in such manner that the bucket is dumped when the opening *c* arrives in the proper position for receiving the grain.

H is a screw-conveyer, arranged lengthwise underneath the cylinder B; and *h* is a chute or spout, which extends from the conveyer-trough *h'* upwardly around the lower portion of the cylinder and terminates underneath the bucket F.

I is a projecting flange, formed on or secured to the outer surface of the cylinder B, at the lower edge of the opening *c*, and adapted to run in contact with that portion h^2 of the chute *h* which is concentric with the cylinder B, so as

to direct the grain from the chute into the opening *c*. The outer edge of the flange I may be provided with a strip of leather or other flexible material.

K K′ are two conveyer-troughs, arranged lengthwise in the cylinder B, one above the other, and *k k′* are the screw-conveyers arranged therein.

L represents the inclined catch-board whereby the grain which is elevated by the cells is conducted into either of the conveyer-troughs K K′. The catch-board L is attached to two arms, *l*, which are pivoted at *l′* to the frame of the machine. As shown in the drawings, the board L is composed of an outer and an inner part, which are adjustably secured together by rack-bars *m* and gear-wheels *m′*. The bars *m* are attached to the under side of the outer part of the catch-board and slide in brackets *n*, secured to the under side of the inner part of the catch-board. The gear-wheels *m′* are mounted on a horizontal shaft, *n′*, which is journaled in the brackets *n* and provided near one end with a hand-wheel, *o*, for turning the same. By moving the outer portion in or out the catch-board is adjusted to the inner surface of the cylinder, and its inclination is increased or reduced, as may be desired. The outer part of the catch-board is held, when adjusted, by a spring-pawl, *o′*, engaging in one of its gear-wheels *m′*. The inner edge of the outer portion of the catch-board overlaps the outer edge of its inner portion sufficiently to permit of the requisite adjustment without breaking the continuity of the catch-board.

P represents a projecting segment or cam, secured to the periphery of the cylinder B, near each end thereof, and *p* are pins or rollers attached to the arms *l* and adapted to come in contact with the cams P. The latter are so arranged upon the cylinder B that the catch-board is permitted to remain in its lowest position (shown in dotted lines, Fig. 2) during that portion of the revolution of the cylinder in which the small cells *d* discharge their contents upon the catch-board. Just before the large cells *d′* begin to discharge their contents upon the catch-board the cams P come in contact with the pins or rollers *p* on the arms *l* and raise the catch-board to the position shown in full lines, Fig. 2. The cams P retain the catch-board in this position until that portion of the cylinder which contains the large cells *d′* has passed the catch-board, when the cams permit the latter to return to its lower position, on which it rests with its inner edge upon a ledge, *q*, formed on the lower conveyer-trough, K. As the catch-board is raised its inner edge strikes against a ledge, *q′*, which is hinged to the upper conveyer-trough, K′, whereby the upward movement of the catch-board is arrested.

r represents a roller, of rubber or other flexible material, which is journaled in bearings *r′*, secured to the outer edge of the catch-board. As shown in the drawings, this roller consists of a rubber tube, which is slipped upon a metallic tube, the latter forming the shaft of the roller and turning in the bearings attached to the catch-board. The roller *r* reduces the friction between the edge of the catch-board and the cylinder, and permits the kernels contained in the cells to pass the edge of the catch-board more readily.

s is a deflecting board or plate, secured to the under side of the catch-board or to the stationary frame of the machine for the purpose of retarding the influx of the grain into the cylinder through the opening *c*, and deflecting the grain upon the inner surface of the cylinder in order to prevent the grain from passing over a considerable portion of the inner cylinder-surface at so great a speed that the small kernels would be prevented from lodging in the cells. The plate *s*, in preventing the too rapid influx of the grain through the opening *c*, prevents the grain from passing over a considerable portion of the cylinder-surface before the grain comes to a state of rest, which is necessary before the grain will lodge in the cells, and it thereby renders the entire inner surface of the cylinder useful in effecting the desired separation.

T T represent the standards, to which the conveyer-troughs are secured, and which are provided on their inner sides with semicircular flanges *t*, to which the ends of the metallic conveyer-troughs are secured. The shafts of the conveyers and of the supporting-rollers are preferably constructed of wrought-iron pipe, as indicated in the drawings.

t′ represents the discharge-spouts of the conveyer-troughs, which may be cast in one piece with the standards T.

U represents the ring, which is secured to the outer side of the cylinder at each end thereof, and which runs in the grooved rollers *b*, upon which the cylinder is supported.

u is an annular flange, angular in cross-section, and secured to the inner surface of the cylinder, at each end thereof, by screws or otherwise, so that the end of the cylinder is clamped between the outer ring, U, and the inner ring, *u*. The latter prevents the grain from escaping at the ends of the cylinder, and serve at the same time to stiffen the ends of the cylinder.

The operation of the machine is as follows: The quantity of grain which is delivered from the feed-hopper into the bucket F is so regulated that the grain which accumulates in the bucket during each revolution of the cylinder is equal to the separating capacity of the cylinder at each revolution. The grain rests against the plate *f′* until the opening *c* of the cylinder arrives opposite the concentric portion h^2 of the chute *h*, when the bucket is dumped by the cams G, as shown in Fig. 3, and the grain contained in the bucket is discharged into the chute *h*. The grain passes from the latter through the opening *c* into the cylinder B, and is arrested by the plate *s* and deflected upon the inner surface of the cylinder, where

it is first operated upon by that section of the cylinder which is provided with the smaller cells, *d*. The cockle and other small grains lodge in these cells, while the wheat and oats are rejected and roll back as the cylinder rotates. The cockle is elevated by the cells *d* and discharged upon the catch-board L, which conducts the cockle to the conveyer-trough K. The grain in the cylinder is next operated upon by the large cells *d'*, which admit the wheat and reject the oats, and whereby the wheat is elevated and discharged upon the catch-board L. The latter has in the meantime been raised so as to discharge the wheat into the upper conveyer-trough, K'. The residue of oats and other large grains are discharged through the opening *c* into the conveyer H below the cylinder when the opening *c* arrives in its lowest position.

The size, form, and arrangement of the cells may of course be varied in accordance with the character of the grain which is to be separated.

I claim as my invention—

1. The combination, with a separating-cylinder, B, provided in its surface with a longitudinal feed-opening, *c*, of means whereby the material is intermittently delivered from the feed-hopper into the feed-opening of the cylinder, a catch-board arranged in the cylinder, means whereby the material falling from the catch-board is carried off, and means whereby the residue discharged from the cylinder through the feed-opening is collected and removed, substantially as set forth.

2. The combination, with a separating-cylinder, B, having a longitudinal feed-opening, *c*, of a chute, *h*, curved concentric with the cylinder, and a plate, I, projecting from the lower side of the opening *c* and running in contact with the concentric chute, substantially as set forth.

3. The combination, with a separating-cylinder, B, having a longitudinal feed-opening, *c*, provided with a projecting plate, I, of a feed-hopper, E, tilting bucket F, and chute *h*, substantially as set forth.

4. The combination, with a separating-cylinder, B, and two conveyer-troughs, K K', arranged within the same, of a movable catch-board, L, and means whereby the latter is made to deliver into either conveyer-trough, substantially as set forth.

5. The combination, with a separating-cylinder, B, and two conveyer-troughs, K K', arranged within the same, of a movable catch-board, L, arms *l*, to which the board is pivoted, and cams P, whereby the catch-board is raised and lowered, substantially as set forth.

6. The combination, with a separating-cylinder, B, having a longitudinal inlet-opening, *c*, of two conveyers, K K', *k k'*, arranged within the cylinder B, a conveyer, H *h'*, arranged below the cylinder B, a movable catch-board, L, and a chute, *h*, substantially as set forth.

7. The combination, with a separating-cylinder, B, of a catch-board, L, having its outer portion made adjustable toward and from the cylinder, and means whereby the material falling from the catch-board is collected and discharged, substantially as set forth.

8. The combination, with the catch-board L, of a roller, *r*, arranged at the edge of the catch-board, substantially as set forth.

9. The combination, with a separating-cylinder, B, having a longitudinal inlet-opening, *c*, of a stationary deflecting-board, *s*, arranged within the cylinder, substantially as set forth.

10. The combination, with a separating-cylinder, B, of conveyer-troughs K K' H and standards T, having curved flanges *t*, upon which the conveyer-troughs are supported, substantially as set forth.

FREDERICK W. HOWELL.

Witnesses:
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EDW. J. BRADY.