No. 612,294. Patented Oct. 11, 1898.

J. E. WOOD.

THRESHING MACHINE.

(Application filed Dec. 11, 1897.)

(No Model.) 4 Sheets—Sheet 1.

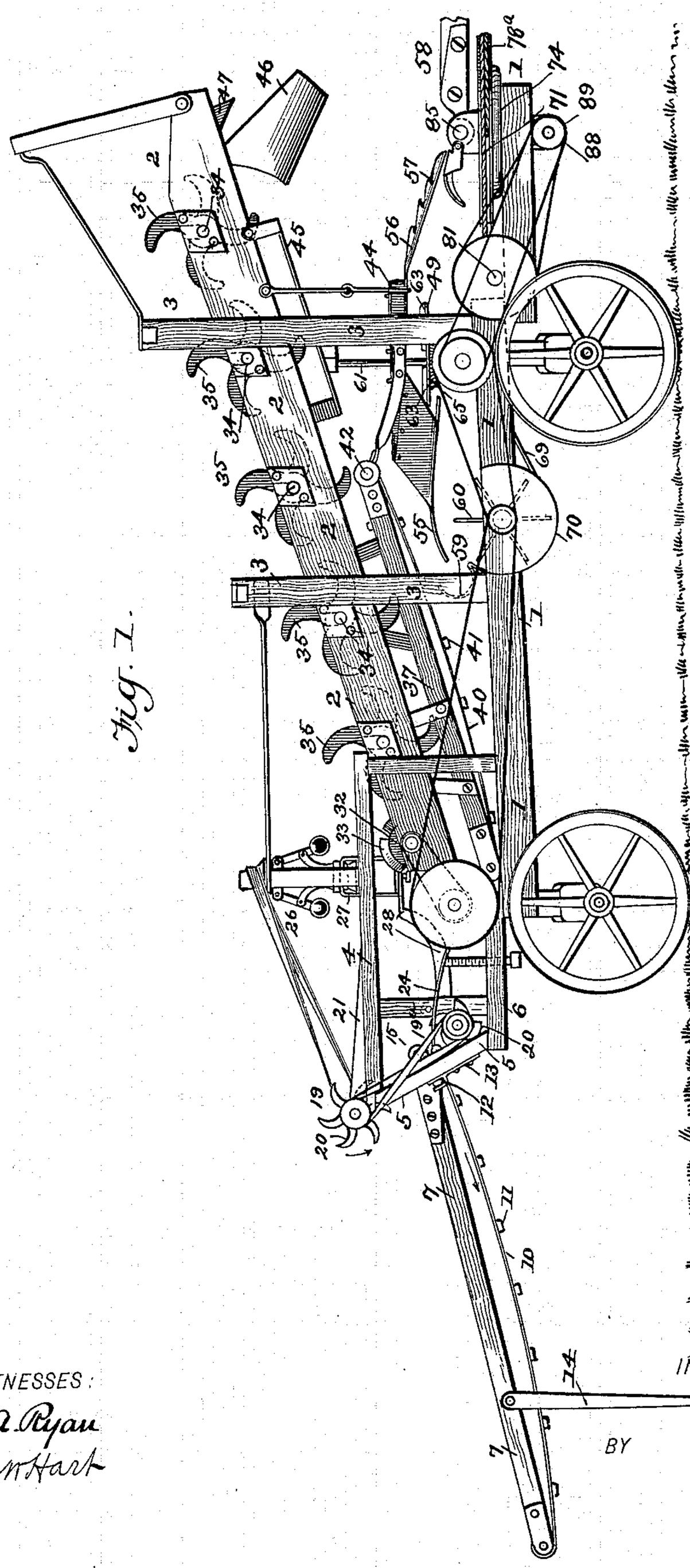

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

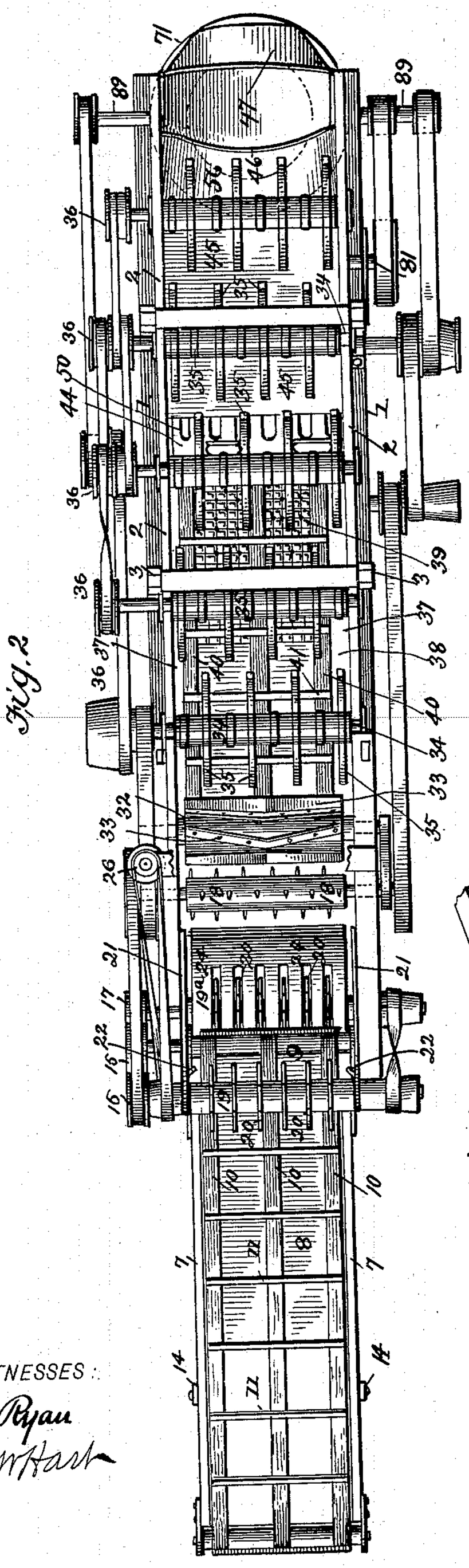

Fig. 2.

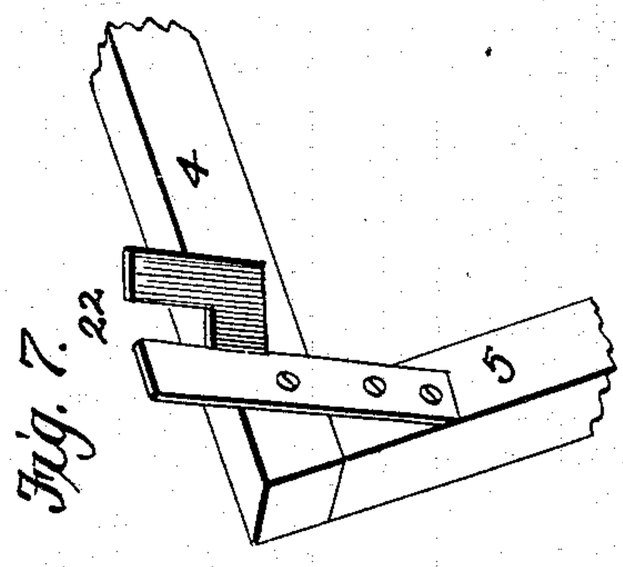

Fig. 7.

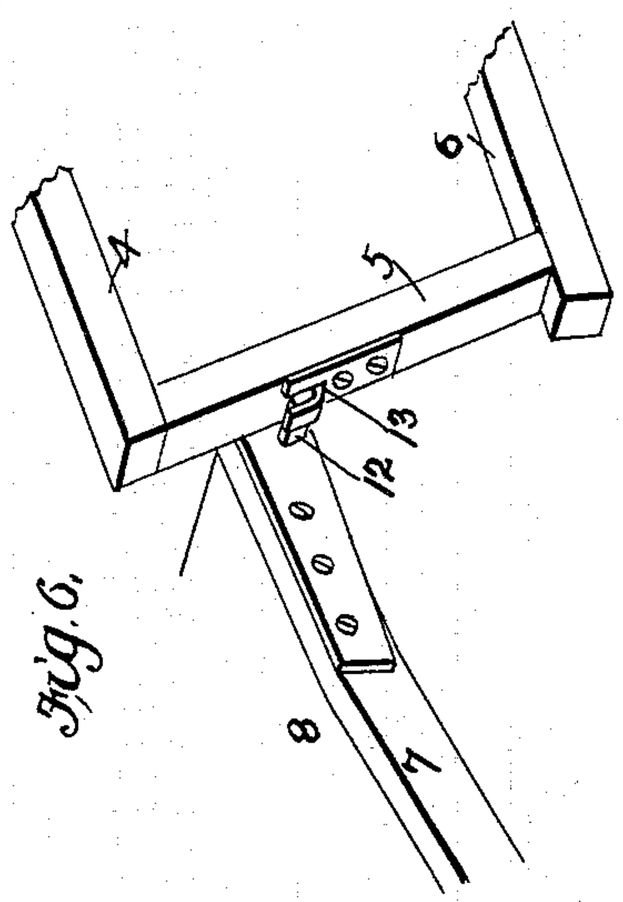

Fig. 6.

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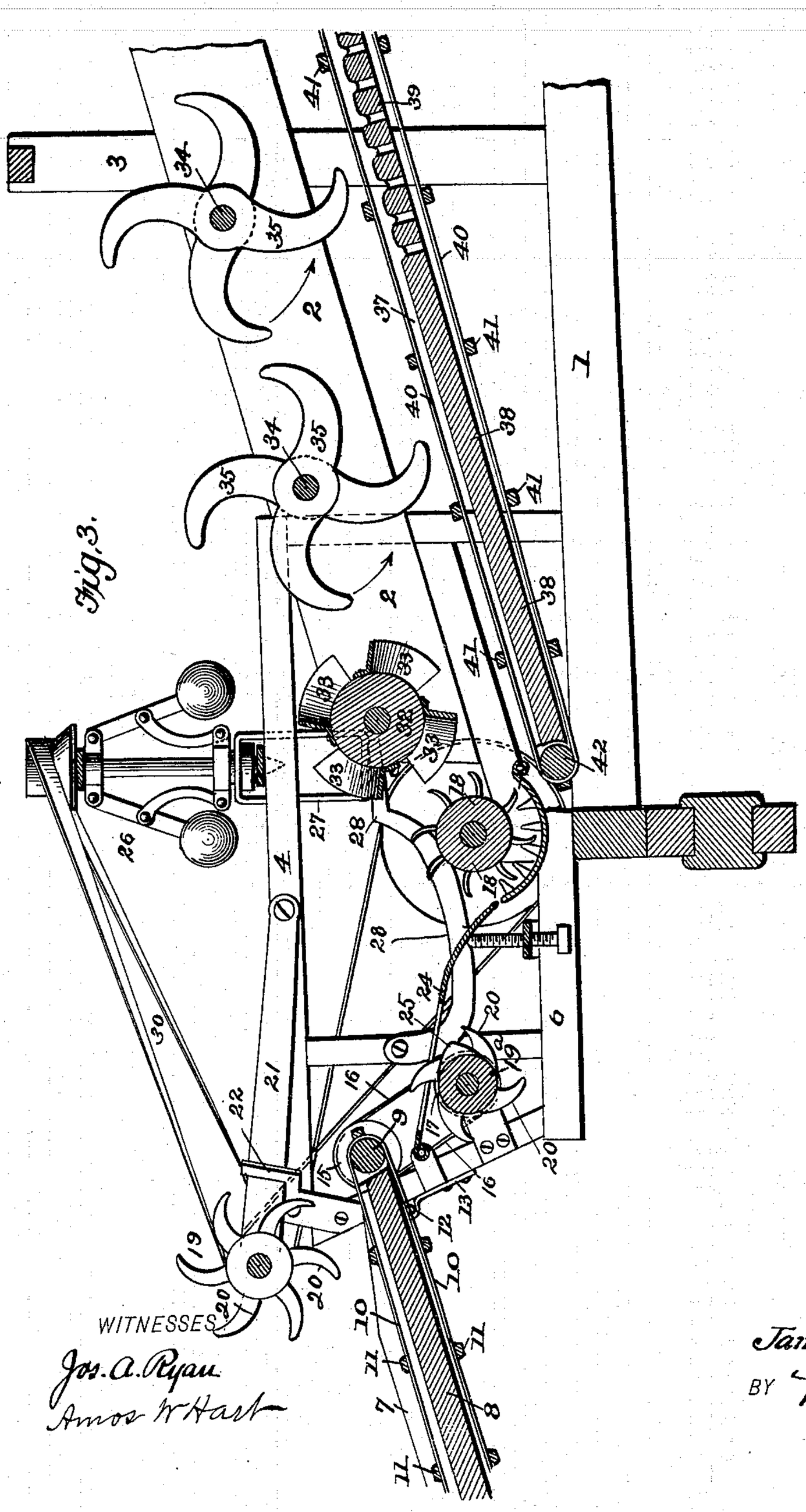
Fig. 3.



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(Application filed Dec. 11, 1897.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 4.

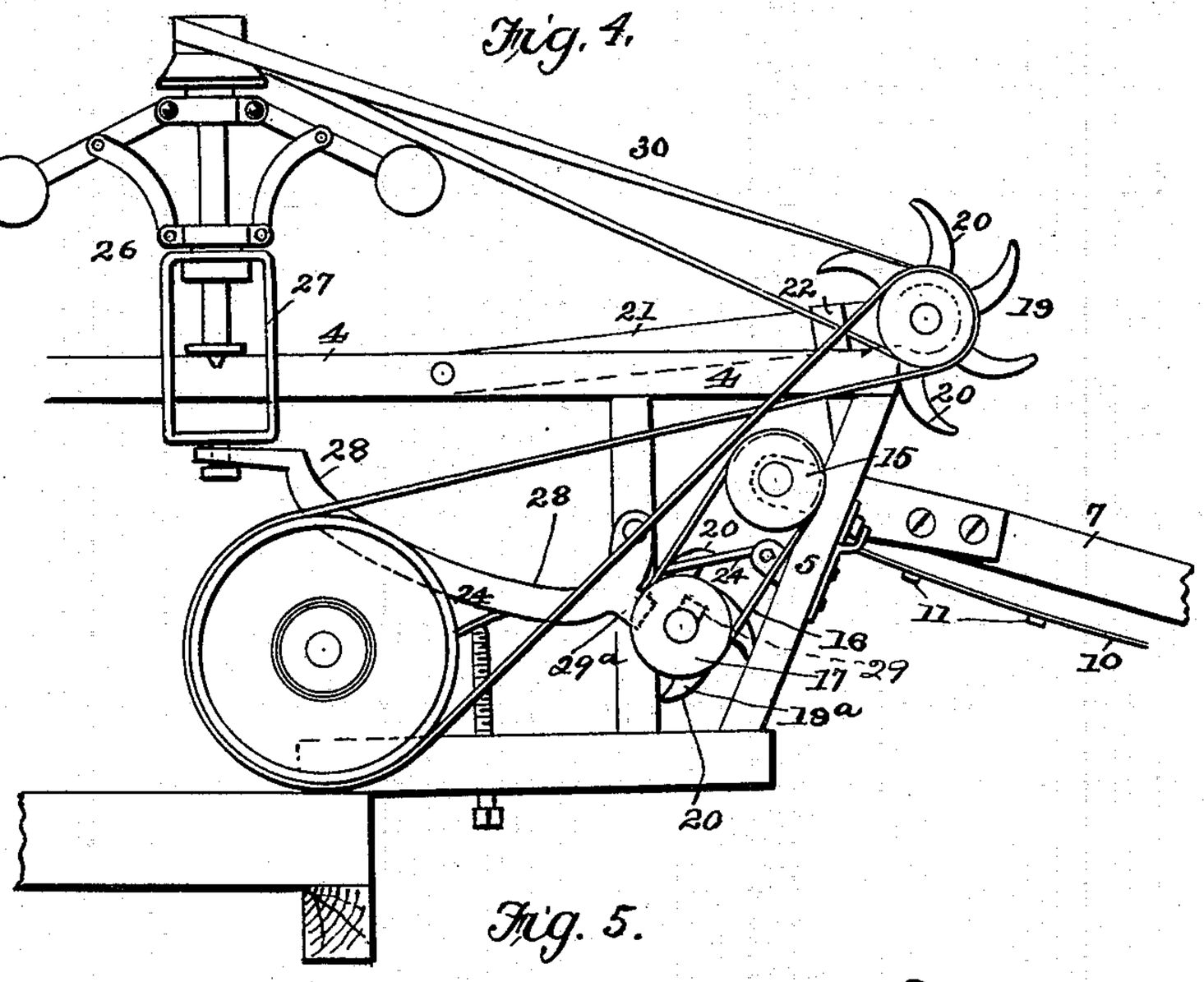
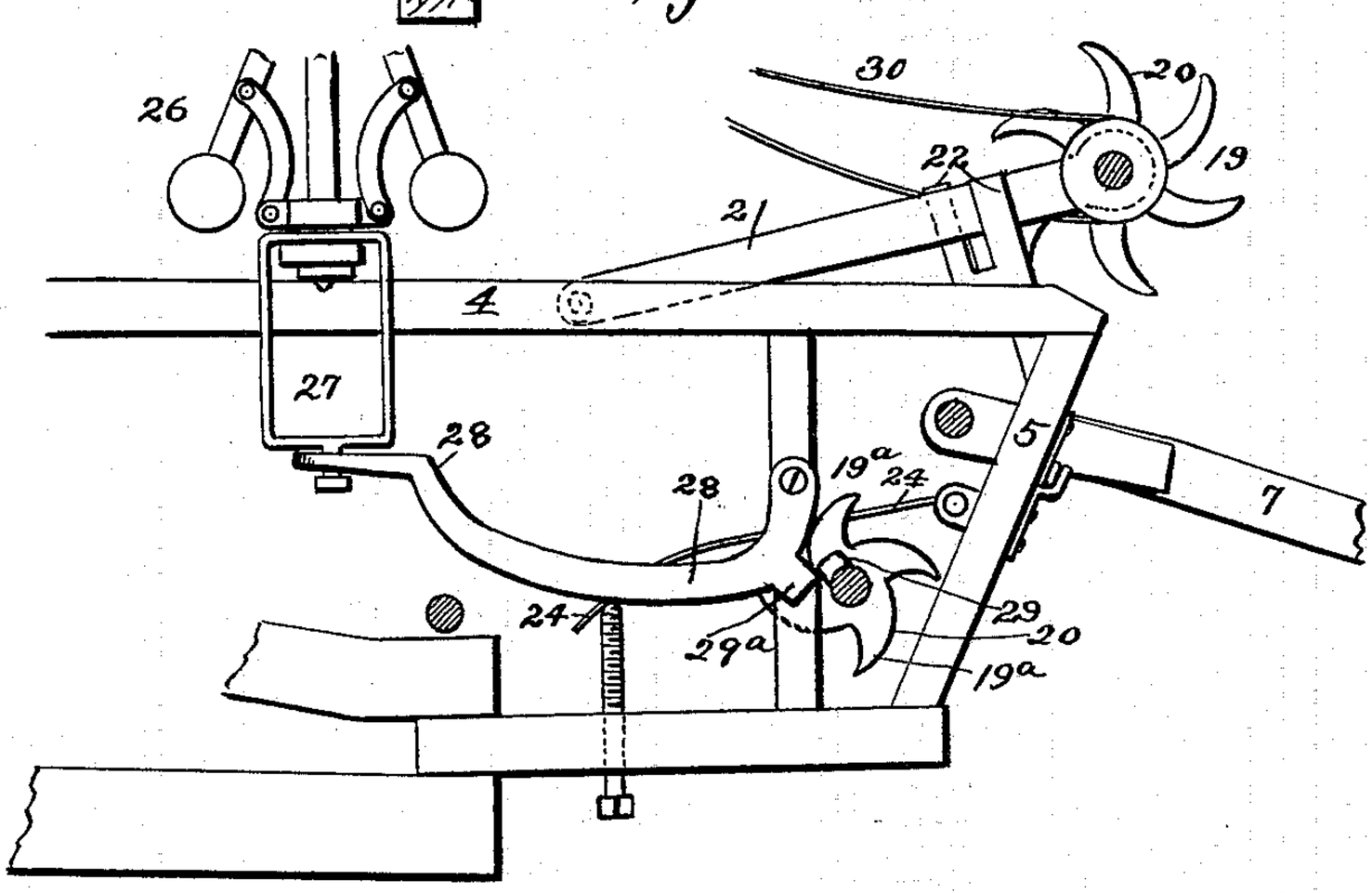


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES E. WOOD, OF HETLAND, SOUTH DAKOTA.

THRESHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 612,294, dated October 11, 1898.

Application filed December 11, 1897. Serial No. 661,502. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WOOD, residing in Hetland, in the county of Kingsbury and State of South Dakota, have invented a new and Improved Band-Cutter and Bundle-Feeder for Threshing-Machines, of which the following is a full and exact specification.

The invention includes certain novel features in the construction and combination of parts, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a side view of my improved machine, including other mechanism of a complete thresher. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal section of the front portion or half of the machine. Figs. 4 and 5 are side views of the portion of the machine showing the governor attachment. Figs. 6 and 7, Sheet 2, are respective views of the means for detachable connection of the feeder-frame with the main frame of the machine.

The frame of the machine is rectangular and oblong and includes a horizontal base portion 1 and an inclined top portion 2, which is supported by uprights or standards 3. Horizontal bars 4 extend from such inclines 2 forward to inclined supports 5. Said parts 4 and 5, together with horizontal extensions 6 of the base-frame 1, constitute the portion of the frame in which the band-cutter is arranged and to which the automatic bundle-feeder is attached. As shown in Figs. 2 and 3, the said feeder consists of a frame formed of longitudinal side bars 7 and an imperforate floor 8. A roller 9 is arranged at each end of this floor, and three endless belts 10, connected by cross-bars 11, run on said rollers, as shown. The upper ends of the bars 7 are provided with lateral ears 12, adapted to fit in brackets 13, Fig. 6, attached to the inclined frame-bars 5. This construction adapts the feeder-frame 7 to be detached from the thresher-frame proper when required. The said frame is provided near its outer end with pivoted legs 14, which serve to support it at any desired elevation. It will ordinarily, however, occupy an inclined position, as shown. The upper roller of the feeder is extended on one side and provided with a grooved pulley 15, (see Fig. 7,) over which runs a belt 16 from a pulley 17 on the shaft of the lower band-cutter.

The band-cutter includes two rotatable drums or cylinders 19 19ª, each provided with curved cutting-blades 20. The upper cylinder 19 is journaled in the outer end of two parallel arms 21, which are pivoted at their inner ends to the horizontal bars 4 of the supplemental frame. Said arms 21 are supported in brackets 22, Fig. 5. The lower cylinder 19ª of the band-cutter has extended journals working in suitable supports 23, Fig. 3. These cylinders act simultaneously to sever the bands of the bundles or sheaves passing, respectively, under and over them, as will be readily understood, and whatever bands are not severed by one are sure to be severed by the other. The upper cylinder 19 acts upon the bundles as they pass over the upper end of the feeder, whence they fall upon a table or plate 24, which is arranged over the lower cylinder 19ª and provided with slots through which the knives 20 of said cylinder project. For convenience of description and in view of its function I will hereinafter designate this table as the "vibrator." It is pivoted at its front end to the inclined frame-supports 5 and is free to move vertically at its inner end. For the purpose of oscillating or vibrating it vertically I employ a cam 25 on the cylinder proper, Fig. 3, which comes in contact with and raises the vibrator once in every revolution of said cylinder. The vibrator is inclined and curved slightly downward toward the threshing-cylinder 18, so that the bundles slide thereon and are delivered to the latter by the effect of gravity, aided by the vibration of the table 24. The threshing-cylinder 18 is provided with teeth and works in a toothed concave in the usual way. For the purpose of regulating the feed or delivery of the grain to such cylinder I employ a ball-governor 26, which is mounted on the frame 5 and with the adjustable sleeve 27 of which is connected a lever 28, that serves to lock the cylinder or shaft of the lower band-cutter 19ª whenever the feed is excessive. The shaft or cylinder 19ª is for this purpose provided with a radial lug or projection 28, that is adapted to engage the

lug 29ª on the lever 28 when the latter is lowered by fall of the governor-balls. The governor is run by a belt 30, Fig. 7, from the upper band-cutter shaft 19, and when the latter is raised by accumulation of a larger number of bundles such belt 30 will obviously become slack, as shown in Fig. 8, and the rotation of the governor will be thereby arrested, so that the balls fall and cause the lever 28 to lock with and stop the lower band-cutter, and since the feeder is run by the belt 16, Fig. 7, from the shaft of the lower band-cutter it is evident the feeder will be arrested at the same time.

I employ a beater, Figs. 2 and 3, which is arranged diagonally above and back of the threshing-cylinder 18 and performs the usual function of knocking loose grain out of the straw and at the same time aids in forcing the latter forward. The beater consists of a cylindrical body 32, which is provided with a number of radial flanges 33, that are constructed in two straight sections that stand at an obtuse angle to each other, the angle being at the middle of the length of the cylinder 32, and when the beater is rotated the outer side of such angle strikes first upon the straw and tends to separate it and force the divided portions laterally, so as to spread it at the same time it is fed to the pickers and grain-carrier, now to be described.

The pickers are arranged in sets, preferably five in number, each consisting of a transverse shaft 34 and numerous curved fingers 35, fixed radially thereon. The shafts 34 are all journaled equidistantly in the inclined upper frame 2 and provided at one end with pulleys 36, on which belts are suitably arranged for rotating the pickers simultaneously in the direction of the curve of the fingers 35, as indicated by arrows.

Beneath and parallel to the plane of the beater and the several sets of pickers (see Figs. 1 and 3) is arranged a grain-conveyer and preliminary chaff-separator. The frame of the same consists of parallel side bars 37 and a connecting-floor, which is imperforate in its lower and middle portion 38, while its upper third 39 (see Fig. 4) is provided with intersecting transverse and longitudinal grooves and with perforations at the points of intersection of said grooves.

The means for moving mingled grain, chaff, and straw over such fixed floor consists of a traveling carrier which is formed of endless belts 40, connected by cross-slats 41 and running on rotary shafts or rollers 42, arranged at the ends of the floor 38 39, as shown. The upper one, 42, of said shafts is extended laterally and provided with a pulley for application of a driving-belt.

The endless conveyer forces the commingled grain and chaff up over the floor 38 39 and off the upper end of the same upon a sieve 44 to the separator proper, while the finer portion of the chaff is interrupted by the corrugated surface of the board and passes down through the perforations in the same.

Beneath the upper two sets of pickers 34 is arranged an inclined imperforate board 45, which is separated from the grain-conveyer before described, but in the same plane therewith. It serves to convey downward and deliver upon the separator such small portion of grain as may remain in and be dislodged from the straw just previous to its delivery to the straw-carrier by means of the chutes or guides 46 47, arranged at the upper end of the inclined frame 2.

The grain-separator consists chiefly of two parts—namely, a fixed sieve 44 and a rotary sieve 49, which latter is arranged directly beneath the former. The fixed sieve 44 (see Figs. 4 and 5) is constructed of a thin metal plate having numerous transverse slots 50 and a series of transverse slots or divisions 51, that extend nearly the entire length of the sieve. The latter is further provided with a series of short transverse vertical flanges 52, which have practically the function of baffle-plates, since they interrupt the passage of mingled grain and chaff over the sieve, so that a more perfect separation is assured. The said sieve is secured upon parallel side bars 53, which are rigidly connected at their front ends by sheet-metal grain chutes or guides 54 and 55 and at their rear ends by a sheet-metal straw guide or chute 56. The latter has a series of perforations at its front end, and its rounded or rear end is provided with outwardly-inclined teeth 57, as shown. This chute 56 delivers upon the carrier or stacker 58 any short straw or chaff that passes off the sieve 48.

The grain-chute 54 is arranged beside and in practically the same plane as the rotary sieve 49 and is curved or inclined slightly downward at its front end, Fig. 4, which overlaps the chute 55. The latter extends farther forward and is similarly curved downward. Thus grain passes off chutes 54 upon the lower chute 55, which delivers it into a transverse trough 59, arranged in front of the rotary fan 60. The blast from the latter acts to draw air between the chute 55 and trough 59 and to force a blast up through the rotary and fixed sieve, as will be readily understood. The rotary sieve 49 is a circular metal plate fixed on a vertical shaft 61 and having short diametrical slots 62, also a series of curved flanges 63, which are secured on the upper side of the plate and radiate from points near the shaft 61. The latter is journaled in parallel cross-bars 64, arranged between the base 1 and inclined portion 2 of the main frame. The shaft 61 is provided with a bevel-gear 65, that meshes with a similar one, 66, on a horizontal shaft 67. This shaft is provided with a pulley 68 on its outer end for application of a driving-belt. It is apparent that mingled grain and chaff not fully separated by the fixed sieve 44 may pass through the

same onto the rotary sieve 49, which will complete the separation. The grain falling upon the inclined chute 69 is delivered to a trough or conveyer 70.

The straw-stacker proper, 58, is hinged to a rotary platform 71, which is annular in form and provided with an exterior circumferential groove 73 on its front side. It is adapted to rotate on a fixed annular grooved bed 74, in which antifriction-balls 75 are placed. Said bed 74 is located upon a rear extension of the base-frame 1. Adjacent to the annular bed 74, on the inner rear side of the same, is a fixed vertical spindle or journal 76, on which is mounted a rotatable sleeve 77.

The means for rotating, or, more properly, oscillating, the stacker-platform 71, and thereby the entire body of the stacker, are cords 78[a], a fixed clutch-section 79, slidable clutches 80 80[a], and a shaft 81.

The cords 78 78[a] are arranged in the groove 72 of the platform 71 and permanently secured to the same at one end and to the clutch-sleeves 80 80[a] at the other ends. The said sleeves 80 80[a] are adapted to normally slide and rotate free on the rotary shaft 81; but when engaged with the fixed clutch-section 79 they are locked with said shaft, so as to rotate with it. The sleeves 80 and 80[a] are rigidly connected by a device 82, which is operated by a pivoted lever 83, so that they may be brought alternately into engagement with the fixed clutch-section 79. It will now be apparent that when one sleeve, say 80, is thus engaged the cord or rope 78, which is attached thereto, will be wound on it, thus turning the stacker-platform 71 to the side in which such cord is applied. Contrariwise when the device 82 is shifted by the lever 83 and the other sleeve, 80[a], locked with the clutch-section 79, the other cord will be wound on the sleeve 80[a], and thereby rotate the stacker in the opposite direction. It is obvious that as one cord, 78, is wound on the sleeve 80 the other cord, 78[a], is unwound from the other sleeve 80[a], and vice versa.

The function of the spindle 76 and antifriction-sleeve 77, before described, is to hold the annular stacker-platform against the tension or pull of the cord 78 78[a], and yet allow the platform to rotate freely.

The aforesaid lever 83 is operated automatically to shift the clutch-sleeves, as described, by means of a loose connection with the stacker-platform 71, which is effected by a chain 84, Fig. 4. Thus when the platform reaches the proper or assigned limit of its rotation in one direction the chain is put under such tension as to shift the sleeves 80 and 80[a], so that they are respectively engaged with and released from the fixed clutch 79 and the platform thereby caused to begin rotation in the opposite direction. The stacker is continually and automatically shifted or oscillated so long as the thresher is in operation.

The circular flange 73 and fixed spindle 76, before described, serve to hold the platform 71 in due concentric position on the annular antifriction-bed 74. As a means for holding the platform 71 down on said bed 74 I employ the following mechanism: A rotary shaft 85 is journaled in vertical ears on the platform 71 and arranged diametrically thereof, as shown in Figs. 4 and 5. On the center of such shaft is fixed a grooved pulley 86, from which a crossed cord or belt 87 runs to a corresponding pulley 88 on a shaft 89, arranged transversely in bearings attached to the under side of the base-frame 1. Between the two above-named rotary shafts 85 and 89 are arranged two fixed ones 90, on which are mounted two loose rotatable antifriction-sleeves 91, that serve as guides to keep the belt 87 in place on its pulleys.

All rotatable shafts derive motion from that of the threshing-cylinder by means of belts, as shown; but a detailed description of the same is unnecessary, since this is within the scope of the skilled mechanic. Thus all movable parts of the machine operate simultaneously to feed and thresh grain, knock out the grain-kernels from the straw, stir or pick up and carry the straw back to the stacker, which oscillates, as described, and also to force the mingled grain and chaff back to the separating media, where the chaff is removed or blown away and the grain proper delivered into suitable conveyers.

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

1. The combination, with the automatic bundle-feeder and rotary threshing-cylinder, of the intermediate band-cutter, composed of a rotary shaft having a series of curved cutters or blades, the vibrating table, which is provided with slots for said blades, and hinged in rear of said shaft, and extends forward of the latter to a point contiguous to said cylinder, and the cams on the shaft which successively vibrate the table, as shown and described.

2. The combination, with the automatic feeder, the threshing-cylinder, the upper band-cutter shaft, journaled in arms pivoted to the frame, the ball-governor, the pivoted lever 28, connected with the governor-slide and having a lug 29[a], the lower band-cutter shaft having a lug 29, adapted to engage the former one, the pulleys on the feeder-shaft, band-cutter shafts, and the governor and cylinder shaft, and bands applied to said pulleys, as shown and described.

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