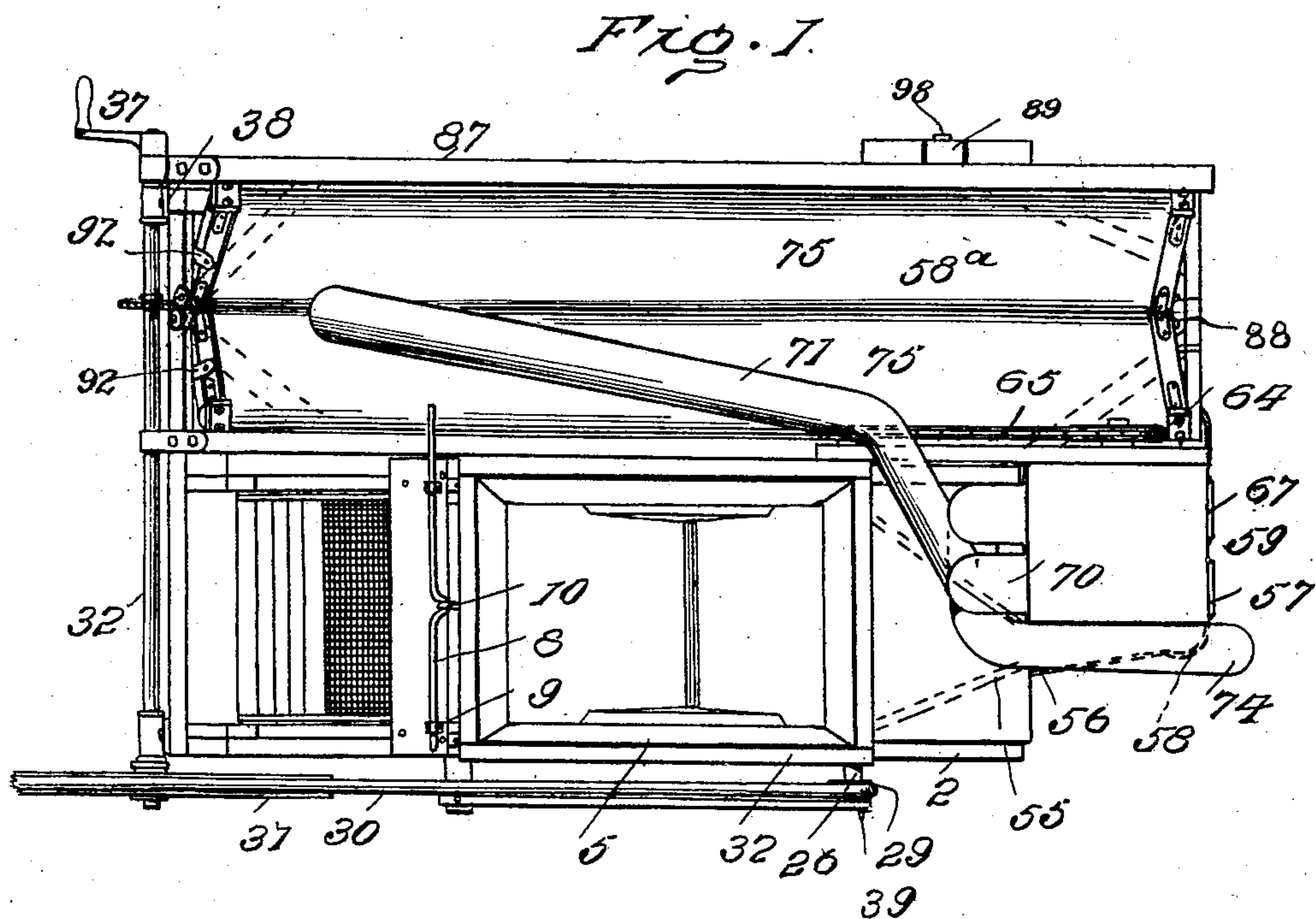


No. 862,624.

PATENTED AUG. 6, 1907.

J. S. EVAN.
GRAIN SEPARATOR.
APPLICATION FILED JULY 21, 1906.

5 SHEETS—SHEET 1.



Witnesses

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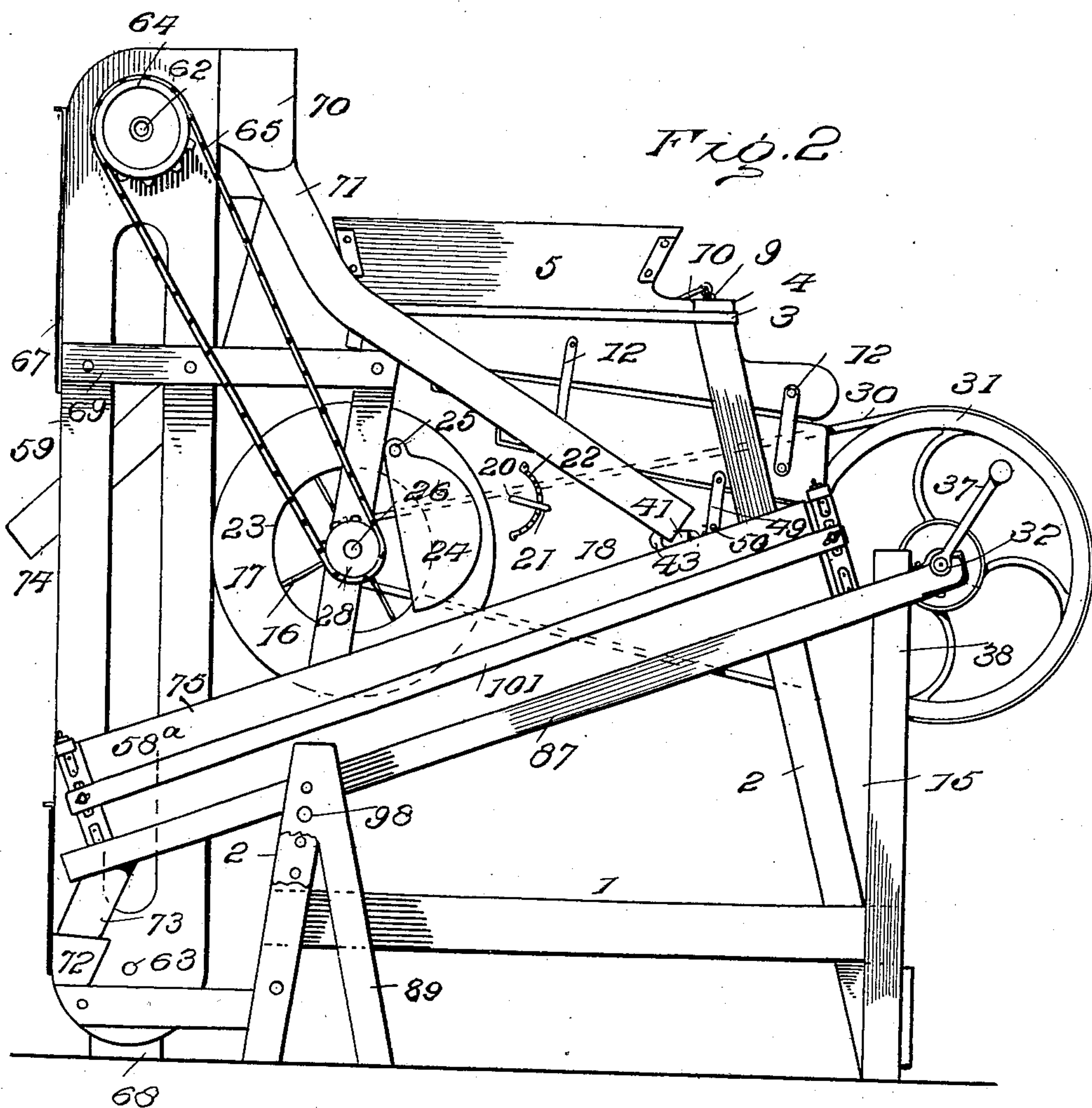
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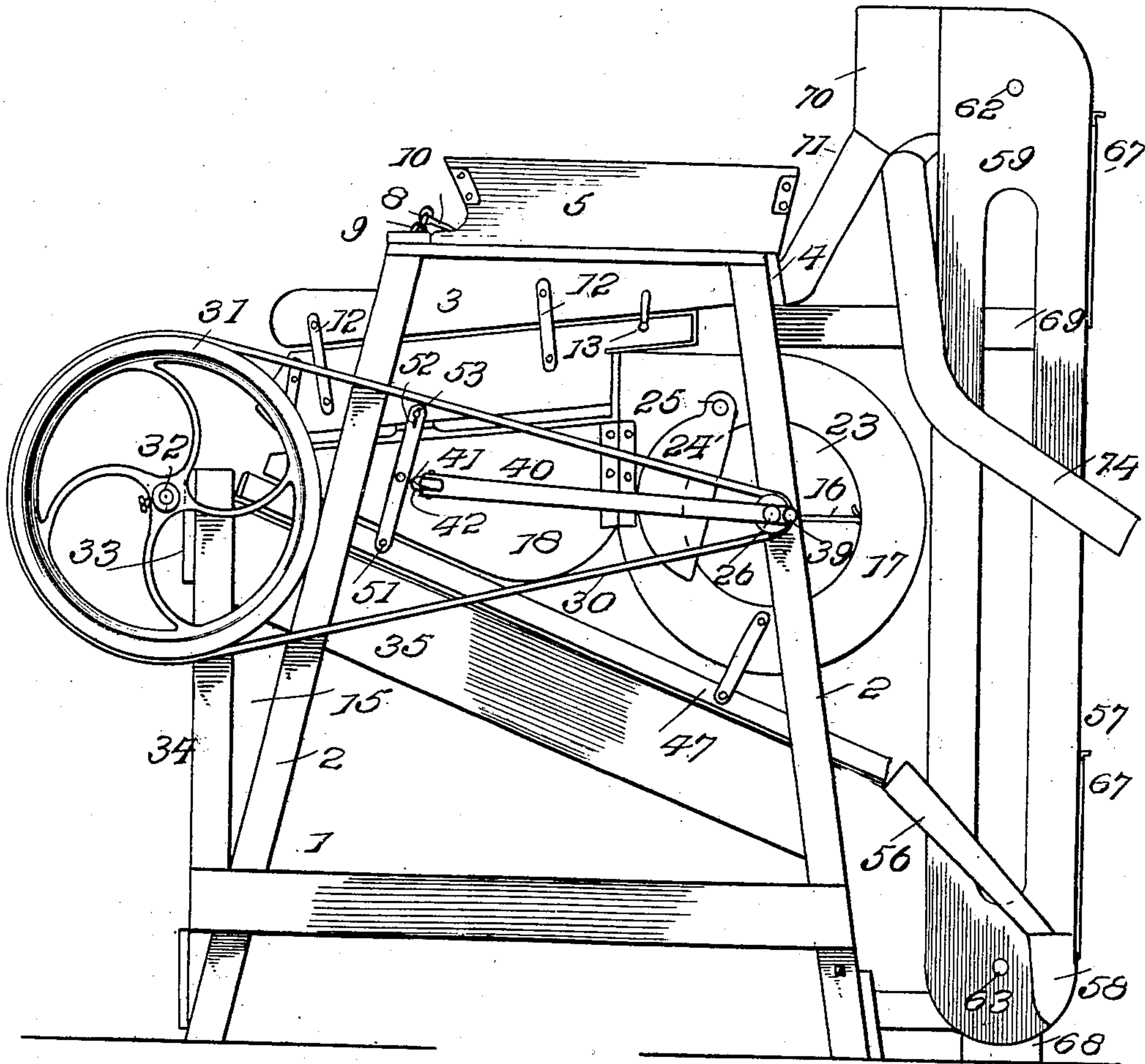
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Fig. 3.



Witnesses

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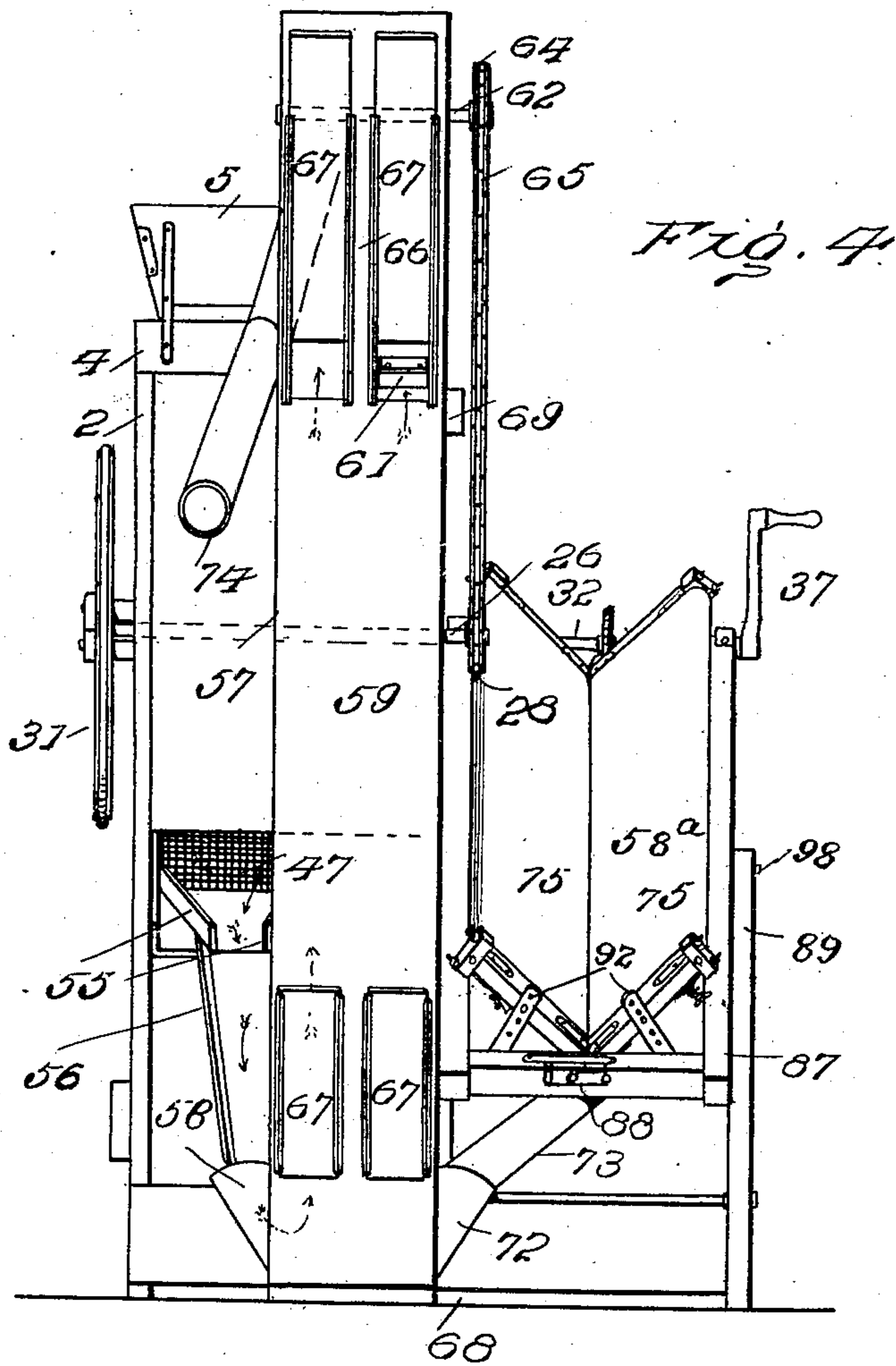
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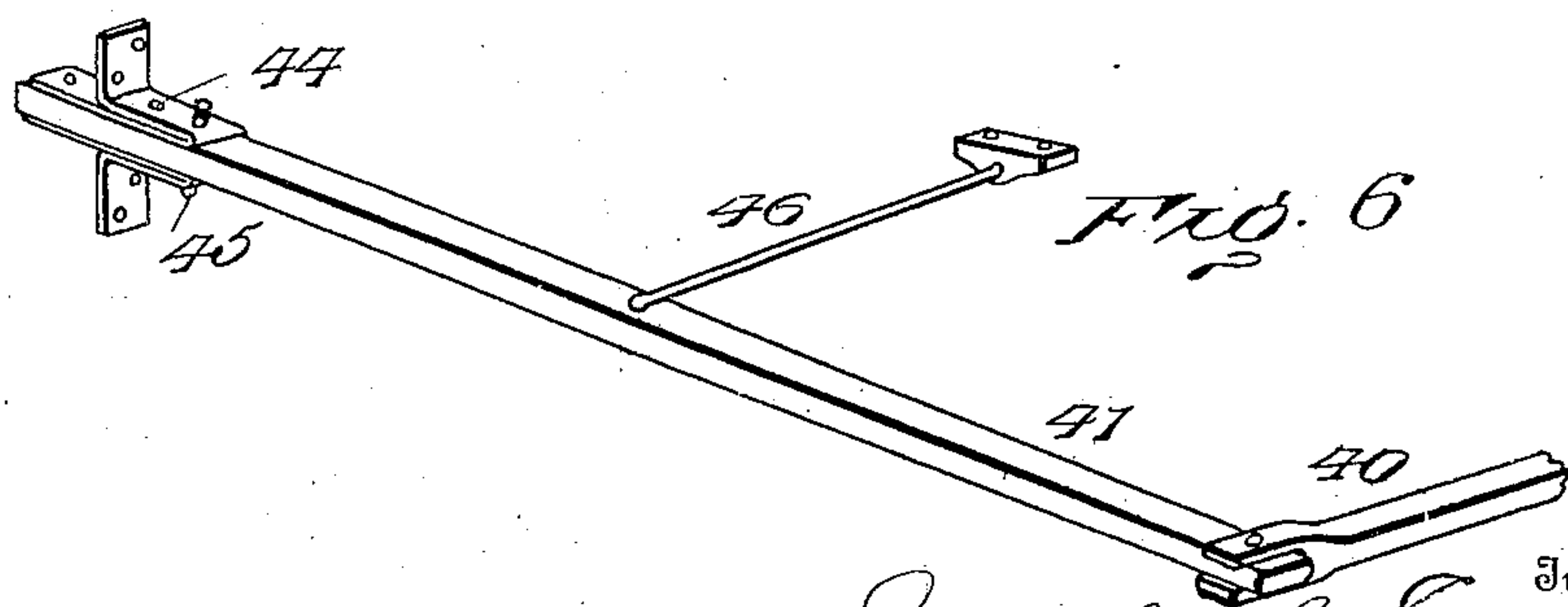
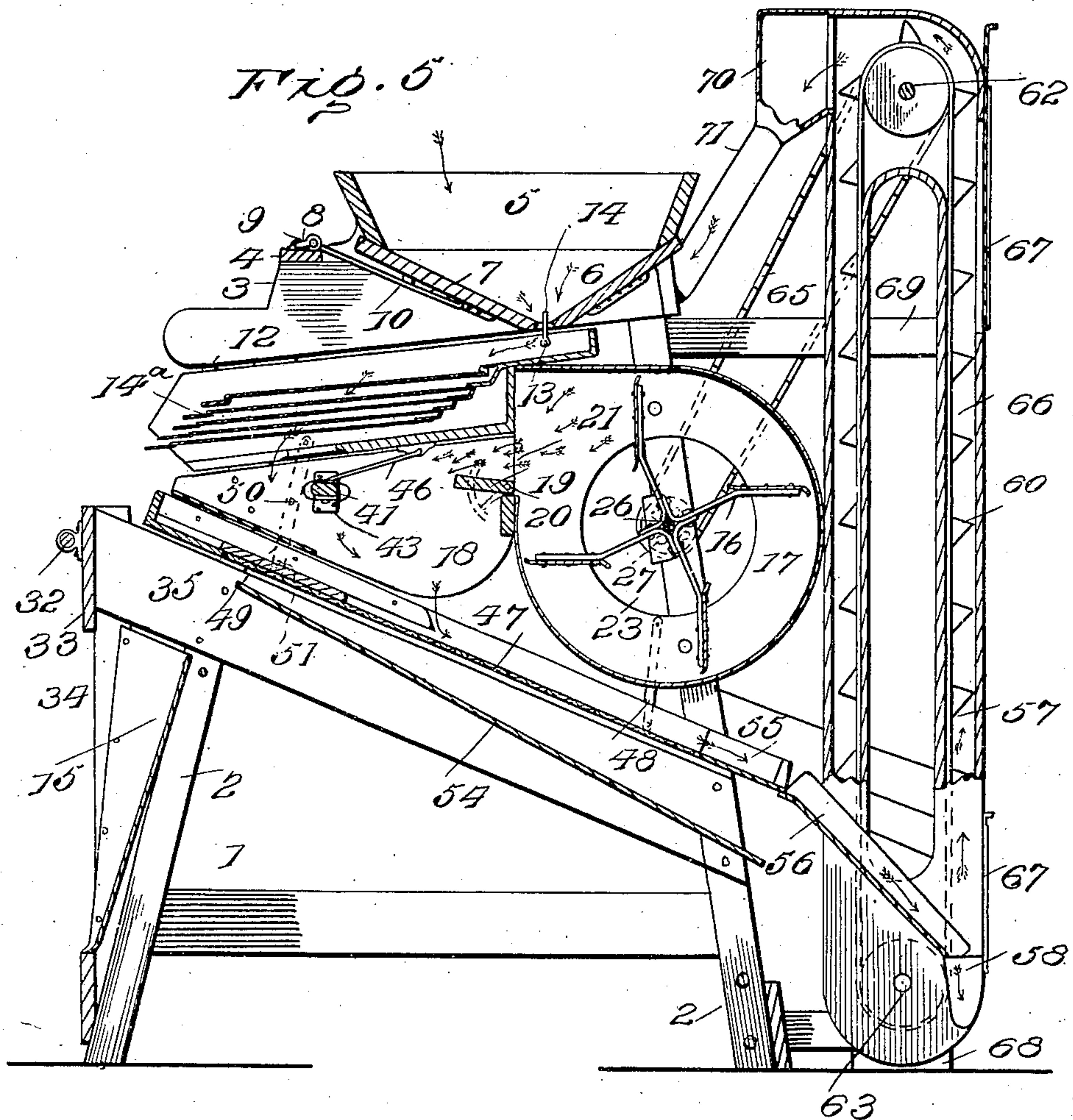
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UNITED STATES PATENT OFFICE.

JOSEPH S. EVAN, OF MINNESOTA LAKE, MINNESOTA.

GRAIN-SEPARATOR.

No. 862,624.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed July 21, 1906. Serial No. 327,187.

To all whom it may concern:

Be it known that I, JOSEPH S. EVAN, a citizen of the United States, residing at Minnesota Lake, in the county of Faribault and State of Minnesota, have invented certain new and useful Improvements in Grain-Separators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in machines for separating and cleaning grain or seed.

The object of the invention is to improve and simplify the construction and operation of machines of this character and thereby render the same more efficient and less expensive.

Further objects and advantages of the invention, as well as the structural features by means of which they are attained, will be made clear by an examination of the following specification, taken in connection with the accompanying drawings, in which the same reference numerals indicate corresponding portions throughout, and in which,

Figure 1 is a top plan view of my improved grain separator; Figs. 2 and 3 are elevations of the opposite sides of the machine, parts being broken away to more clearly illustrate the construction; Fig. 4 is an end elevation; Fig. 5 is a vertical longitudinal sectional view; Fig. 6 is a detail perspective view of the shaker bar 41 and its attached parts.

Referring to the drawings by numerals, 1 denotes the main frame of the machine, consisting, preferably, of two pairs of oppositely inclined legs 2 suitably connected at their lower ends by longitudinal and cross bars, and at their upper ends by side boards 3 and end boards 4. Upon the boards or bars 3, 4 is supported a hopper 5 in which the grain or seed to be separated and cleaned is placed. The bottom of this hopper is formed by two downwardly and inwardly inclined boards 6, 7, the latter of which is slidably mounted in suitable guides on the sides 3, so that its lower edge may be adjusted toward or from the board 6 to regulate the discharge of the grain from the hopper or to cut it off entirely. The adjustment of the slide 7 is effected by a hand lever 8 pivoted at 9 and connected by a link 10 to said slide 7.

The grain discharged from the hopper falls upon the upper end of an oscillatory separator shoe 11 which is mounted beneath the sides 3 and suspended therefrom by pairs of links 12 as shown in Figs. 2 and 3. In this upper portion of the shoe is a transverse oscillatory rod 13 carrying an agitator plate 14, which extends upwardly between the bottom boards 6, 7, as seen in Fig. 5. This plate oscillates, as the shoe is oscillated, and feeds the grain evenly into the shoe. The rod 13 has one of its ends extending through one side of the shoe 11 and formed with a hand piece. Removably mounted in the central portion of the shoe is a plurality of

downwardly-inclined, super-posed screens 14^a through which the grain passes and off of the lower ends of which the dirt is discharged into an inclined deflector plate 15 arranged between two of the legs 2 and adapted to direct the dirt upon a pile at one end of the machine. Any number of screens may be employed and they may be of any suitable form and construction.

The grain as it falls from the lowermost screen passes through an air blast from a fan 16 mounted to rotate in a drum 17 secured between two of the legs 2. The fan blast is directed by a casing 18 disposed beneath the shoes and secured to the drum 17 and to the other two legs 2, as shown. The fan blast is regulated by a board 19 pivoted at 20 to swing and open or close an opening 21 between the drum 17 and the casing 18. This blast or wind board has one end of its pivot rod 20 extending through one side of the casing 18 and provided with a resilient operating lever 21 adapted to engage a segmental rack 22 to hold the wind board in an adjusted position. The drum 17 has its two heads formed with concentric circular openings 23, the inlet of air through which may be regulated by semi-circular doors 24 pivoted at 25. The fan consists of sheet metal blades riveted upon radial arms which are in the form of flat metal bars provided with right angularly bent inner ends which are bolted together and thus clamped upon a transverse shaft 26, as will be seen upon reference to Fig. 5. The shaft 26 is mounted in ball bearings 27 secured to the legs 2 and has fixed upon one of its ends a sprocket pinion 28 and upon its other end a small pulley 29.

The fan shaft is driven by a belt 30 passed around the pulley 29 and around a fly wheel 31 fixed upon a drive shaft 32. The latter is disposed transversely at one end of the machine and is journaled in suitable bearings secured upon a cross bar 33 which connects the upper ends of two uprights 34 secured to two of the legs 2. These uprights 34 are supported by diagonal braces 35 which also connect in legs 2, as shown. The fly wheel is fixed upon one end of the shaft 32 and its other end is extended beyond the frame 1 and has secured upon it a crank handle 37. This extended end of the drive shaft is mounted in a bearing upon an upright or leg 38 which is connected to one of the legs 2 by cross bars.

The pulley 29 is provided with a crank pin 39 to which is connected one end of a pitman rod 40. In the forked opposite end of the latter is pivoted the projecting outer end of a bar 41 which it oscillates. This oscillatory bar extends transversely through slots 42, 43 formed in the sides of the casing 18 and it is adjustably pivoted in the slot 43 between two metal brackets 44 arranged therein. These brackets have series of apertures through any pair of which may be passed the pivot 45 for said oscillatory or shaker bar. The latter is connected by a link or rod 46 to the bottom of the screen

shoe 11, as shown in Fig. 5. It will be seen that by changing the pivot 45 the movement of the shoe 11 may be regulated as desired.

The fan blast blows the chaff and dirt out of the machine and the grain that passes through it falls upon the inclined bottom of the casing 18 from which it falls upon a downwardly-inclined oscillatory screen 47. Slidably mounted in the frame of the screen 47 is a board 47^a which may be shifted longitudinally to cover or uncover a portion of the upper end of the screen. The latter has its frame pivotally suspended at its lower end by links 48 depending from the heads of the drum 17 and at its upper end by oscillatory bars 49. The latter are pivoted intermediate their ends at 50 on the sides of the casing 18 and their lower ends are pivotally connected to the screen frame by a transverse rod 51. Their upper ends are formed with slots 52 to receive pivot bolts 53 upon the sides of the oscillatory shoe 11, so that as the latter is oscillated its motion will be imparted to the bars 49 and hence to the screen 47. The screenings that pass through the screen 47 fall upon a downwardly-inclined board 54 which may be covered with oil-cloth if desired. This board 54 is secured between the inclined braces 35 and the screening passing down it may be discharged into a basket or other receptacle. The grain that does not pass through the screen 47 is directed by an inwardly inclined board 55 arranged, at its lower end, into a spout or chute 56 arranged upon one side of an elevator 57 and adapted to discharge into a funnel 58 upon the latter.

The elevator 57 is provided for the purpose of elevating the grain from the screen 47 and discharging it upon the upper end of a wild oats removing or cleaning device 58^a arranged at one side of the frame 1, and also for elevating the cleaned grain from the lower end of the device 58^a and discharging it into a sack or other suitable receptacle. The elevator is therefore double, its casing 59 containing two endless belts 60, 61 of canvas or the like, on which are secured suitable buckets or cups. The belts 60, 61 pass around pulleys upon upper and lower shafts 62, 63 journaled in suitable bearing in the casing 59. The upper shaft 62 has upon one of its outer ends a sprocket-wheel 64 which is connected by a sprocket-chain 65 to the sprocket pinion 28. on the fan shaft. The casing 59 is preferably constructed, as shown, with a hollow or open central portion, and its two sections, in which the belts 60, 61 are located, are separated by vertical partitions 66. In the outer wall of the casing are sliding doors 67 adapted to close openings through which access may be had to said belts. The frame 59 is disposed vertically, its bottom resting upon a cross bar 68 and its top being supported by the bars 69 which connect it to the legs 2. The buckets of the belt 60 receive the grain from the funnel 58 and discharge it into a funnel 70 from which it is conducted by a pipe 71 to the upper end of the device 58^a. The buckets of the belt 61 receive the cleaned grain from a funnel 72 into which it is discharged from a pipe 73 which receives the grain from the lower end of said device 58. The belt 61 discharges the cleaned grain into a funnel from which projects a pipe 74 which leads to one side of one end of the machine and is adapted to discharge it into a sack or other suitable receptacle.

The device 58^a for cleaning and separating wild oats from the other grain or seed forms the subject matter

of a co-pending application filed December 15, 1906 and bearing Serial Number 348,088, and hence I will give but a brief description of this device. It comprises two oppositely moving endless aprons 75 arranged at angles with respect to each other and in a downwardly inclined position so that the grain will travel downwardly between them. The aprons travel over rollers arranged along the longitudinal edges of boards located between the stretches of the aprons. The lower rollers are pressed together by springs arranged in their bearings 88 and said bearings form pivots for the two apron carrying boards. The upper rollers over which the aprons pass are adjustably mounted for stretching the aprons. The bearings 88 are located in the ends of a downwardly inclined frame 87 adjustably mounted in a rigid frame 89 connected to the main frame of the machine. The mounting of the frame 87 is effected by swinging its upper end from the crank shaft 32 and adjustably supporting its lower end upon a cross bar 98 arranged in the frame 89. The lower rollers of the apron 75 are geared together and to the crank shaft 32 so that the motion of the latter will be imparted to the aprons. Said aprons are adjusted angularly with respect to each other by means of adjustable braces 92 pivoted to the frame 87 and adjustably connected to the boards between the stretches of the aprons. The aprons 75 are made of or covered with flannel or other material having a nap surface to which the wild oats will stick and be carried upwardly out of the stream of grain passing downwardly between the aprons. The wild oats are removed from the aprons by adjustable scraper bars 101 engaged with their outer stretches as seen in Fig. 2.

The operation and advantages of the machine will be readily understood from the foregoing description, taken in connection with the accompanying drawings, and the following brief description. The grain to be cleaned for use as seed or for other purposes, is deposited in the hopper 5 from which it is evenly discharged into the shoe 11 by the feed device 14, the flow of the grain being regulated by operating the lever 8. The oscillatory movement imparted to the shoe by the shaker rod or bar 41, causes the grain to travel down the same and to pass through its screens and the air blast from the fan. The dirt is blown out of the machine by the fan blast and the grain passes over the screen 47 which is oscillated through its connection with the shoe, as previously described. From the screen 47 the grain passes to the elevator which discharges it into the pipe 71 which in turn deposits it upon the upper end of the aprons 75. The latter rotate in opposite directions, that is their inner stretches move upwardly and carry the wild oats and the like, which sticks to their flannel surfaces, out of the stream of the grain passing down the aprons, the oats being removed from the outer stretches of the aprons by the scraper bars, as previously explained. From the lower end of the aprons the grain passes into the other side of the elevator which then discharges it from the pipe 74 into a sack or other receptacle. The various adjustments of the different parts of the machine permit it to operate in a most efficient manner.

While I have shown and described the preferred embodiment of the invention, it will be understood that I do not wish to be limited to the precise showing herein

set forth, since various changes in the form, proportion and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention, as defined by the 5 appended claims.

Having thus described my said invention, what I claim as new and desire to secure by Letters Patent of the United States, is

1. In a machine of the character described, the combination of a main frame, and an oscillatory screen shoe, links 10 for suspending said shoe, levers pivoted intermediate their ends on opposite sides of the main frame and having their upper ends loosely pivoted to said shoe, an inclined screen frame arranged beneath said shoe and pivoted at 15 its upper end between the lower ends of said levers, links pivotally suspending the lower portion of said screen frame from the main frame, a lever extending transversely through the main frame beneath said shoe, angle brackets having said transverse lever adjustably pivoted between

them, a link connecting said shoe to said transverse 20 lever, and means for oscillating the latter, substantially as and for the purpose set forth.

2. In a machine of the character described, the combination of a main frame, an oscillatory screen shoe mounted 25 thereon, a lever arranged transversely in said frame beneath said screen shoe, a pair of oppositely disposed angular brackets secured to said frame and having their horizontal portions formed with longitudinal series of apertures and spaced apart to receive one end of the lever between them, an adjustable pivot pin passed vertically 30 through the lever, and alining apertures in said brackets, a link connection between said lever and said shoe, and means for oscillating said lever, substantially as shown and described.

In testimony whereof I hereunto affix my signature in 35 presence of two witnesses.

JOSEPH S. EVAN.

Witnesses:

GEORGE KREMER,
JOHN P. KREMER.