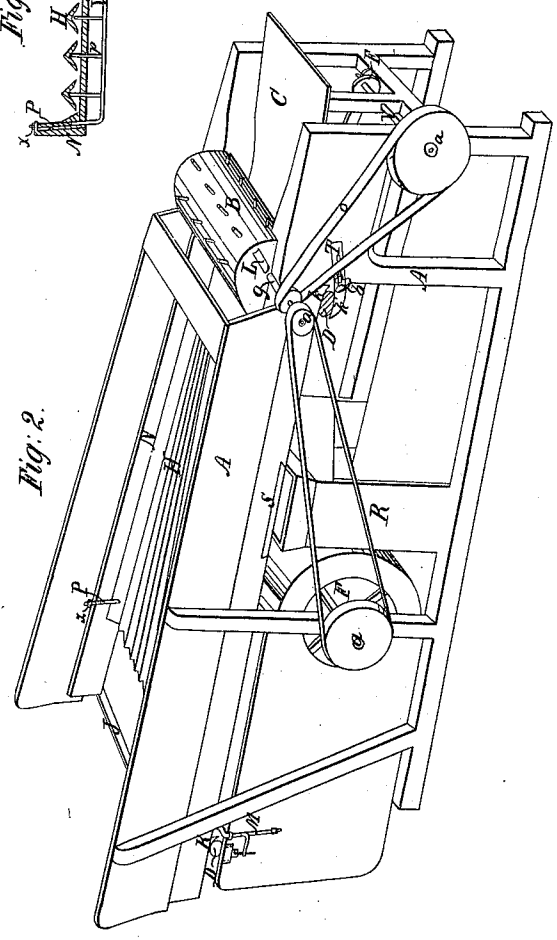
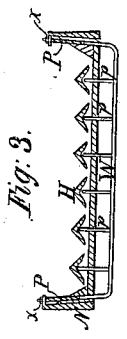
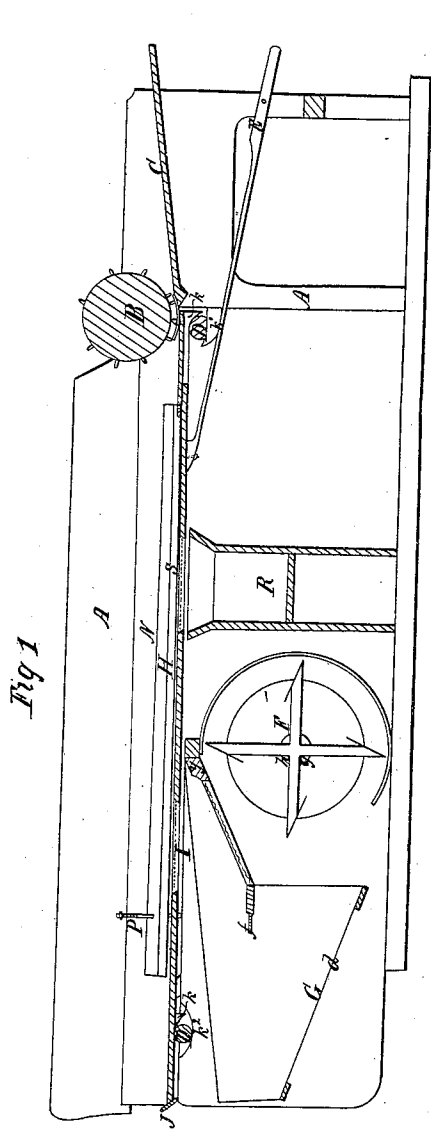


C. Roberts.
 Thrashing Mach.
 N^o 9,140. Patented Jul 20, 1852



UNITED STATES PATENT OFFICE.

CYRUS ROBERTS, OF BELLEVILLE, ILLINOIS.

GRAIN-SEPARATOR.

Specification of Letters Patent No. 9,140, dated July 20, 1852.

To all whom it may concern:

Be it known that I, CYRUS ROBERTS, of Belleville, in the county of St. Clair and State of Illinois, have invented certain new and useful Improvements in Machines for Separating and Cleaning Grain; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, which forms part of this specification, and in which—

Figure 1 represents a view in perspective of my improved thresher, separator, and cleaner, Fig. 2 is a vertical longitudinal section thereof, and Fig. 3 is a transverse section of the same.

My invention is divided into several parts which may be used separately or in connection. The first of these consists of a set of adjustable tracks acting in connection with a jumping roller on which the separator trough rests, in such manner that the amount of longitudinal shake or vibration can be regulated as required to convey the straw faster or slower without varying the vertical shake or vibration.

The second part of my invention consists of a series of adjustable angular rails which are arranged in the separating trough in such manner that they facilitate the descent of the grain and insure its separation from the straw, while they also prevent the latter from clogging or choking and at the same time can be adjusted to different angles of inclination to retard or to accelerate the passage of the straw and thus regulate the amount of shaking to which it is subjected before it is discharged from the machine.

The object of the third part of my invention is to relieve the winnowing or cleaning apparatus of a large portion of the work it is required to perform in machines hitherto constructed, and it consists in separating the cockle, chaff, shrunken grain, sand, &c. from the plump grain before the latter is delivered to the cleaning apparatus.

In the accompanying drawing A is the frame of the machine at the front extremity of which is the threshing cylinder B with its concave *e*. This thresher is provided with a feeding table C on which the sheaves of grain to be threshed and cleaned are received one at a time.

The separating trough N extends from the hinder side of the threshing apparatus to the hinder extremity of the main frame.

Its sides are fitted with two pairs of tracks K K which rest upon the peripheries of two jumping rollers D D, that are supported by similar pairs of tracks K', K², on the frame of the machine. The pair of tracks, K', that support the front jumping roll are secured to plates T each of which has a slot in it to admit a clamp screw *b* on which the track plate can be slid to vary the position of the track and thus vary the extent to which the trough can be moved longitudinally without varying its vertical movement or jump.

Adjustable tracks have not been represented in the drawing as applied to the hinder jumping roll, as the representations and description of the front ones are sufficient to enable a constructor to make any number without requiring a distinct representation of each one. A longitudinal vibratory movement is imparted to the separating trough by means of a crank U and pitman or connecting rod E. The crank U is of the disk variety, it is secured to a shaft V, and is pierced at different distances from its axis of rotation with two or more holes to any one of which the crank pin can be applied, so that by shifting the pin from one hole to another the stroke of the pitman and of the separating trough with which it is connected can be increased or diminished.

The separating trough extends slightly beneath the threshing apparatus so as to receive the straw and grain directly from the latter. It is traversed throughout nearly its whole extent by a series of angular rails which may be formed either of sheet iron or wood. These rails, H, are secured by their front extremities to the bottom of the elevating trough; their hinder extremities are supported on standards *p*, whose upper extremities bear in oblong sockets formed in the basis of the angular rails, and whose lower extremities pass through holes in the bottom of the trough and are all made fast to a cross bar W beneath. The latter is suspended from the elevating trough by two bolts, P P, which pass through slots in the sides of the trough and are fitted at their upper extremities with adjusting nuts *x*, by turning which the crossbar and its standards or pins, together with the hinder extremities of the whole series of angular rails which are supported by the pins, can be raised farther above the

bottom of the trough or can be lowered toward it. By this means the inclination of the rails can be varied as occasion may require. The bases of the angular rails even when lowered to their greatest extent are always clear of the bottom of the trough, there being a shallow space left between the two, in which the grain is received as it falls from the straw and is moved along by the shake toward the hinder extremity of the trough.

The cleaning apparatus is situated beneath the hinder extremity of the separating trough, whose bottom at this point is fitted with a coarse screen I that permits grain and such matters to pass through, but refuses the heads and short pieces of straw. The cleaner consists mainly of a shoe G, and fan F. The shoe is suspended at the middle of its forward cross bar *y* from a cross bar of the main frame. Its hinder extremity is suspended by suitable sway straps or links. It contains a screen *d* and fingers *f*, for subjecting the grain to the action of the blast generated by the fan, and it has a transverse vibratory movement imparted to it by the longitudinal vibrations of the separating trough. This movement is transmitted from the latter to the former by means of a horizontal bent lever M which is pivoted at the intersection of its arms to one of the side boards of the cleaning apparatus. The longer arm of this lever extends beneath the separating trough and enters a slot formed in a bracket secured to the middle thereof, while the shorter arm of the lever is connected by a link with the shoe G.

The cleaning apparatus as above stated is situated at the hinder extremity of the main frame. It is preceded by an apparatus for separating the smaller heavy impurities with which grain is mingled before the grain is delivered to the cleaner. This apparatus consists of a fine screen S fitted into the bottom of the separating trough at a point intermediate between the wheat screen I and the threshing apparatus. The meshes of this screen are too fine to permit any good grain to pass through but are sufficiently coarse to admit cockle, chess, sand, &c. Beneath this screen is a hopper R having an inclined bottom to receive the matters separated by the screen and to deliver them at the side of the machine.

The fan shaft *h*, cylinder shaft *g*, and crank shaft V are all connected by means of belts *o*, *o*, and belt pulleys, so that when one is driven the other two are also caused to revolve. In general I prefer to drive the cylinder shaft by means of a driving belt that transmits motion from a horse-power or other convenient prime mover. As the crank shaft revolves the separator is caused to vibrate longitudinally, rising as soon as it has moved backward far enough for the

jumping rolls to strike their inclined tracks, and falling again at the commencement of its return forward. The extent of the longitudinal motion is regulated by the position of the crank pin and the adjustment of the tracks, while the upward movement is constant and is regulated by the inclination of the tracks on which the rollers run.

The grain delivered upon the feed table is fed into the thresher; thence is passed into the separating trough; as it moves over the rails H and is shaken by the rapid up and down movement or jump of the trough, the grain and analogous matters pass between the rails and fall upon the bottom of the trough while the straw remaining on the rails is moved onward by the longitudinal movement of the trough and is finally discharged at the hinder extremity of the machine. The time occupied by the straw in passing through the separator varies according as the rails are set by the movement of the cross bar W at a greater or less inclination. If in practice it be found that the grain is not thoroughly separated from the straw, the cross bar must be raised to increase the inclination of the rails and thus retard the onward movement of the straw. On the other hand if it be found that the grain is thoroughly separated, the cross bar may be lowered with advantage to facilitate the onward movement of the straw until loss of grain begins to ensue. The angular form of rail greatly facilitates the action of the separator, for rails of this form clear themselves from the straw much better than any other form which I have tried. The straw is therefore not liable to choke in the machine, which would happen if the rails did not possess the property of clearing themselves. As the grain and other matters work along beneath the rails, they pass over the fine screen S which separates the cockle, chess, shrunk grains, sand, &c., and delivers them to the hopper R beneath, by which they are discharged at the side of the machine; thus relieving the cleaning apparatus of all these matters. The good wheat and the lighter particles of larger size being too small to pass through the cockle screen, pass on to the wheat screen; here the wheat and other matters of about the same size pass through to the shoe beneath in which they are separated by the blast of the fan. The clean wheat being delivered by the inclined grated bottom of the shoe toward the fan case while the lighter matters are blown out at the hinder extremity of the shoe. The heads and other bulky matters that may have passed between the bars, being too large to pass through the wheat screen, work onward to the hinder end of the separating trough and fall therefrom with the straw from above the rails.

Having thus described my improvements

70

75

80

85

90

95

100

105

110

115

120

125

130

in grain separators and cleaners what I claim therein as new and desire to secure by Letters Patent is—

5 1. The combination of the adjustable crank for vibrating the separating trough, with the adjustable tracks on which the jumping roller runs which shakes the trough up and down whereby the conveyance of the straw may be accelerated or retarded without
10 affecting the vertical shaking of the straw.

2. I also claim the adjustable angular rails constructed and arranged in the separating trough in the manner and for the purposes herein set forth.

3. I likewise claim the method herein de- 15 scribed of relieving the winnowing apparatus of a portion of the work by separating, by means of a screen S arranged substantially as herein set forth, such impurities as will pass through it before the grain is de- 20 livered to the winnowing apparatus.

In testimony whereof I have hereunto subscribed my name.

CYRUS ROBERTS.

Witnesses:

E. I. RENWICK,
H. H. WATSON.