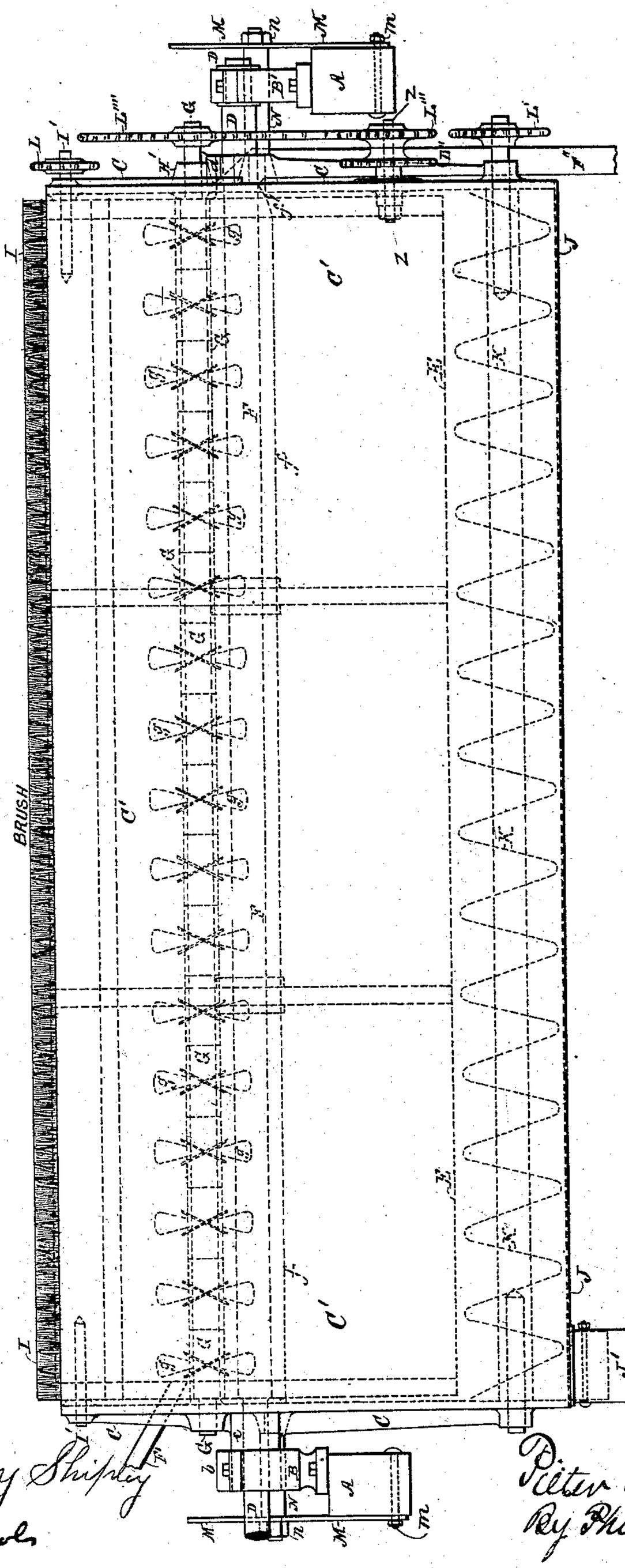
(No Model.) 4 Sheets—Sheet 1.

P. VAN GELDER.

GRAIN SEPARATOR.

No. 282,415. Patented July 31, 1883.

Fig. 1.



Witnesses.

Harry Shipley

Wm Nichols

Inventor.

Pieter van Gelder

By Philip T. Dodge. atty

(No Model.)

4 Sheets—Sheet 2.

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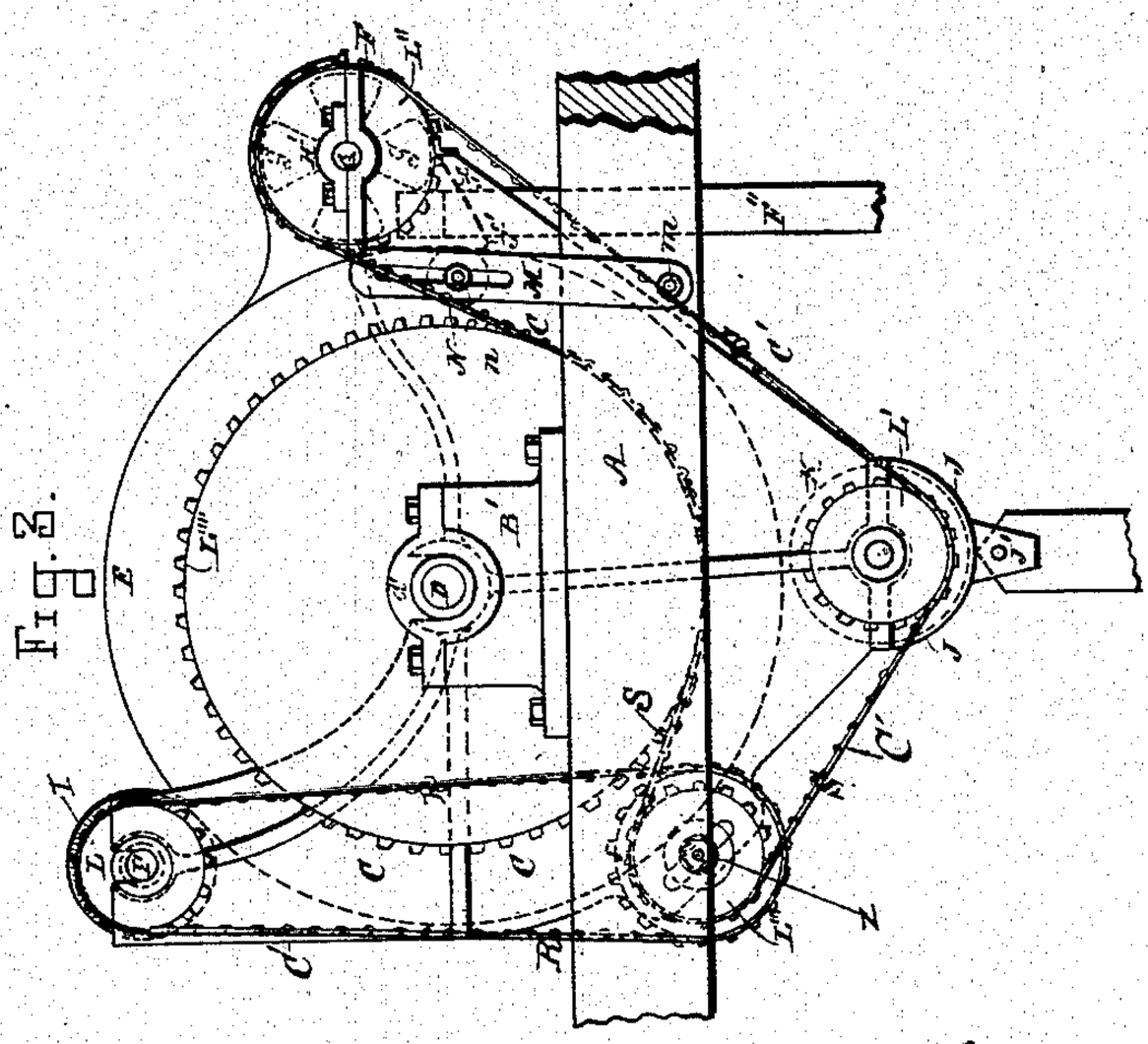

Fig. 2.

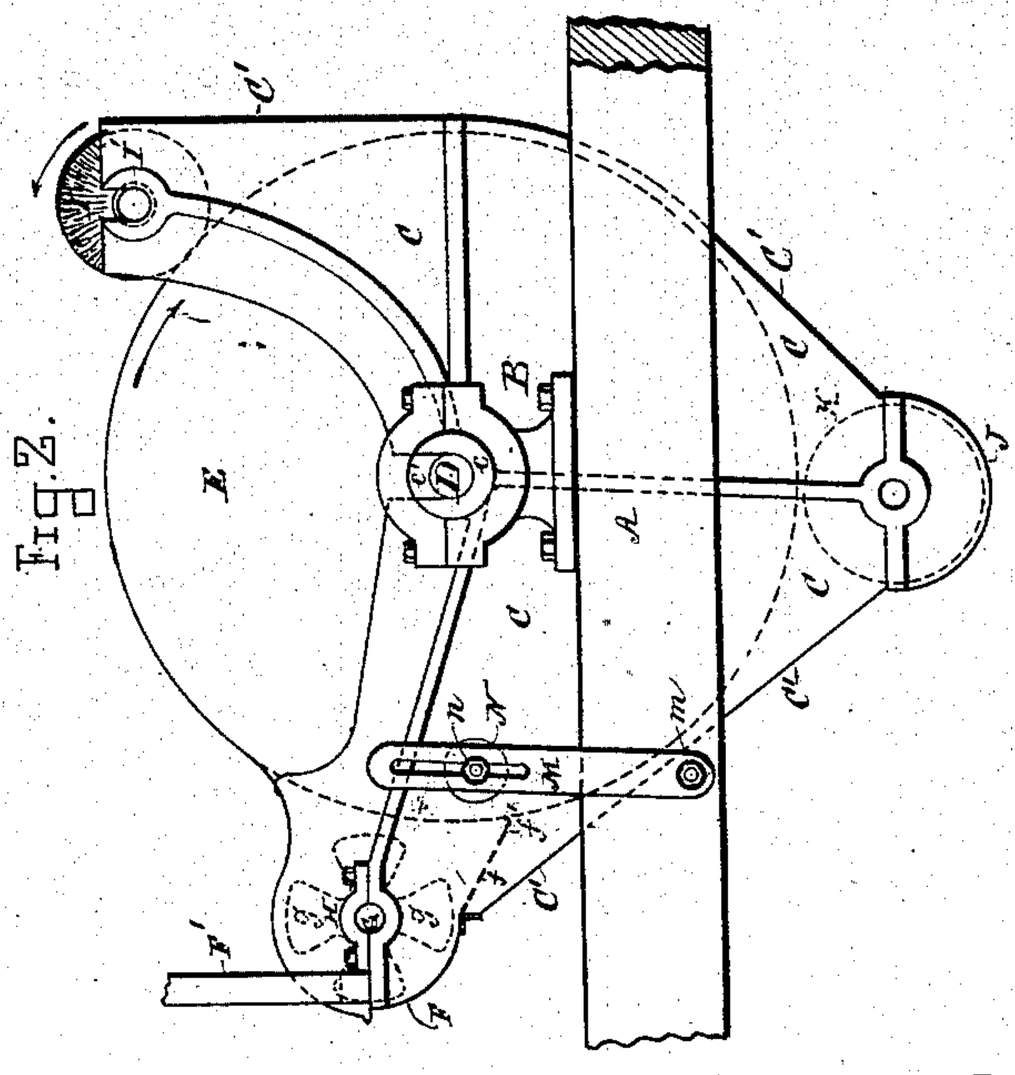

Fig. 2.

Witnesses.

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4 Sheets—Sheet 3.

P. VAN GELDER.

GRAIN SEPARATOR.

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Fig. 5.

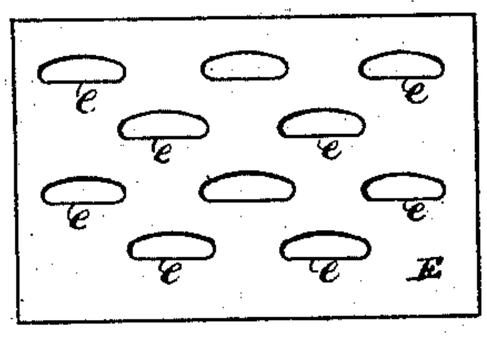

Fig. 4.

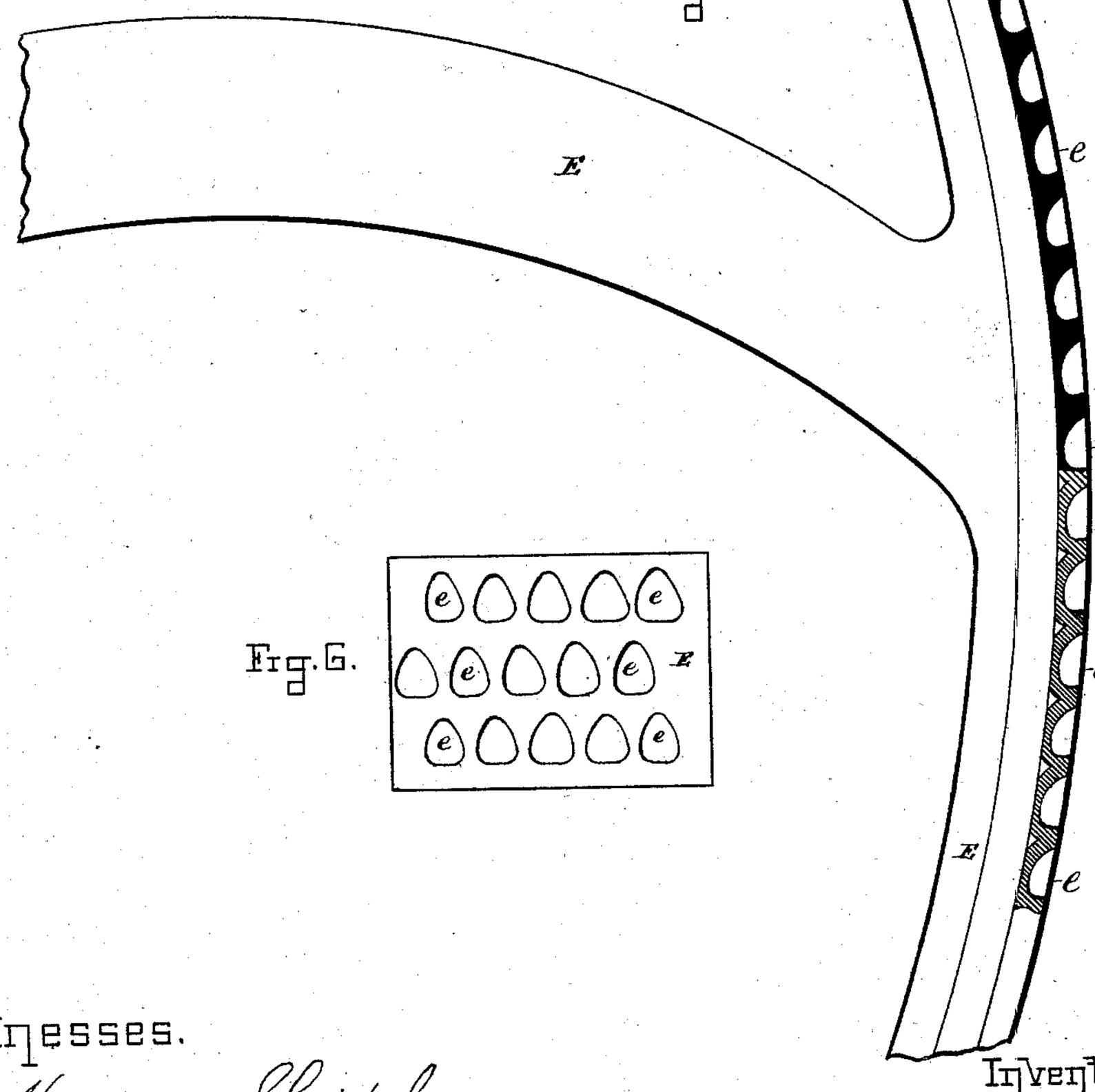

Fig. 6.

Witnesses.

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(No Model.) 4 Sheets—Sheet 4.

P. VAN GELDER.

GRAIN SEPARATOR.

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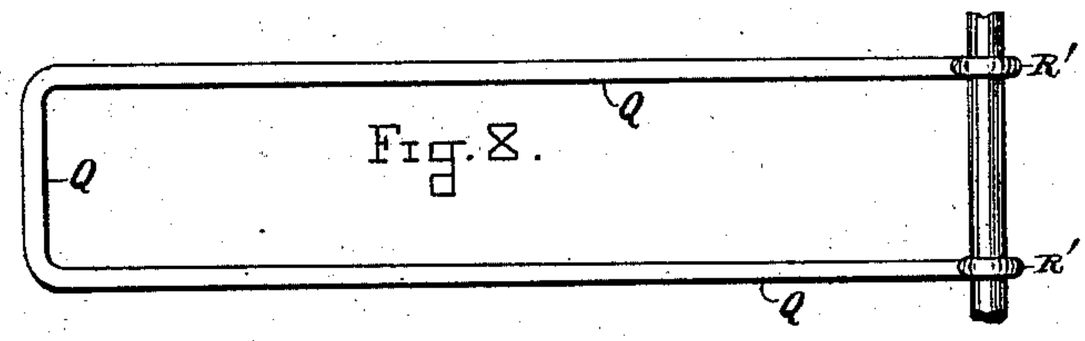

Fig. 8.

Fig. 7.

Fig. 10.

Fig. 9.

Witnesses.

Harry Shipley

Wm Nichols.

Inventor.

Peter van Gelder

By Philip T Dodge

UNITED STATES PATENT OFFICE.

PIETER VAN GELDER, OF SOWERBY BRIDGE, COUNTY OF YORK, ENGLAND.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 282,415, dated July 31, 1883.

Application filed March 2, 1883. (No model.) Patented in England July 18, A. D. 1882, No. 3,415.

To all whom it may concern:

Be it known that I, PIETER VAN GELDER, of Sowerby Bridge, in the county of York, in the Kingdom of England, have invented certain new and useful Improvements in Grain-Separators, (for which a patent was granted me in Great Britain on the 18th day of July, 1882, No. 3,415,) of which the following is a specification.

My invention relates to that class of machines used more particularly for removing garlic and other impurities from wheat, which consists, essentially, of a revolving cylinder, against which the grain is delivered, provided in its surface with holes or pockets adapted to take up and remove from the mass certain classes of seeds or matters, leaving the remainder behind.

The improvement relates mainly to an improved form of the cells or pockets, to the means for presenting grain to the cylinder, and to means whereby the feeding and delivering devices may be adjusted circumferentially about the cylinder.

Referring to the accompanying drawings, Figure 1 represents a side elevation of my improved machine. Figs. 2 and 3 are elevations of the same, looking against the opposite end. Fig. 4 is a vertical section through one side of the cylinder. Figs. 5 and 6 are face views of portions of the same, showing pockets of different forms, adapted for the removal of different matters. Fig. 7 is a vertical section through one side of the cylinder and feeding mechanism and attendant parts. Fig. 8 is a top plan view of one of the yielding guards employed to remove matters which are lodged improperly in the pocket. Fig. 9 is a top plan view of a portion of the feed-screw. Fig. 10 is a top plan view illustrating a modified construction.

Referring to Figs. 1, 2, and 3, A represents rigid beams or supports, which are to be constructed in any suitable form and of any suitable material, either as a portion of one frame, or otherwise. Upon the respective beams A are mounted two journal blocks or bearings, B, designed to give support to opposite ends of a horizontal cylinder and its attendant parts.

E represents the cylinder, arranged in a horizontal position and secured upon a central driving-shaft, D, the ends of which are extended through and receive, indirectly, support from the bearings B, the cylinder being free to revolve. The cylinder, which may be built of wood, metal, or other material in any suitable manner, is provided on its outer surface with a great number of small holes or pockets, *e*. (Clearly represented in Figs. 4, 5, 6, and 7.) These cells, of a size corresponding with that of the grains or particles which they are to receive and convey away from the mass of grain, are made in vertical section, of a form shown in Figs. 4 and 7, their upper walls inclining gradually backward into the surface of the cylinder, while their lower edges are extended abruptly outward to the periphery, preferably with a slight curvature forward in the direction of rotation. In other words, the lower edge of the pocket extends inward at substantially right angles to the circumference of the cylinder, while the upper edge or surface extends inward at a less angle. This construction adapts the pockets to readily receive and retain seeds or other particles of proper size, and which will be carried upward therein, as the cylinder revolves in the direction indicated by the arrows, without a tendency to roll outward, or escape in a backward direction therefrom. The gentle inclination at the front or upper edge of the pocket, however, admits of the seeds being readily removed therefrom in a forward direction—that is to say, in the direction in which the cylinder revolves. The pockets, of the form represented in Fig. 5, are adapted to receive and retain cockle or other small seeds, while those represented in Fig. 6 are adapted to receive the wheat.

Outside of the cylinder I employ a framework to carry the feeding and discharging mechanisms constructed in the following manner: A vertical plate or frame, C, is mounted at each end of the cylinder and provided with a tubular journal arranged to encircle the central shaft, D, of the cylinder, and seated loosely in the corresponding journal box or bearing, B. The tubular journals thus arranged serve to sustain the plates C and admit of their re-

volving around the shaft D, and at the same time they serve as bearings for said shaft.

Lengthwise of the cylinder I extend plates C′ C′, secured at their ends firmly to the rocking end plates, C, and constituting, in connection therewith, a frame-work free to rock or tip about the cylinder E, to a limited extent, this frame being designed to give support to the feed-spout and screw, the discharging-brush, and the delivery-worm. Upon one of the plates C′, and extending the entire length of the cylinder, I form or attach a feed-trough, F, having an open side adjacent to the cylinder, in order that the grain received therein may lie in contact with the surface of the cylinder, to the end that those seeds which are to be removed may enter the cells or pockets.

As shown in Fig. 7, the bottom of the feed-trough F is inclined downward toward the surface of the cylinder to facilitate the flow of grain toward the same. At its lower side the trough is provided with a lip, *f′*, of felt or equivalent flexible material, the edge of which is curled upward against the surface of the cylinder, as shown in Fig. 7, and in operation held in contact therewith by the pressure of the grain above. This construction effectually prevents the escape of the grain between the edge of the hopper and the surface of the cylinder.

The feeding-trough F communicates at one end with an inlet or feed-spout, F′, through which the uncleaned grain is delivered into the machine, and communicates at its opposite end with a spout, F″, through which the purified grain is discharged.

Lengthwise within the feed-trough F, I mount a horizontal shaft, G, bearing at its ends in the end plates, C, and provided through its length with a series of spiral or oblique blades, *g*, by means of which the mass of grain in the trough is thoroughly agitated, so that each particle may come in contact with the cylinder and be gradually passed through the machine from the head to the tail. The construction of this agitator and feeder may be modified as regards the details, provided it is adapted to operate with the effect above described.

Above the feed-shaft G, preferably upon one and the same shaft, extending lengthwise of the machine, are a series of yielding guard-arms, Q, the forward ends of which will rest against or in close proximity to the surface of the cylinder, in order that they may act upon and remove from the cells any large particles which may accidentally lodge therein and be carried upward by projecting therefrom.

It will be understood that the guards will have no effect upon the small grains seated entirely within the pockets, and that their action will be confined entirely to those which project beyond the surface of the cylinder.

The guards Q may be of any suitable form and construction, provided only that their operative faces lie in close proximity to the cylinder. It is preferred, however, to construct them of elastic wire in a U form, as represented in Fig. 8, with their outer or rear ends, R′, coiled and secured in position, as shown in Fig. 7. It will be understood that there will be a sufficient number of these guards placed side by side to extend the entire length of the cylinder, each free to rise and yield independently of the others.

On the opposite side of the cylinder from the feed-trough, and extending the entire length thereof, I mount a revolving brush, I, the journals of which are seated in the end frames, C. By means hereinafter described this brush is caused to revolve and its active surface moved in the same direction as the adjacent surface of the cylinder, but at a higher speed, whereby it is caused to act upon and remove from the cells the seeds contained therein. The seeds thus removed descend by gravity past the rear side of the cylinder into a trough or receiver, J, located between the lower edges of the plates C′ C′, and sustained thereby and by the end plates, C.

The trough J contains a worm or screw, K, of any ordinary or suitable form, whereby the delivery of the seeds is effected at the end of the machine.

The operation is as follows: The grain to be purified is delivered through the spout F′ into the trough F, and is distributed lengthwise therein by means of the revolving blades *g*. The cylinder being set in motion, its surface moves upward past the open side of the feed trough against the side of the mass of grain resting thereon, the grain being agitated so that each and every grain is brought with certainty against the surface of the cylinder, the grain being at the same time gradually moved lengthwise of the cylinder. Those seeds or impurities which the pockets are adapted to receive enter said pockets and are carried upward therein, over the top of the cylinder, and descending on the opposite side, fall from the pockets, or, in the event of their failing so to do, are removed by the action of the brush I, and descend to the bottom spout, J, from which they are delivered by the screw. Those large seeds, if any, which may by chance be retained in the pockets will encounter the guards Q, whereby they will be displaced from the pockets and caused to fall back into the mass below.

Owing to the wide difference between different masses of grain as regards the character and amount of impurities contained therein, and other circumstances, it is desirable that the position of the delivery-brush I and the height and inclination of the feed-spout with respect to the cylinder shall be susceptible of adjustment to suit the requirements of each case. It is for this purpose, mainly, that the frame supporting said parts is arranged, as before mentioned, to rock or tip upon the central journals.

It will be observed that the feed-screw, the

feed-trough, the brush, and the delivery-spout are all sustained by the end plates, C, and that the rocking motion of these plates will change the position of said parts with respect to the cylinder without changing their positions in relation to each other.

Any suitable means may be employed for rocking the end plates or frames, C, and for securing them in different positions—a simple means consisting, as represented in Figs. 2 and 3, of links M, pivoted at *m* to the supporting-beams A, and provided on their upper ends with slots, through which clamping-bolts *n* pass into the frames C.

It is obvious that the cells or pockets of the cylinder may be adapted to receive the wheat or other grain and remove the same, leaving grain of smaller size, or that they may be adapted to receive the small impurities or seeds, leaving the wheat.

If it be desired to have the machine remove two or more kinds of seed, the surface of the cylinder may be divided transversely into two or more lengths or sections, and the surface of each section provided with cells adapted to receive a particular kind of seed only. The result of this arrangement, which is represented in Fig. 10, will be that the seed in the course of its passage lengthwise of the cylinder, will first have one class of seeds removed by one series of pockets, and then be brought opposite a second series of pockets, by which another class of seeds will be removed, and so on repeatedly.

It is preferred to construct the feed worm or screw of a series of short hubs or sleeves arranged end to end upon a shaft, and each bearing two or more blades, as shown in Fig. 9, this construction permitting the removal of a broken section and its convenient replacement by another.

The present invention is restricted to those matters and things which are hereinafter claimed, and as to all matters which may be described or shown, but which are not claimed, the right is reserved to make the same the subject of a separate application.

Motion will be ordinarily communicated to the machine through the shaft D of the cylinder by means of a pulley or equivalent device connected therewith. For the purpose of imparting motion thence to the other moving parts I adopt the following arrangement: The shaft of the brush I is provided at one end with a chain-wheel, L. The shaft of the delivery-screw is provided with a chain-wheel, L′. The feed-shaft G is provided with a pulley, L″, and an adjustable spindle or arbor on one of the end plates, C, is provided with two united chain-wheels, L‴, and the main shaft D is provided with a large chain-wheel, L⁗, as clearly represented in Figs. 1 and 3. A chain, R, (shown by dotted lines in Fig. 3,) connects the pulley L of the brush with one of the pulleys, L‴, and a second chain, S, (shown in the same figure,) passes around the second pulley, L‴, thence beneath and against the pulley L⁗ on the main shaft, around the pulley L″ on the feed-shaft, and thence beneath the pulley L′ on the delivery-screw to the starting-point.

It will be seen that by this arrangement motion is communicated from the main shaft D, through the pulley L⁗ and chain S, to the feed-screw, the delivery-screw, and the pulley L‴, and that by means of the chain R motion is communicated from the pulleys L‴ to the brush.

As shown in Fig. 3, the shaft-arbor Z, which sustains the double pulley L‴, is mounted in a slot in the arm C, and secured by a nut on its inner end, as represented in Fig. 1, in order that it may be adjusted laterally. This adjustment of the double pulley is advantageous, in that it permits the chains to be readily applied and placed under proper tension. By removing the respective pulleys and replacing them by others of different sizes the relative speeds of the different members may be varied as required.

Having thus described my invention, what I claim is—

1. In a grain-separator, the combination of the cylinder provided with cells or pockets in its surface, a feed-trough extending lengthwise of said cylinder, with the open side adjacent thereto, and a feeding device, substantially as described, to agitate the mass of grain and effect its movement through the trough lengthwise of the cylinder.

2. In a grain-separator, the combination of the revolving cylinder provided with cells or pockets in its surface, the feed-trough having an open side adjacent to said surface, and a guard located adjacent to the surface of the cylinder and above the feed-trough, whereby it is adapted to act upon those seeds which may project from the pockets and effect their return to the feed-trough.

3. In combination with the cylinder having the external cells or pockets therein, the feed-trough having the open side adjacent to said cylinder, and the yielding-guard Q, having its free end located adjacent to the cylinder and above the feed-trough.

4. In a grain-separator, a cylinder provided with cells in its surface, combined with a feed-trough having an open side adjacent to the surface of the cylinder, and a flexible lip or packing applied to the lower edge of the trough and acting against the surface of the cylinder, substantially as described, whereby the escape of the grain between the cylinder and trough is prevented.

5. The combination, with the cylinder having a cellular surface, of the feed-trough and the flexible lip or packing *f′*, secured to the trough, and having its opposite edge curled upward against the surface of the cylinder, as shown.

6. In a grain-separator, in combination with mechanism, substantially as described, for de-

livering grain to the surface of said cylinder and for rotating the same in the direction indicated, a cylinder having in its surface cells or pockets *e*, the rear edges of which enter abruptly from the periphery, while the forward edges have a gradual inclination inward, as shown, whereby the escape of the seed from the cells in a forward direction is permitted.

7. In a grain-separator, in combination with mechanism, substantially as described, for delivering grain to the surface of said cylinder and for rotating the same in the direction indicated, the cylinder having in its surface cells or pockets *e*, the rear edges of which have an inward and backward curvature, substantially as described and shown, whereby the escape of the grain therefrom is permitted.

8. In a grain-separator, in combination with mechanism, substantially as described, for delivering grain to the surface of said cylinder and for rotating the same in the direction indicated, a cylinder having in its surface cells *e*, the rear walls or edges of which are carried slightly inward from the bottom to the surface in a forward direction, while their forward edges have a gentle ascent from the bottom to the surface, whereby the escape of the seed from the rear edge of the cells is prevented, but its escape from the forward edge facilitated.

9. In a grain-separator, a cylinder provided at different points in its length with cells or pockets of different size, combined with means, substantially as described, for effecting the movement of the grain lengthwise over the surface of the cylinder, in contact therewith, whereby the grain is subjected to the pockets of different size, successively.

10. In a grain-separator, the combination of a cylinder having a cellular surface with the feed-trough and a delivery-brush mounted in supports arranged to revolve about the axis of the cylinder.

11. In a grain-separator, the combination of a cylinder having a cellular surface with a feed-trough located adjacent thereto, and adjustable, substantially as described, circumferentially about said cylinder.

12. In a grain-separator, the combination of a cylinder having a cellular surface with a rotary delivery-brush, I, adjustable circumferentially about the said cylinder in the manner and by means substantially as described.

13. In combination with the cylinder having the cellular surface, the rocking frames C, the feed-trough, the delivery-brush, the delivery-screw mounted in said frames, and means, substantially as described, for locking said frames in different positions.

14. In combination with the cellular cylinder and the wheel L'''', applied to its axis, the revolving frames C, the delivery-brush, the feed-screw and the delivery-screw mounted in said frames, and provided with driving-pulleys at their ends, and the driving-chains R S, applied substantially as described.

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Witnesses:
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