No. 854,623. PATENTED MAY 21, 1907.

T. M. BALES.

GRAIN CLEANER AND SEPARATOR.

APPLICATION FILED FEB. 14, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

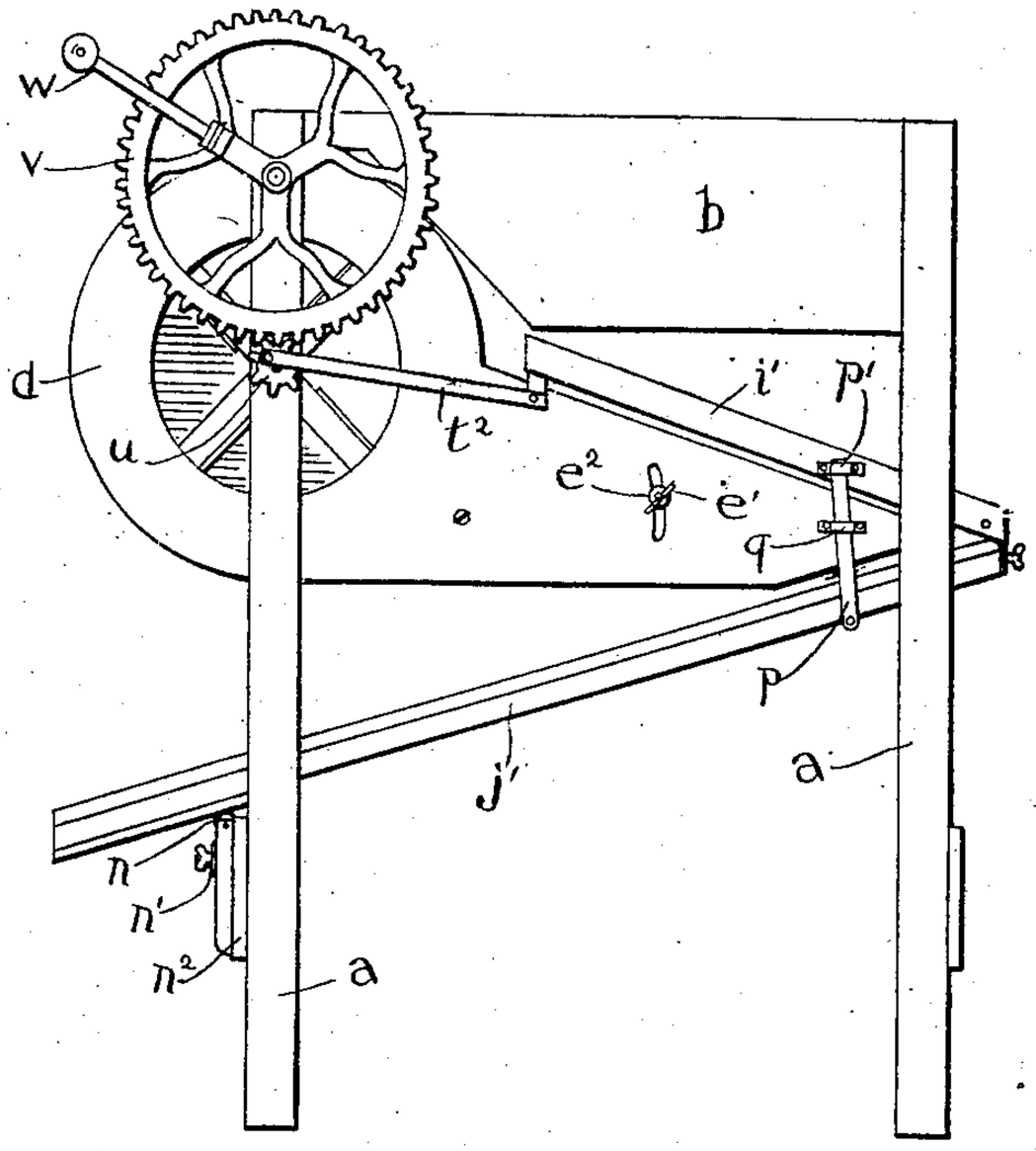


Fig. 6.

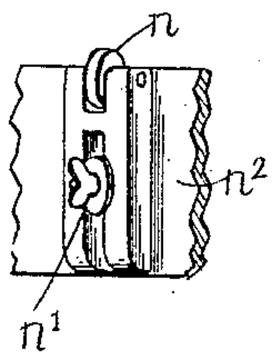


Fig. 7.

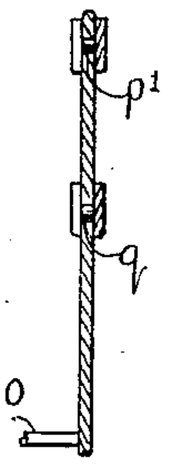
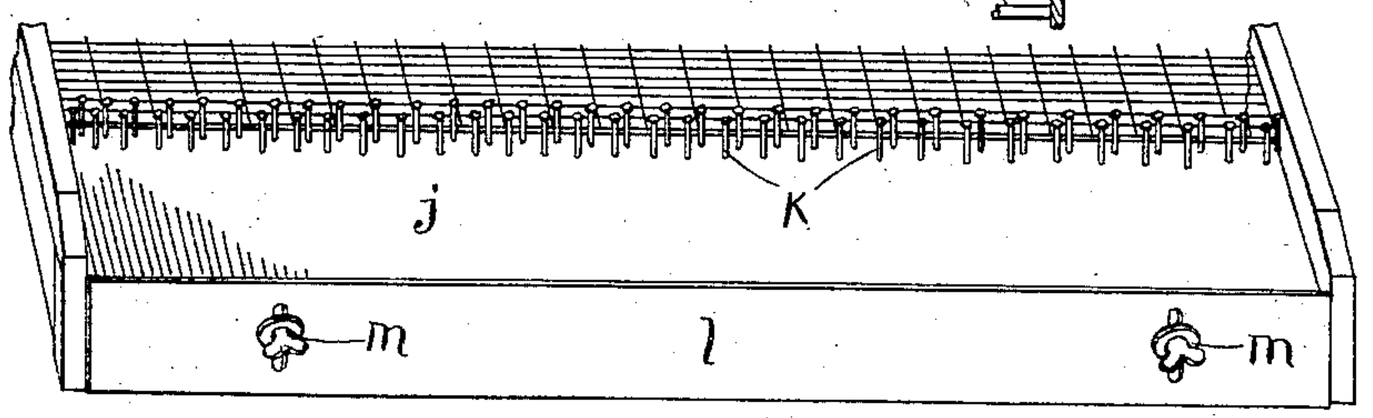


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 2.

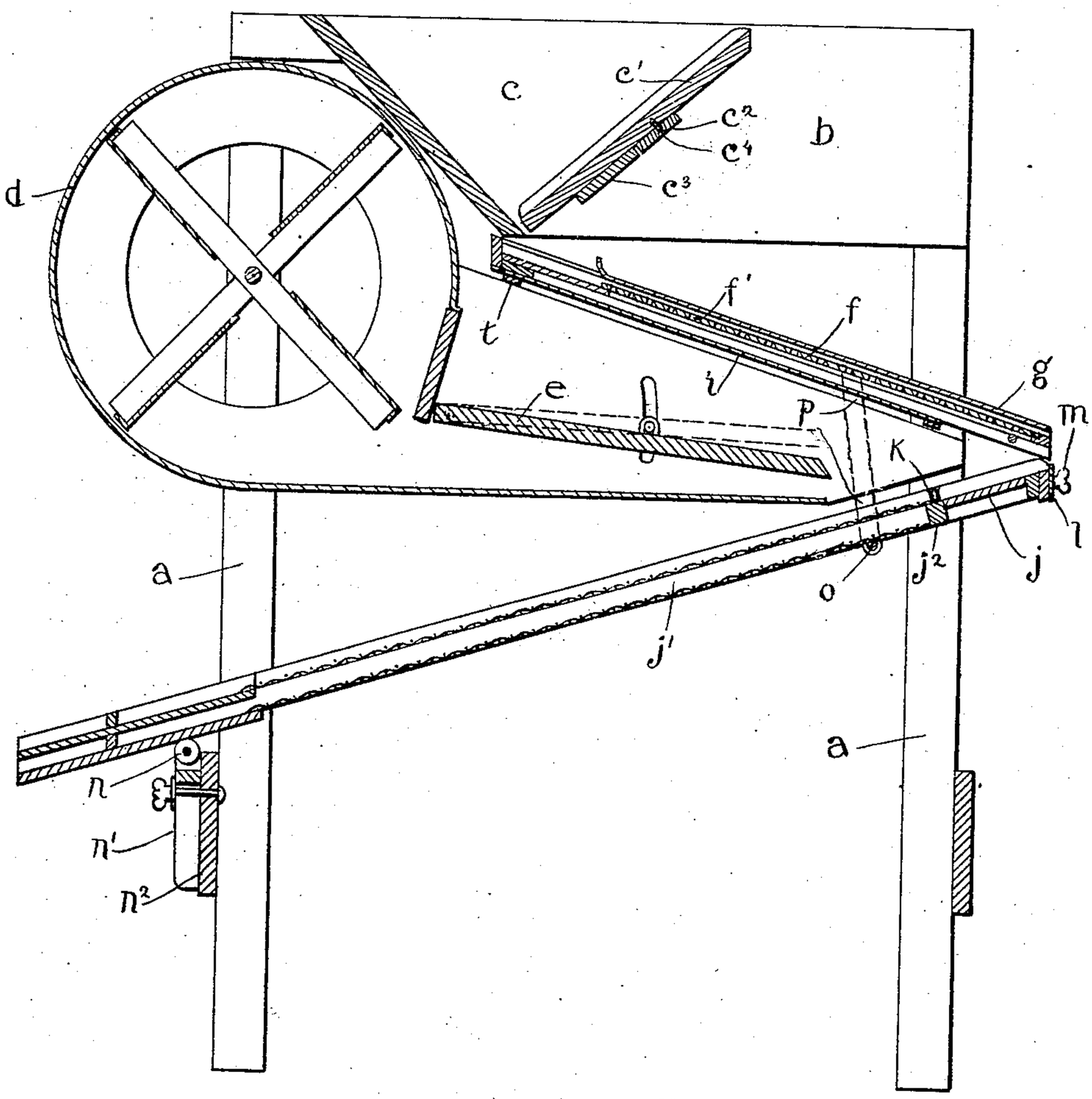


Fig. 5.

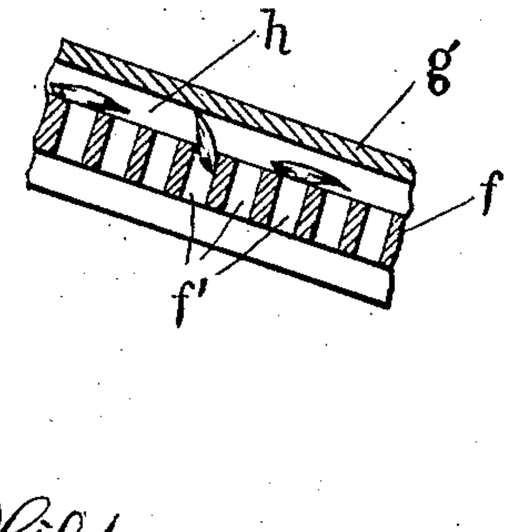
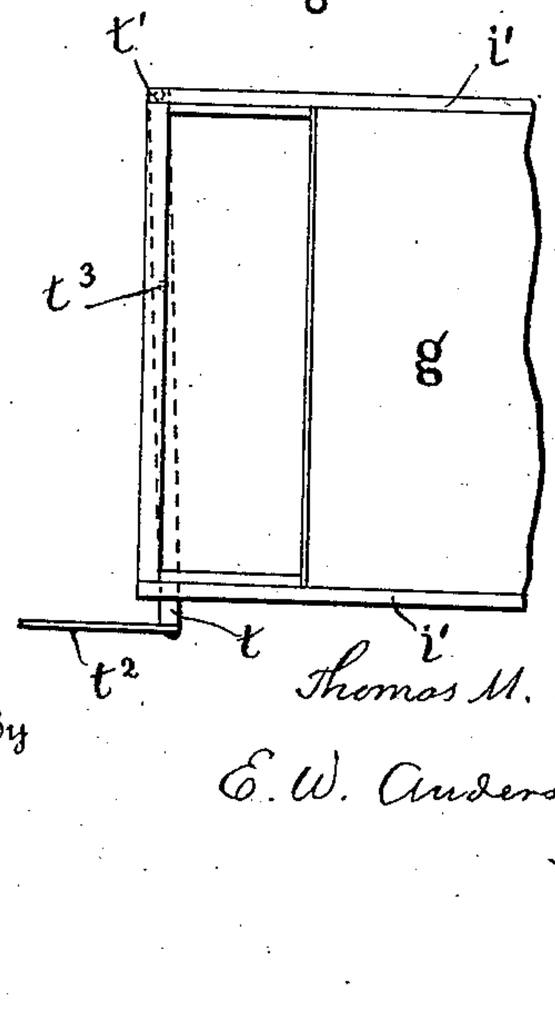


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS M. BALES, OF DUBLIN, INDIANA.

GRAIN CLEANER AND SEPARATOR.

No. 854,623. Specification of Letters Patent. Patented May 21, 1907.

Application filed February 14, 1907. Serial No. 357,408.

To all whom it may concern:

Be it known that I, THOMAS M. BALES, a citizen of the United States, and a resident of Dublin, in the county of Wayne and State of Indiana, have made a certain new and useful Invention in Grain Cleaners and Separators; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of the invention Fig. 2 is a central vertical section of the same. Fig. 3 is a detail perspective view of the upper end of the screen box. Fig. 4 is a detail plan view of the upper end of the riddle box Fig. 5 is a detail vertical section (fragmentary) of the riddle. Fig. 6 is a detail perspective view of the roller support for the lower end of the screen box. Fig. 7 is a detail sectional view of a supporting link for the lower riddle box, showing its means of connection with the fan casing and riddle boxes.

The invention relates to grain cleaners and separators, having for its object the provision of an efficient machine of simple and economical construction, and which will be light in weight.

Other objects and advantages will hereinafter appear.

The invention consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings illustrating the invention, the letter *a* designates the upright supports or frame bars two of which are provided at each side, connected by brace boards *b*, at the top. Fitting within the supporting framework so formed is the hopper *c*, having an adjustable gate *c'*, which is moved by any suitable device, shown in the present case as a cam lever c^2, bearing upon a cross bar c^3 connecting boards *b*, and such cam lever having a fulcrum connection c^4 with the gate. *d* is the fan case, located within such framework and having its bottom wall extended to form the lower wall of the blast chamber throat. The upper wall of such throat is formed by a wind-board *e* having its front end pivoted to the side walls of the blast chamber, adjacent to the rear of the fan casing, such board terminating at its other end substantially in line with the corresponding end of the lower wall aforesaid, and being adjustable toward and away from such lower wall to regulate the intensity of the blast. The adjustment of the said board *e* is effected by means of a set screw connection *e'* having engagement with the walls of an arcuate slot in the side wall, a washer e^2 being provided for such set screw.

f is a riddle upon which the grain is delivered from the hopper, such riddle being of metal or wood of about one fourth inch in thickness and having perforations *f'* which are of proper size to admit of the passage of grains of wheat or the like. A cover *g* is provided for the riddle, such cover having its lower surface spaced from the riddle by about one quarter of an inch, forming a run-way or passage *h*, leading out at the rear of the machine. A grain board *i* is located below the riddle, such riddle, cover, and grain board being connected together by side pieces *i'*, for connection of vibratory mechanism. The grain is delivered from the grain board upon an upper non-perforated extension *j* of the screen box *j'*, carrying two screens, as shown, although the number is not essential. The riddle and screens are inclined in opposite directions as is customary, and the upper screen rises at its upper end to about on a line with the lower wall of the throat of the blast chamber, or a trifle above the same, where a transverse bar j^2 is provided, to which the screens may be fastened at their upper margins. This bar carries a transverse series of attenuated projections or pins *k* arranged in a zigzag manner, such pins being nearly vertical, as shown, or at right angles to the upper surface of the transverse bar. Beyond the series of projections *k* is the extension *j*, shown as having a smooth upper surface on a line with the upper screen and projecting about four inches in rear thereof, where it is provided with a transverse guard plate, *l*, having slots and screws *m*, for vertical adjustment, whereby said guard plate may be raised to project above the upper surface of such extension to a limited degree. The lower end of the screen box is supported by a roller *n* carried by a bracket *n'*, having a slot and set screw connection with transverse frame bar n^2, for vertical adjustment, whereby the lower end of the screens may be raised or lowered to alter the inclination thereof, the screen box being supported at its upper end by a transverse rod *o*, engaging at its ends the

links p, pivoted to the side walls of the fan casing at q, and having an upper pivoted connection with the riddle box at p'.

The riddle box is supported at its lower en by its connection with links p, and at its upper end is supported by a transverse lever t, fulcrumed at one end to the fan casing at t', and having at its opposite end a pitman connection t^2 with a wrist pin upon pinion u, meshing with large gear wheel v, having a crank connection at w, for operation by hand. Upon turning the crank, the lever t through its intermediate pivotal connection with the riddle box at t^3, will vibrate such box, which through the links p at each side, will vibrate the lower screens.

The throat of the blast chamber is substantially horizontal and delivers the blast upon the upper non-perforated extension of the screens, through the transverse zig-zag series of stop pins or wires, and upon the transverse guard plate, whence it passes out above the screens. No blast whatever is delivered upon the riddle, but passes below the same.

The riddle is designed mainly for the separation of grains of wheat from oats, which is commonly difficult, and requires an upper series of chaff screens, as well as a lower series of screens. In the present case the grain of oats being longer than the height of the space between the riddle and its cover, cannot stand on end to get through the perforations of the riddle, which is sufficiently thick to prevent a grain of oats from going through the same on an incline, as shown in detail in Fig. 5 of the drawings.

By providing a substantially horizontal blast delivered upon the upper extension of the screen provided with my special guard devices, all cockle, sticks, straw, and foreign matter are separated from the grain, without the necessity of providing an upper series of chaff screens and means for directing a lifting draft upon the same. The machine is thus made more economically, and is much lighter, saving freight in transportation, at the same time being more simple in its construction, and less likely to get out of order.

In the separation of wheat or the like from oats, the oats pass through the run-way or passage h above the riddle, being aided by the vibratory motion of the riddle, and out at the rear end of the machine, where a suitable receptacle may be provided to receive them. The wheat passes through the riddle and drops upon the non-perforated extension of the screen, being blown against the guard plate l, where it collects to a certain extent and remains for a sufficient space of time, for the cockle, and other light impurities to be blown over the top of the guard plate. After this temporary stoppage, the wheat passes down the extension j, being aided by the vibratory motion of the screens, and any sticks or straws therein contained, and which are difficult of removal, are halted by the transverse stop pins, and are turned parallel to such series or sidewise, exposed to the full force of the blast, which readily blows them out over the guard plate.

The lower end of the screen box when raised by adjustment of the roller aforesaid, renders the inclination of the screens less, whereby an excess of sticks and other impurities may be more readily blown out. By raising the guard plate to about one half inch above the upper surface of the extension j, grass seed may be readily separated from chaff and other light stuff. Ordinarily for separation of wheat from oats, this guard plate is raised but about one-eighth of an inch, a very slight raise only being required.

The roller upon which the screen box rests, makes the machine work easier, and reduces wear.

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

1. In a grain cleaner and separator, the combination of a hopper, an inclined screen, having an upper smooth surface extension provided with a transverse vertically adjustable guard plate at its upper end, and a transverse zig-zag series of stop pins at its lower end between the same and the screen, means for delivering the grain from the hopper upon said smooth surface extension, a fan casing having a throat adapted to deliver the blast upon said smooth surface extension of the screen, a fan in said casing, and means for vibrating the screen.

2. In a grain cleaner and separator, the combination of a hopper, a riddle upon which the grain is delivered from the hopper and having means in connection therewith for separating oats from grain of rounder formation, said riddle having a grain board below the same, a screen having an upper smooth surface extension upon which the grain is delivered from said grain board, said extension having a transverse vertically adjustable guard plate at its upper end, and a transverse zig-zag series of stop pins at its lower end between the same and the screen, a fan casing having a throat adapted to deliver the blast upon the smooth surface screen extension, a fan in said casing and means for vibrating the screen and riddle.

3. In a grain cleaner and separator, the combination of a hopper, a riddle of about one fourth inch in thickness upon which the grain is delivered from the hopper, said riddle having a cover separated therefrom by about one fourth inch, and a grain board, a screen having an upper smooth surface extension upon which the grain is delivered from said grain board, said extension having a transverse vertically adjustable guard plate at its upper end, and a transverse zig-zag series of

stop pins at its lower end between the same and the screen, a fan casing having a throat adapted to deliver the blast upon the smooth surface screen extension, a fan in said casing and means for vibrating the screen and riddle.

4. In a grain cleaner and separator, the combination of a hopper, an inclined screen having an upper smooth surface extension provided with a transverse vertically adjustable guard plate at its upper end, and a transverse zig-zag series of stop pins at its lower end between the same and the screen, means for delivering the grain from the hopper upon the smooth surface screen extension, a fan casing having an extension of its lower wall forming the bottom wall of the blast throat, a wind board having a hinged connection at one end thereof adjacent to the fan casing and forming the upper wall of such throat, said blast throat being adapted to deliver the blast upon the smooth surface screen extension, a fan in said casing, and means for vibrating the screen.

5. In a grain cleaner and separator, the combination of a hopper, an inclined screen having an upper smooth surface extension provided with a transverse vertically adjustable guard plate at its upper end and a transverse zig-zag series of stop pins at its lower end between the same and the screen, means for delivering the grain from the hopper upon the smooth surface screen extension, a fan casing having a throat adapted to deliver the blast upon the smooth surface screen extension, a fan in said casing, and means for vibrating the screen, and means for altering the inclination of the screen, with relation to the direction of the blast.

6. In a grain cleaner and separator, the combination of a hopper, an inclined screen having an upper smooth surface extension provided with a transverse vertically adjustable guard plate at its upper end, and a transverse zig-zag series of stop pins at its lower end, means for delivering the grain from the hopper upon the smooth surface screen extension, a fan casing having a throat adapted to deliver the blast upon the smooth surface extension of the screen, a fan in said casing, means for vibrating the screen including a transverse rod upon which the screen is supported at its upper end, and a vertically adjustable roller upon which the screen rests at its lower end.

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

THOMAS M. BALES.

Witnesses:
WILLIAM GRIESINGER,
JOHN C. DODSON.