(No Model.) 2 Sheets—Sheet 1.

C. E. McNEAL.

SEPARATOR FOR GRAIN.

No. 253,546. Patented Feb. 14, 1882.

Fig. 1

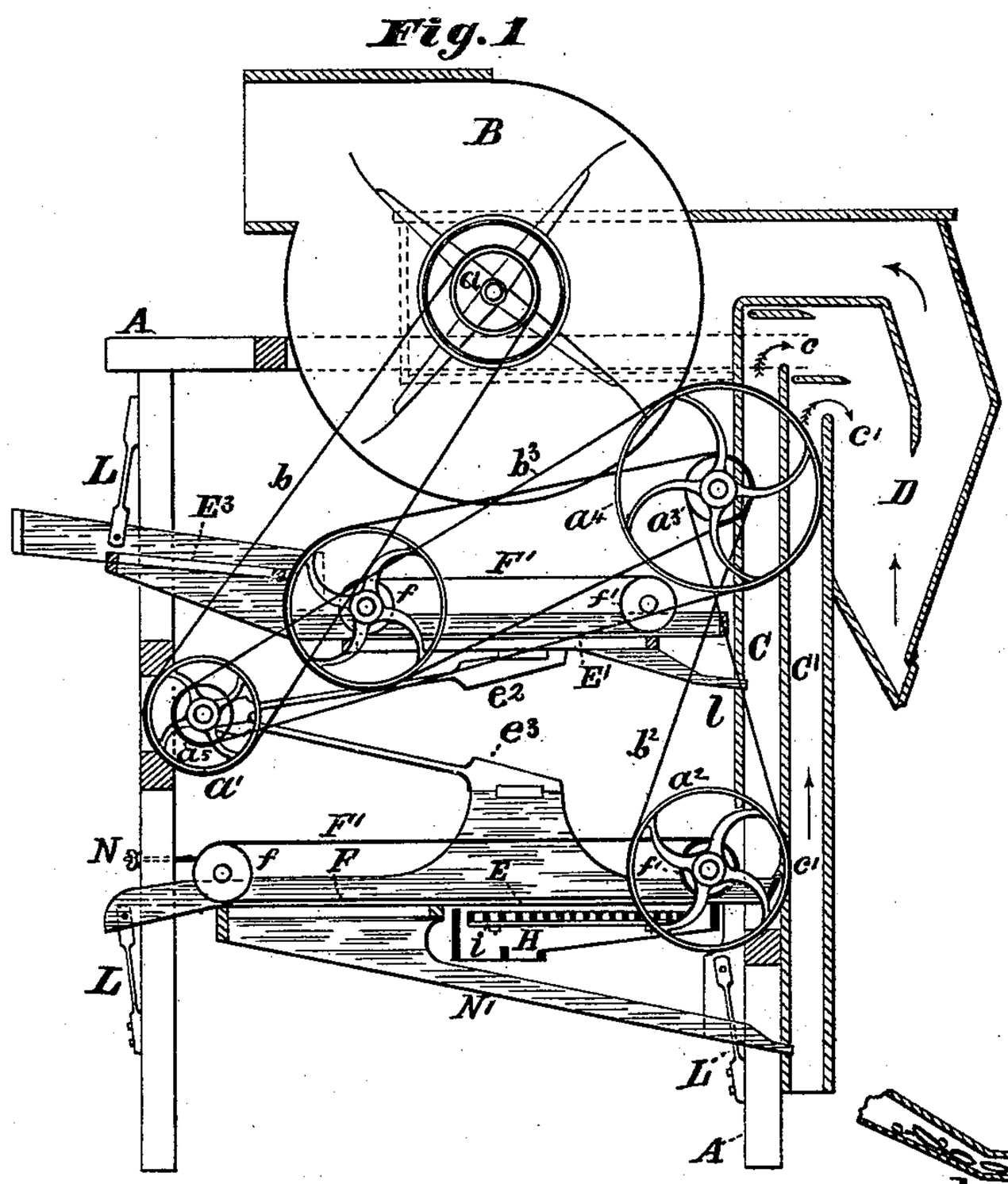


Fig. 2

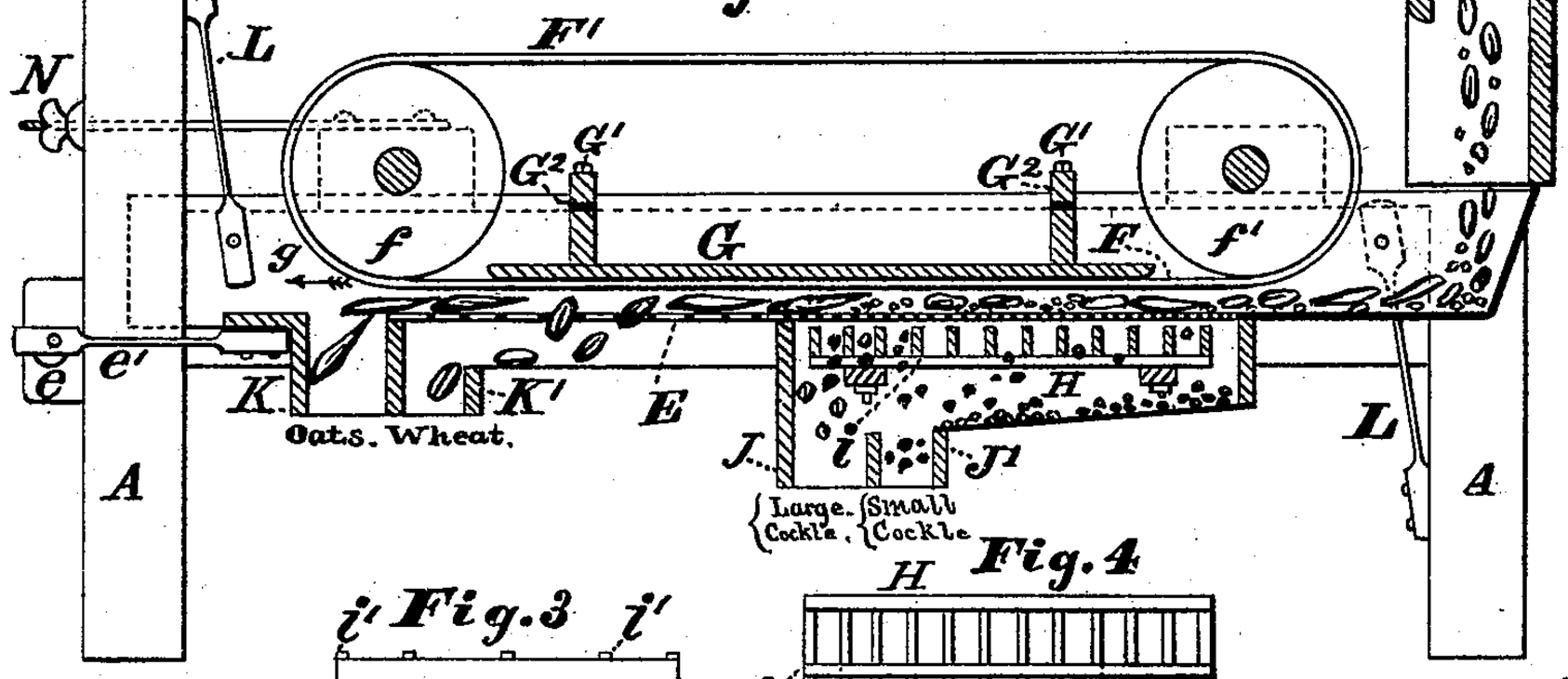
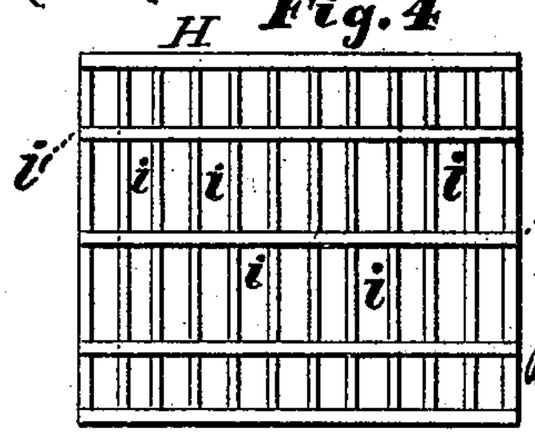


Fig. 3

Fig. 4



Witnesses.
Amos W. Sanglee.
Hugh Sangster

Inventor
Charles E. McNeal.
By James Sangster
Atty.

(No Model.) 2 Sheets—Sheet 2.

C. E. McNEAL.

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Fig. 5

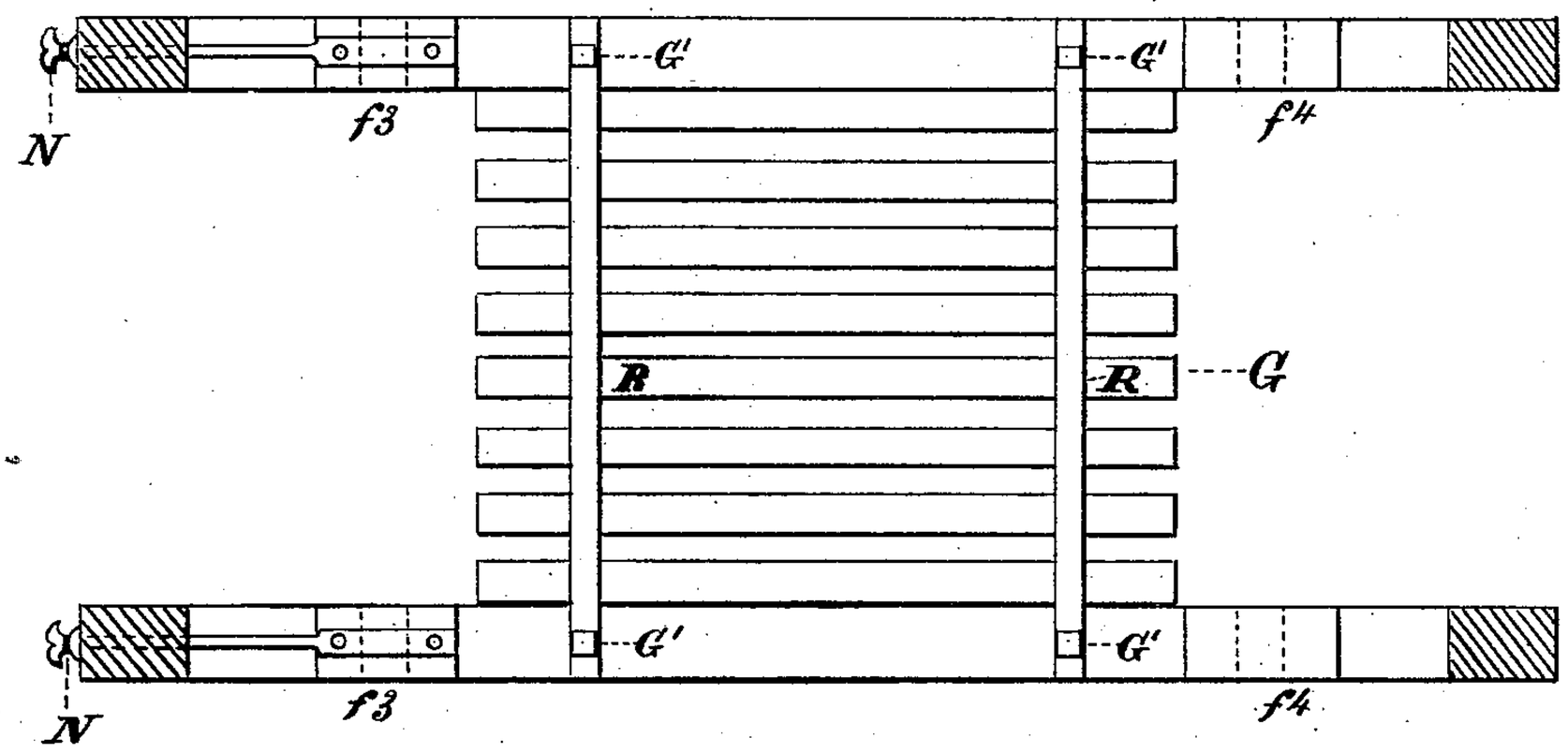


Fig. 6

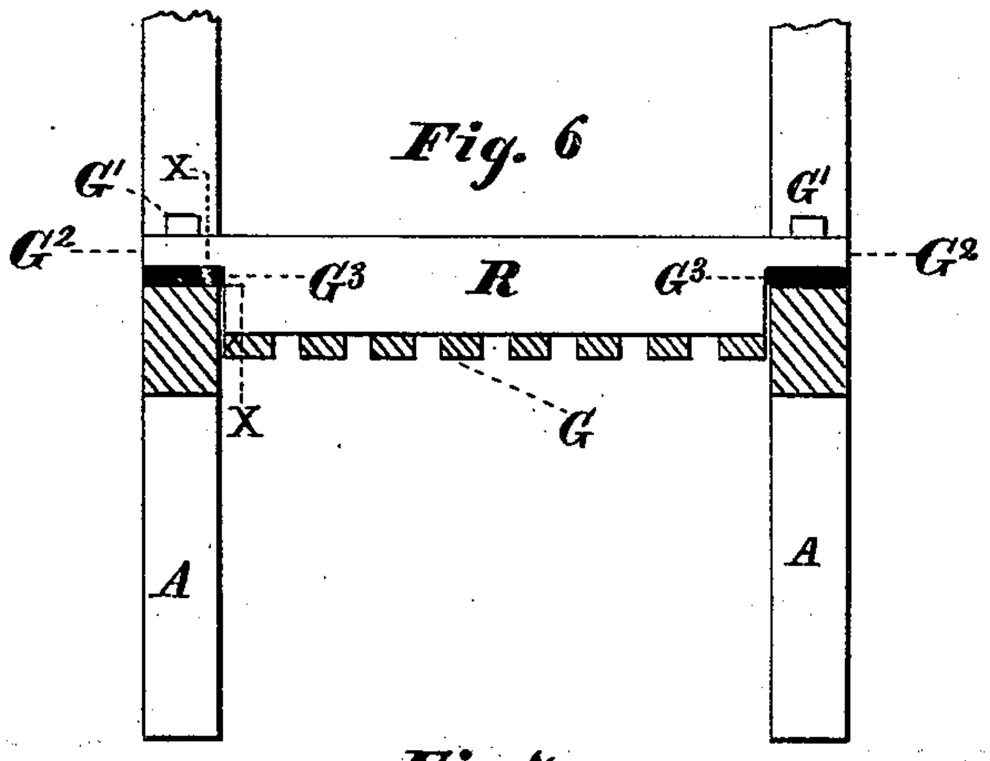
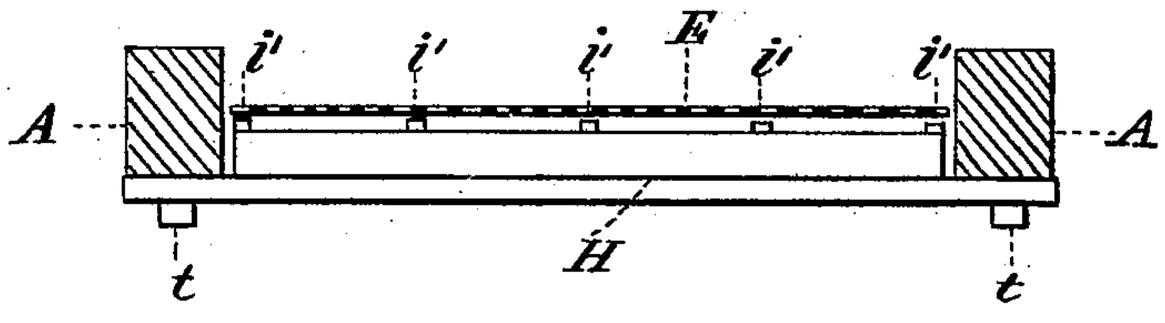


Fig. 7.



Witnesses
Hugh Sangster
Jos. Schenk

Inventor.
Charle E. McNeal.
By Jame Sangster
Atty.

UNITED STATES PATENT OFFICE.

CHARLES E. McNEAL, OF SILVER CREEK, NEW YORK, ASSIGNOR TO HIMSELF AND ALBERT H. SPAULDING, OF SAME PLACE.

SEPARATOR FOR GRAIN.

SPECIFICATION forming part of Letters Patent No. 253,546, dated February 14, 1882.

Application filed January 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. McNEAL, a citizen of the United States, residing in Silver Creek, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Separators for Grain or other Materials, of which the following is a specification.

The object of my invention is to provide the means for a more certain, rapid, and perfect separation of oats, cockle, garlic, and other seeds or materials from wheat; and it consists of certain combinations of parts which will be more clearly hereinafter described, which are illustrated in the drawings, in which—

Figure 1 is a vertical longitudinal section through the frame-work of the machine, the fan, the air-chambers, and screens. Fig. 2 is an enlarged longitudinal section through one of the screens, a portion of one of the air-trunks, the plate or rack above the lower moving part of the belt, and a section through the stationary rack below the screen. Fig. 3 is an end view of said stationary rack, and Fig. 4 represents a top view of the same. Fig. 5 is a horizontal section through the vertical frame-bars, showing a plan or top view of the plate or rack for holding the lower part of the endless apron in place. Fig. 6 is a vertical cross-section through the center of the frame and the said rack or plate; and Fig. 7 represents a vertical cross-section through the horizontal frame and through the lower screen, showing an end view of the stationary rack H and the manner of connecting it to the frame.

A represents the ordinary frame-work of a separating-machine; and B, a fan, made and operated in the usual way by means of pulleys a a', belt b, and pulleys a^2 a^3 a^4 a^5 and belts b^2 b^3. The air-trunks C C′ are arranged one back of the other, as shown, and both enter the air-chamber D, thereby producing a double air-blast in the direction of the arrows c c', and dispensing with a second air-chamber. The air-chamber D being of the ordinary and well-known construction, a further description here is unnecessary.

E E′ represent the screens. They are supported on the ordinary springs, L, and made to vibrate by the usual crank or eccentric, e, and arm or pitman e', (see Fig. 2,) or arms e^2 e^3, (shown in Fig. 1;) but instead of being operated on an incline in the usual way, they are arranged horizontally or level, so that the lower moving part, F, of the endless belt F′, (which is supported on the rollers f f',) as it moves in the direction of the arrow g, (see Fig. 2,) or toward the tail of the screen, will act as a feeder, which carries the grain evenly spread onto the screen and sweeps the oats, straws, and other longer material off from the tail of the screen, while the grain by the action of the screen falls through the perforations. The upper screen, E′, is a single wheat-screen. The grain as it drops therefrom passes through the spout l into the air-trunk C, and from thence down upon the screen E, which is provided with three sizes of perforations—one for fine cockle, dust, sand, &c., one for large cockle, and the other for wheat; or there may be three separate screens, each made easily removable, if desired.

Heretofore one of the objections to the endless belt F′ has been that it does not retain its level position, as the grain will sometimes lift it higher in one place than another and allow sticks, straw, &c., to gather under it. Furthermore, it is well known that a belt running horizontally, or nearly so, is liable to vibrate, which vibration would leave room for the oats or other longer material to up-end or tip up and pass through the screen. To avoid this objection I place a level plate or board or rack, G, over the belt, as shown in Fig. 2, which is held in place by means of bolts or screws G′ to the bars G^2. These bolts are arranged in any well-known way, so that the plate G can be adjusted vertically. (See Figs. 5 and 6, in which the rack or plate G and its mode of adjustment are shown more clearly.) It is fastened to the horizontal bars of the frame A by means of the cross-bars R and bolts G′, a block of soft india-rubber, G^3, being interposed to afford the means for vertically adjusting the rack by screwing the bolts G′ up or down. It will now be seen that the part F of the belt F′ travels toward the tail of the screen, and at the same time operates as a feeder for drawing the grain, evenly spread and at a uniform rate, on to the screen, and that as the screen is in motion the wheat will sift through the perforations adapted for it; but as the oats are longer than the wheat and have the traveling belt resting

on them and kept in its proper position by the plate or rack G, it is impossible for them to turn up and fall through the perforations, but are swept by the moving belt past and over the tail of the screen, away from the wheat. The cockle, garlic, or other seeds pass through the cockle-screen before reaching the perforations for the wheat, so that the separation of the cockle or other smaller material from the wheat is as complete as the separation of the oats or larger material therefrom.

Underneath the vibrating screen is placed a stationary rack, H. (See Figs. 2, 3, and 4.) The bars *i*, which are about one-eighth of an inch wide and one-fourth of an inch apart, are arranged at a uniform distance below the screen—say one-sixteenth of an inch. The motion of the screen causes it to move back and forth over the bars *i*, and should any kernels of wheat get into the holes of the cockle-screen, the end of the kernel, as soon as it passes partly through, will by the motion of the screen be brought in contact with the bars of the rack, and be thereby immediately driven back to the upper surface of the screen. Owing to the shape of the cockle, garlic, or other seeds, they do not come in contact with the bars *i* until they are too far through to be driven back, and consequently fall below the bars away from the grain. The broken wheat, cockle, or other seeds cannot lodge in the perforations, as the pressure of the traveling belt will drive them through. Two sizes of cockle-screens are used in the lower screen, as clearly shown in Fig. 2—the finest for sand, small seeds, or small cockle, and the larger one for letting through the large cockle or broken or imperfect kernels. The products of each screen are conducted from the machine separately—the cockle and other smaller material through the spouts or openings J J′, and the wheat and oats through the conductors K K.′ (See Fig. 2.)

The top of the rack H is provided with a series of thin strips, *i*′, arranged longitudinally and fastened firmly thereto, said strips projecting above the rack at a uniform distance—say one-sixteenth of an inch—and serve as a support for the cockle-screen to rest upon. Thus it will be seen that these strips *i*′ serve as a support for the cockle-screen, and also keep all parts of the screen (which would otherwise be liable to sag) at the required uniform distance above the bars *i* in rack H, and at the same time leave the screen free to slide back and forth. The screen is held down on these strips by its own weight, and also by the weight of the grain and the pressure of the traveling belt resting upon it.

I have shown the rack H as a stationary rack; but it may be constructed so as to have a vibrating motion, in opposition to the motion of the screen, without changing the nature of this part of my invention; and the plate or rack G may be fastened in place so as not to be adjustable, if desired; but it would not answer the purpose as well; and in some cases the longitudinal bars *i*′ may be dispensed with; or they may be fastened to the bottom of the screen; but the expense would be more, and the bars would slide on the top of the rack.

The belt F′ is adjusted by the usual tightening device, N. (Shown in Fig. 2.)

E³ represents the ordinary oat or coarse-wheat screen. The screens may, if desired, be arranged, in the usual way, on an incline; but the advantage in arranging them and the traveling belt horizontal instead of inclining them is that the grain does not have to travel so far over the face of the screen before sifting through it. Consequently the screen can be made shorter, thereby reducing the expense of construction, and producing a lighter and more durable screen in proportion to its capacity, and the oats, sticks, straw, &c., would not have to travel so far before passing over and off from the tail of the screen, out of the way.

The operation of the machine is as follows: The wheat is first fed into a coarse shaking screen, E³, for the purpose of removing the coarse screenings. It then passes on the screen E′, over which the belt or apron travels. The belt acts as a feeeder by drawing the grain onto the screen, as hereinbefore mentioned, the oats passing over the tail of the screen, while the wheat drops through upon a conductor which conducts it into the first wind-trunk, where the first air separation takes place. From the first wind-trunk the grain falls upon the head of the second shaking screen, where it is again fed by the traveling belt upon the screen E. The perforations of this second screen are, first, fine-cockle screen; second, coarse-cockle screen; third, wheat-screen. The fine screen takes out the sand, seeds, and small cockle, the second the larger cockle and small imperfect kernels, the wheat-screen letting through the wheat, while the oats are carried by the action of the belt over the tail of the screen. The wheat from the second shoe or screen is conducted into the second air separation, from which it is discharged free from all foreign substances.

I claim as my invention—

1. The combination of the traveling belt F′ and its supports *f f′* with a screen, E, a plate or rack, H, and means for vibrating the screen between the belt and rack, for the purposes described.

2. The traveling belt F′, adjustable plate or rack G, the bars G², and the bolts or screws G′, in combination with the vibrating screen and a stationary rack, H, arranged below it.

3. The combination of the vibrating screen and a rack arranged below it having a series of transverse bars, *i*, and a series of thin longitudinal strips, *i*′, for the support of and for limiting the distance between the transverse bars *i* and the screen, as and for the purpose specified.

CHARLES E. McNEAL.

Witnesses:
JAMES SANGSTER,
H. SANGSTER.