No. 762,639. PATENTED JUNE 14, 1904.

E. M. KRAMER.

GRAIN SEPARATOR.

APPLICATION FILED SEPT. 21, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

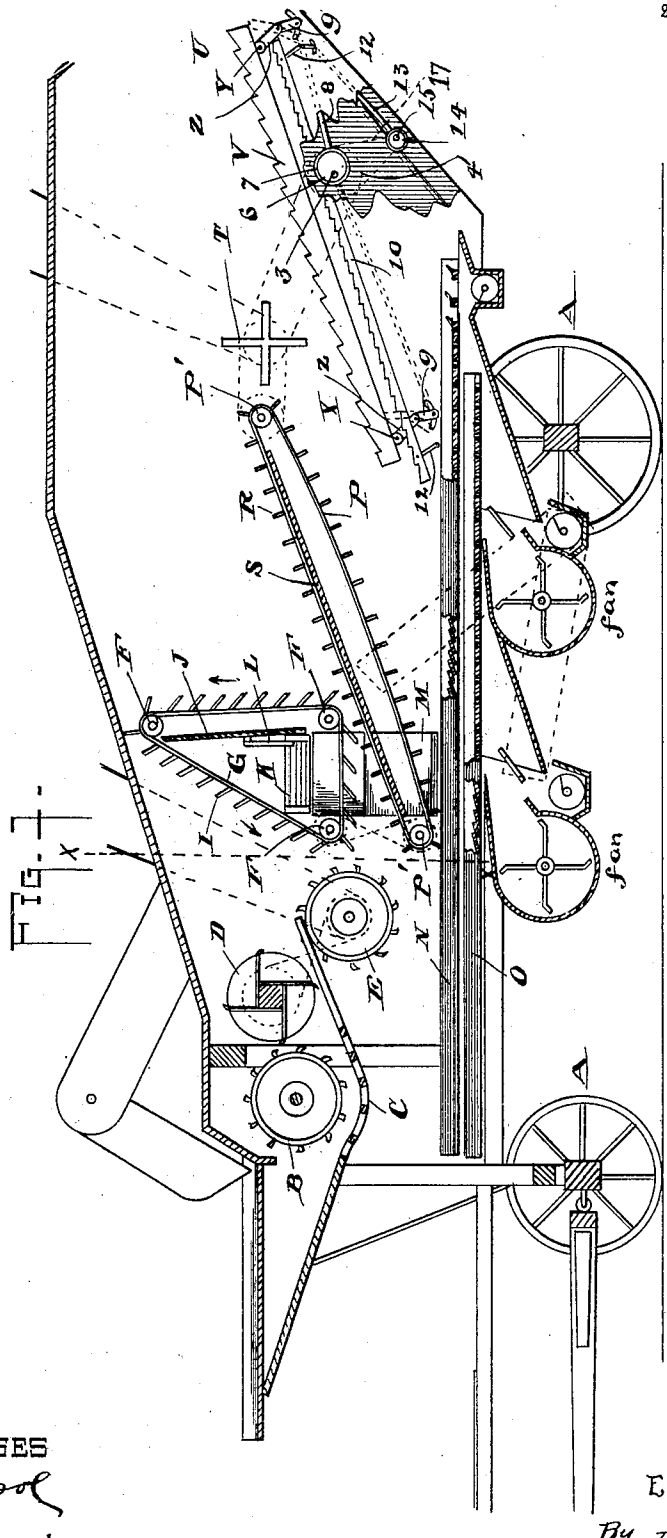


FIG. 1.

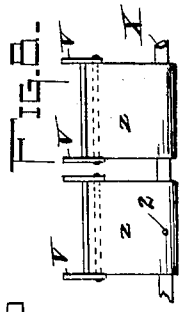


FIG. 8.

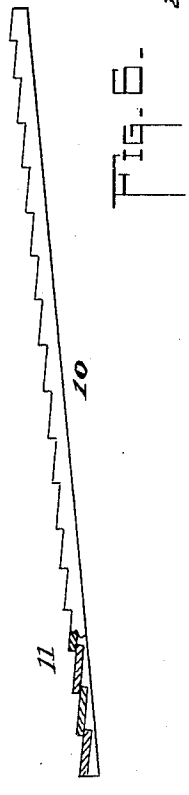


FIG. 6.

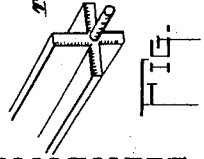


FIG. 7.

WITNESSES

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No. 762,639. PATENTED JUNE 14, 1904.

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NO MODEL. 2 SHEETS—SHEET 2.

FIG. 3.

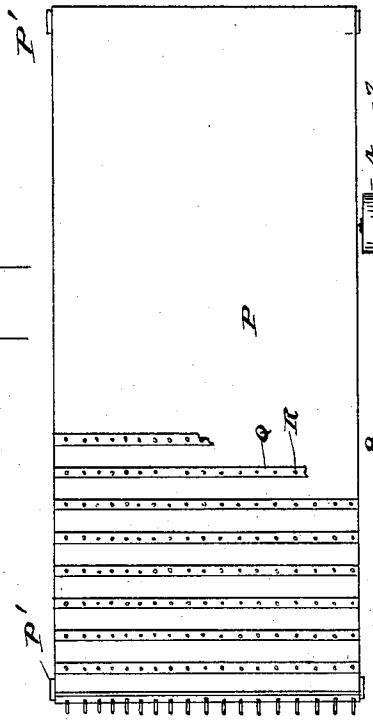


FIG. 4.

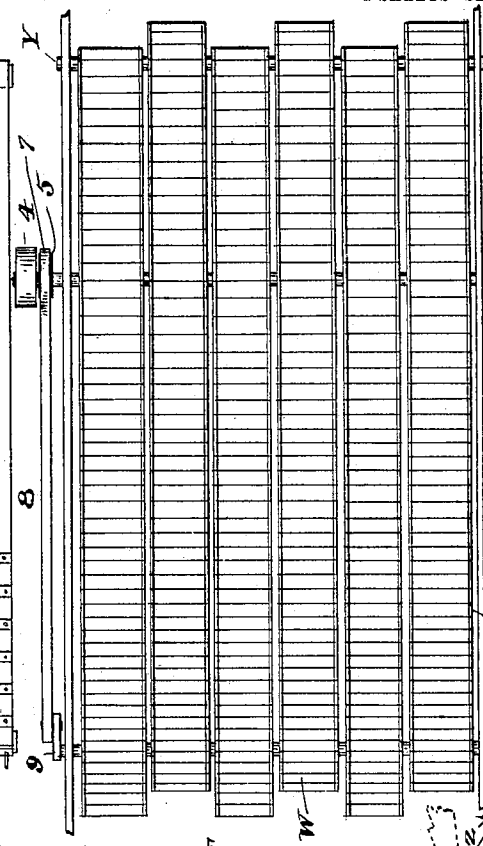


FIG. 5.

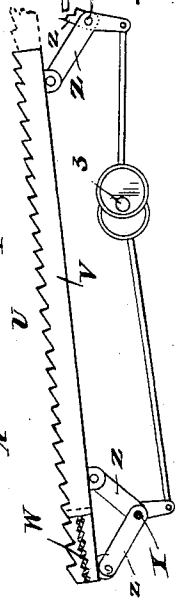
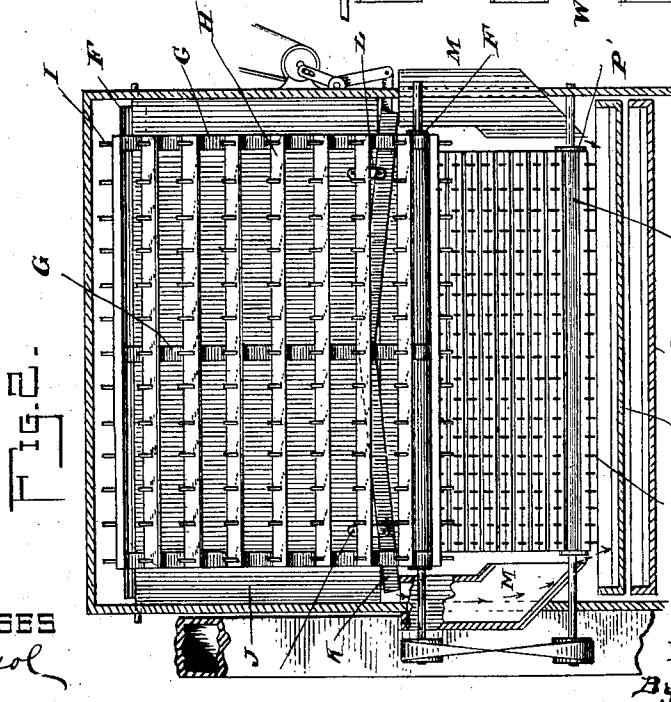


FIG. 2.



WITNESSES

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No. 762,639. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

EMIL M. KRAMER, OF CISSNAPARK, ILLINOIS.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 762,639, dated June 14, 1904.

Application filed September 21, 1903. Serial No. 174,128. (No model.)

To all whom it may concern:

Be it known that I, EMIL M. KRAMER, a citizen of the United States, residing at Cissnapark, 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 threshing-machines or separators.

The object of the present invention is to provide for a separator a new means of elevating the straw from which the grain has been beaten.

Another object is to improve upon the form of separator shown in my Patent No. 740,575, issued October 6, 1903.

In the appended drawings, Figure 1 is a longitudinal sectional elevation of my improved separator. Fig. 2 is an elevation of the machine looking toward the rear on line X X, Fig. 1. Fig. 3 is a top view of a straw-carrier. Fig. 4 is also a top view of another form of carrier. Fig. 5 is a side view of the carrier shown in Fig. 4. Fig. 6 is a side view of a vibrating bottom board used beneath the carrier just described. Fig. 7 is a perspective view of a portion of a beater. Fig. 8 is an end view of a portion of the carrier shown in Fig. 4.

A A indicate the wheels of the machine, on which the usual sills are supported, but not all shown.

At B is a cylinder beneath which is the usual concave C. Rearward of the cylinder B is a beater D, below which are the fingers of the said grating C, all of which has been shown in my patent above referred to. Beneath the said fingers is the threshing-cylinder E usual to such machines. This has all been described in my patent referred to, and I will now proceed to the improvements of the present. At F F F are three rollers, over which runs a carrier comprising the belts G, having the cross-slats H affixed thereto, said slats being severally provided with a row of spikes I, as shown in Fig. 2. In front of the vertical run of this carrier is a stop-board J, designed to arrest the flight of grain from the cylinder E. This board is secured rigidly in place, and the carrier passes over and beneath it, as may be seen in Fig. 1. Hung from this stop-board is a vibrating tray K, suspended on hangers L, which slants downward from the middle at each side, and beneath the open ends are hung spouts M, whose lower ends terminate above a grain-pan N, beneath which is a similar pan O. Beneath the carrier H I is an upwardly and rearwardly slanting carrier comprising the canvas P, carried on the rollers P′, said canvas having slats Q and spikes R, arranged substantially as shown in Fig. 3. A board S supports the upper stretch of canvas with its load of straw. The carrier thus provided extends beneath the carrier H I, and just beyond its upper end is a revolving beater T. Beneath the beater is a straw-rack U, consisting of a series of slanting trays which are composed of the metal sides V, serrated at the top, as shown in Fig. 5. The bottoms consist of slats W, arranged as shown in said Fig. 5. In the Fig. 4 I have shown six of these trays, each of which is supported from two shafts X Y by means of links Z, Figs. 5 and 8. On the shaft X every other one of the links Z is securely fastened, as by a pin 2, Fig. 8. The remaining links on said shaft are loose and free to rock. On the shaft Y the same is true; but the links of the trays whose links on the shaft X are fastened are loose. Likewise those of the trays whose links are loose on shaft X are tight on the shaft Y. It will thus be seen that a rocking movement of both shafts will impart movement in a back-and-forth manner to two sets of trays and that each intermediate tray will move in an opposite direction from its neighbor if said shafts are rocked in opposite directions at the same time. Beneath the rack thus constructed is a revoluble shaft 3, driven by means of a pulley

4 at one end and carrying an eccentric 5 adjacent thereto and an eccentric 6 at the opposite end of the shaft. An eccentric-strap 7 surrounds each member 5 and 6, and a rod 8, connected to each strap, has loose connection with an arm 9 on each shaft X Y. A revolution of the shaft 3 will set up a rocking movement to shafts X and Y and cause the vibratory movement of the trays, as above described. It will be noted that the teeth of the sides V point toward the upper end of the trays and that the slats W face toward the bottom. By this means the said teeth serve to continually carry the straw higher and higher up the rack, while the slats W, which receive any stray grain, continually work it downward upon the grain-pan N.

Beneath the rack described is a vibrating board 10, consisting of the slats 11, which upon catching any grain from the rack also carries it down to the said pan N, as will be understood. Motion is imparted to this board through arms 12, pivoted to the sides of the separator, to one of which is connected an arm 13, driven from an eccentric 14 and a shaft 15, which latter derives its motion from a pulley 16 and belt 17, (shown in broken lines in Fig. 1,) said pulley 16 being on the end of the shaft 3 adjacent to pulley 4 above described, but which latter derives its motion from a belt 17. (Shown in broken lines in Fig. 1.)

Beneath the grain-pans N and O are located two fans, both of which I have described in my former patent and which will be merely referred to herein to indicate their office. They are arranged one behind the other in tandem order. They are thus arranged so that what one fan does not accomplish in cleaning the grain the other will, thereby making a cleaner grain when finished than is possible with a single fan.

In operation the grain is fed as usual to the cylinder B and is then caught by the beater D, which feeds it to the shattering-cylinder E. The beater is made to revolve at a slower rate of speed than the said cylinder E, thereby holding the straw back and causing a better tearing apart of the same, and consequent better separation of the grain. The cylinder E in its revolution casts the straw upon the carrier H I, which moving in the direction of the arrows drags the straw upon the carrier P, which in turn elevates it to and upon the beater T. The latter member then tosses and tumbles the straw upon the rack V and in so doing assists greatly in dislodging any unseparated grain. The straw when cast upon the rack V is gradually worked up toward the top to the exit; but meanwhile it is violently shaken to shatter out any remaining grain, and by reason of the fact that each alternate tray is continually moved in an opposite direction from that of its neighbor the straw is worked thoroughly, with the result that before exit it is perfectly free of grain. Meanwhile the freed grain is worked down to the grain-pans beneath, and any stray grain reaching the board 10 beneath is likewise carried downward, where it is cleaned in the usual way by the tandem fans.

I regard the carrier G H I, carrier P, beater T, and peculiarly-constructed rack V as very important in the thorough cleaning of the straw, and upon these it is desired to base my claims. It is to be understood, however, that it is not the intention to be confined to the exact structure and arrangement shown in the drawings, since many changes may be made without sacrificing the spirit or intent of my invention.

I claim—

1. In a grain-separator the combination of the shelling cylinder and concave, an endless carrier behind the same and having a run extending upward and rearward, also a vertical and a horizontal run, horizontal slats on such carrier, teeth on the slats all substantially as set forth, a vertical stop-board behind the upward and rearward run, a grain-receiving pan beneath the stop-board, a second endless carrier below the first comprising a canvas belt, slats thereon, pins secured in the slats, a beater at the rear of said last carrier and a series of straw-carrier sections comprising two divisions, each division consisting of alternate sections of the carrier, means for imparting a vibratory movement to each division in an opposite direction from its neighbor substantially as set forth.

2. On a grain-separator the combination of the shelling cylinder and concave, an endless carrier behind the same and having a run extending upward and rearward, also a vertical and horizontal run, horizontal slats on such carrier, teeth on the slats all substantially as set forth, a vertical stop-board behind the upward and rearward run, a grain-receiving pan beneath the stop-board, a second endless carrier below the first comprising a canvas belt, slats thereon, pins secured in the slats, a beater at the rear of said last carrier and a series of straw-carrier sections comprising two divisions, each division consisting of alternate sections of the carrier, means for imparting a vibratory movement to each division in an opposite direction from its neighbor, a vibrating slatted board beneath the straw-carrier, and vibrating grain-pans located beneath the vibrating board and the cylinders and carriers substantially as shown.

3. A straw-rack for threshing-machines comprising a series of trays having serrated sides substantially as shown and described, slatted bottoms for said trays for the purposes indicated, rock-shafts beneath said trays one being near each end of said trays, a link piv-

oted to every other one of the trays and secured to one of the shafts, links pivoted to the intermediate trays and secured to the other shaft and means for imparting a rocking movement to the said shafts simultaneously in opposite directions to vibrate the trays in the direction of their lengths, every other one moving in one direction and the intermediate ones moving in the opposite direction as set forth and for the purposes indicated.

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

EMIL M. KRAMER.

Witnesses:
H. B. HARVEY,
T. WAYNE YOUNG.