

No. 710,366.

Patented Sept. 30, 1902..

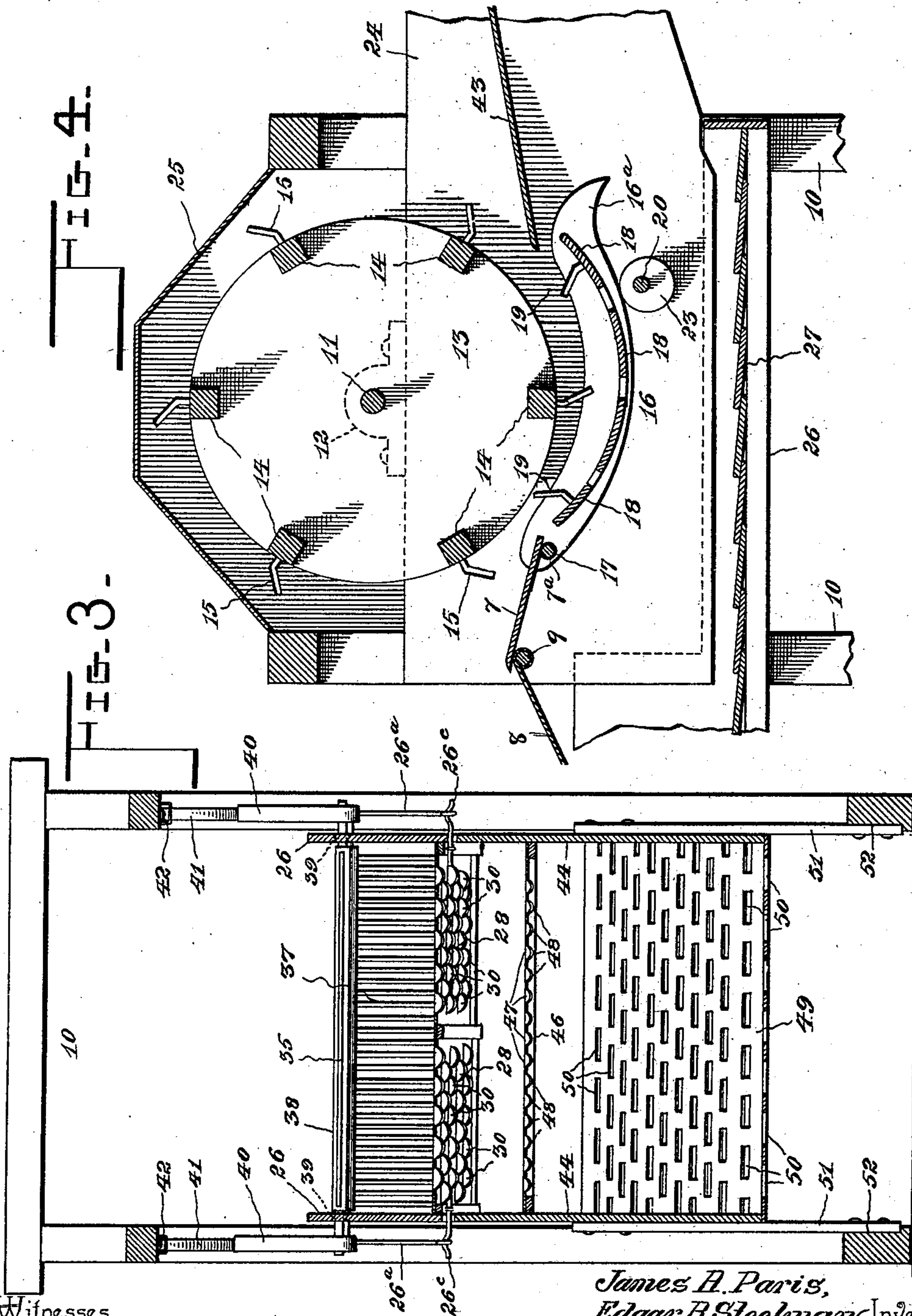
J. A. PARIS, E. B. STEELMAN & J. L. HAVERFIELD.

PEA THRESHER.

(Application filed May 10, 1899.)

(No Model.)

3 Sheets—Sheet 2.



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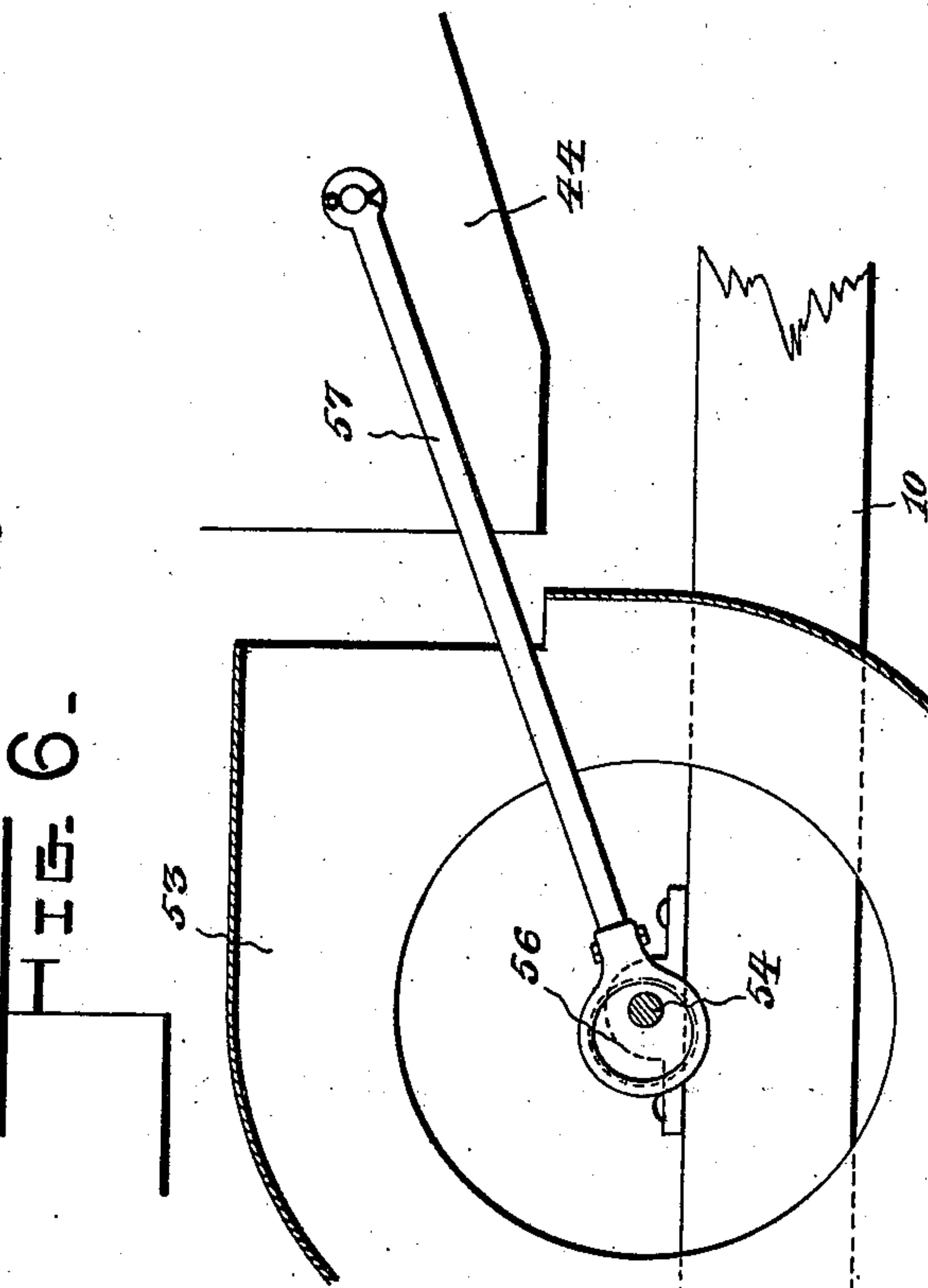
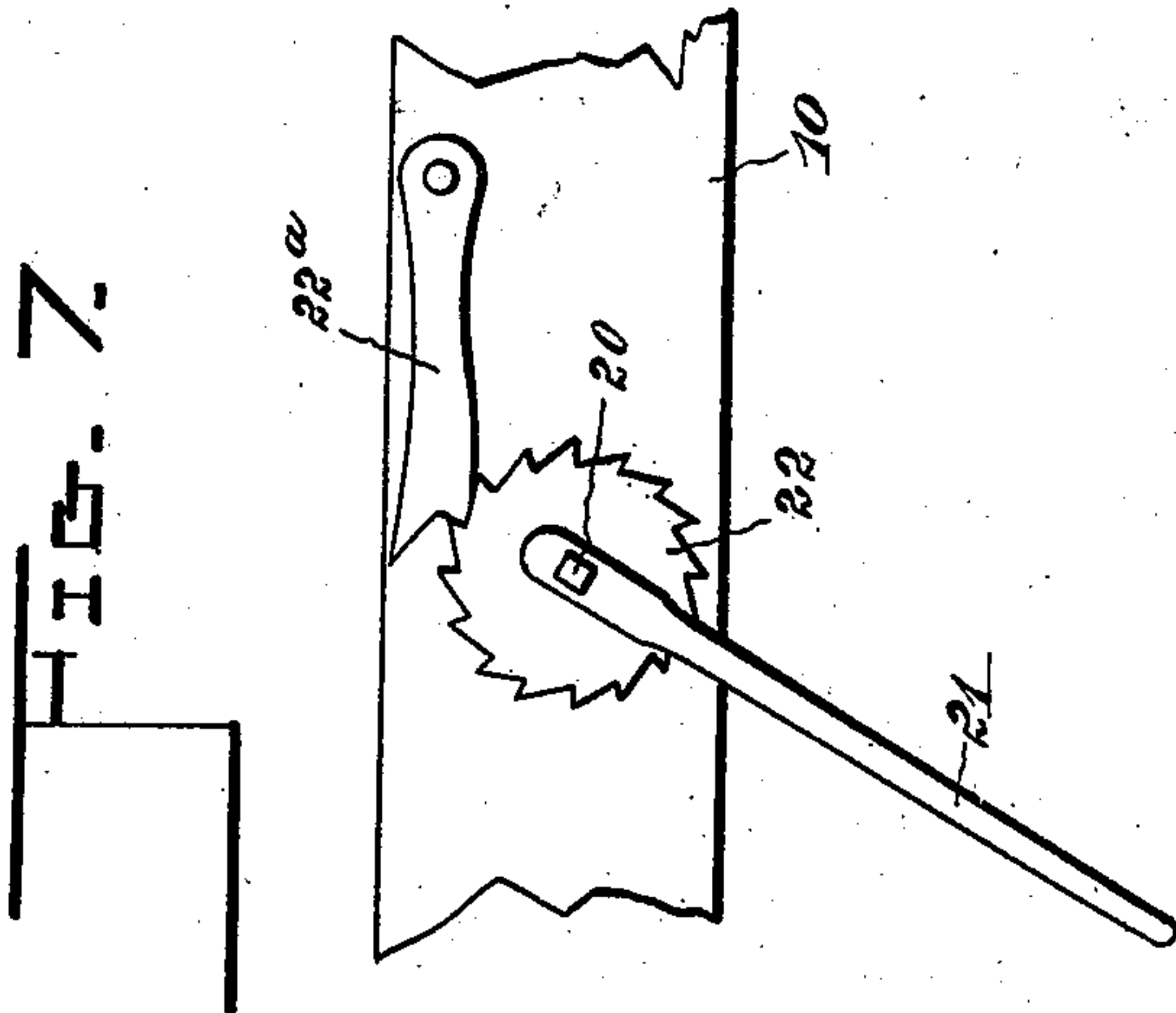
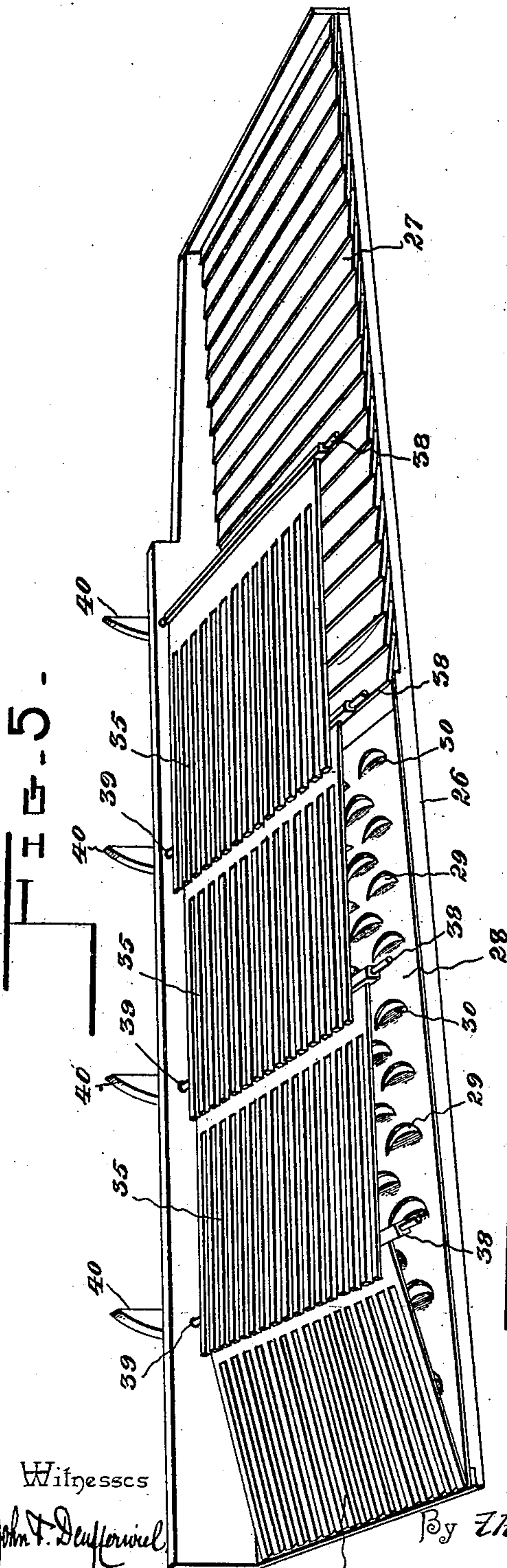
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UNITED STATES PATENT OFFICE.

JAMES ALVIN PARIS, EDGAR BEANEN STEELMAN, AND JOSEPH LINCOLN HAVERFIELD, OF CEDAR, TENNESSEE, ASSIGNORS OF ONE-HALF TO MAYFIELD MANUFACTURING COMPANY, OF MAYFIELD, KENTUCKY.

PEA-THRESHER.

SPECIFICATION forming part of Letters Patent No. 710,366, dated September 30, 1902.

Application filed May 10, 1899. Serial No. 716,277. (No model.)

To all whom it may concern:

Be it known that we, JAMES ALVIN PARIS, EDGAR BEANEN STEELMAN, and JOSEPH LINCOLN HAVERFIELD, citizens of the United States, residing at Cedar, in the county of Gibson and State of Tennessee, have invented a new and useful Pea-Thresher, of which the following is a specification.

Our invention relates to improvements in pea threshers especially designed for operation on the kind of peas known as the "Southern cow-peas;" and the object in view is to provide a simple and efficient structure adapted to break the hulls and free the peas therefrom, to separate the peas from the vines and trash, to discharge the refuse, and to clean the desirable peas from the split peas, broken pieces of pods, and other refuse.

With these ends in view the invention consists in the novel combination, construction, and arrangement of parts, which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a side elevation of a pea-thresher embodying our invention and showing the casing skeletonized to represent the working parts. Fig. 2 is a vertical longitudinal section through the machine. Fig. 3 is a vertical transverse section on the plane indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is an enlarged detail section through the cylinder and concave, illustrating the teeth which we employ for threshing the pods and vines. Fig. 5 is a detail perspective view of the riddle for the main shoe. Fig. 6 is a detail view of the means for driving the auxiliary cleaning-shoe. Fig. 7 is a detail view of the means for locking the adjusting-shaft of the concave.

The same numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

For a better understanding of the working elements of our machine we have represented the framework 10 skeletonized in Figs. 1 to 3, inclusive; but it will be understood that this frame is to be provided with a casing, which is adapted to house or inclose the several working parts of the threshing-machine.

The cylinder-shaft 11 is journaled in suit-

able bearings 12, provided on the frame at the front end of the machine, and this shaft carries the cylinder 13, which consists of suitable heads having a series of spaced bars 14 secured thereto. The teeth 15 of the cylinder are bent and attached to the bars 14 to assume an inclined or angular relation to the bars, and said teeth are disposed, preferably, at angles of forty-five degrees to the bars. The teeth are not grouped closely together, but they are spaced with considerable intervals between them, and said spaced teeth are fixed in any appropriate way to the spaced bars 14, whereby the cylinder is made to properly act on the pods to break the latter and free the peas from said pods and vines. The concave 16 is arranged below and in proper relation to the cylinder, and said concave has side bars 16^a, which are curved or pivoted at 17 to the frame 10. The concave has cross-bars 18, fixed to the side bars 16^a, and these cross-bars are properly spaced apart to provide openings or spaces between said bars, adapted to permit the peas to pass through the concave and to lodge upon the main shaking-shoe. The concave-bars 18 are provided with angular spaced teeth 19, similar to the cylinder-teeth, but disposed in reverse order, and this concave is hung at one end, so that its otherwise free end may be adjusted toward or from the cylinder through the medium of a shaft 20. This shaft is arranged transversely across the frame, which is provided with suitable bearings for the reception of said shaft, and a protruding end of the shaft is provided with a lever 21 and a ratchet 22, said ratchet being engaged by a pawl 22^a. The adjusting-shaft 20 is provided with cams 23 at points to engage with the side bars of the pivoted concave, and by turning the shaft the cams are adapted to move the pivoted concave with relation to the cylinder, said shaft being held in its adjusted position by the pawl-and-ratchet locking contrivance. The threshing-machine is equipped with the feed-board 24, adapted to deliver the vines and pods to the cylinder and concave, and said cylinder is inclosed below a cap 25, as is usual in the art.

The main shaking-shoe 26 is disposed in a horizontal position in the machine, and this shoe has its front receiving end disposed below the concave, while its rear delivery end extends to or through the rear end of the machine-frame. Said shaking-shoe is sustained for reciprocating play within the frame by suitable links or hangers 26^a, which have their upper ends connected to eyebolts 26^b of the frame, while their lower ends are fitted loosely to fingers 26^c on the shoe. This shoe carries a peculiarly-fashioned bottom, consisting of the stepped or slatted front section 27 and a riddle 28 as the rear section, the two sections of the bottom being disposed in the same horizontal plane longitudinally of the shoe. The slatted front section 27 consists of a series of slats arranged in overlapping order and fixed to the sides of the main shoe to form a step-shaped section of the bottom, and said slatted portion of the bottom is disposed below the concave and extends to a point over the auxiliary cleaning-shoe. (See Fig. 2.) The riddle 28 is constructed, preferably, of sheet metal, and it is fixed to the sides of the shoe in the horizontal plane of the slatted bottom section. This riddle has openings 29 punched or formed therein to have the inclined lips 30 extend below the plane of the metallic screen, said lips being disposed below the openings 29 and in positions to discharge the peas in a forward direction. The perforated and lipped riddle of the main shoe is disposed over the auxiliary cleaning-shoe. The shaking motion is imparted to the main shoe by means of a shaft 31, which is disposed below the shoe and is journaled in proper bearings 32 on the frame 10, and this shaft is provided with a crank 33, with which engages the front end of the pitman 34, having its rear end fastened to the bottom of the shaking-shoe. This shaking-shoe is equipped with a series of rakes which are hung for vibration in vertical planes and are disposed in series one above another, with the free end of each rake overlapping and bearing upon the pivoted end of the next in series, and hence disposed for operation so as to carry the vines and refuse through the machine. A number of these rakes are indicated by the numeral 35 in Fig. 2, and the rakes 35 are mounted in the same horizontal plane to overlap one another. A delivery-rake 37 is disposed at the rear end of the shaking-shoe, and this delivery-rake is inclined downwardly from its pivotal point to the exit of said shoe in order to discharge the vines and trash from the machine. Each rake consists of a rock-shaft 38 and a series of spaced fingers, which are fast with said shaft to vibrate therewith, and the sides of the main shoe are provided with shaft-bearings 39, in which the rake-shafts 38 are loosely mounted. The ends of the rake-shafts are extended or prolonged beyond the bearings and the sides of the shoe,

and to said prolonged ends of the shafts are fixed the tappets 40, a pair of tappets being secured to each rake-shaft. To each tappet is fastened one end of a limiting-strap 41, which has its other end fastened at 42 to a part of the machine-frame 10, and the rakes are thus mounted in the shaking-shoe to travel therewith, while the tappets are connected to the frame by the straps in order to impart the lifting motion to the rakes on the reciprocation of the shoe. When the crank of the shaft 31 is on its forward center, the shoe is moved in a direction to ease the strain on the straps 41 and permit the rakes to drop by gravity into their overlapping relation; but when the crank is on its up center the shoe is moved in a rearward direction, as indicated by the arrow in Fig. 2, in order to carry the rake-shafts away from the points of attachment 42 of the straps through the machine-frame. On this movement of the shoe the tappets pull on the straps and the latter serve to move the tappets in a direction which will rock the shafts 38 and raise the series of rakes 35, and the rakes are thus vibrated in vertical planes in unison with the reciprocal movement of the main shoe. The entire series of rakes 35 37 are vibrated in the manner described in order to agitate the vines and refuse for the elimination of the peas therefrom, and the final rake 37 is disposed in its inclined position at all times and notwithstanding its vibratory motion, so as to facilitate the discharge of the vines and refuse from the thresher.

A delivery-plate 8, which is substantially in the form of a compound curve in cross-section, as shown in Fig. 2, is pivoted at one edge in rear of and slightly above the concave, at 9, and its free lower edge bears upon the foremost of the series of rakes, as shown, this disposition of the delivery-plate being such that as the said rake moves back and forth with the shoe the delivery-plate, which is relatively stationary, will feed the halm onto the rakes as it is delivered from the threshing-cylinder, and, furthermore, facilitate and contribute to the rearward passage of the halm over said series of rakes. A bridge-plate 7 is pivoted at its front lower side in the concave-frame, as at 7^a, the rear edge of said bridge-plate, which is free, bearing upon and projecting over the pivoted edge of the delivery-plate, the said bridge-plate serving to direct the halm from the threshing-cylinder onto the delivery-plate and its free projecting rear edge serving to counteract any tendency of the halm to work forward.

A feed-chute 43 is disposed in an inclined position between the concave and the front vibrating rake, and this chute has its front end supported on the pivoted end of the concave or on the machine-frame, so as to assume a proper inclined position, which will facilitate the passage of the vines and pods from the threshing mechanism to the rake mechanism.

The cleaning-shoe 44 of the machine is disposed below the riddle of the main shoe, and the front part of the cleaning-shoe frame is recessed to provide an extension 45, which overhangs the shoe-fan and projects below the stepped section 27 of the bottom in the main shoe, thus arranging the two shoes in such relation as to adapt the peas discharged from the main shoe to lodge upon the cleaning-shoe. This cleaning-shoe carries two riddles, arranged one below the other. The upper riddle 46 is secured to the cleaning-shoe frame in any appropriate manner to extend from the prolongation 45 to the rear end of the shoe 44, and said upper riddle is preferably of sheet metal, with holes 47 punched therein to provide the inclined lips 48. The lower riddle 49 of the cleaning-shoe is fixed to said shoe in an inclined relation to the upper riddle 46, and the primary purpose of the lower riddle 49 is to separate the split peas and refuse from the desirable peas. To this end we provide the inclined lower riddle with closely-grouped oblong slots 50, the axis of each slot being disposed across the length of the riddle 49. The cleaning-shoe 44 is suspended within the frame and below the main shoe by spring-hangers 51, which have their upper ends pivotally connected to the shoe-frame, while the lower ends of said spring-hangers are fastened securely in recessed seats 52, provided on the sills of the main frame 10. The shoe-fan has its casing 53 secured in any appropriate way to the main frame and disposed contiguous to the recess and prolonged end 45 of the cleaning-shoe, and within this casing is disposed a fan-shaft 54, said shaft being journaled in suitable bearings on the sills of the frame 10. This shaft carries a fan 55 of any approved construction. One of the important features of our machine is the provision of means by which the fan-shaft is made to impart the vibrating movement to the cleaning-shoe to simplify the construction and promote efficiency, and to this end we employ eccentrics 56, which are fixed to the fan-shaft 54. These eccentrics are embraced by yokes on pitmen 57, which have their opposite ends pivoted to the cleaning-shoe 44, and the eccentrics and pitmen are thus adapted to be rotated by the same shaft which operates the fan to create the blast. The blast from the fan is delivered directly upon the lower slotted inclined riddle of the shoe and below the upper lipped riddle of said shoe, and the peas which lodge upon said lower shoe-riddle are delivered to a transverse trough or conveyer 57^a, which is supported on the machine-frame.

The fan-shaft 54 is equipped with a pulley 58. Another pulley 59 is fixed to one end of the shaft 31, which drives the main shoe, and a pulley 60 is fixed to one end of the cylinder-shaft 11. All these pulleys 58 59 60 are disposed in the same plane at one side of the machine-frame, and a single pulley-belt 61 is

fitted operatively to said pulleys in order to transmit the motion from the threshing-cylinder shaft to the shaft 31 and the shaft 58 for the proper actuation of the main shoe, the cleaning-shoe, and the cleaning-shoe fan. The cylinder-shaft 11 may be equipped at the opposite end of its pulley 60 with another pulley, which may receive a belt from a traction-engine, or said cylinder-shaft may have a beveled gear adapted to be driven by a similar gear propelled from a horse-power mechanism. The endless belt 61 may be kept in a taut condition by a belt-tightener lever 62, which carries the idler-pulley 63, adapted to ride against one strand of the belt 61, and said lever 62 may be held in place by any suitable form of locking device, (indicated generally by the numeral 64.)

The operation of our invention is as follows: Our improved threshing-machine is designed for use for threshing cow-peas which have been cut and cured in the field. The dried pods of cow-peas, as is well known, are extremely brittle, while the stems or straw of the halm thereof, although tenuous, are tough. The action of our revolving threshing-cylinder not only serves as its teeth to drag the pea-vines through and between the fixed teeth on the concave, but subject the same to the beating or pounding action of the cross-bars of said threshing-cylinder, with the result that the pods are efficiently shredded and broken thereby, the shelled peas and a certain proportion of the fragments of the pods and leaves falling through the openings of the concave onto the stepped upper portion of the shaking-shoe 27, while the threshed halm, together with such of the shelled peas as have lodged in it and escaped the concave, is swept and delivered onto the series of vibrating and rocking rakes, which serve to efficiently toss the halm during its passage over them through the machine and dislodge the shelled peas therefrom, which fall, together with a certain proportion of the smaller particles of the pods, leaves, and other portions of the halm, onto the riddle 28, while the mass of the halm is delivered from the last of the series of shaking and vibrating rakes onto a carrier, where it rapidly accumulates, and may be hauled away and stacked or housed, being very valuable as fodder, particularly for cattle. The shelled peas which fall upon the stepped portion 27 of the upper vibrating shoe are worked downward thereby onto the riddle 28 and in falling through the openings in said riddle are subjected to the action of upward and outward currents of air from the fan-blast deflected by the forwardly and downwardly inclined lips 30 of the said riddle, which currents blow the lighter particles of pods and halm away from the peas, while permitting the latter, which are too heavy to be blown away by the blast, to descend into the riddle of the lower vibrating shoe. In passing through the openings in said lower riddle the

peas are again winnowed by the currents of air deflected upward and outward through said openings by the depending forwardly-inclined lips 48, thus efficiently winnowing
 5 the peas, the blast which passes under the lower riddle and between it and the upper riddle serving to convey the loose particles of the halm, which are also of value as fodder, from the machine and causing the same
 10 to settle and become deposited in and on the accumulation of halm ejected by the rakes. The split and diminutive peas in moving forward over the screen 49 fall through the openings thereof and may be collected in a suitable receptacle placed under said screen or
 15 permitted to accumulate on the ground or floor, while the whole and full-sized peas, in a condition thoroughly cleaned and winnowed, drop from the lower forward side of said screen
 20 49 and may be collected in a vessel below the spout 57^a. The front end of the riddle 47 is adjustable vertically, it being adapted to be inserted in appropriate openings 6, arranged in vertical series, as shown in Fig. 2, and
 25 hence the said riddle may be adjusted to any angle required to secure the best results.

It will be noted that the concave has two series of teeth 19, located, respectively, near
 30 the front and rear edges of the concave, and these teeth are curved or inclined in the direction of the line of feed of the peas and vines as they travel over the concave. The teeth 15 on the cylinder are inclined or curved in a backward direction from the direction
 35 of rotation of the cylinder, as shown by Fig. 4, and these teeth are thus disposed to sweep through the spaces between the concave-teeth and to coact therewith in breaking up the pods, without, however, breaking the peas.
 40 The two sets of teeth 15 and 19 are similarly formed of stout wire cut into suitable lengths and bent between their ends. By thus forming the teeth they will break up the pods without injuring the berries or peas, as no

sharp edges are presented to cut into or 45 through the peas.

Having thus described the invention, what we claim is—

In a machine for threshing peas, the combination of a frame, a vibrating shoe suspended therefrom and adapted to catch the
 50 threshed peas as the same fall, said shoe having a riddle in the bottom thereof, a series of shaking and ejecting screen-rakes pivoted in the shoe above the riddle and disposed in successively lower planes, said rakes being adapted
 55 to strike one upon another and to overlap when in horizontal position, rock-arms attached to the rakes and connections between the rock-arms and the frame, a threshing-cylinder and a vertically-movable concave, the
 60 latter being arranged in a higher plane than the uppermost shaking screen-rake, and a shoulder between the concave and shaker comprising a relatively fixed pivoted delivery-plate disposed in rear of the concave and
 65 inclining downward and having its free end bearing on the uppermost of a series of screen-rakes, the latter sliding back and forth under the delivery-plate whereby the latter is
 70 effective in feeding the halm rearward on the series of screen-rakes, and an upwardly-inclined bridge-plate pivoted to the rear of the concave and at its free end bearing on and projecting over the pivoted edge of the
 75 delivery-plate, whereby the shoulder intercepts the back movement of the halm, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures 80 in the presence of two witnesses.

JAMES ALVIN PARIS,
 EDGAR BEANEN STEELMAN.
 JOSEPH LINCOLN HAVERFIELD.

Witnesses:

J. R. STRATTON,
 C. A. THOMAS.