C. R. CLIFFORD.
Grain Separators.

No. 197,251. Patented Nov. 20, 1877.

Fig 1.

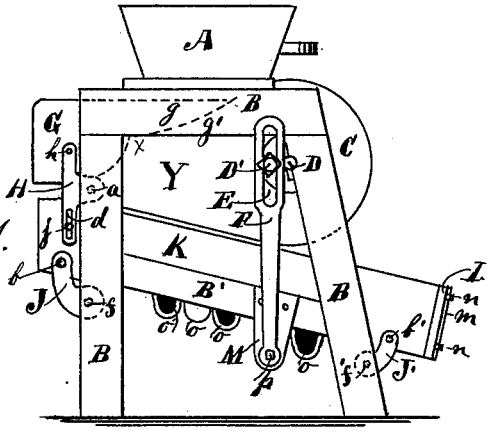

Fig 5

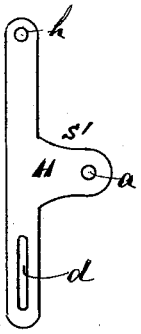

Fig 6

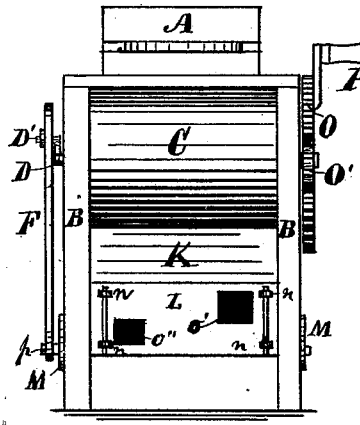

Fig 2.

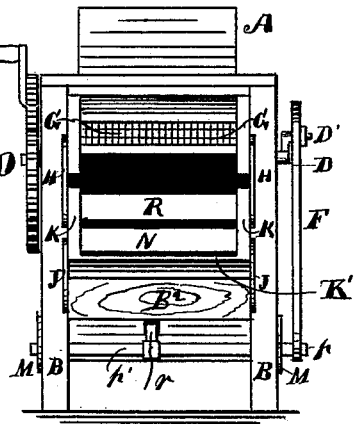

Fig 3.

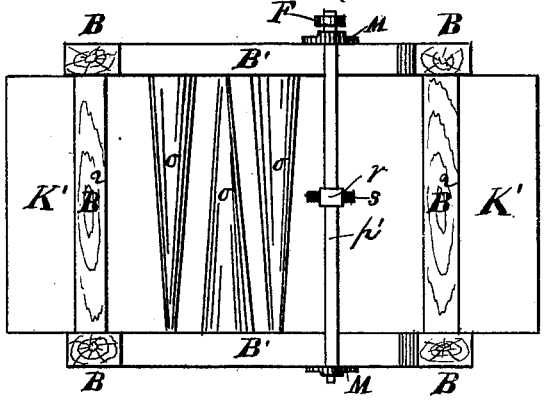

Fig 4

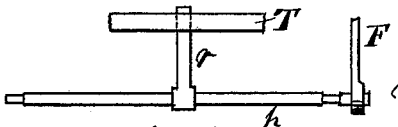

Fig 7.

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UNITED STATES PATENT OFFICE.

CASSIUS R. CLIFFORD, OF RAYSVILLE, INDIANA.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **197,251**, dated November 20, 1877; application filed May 5, 1877.

To all whom it may concern:

Be it known that I, CASSIUS R. CLIFFORD, of Raysville, Henry county, State of Indiana, have invented certain new and useful Improvements in Grain-Seed Cleaners and Graders, of which the following is a description, reference being had to the accompanying drawings.

My invention consists of the construction, arrangement, and combination of parts, as will be hereinafter fully set forth in the specification and claims.

In the drawings, Figure 1 represents a side elevation of my improved cleaner and grader; Fig. 2, a front elevation, and Fig. 3 a rear elevation, of the same. Fig. 4 is a plan view of the bottom of the machine. Figs. 5, 6, and 7 are details.

B B B^1 represent the frame-work of the machine. A is the hopper. Y represents the side boards of the cylinder C, having its upper rear portion cut out in curves, as shown at g' by dotted lines. The upper vibrating tilting screen-frame G has its side frames cut with corresponding curves, to fit the curves g' of the side boards Y, as shown in Fig. 1.

K represents the lower shoe, inside of which are the screen-frames R and N. These frames are provided with different grades of screens, the coarsest of which is at the top of frame R. The next finest is at the bottom of the same frame. The top of frame N has a still finer screen, and that at the bottom of frame N is the finest, while the screen on the tilting frame G is the coarsest of all.

The shoe K is supported on curved links J J′, constructed as shown in Fig. 5. These links are pivoted to the sides of the shoe at b b', and also pivoted to the legs B B at $f f'$ on each side, as shown in Fig. 1, so as to allow the shoe to vibrate as follows: When the shoe K is moved backward, then the front end is elevated and the rear end falls, and when the shoe is moved forward, then the front end falls and the rear end is elevated. The elevation and depression of each alternate end of the shoe are caused by the form and manner of attaching the links on curved arms J J′ to the sides of the shoe, and to the frame, which is an essential feature of my invention, while the movement of the shoe K is another essential feature, and is accomplished by the peculiar construction and arrangement of devices which I will now describe.

On the side frames B^1 B^1 are attached hangers M M, which project downward, as shown in Figs. 1 and 4. These hangers support a rod, p, on the center of which is an arm, r, which is shown more fully in Fig. 7. This arm extends upward, and passes through a hole formed in the floor K′ of the shoe K, as shown, or is attached to a suitable socket secured to the floor K′, in such a manner that when the arm r is vibrated the shoe will be moved forward and backward. The outer end of the rod p' is square, and is secured to the lower end of the vibrating lever F, as shown in Figs. 1 and 7. This lever extends upward, and has a long slot formed in its upper end, in which the wrist-pin D′ of the crank D operates.

When the fan that is inside of the cylinder C is revolved, the shaft which has the crank D on its end communicates motion to the lever F, causing it to vibrate at its upper end, thus causing the shaft p' to partially rotate in alternate directions; and by this means the arm r causes the shoe K to move backward and forward, and at the same time the links or arms J J′ give a tilting motion to the shoe K and riddles R N, as before described.

Below the floor K′ of the shoe K there are located two cross-bars, B^2 B^2, and as the shoe K is brought down by the links J on its forward motion it is suddenly arrested in its motion forward and downward, thus causing the material that is to be screened to be violently forced toward the front lower end of the screens R and N, and thus facilitate its passage through the screens. The same motion and effect are produced on the screens R and N when the shoe K is moved backward. The links J at the rear of the shoe bring the bottom K′ in violent contact with the rear cross-beam B^2, and give the material an impetus backward and upward, thus causing it to readily pass through the screens. The material, when screened, passes out at one or the other of the spouts o o o o below the floor of the shoe, or out at the holes o' o'' at the end of the shoe, according to the degree of firmness of the material.

The upper or tilting screen G has a very peculiar motion given to it—*i. e.*, a vibrating and

tilting motion combined. This motion is obtained as follows: The link H (shown in detail in Fig. 6) is formed with an offset, S′, at one side, in which is a pivot-hole, *a*. The lower end of the link has a slot, *d*, and the upper end is also provided with a pivot-hole, *h*. There are two of these links, one on each side, and the upper ends are pivoted to the upper tilting screen G, and the lower end has a stud, *j*, passed through the slot *d* into the side of the shoe K, as shown in Fig. 1. The central side projection of the links H is pivoted to the side frames B at *f*. (Shown in dotted lines in Fig. 1.) The bottoms of the sides of the tilting screen G are curved, as shown at *g*′, Fig. 1, so as to correspond with the sides Y of the machine.

By these constructions and arrangements the screen G has a vibrating and an oscillating and a tilting motion imparted to it when the shoe K is moved. The slot *d* in link H prevents the downward and upward motion of the rear end of the shoe, caused by the links J, from pulling the screen G down, while the backward and forward motion of the shoe causes the link H to vibrate on its pivot *a*, and imparts a sliding movement of screen G forward and backward; and the curved bottoms of the sides of the screen G, as they are moved forward and backward by the links H, impart an upward forward and a downward backward motion to the screen G, thus causing the material that falls on the screen from the hopper A to readily pass through the screen, while the chaff passes out over the rear end of the screen and falls to the ground.

If the top tilting screen is not required, then the links H are disconnected and the screen remains stationary; or it can be removed, thus allowing the material from the hopper to fall upon the top screen of frame R.

As the machine is represented in the drawings, it is designed to get six separations—that is, one to each of the spouts *o o o o* below, and to each of the openings *o*′ *o*″ at the front of the shoe K. By removing or disconnecting the front curved links or arms J J, there is but one jerking motion given to the shoe—that is, at the back—while the front end of the shoe slides on the cross-beam B^2, with no downward motion from the links to produce violent agitation of the material on the screens. By removing the front cap L of the shoe, which is accomplished by removing the pins *m* from the eyebolts *n n*, and taking out the separator-slides of the riddle, (not shown,) then the machine is converted into a cleaner; and when the separator-slides are replaced and the discharge-openings *o*′ *o*″ are opened, then the machine is a grain cleaner and grader combined.

In chaffing, the tilting riddle G, Fig. 1, is used; but when the machine is used as a grader, then the links H are disconnected, which leaves the top screen G stationary, and allows the grain to pass through the tilting screen to the screens below.

What I claim as new, and wish to secure by Letters Patent, is—

1. The combination of the riddle G, provided with sides having curved and inclined lower edges, and the side boards Y of the mill formed with corresponding edges, as set forth.

2. The slotted links H, having offsets *s*′, and pivoted through said offsets to the frame, in combination with the riddle G, pivoted to the upper ends of the links, and with the shoe K, having pins projecting into the slots of the links, as set forth.

3. The combination, with the shoe K and its screens, of the detachable cap L, having openings *o*′ *o*″, arranged as specified.

4. The combination of the shoe K, supported by links J J′, pivoted to the frame at points inside the points of attachment to the shoe, the riddle G, and links H, pivoted each at one side to the frame, at the top to the riddle, and having slotted lower ends receiving pins on the shoe, as set forth.

5. The combination of the shoe K, crossbars extending below the same, and the links J J′, pivoted at points inside the points of attachment to the shoe, as set forth.

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

CASSIUS R. CLIFFORD.

Witnesses:
E. O. FRINK,
GEO. W. GRIFFIN.