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Patented Dec. 24, 1901.

O. & S. McINTIRE.

GRAIN SEPARATOR AND THRESHING MACHINE.

(Application filed May 7, 1900.)

(No Model.)

3 Sheets—Sheet I.

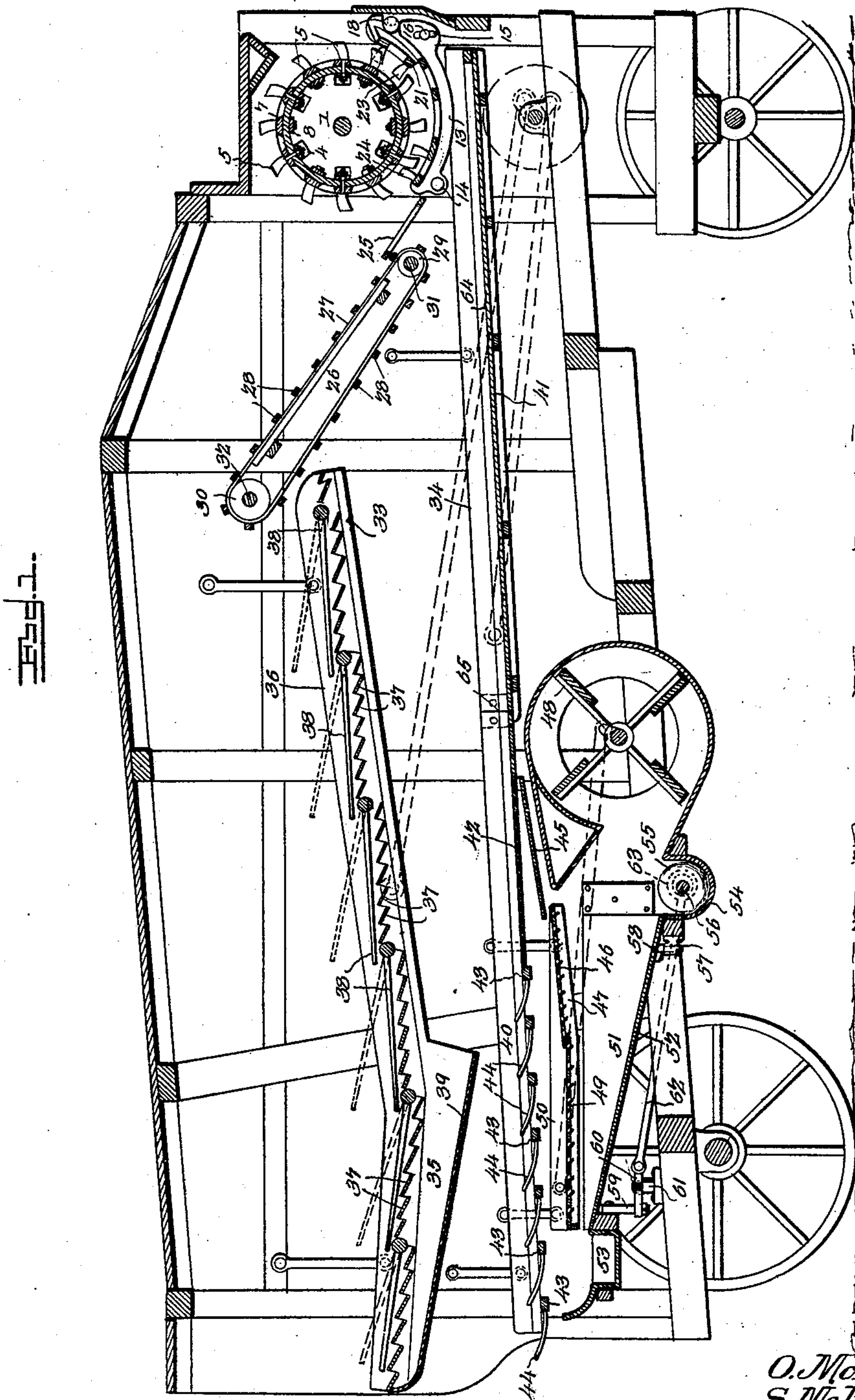


Fig. 1.

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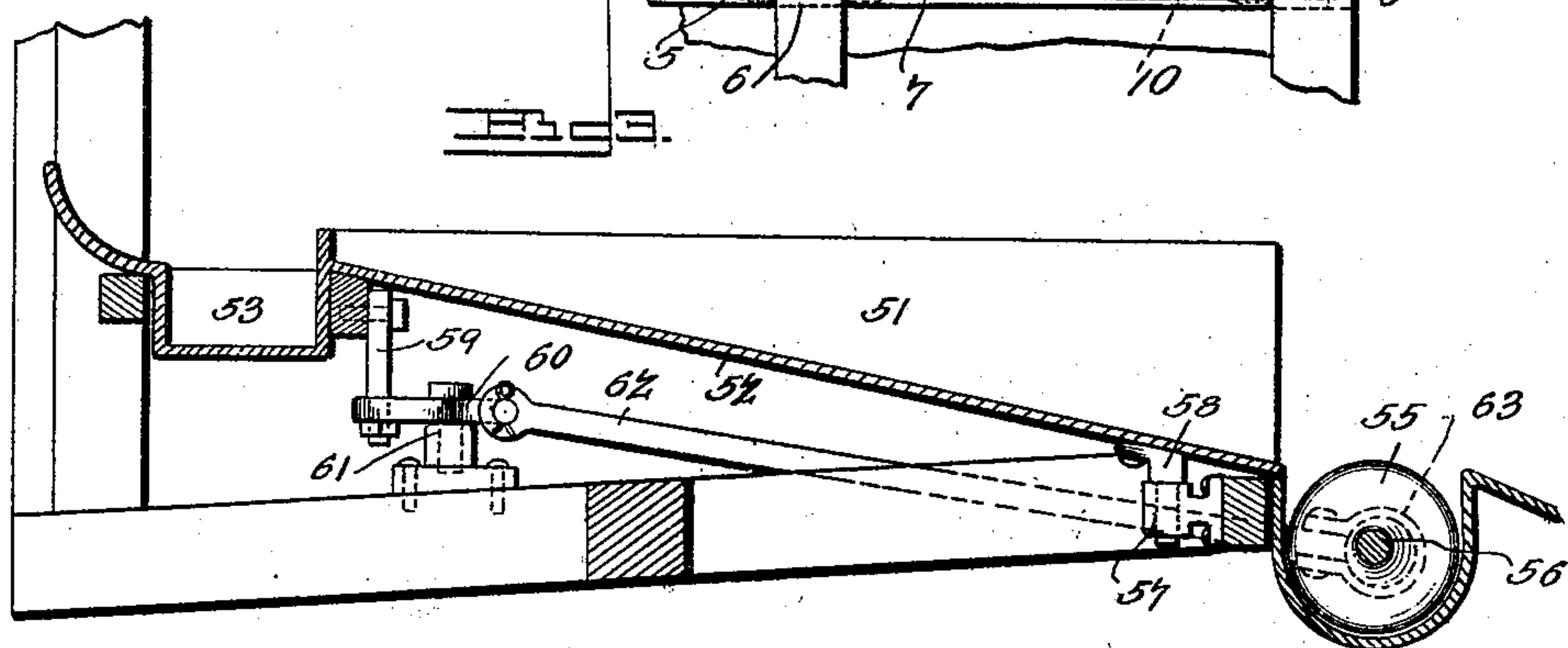
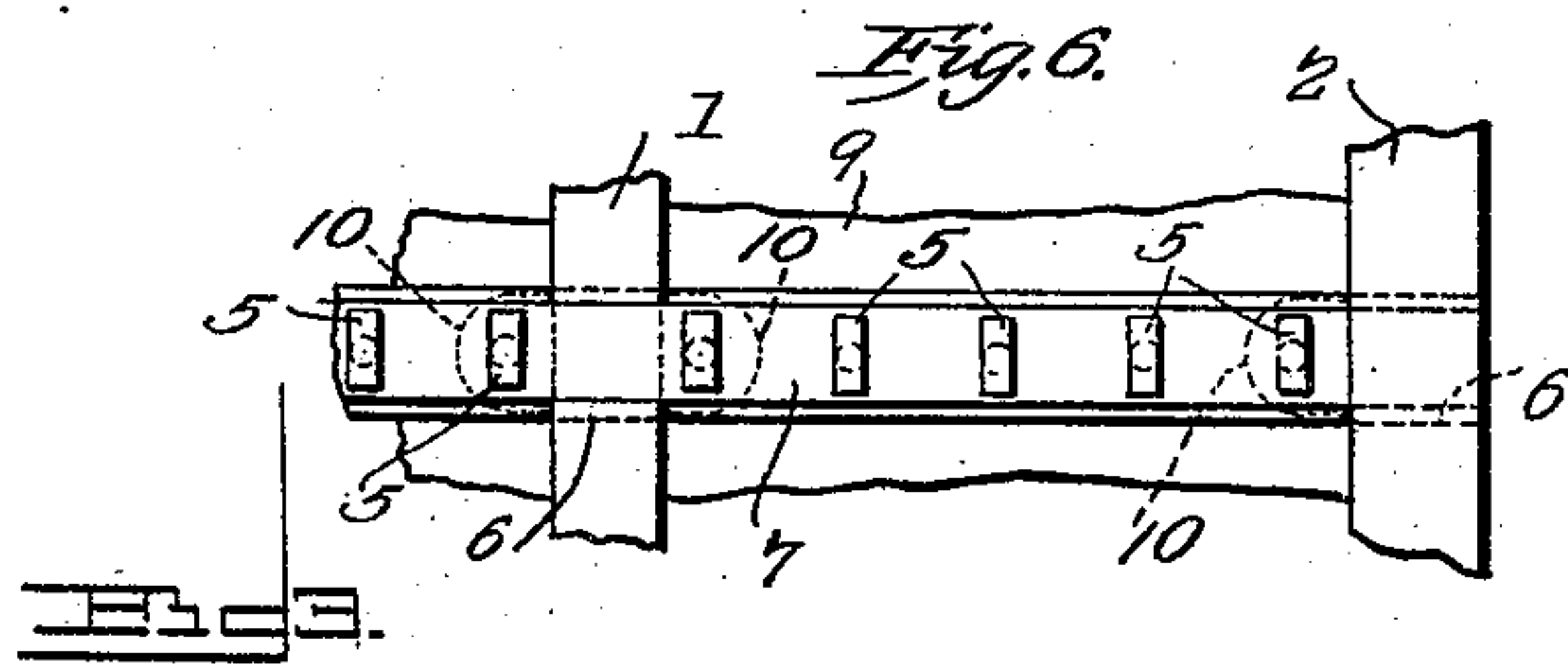
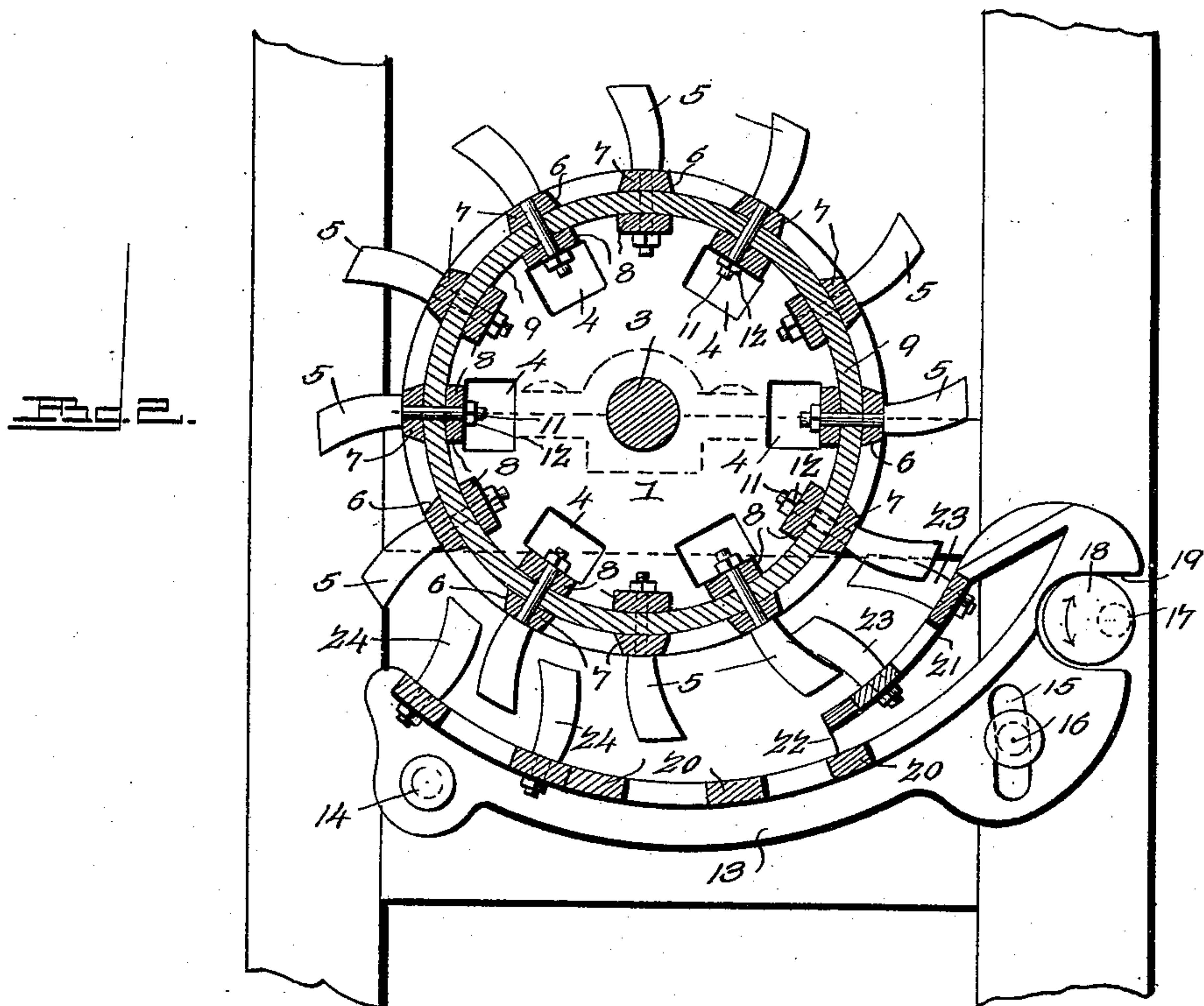
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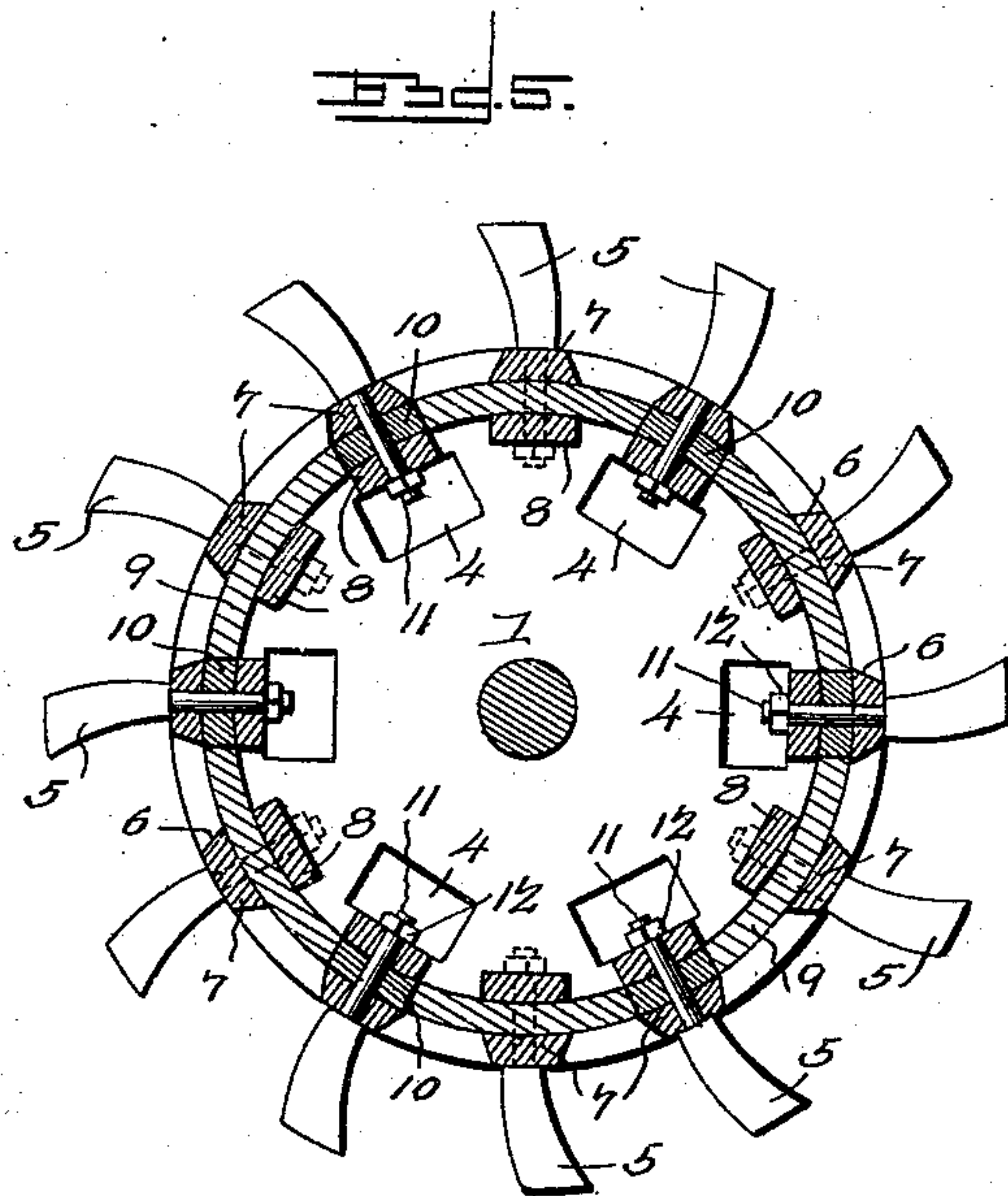
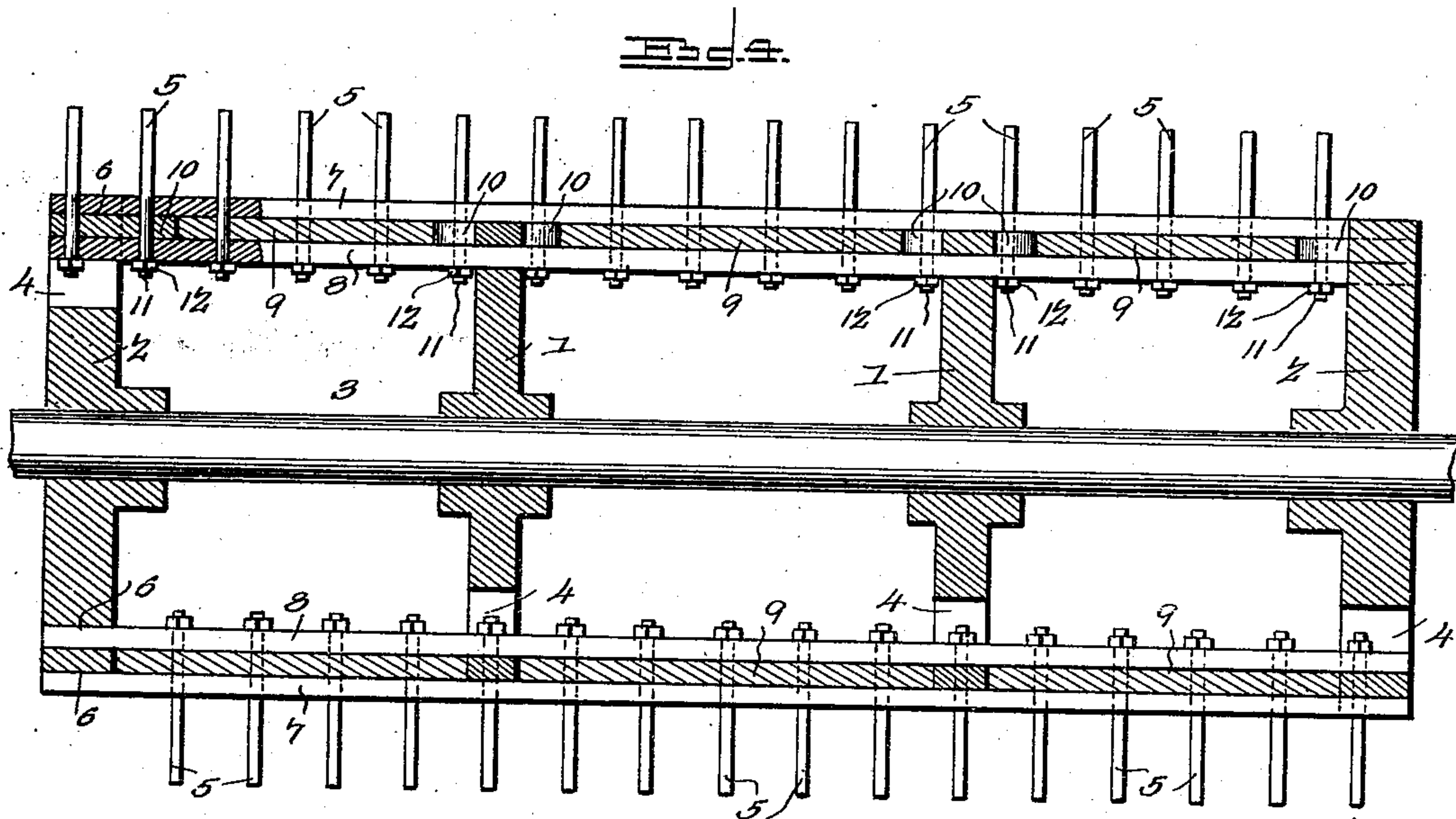
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UNITED STATES PATENT OFFICE.

OLIVER MCINTIRE AND SAMUEL MCINTIRE, OF MOUNT HOPE, KANSAS,
ASSIGNORS OF TWO-THIRDS TO DON KINNEY AND W. J. TROUSDALE,
OF NEWTON, KANSAS.

GRAIN-SEPARATOR AND THRESHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,828, dated December 24, 1901.

Application filed May 7, 1900. Serial No. 15,756. (No model.)

To all whom it may concern:

Be it known that we, OLIVER MCINTIRE and SAMUEL MCINTIRE, citizens of the United States, residing at Mount Hope, in the county of Sedgwick and State of Kansas, have invented a new and useful Grain-Separator and Threshing-Machine, of which the following is a specification.

Our invention is an improved threshing-machine and grain-separator, one object of our invention being to effect improvements in the construction of the threshing-cylinder and concave and in the relative arrangement of the coacting parts of the cylinder and concave.

A further object of our invention is to effect improvements in means for conveying the grain from the threshing mechanism to the shaking-shoe and to effect the separation of the greater portion of the grain from the straw while the same is being so conveyed.

A further object of our invention is to effect improvements in the construction of the lower vibrating shoe whereby the front portion of the same may be lowered to permit access to the concave, and thereby enable the teeth of the concave to be tightened or replaced when broken, as may be required.

A further object of our invention is to effect improvements in the construction of the chaffing-riddle.

A further object of our invention is to effect improvements in the construction of the separating riddle or shoe whereby the latter is provided with interchangeable screens adapted for grain of various kinds.

A further object of our invention is to provide improved means whereby lateral vibratory motion is communicated to the separating-riddle.

Our invention consists in the peculiar construction and combination of devices herein-after fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of a threshing-machine and grain-separator embodying our improvements. Fig. 2 is a detail vertical sectional view illustrating the

construction of the threshing-cylinder and concave. Fig. 3 is a similar view showing the separating-riddle and the means for imparting lateral vibratory motion thereto. Fig. 4 is a detail vertical longitudinal sectional view showing the construction of the threshing-cylinder. Fig. 5 is a detail transverse sectional view of the same. Fig. 6 is a detail view showing the construction of the cylinder.

In the construction of the threshing-cylinder we provide a series of circular heads 1 2, the heads 1 being interiorly disposed and the heads 2 forming the ends of the threshing-cylinder, and said heads are secured at suitable distance apart on the shaft 3 by being keyed thereto or in any other suitable manner. The said heads are provided with openings 4 of suitable size and appropriately located, through which access may be obtained to the interior of the threshing-cylinder to facilitate the attachment or removal of the teeth 5. The heads are provided with peripheral dovetail openings 6, adapted for the insertion and retention of pairs of longitudinally-disposed bars 7 8, of iron or steel, which are adapted to fit said openings 6, the bars 8 being disposed in line with the outer bars 7, radially and at a suitable distance therefrom, a wooden filling 9 being interposed between said inner and outer bars, as shown in Figs. 2 and 4.

The heads 1 2 are provided on their opposing sides with laterally-projecting lugs or ears 10. Said lugs engage said wooden filling, as shown in Fig. 5, and said lugs are in the plane of said wooden filling, so that their inner and outer surfaces and the corresponding surfaces of said wooden filling are flush. Certain of the teeth 5 have their bolt-shanks 11 extended through said lugs and also through the bars 7 8 and secured firmly in position on the cylinder and also serving to clamp the bars 7 8 firmly to opposite sides of said lugs 10 by means of the usual nuts 12, which are screwed to the inner ends of said bolt-shanks. The bolt-shanks of the other cylinder-teeth extend through the bars 7 8 and the wooden filling 9, as shown.

The concave 13 is disposed below the threshing-cylinder, is pivoted at its rear side, as at 14, and is provided with adjusting-slots 15, which are concentric with the pivots 14 and 5 in which are disposed securing-bolts 16, which while securing the ends of the concave between the side walls of the casing of the machine permit of the adjustment of the concave on its pivots, so that the coacting faces 10 of the concave and threshing-cylinder may be disposed as closely together or as far apart as may be requisite to secure the best results under varying conditions. To effect this adjustment of the concave, we provide a shaft 15 (indicated at 17) which has its bearings in the side walls of the casing and is provided with any suitable means or lever (not here shown, as the same is within the scope of any mechanic or any other person skilled in machines of this class) whereby said shaft may be turned and locked at any adjustment required. Fast on the said shaft are eccentric cams 18, which engage openings 19, provided at the front sides of the concave, at the ends 25 thereof, said cams by partly turning the shafts 17 serving to adjust the front side of the concave vertically, as will be readily understood.

It will be observed by reference to Fig. 2 30 of the drawings that the bottom of the concave is disposed tangentially with relation to the lower side of the threshing-cylinder and that the radius of the curved bottom of the concave is much greater than the radius of 35 the threshing-cylinder, and it will be further observed that the front side of the bottom of the concave is much farther from the threshing-cylinder than the rear side thereof. The bottom of the concave is provided with and 40 composed of parallel bars 20, disposed at suitable distance apart to admit of the passage of grain between them. The front side of the concave is provided with a raised section 21, which is concentric with the threshing-cylinder and is disposed more closely to the 45 coacting side of the threshing-cylinder than the other part of the concave, said raised front section of the concave forming a step or offset, as at 22, on the inner side thereof 50 between the same and the bottom of the concave. The bars of the said raised section 21 of the concave are armed with teeth 23, which are identical in size, shape, and construction with the teeth 5 of the threshing-cylinder, 55 and the bars at the rear side of the concave are also provided with teeth 24, which are identical with the teeth on the threshing-cylinder. Hence the threshing-teeth may be used either on the threshing-cylinder or on 60 the coacting parts of the concave. The central portion of the concave intermediate of the raised section 21 and the rear side of the concave is wholly unprovided with teeth, as will be observed. By thus providing the concave 65 with the raised portion at its front side, whereby an offset is formed between the inner side of said rear portion and the central

portion of the bottom of the concave, the grain, meaning the grain which is being threshed, including both grain and straw, after passing between the coacting faces of the 70 raised section of the concave and the threshing-cylinder drops upon the intermediate portion of the bottom of the concave before reaching the rear portion thereof, where it is 75 again threshed by the coacting teeth of the concave and cylinder, and the grain by thus being dropped during the threshing process clear of the coacting threshing-teeth is caused to turn and change its position so as to present new surfaces to the action of the threshing mechanism, thus greatly increasing the efficiency and capacity of the threshing mechanism and effecting a more thorough threshing of the grain. 85

In rear of the concave is a grate 25, from which the straw is delivered onto the lower portion of an inclined conveying-riddle 26, which comprises a pair of or series of endless belts 27, connected together transversely by 90 a series of slats 28, disposed at a suitable distance apart, the said endless conveying-riddle being supported by wheels or rollers 29 30 on shafts 31 32, respectively, which have their bearings in the sides of the casing. The 95 said conveying-riddle is inclined upward rearwardly and delivers the straw onto the front upper end of the upper shaking-shoe 33. It will be understood that as the straw ejected from the threshing mechanism passes over 100 the grate and the conveying-riddle much of the grain which has been threshed therefrom and has failed to pass through the bottom of the concave drops from said grate and conveying-riddle onto the lower shaking-shoe 34. 105

The upper shaking-shoe 33 is inclined downward rearwardly throughout the greater portion of its length and at its rear portion is inclined upward rearwardly, as at 35. Said upper shaking-shoe comprises the side bars 36 110 and the transversely-disposed connecting-slats 37, which are obliquely arranged, as shown, and form openings between their opposing respective front and rear edges for the passage therethrough of the threshed grain. 115 Shaking-rakes 38 are provided on the upper shaking-shoe, and said upper shaking-shoe and said shaking-rake are actuated by the means and in the manner well known to those skilled in this art, and I have therefore not 120 shown such means in the drawings nor particularly described the same in this specification. Below the upwardly-inclined rear portion of the upper shaking-shoe is an imperforate inclined bottom 39, which serves to 125 convey such of the grain as falls through the rear portion of the upper shaking-shoe onto the chaffing-riddle 40 at the rear portion of the lower shaking-shoe 34. The shaking-shoe 34 is actuated by the means and in the manner 130 common to machines of this class. The front portion of said lower shaking-shoe is provided with an imperforate bottom or shaking-pan 41, at the rear of which and intermediate of

the same and the chaffing-riddle is a screen 42. The chaffing-riddle comprises a series of parallel bars 43, which transversely connect the side bars of the lower shaking-shoe, and upwardly-curved rearward-extending fingers 44, which are suitably spaced apart or attached to and project from the said bars 43. An imperforate downward-inclined rearwardly-extending board 45 is disposed under the screen 42 and delivers such grain as falls through said screen onto the front downward-inclined lip-riddle 46, which is carried by a separating-shoe 47, located in rear of a blast-fan 48. A separating-riddle 49 is disposed in rear of the lip-riddle 46 and is carried by the said separating-shoe and inclines upward rearwardly. Said separating-riddle is removable from its frame 50, and the machine is provided with a number of such separating-riddles, which differ in the size of the openings therein and are adapted for use with various kinds of grain, an appropriate screen being used, as will be understood.

A laterally-vibratory shoe 51 is located below the separating-shoe and in rear of the blast-fan and has the upward rearwardly-inclined bottom 52, at the rear end of which is a tailings-conveyer trough 53, and at the front side of which, communicating therewith, is a grain-trough 54, in which operates a conveying-worm 55, carried by a shaft 56, which has its bearings in the sides of the casing and is rotated in any suitable manner. The front portion of the shoe 51 is pivotally connected to a supporting-bracket 57, as at 58. From the rear side of said shoe depends an arm 59, which is connected to a horizontally-disposed bell-crank lever 60, mounted on a supporting-bracket 61, and one arm of which is connected by a pitman 62 to an eccentric 63, which is carried by the shaft 56.

It will be understood by this construction and arrangement of devices that when the machine is in operation lateral vibratory motion will be imparted to the shoe 51. It will be observed by reference to Fig. 1 of the drawings that the relative disposition of the chaffing-riddle, separating-riddle, and laterally-vibratory shoe and blast-fan is such that the blast of air passes upward rearwardly, through the separating-riddle and chaffing-riddle, and serves to effectually winnow the grain as the same falls from the said riddle and rolls downward on the inclined bottom of the laterally-vibratory shoe.

The front portion of the shaking-shoe 34 is provided with a hinged section 64, the hinges of which are at the rear end thereof, as at 65, said hinged section being adapted to be lowered at its front end within the side bars of shoe 34 to permit access to be attained to the concave when it is necessary to replace the teeth in the latter or tighten the teeth therein, thus avoiding the necessity of removing the

concave, as is usually required in machines of this class.

Having thus described our invention, we claim—

1. The combination with a cylinder, of a concave, a portion of which is arranged eccentrically to the cylinder, to thus form therewith a throat which narrows toward the discharge and a receiving portion overlapping the first-named portion and nearer to and concentric with said cylinder, and forming a step over which the grain falls to the eccentric portion of the concave; the receiving and discharging portions of the concave being provided with teeth, substantially as described.

2. The combination with a cylinder, of a concave, a portion of which is arranged eccentrically to the cylinder, to thus form therewith a throat which narrows toward the discharge and a receiving portion overlapping the first-named portion and nearer to and concentric with said cylinder, and forming a step over which the grain falls to the eccentric portion of the concave; the receiving and discharging portions of the concave being provided with teeth, and said eccentrically and concentrically disposed portions of said concave having openings for the passage of threshed-grain therethrough, substantially as described.

3. A threshing-cylinder comprising heads having openings 4, side lugs and peripheral openings 6, a shaft on which the heads are secured, a tubular cylindrical wooden filling extending from head to head and engaged by the side lugs of the heads, the latter being in the plane of said wooden filling, pairs of longitudinally-disposed connecting-bars in said openings in the said heads and bearing against the inner and outer sides of said tubular filling, and teeth having extended bolt-shanks passing through the said bars and the said tubular filling, certain of the teeth having their bolt-shanks extended also through said lugs and clamping said connecting-bars to said cylinder-heads, substantially as described.

4. In a threshing-machine, a shoe pivotally supported at one end, in combination with a horizontally-disposed crank-lever under and connected to the under end of the shoe, a conveyer-worm in a trough at the discharge end of said shoe, an eccentric on the shaft of said worm, and a pitman connecting said eccentric and said bell-crank lever, to laterally vibrate said shoe, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

OLIVER MCINTIRE.
SAMUEL MCINTIRE.

Witnesses:

C. L. KINNEY,
G. H. WELCH.