(No Model.) 2 Sheets—Sheet 1.

J. A. KRAKE.

Grain Separator.

No. 236,340. Patented Jan. 4, 1881.

Fig. 1.

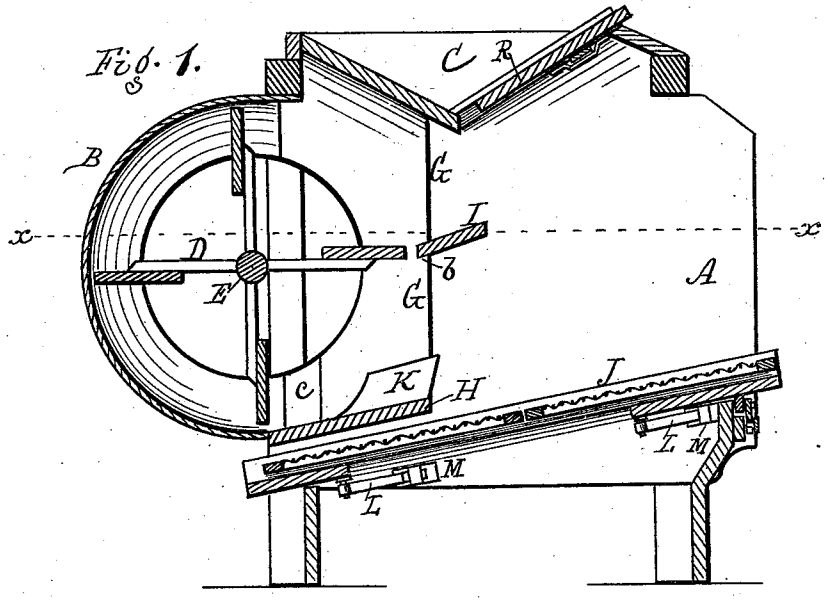
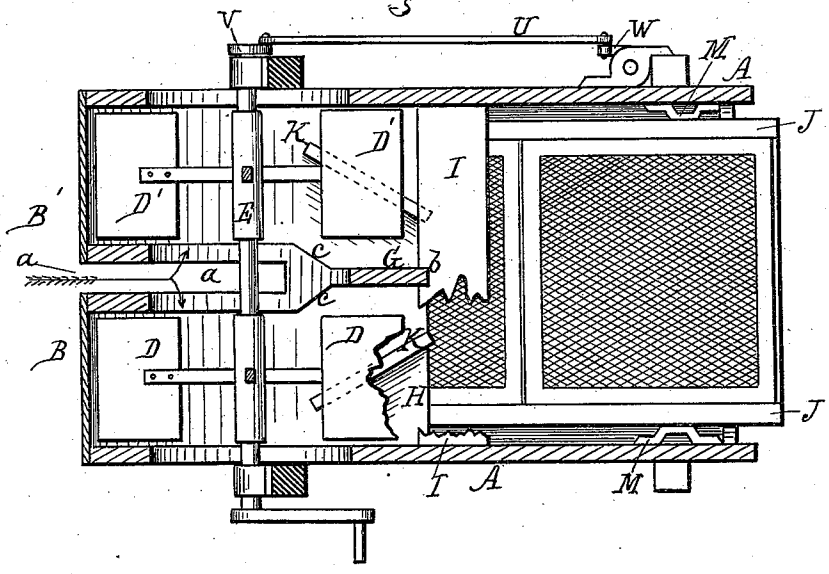


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

J. A. KRAKE.

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Fig. 3.

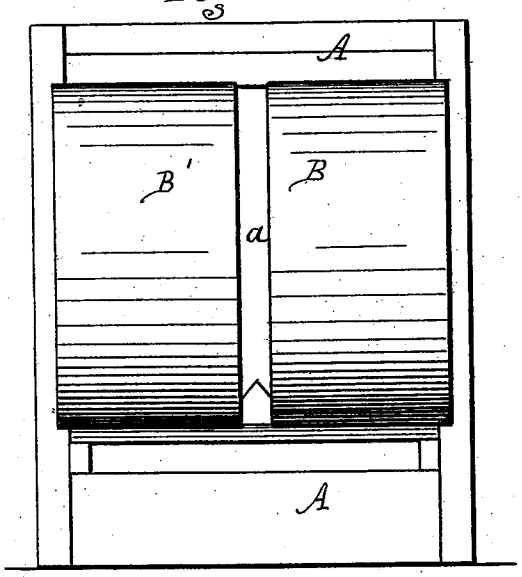


Fig. 4.

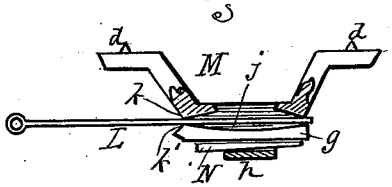


Fig. 5.

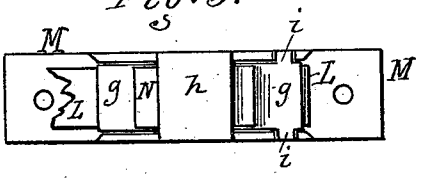


Fig. 6.

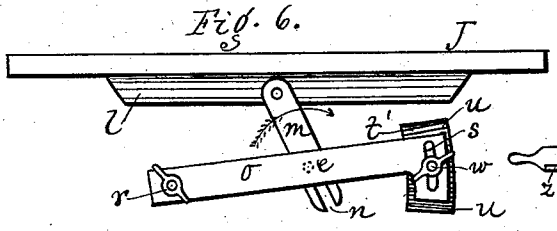


Fig. 7.

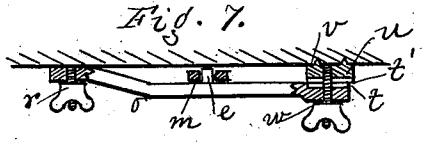


Fig. 8.

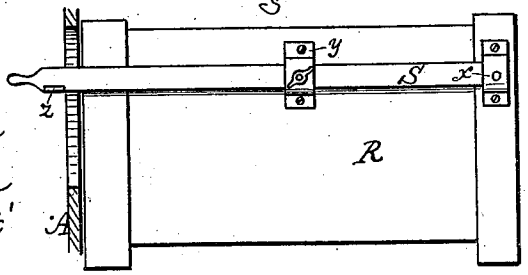


Fig. 9.

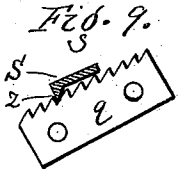
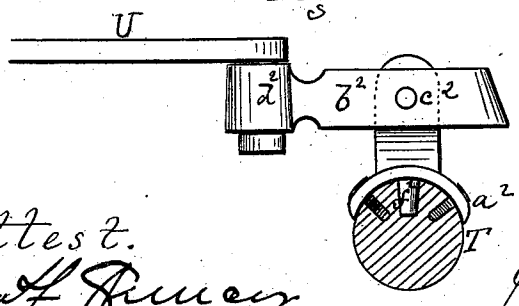


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN A. KRAKE, OF BUFFALO, NEW YORK, ASSIGNOR TO WM. F. MILLER, OF SAME PLACE.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 236,340, dated January 4, 1881.

Application filed May 28, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. KRAKE, a citizen of the United States, residing at Buffalo, Erie county, New York, have invented a certain new and useful Improvement in Grain-Separators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a central longitudinal vertical section of the machine. Fig. 2 is a horizontal section, in line *x x*, through the fan-case. Fig. 3 is a rear elevation of the fan-case. Figs. 4, 5, 6, 7, 8, 9, and 10 are detail views.

My improvement relates to grain-separators in which the fan-case is divided into sections, with air-supplying passages between, and in which separate short fans are used in the several sections, whereby a more equal and uniform blast is produced through the machine.

The invention consists in the combination, with the separate sections of the fan-case and the fans resting therein, of a dividing-board located between the sections, forming heads to the same, and serving to produce suction in the sections.

It also consists in an improved construction and arrangement of the springs which hold the lower shoe; also, in the arrangement of parts for giving a vertical vibration to the outer end of said shoe; also, to certain other devices, which will be hereinafter more fully described.

In the drawings, A represents the ordinary casing of the machine. B is the fan-case, and C is the hopper.

The fan-case, instead of being made in a single unbroken length, as in ordinary machines, is made in two or more short sections, B B′, with intervening passages *a* between them, as shown in Figs. 2 and 3; and the fan, instead of being made in a single long fan, as usual, is made in a series of two or more short fans, D D′, said fans being attached to the same shaft E, and resting in the said sections of the fan-case. By thus dividing the fan-case into sections and leaving air-passages between them, and by using short fans in said sections, the air is fed into and in contact with the fans equally the whole length of the case, and the blast which is produced is equal in intensity throughout the whole cross-area of the machine. By this means in very large machines a uniform and equal blast can be maintained. The great difficulty in ordinary machines is, that the fan-case, being in a single length, and the air entering only at the ends, the center of the fan is imperfectly supplied and the blast is weaker at the center than at the sides of the machine. The spaces or passages *a* between the sections of the fan-case are of such capacity as to admit a full volume of air, and between each two sections is a dividing-board, G, in which is formed a circular opening corresponding with that in the outer end of the fan-case. This dividing-board serves as a partition between the sections, and a head sufficient to form a vacuum and direct the air inward to the fan.

H is a directing-board in front of the fan-case, which directs the blast upward, and I is a similar directing-board midway of the height of the screen-chamber. The dividing-boards G rest on top the directing-board H, being fastened thereto and also to the top of the machine, and the board I is notched into the edge of the board G, as shown at *b*, Fig. 1, by which means the whole structure is stiffened and held in place.

K K are wings forming wind-boards, attached to the directing-board H on opposite sides of the dividing-board G. They are set angularly, as shown in Fig. 2, the outer ends diverging and inner ones converging, by which means each wing takes a portion of the blast impelled by the fan and concentrates it at its front end, so that as the blast passes the edge of the board G it will be driven toward the center. The currents from these two wings, uniting at the center immediately in front of the board G, prevent any deadening of the blast at that point, which might otherwise occur by reason of the board G dividing the blasts from the two fans and deflecting them to one side, thereby weakening the action in the center. These wings have special relation to an apparatus where two or more fans are employed, with a partition between the fans, as above described.

c c are angular blocks filling the spaces at the junction of the dividing-board G with the heads or rims of the case bounding the air-

passages *a a*, and serving to prevent the settling of dead air or eddies therein.

J is the lower shoe, the upper one and its screens not being shown in the drawings. The shoe J rests on springs L L at the four corners in a manner similar to that shown in my patent of January 6, 1880. These springs are flat springs attached to bearings M M, fastened to the sides of the case, the front ends of the springs having eyes through which pass pins projecting from the shoe, so that the shoe can be raised or lowered on the springs. The ends of the bearings M have spurs *d d*, which indent in the wood and hold the bearings firmly in place in connection with the screws which pass through the ends.

Heretofore some difficulty has been experienced from the breaking of the springs at the point where they pass over the edge of the bearings. I remedy this difficulty by the following means:

g is a block or follower, which rests between the spring and the cross-bar *h* of the bearing. The follower has side lugs, *i i*, at one end, which fit in sockets of the bearing to prevent the follower from falling out. The inner or under side of the follower, also the inner face of the bearing, is made hollowing, as shown at *j*, Fig. 4, so that the spring which rests between will have a space in which to press out and in. The end of the spring at the rear rests loosely between the end of the follower (held up by the lugs *i i*) and the top of the bearing, so that said end may move freely out and in, and yet be retained closely in place. At the front end, where the spring passes over the edge of the bearing, is a sharp edge, *k*, on the bearing, and a corresponding sharp edge, *k'*, on the end of the follower, the two sharp edges clamping the spring and leaving it free of contact at all other parts. The follower is clamped down by a key, N, inserted between its back and the cross-bar *h* of the bearing.

The operation is as follows: As the long end of the spring vibrates from side to side with the shoe, the spring will simply have a rolling or turning motion between the two sharp edges, *k k'*, which form the fulcrum. The inner end of the spring, which rests within the bearing, has a certain degree of lateral play in the hollow *j* of the follower, and the extremity of the spring, which rests between the rear end of the follower and the bearing, being free and unimpeded endwise, can move out and in to compensate for the binding of the spring. By this means there is little liability of the breaking of the spring, as the only holding contact is at the edges *k k'*. Ordinarily the spring has been clamped fast between the follower and bearing a considerable distance, and breakage occurs at the point where the spring passes over the bearing.

A vertical jarring motion is given to the rear end of the shoe J by the following means: *l* is a cleat or cross-bar secured on the under side of the shoe. *m* is a jolting-bar pivoted to this cleat, and hanging down vertically. The lower end of the jolting-bar is provided with a slot, *n*. *o* is a bar attached to the case A by a bolt, *r*, which forms a pivot. The opposite end has an enlarged head, in which is a slot, *s*, and on the under side are ratchet-teeth *t*. *u* is a block resting under the head and secured to the casing, and also provided with ratchet-teeth *t'*, into which the teeth *t* engage. The ends of the block *u* on the under side are provided with spurs *v v*, which strike into the wood to hold the block in place. *w* is a bolt attached to the case, which passes up through a hole in the block, and also through the slot *s*, and has a thumb-nut screwing on the outer end, by which means the head is clamped down fast on the block.

By the means above described the bar *o*, turning on the pivot *r*, can be adjusted higher or lower at the outer end, and retained at any adjustment by the bolt and nut *w*. The bar is bent so as to stand out from the wood, and on its under side it has a round stud, *e*, which fits in the slot *n* of the jolting-bar *m*.

The operation is as follows: As the shoe is vibrated laterally the jolting-bar *m* will be rocked to and fro and toward the center of the stroke, bearing upon the stud *e*. It will raise the shoe upward as it passes the dead-point, and will then fall again. By this means a vertical toss or jar will be given to the shoe at every stroke, which is effective in stirring up the grain and working it down over the screens, and also in clearing the meshes of the screens of such grains as may clog. By raising the bar *o* more or less, a corresponding increased or lessened vertical throw may be given to the shoe, and by lowering the bar to such an extent as to free the jolting-bar from the stud *e*, the shoe may be allowed simply to vibrate horizontally without having any vertical throw imparted to it. An important feature is, that whatever may be the height to which vertical throw is given the shoe by the adjustment of the bar, as described, the vertical movement comes only at the moment the jolting-bar approaches a vertical position, and then the throw is almost instantaneous, after which the shoe simply receives a horizontal movement, this action being much more effectual than that where a rolling and long-continued vertical motion is given.

R is the adjustable slide in the hopper, for gaging the flow of the grain to the screens. Its edges are V-shaped and run in corresponding grooves of the frame.

S is a lever on the under side of the slide, having its fulcrum at *x*, on a stationary part outside the slide. The lever passes through a loop or bearing, *y*, of the slide, and extends through the side of the case A. On the outside of the case A is a ratchet-plate, *q*, and on the end of the lever S is a tooth, *z*, which engages with the ratchet-plate at any height to which it is raised. By raising the lever on the outside the slide R will be raised with it and

it can be retained at any adjustment by the means described. The handle of the lever comes on the side that the operator stands, so that he can turn the crank and regulate the slide at the same time.

T, Fig. 10, is the vertical rock-shaft used for imparting the vibratory motion to the shoes. U is the pitman connecting said rock-shaft with the crank-wheel V.

W is a joint-piece connecting the end of the pitman with the rock-shaft. This joint-piece consists of the flanged casting a^2, which is screwed to the rock-shaft, and a block, b^2, which is pivoted at c^2 to the casting, so as to turn horizontally, and has at its outer end an eye, d^2, in which the end of the pitman turns vertically. By this means a double-joint action is attained, which prevents the binding and strain which occurs where the end of the pitman is hooked, and simply enters a socket or eye of the casting. This device allows free motion, both horizontally and vertically, so that no strain can occur. The flange which fits the rock-shaft has a central pin, f^2, which enters a hole in the rock-shaft and assists the screws in holding the parts fast together.

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

1. In combination with the fan-case made in separate sections, and separate fans resting in said sections, the dividing-boards G, located between the sections of the fan-case, forming heads to the same, provided with openings to admit air to the sections, and serving to produce suction in the sections, as herein shown and described.

2. In a grain-separator having its fan-case made in separate sections, with separate fans resting in the sections, the dividing-board G, having its inner portion in a single thickness, and its outer portion in two separate thicknesses, with an air-passage between, said board forming a complete head to the two sections, and allowing air to be supplied to both sections by entering between the two thicknesses at the rear, as herein shown and described.

3. In combination with the separate sections B B′ of the fan-case, and the separate fans D D′, resting therein, the directing-board H, extending inward from the fan-case and beneath the same, and the two angular wings K K on the directing-board, converging centrally between the sections, whereby the currents which are drawn in opposite directions and away from the center of the machine by the two fans will be forced forward toward the center by the wings, as herein shown and described.

4. In a grain-separator, the combination of the directing-boards H and I and the vertical dividing-boards G, the upper directing-board, I, being notched into and supported by the boards G, as herein shown and described.

5. In a grain-separator, the bearing M and follower g, constructed at the front end with the sharp-edged bearings k k', for clamping and holding the spring L, and the hollow or concave faces j, to allow free play of the end of the spring between them, the rear end of the spring being free to move endwise, as herein shown and described.

6. The combination of the follower g, provided with the lateral lugs $i\,i$, and the bearing M, constructed with corresponding lateral sockets to receive the lugs, the whole so arranged, as described, as to leave an opening between the follower and bearing for the free passage of the end of the spring L, as specified.

7. In a grain-separator, the combination, with the shoe J, of the pivoted jolting-bar m, attached thereto, and a bearing or stud, e, upon which the jolting-bar rests, said bearing being made adjustable higher or lower, to change the vertical throw of the machine without increasing the length of vibration, as herein shown and described.

8. In a grain-separator, the combination of the pivoted jolting-bar m and bar o, said bar o being adjustable higher or lower, and provided with a bearing or stud, e, upon which the jolting-bar rests, as and for the purpose specified.

9. In a grain-separator, the combination of the jolting-bar m, provided with a slotted lower end, the lever o, provided with a stud, e, resting in the slot of the jolting-bar, a head upon the end of the lever provided with teeth t, which engage with corresponding teeth t' of a block, u, and the bolts r w, one forming the pivot, and the other a clamp, as shown and described, and for the purpose specified.

10. In a grain-separator, the combination, with the hopper-slide R, of the lever S, pivoted at one end to a stationary part of the machine, passing through a loop or bearing of the slide, projecting through the case, and having at the outer end a tooth, z, which engages with a ratchet-plate, q, for the purpose of raising and holding the slide at any adjustment, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN A. KRAKE.

Witnesses:
R. F. OSGOOD,
R. E. WHITE.