(No Model.)

3 Sheets—Sheet 1.

E. McDONALD.

THRASHING MACHINE.

No. 446,234. Patented Feb. 10, 1891.

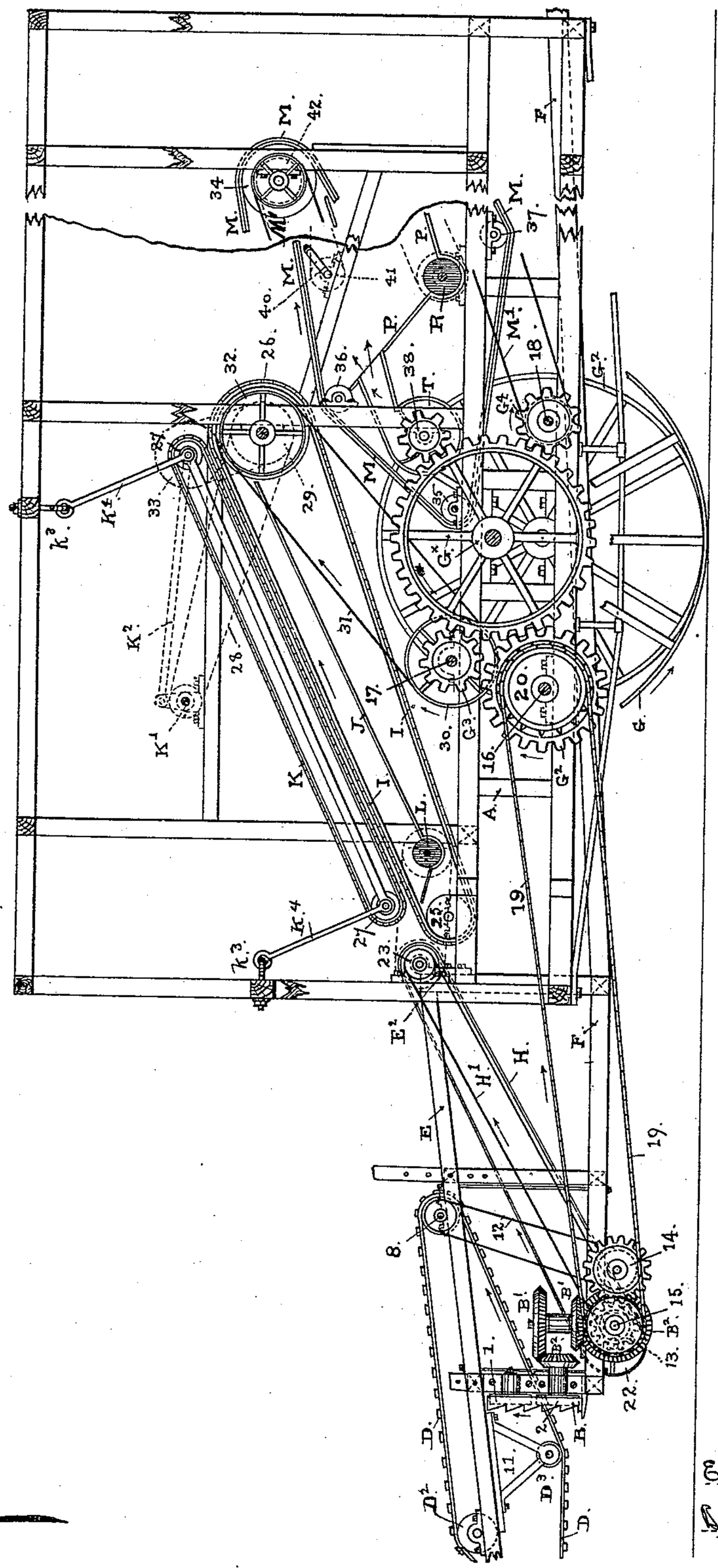

Fig. 1.

Witnesses:

Wm. Mayer

J. E. Ford

Inventor:

Edwin McDonald

By Prindle & Adams

his Atty's.

(No Model.)

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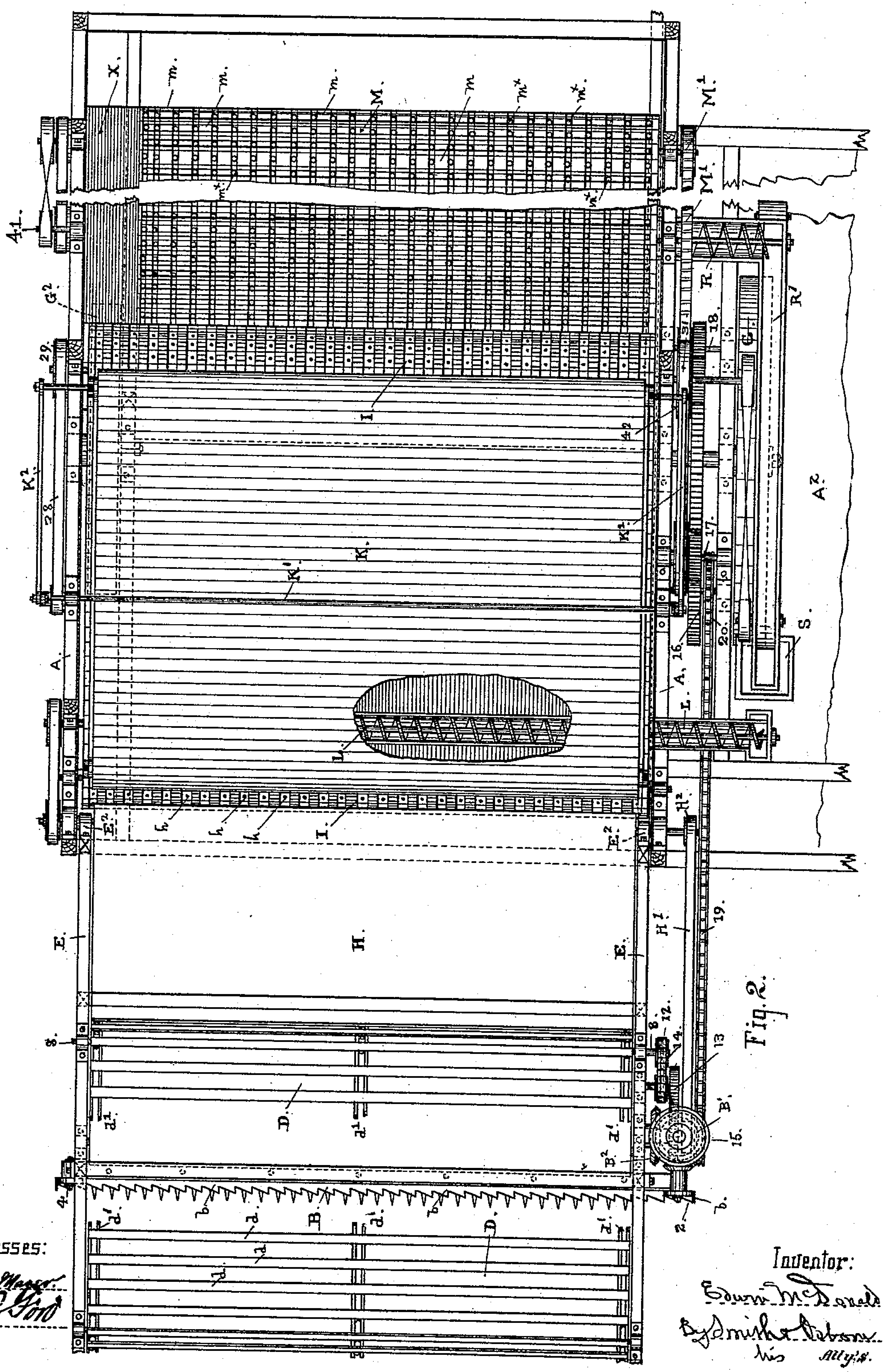

Fig. 2.

Witnesses:

Wm. Mager.
J. G. Ford

Inventor:

Edwin McDonald
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his Atty's.

(No Model.) 3 Sheets—Sheet 3.

E. McDONALD.

THRASHING MACHINE.

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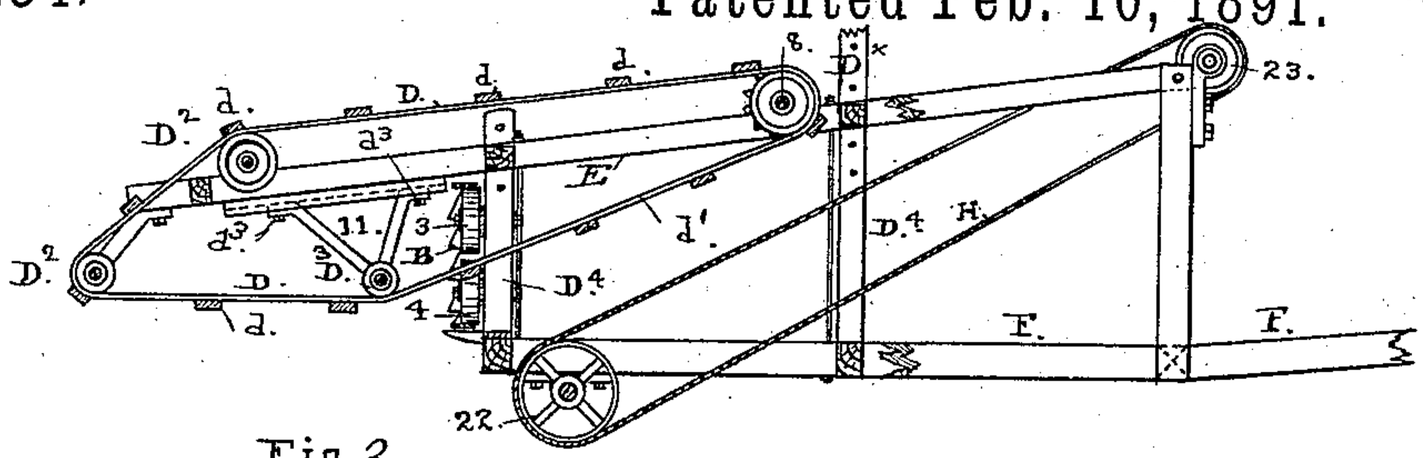


Fig. 3.

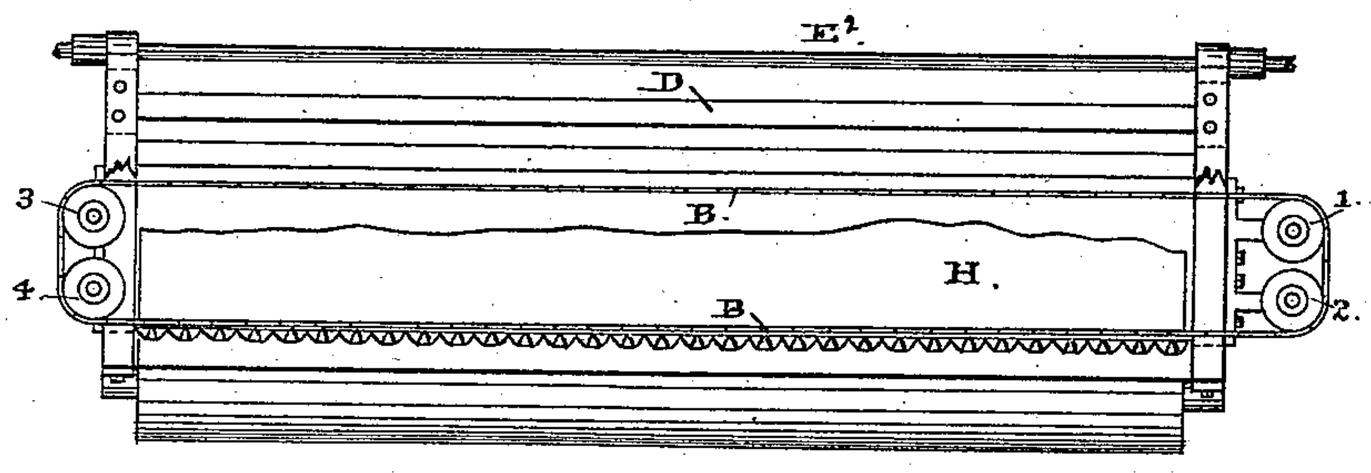


Fig. 4.

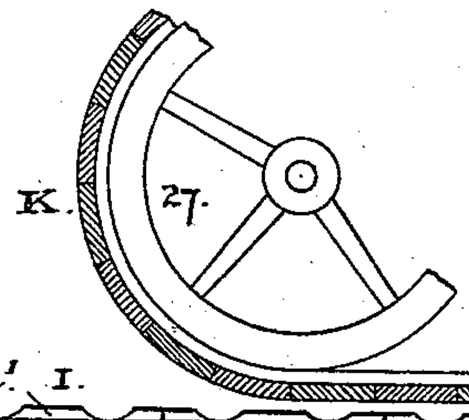
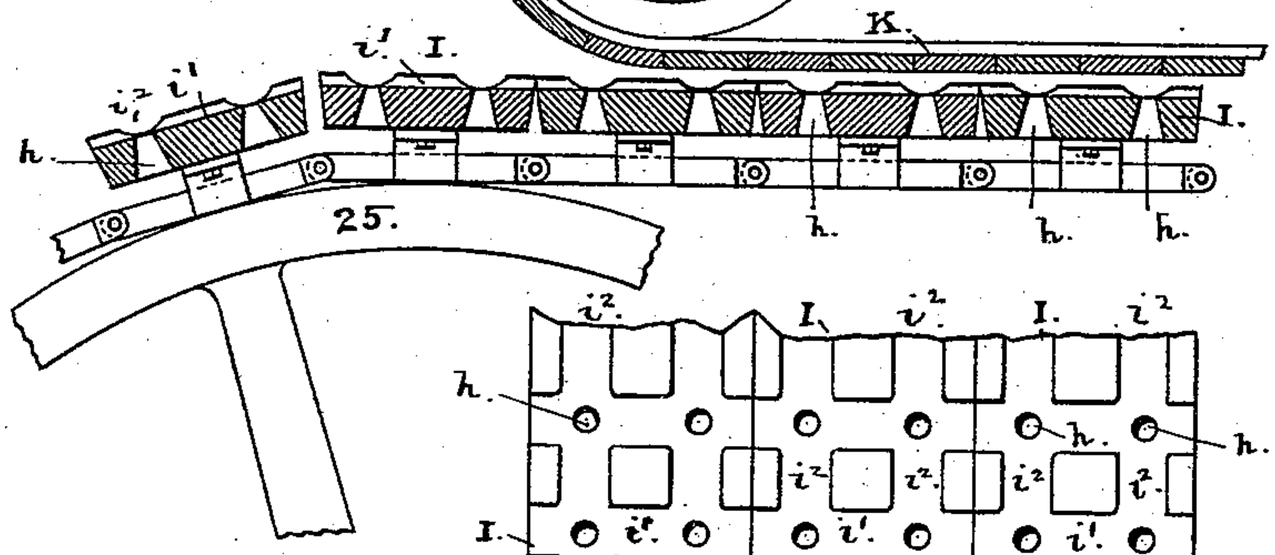


Fig. 5.



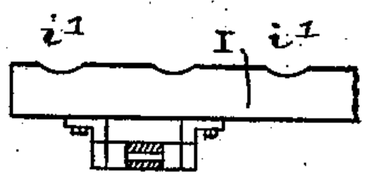


Fig. 7.

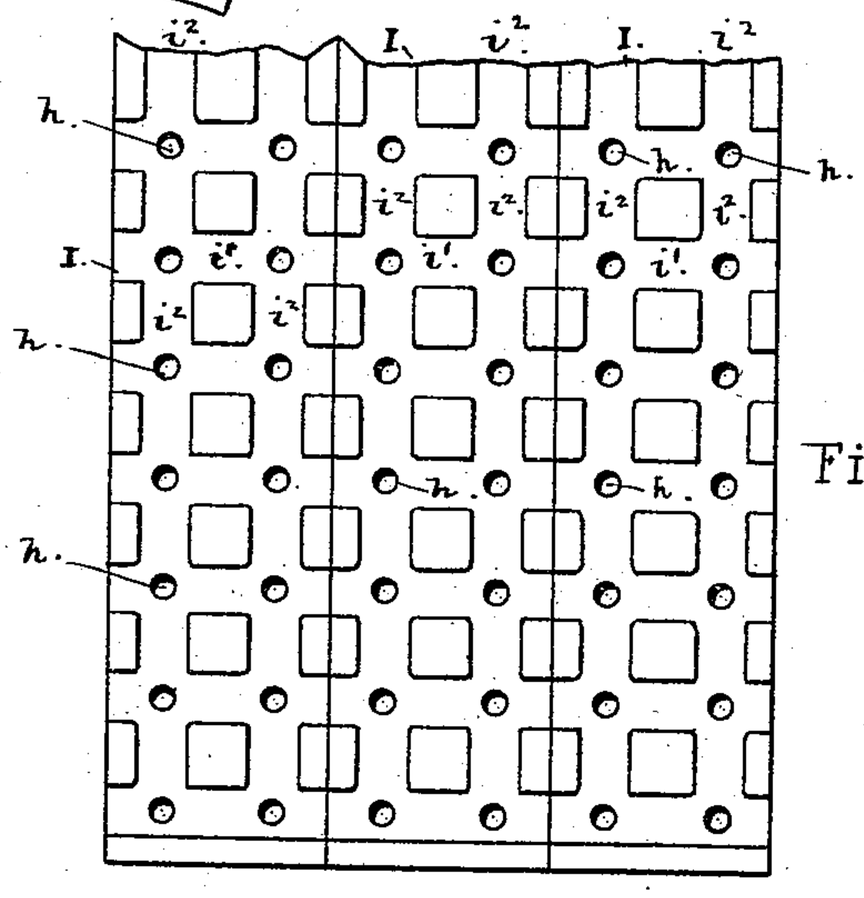


Fig. 6.

Witnesses:

W. Mayer.

J. E. Ford

Inventor:

Edwin McDonald

By Smith & Osborn

his Atty's.

UNITED STATES PATENT OFFICE.

EDWIN McDONALD, OF WILLOW, CALIFORNIA.

THRASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,234, dated February 10, 1891.

Application filed October 11, 1889. Serial No. 326,713. (No model.)

To all whom it may concern:

Be it known that I, EDWIN McDONALD, a citizen of the United States, residing at Willow, in the county of Colusa and State of California, have invented certain new and useful Improvements in Thrashing-Machines, of which the following is a specification.

My invention relates to improvements in the thrashing apparatus of combined harvesting-machines that are constructed to cut, thrash, separate, and sack the grain at one operation; also, to improvements in grain-separators for such machines, and also to the production of a combined machine having several novel points and features of operation, all as hereinafter fully described.

The claims in the present application are confined to the thrasher; but description and illustration of the header are given in order to show the operation of the thrasher in connection therewith. The construction of these parts and the combination with them of the necessary mechanism for operating them is explained in the following description, in which the accompanying drawings are referred to by figures and letters.

Figure 1 is a side elevation, and Fig. 2 is a top view, of the principal parts of a machine embodying my invention, with portions in section, and also broken away in part at both ends in order to bring the figures within the limits of the drawings. Fig. 3 is a side elevation of the sickle and reel on a larger scale. Fig. 4 is a view of the same parts from the front of the machine. Figs. 5, 6, and 7 show details of the thrashing-apron, of which Fig. 5 is a vertical section through the parts at the front or feeding-in end, and the remaining figures are top and transverse sectional views, respectively, of the thrashing-apron bars.

In this machine the sickle is an endless chain or belt B, carried by wheels or pulleys 1 2 3 4, across the front end of the machine-frame, and the reel D is of like endless character. That portion of the sickle which runs under the bottom carriers 2 4 is the acting portion and is pressed against the standing grain as the machine advances. The reel is arranged to travel through the space between the top and bottom lines of the endless sickle in such manner that the slats of which it is formed strike the heads of grain and throw them toward the cutters. The cutters *b b* are set on the outer edge of the sickle-belt and have inclined cutting-edges and straight backs.

D is the endless reel, formed of spaced slats *d d* on carrying-belts *d' d'* and mounted in a frame E upon pulleys D^2 D^3, &c. The reel-frame is adjustable vertically for the purpose of setting the bottom line or acting portion of the reel higher or lower, it being movable upon the uprights D^4 D^4, to which it is secured by bolts or other suitable fastenings. The uprights are parts of the sickle-carrying frame F, which is itself attached to the main frame A at the points E^2 E^2 by hinge-joints. The hangers 11, carrying the pulleys D^3, are movable and can be shifted forward or backward to bring the line of the reel into different working position with relation to the sickle. The hangers are held by bolts and nuts d^3. The shaft 8 is driven by the belt 12 from the pulley 14, which is fast on the shaft of one of the two gears 13, the other gear being itself driven from the shaft 16 through the medium of the chain belt 19 and sprocket-wheel 20. The three shafts 16, 17, and 18 receive their motion from the master-wheel G through the large spur-wheel $G^\times$, fixed on the wheel, and the drivers G^2 G^3 G^4. From this train of gears are actuated the sickle, reel, thrasher, and separator. The shaft 15 also gives motion to the driver 2 of the sickle, it being geared into the sickle-driver by the bevel-gears B' B^2, as seen in Fig. 1. From the same shaft 15 is also operated an endless apron or draper H, of the usual construction, between the rear line of the sickle and the receiving end of the thrashing apparatus. The office of this draper is to carry the headed grain away from the sickle and deliver it into the thrasher, and it is operated by rollers 22 23 and belt and pulleys H' H^2, the pulleys being fixed on the short shaft 15 and the axle of the upper roller 23. This roller is placed at the pivot on which the sickle-frame moves in the main frame.

The aprons I K constitute the thrashing apparatus and take the place of the well-known rotating cylinder and stationary concave. Both aprons are formed of bars or thick slats of wood closely jointed together to run smoothly around carrying-wheels 25,

26, and 27, and one apron sets closely upon the other, as shown on Figs. 1 and 5. The bars of the lower apron I are grooved both longitudinally and transversely, the channels i' and i^2 running at right angles to each other, and at their intersection are perforations h, extending through the bars, which are of sufficient size to let through small seeds without allowing the grain to pass. The top apron is formed of bars without grooves and perforations and with flat acting faces of ordinary smoothness. Both aprons travel in the same direction and set at the same degree of inclination; but the top apron moves more rapidly than the lower apron, and in addition to the longitudinal progression the top apron has a longitudinal vibratory rubbing movement at the same time. The apron I is moved from the shaft 17 by the pulleys 30 32 and the belt 31, and the top apron is run by belt and pulleys from the top carrier 26, as seen in Fig. 1. The vibratory motion of the top apron is produced from a crank-shaft K′, driven by pulleys and the belt 28 and connected to the upper end of the apron at both sides of the frame A by the rods K^2, the apron being suspended from eyes k^3 k^3 overhead by links K^4. These aprons are the full width of the sickle, and, being set directly behind it and in line with the lay of the headed grain, it will be seen that the heads are operated on just as they fall from the sickle without being turned to one side or bunched together.

It should be mentioned that the apertures h in the bars of the lower apron are not essential to the thrashing operation in this apparatus, but are only intended to discharge small seeds and other foreign matter from the grain while it is passing upward to the separator. To catch and carry away this matter the stationary bottom J is set under the acting portion of the lower apron, with suitable pitch toward the front end, and the conveyer L is placed at the bottom of the incline, with a conductor discharging at the side of the machine.

The separator M is an endless apron formed of hinged or jointed bars m m, with their faces grooved the same as the bars of the thrashing-apron, and also perforated at the intersections of the grooves. In these bars, however, the apertures $m^\times$ are of suitable size to let the grain pass through. The apron M is carried on pulleys 34 35 36 37 and is run from shaft 18 by the belt M′ and pulleys 42 42. The apron is carried around the four rollers for the purpose of leaving suitable amount of space under the top or acting portion, which extends from the pulley 36 to the pulley 34, just under the tail end of the thrashing-apron, in which space are located the inclined grain-boards P and the fan T. A beater 40 is placed under the top surface of the apron to strike or vibrate the apron during its progressive movement, so that an additional shaking motion is given to the separator by such means. The beater is a shaft extending across the frame under the apron and provided with short arms that strike against the backs of the bars as the shaft revolves. Motion is given to the shaft by a pulley 41 and a belt running to it from a small pulley on the top roller-shaft.

A conveyer and conductor R at the bottom of the inclines P carries off the separated grain to the side of the machine, this conveyer being connected with an elevator R′, that delivers the grain to a hopper S on a platform A^2, which is provided for that purpose outside the main wheel G, and on which is afforded also room for a man to sack and tie. This hopper is of usual construction, with spouts for filling several sacks at once.

The fan T is driven from the main gear by shaft and pinion 38, and its discharge-aperture is the full width of the shoe M, so that it delivers the blast in an upward direction across the entire acting surface over it.

All the various working parts and mechanism derive their power from the main wheel G, which is of greater diameter than the opposite wheel for that reason, and the two wheels are attached to their respective axles by slip-clutches in the usual manner. The off wheel G^2 being placed inside the line of cut, in order to clear the standing grain, is brought under the thrashing-apron, which requires to be of the same width as the sickle; but the separator M is brought inside the main frame, as shown in Fig. 2, and the difference in width between the thrasher and the separator at the off side is filled by the stationary inclined shield or board X.

For machines of ordinary size and capacity I consider it unnecessary to provide more than one separating-shoe, and the straw from the tail of this separator can be delivered directly upon a straw-carrier traveling across the machine and delivering at one side. It should be mentioned, however, that an additional separator may be set behind the one herein shown to operate further upon the straw and refuse before such matter is finally discharged from the machine.

The usual arrangement and connection of tongue and tiller for working the machine is employed, and the draft-animals can be placed behind or at the front and on the near side to travel over the cut grain.

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

1. In a harvesting-machine, an endless traveling-apron formed of hinged or jointed bars, with channels intersecting one another, and apertures through the bars at the intersections of said channels, substantially as described.

2. In a thrashing-machine, the combination of an endless traveling surface I, having perforations and set in an inclined position, and an endless traveling surface K, shorter than the thrashing-surface, mounted over said thrash-

ing-surface, having a vibratory motion in the direction of its travel, with the stationary bottom J and conveyer L, as set forth.

3. In a thrashing-machine, a separator-shoe formed of an endless traveling apron composed of bars with channels and perforations, as described, in combination with pulleys 34, 35, 36, and 37, for holding said shoe in the manner described, and with the fan R and stationary inclined grain-board P, located within the shoe, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

EDWIN McDONALD. [L. S.]

Witnesses:
CHAS. E. KELLY,
J. E. FORD.