No. 740,575. PATENTED OCT. 6, 1903

E. M. KRAMER.

GRAIN SEPARATOR.

APPLICATION FILED NOV. 3, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

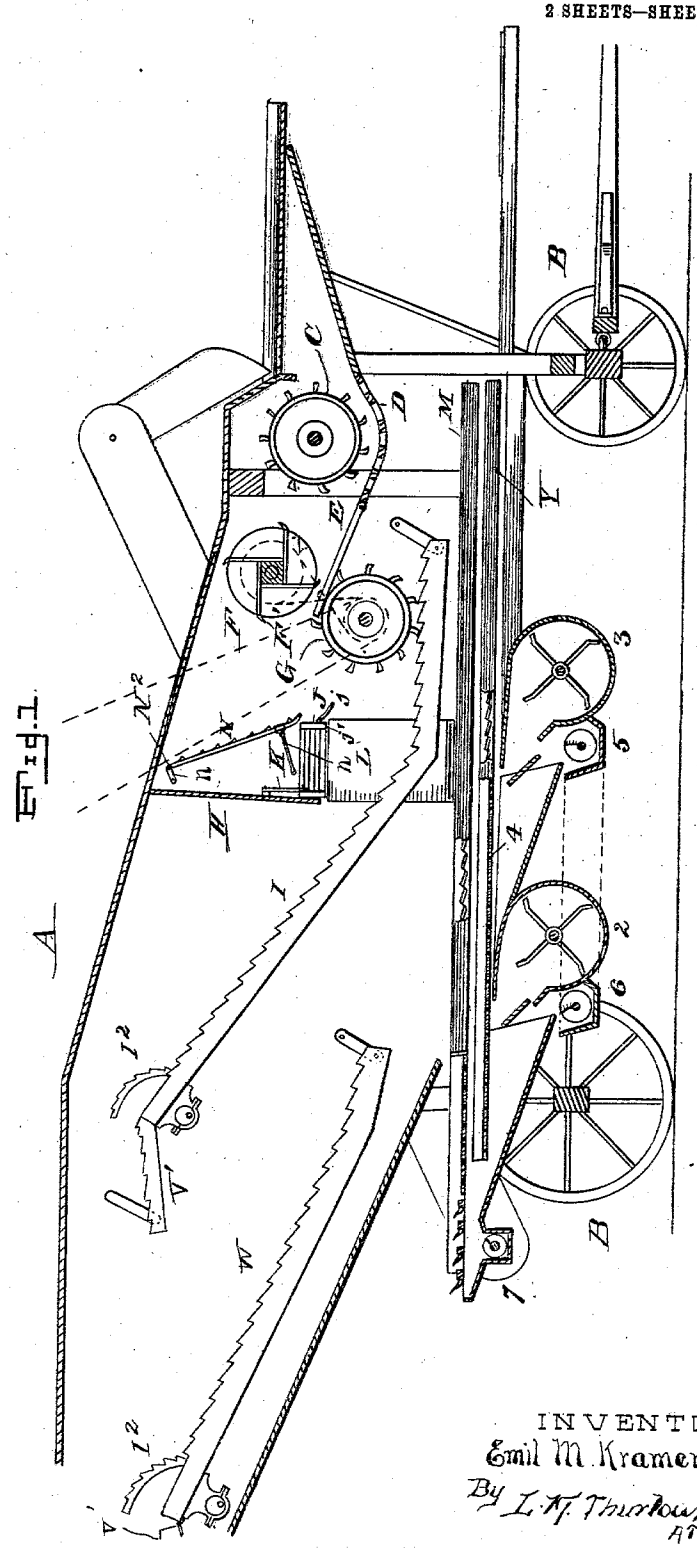


Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

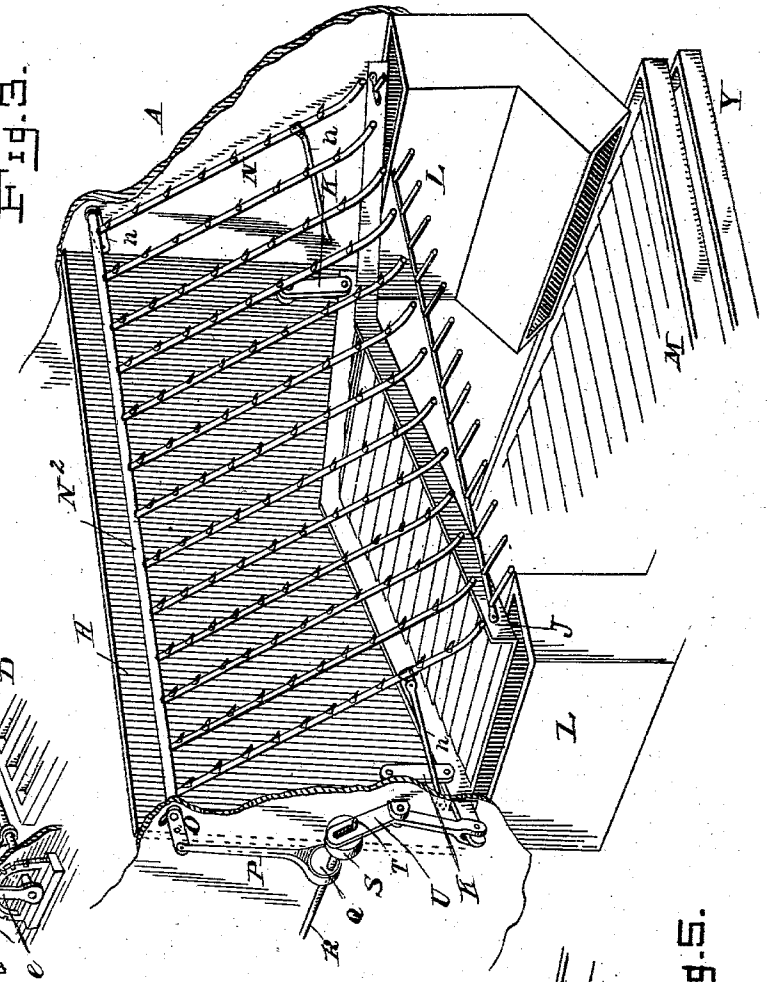


Fig. 2.

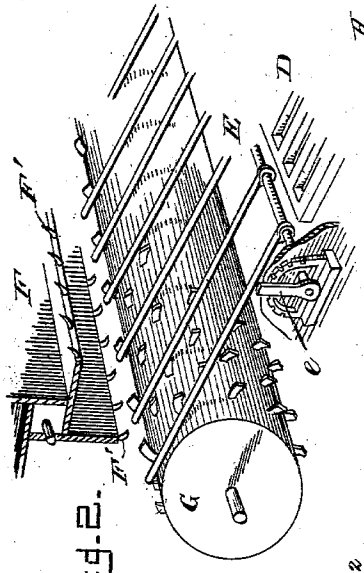


Fig. 4.

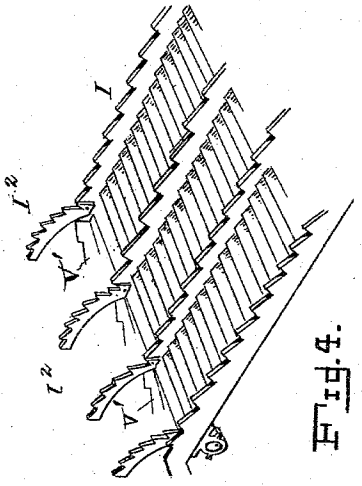
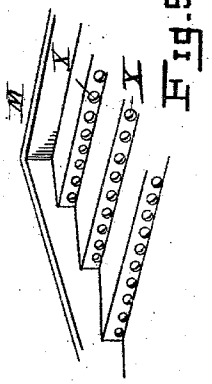


Fig. 5.



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No. 740,575. Patented October 6, 1903.

UNITED STATES PATENT OFFICE.

EMIL M. KRAMER, OF CISSNA PARK, ILLINOIS.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 740,575, dated October 6, 1903.

Application filed November 3, 1902. Serial No. 130,009. (No model.)

To all whom it may concern:

Be it known that I, EMIL M. KRAMER, a citizen of the United States, residing at Cissna Park, in the county of Iroquois and State of Illinois, have invented certain new and useful Improvements in Grain-Separators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention pertains to improvements in that class of farming implements known as "threshers" or "grain-separators."

The object of the invention primarily is to produce a separator having means for giving a better and more thorough separation of the grain.

A further object is to produce also a separator having means for a more complete extraction of the chaff and foreign matter from the grain.

The invention relates to certain details of construction in addition to the above, as will be pointed out in the accompanying specification and in the appended claims.

In the drawings herewith, which form a part of this application, Figure 1 is a side elevation of a thresher in section, showing my invention. Fig. 2 is a perspective view of part of the separating mechanism. Fig. 3 is also a perspective view of part of the separating mechanism used in conjuction with that shown in Fig. 2. Fig. 4 is a perspective view of a portion of a straw-rack, showing its peculiar construction. Fig. 5 is a perspective view of a portion of one of the riddles, showing perforations therein.

A indicates the separator, and B B the usual carrying-wheels therefor. At C is the cylinder usual to such machines, beneath which is the concave D, having the rearwardly-extending grating E, which in the present case takes the form of a series of fingers, as in Fig. 2. The said cylinder C will be referred to hereinafter as the "primary" cylinder, for the reason that I employ a second cylinder G beneath the fingers just referred to and which will be designated as the "secondary" one. Above and between these two cylinders is the customary beater F, whose members are provided at their edges with a row of teeth F'. Rearward from the beater and secondary cylinder is located a partition H, substantially vertical, extending from the top of the machine down near the straw-carrier I and filling the entire width of the machine, as shown in Fig. 3. Just in front of this partition is a pan or shaker J, hung from the said partition by hangers K or other means of like nature that will support said pan and permit a vibratory movement thereof transversely of the machine. A series of fingers *j* are carried on a rod *j'*, secured to the pan, the purpose of which will be described later. Beneath each end of the pan is a spout L, whose lower ends overhang the usual grain-pan M. In front of the pan is a grating N, consisting of a number of rods held in a horizontal bar N^2, extending across the machine. The latter extends at one end through the side of the separator, and to it is secured one end of an arm O. Said arm is pivoted at about its middle to the machine, and movement is imparted to the arm by a rod P and eccentric Q on a shaft R, as shown, and all of which will be understood. Said shaft R also carries an eccentric plate S, having a pin T. A rock-arm U is pivoted on the side of the separator, one end of which is pivotally attached to a projection of the pan J, which extends through the side of the said separator. The opposite end of the rock-arm is slotted and is in engagement with the pin T of the eccentric plate. Motion imparted to the shaft R will transmit motion to the pan J in the manner described, and the grating N will receive an up-and-down vibratory movement in the plane in which it lies. Arms *n* at each end and at the top and bottom of the said grating are pivoted to the latter and to the sides of the separator and serve to carry the grating and allow free movement thereof. Hanging beneath the pan J and above the grain-pan M is the usual straw carrier or rack I, which is provided near its upper end with curved fingers I^2 at intervals across its width, as shown in Fig. 4, and with an additional extension V' beyond. A second rack W is located behind the one already described and is provided with like attachments, except that the part V' is hinged to the rack instead of being rigid therewith, as in the case of the rack I. In place of the single grain-pan M as used in other machines of this class I employ two, as

shown in Figs. 1 and 3, the upper one having a series of apertures X in its bottom, as shown in Fig. 5. In conjunction with these two pans M and Y are two fans 2 and 3, arranged in tandem, so that both deliver their blasts up through the perforated grain-pans above. The usual riddles may be used; but they are not shown here, as I attach no claim to their use, but desire to put particular stress upon the use of these two fans as explained. My reason for having two fans is that usually the grain is not relieved sufficiently of its chaff. In my form each fan sends a blast through the grain as it passes over, and every particle of foreign matter is removed, and the result is a clean product. The perforations X are provided in the upper pan to permit the grain to gradually sift through to the lower one, which is of the ordinary closed-bottom variety, while the small pieces of straw and chaff are carried to the outlet at the back of the machine. By this means the grain is cleaner when reaching the first fan and most of the chaff has been removed before the blast is turned upon it. Grain falling through the perforations 4 in the lower pan passes to the conveyer 5, and that portion of the grain continuing rearward still farther finally reaches the conveyer 6, where before entering such conveyer the second fan removes any small remainder of chaff therefrom. The tail end conveyer at 7 elevates the lost grain to the concaves, as in ordinary practice, where it again goes through the machine. The conveyers 5 and 6 may be arranged to empty into a common receptacle or each have connection with a separate receiver, as desired.

The operation of my improved separator may be understood from the following: The grain is fed to the cylinder C in the usual manner and is carried to the secondary cylinder and the beater upon the grating E, the fingers of which are made adjustable by means of a lever *e* at the outside of the machine, Fig. 2, by which it may be placed and secured wherever desired. The teeth of the secondary cylinder project through the grating and are thus enabled to rake the straw therefrom. In practice the said cylinder is given something like six hundred revolutions per minute, while the beater F is given in the neighborhood of two hundred revolutions, and it will be understood that since the former runs at a much greater speed than the latter it will tear the straw to pieces and throw it against the grating N. By revolving the beater at a much slower speed than the cylinder it acts as a drag to the straw and prevents it being drawn through in a bulk quantity, and by thus retarding it the said cylinder can better tear it to pieces, as above described. By both the tearing process and by being cast with force against the grating N the grain is liberated from the straw in a much better manner than by the ordinary means. The straw is stopped in its flight when striking the said grating, and the grain passes through and striking the partition H falls into the pan J and finally passes to the grain-pans M and Y through the spouts L L. Being constantly in agitation, the grating N is kept free of the straw, which falls upon the rack I below, Fig. 1, and is elevated as usual and is carried up upon the curved arms I^2. By passing up and over these arms the straw is retarded to some extent and hangs and dangles from said arms, and in this way any grain not already threshed out will be shaken out and will fall into its proper receptacle. The fingers *j* on the pan J serve to separate the straw falling upon them by the vibrating motion of the pan, so that it will not fall in a bundle upon the rack beneath. I desire to make it understood that I do not wish to confine myself to the particular construction shown and described, as other good means can be used that will accomplish the same end. Furthermore, the particular location of the various elements may be changed to suit the requirements as to capacity and the work required, whether for one kind of grain or another.

Having thus described my invention, I claim—

1. In a grain-separator, a shelling-cylinder and its teeth, a grating above the same for receiving and carrying the grain, and through which the teeth are adapted to project, a revoluble retarding means above the cylinder and grating, the cylinder adapted to revolve at a faster rate of speed than the said retarder for the purposes set forth, a grating against which the grain and straw are thrown, a stop behind said grating against which the seed is thrown, a pan beneath the same for receiving the seed and means for imparting a vibratory movement to the grating and pan for the purposes set forth.

2. In a grain-separator, the combination of the usual concave, a cylinder above the same, a grating beyond the concave, a secondary cylinder beneath the grating the teeth thereof projecting through said grating, a revoluble retarding-beater above the secondary cylinder and revolving at a slower rate of speed than the latter for the purposes indicated, a grating located behind the retarder and secondary cylinder, a stationary stop behind the grating, a pan beneath the stop and means for imparting a vibratory movement to the pan and grating for the purposes set forth, the secondary cylinder adapted to project the straw and grain upon the grating in the manner described.

3. In a grain-separator the combination of the separator-body, a grating therein for receiving the unthreshed grain, a separator-cylinder beneath the grating, a beater above the said cylinder and grating, a vibrating grating for receiving the grain and straw from the separator-cylinder, the same vibrating in a vertical plane, a grain-board erected behind the latter grating, a vibrating grain-pan beneath the grating adjacent to the grain-board

for the purposes described, a straw-carrier beneath the vibrating grating and the separator-cylinder, said carrier being horizontally arranged beneath the cylinder and then slanted upward and rearward and having a rearwardly-extending curved and serrated extension at its upper end substantially as described.

4. In a grain-separator the combination of the separator-body, a grating therein for receiving the unthreshed grain, a separator-cylinder beneath the said grating, a beater and retarder above the grating and cylinder, a vertically-vibrated grating behind the separator-cylinder for receiving the straw from the latter, a grain-board behind the grating for stopping the flight of the separated grain passing through the grating from the cylinder, a vibrating grain-pan beneath the said grating adjacent to the grain-board for catching the separated grain stopped by the said board said pan lying transversely of the machine, a perforated vibrating pan beneath the first for receiving grain therefrom, an imperforate grain-pan beneath the perforated one and a pair of blast-fans beneath the latter and arranged substantially in the manner and for the purposes described.

5. In a grain-separator, the combination of the grating for receiving the unthreshed grain, a separator-cylinder beneath the same, a beater above the cylinder and grating adapted to operate as described, a grating behind the beater and separator-cylinder the same adapted for a vibratory motion in a vertical plane, a substantially vertical stop-board behind the grating, a grain-pan lying transversely of the machine for catching the separated grain from the stop-board and vibrated in the direction of its length to deliver grain from each of its ends, and grain-pans beneath the said vibrated pan substantially as shown and described.

6. The combination of the thresher-body, the grating D therein, the feeding-cylinder C above the grating, the separator-cylinder G beneath the grating at the rear, the retarding-beater F above the grating and cylinder G, the grating N behind F and G, the stop-board H behind the grating N, the grain-pan J beneath the grating for the purposes set forth, the same slanting downward at each end from the middle thereof, the grain-pans M, Y beneath the said pan J and the fans 2 and 3 arranged substantially as shown and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

EMIL M. KRAMER.

Witnesses:
JOHN L. HURLIMAN,
W. L. GROSSE.