(No Model.) 4 Sheets—Sheet 1.

F. W. HOWELL.

COCKLE SEPARATOR.

No. 346,815. Patented Aug. 3, 1886.

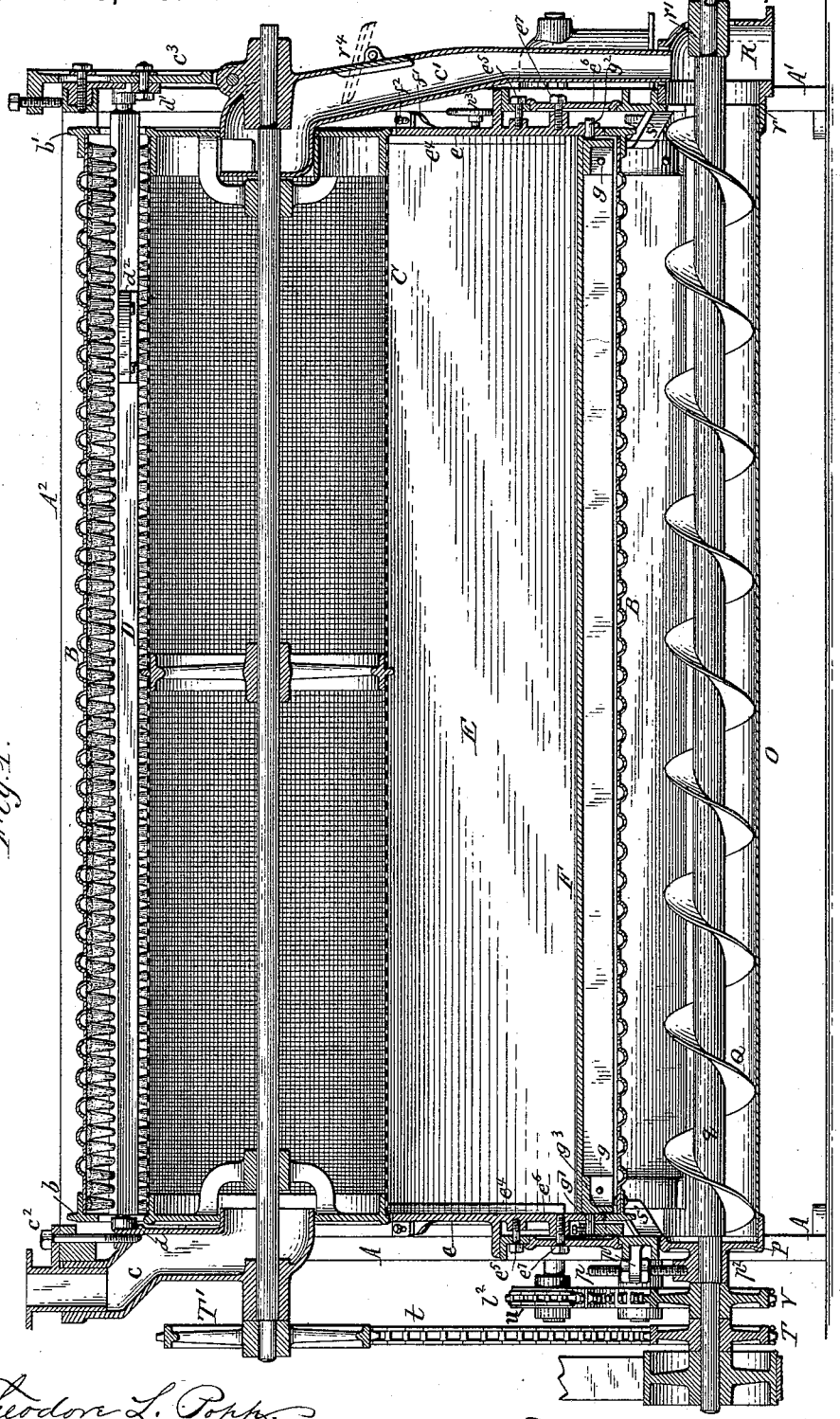

Fig. 1.

Witnesses.
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(No Model.) 4 Sheets—Sheet 2.

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COCKLE SEPARATOR.

No. 346,815. Patented Aug. 3, 1886.

Fig. 3.

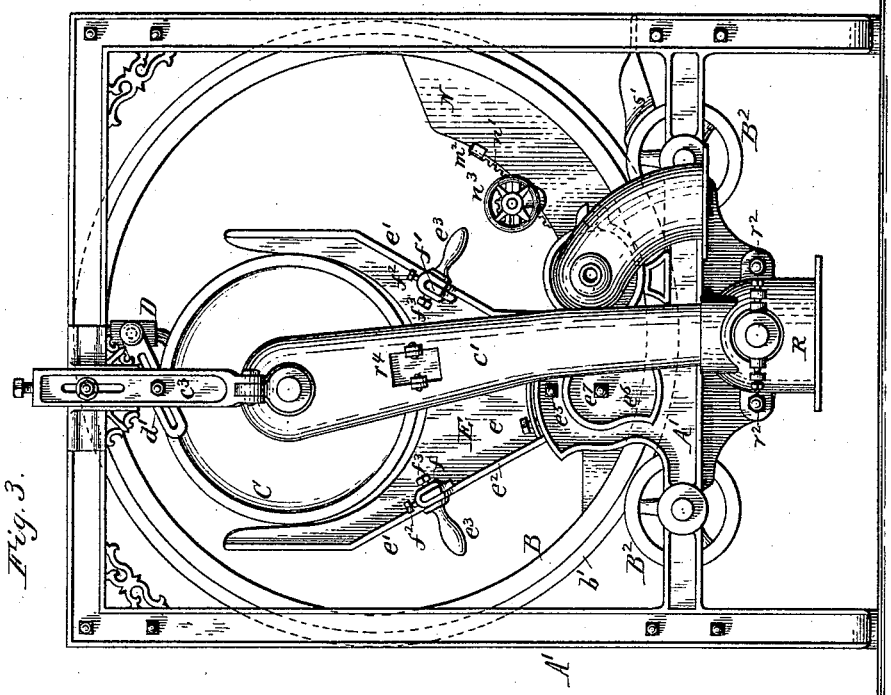
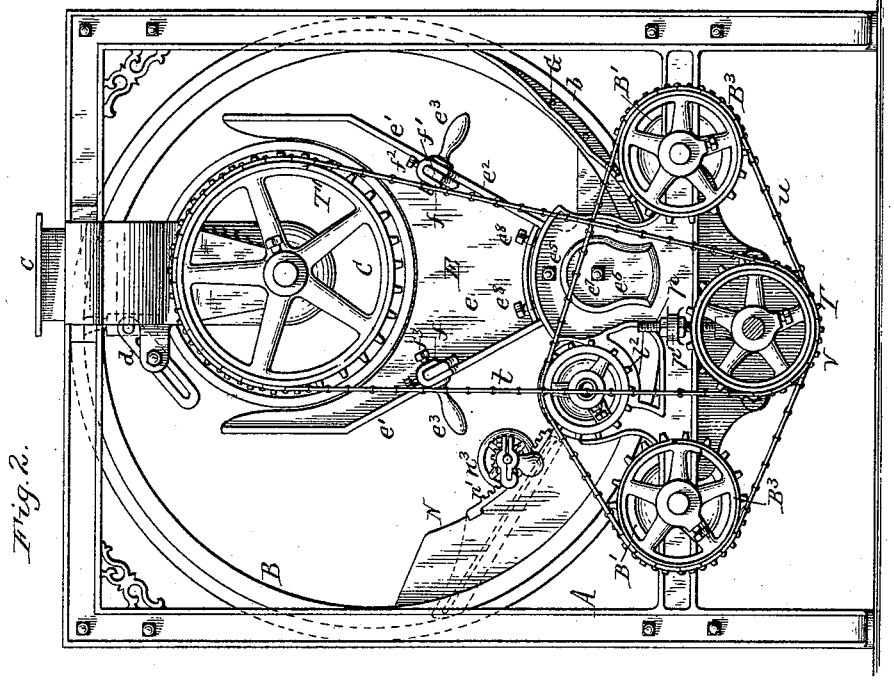


Fig. 2.



Witnesses:
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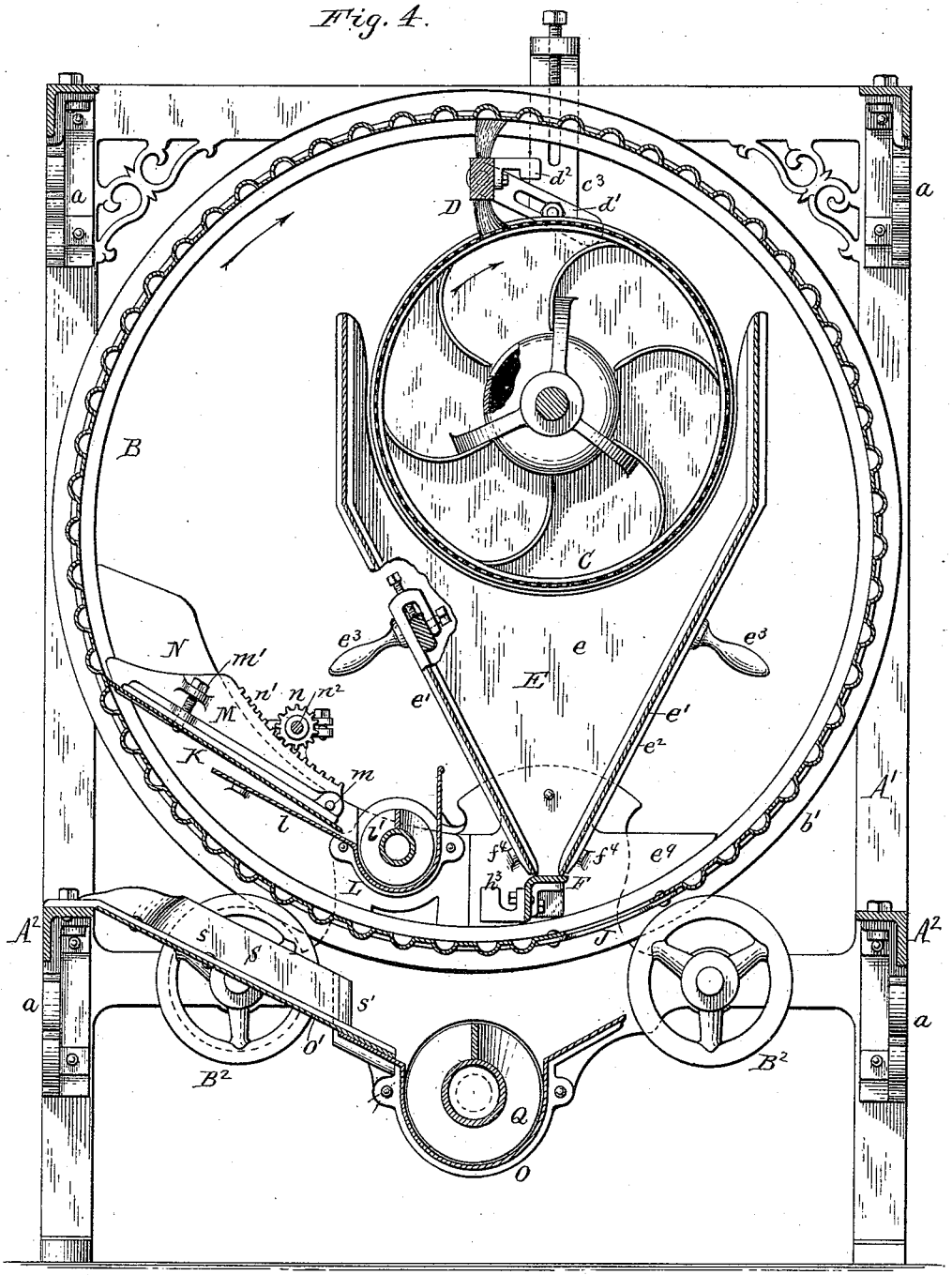
(No Model.) 4 Sheets—Sheet 3.

F. W. HOWELL.

COCKLE SEPARATOR.

No. 346,815. Patented Aug. 3, 1886.

Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

F. W. HOWELL.

COCKLE SEPARATOR.

No. 346,815. Patented Aug. 3, 1886.

Fig. 5.

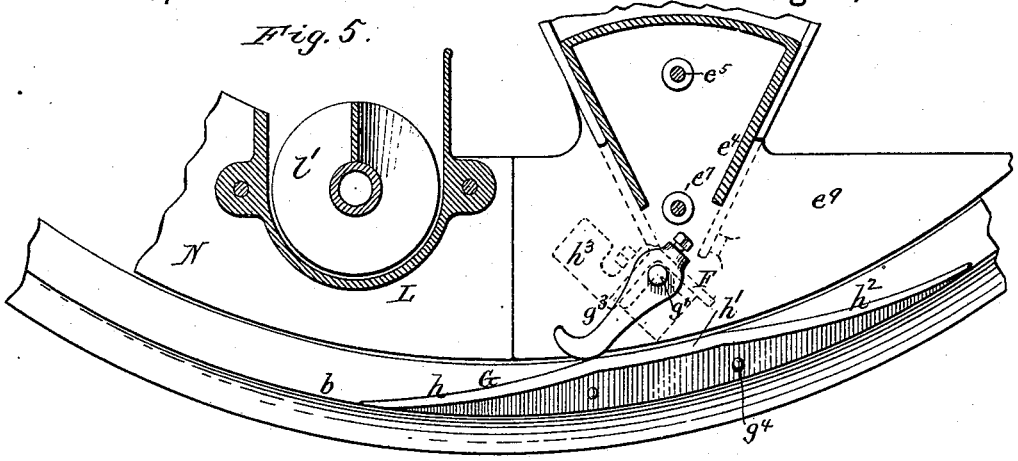


Fig. 6.

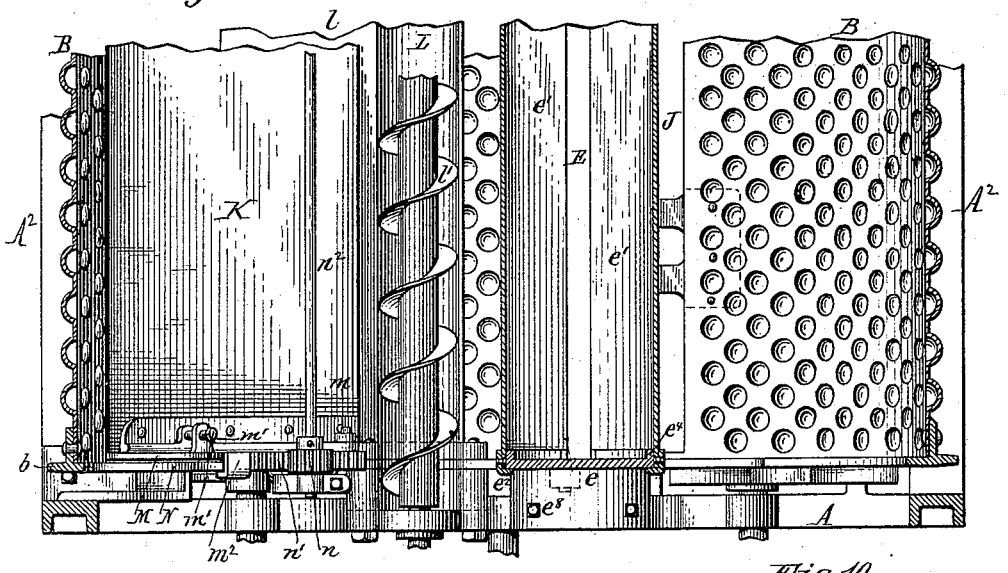


Fig. 7.

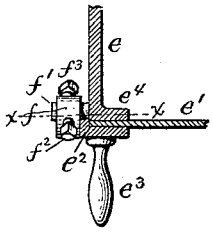


Fig. 8.

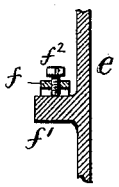


Fig. 9.

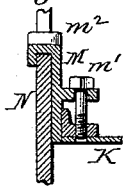


Fig. 10.

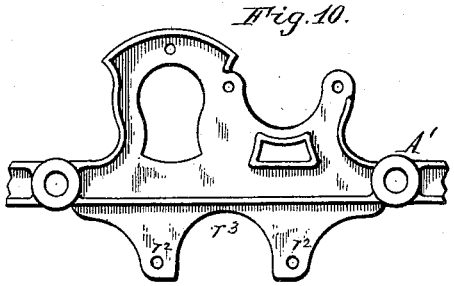
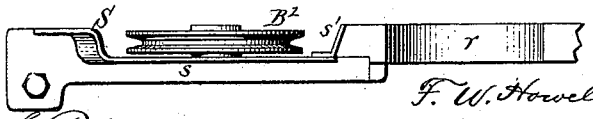


Fig. 11.



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Attorneys.

UNITED STATES PATENT OFFICE.

FREDERICK W. HOWELL, OF BUFFALO, NEW YORK, ASSIGNOR TO MARGARET T. HOWELL, OF SAME PLACE.

COCKLE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 346,815, dated August 3, 1886.

Application filed February 9, 1886. Serial No. 191,349. (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 Improvements in Cockle-Separators, of which the following is a specification.

This invention relates to an improvement in that class of cockle-separators which consist of a revolving drum provided on its inner side with pockets, cells, or indentations in which the cockle and other small impurities embed themselves, and by which the same are elevated and delivered to a catch-board, while the wheat and larger grains roll back and are separately discharged.

The object of the present invention is to improve the construction and operation of machines of this kind; and my invention consists to that end of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of four sheets, Figure 1 is a longitudinal sectional elevation of a cockle-separator provided with my improvements. Figs. 2 and 3 are elevations, respectively, of the feed and discharge ends of the machine. Fig. 4 is a cross-section of the machine on an enlarged scale. Fig. 5 is a sectional elevation of the mechanism by which the feed-valve is actuated on an enlarged scale. Fig. 6 is a longitudinal section of one end of the drum and connecting parts. Fig. 7 is a longitudinal section of one end of the feed-hopper. Fig. 8 is a vertical section in line *x x*, Fig. 7. Fig. 9 is a vertical section of one end of the adjustable catch-board. Fig. 10 is an elevation of the lower portion of the main frame. Fig. 11 is a top plan view of one of the roller-guards.

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

The stationary frame of the machine consists of end frames, A A′, and longitudinal connecting-pieces A^2, firmly secured together and stiffened by brackets *a*.

B represents the separating-drum, provided on its inner surface with suitable cells or indentations.

B′ and B^2 represent rollers supporting the drum B and journaled, respectively, in the end frames, A A′, the drum being provided with end rings, *b b′*, which run in the grooves of the supporting-rollers. The shafts of the rollers B′ at the head of the machine are provided with chain-wheels B^3, for driving these rollers.

C represents a separating-reel arranged lengthwise in the drum B, for the purpose of separating from the material the large grain which should not go to the separating-drum, and for distributing the material lengthwise in the drum.

c represents the feed-spout through which the grain enters the reel, and *c′* the discharge-spout through which the large grain escapes from the reel. The reel is clothed with wire-cloth or perforated metal of the proper mesh to effect a separation of the large grain, which tails off from the small and broken grain, cockle, and other small impurities which pass through the meshes of the reel. The reel is adjustably supported in the end frame, A, by means of its feed-spout *c* and an adjusting-screw, c^2, and in the end frame, A′, by means of an adjustable hanger, c^3, as represented in Fig. 1.

D represents a duplex brush, which bears against the inner side of the separating-drum and the outer side of the reel, and which is pivoted to bearings *d d′*, secured adjustably to the feed-spout *c* and hanger c^3, so that the brush can be adjusted from time to time to bear firmly against the reel and drum, as may be necessary in consequence of the wear of the brush. The brush-stock is provided on one side of its axis with a weight, d^2, which counteracts the tendency of the reel to turn the brush on its pivots away from the reel and drum, and which keeps the brush in contact with these parts, as represented in Fig. 4.

E represents the feed-hopper, arranged lengthwise in the drum B, underneath the reel C, so as to receive the material which passes through the meshes thereof. This hopper is composed of end plates, *e*, and side plates, *e′*. The side plates, *e′*, are provided at both ends with flanges e^2, which overlap the outer sides of the end plates, *e*, and which carry handles e^3. The end plates, *e*, are provided at their inner sides with flanges e^4, against which the side

plates rest. The end plates, *e*, are secured to the end frames, A A′, by horizontal bolts e^5, and the end plates are further supported on the frames by doors e^6, which are fitted in openings in the frames and to which the end plates, *e*, are secured by bolts e^7. The end plates, *e*, are made vertically adjustable on the frames A A′ by set-screws e^8, so that the lower edges of the curved extensions e^9 of the end plates, *e*, can be closely adjusted to the inner surfaces of the end rings, *b b′*, of the drum B. The side plates, *e′*, of the hopper are secured to the end plates, *e*, by hooks *f*, formed on the flanges e^2 of the side plates and engaging over lugs *f′*, formed on the end plates. The side plates, *e′*, are made vertically adjustable by set-screws f^2, which pass through the hooks *f* and bear upon the lugs *f′*, as represented in Figs. 3, 4, 5, and 8, whereby the lower edges of the side plates, *e′*, can be nicely adjusted to the valve F, which opens and closes the discharge-opening of the hopper E. After the side plates have been so adjusted they are clamped in position on the lugs *f′* by set-screws f^3. The side plates, *e′*, are supported near their lower ends by lugs f^4, formed on the inner sides of the lower portions of the end plates, *e*. Upon releasing the screws f^3 the side plates can be removed through either end of the machine.

The valve F is arranged horizontally underneath the discharge-opening of the hopper E, and is journaled at each end in the end plates, *e*, so that by placing the valve in the position represented in Fig. 4 the discharge-opening of the hopper is closed, while by giving the valve a partial turn its upper face is inclined, thereby opening the mouth of the hopper, as represented by dotted lines in Fig. 5. The valve is preferably constructed of angle-iron to render it stiff, and the angle-iron is secured to angular heads *g*, which carry the journals *g′* g^2 of the valve. The journal *g′* is provided with an arm, g^3, which projects downwardly, as represented in Figs. 1 and 5, and which is operated by a cam, G, secured to one end of the drum. When the drum is very long, each end of the valve may be provided with an actuating arm and cam. The cam G is secured to the outer side of the end ring, *b*, of the drum by bolts g^4, which are preferably removable, so that when the indentations of the drum have become worn at their lower edges, compared with the direction in which the indentations ascend on the working side of the drum, the drum can be reversed, and the cam G can be secured to the opposite end of the drum. The cam G is provided with an ascending incline, *h*, which opens the valve, a concentric portion, *h′*, which holds the valve open, and a descending incline, h^2, which permits the valve to close without a jar under the influence of weight h^3, which is attached to the valve laterally of the axis thereof. The weight also serves to hold the valve closed against the pressure of the grain in the hopper E.

The drum B is provided with a longitudinal opening, J, through which the material is discharged which is not elevated by the indentations of the drum. The cam G is so arranged on the drum that the valve F is opened immediately after the opening J has passed the discharge-opening of the hopper E, so that the grain to be separated is delivered upon the inner surface of the drum directly in rear of the opening J. It will be seen that by this means the grain is delivered by the automatic valve directly upon the inner surface of the drum, whereby the construction of the machine is greatly simplified and its operation rendered more reliable.

K represents the inclined catch-board, arranged within the drum B on the ascending side thereof, and L is the conveyer-trough, which receives the material from the catch-board. The latter is supported at both ends by carriers M, which rest upon shields or plates N, curved concentric with the drum and secured to the end frames, A A′, as represented in Figs. 2, 3, 4, and 6, so as to extend upwardly from the lower portions of the hopper-plates *e* beyond the upper edge of the catch-board K. The latter is pivoted near its lower edge to both carriers M, as shown at *m*, and is attached to said carriers near its upper edge by screws *m′*, as represented in Figs. 4 and 9, by which the upper edge of the catch-board can be adjusted toward and from the inner surface of the drum. The carriers M are provided with outwardly-projecting flanges m^2, which rest upon the curved upper surfaces of the shields N, so that by moving the carriers upwardly or downwardly the catch-board is raised or lowered in the drum without changing its distance from the drum. The carriers M are moved on the shields N by gear-wheels *n*, which engage with gear-segments *n′*, formed on the upper sides of the carriers. The wheels *n* are secured to a shaft, n^2, which is journaled in bearings secured to the shields N, and the shaft is provided with a hand-wheel, n^3, by which it is turned. The catch-board is held in position, after it is adjusted, by clamping the shaft n^2 in its divided bearings.

l is an inclined plate extending from the conveyer-trough L upwardly underneath the lower portion of the catch-board.

l′ is the conveyer-screw, arranged in the trough L, and l^2 is a chain-wheel secured to the front end of the shaft of the conveyer-screw *l′*.

O represents the conveyer-trough, arranged below the drum B and receiving the large grain which escapes from the discharge-opening J of the drum.

O′ is an inclined catch-board, which extends upwardly from one side of the trough O to the side of the main frame, where it is supported by one of the horizontal pieces A^2. The front end of the trough O is closed by a cap, P, which is adjustably supported by a screw, *p*, passing through a lug, *p′*, on the end frame, A, as represented in Fig. 1, so that this end of the

trough can be raised and lowered. The cap P is provided with a bearing, p^2, in which the shaft q of the conveyer-screw Q is journaled. The rear end of the trough O is open and secured to a discharge nozzle or spout, R, by means of a flange, r, which is secured to the trough. The spout R is provided with a journal, r', in which the rear end of the shaft q is journaled. The spout R is secured to the under side of the rear frame, A, by bolts r^2, as represented in Fig. 3, and the frame A′ is provided on its under side with a recess, r^3, in which the spout R is seated, as represented in Fig. 10, and which permits the rear end of the conveyer to be lowered away from the frame upon removing the bolts r^2. The discharge-spout c' of the reel C opens with its lower end into the discharge-spout R, so that the large wheat coming from the reel and the large wheat discharged from the drum are discharged together from the machine through the spout R.

The discharge-spout c' is provided with a door, r^4, which can be turned on its pivots, as represented by dotted lines in Fig. 1, for the purpose of delivering from the spout c' a sample of the material which tails off from the reel. If this material contains cockle, the rear end of the reel is raised to keep the grain longer in the reel.

S, in Figs. 4 and 11, represents guards secured to the upper side of the catch-board O′ on the inner side of the rollers B′ B^2, to prevent the grain falling on the catch-board from passing through the openings in the catch-board in which the rollers B′ B^2 are arranged. Each guard S consists of an upright flange, s, secured to the catch-board O′ on an upright flange s', secured to the end of the conveyer-trough O, and bearing against the lower end of the flange s, as represented in Fig. 11. Upon detaching the catch-board O′ from the horizontal piece A^2 of the main frame the catch-board can be removed, with the flanges s attached thereto, without disturbing the rollers B′ B^2 or the conveyer-trough O.

t, in Figs. 1 and 2, represents an endless chain, which runs around wheels T T′, and whereby the reel is driven from the lower conveyer-shaft, q.

u represents an endless chain, which runs around a chain-wheel, v, on the conveyer-shaft q, and around the wheels B^3 and l^2, whereby the driving-rollers B′ and the conveyer-screw l' are driven from the lower conveyer-shaft, q. The proper tension of the drive-chains t and u is maintained by adjusting the conveyer-trough O and the reel C.

The grain to be separated passes first into the reel C, by which the large wheat is separated from the small wheat, cockle, and other fine impurities. The large wheat escapes through the spout c', while the small grains pass through the meshes of the reel into the hopper E. The small grain is intermittently discharged from the hopper upon the drum, which elevates the cockle and other small impurities, while the wheat is rejected and rolls back until it reaches the opening J in the drum, through which it is discharged into the conveyer-trough O. The cockle and other small impurities fall upon the catch-board K, and are removed by the conveyer L l'.

I claim as my invention—

1. The combination, with the separating-drum B and the reel C, arranged within the same, of a pivoted brush D, bearing against the inner side of the drum and the outer side of the reel, and provided with a weight, d^2, substantially as set forth.

2. The combination, with the stationary main frame, of the separating-drum B and an internal feed-hopper, E, composed of end plates, e, secured to the main frame, and side-plates, e', attached removably to the end plates, e, substantially as set forth.

3. The combination, with the separating-drum B, of the internal feed-hopper, E, composed of end plates, e, provided with lugs f', and side plates, e', having hooks f, substantially as set forth.

4. The combination, with the separating-drum, of the internal feed hopper, E, having movable side plates, e', and the discharge-valve F, the side plates, e', being adjustable toward and from said valve, substantially as set forth.

5. The combination, with the separating-drum B, provided with a longitudinal discharge-opening, J, of a feed-hopper, E, arranged lengthwise in said drum and provided with a longitudinal discharge-opening and an automatic valve, whereby the discharge-opening of the hopper is opened and closed intermittently, and whereby the grain is delivered directly upon the inner surface of the separating-drum, substantially as set forth.

6. The combination, with the separating-drum B, provided with a longitudinal discharge-opening, J, of a feed-hopper, E, arranged lengthwise in said drum and provided with a longitudinal discharge-opening, a pivoted valve applied to the discharge-opening of the hopper, and a cam secured to the drum B, whereby said valve is opened and closed intermittently, substantially as set forth.

7. The combination, with the separating-drum B, provided with a longitudinal discharge-opening, J, of a feed-hopper, E, arranged lengthwise in said drum and provided with a longitudinal discharge-opening, a pivoted valve, F, applied to the discharge-opening of the hopper, and provided with a weight, h^3, and arm g^3, and a cam, G, secured to the drum B and engaging with the valve-arm g^3, substantially as set forth.

8. The combination, with the separating-drum, of an internal conveyer-trough, L, provided with an inclined plate, l, and a catch-board, K, made adjustable concentric with the drum, substantially as set forth.

9. The combination, with the separating-drum, of a supporting-frame, catch-board supports attached to said frame and made adjusta-

ble concentric with the drum, and a catch-board made adjustable on its supports toward and from the drum, substantially as set forth.

10. The combination, with the separating-drum B and the stationary frame provided with shields N, curved concentric with the drum, of the catch-board K, provided with carriers M, resting upon said shields and made adjustable thereon, substantially as set forth.

11. The combination, with a separating-drum, B, and the stationary frame provided with shields N, of the adjustable carriers, M, resting on said shields, and the catch-board K, adjustably attached to the carriers M, substantially as set forth.

12. The combination, with a separating-drum, B, and the stationary frame provided with shields N, of the adjustable carriers M, resting on said shields, the catch-board K, pivoted to said carriers, and the adjusting-screws m', substantially as set forth.

13. The combination with the separating-drum B and the stationary frame provided with shields N, of carriers M, resting on said shields, and provided with gear-segments n', a catch-board, K, attached to said carriers, and gear-wheels engaging with said gear-segments, substantially as set forth.

14. The combination, with the separating-drum B, having a longitudinal discharge-opening, J, of the supporting-wheels B' B^2, the conveyer-trough O, provided with guard-flanges s', and the catch-board O', provided with guard-flanges s, substantially as set forth.

15. The combination, with the separating-drum B and the stationary frame, of the conveyer-trough O, made vertically movable in said frame, and provided at its ends with journals p^2 r', and the conveyer-shaft q, journaled therein, substantially as set forth.

16. The combination, with the stationary frame, the separating-drum, and the reel C, arranged within the drum, of the vertically-movable conveyer-trough O, the conveyer-shaft q, journaled in said trough, and the endless chain t and wheels T T', whereby the reel is driven from said conveyer-shaft, substantially as set forth.

17. The combination, with the stationary main frame provided with driving-rollers B', the separating-drum B, and the reel C, arranged within the same and made vertically adjustable in the main frame, of the vertically-movable conveyer-trough O, the conveyer-shaft q, journaled in said trough, the endless chain t and wheels T T', whereby the reel is driven from said conveyer-shaft, and the endless chain u and wheels V B^3 l^2, whereby the drum B and the conveyer l' are driven from the conveyer shaft q, substantially as set forth.

Witness my hand this 1st day of February, 1886.

FREDERICK W. HOWELL.

Witnesses:
JNO. J. BONNER,
OSCAR SCHAUB.