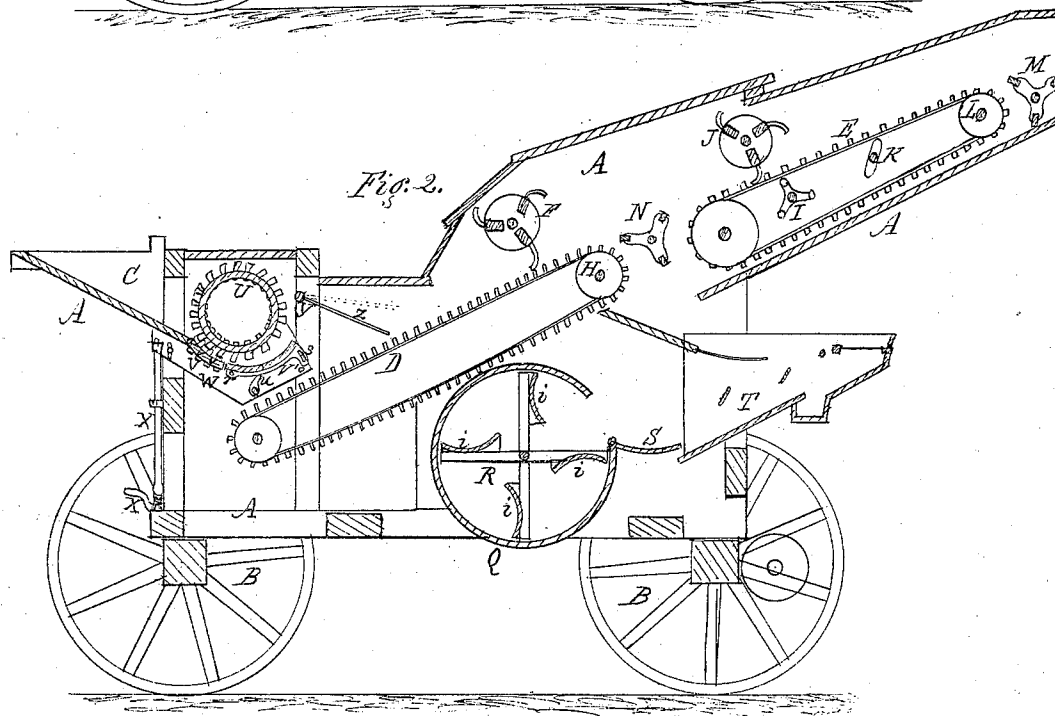
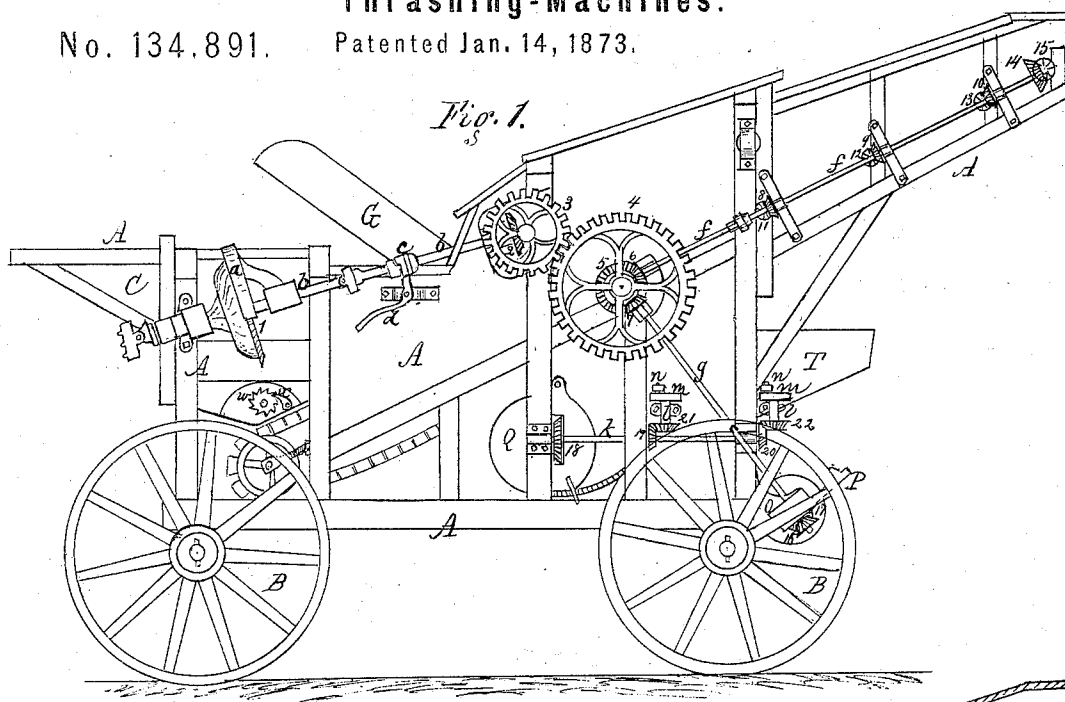


A. JOHNSTON.
Thrashing-Machines.

No. 134,891.

Patented Jan. 14, 1873.



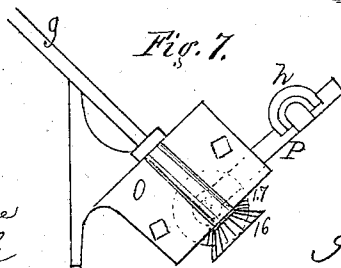
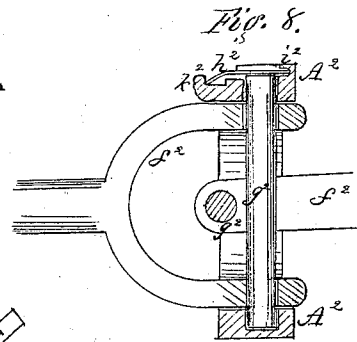
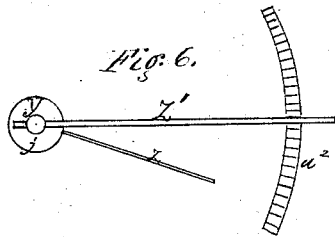
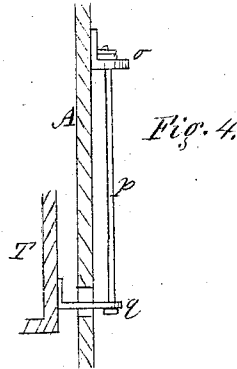
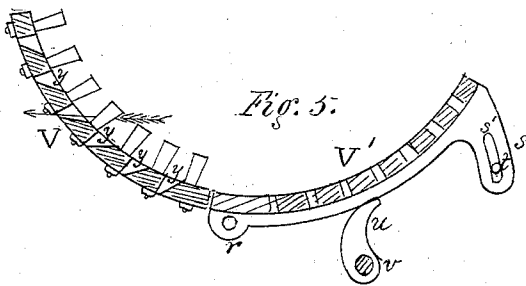
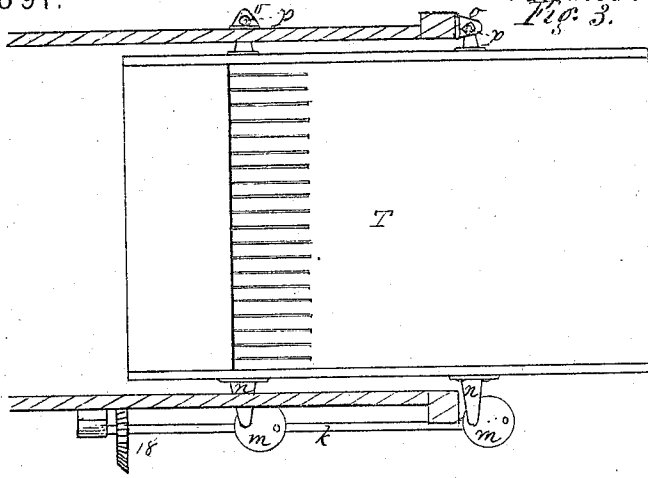
Witnesses.
Archib Paine
J D Doyle

Inventor.
Arthur Johnston,
per R. F. Osgood,
Atty.

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UNITED STATES PATENT OFFICE.

ARTHUR JOHNSTON, OF LOCKPORT, NEW YORK.

IMPROVEMENT IN THRASHING-MACHINES.

Specification forming part of Letters Patent No. 134,891, dated January 14, 1873.

To all whom it may concern:

Be it known that I, ARTHUR JOHNSTON, of Lockport, in the county of Niagara and State of New York, have invented certain Improvements in Thrashing-Machines, of which the following is a specification:

Nature of the Invention.

My invention consists in the construction and arrangement of the machine, as herein-after described.

General Description.

In the drawing, Figure 1 is an elevation of my improved machine; Fig. 2, a longitudinal vertical section; Fig. 3, a plan of the shoe, showing its connection with the main case or frame; Fig. 4, a view of the suspending attachment to one side of the shoe; Fig. 5, a section of the concave; Figs. 6, 7, and 8, detail views.

The main frame or case A is of the usual form of thrashing-machines, and is mounted on wheels B B in the usual way. It also has the ordinary hopper C for feeding in the grain; the ordinary raddles D E for carrying off the straw and separating the grain therefrom; and the usual elevator G for elevating the tailings as they pass from the shoe. The power is applied from the tumbling-rod through the medium of bevel-wheel 1, incased in the shield a, and driving the shaft b. On this shaft is a clutch, c, with lever-handle d, by which it is thrown into or out of gear; and at the end of the shaft is a bevel-gear, 2, which meshes with a corresponding bevel-pinion that drives the beater F, Fig. 2. On the end of the beater-shaft F is a spur-wheel, 3, which engages with and gives motion to a larger spur-wheel, 4, situated on shaft H that drives the lower raddle. On this same shaft H is a bevel-wheel, 5, with which engage two bevel-pinions, 6 and 7. The upper one, 6, gives motion to a shaft, f, which runs upward the whole length of the machine. At suitable points apart this shaft has three bevel-pinions, 8, 9, and 10, which give motion to corresponding pinions 11, 12, and 13, the shafts of which, respectively, drive the raddle-agitators I K and the upper shaft L, by which the upper raddle is driven. At the end of shaft f is also a bevel-wheel, 14, engaging with another, 15, by which motion is given

to the fly M, which is located outside the upper raddle and in the discharge-mouth of the machine. A similar fly, N, is also located in the space between the ends of the two raddles, driven by a pulley on the opposite side of the machine from that shown in Fig. 1. The object and operation of these flies will presently be explained. A beater, J, is also used above the upper raddle, similar to F, above the lower one. These beaters simply catch and stir up the straw by the curved fingers attached thereto, and thus serve to separate the grain therefrom. The other pinion, 7, gives motion to a shaft, g, which extends downward in an angular direction to the back corner of the machine, where it has a bevel-gear, 16, that meshes with a corresponding one, 17, Fig. 7, that runs a cross-shaft. This shaft, by suitable gearing, gives motion to the elevator that raises the tailings through spout G. The ends of the two shafts connect with a hollow box, O, Fig. 7, which holds gear 17 inside it. On the outside of the inner plate of the box is a boss or stud through which the cross-shaft passes, and on this boss rests a hinge-arm, P, with hinge h. There is one of these on each side of the machine, and they serve to attach the base of the straw-stacker which elevates the straw to the top of the stack. These hinged arms, turning concentrically, will allow the stacker to be raised at any angle or elevation. The ordinary fan-case Q is employed, holding the fan R. Just in the rear of the fan-case is a flue-board, S, extending from side to side, and made curved or concave in cross-section or longitudinally of the machine. The wings i i of the fan are also made concave in cross-section in the direction of motion, as clearly shown in Fig. 2. By this combination of the cross-flue board S with the curved wings i i I produce a special effect, viz: I prevent any back action or suction of the air after it has once passed the flue. This will be apparent when it is seen that in passing the flue the heel or inner edge of the wings will come opposite the inner edge of the flue-board before the outer edge of the wings will. This obviates a great difficulty heretofore experienced in the drawing back of the air. The flue-board turns on a hinge, so as to be adjusted to any desired angle. One advantage of the concave form of the flue-board is that it gives a turn or deflection

to the air, which diffuses it through the shoe space without bearing too heavily upon the inclined discharge-board down which the grain passes. The curvature of the wings also assists in this action, as the tendency is to throw the air down on the flue-board. The curved wings of themselves draw the air in more readily from the ends of the fan-cases, and discharge it in a more full and uniform volume than in any other form with which I am acquainted. The shoe T has nothing peculiar in its construction, but is hung in a peculiar way, by which a rotary horizontal motion is obtained. A shaft, *k*, Figs. 1 and 3, is located horizontally on the outside of the machine. This shaft has a bevel-gear, 18, which engages with a corresponding gear on the fan-shaft, by which it receives motion. It also has two bevel-gears, 19 and 20, which engage with gears 21 and 22 on upright bearings *l l* that run in boxes attached to the frame. On top the bearings are crank-rods *m m*, to which are jointed lugs *n n*, which pass through slots made in the casing of the machine, and are then securely bolted to the side of the shoe. Upon the opposite side of the casing of the main frame and upon its rear post are attached bearings *o o*. From these depend rods or arms *p p*, which connect at the bottom with corresponding lugs *q q* that are bolted fast to the shoe. The connection of the rods *p p* is such that they have a free swinging motion from their top bearings, as shown in Fig. 4. The revolutions of the crank-heads *m m* will cause a rotary motion to be given to the shoe, which is assisted by the suspension of the rods at the opposite side. This motion gives a regular and uniform action to the separation, and assists the blast in carrying off the refuse. It also diffuses and spreads the mass equally over the whole surface, and prevents the irregularity that occurs where motion is simply forward and back or crosswise. The combination of the crank motion with the pendulous one on the two opposite sides is effective in producing this action, while but very little friction is caused. The cylinder U is of ordinary construction and form. The concave, however, is peculiar. It consists of two sections or halves, V V'. The first one, V, is made fixed and stationary, and has the ordinary teeth for meshing with the teeth of the cylinder. The second section, V', is hung upon the pivot *r*, and its opposite end is made to adjust higher or lower in order to increase or decrease the friction in proportion to the kind and quality of the grain. The swinging end is held and graded in proper position during the adjustment by means of a concentric lug, *s*, which has a slot, *s'*, through which passes a pin, *t*, that forms the guide. At each side of the machine is a curved cam, *u*, resting under the swinging part of the concave and attached to a cross-shaft, *v*. By turning the shaft one way or the other it will be seen the concave will be raised or lowered correspondingly by the cams. To the end of the shaft, outside the machine, Fig. 1, is secured a ratchet-wheel, *w*,

with which engages a pawl, *x*. This is for the purpose of holding the shaft with the cams raised to any desired position. The whole concave is attached to a plate, W, on each side of the machine. At the inner end this plate turns on a bolt or pivot; but at the outer end it is made adjustable vertically by means of screw-rods and wrenches X X, as shown at the left in Fig. 2. This adjustment is for the purpose of moving the stationary part V of the concave bodily up and down.

By means of this combined adjustment of the two sections of the concave, the first moving up and down bodily and the last swinging upon a center to open and close the mouth, I can attain a better result in the clearing of the grain from the heads than in any other arrangement with which I am acquainted.

The swinging section of the concave is made either slatted or entire with holes through. The stationary part has holes through for the purpose of allowing the passage of the grain. Heretofore these holes have been made straight through, or in a radial line with the concave. In such case the grain is much broken by the great force employed in thrashing. To obviate this I make the holes *y y* angular, the angle running backward from the direction of motion of the cylinder. At the bottom they concentrate to a discharge-opening of proper size, through which the grain passes. The angles of these openings stand in the direction in which the grain is forced back by the cylinder; and as they present no sharp edges for contact the grain will pass off without being broken. This forms one feature of novelty in my invention.

In the rear of the cylinder is a shaft, *y*, having a series of fingers, *z z*, which extend down at an angle till they nearly reach the upper surface of the lower raddle. On the end of the shaft, outside the machine, is a head, *j*, (Fig. 6,) to which is attached a spring-rod, Z, that moves over the face of a concentric ratchet, *a*², into the teeth of which it catches and holds at any elevation. By this means the fingers can be set at any height, as indicated by the dotted lines, Fig. 2.

The object of these fingers is to prevent the throwing or forcing of the straw upward over the surface of the raddle too rapidly by the rapid movement of the cylinder. The fingers serve as a brake or stop, so that the straw will pass up gradually over the raddle for the perfect separation of the grain.

The flies M N are of importance in connection with the raddles in producing a perfect separation of the grain from the straw. The fly N, lying between the two raddles, tosses the straw over from one to the other, and shakes the grain out so that it will drop through the space below. The other one, M, has a similar function at the top, and the additional one of producing a perfect discharge of the straw and preventing any clogging or back action.

It will be noticed that each of the flies is composed of three slats secured to arms or forks

from the shaft so as to leave the whole as open as possible for the passage of the grain. It is necessary to interpose in the shaft *b*, also in the shaft *f*, and also in other shafts of the machine, universal joints, so as to give free action to the shafts and prevent any binding or twist. I employ the ordinary coupling-ring *A*², (Fig. 8,) in which fit the forks or branching ends *f*² *f*² of the shaft, connected to the ring by the ordinary cross bolts or pins *g*² *g*². At one end of each bolt is located a flat spring, *h*², which fits into a seat, *i*², formed for it at one end, while the other end is curved down and rests in a seat, *h*², by which it is shielded from contact with anything in revolving. This spring covers the end of the bolt and prevents its displacement or escape.

Claims.

What I claim, and desire to secure by Letters Patent, is—

1. In a thrashing-machine, the combination, with a concave constructed in sections *V V'*, of the adjusting devices, substantially as described, whereby one section is adjustable up and down bodily, and the other adjustable upon the pivot *r* for gaging the discharge-mouth, as herein set forth.

2. In combination with the concave formed of the two sections *V V'*, the cams *u*, shaft *v*, and ratchet and pawl *w x*, for adjusting one section, and the screw-rods and wrenches *X* for adjusting the other, as herein shown and described.

3. The section *V* of the concave, provided with discharge-apertures made angular or in-

clined backward to prevent the breaking of the grain, as herein described.

4. In combination with the raddle *D* and with the thrashing-cylinder, the shaft *y* with angular fingers *z z*, and its adjusting-rod *Z*, and engaging ratchet *a*², arranged and operating as herein described.

5. In a thrashing-machine, the two three-slatted flies *M N*, one located in the space between the raddles and the other in the discharge-mouth of the machine, said flies being combined with the raddles, in the manner and for the purpose specified.

6. In a thrashing-machine, in combination with the curved wings *i i* of the fan, the curved flue-plate *S*, arranged and operating as herein described.

7. In combination with the shoe *T*, the shaft *k*, gears 19 20 21 22, crank-heads *m*, and lugs *n* on one side, and the lugs *o q* and pendulous rods *p p* on the other, for giving a horizontal rotary motion to said shoe, as herein shown and described.

8. The combination of the hollow box *O* with the hinge-arms *P*, constructed and arranged to operate as herein shown and described.

9. In combination with the coupling-ring *A*², branching ends *f*², and cross-bolts *g*² *g*², the flat springs *h*² and seat *i*², as herein shown and described, for the purpose specified.

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

Witnesses: ARTHUR JOHNSTON.

R. F. OSGOOD,
ARCHIE BAINE.