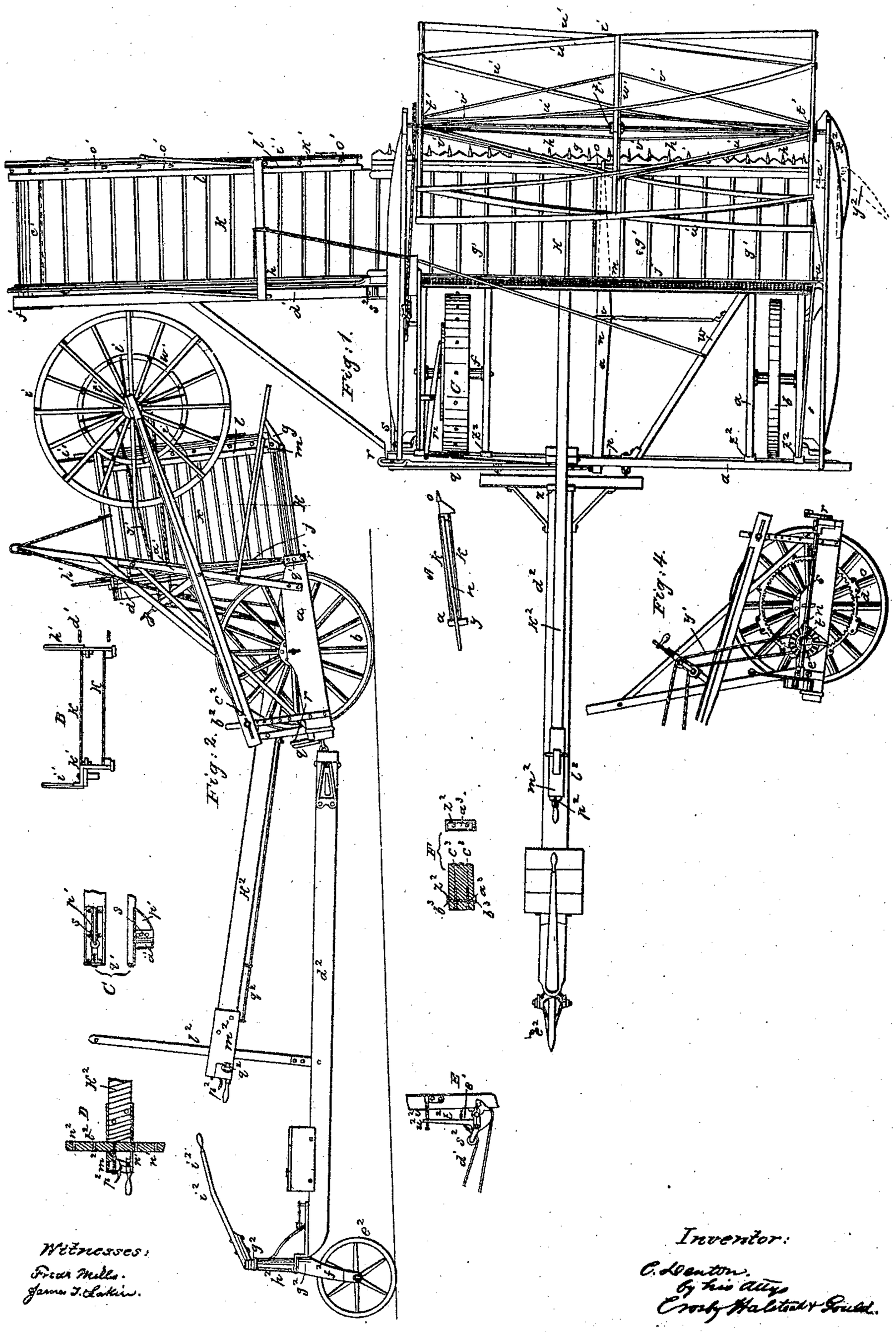
C. DENTON.

Harvester.

2 Sheets—Sheet 1.

No. 79,452.

Patented June 30, 1868.



Witnesses:
Fredk Mills.
James T. Lakin.

Inventor:
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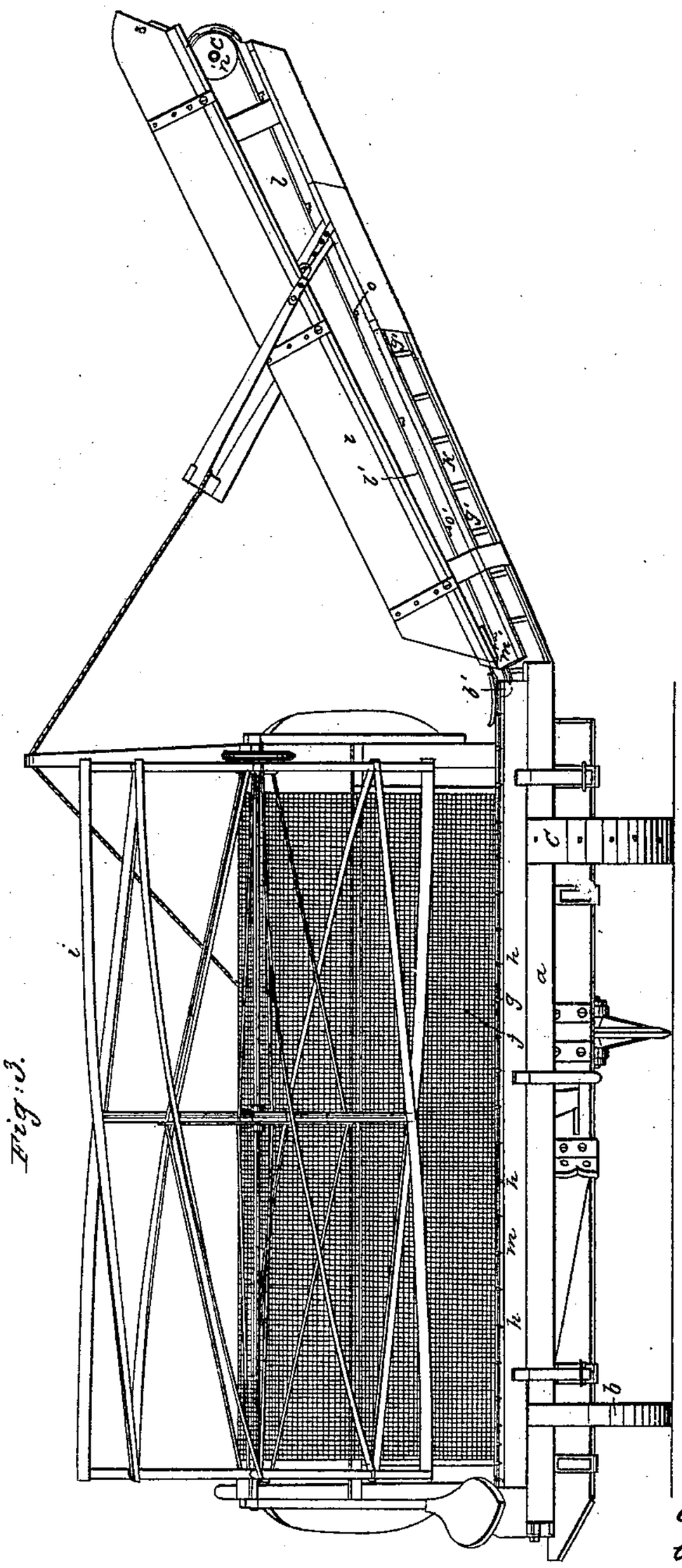

Fig: 3.

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# UNITED STATES PATENT OFFICE.

CHARLES DENTON, OF DECATUR, ILLINOIS, ASSIGNOR TO AMES PLOW COMPANY, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **79,452,** dated June 30, 1868.

*To all whom it may concern:*

Be it known that I, CHARLES DENTON, of Decatur, in the county of Macon and State of Illinois, have invented an Improved Heading-Machine; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My improvements relate to details of construction of reaping-machines of that class known as "headers," in which the tops only of the grain-stalks are cut with the grain-heads, leaving the remainder of the stalks standing, to be plowed in.

My improvements have reference to the construction of the inclined spout or conductor through which the conveyer travels to discharge the cut grain into a wagon running with the header, and beneath the upper end of the spout; also, to the arrangement of the mechanism for driving the sickle-bar, and to other features hereinafter enumerated and described.

The drawings represent a heading-machine embodying my improvements.

Figure 1 shows a plan of the machine; Fig. 2, a side elevation; Fig. 3, a rear elevation; Fig. 4, an end view of the driving-wheel, and the mechanism adjacent to and connected with the same.

*a* denotes the main frame or carriage, supported on a pair of wheels, *b c*, one of which, *c*, is the power-wheel for driving the sickles, the conveyer, and the reel, it having a main gear, *d*, meshing into and driving a pinion, *e*, on a cross-shaft, *f*. *g* denotes the ordinary sickle-bar, the cutting-teeth of which reciprocate through the fingers *h*, in the usual manner. *i* denotes the rotating reel, which holds the grain up to the sickles, and throws it over upon the conveyer as it is cut, the grain being kept from going over upon the rear of the machine by the screen *j*. *k* is the conveyer or apron upon which the cut grain falls after being cut, this apron traversing over the front of the main frame, and up over an incline or spout, *l*, from which it falls into the receiving-wagon.

The sickle-bar is supported by and reciprocates upon the front beam *m* of the frame *a*, and its reciprocating motion is imparted as follows: Running centrally across the frame is a lever, *n*, the front end of this lever being jointed to the sickle-bar at its center, as seen at *o*, while its rear end extends through and is supported by the rear beam *p*, as seen at Fig. 1. By a link, *q*, in rear of the beam *p*, the lever *n* is connected to the crank-pin of a crank-wheel, *r*, on a shaft, *s*, which shaft bears a bevel-gear, *t*, driven by a gear, *u*, on the shaft *f*. The lever *n* is fulcrumed at or near its center, as seen at *v*, Fig. 1.

As usually arranged, the sickle-lever is placed at the extreme end of the machine, where it is jointed at one end to the sickle-bar, and at its opposite end to the frame, while a connecting-rod extends centrally through the frame lengthwise, and is jointed to the lever at the center thereof.

This arrangement is objectionable in that, having the whole sickle-bar to push before it, there is too great a strain upon the sickles, rendering it very hard to work the sickles in one direction, the bar being more or less liable to buckle, while it is also difficult to run the connecting-rod through the frame, on account of the wheels, and the force is indirectly applied.

By placing the shaft *s* at the end of the frame and running it back to the rear of the frame, and by placing the sickle-lever across the frame, fulcrumed at its center, jointed to the center of the sickle-bar, and driven by the link *q*, connecting its rear end to the crank of shaft *s* at the rear of the frame, the sickles are moved in each direction by the same force, the driving-wheel and its fellow draft-wheel are left free from the sickle-driving mechanism, and the power from the driving-wheel is more directly, practically, and advantageously applied.

The fulcrum *v* is a loose fulcrum, it being made as a bar, hinged to the beam *w*, and being incapable of end movement, but swinging laterally sufficiently to allow the lever *n* to yield in the direction of its length, thereby preventing the sickle-bar from binding against the front beam at or near the fulcrum, as it would somewhat incline to do were the fulcrum made immovable.

To relieve the front end of the lever from liability to clog with straw, and for its better support, I run it through a slot in the rear beam *y* of the endless-apron frame, and under the apron, or between the two parts of the apron, as seen at A, which represents a cross-section through the front of the frame *a*.

The endless conveyer-apron *k* occupies the front of the machine, directly in rear of the sickles, traveling around guide-rolls $a^1$ at one end of the frame, and over and under guide-rolls $b^1$ at the opposite end, and thence up the incline or spout *l*, around a drum, $c^1$, motion being communicated to it by a belt, $d^1$, running around a pulley, $e^1$, on the shaft *s*, to and around a pulley, $f^1$, on the shaft of drum $c^1$. The conveying or upper surface of the apron is kept from sagging by a series of friction-rolls placed underneath its edges, in connection with the cross-pieces $g^1$, to which the apron is attached, the pieces $g^1$ acting as drags to catch and carry the grain along. The spout *l* has two side pieces or boards, $h^1$ $i^1$, between which the conveyer carries the grain from the frame in rear of the sickles.

As heretofore constructed, the rear one of these side boards has been in line with the rear edge of the conveyer-apron, and the front one in line with the front edge thereof. As the screen keeps the grain in line with the rear side board $h^1$, the grain is transferred from the frame at this point to the spout without difficulty. At the front side, however, there is great difficulty in effecting this transfer satisfactorily, because as the cut ends of the heads fall over, they project more or less beyond the front edge of the apron, and catching against the end of the side board, they are arrested thereby, and the short straw, with its heads, piles up and accumulates, necessitating stoppage of the machine for clearance.

To remedy this I make a floored offset, $k^1$, in the spout, as seen at B, which shows a cross-section of the spout, and place the side board $i^1$ in line with the sickles, leaving a space between the apron and the side board, as shown in Fig. 1. As the heads must fall back of the sickle-edges, this construction of the spout obviates the liability to clog, and the solid floor beneath the auxiliary belt prevents the heads from dropping through and being lost, while at the same time it serves to sustain the belt and the weight of grain imposed upon it.

In connection with this offset I employ a belt, $l^1$, located at or near the center of the offset, and running around a loose roll, $m^1$, at the foot of the spout, and a pulley, $n^1$, on the drum-shaft at the top of the spout, this belt having teeth or projections $o^1$ on its outer surface. The belt moves in correspondence with the main conveyer-apron, and as auxiliary thereto, the ends of the heads catching against its projections $o^1$, and being thereby fed forward or kept from dragging on the offset $k'$. As before observed, the lower end of the conveyer-apron runs around rolls $a'$. As the conveyer stretches more or less by use, some provision is desirable for tightening it upon its pulleys or rolls. For this purpose I make the rolls $a^1$ adjustable in position as follows: Each roll runs on a shaft mounted in a small bearing-frame, $p^1$, which frame is supported by the adjacent beam, and runs in a slot or ways therein, as seen in plan and elevation at C. At the outer end of the sliding bearing is a screw-bolt, $q^1$, working into the bearing or into a nut fixed thereto, this bolt extending out through a plate, $r^1$, fixed to the end of the frame, the plate forming a seat for the head of the bolt.

By turning the bolt the bearing may be brought toward or carried from the end of the frame, and the apron will be thereby tightened or made loose, as will be readily understood.

To prevent straw from winding about and clogging the rolls, I apply to each frame $p^1$ a scraper or "doctor," $s^1$, the edge of which, being brought close to the surface of the roll, removes therefrom all material having a tendency to adhere thereto.

The axle of the reel *i* has at each end, and at its center, a hub, $t^1$, from which spring the spokes which sustain the cross-pieces $u^1$, that act upon the grain. As the reel has necessarily to be very light in structure, these parts are all slight; and to stiffen the reel I combine with it an interior truss, as follows: To each end hub $t^1$, I secure one end of a rod, $v^1$, and from the ends to the center I incline each rod, fastening it at the center through a center spoke, or preferably through a ring, $w^1$, fastened to the spokes, thus making, with each rod and the reel-shaft, a triangular truss, supporting the reel at its center, and thereby strengthening it throughout.

The reel-shaft bears at one end a pulley, $x^1$, which, by means of a band, $y^1$, is connected to and driven from a pulley on the shaft *f*, the band running over guide sheaves or pulleys, as seen at Fig. 4, these sheaves being preferably made adjustable, as shown, for the purpose of taking up any slack in the band.

Each bearing-rail of the reel is pivoted or fulcrumed on an upright, $a^2$, and its rear end is bolted to a post, $b^2$, in which post is a series of holes for the reception of a bolt, $c^2$, the bolt extending through a slot in the rail, this slot, the bolt, and the bolt-holes enabling the rear ends of the bearing-rails to be adjusted as to height so as to raise and lower the reel relatively to the sickle-bar, and confine it in proper position.

$d^2$ denotes the draft-pole of the header, connected loosely to the rear beam of the frame *a*, in the ordinary manner. At its rear end this pole is supported by a steering-wheel, $e^2$, the axis of which is mounted in bearings in a fork, $f^2$, depending from the bottom of a vertical shaft, $g^2$, turning in a sleeve, $h^2$, fixed to the pole, the shaft having at its top a tiller, $i^2$, for turning the wheel. This steering-wheel has generally been placed directly under the pole, the shaft $g^2$ running up through and turning in the pole. This is objectionable, because the wheel has either to be made too

small for practical use, (in order to bring the front of the pole down low enough,) or the front of the pole has to be carried too high. To obviate this I carry the axis of the wheel out beyond the rear of the pole, and make the vertical bearing or sleeve for the tiller post or shaft in the end of a cap-piece secured to and projecting beyond the pole, being thereby enabled to drop the pole down below the top of the wheel, as seen in Fig. 2.

The weight of the front of the main frame carries the sickle-bar into position with respect to the heads of the grain to be cut, and the front of the frame is maintained at proper height by a lever or pole, $k^2$, bolted to the main frame, and extending rearward over the pole $d^2$, in position with respect to which it is confined by a latch mechanism which bolts the front end of the lever to a post, $l^2$, on the pole $d^2$. The post $l^2$ has generally run up at the side of the lever $k^2$, and having notches into which a latch or pawl on the lever slipped; and as these notches soon become worn, and the latch or pawl is constantly slipping therefrom, letting the sickle-bar to the ground, some device is necessary which, while locking the lever and post positively in connection, shall be capable of quick or instant disconnection to raise or lower the sickle-bar.

For this provision I apply to the front of the lever a metal box, $m^2$, directly through which the post $l^2$ passes, as seen in Figs. 1 and 2, and at D, which shows the interior of the box.

In the rear side of the post $l^2$, I make a series of holes, $n^2$, and in the front of the box $m^2$, I insert a spring-bolt, $o^2$, which springs into either of the holes $n^2$, opposite to which it may be brought, and which is drawn therefrom to raise or lower the sickle-bar by pressure on a finger-lever, $p^2$. By this means the lever is always locked in some position, excepting when it is being purposely raised or lowered for adjustment of the sickle-bar.

Running through the box $m^2$ is also seen the shipper-rod $q^2$, or an attachment thereto, for operating the shipper-lever $r^2$, for throwing the pinion $e^2$ into or out of connection with the driving-gear $d$, this pinion communicating movements to the sickles, reel, and conveyer, as before described.

The spout $l$ is attached to the frame $a$, so that its upper end may rise and fall with respect thereto, the upper end of the spout resting on the grain-receiving wagon.

The belt $d^1$, which connects pulley $e^1$ on shaft $s$ with pulley $f^1$ on drum $c^1$, which drives the conveyer, is rendered more or less loose, as the conveyer is raised and lowered, or tips relatively to the frame $a$. To keep it tight upon its pulleys, so that it may not slip thereon and fail to drive the conveyer-apron, I apply to the belt a self-adjusting binder-pulley, as follows: This pulley (seen at $s^2$ in Fig. 1, and at E, which shows it in elevation in connection with the main belt-pulley) is mounted on an axis fixed to the end of one arm of a bent lever, $t^2$, which lever is fulcrumed to a projection extending from the frame $a$. The upper arm of the lever slides on a rod, $u^2$, around which is a spring, $v^2$, the stress of which forces out the lever-arm, and, as will be readily seen, presses down the binder-pulley against the belt, the stress of the spring being sufficient at all times, or under all changes of position of the spout, to keep the belt sufficiently taut to drive the conveyer-pulley.

The divider-board, which separates the grain to be cut from the adjacent stalks, is seen at $x^2$, it being fastened to the front beam of the frame and to the post $a^2$.

As the grain in line with the divider is sometimes entangled, or more or less broken or thrown down, I hinge to the under side of the board a swinging arm, $y^2$, which can be thrown from its position under the divider-board (seen in dotted lines in Fig. 1) out from the outer edge of the board, as seen in Fig. 1, this extension insuring the division of the grain-heads, so that all the cut heads will be thrown over upon the conveyer. When the heads are straight, however, this arm is not required or wanted, and it is then folded under the divider-board.

In connecting the cross or bearing beams of the main frame or carriage to the main beams, I employ metal socket-plates $z^2$, constructed and applied as follows: Each plate $z^2$ has in one face a socket, $a^3$, as seen at E, which represents a section of the socket and beams, and a view of the socket-face, this socket being made of a size to fit and receive the end of the beam, surrounding the four sides thereof. The opposite face of the socket has two lips, $b^3$, at its upper and lower edges, these lips fitting over and embracing the front beam of the frame $a$.

Holes are made through the socket, as seen at E, and through the main beam. Through each of these holes, and into the end of the cross-beam, a screw or screw-bolt, $c^3$, passes, as seen in the section at E.

By this device it will be seen that the beams do not depend upon the bolts alone to brace them and keep them from displacement or from loosening, but that each cross-beam is supported in position relatively to the main beam, and secured from lateral and vertical play by the socket-piece.

A similar socket-piece may be applied to the pole to secure it to the whiffletree, as seen at Fig. 1.

I claim—

1. Fulcruming the lever which actuates the sickle-bar at or near its center by means of a movable lever, and driving it by a link connected at the rear of the frame with the driving mechanism, which is located outside of the frame.

2. Pivoting the sickle-bar lever to a laterally-movable or vibrating lever, substantially as and for the purpose set forth.

3. The combination of the floored offset $k^1$

and its side board $i^1$ with the auxiliary belt and main belt of the spout.

4. Combining with the conveyer-rolls $a^1$ the clearers $s^1$, substantially as set forth.

5. Combining with the reel $i$ the truss-wires attached to a central ring, and to disks or hubs at the opposite ends of the axle, substantially as set forth.

6. Combining with the frame or carriage-lever $k^2$, and with the post $l^2$, the box $m^2$, with its spring-bolt $o^2$, springing into the holes $n^2$ of the post $l^2$, and withdrawn therefrom, substantially as described.

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