

(No Model.)

2 Sheets—Sheet 1.

T. F. GRAY.
GRAIN AND COCKLE SEPARATOR.

No. 460,436.

Patented Sept. 29, 1891.

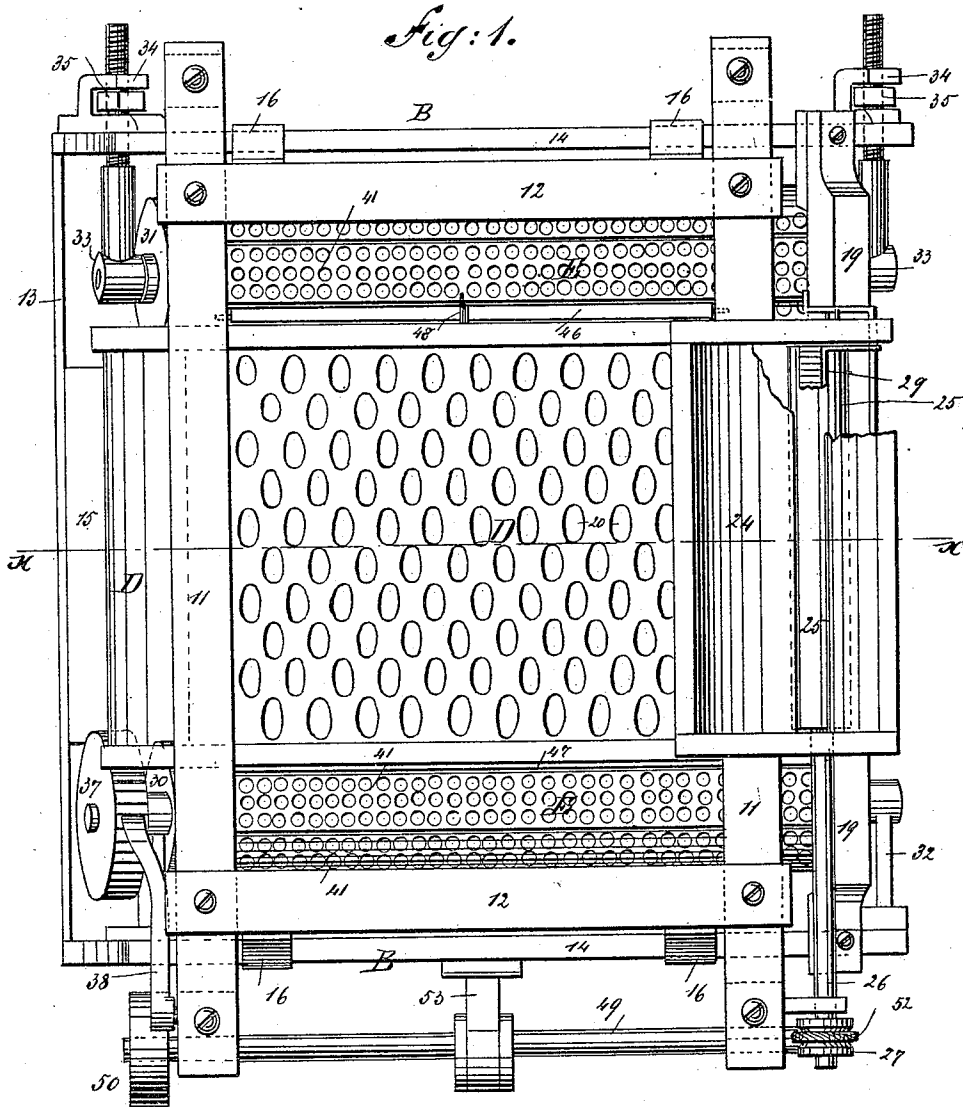
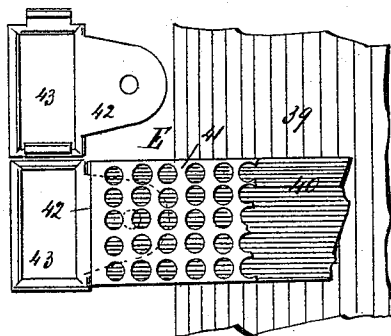


Fig: 4.

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ATTORNEYS

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Fig. 2.

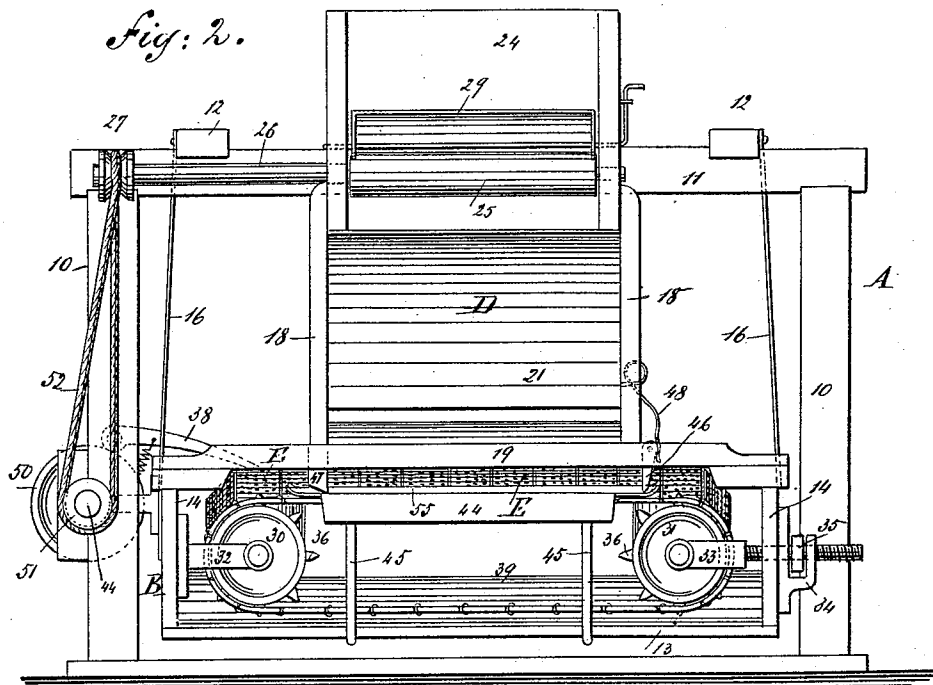
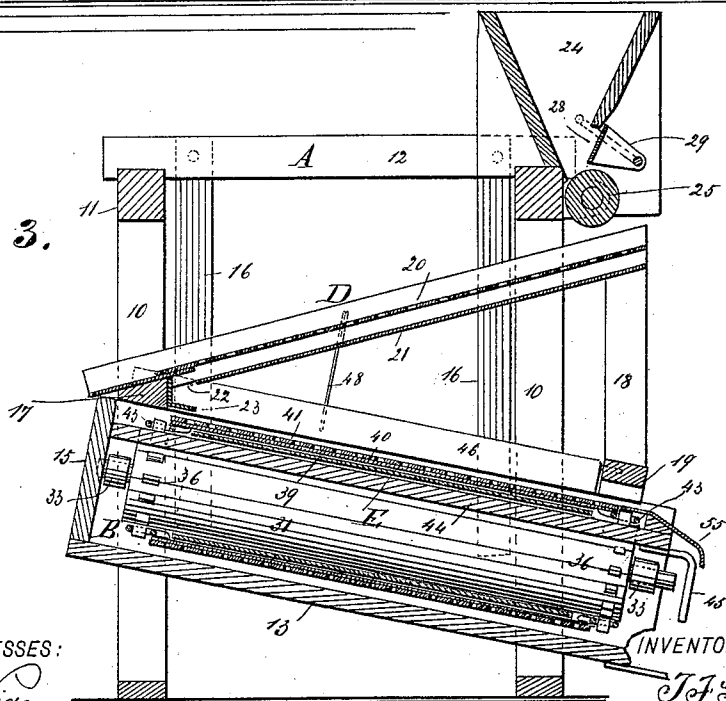


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS F. GRAY, OF MONROEVILLE, OHIO.

GRAIN AND COCKLE SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 460,436, dated September 29, 1891.

Application filed February 25, 1891. Serial No. 382,720. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. GRAY, of Monroeville, in the county of Huron and State of Ohio, have invented a new and Improved Grain and Cockle Separator, of which the following is a full, clear, and exact description.

My invention relates to a grain-separator, and has for its object to provide a machine of simple, durable, and economic construction by means of which a small seed called "cockle" will be effectually separated from wheat-kernels.

A further object of the invention is to provide a means whereby the cockle and kernels of wheat will be separately delivered from the machine.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

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

Figure 1 is a plan view of the machine, a portion of the hopper being broken away. Fig. 2 is a front elevation thereof. Fig. 3 is a central vertical section taken on the line $x x$ of Fig. 1, and Fig. 4 is a detail view of the endless supporting belt or table.

The machine is constructed with two frames, an outer fixed frame A and an inner suspended frame B, capable of a lateral vibratory movement. The outer frame, usually rectangular in general contour, consists of corner posts or standards 10, secured to any suitable support, longitudinal beams 11, connecting the supports at each side, and transverse beams 12, attached to the side beams. The inner frame is contained in the outer one and usually comprises a bottom 13, sides 14, and a back board 15, preferably covering the central portion only. The forward portion of the frame is open and also its top.

The frame B is suspended by flexible or yielding hangers 16, usually made from spring metal, the hangers being secured to the sides of the frame and to the cross-beams 12 of the fixed frame. The movable frame is so located that it has a decided inclination from the back of the machine downward to the front.

The inner movable frame is wider than the fixed frame and is provided at its higher or rear end with a beam 17, upon which the lower extremity of a screen or sieve D rests. The sieve inclines from the front of the machine downward in direction of the rear thereof, or in a reverse direction to the body of the movable frame, and extends over and beyond the upper edge of the back board 15. The forward higher end of the sieve is supported by uprights 18, resting upon a beam 19, extending from side to side of the movable frame. The sieve is constructed with an upper perforated plate 20, the perforations being oval or practically so, and a plain bottom plate 21, spaced a slight distance from the upper perforated plate. The bottom plate 21 terminates in front of the lower beam-support of the sieve, whereby an opening 22 is formed, through which the screened material drops, being directed to an endless traveling belt or table E, located in the body of the movable frame beneath the sieve by an angled plate 23, or its equivalent, secured to the beam 17, as shown in Fig. 3. A hopper 24 is located over the upper end of the sieve and is usually secured to one of the side pieces of the fixed frame. At the open lower end of the hopper a roller 25 is located, fast upon a shaft 26, journaled in the sides of the hopper and extending in the direction of one end of the machine, the said shaft being provided with a pulley 27. An opening 28 is made in the outer side of the hopper, which extends through to the bottom, and a damper or cut-off 29 is pivoted to the sides of the hopper in such manner that it may be manipulated to close the opening 28, or partially close it, thus regulating the amount of material to be discharged from the hopper upon the sieve.

The damper or cut-off usually consists of a flat body having ears at its ends, and it is pivoted to the hopper usually by passing a rod through the sides of the latter and through the ears, the latter being attached to the rod. The rod at one end is provided with a suitable handle whereby it may be turned.

Within the body of the movable frame rollers 30 and 31 are journaled at opposite sides. The bearings 32 for the trunnions of the roller 30 are rigidly secured to the inner face of one side piece of the frame B. The bearings 33,

in which the trunnions of the opposite roller 31 are journaled, are laterally adjustable, the boxes having arms attached thereto threaded at their outer ends, the threaded portion of the arms being passed through a side board of the frame B and through threaded apertures in essentially U-shaped brackets 34, secured to the outer face of the side board. Nuts 35 are located upon the threaded portion of the arms between the members of the brackets, as shown in Fig. 1. By this means the roller 31 may be adjusted to and from the roller 30 to keep taut the endless separating belt or table E, which the rollers are adapted to support and carry. Sprocket-wheels are attached to the ends of the rollers, or sprocket-teeth 36 are produced upon the periphery of the rollers near their ends, as illustrated in Fig. 3. The trunnion of the roller 30 extends beyond the rear bearing, and upon the projecting end of the trunnion a ratchet-wheel 37 is keyed or otherwise secured. This ratchet-wheel is engaged by a spring-pressed dog 38, pivoted preferably to one of the corner-posts of the fixed frame. The dog is constantly held in engagement with the ratchet-wheel by its spring.

The endless table or belt E is preferably made up of a body-belt 39, of leather or of a like material, a series of transverse metal strips 40, attached to the body-belt 39 and arranged closely together, and perforated strips 41, attached to the plain strips 40, the plain and perforated strips being preferably of equal length and width. The metal strips are secured at their extremities to ears 42, projected one from each link 43 of endless chains, one chain being located at each side of the table. The metal strips 40 and 41 are preferably made of a width equal to the length of the links to which they are attached. The table is thus provided with a series of pockets. The under or body belt 39 is preferably narrower than the upper portion of the table, and the links 43 of the chains receive the sprockets 36 upon the rollers. The table or belt E passes over a horizontal partition 44, secured at one end to the back board 15 of the movable frame and supported at its other end by bracket-rods 45, secured to it and to the bottom board of the frame B, as illustrated in Fig. 3. The partition 44 is intended to prevent the upper surface of the table from sagging, as it is necessary that the said surface should be practically straight. Two guide-bars 46 and 47 extend from front to rear over the separating table or belt, the said guide-bars being attached to the front and rear beams 17 and 19 of the frame B. The guide-bar 47 is fixed, and the guide-bar 46 is pivoted and pressed by a spring 48 in such manner that said bar normally maintains a vertical position. The bars 46 and 47 are elevated above the table a sufficient distance, only not to interfere with the movement of the latter.

The drive-shaft 49 is journaled at one end of the machine and is provided at one end

with a drive-pulley 50 and at the opposite end with a pulley 51, connected with the pulley 27 of the roller-shaft 26 by a belt 52, and a lateral reciprocating movement is imparted to the frame B through the medium of a cam located upon the drive-shaft and working in a socket 53, secured to one side of the movable frame, as illustrated in Fig. 1.

In the operation of the machine the feed from the hopper to the sieve D is regulated and the drive-shaft is set in motion, whereupon the frame B, carrying the sieve and table, is rapidly reciprocated laterally, and by reason of the lateral movement of the frame B the dog 38 forces the ratchet-wheel 37 to revolve, and thereby communicates movement to the rollers carrying the endless belt or table. The pockets in the upper face of the endless belt or table are round and are of sufficient size and depth to just neatly accommodate cockles that may be in the grain. The grain leaving the hopper falls upon the perforated surface of the reciprocating screen or sieve, the dust and chaff pass off from the screen at the rear of the machine, and the wheat and cockles drop through the openings in the sieve upon the bottom plate thereof and are conducted to the upper face of the separating belt or table. This table, gradually moving in one direction and at the same time being laterally reciprocated, separates the grain from the cockles, the oblong kernels of wheat rolling off the table at the forward side of the machine between the guide-bars 46 and 47 and over a guide-plate 55 into any receptacle placed beneath said plate to receive the grain. The cockles, however, being round, enter the pockets in the table and are carried by the table to the end of the reciprocating frame B, from whence they pass out at the front of the machine into any vessel placed to receive them. If a kernel of wheat should by chance enter one of the pockets in the table that portion in the pocket will be of less weight than the portion out of it, and as the table is constantly shaken and is inclined the kernel will not long remain in the opening or recess.

In the event that two or more cockles should be crowded between the walls of a pocket, so as to extend some distance above the upper face of the table, upon striking the pivoted guide rail or bar 46 it will move a sufficient distance outward to admit of the passage of the obstruction.

It will be observed that the machine is exceedingly simple and durable, and that it may be economically manufactured.

I desire it to be understood that any desired number of sieves may be employed, and that a laterally-reciprocating movement may be imparted to the inner suspended frame in any well-known manner.

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

1. In a grain-separator, the combination,

with a main frame, of a vibrating frame mounted in the main frame, parallel rollers mounted in the vibrating frame and inclined in the direction of their length, an endless belt passing around said rollers and provided with pockets, and means for operating the endless belt by the vibration of the said frame, substantially as described.

2. In a grain-separator, the combination, with a main frame, of a vibrating frame in the main frame, parallel rollers mounted in the vibrating frame and inclined in the direction of their length, an endless belt passing around said rollers and provided with pockets, a ratchet-wheel on one of the rollers, a pawl pivoted to the main frame and engaging the ratchet-wheel, a drive-shaft, and a cam on the drive-shaft for operating the vibrating frame, substantially as herein shown and described.

3. In a grain-separator, the combination, with an endless separating-belt inclined in

the direction of its width, of guide-bars arranged transversely above the belt, one of the guide-bars being pivoted and held in a vertical position by a spring, substantially as herein shown and described.

4. A grain-separator comprising a main frame, a hopper on the said frame, a vibrating frame suspended in the main frame, an endless separating-belt mounted in the vibrating frame and inclined in the direction of its width, a sieve in the vibrating frame above the endless belt and inclined in a direction reverse to that of the separating-belt, a cam for operating the vibrating frame, a ratchet-wheel on one of the rollers of the endless belt, and a pawl pivoted to the main frame and engaging the ratchet-wheel, substantially as herein shown and described.

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Witnesses:

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