

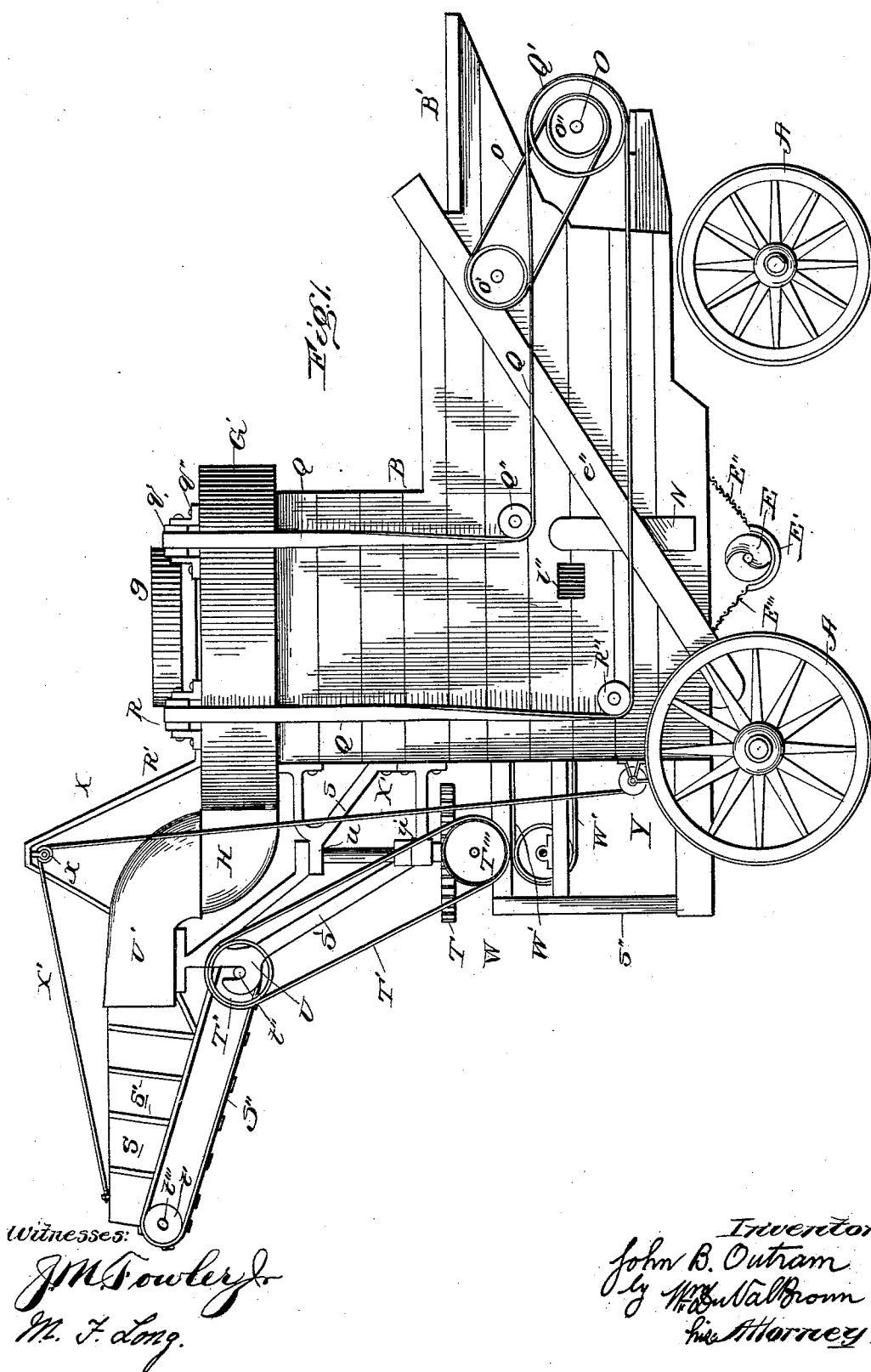
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4 Sheets—Sheet 1.

J. B. OUTRAM.
THRESHING MACHINE.

No. 569,298.

Patented Oct. 13, 1896.



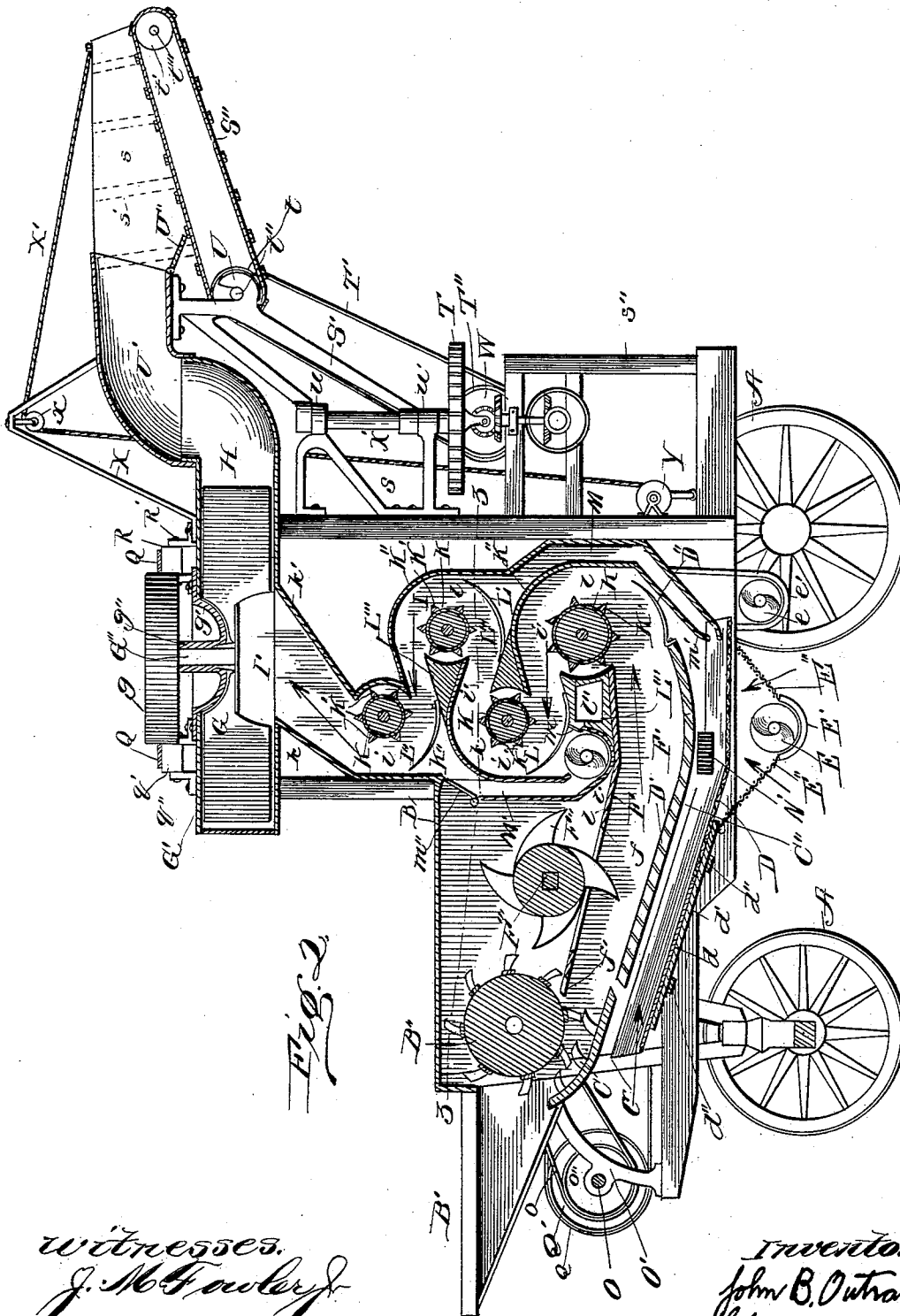
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4 Sheets—Sheet 2.

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witnesses.
J. M. Fowler &
M. J. Long.

Inventor:
John B. Outram
G. M. & A. Brown
his Attorney.

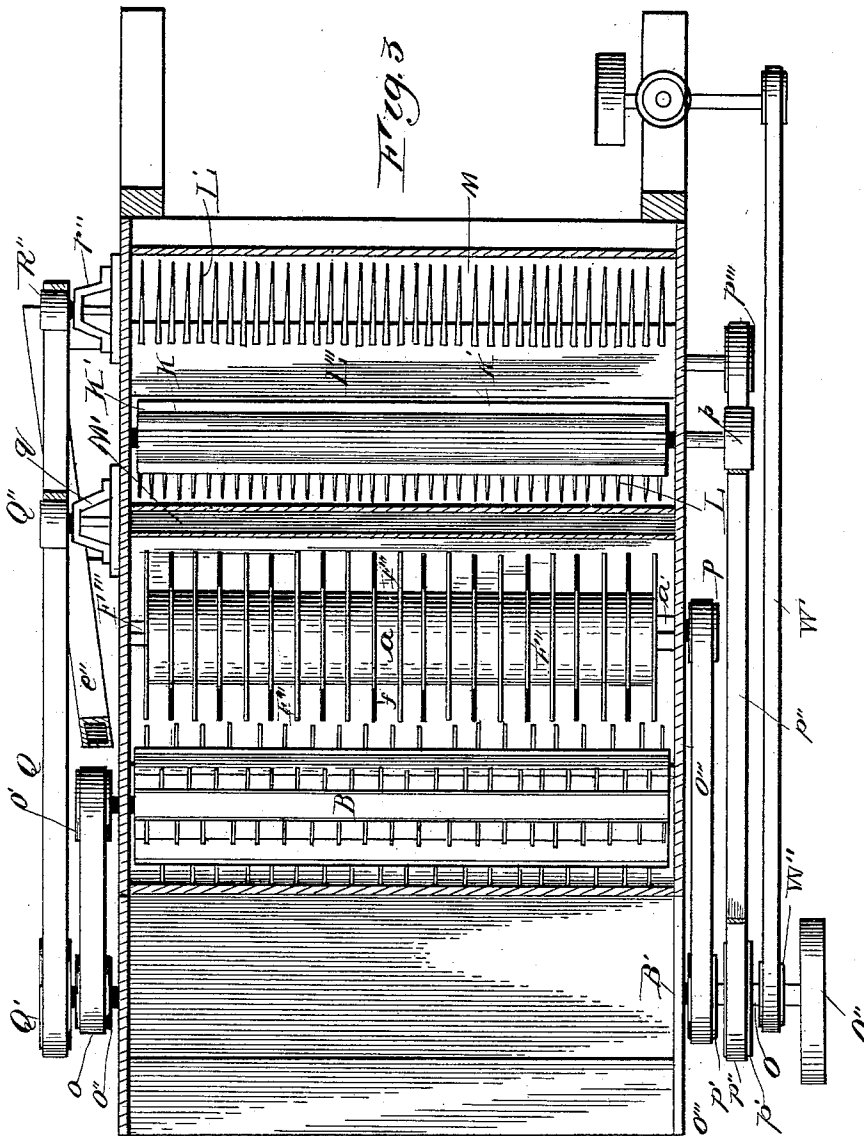
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4 Sheets—Sheet 3.

J. B. OUTRAM.
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witnesses.

J. M. Fowler Jr.

M. F. Long.

Inventor:

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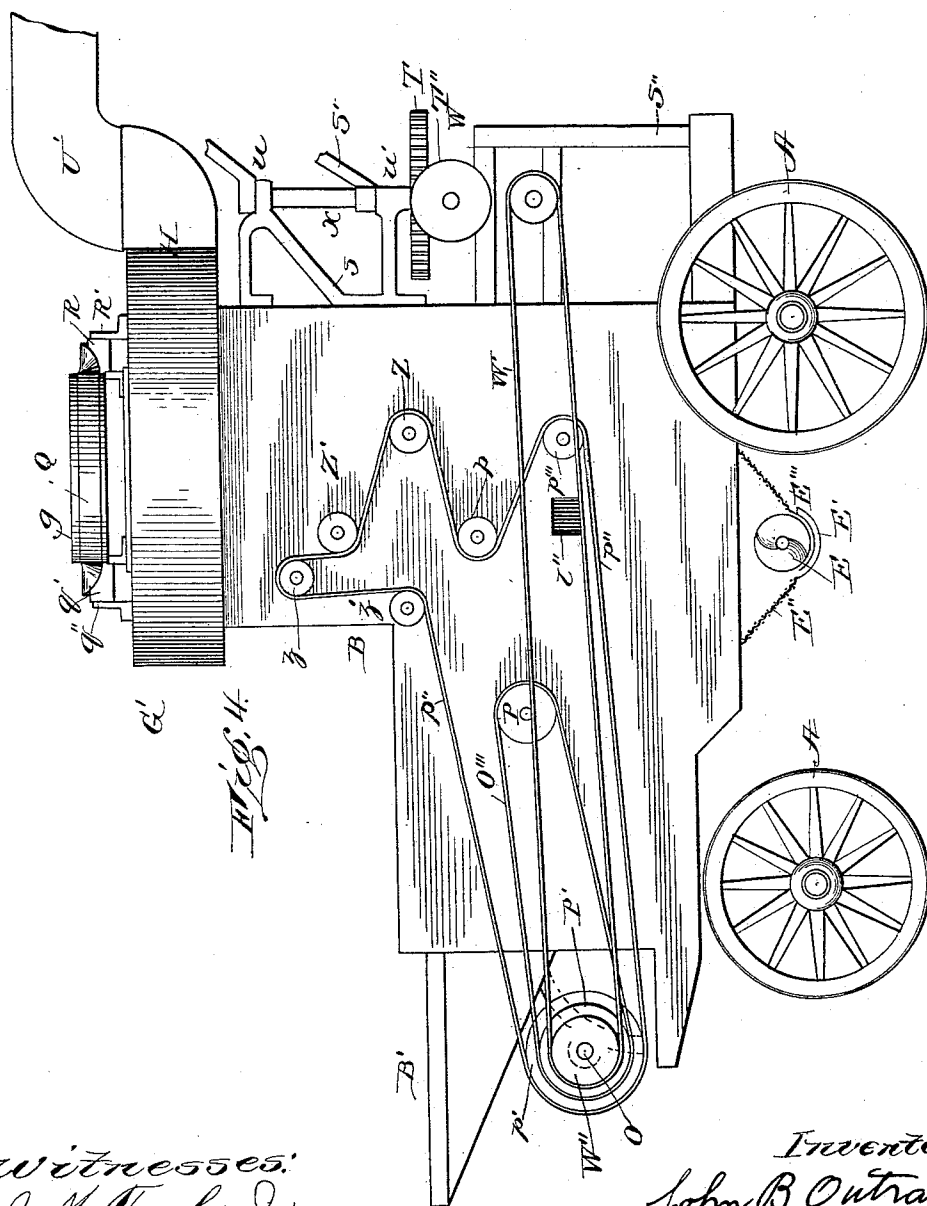
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4 Sheets—Sheet 4.

J. B. OUTRAM.
THRESHING MACHINE.

No. 569,298.

Patented Oct. 13, 1896.



Witnesses:
J. M. Fowler Jr.
G. E. Glascock

Inventor
John B. Outram
By ^{Wm} Donald Brown
his Attorney

UNITED STATES PATENT OFFICE.

JOHN B. OUTRAM, OF URBANA, OHIO, ASSIGNOR TO SAM BUFKIN, OF COLUMBUS, OHIO.

THRESHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 569,298, dated October 13, 1896.

Application filed March 23, 1896. Serial No. 584,485. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. OUTRAM, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Threshing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a new and useful improvement in threshing-machines; and it consists in the construction and arrangement of parts hereinafter described, and definitely pointed out in the claims.

The aim and purpose of this invention is to construct a threshing-machine wherein the straw after being passed through the thresher mechanism is pulled forward by means of a suction-fan located adjacent the exit, carrying forward the straw, dust, and chaff and allowing the grain to fall downward by gravity, thereby pulling away and separating the straw, dust, and chaff from the grain and dispensing with the ordinary vibrating straw-racks and separators and cumbersome mechanism now used in threshing-machines.

It is also the object to construct a threshing-machine which will occupy but a small space, be light in weight, have but little mechanism, and therefore require a small amount of driving power, and which can be cheaply manufactured and easily moved from place to place.

In the drawings I show one construction and arrangement of parts whereby these objects can be accomplished and wherein like letters of reference indicate corresponding parts in the several views, and in which—

Figure 1 is a side elevation of a threshing-machine embodying my invention. Fig. 2 is a longitudinal vertical section through the same; and Fig. 3 is a horizontal section on the line 3 3, Fig. 2. Fig. 4 is a side elevation of the machine, showing the side opposite of that shown in Fig. 1, parts of the stacker mechanism being omitted.

In the drawings, A designates the supporting-wheels, and B the casing. The forward end of the casing is provided with the usual

feed-board B', and in the rear of the feed-board and within the casing is the threshing mechanism, which consists of the ordinary cylinder B'' and concave C. The forward lower end of the casing below the threshing mechanism is left open, as shown at C', for the passage of air, as hereinafter described. The bottom of the casing in rear of the threshing mechanism is also left open, as shown at C'', for the same purpose.

Above the opening C'' in the bottom of the casing is arranged a vibrating screen or pan D, and above the vibrating screen is a vibrating grate D', having teeth D'', projecting from the rear end, for a purpose hereinafter described. The forward portion of the screen D is provided with a closed or solid bottom d, and secured to the under side of the bottom is a sliding board d', secured in place by the strips d'', and which acts as a damper regulating the size of the opening in the bottom of the casing and consequently regulating the force of the air-currents drawn through the bottom by the suction-fan, as hereinafter described.

Below the screen or pan D is located the grain-auger or screw conveyer E, which rests in the trough E'. The trough is supported by the oppositely-inclined screens E'' and E''', which have their lower ends secured to the edge of the trough and their upper ends secured to the casing. At the rear of the shaking pan or screen is located the auger e, which is adapted to receive the tailings as they fall from the pan. This auger rests in a trough e', which is secured to the casing. This auger communicates with a tailings-elevator e'', which is located on the outside of the casing, as shown in Fig. 1, and conveys the tailings back to the feed-board in the usual and well-known manner.

Above the vibrating grate D' is secured a decking or deflector F. This decking is secured to the sides of the casing, and is located a sufficient distance above the grate to form a passage-way F' for the straw and grain after passing through the threshing mechanism. The vibrating screen or pan, grate, and decking are arranged at a rearwardly downwardly incline, thereby making the passage-

way F' incline rearwardly downward. Above the decking F' is arranged a series of knives F'' , mounted upon a squared shaft F''' . These knives extend down into the passage-way F' through slots f in the decking, and are adapted to revolve and engage the straw after leaving the thrasher mechanism and straighten out any bunches or tangles in the straw which might be formed in the threshing operation. These knives consist of two oppositely-arranged blades and are placed on the squared shaft so that the blades of one knife will be at an angle to the blades of the adjacent knife. These knives are spaced apart by the blocks α and can be adjusted by the nut α' on one end of the shaft. The forward end of this decking extends flush with the threshing-cylinder and is provided with the slits f' , through which the teeth of the cylinder can pass, as plainly shown in Fig. 2.

The rear end of the passage-way F' communicates with the lower end of a tortuous passage I . The upper end of this tortuous passage connects with the exit I' , located at the top of the casing. Above the exit and outside of the casing is placed a suction-fan G , which is protected by a suitable housing G' . This fan is provided with a shaft G'' , which extends to the outside of the housing and has secured to its upper and outer end a pulley g .

g' designates a plate extending over the opening at the top of the casing. This plate is provided with an annular flange g'' , which surrounds the shaft G'' . It will thus be seen that the fan is incased in a practically airtight casing. Extending rearwardly from the housing and communicating with the interior thereof is a flue H for a purpose hereinafter described.

The tortuous passage I , as will be seen by referring to Fig. 2, consists of a series of vertical passages i and a series of horizontal passages i' . Arranged at the meeting points of these vertical and horizontal passages are beating or guide cylinders K , provided with longitudinal ribs K' . The outer walls of the tortuous passage above the cylinders are curved, as shown at K'' , so as to avoid any angles or obstructions above the cylinders when the straw is being pulled over the cylinders by the suction-fan. Above the uppermost cylinder the side walls are made flaring, as shown at k, k' , until they reach the exit, thereby making the passage I larger at the top than the bottom to make room for the larger volume of air which is sucked into the passage-way through the various openings hereinafter described and allow the straw to become separated, so that it can more readily pass through the exit and fan to the flue H .

Arranged at the rear end of the horizontal passages and below the cylinders are a series of teeth L, L', L'' , which are slightly curved upward, so as to project into the path of the moving straw. These teeth are arranged in

series and extend transversely entirely across the passage-way and are supported by the blocks L''' . These teeth are preferably formed of spring-steel.

Below the lower series of teeth L the passage-way is formed with an opening or chute, and below the opening is arranged a grain-auger l , resting in a trough l' . The lowermost block L''' is formed hollow and is connected with an opening l'' in the side of the casing.

m designates a lip extending down from the block L''' to a point adjacent the inner edge of the trough, but out of contact therewith, so that a current of air can be sucked in through the opening l'' and through the grain falling into the auger, carrying upward the chaff and dust and at the same time guiding the grain into the auger. Below the second series of teeth L' the bottom of the passage is left open communicating with the chute M , which extends down and discharges into the pan D . Air will be drawn up through this chute, and to prevent too much air passing through the chute I provide its lower end with the inwardly-extending lip m' . Below the upper series of teeth L'' the bottom of the passage-way is provided with an aperture which communicates with a chute M' . The lower end of this chute discharges into the auger l . The side of the chute is formed with a hinged door m'' for the admission of air to the chute. By making the door with a hinge the amount of and force of the air sucked in by the fan can be regulated. The end of the auger l communicates with a spout N on the outside of the casing, as shown in Fig. 1, which has an inward bend and discharges into the pan D , as shown at N' , Fig. 2.

It will thus be seen that any grain which is carried up through the tortuous passage will become separated from the straw and dust either by coming in contact with the cylinders or teeth and fall by force of gravity into the various chutes and be led back onto the vibrating pan, where the thoroughly-separated grain will fall into the auger E and the tailings fall into the auger e . It will further be observed that the grain in falling through the various chutes and passages is subject to a strong upward draft of air, thereby pulling away the dust and chaff from the grain which is falling by gravity force and thoroughly separating the same. It will further be noticed that when the straw is being drawn up through the passage and is being guided around the curves by the guide-cylinders the straw will be entirely turned over every time it passes around a cylinder, and, further, when the straw reaches the end of a horizontal passage it will be supported by the fingers over the openings in the bottom of the passage, and will then be drawn up through the vertical passage-way, allowing the grain to fall directly down through the openings. The straw will not only be turned over by the

cylinders, but will strike against the walls of the tortuous passage, thereby assisting and separating the grains.

By forming the passage-way F' and the horizontal passages i' in the tortuous passage slightly inclined downward and the air being drawn in a straight line, as shown by the arrows, Fig. 2, the straw will be floated by the air and can be much more readily carried than if the force of the air were directly behind the straw. For that reason I provide the casing with the forward opening C' , and the air being drawn in a straight line to a point directly under the first guide-cylinder will travel at a slight angle to the straw and tend to float the straw, as above described, and greatly facilitate the movement of the same. The same purpose is accomplished in all the horizontal passages, and the air is in each case pulled directly into the rear of each horizontal passage and will travel at an angle to the path of the straw. By providing the damper d' I can readily vary the size of the opening C' , thereby regulating the force of the draft pulled in by the fan, as is desired according to the nature of the grain to be threshed. It will be noticed that the lower rear part of the casing is closed by the lower end of the chute M and trough e' , and that the air will pass through the pan D , as indicated by the arrows, Fig. 2.

The location of the openings in the casing is important for the reason that the air which carries the straw is drawn in through these openings and very little, if any, air will pass in between the concave and cylinder, which space will be occupied by the straw and prevent the passage of air.

The various parts are operated as follows: O designates a counter-shaft supported by a bracket O' , secured to the front part of the casing. The shaft is actuated by any suitable source of power (not shown) by a driven pulley O'' . The threshing-cylinder is driven by a belt o , passing over a pulley o' on the end of the cylinder-shaft and a pulley o'' on the counter-shaft. The knives are actuated by a belt o''' , passing over a pulley P on the end of the knife-shaft and a pulley P' on the counter-shaft. The guide-cylinders are driven by a belt P'' , which passes under a pulley P''' on the shaft of the lower cylinder and partially around the pulley p on the shaft of the next cylinder above and then under and partially around the next pulley Z on the shaft of the next cylinder and then partially around the pulley Z' on the shaft of the top cylinder, revolving each pulley and cylinder in opposite directions. The belt then passes around an idler z and belt-tightener z' on the side of the casing and then back to a pulley p' on the counter-shaft, all as plainly shown in Fig. 4. The fan is actuated by a belt Q , which passes around a pulley Q' on the counter-shaft and around a pulley Q'' , which is supported on a bracket q on the side of the casing. The belt is then given a quarter-

turn and passes over a pulley q' , supported on the top of the casing by a bracket q'' , and is then given a half-turn around the pulley g on the shaft of the fan, and is then given another quarter-turn and passes over a pulley R , supported by a bracket R' on top of the casing, and then down and around a pulley R'' , supported by a bracket r'' on the side of the casing, and then given another quarter-turn and back to the pulley Q' on the counter-shaft. It will thus be seen that the threshing-cylinder, guide-cylinders, and fan are operated by separate belts, and therefore if the threshing-cylinder should become choked and retarded its actuating-belt will simply slip over the pulley on the counter-shaft, and will not affect the movement of the suction-fan or guide-cylinders, and the suction-fan being revolved at the same rate of speed will assist in clearing the threshing-cylinder of the accumulated straw.

Secured to the rear end of the casing is a bracket S , and swiveled on the bracket is a supporting-arm S' for the automatic stacker. The arm rests on the collars u and u' on the bracket. The automatic stacker is of the ordinary construction and consists of an elevator passing around the pulleys t and t' , which are secured, respectively, on the shafts t'' and t''' and the side curtains s , supported by the uprights s' . The stacker is actuated by any well-known mechanism W , supported on the framework s'' , secured to the rear of the casing and actuated by a belt W' , which extends forward and around the pulley W'' on the counter-shaft. The stacker can be made to swing at any suitable angle to the flue by the ordinary means (not shown) engaging the gear-wheel T , secured on the supporting-arm S' . The elevator is actuated by a belt T' , passing over a pulley T'' , actuated by the driving mechanism and the pulley T''' , secured to the outer end of the shaft t'' .

The upper end of the supporting-arm S' is formed with hooks U , in which the ends of the shaft t'' rest. U' designates a hood swiveled to the outer end of the flue H . The outer end of the hood is secured to and is supported by the arm S' , so that when the arm swings the hood will also swing.

U'' designates an apron secured to the end of the hood and resting on the elevator.

X designates a derrick supported by the casing and supporting-arm, and X' designates a hoisting-rope having one end secured to the outer end of the automatic stacker and passing over a pulley x and then down to a winch Y , near the bottom of the casing, in order that the outer end of the automatic stacker can be raised or lowered as desired. It will thus be seen that by supporting the stacker by the hooks U the stacker can be readily taken off and another stacker substituted, such, for instance, as a pneumatic stacker, by simply uncoupling the belt T' and hoisting-rope X' and lifting the shaft t'' out of the hooks U .

It is further to be noted that in carrying out my invention, and as shown in Figs. 1 and 2, I am enabled to provide a much shorter casing than heretofore, and which will be about the same in height. I also dispense with the numerous straw-racks and separating-screens and the complicated mechanism for actuating the same.

While I have shown but one means for carrying out my invention, I desire it to be understood that I do not limit myself to the construction shown, and am aware that many changes can be made in the construction and arrangement of parts without in the least departing from the nature and principles of my invention.

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

1. In a threshing-machine, the combination with the casing having an exit at the top, a screened opening in the bottom and an opening in the front of the casing, of thresher mechanism located in the casing in front of the opening in the bottom and over the opening in the front of the casing, and a suction-fan located at the top of the casing and in the rear of the screened opening adapted to draw air through the screened opening and front of the casing and up out through the exit, whereby the threshed straw and dust are pulled in an upward direction from the screen through the casing and out through the exit by the force of the air, substantially as described.

2. In a threshing-machine, the combination with the casing, having an exit at the top and a screened opening in the bottom, of thresher mechanism located in the casing in front of the opening in the bottom, a decking located above the said opening, extending rearwardly from the thresher mechanism, an upwardly-extending passage at the rear of the decking and a suction-fan located at the top of the casing adapted to draw air through the screened opening of the casing under and around the rear end of the decking and then upwardly through the passage and out through the exit, whereby the threshed straw and dust are drawn rearwardly over the screened opening and upwardly through the passage and out through the exit, substantially as described.

3. In a threshing-machine, the combination with the casing having an exit at the top, an opening in the bottom and an opening in the front of the casing, of thresher mechanism located in the casing in front of the opening in the bottom and over the opening in the front of the casing, a downwardly-inclined decking arranged above the opening in the bottom and on a plane above the opening in the front, a downwardly-inclined grate or screen below the decking and over the opening in the bottom, the decking and screen or grate forming a downwardly-inclined passage in the rear of the opening in the front of the

casing for the threshed straw and dust after leaving the thresher mechanism, and a suction-fan located at the top of the casing adapted to draw air through the bottom and front of the casing rearwardly around the rear end of the decking and then upwardly through the exit, whereby the threshed straw and dust are drawn through the downwardly-inclined passage and then upwardly out through the exit by the force of the air, substantially as described.

4. In a threshing-machine, the combination with the casing having an exit at the top and an opening in the front of the casing, of thresher mechanism located in the casing and over the opening in the front of the casing, a decking located in the casing and in rear of the thresher mechanism and on a plane above the opening in the front of the casing and a suction-fan located at the top of the casing adapted to draw air through the opening in the front of the casing under and around the rear end of the decking and then upwardly out through the exit whereby the threshed straw and dust are drawn rearwardly from the thresher mechanism under the decking and then upwardly through the casing and out through the exit, substantially as described.

5. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing on a plane above the air-ingress opening, of a tortuous passage-way leading to the exit and located in the rear of the thresher mechanism and having its opposite end communicating with the air-ingress opening, a grain-chute leading from the passage-way, and a suction-fan at the exit adapted to draw air through the opening and through the tortuous passage out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

6. In a threshing-machine, the combination with the casing provided with an exit for the threshed straw and dust, a screened opening in the bottom and an opening in the front of the casing, of thresher mechanism located in the casing in front of the opening in the bottom and over the opening in the front of the casing, a tortuous passage-way leading to the exit and communicating with the openings, a grain-chute leading from the passage-way, and a suction-fan at the exit adapted to draw air through the openings in the bottom and front of the casing and through the tortuous passage out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

7. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing, of a tortuous passage-way leading to the exit and having its opposite end commu-

nicating with the air-ingress opening, a grain-chute leading from the passage-way, a rotatable cylinder located at the bends in the tortuous passage-way adapted to guide the straw around the bends and turn the straw over, and a suction-fan at the exit adapted to draw air through the opening and through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

8. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air adjacent to the lower portion of the casing, and thresher mechanism located in the casing on a plane above the air-ingress opening, of a tortuous passage-way leading to the exit and having its opposite end communicating with the air-ingress opening, a downwardly-extending grain-chute leading from the passage-way, projections in the passage-way arranged in the path of the straw and over the downwardly-extending grain-chute, and a suction-fan at the exit adapted to draw air through the opening and through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

9. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing, of a tortuous passage-way leading to the exit and having its opposite end communicating with the air-ingress opening, a rotatable cylinder located at the bends in the tortuous passage-way, a downwardly-extending grain-chute leading from the passage-way, projections in the passage-way arranged in the path of the straw and over the downwardly-extending grain-chute, and a suction-fan at the exit adapted to draw air through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

10. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing on a plane above the air-ingress opening, of a tortuous passage-way leading to the exit located in the rear of the thresher mechanism and having its opposite end communicating with the air-ingress opening, means in the passage for turning over the straw, and a suction-fan located at the exit adapted to draw air through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

11. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for

the ingress of air adjacent the lower portion of the casing, and thresher mechanism located in the casing on a plane above the air-ingress opening, of an upwardly-extending tortuous passage-way leading to the exit and having its opposite end communicating with the air-ingress opening, a downwardly-extending grain-chute leading from the passage-way, and a suction-fan located at the top of the casing adapted to draw air through the opening upward through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn upwardly through the tortuous passage-way and out through the exit, substantially as described.

12. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing on a plane above the air-ingress opening, of a tortuous passage-way leading to the exit and having its opposite end communicating with the air-ingress opening, the tortuous passage consisting of vertical passages and horizontal passages, the horizontal passages being arranged at a downwardly incline, a grain-chute leading from the passage-way, and a suction-fan located at the top of the casing adapted to draw air through the opening, through the tortuous passage and out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage and out through the exit, substantially as described.

13. In a threshing-machine, the combination with the casing having an exit for the threshed straw and dust and an opening for the ingress of air, and thresher mechanism located in the casing, of a tortuous passage-way leading to the exit and having its opposite end communicating with the air-ingress opening, a downwardly-extending grain-chute leading from the passage-way and communicating with an air-ingress opening, and a suction-fan located at the exit adapted to draw air through the opening, through the passage-way and through the grain-chute out through the exit, whereby the threshed straw and dust are drawn through the tortuous passage out through the exit, substantially as described.

14. In a threshing-machine, the combination with the casing having an exit at the top, an opening in the bottom and an opening in the front of the casing, of thresher mechanism located in the casing in front of the opening in the bottom and over the opening in the front of the casing, a downwardly-inclined decking arranged above the opening in the bottom, a downwardly-inclined grate or screen below the decking and over the opening in the bottom, the decking and screen or grate forming a downwardly-inclined passage in the rear of the opening in the front of the casing for the threshed straw and dust after leaving the thresher mechanism, a tortuous passage-way leading from the rear

end of the inclined passage-way upward to the exit consisting of vertical and horizontal passages and the horizontal passages arranged at a rearward incline, and a suction-fan located at the top of the casing adapted to draw air through the bottom and front of the casing rearwardly around the rear end of the decking and then upwardly through the tortuous passage and then through the exit, whereby the threshed straw and dust are drawn through the downwardly-inclined passage and then upwardly through the tortuous passage out through the exit, substantially as described.

15 15. In a threshing-machine, the combination with the casing provided with an exit

for the threshed grain and straw and an air-ingress opening, of a flue leading from the exit, thresher mechanism located in the casing, a suction-fan at the exit and within the flue, a swinging arm secured to the rear end of the casing, a stacker secured to the arm, and a hood supported by the arm and swiveled to the end of the flue, substantially as described.

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

JOHN B. OUTRAM.

Witnesses:

FRED H. CROUGHTON,
S. B. STURTEVANT.