No. 818,009.

PATENTED APR. 17, 1906.

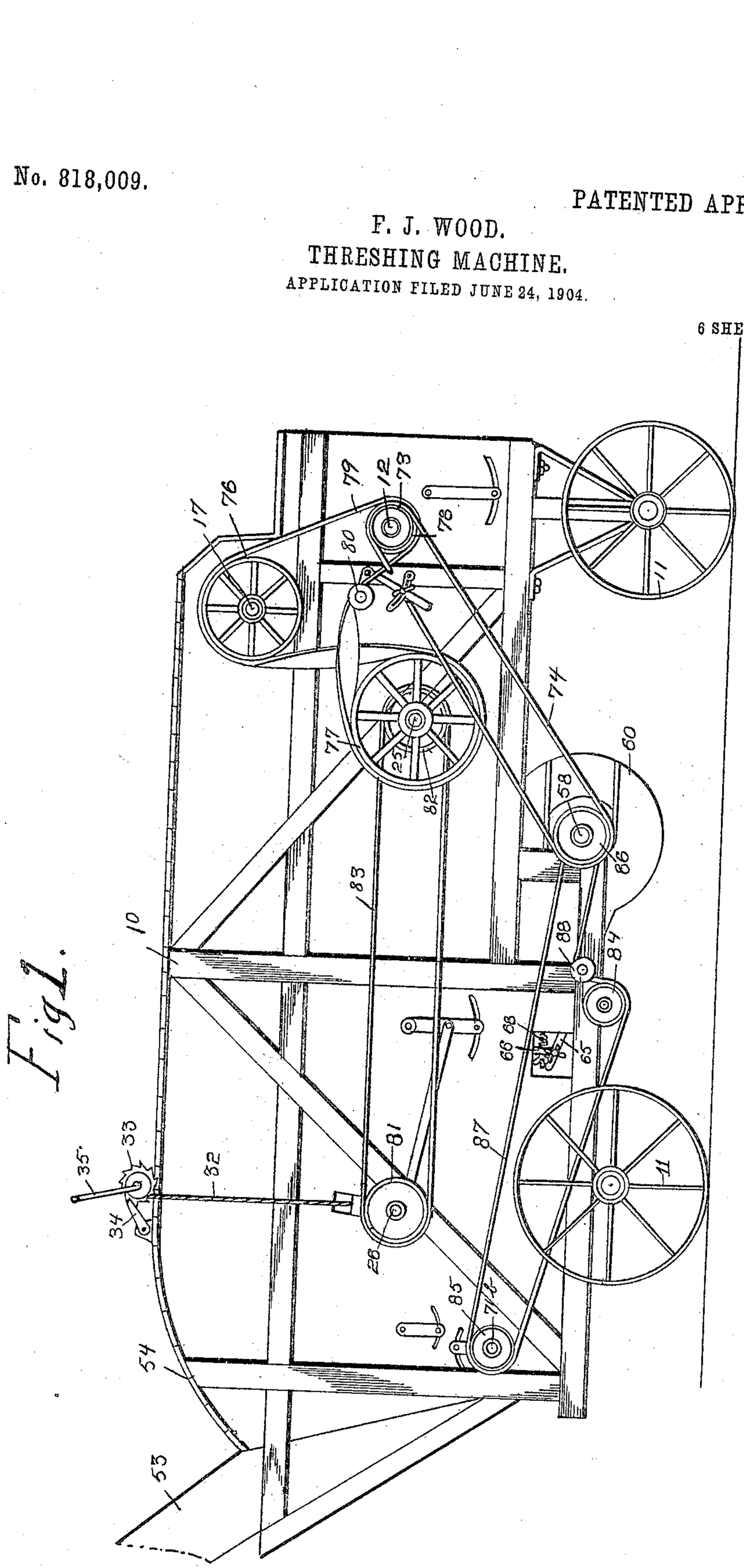
F. J. WOOD.

THRESHING MACHINE.

APPLICATION FILED JUNE 24, 1904.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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J. B. Sweetney.

Inventor F. J. Wood
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6 SHEETS—SHEET 2

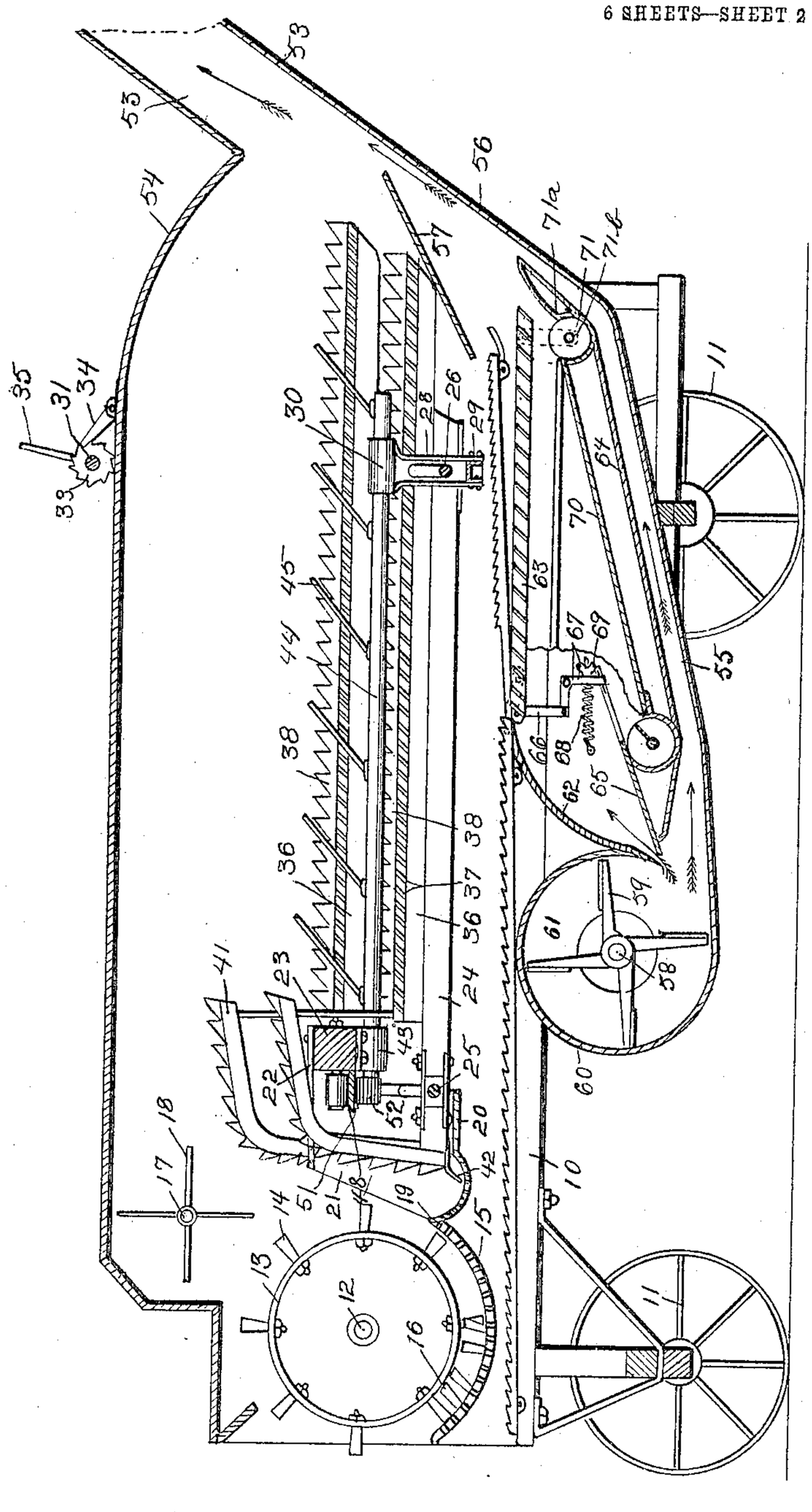

Fig. 2.

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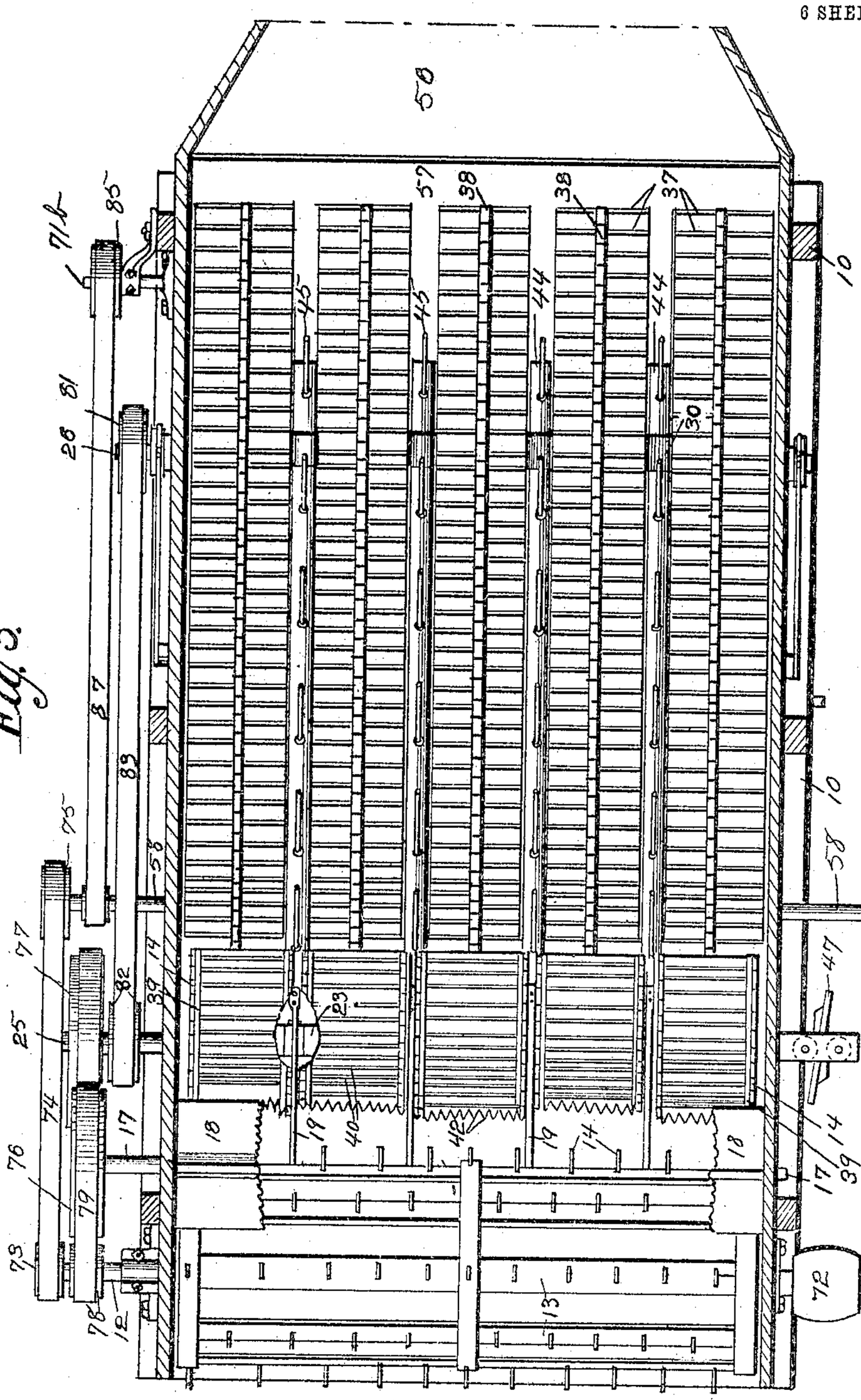
6 SHEETS—SHEET 3.

Fig. 3.



Witnesses.

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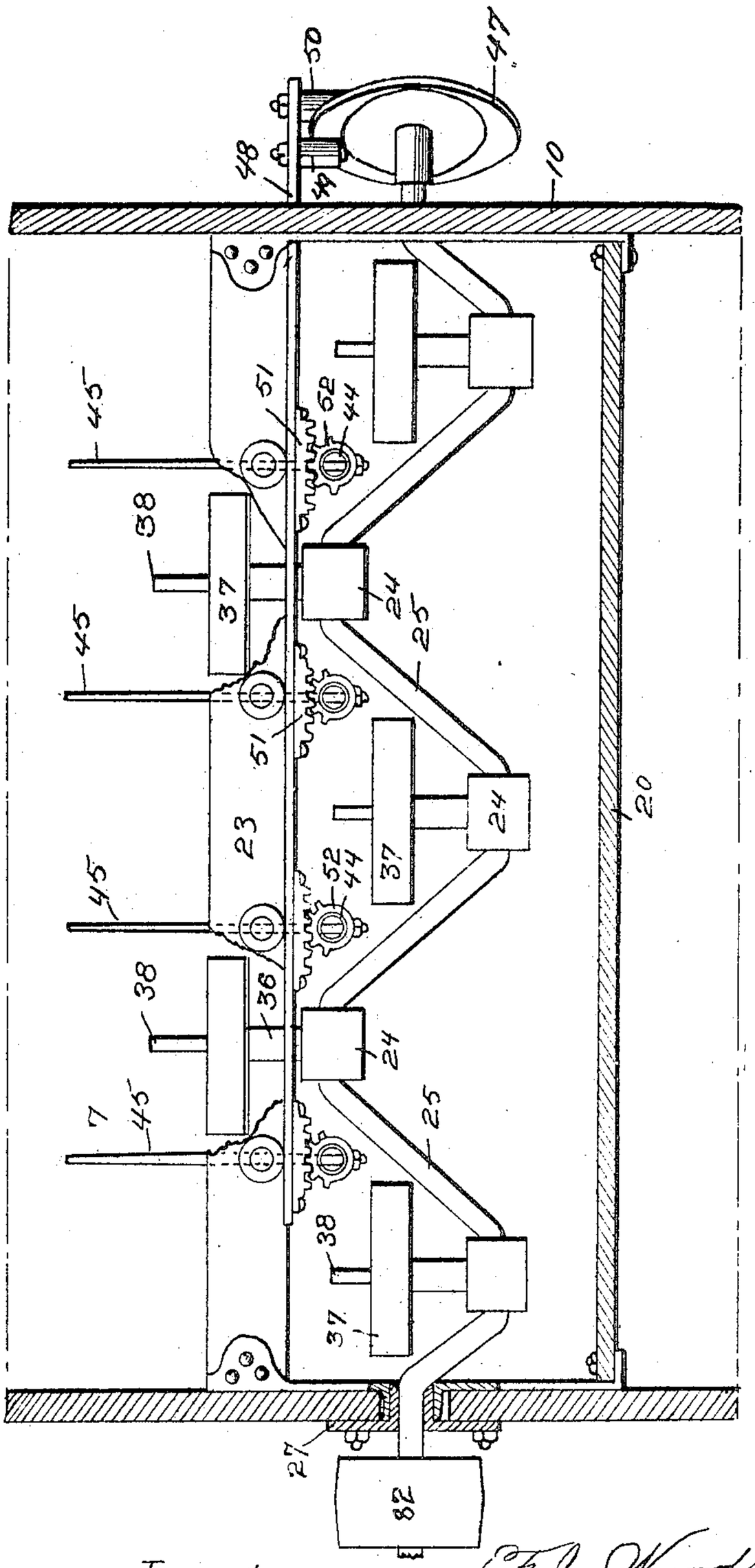
6 SHEETS—SHEET 4.

Fig. 4.



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6 SHEETS—SHEET 5.

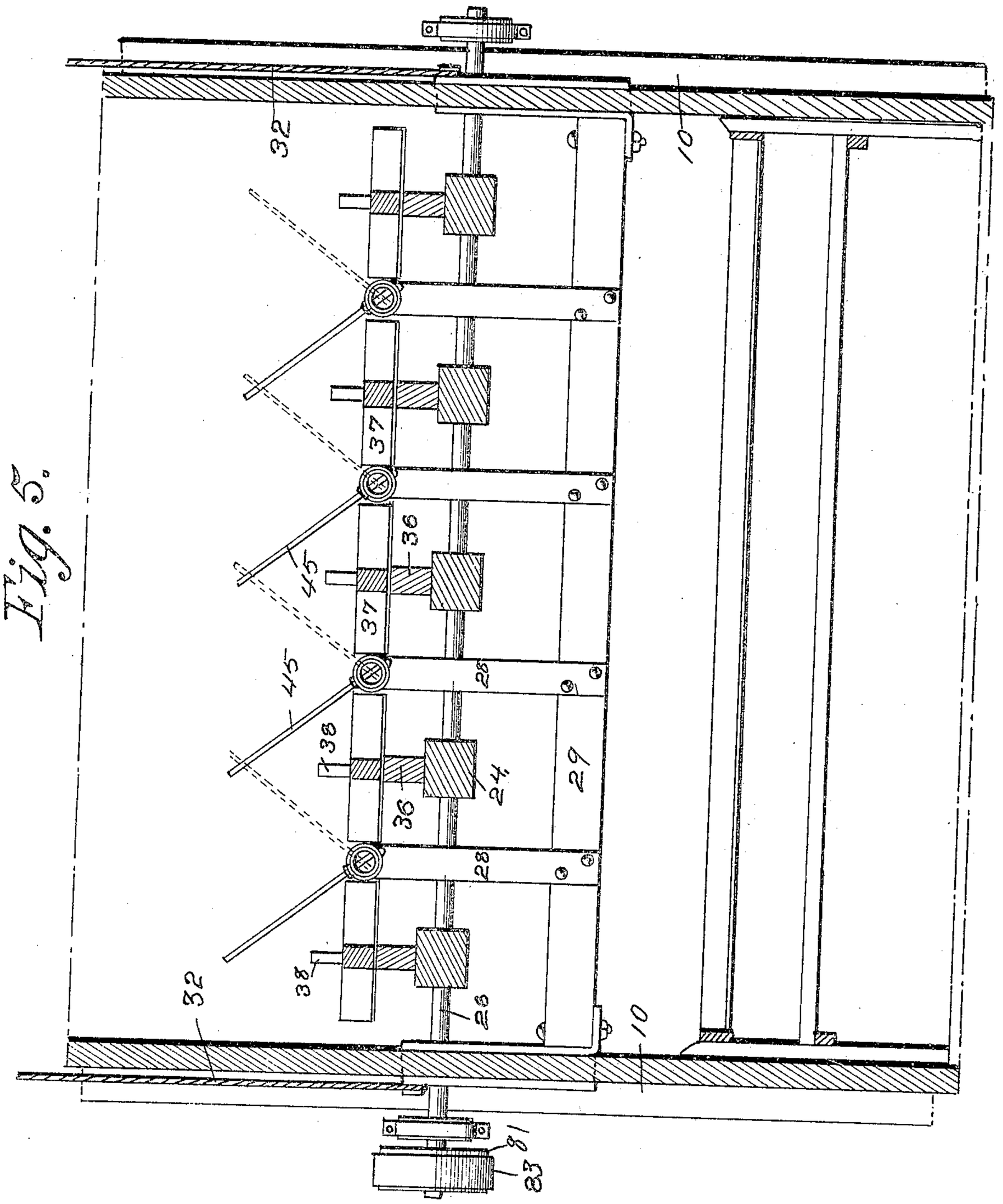

Fig. 5.

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6 SHEETS—SHEET 6.

Fig. 7.

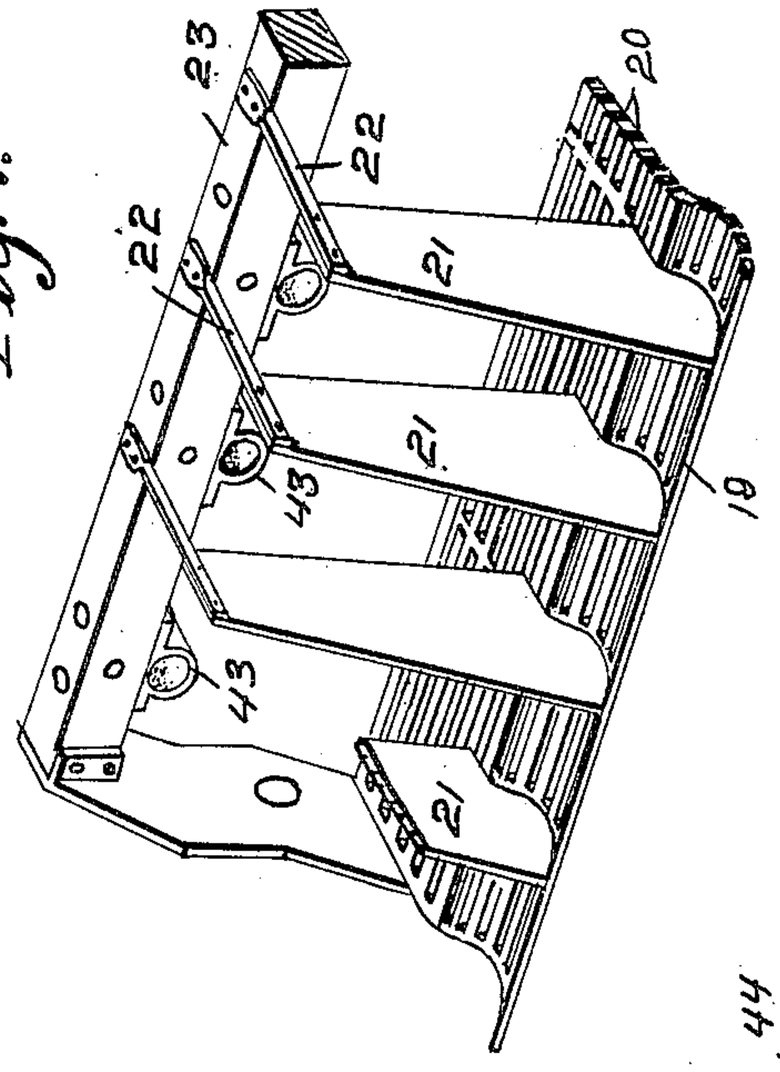


Fig. 8.

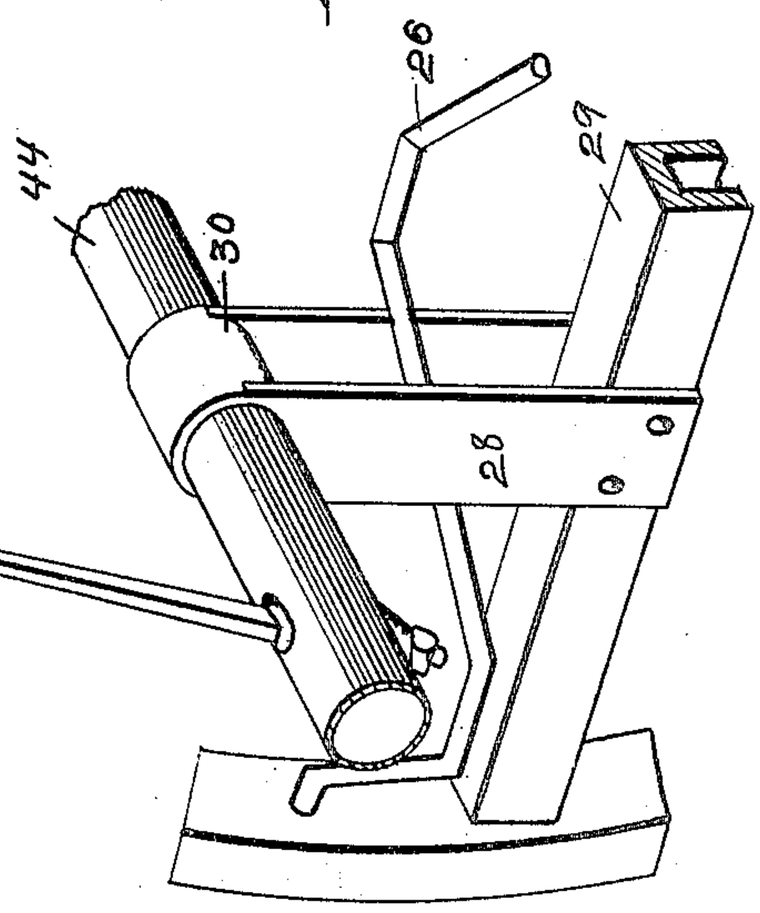
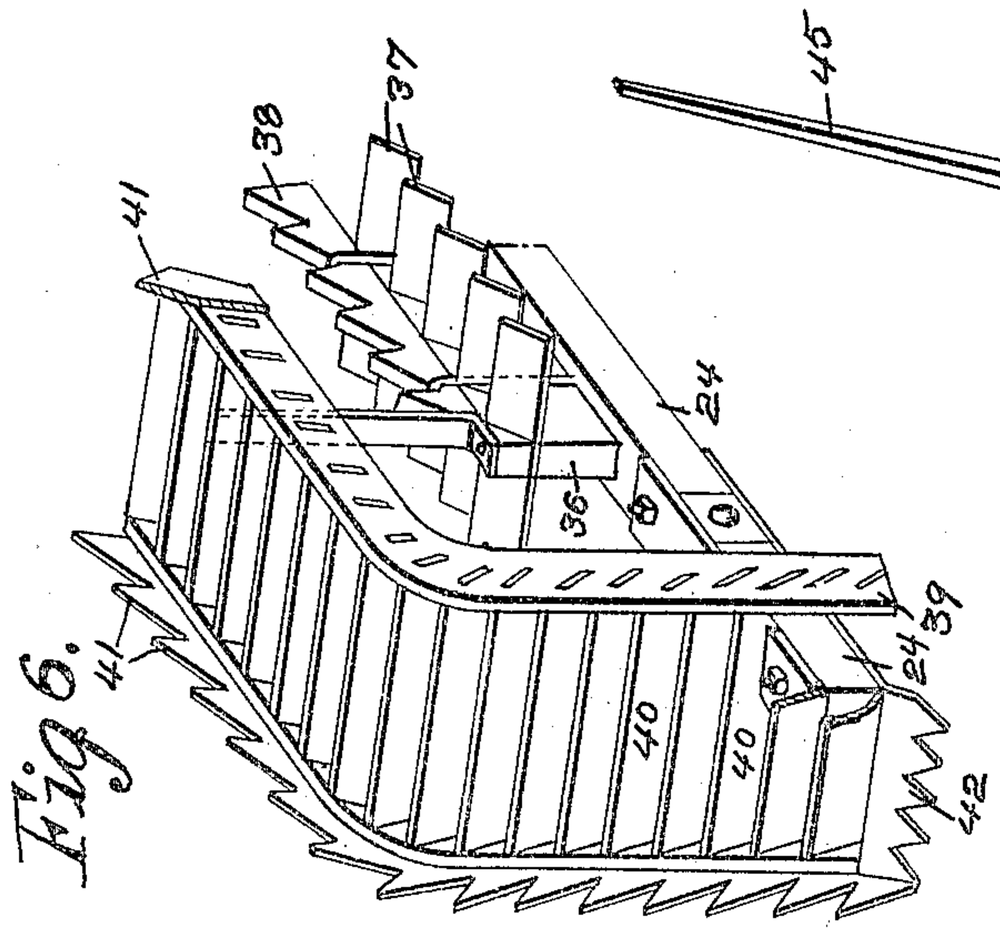


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANZ J. WOOD, OF DES MOINES, IOWA.

THRESHING-MACHINE.

No. 818,009. Specification of Letters Patent. Patented April 17, 1906.

Application filed June 24, 1904. Serial No. 213,961.

To all whom it may concern:

Be it known that I, FRANZ J. WOOD, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Threshing-Machines, of which the following is a specification.

The objects of my invention are to provide a threshing-machine of simple, durable, and inexpensive construction and to provide a machine of this class that will be of comparatively light weight and small size and yet capable of a maximum efficiency in separating grain from the stock.

My invention consists in the construction, arrangement, and combination of the various parts of the machine whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation of the complete machine. Fig. 2 shows a central longitudinal sectional view of the complete machine. Fig. 3 shows a top or plan view of the complete machine with the upper part of the machine-frame removed to illustrate the interior construction. Fig. 4 shows a detail sectional view of the machine-frame, taken in front of the ends of the shaking-pans to illustrate the mechanism for operating the oscillating arms and the relative position of the shaking-pans thereto. Fig. 5 shows a similar view taken on a line through the shaking-pans, illustrating the oscillating arms in a different position with relation to the shaking-pans. The dotted lines in this figure illustrate the position of the oscillating arms at one limit of their movement. Fig. 6 shows a detail perspective view of the forward end of one of the shaking-pans with the stock-elevating grate in position thereon. Fig. 7 shows a detail perspective view of a part of the stationary grated platform upon which stock is discharged from the concave and also the upright partitions mounted on the grated platform, and Fig. 8 shows a detail perspective view of one of the oscillating arms and the rock-shaft for operating it and one of the crank-shafts which operate the shaking-pans.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the frame of the machine. This frame is supported upon the wheels 11 in the usual manner. Near the front of the machine is the shaft 12, upon which the cylinder 13, having the teeth 14, is mounted. Beneath the cylinder is the concave 15, also provided with teeth 16. The cylinder and concave are of the ordinary construction. Above and in the rear of the cylinder is the shaft 17, upon which a beater 18 is mounted. Immediately in the rear of the concave is a stationary grated platform, the forward end of which (indicated by the numeral 19) is curved downwardly and rearwardly and then upwardly and rearwardly, and the rear end of the grated platform (indicated by the numeral 20) is arranged in a substantially horizontal plane. Mounted upon the grated platform is a series of upright partitions 21, the forward edges of which are flush with the front of the grated platform and inclined upwardly and rearwardly and the rear edges of which extend from a position a slight distance in the rear of the curved portion 19 of the grated platform and project straight upwardly. The upper ends of these upright partitions are fixed to the brackets 22 on the stationary cross-piece 23. The shaking-pans each comprise a shaking-pan beam 24, mounted at its front end portion on a crank-shaft 25 and at its rear end portion on a crank-shaft 26. The crank-shaft 25 is supported in suitable bearings 27 in the sides of the machine-frame, and the crank-shaft 26 is supported in the brackets 28, which brackets are fixed to a cross-piece 29, so that they may be jointly raised and lowered.

At the top of each of the brackets 28 is a bearing 30 for purposes hereinafter made clear. I have provided means for raising and lowering these brackets jointly as follows: Mounted upon the top of the machine-frame is a shaft 31, and a rope or cable 32 is attached to the shaft 31 at one end and to the crank-shaft 26 at its other end, so that by turning the shaft 31 the crank-shaft 26 may be raised and lowered. For securing the shaft 31 in various positions I have fixed a ratchet-wheel 33 to the shaft 31, and a pawl 34 is provided for engaging the ratchet-wheel. A crank 35 is also provided for turning the shaft 31. In this way the shaft 26 may be supported in various positions. When the crank-shafts 25 and 26 are rotated, the shaking-pan beams will be oscillated in the ordinary manner required for advancing the stock resting upon the shaking-pans from the front toward the rear of the machine. The shaking-pans proper comprise a longitudinal

strip 36 on top of each shaking-pan beam 24, and at the top of the strip 36 are the cross-slats 37, inclined upwardly and rearwardly. These cross-slats are all of even length, and those on one shaking-pan beam project to positions slightly spaced apart from those on the adjacent shaking-pan beams, and on top of the center of each strip 36 is a toothed rib 38, projecting above the cross-slats 37 and arranged at the longitudinal center of said cross-slats. These shaking-pans are of a length to extend from a point near the grated platform 19 and 20 to a point near the rear of the machine. Secured to the forward end of each shaking-pan is a stock-elevating grate. Each stock-elevating grate comprises two side pieces 39, supported at the front of the shaking-pan beam and inclined upwardly to a point above the top of the rib 38 and then rearwardly and upwardly, as clearly shown in Fig. 6. The parts 39 are connected by a series of cross-slats 40, which are inclined upwardly and forwardly between the upright portions of the parts 39 and upwardly and rearwardly between the rearwardly-projecting portions of the parts 39. Fixed to each of the parts 39 is a notched rib 41, and at the bottom of the stock-elevating grate is a toothed arm 42, projecting downwardly and forwardly. These stock-elevating grates are so arranged that the sides of their upright portions stand between and close to the upright partitions 21, and their rearwardly-projecting portions extend over the top of the cross-piece 23. The rib 42 at the front of each pan projects downwardly into the part 19 of the grated platform. In use with this portion of the machine and assuming that stock is being passed through between the cylinder and concave and that the shaking-pans are being oscillated, the layer of stock coming from the concave will be directed upwardly and rearwardly by the front edges of the upright partitions 21. Some of the stock, however, will pass between the partitions upon the grated platform and against the front edges of the stock-elevating grates. This stock will be moved upwardly by the oscillating movements of the stock-elevating grates. The front edges of the upright partitions will serve to prevent stock from adhering to the notched ribs at the sides of the stock-elevating grate during the rearward and downward portion of their movement, and the grated platform, the notched rib 42, and the slats 40 will all permit kernels of grain to pass downwardly while the straw or stock is being forced upwardly and loosened or untangled. The beater 18 will prevent the stock from moving forwardly over the cylinder, and it will direct the stock rearwardly over the tops of the stock-elevating grates, so that after leaving the grates the stock will fall upon the shaking-pans, and it will be delivered upon the shaking-pans in a loose fluffy condition, which will readily permit the heavy kernels to pass through the layer of stock. This layer is gradually advanced toward the rear of the machine by the oscillating movements of the shaking-pans.

One of the important features of my invention is the means for forcing the layer of stock that rests upon the shaking-pans upwardly and from side to side of the machine as the stock progresses toward the delivery end. On the under surface of the cross-piece 23 I have fixed a number of bearings 43, and between each pair of the shaking-pans I have mounted a shaft 44, the forward end of which is supported in one of the bearings 43 and the rear end in one of the bearings 30. When the shaking-pans are in the position shown in Fig. 5 of the drawings, all in the same horizontal plane, the shafts 44 stand between the shaking-pans and approximately fill the space between the edges of the shaking-pans, but do not engage the shaking-pans. Then when the shaking-pans are at their limit of movement vertically relative to each other, as shown in Fig. 4, the shafts 44 are above some of the shaking-pans and below the others. Mounted in each of the shafts 44 is a series of separating-arms 45, projecting rearwardly and upwardly. I have provided for jointly rocking the shafts 44 during the operation of the machine, as follows: Mounted upon the crank-shaft 25 is a cam-wheel 47, and slidingly mounted near the forward end of the machine-frame is a rack-bar 48, having two rollers 49 and 50 fixed thereto, engaging opposite faces of the cam-wheel 47. Hence when the cam-wheel is rotated the rack-bar 48 will be reciprocated across the machine. Fixed to the rack-bar are a number of racks 51. Above the adjacent end of each of the shafts 44 and fixed to each shaft 44 is a pinion 52, in mesh with the adjacent rack 51. Hence the shafts 44 are rocked during the rotation of the crank-shaft 25. As before stated, the arms 45 project rearwardly and upwardly, and when the shafts 44 are rocked a rocking movement is imparted to the said arms 45. The limit of their movement is shown in Fig. 5 of the drawings. In one position the upper ends of the arms project over the ribs 38 of the shaking-pans on one side, and at the other limit of movement they project over the ribs 38 on the pans at the other side, and at the center of their movement they stand vertically, so that they do not interfere with the up-and-down movements of the shaking-pans. Hence by moving the shafts 44 by power direct from the crank-shaft 25 the movement of the arms 45 will be timed with relation to the movement of the shaking-pans, so that they will not interfere with each other. In operation the effect of these arms 45 will be as follows: Assuming that a layer of stock is resting upon the shaking-

pans and assuming that kernels of grain have been separated from the heads and lie on top of the layer of grain, the arms 45 will first throw the stock upwardly and toward one side of the machine-frame, and immediately thereafter the arms will throw the stock upwardly and toward the other side of the machine-frame, thus turning over each portion of the layer of stock and permitting any kernels that may be embedded in the layer to drop through the shaking-pans. The operation of the shaking-pans themselves without the arms 45 is such that the stock is advanced in a continuous layer from the front toward the rear of the machine and the kernels of grain that are contained in the matted layer of stock do not readily pass through the layer; but by providing arms 45 to engage the under surface of a layer of stock resting on feeding-pans and by oscillating these arms the portion of stock that is engaged by the arms on each shaft is thrown upwardly and partially turned over, and before it reaches the pan on the opposite side toward which it is being thrown the adjacent set of arms strikes it and throws it upwardly and toward the other side, thus causing it to be partially turned over and permitting any kernels therein to drop through, and by timing the movements of the arms 45 properly with relation to the movements of the shaking-pans, as shown and described, they will not in any way interfere with the movement of each other. On account of the thorough separation of the kernels from the stock caused by the coöperation of the arms 35 with the shaking-pans a threshing-machine of comparatively light weight and small size may be used, because the length of the shaking-pans may be made materially less than if no arms 45 were provided.

At the rear of the machine-frame is a wind stacker-tube 53, projecting upwardly and rearwardly. The top of the machine-frame inclines downwardly and rearwardly at 54 to a point where it strikes the wind stacker-tube. The bottom of the machine from the point about its transverse center to a point near its rear end is made solid at 55 and inclines rearwardly and upwardly throughout the entire width of the machine and then upwardly and rearwardly at a greater angle at 56 and gradually narrows to a point where it strikes the wind stacker-tube. Located directly under the rear ends of the feeding-pans is a deflector 57, inclined upwardly and rearwardly, its rear end being nearer the part 56 than its forward end, thus forming a narrowed throat. As will hereinafter appear, I have provided means for creating a wind-blast to pass over the bottom 55, then upwardly between the bottom 56 and the deflector 57, and then into the wind stacker-tube, the parts being so arranged that stock passed over the feeding-pans will be directed by the part 54 of the top and the deflector 57 to enter the wind stacker-tube 53. I have also provided means whereby a single shaft and the necessary means for driving it may be made to perform the double function of separating the chaff from the grain on the sieves of the machine and also of providing the necessary wind-blast for the stacker-tube. The numeral 58 indicates a shaft upon which the fan 59 is mounted. This fan is contained in a large fan-casing 60, mounted beneath the machine-frame. Air is introduced into the fan through the eye 61 at one side and is discharged from the fan-casing over the inclined bottom 55, which forms a continuation of one edge of the fan-casing. The adjacent edge of the fan-casing is spaced apart from the bottom 55 and inclines upwardly and rearwardly at 62 to a point adjacent to the forward end of the separating grate or sieve 63. The top of the stacker-tube extending from the fan-casing to a point near the deflector 57 is indicated by the numeral 64 and extends from one side of the machine to the other, forming a wide shallow passage-way for the air-blast from the fan. The forward end of the part 64 is spaced apart slightly from the lower end of the part 62, thus forming an air passage-way between said parts. This passage-way, however, is controlled by a valve 65, and I have provided means for automatically operating this valve in order to supply an air-blast sufficiently to meet the requirements of the grate or sieve 63 under varying conditions, as follows: The said grate or sieve 63 is pivotally supported at its rear end and its forward end is mounted at each side upon a link 66. Each of these links is pivoted to a bell-crank lever 67, fulcrumed to a stationary support and connected to the slide-valve 65. A contractible spring 68 is fixed at one end to the machine-frame, projected rearwardly, and adjustably connected by means of a thumb-nut 69 with the lower end of the bell-crank lever 67. When a considerable quantity of chaff and grain accumulates on top of the grate or sieve 63, the weight thereof overcomes the resiliency of the spring 68 and permits the forward end of the grate or sieve to move downwardly, and this movement withdraws the valve 65 to thereby enlarge the opening to the fan-casing, so that a relatively great amount of wind-blast passes upwardly through the grate or sieve sufficient to advance the accumulated chaff and grain on the grate or sieve 63, and when the quantity of chaff and grain is diminished the valve is operated to diminish the quantity of wind-blast, so that the supply of wind-blast to the grate or sieve may be proportioned to the requirements of the grate or sieve under varying conditions. Beneath the grate or sieve is an inclined platform 70, upon which the grain moves downwardly to the spiral conveyer 71. This conveyer is of the ordinary construction

and moves the grain laterally beneath the machine to a point of discharge. At the top of the inclined platform 70 is a tailings-spout 71[a], in which is mounted a spiral conveyer 71[b] of the ordinary construction. In operation with this portion of my machine the fan 59 is made large enough and is run at a rate of speed sufficient to provide a wind-blast sufficient for the requirements of the grate or sieve of the machine and also sufficient to move the stock upwardly through the wind stacker-tube. The machine is built with the wind stacker-tube and the machine-frame all complete and in compact form. Only one shaft 58 and gearing for driving it are necessary to supply wind-blast for both purposes. At the point where the wind-stacker communicates with the fan-casing the tube is of the entire width of the machine-frame, but quite shallow, sufficient, however, to carry the proper quantity of wind-blast. At the rear of the machine the wind stacker-tube is narrowed toward its upper end, but is also made deeper to thereby carry the proper quantity of wind-blast. The deflector 57, coöperating with the top of the machine 54, causes the wind-blast to enter the upper end of the stacker-tube and also directs the stock into the stacker-tube. By this arrangement a relatively small and compact machine is provided and the cost of the machine is minimized, because one fan and one shaft and the necessary means for driving them are made to accomplish a double function.

I have provided means for driving the various operative parts of the machine, as follows: On the shaft of the threshing-cylinder I have mounted a pulley 72, to which power may be applied from an engine. On both ends of this shaft 12 I have mounted pulleys 73, which are connected by belts 74 with pulleys 75 on the fan-shaft 58. This double system of belts and pulleys for this purpose is provided to prevent slipping and to drive the large fan at a relatively high rate of speed. The beater-shaft 17 and the shaft 25 of the shaking-pans are driven by means of a pulley 76 on the beater-shaft and a pulley 77 on the crank-shaft 25. These pulleys are connected with each other and also with a pulley 78 on the threshing-cylinder shaft by means of a belt 79. An adjustable belt-tightener 80 is provided for this belt 79 and is of the ordinary construction. I provide for operating the crank-shaft 26 by means of a pulley 81 on the shaft 26, a pulley 82 on the shaft 25, and a belt 83 connecting them. I have provided for driving the conveyers 71 and 71[b] by means of the pulley 84 on the spiral conveyer 71, the pulley 85 on the spiral conveyer 71[b], and the pulley 86 on the shaft of the fan-casing. These pulleys are connected by a belt 87, and a belt-tightener 88 is provided for said belt.

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

1. The combination of a platform, upright partitions secured to the platform, oscillating straw-pans and stock-elevating grates secured to the front ends of the shaking-pans and projecting between the upright partitions.

2. A combination with an oscillating straw-pan of a stock-elevating grate, comprising two sides fixed at their lower ends to the front of the straw-pan extending upwardly and rearwardly, and toothed at their front and top edges, a support fixed to the straw-pan extending upwardly and attached to the rear end of said sides, and slats between the sides arranged at an angle adapted to move straw upwardly and rearwardly over the top of the straw-pan and to permit grain to pass through.

3. The combination of a series of stock-advancing pans capable of up-and-down movement, a series of stock-spreading fingers mounted for rocking movement only and means for operating said pans and fingers in unison, said fingers arranged with relation to the pans to project over the pans that are at their lower limit of movement and away from the pans that are at their upper limit of movement.

4. The combination of a series of stock-advancing devices, means for oscillating them in vertical planes the alternate ones being moved in opposite directions, a series of stock-spreading fingers mounted between said advancing devices and capable of rocking from side to side, said stock-advancing devices being alternately moved above and below the center of movement of said fingers, and means for rocking the fingers to project over the stock-advancing devices that are below their center of movement and away from those above their center of movement.

5. The combination of a series of stock-advancing devices spaced apart, means for oscillating them in vertical planes, the alternate ones being moved in opposite directions, a series of rock-shafts in stationary bearings arranged between the stock-advancing devices at a point midway between the upper and lower limits of movement of said stock-advancing devices, spreading-fingers secured to said shafts and projecting upwardly and toward the delivery end of the stock-advancing devices, and means for rocking said shafts in unison with the movement of the stock-advancing devices, said means causing the arms to project over the stock-advancing devices that are at their lower limits, and away from the stock-advancing devices that are elevated.

6. The combination of a platform, upright partitions secured to the platform, a cross-piece supporting the upper ends of the upright partitions, oscillating shaking-pans, and

stock-elevating grates secured to the front end of the shaking-pans and projecting between the upright partitions.

7. In a threshing-machine, the combination of a grated platform having a trough-shaped forward end, a number of upright partitions spaced apart, secured to the grated platform, their forward ends extending upwardly and rearwardly, a cross-piece supporting the upper ends of said partitions, a series of shaking-pans, a stock-elevating grate secured to the forward end of each shaking-pan, comprising an upright portion projecting above the top of the shaking-pan, a portion projecting rearwardly and upwardly therefrom, notched ribs at the sides of the shaking-pans standing close to the adjacent partitions, in one position of the shaking-pans projecting in front of the front edges of the partitions and in another position of the shaking-pans projecting in the rear of the front edges of the partitions, and fingers at the lower ends of the stock-elevating grates projecting downwardly and forwardly and moving close to the trough-shaped portion of the grated platform.

8. The combination of a crank-shaft, having oppositely-disposed crank-arms, two shaking-pans mounted on the crank-arms, a rock-shaft supported between the shaking-pans, arms fixed to the rock-shaft and projecting upwardly, a pinion on the rock-shaft, a rack-bar in mesh with the pinion and means driven by the crank-shaft for reciprocating the rack-bar.

9. The combination of a crank-shaft, having oppositely-disposed crank-arms, two shaking-pans mounted on the crank-arms, a rock-shaft supported between the shaking-pans, arms fixed to the rock-shaft and projecting upwardly, a pinion on the rock-shaft, a rack-bar in mesh with the pinion, and a cam on the crank-shaft operatively connected with the rack-bar.

10. The combination with a crank-shaft having oppositely-disposed crank-arms, of two shaking-pans supported on the crank-arms, a rock-shaft mounted on a stationary support and extending between the shaking-pans, arranged above the lower pan and below the upper pan, when the pans are at their opposite limits of their up-and-down movement, arms fixed to the rock-shaft and movable to position over the pans and means for rocking the shaft in unison with the oscillating movements of the shaking-pan.

11. The combination of two crank-shafts having oppositely-disposed crank-arms, two shaking-pans mounted on the crank-arms, of said shafts, a rock-shaft mounted on a stationary support between the shaking-pans, arms fixed to the rock-shaft and projecting upwardly and toward the delivery end of the shaking-pans, a cam on one of the crank-shafts, a rack-bar operatively connected with the cam, and a pinion on the rock-shaft meshed with the rack-bar.

12. The combination of a machine-frame, a crank-shaft having oppositely-disposed crank-arms rotatably mounted in the machine-frame, a second crank-shaft having oppositely-disposed crank-arms, a cross-piece, brackets on the cross-piece supporting the second crank-shaft, means for raising and lowering the cross-piece, a number of shaking-pans connected to the crank-arms of said shafts, a stationary cross-piece fixed to the machine-frame, a number of rock-shafts arranged between the shaking-pans supported at one end by the stationary cross-piece and at the other end by the brackets on the adjustable cross-piece, arms fixed to the rock-shafts and projected upwardly and rearwardly, and means driven by one of the crank-shafts for operating the rock-shafts.

13. The combination of a machine-frame, a crank-shaft having oppositely-disposed crank-arms rotatably mounted in the machine-frame, a second crank-shaft having oppositely-disposed crank-arms, a cross-piece, brackets on the cross-piece supporting the second crank-shaft, means for raising and lowering the cross-piece, a number of shaking-pans connected to the crank-arms of said shafts, a stationary cross-piece fixed to the machine-frame, a number of rock-shafts arranged between the shaking-pans supported at one end by the stationary cross-piece and at the other end by the brackets on the adjustable cross-piece, arms fixed to the rock-shafts and projected upwardly and rearwardly, pinions on the rock-shafts, a rack-bar slidingly supported and in mesh with the pinions, and a cam on one of the crank-shafts operatively connected with the said rack-bar.

14. The combination of a machine-frame, a grate or sieve, a bottom for the machine-frame inclined upwardly and rearwardly, a discharge-spout to receive stock forced over the bottom, a fan-casing, a partition above the bottom extending from a point near the fan-casing to a point beyond the grate or sieve, a fan in the fan-casing, a tailings-spout above the first partition extending laterally and a grain-discharge spout extending laterally beneath the end of the grate or sieve opposite from the tailing-sieve.

15. The combination of a machine-frame inclosed at its discharge end, a discharge-spout communicating with the delivery end of the machine, a grate or sieve near the bottom of the machine-frame, a fan-casing below the machine-frame, a solid bottom extending from the fan-casing to the discharge-spout, a partition above the inclined bottom extending from a point in the rear of the grate or sieve to a point adjacent to the fan-casing, a partition extending from the fan-casing to a point in front of the grate or sieve,

a deflector extending from a point above the rear end of the grate or sieve upwardly and rearwardly, and a fan in the fan-casing.

16. The combination of a machine-frame inclosed at its discharge end, a discharge-spout communicating with the delivery end of the machine, a grate or sieve near the bottom of the machine-frame, a fan-casing below the machine-frame, a solid bottom extending from the fan-casing to the discharge-spout, a partition above the inclined bottom extending from a point in the rear of the grate or sieve to a point adjacent to the fan-casing, a partition extending from the fan-casing to a point in front of the grate or sieve, a deflector extending from the point above the rear end of the grate or sieve upwardly and rearwardly, and a fan in the fan-casing, and a valve controlling the passage-way to the grate or sieve.

17. The combination of a machine-frame inclosed at its discharge end, a discharge-spout communicating with the delivery end of the machine, a grate or sieve near the bottom of the machine-frame, a fan-casing below the machine-frame, a solid bottom extending from the fan-casing to the discharge-point, a partition above the inclined bottom extending from a point in the rear of the grate or sieve to a point adjacent to the fan-casing, a partition extending from the fan-casing to a point in front of the grate or sieve, a deflector extending from the point above the rear end of the grate or sieve upwardly and rearwardly, a fan in the fan-casing, and a threshing-cylinder and means for driving the fan from the threshing-cylinder.

18. A combination of a machine-frame comprising an inclosed casing communicating with a stacker-trunk, a grate or sieve yieldingly supported in machine-frame, a fan-casing, a fan therein, partitions arranged to direct air from the fan under the sieves and into the stacker-trunk, and also through the sieves, a valve arranged to control the passage-way from the fan-casing to a point through the sieves, and means for connecting the sieve and valve, said means tending to open the valve when the sieve is lowered by an accumulation of stock, and also tending to close the valve when the sieve is in a normally elevated position.

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Witnesses:
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