

No. 639,711.

Patented Dec. 26, 1899.

J. CHIAL.
STRAW STACKER.

(Application filed July 11, 1899.)

(No Model.)

2 Sheets—Sheet 1.

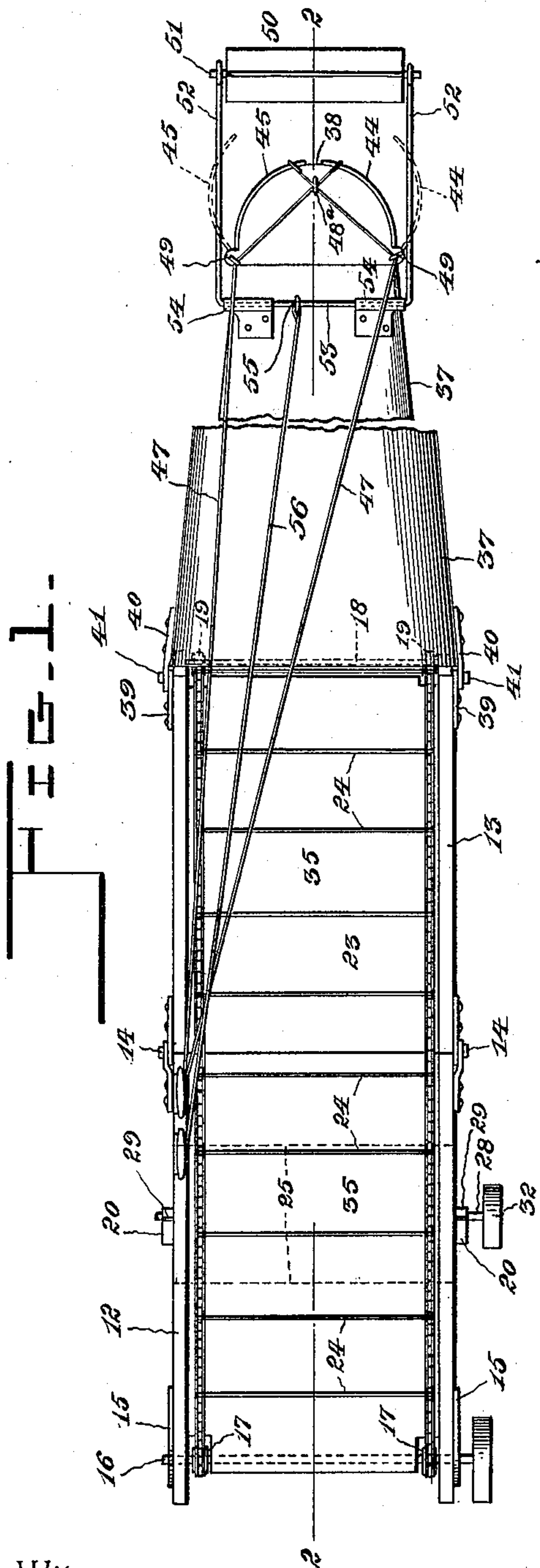
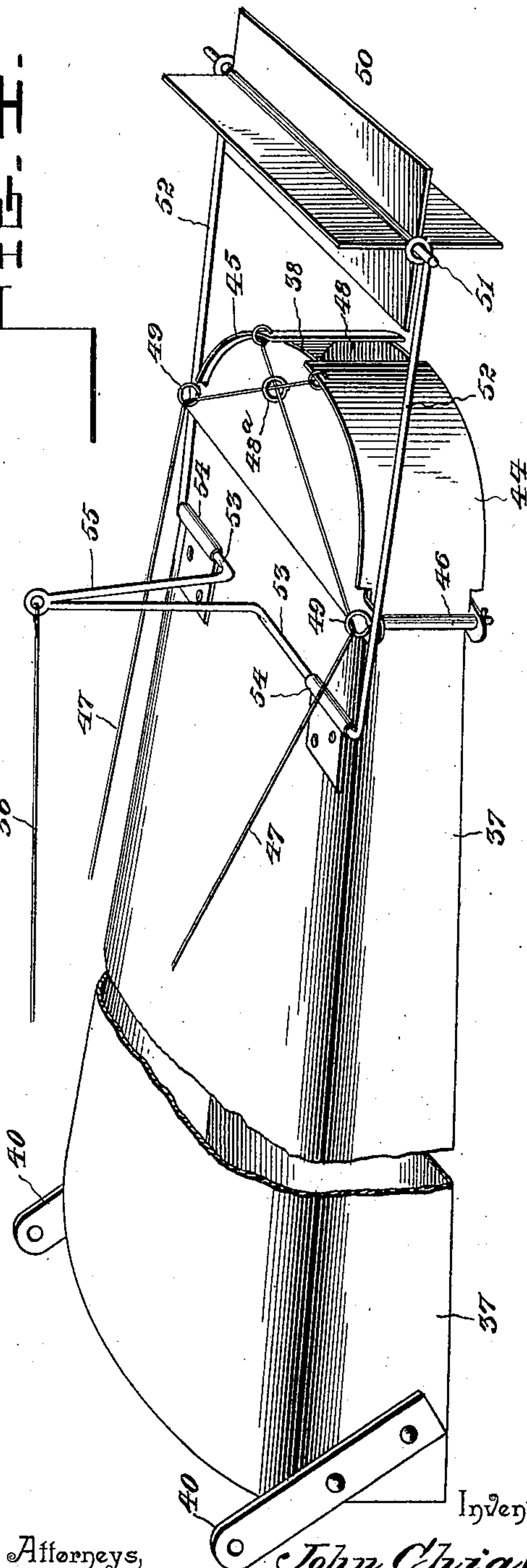


Fig. 1.



Witnesses

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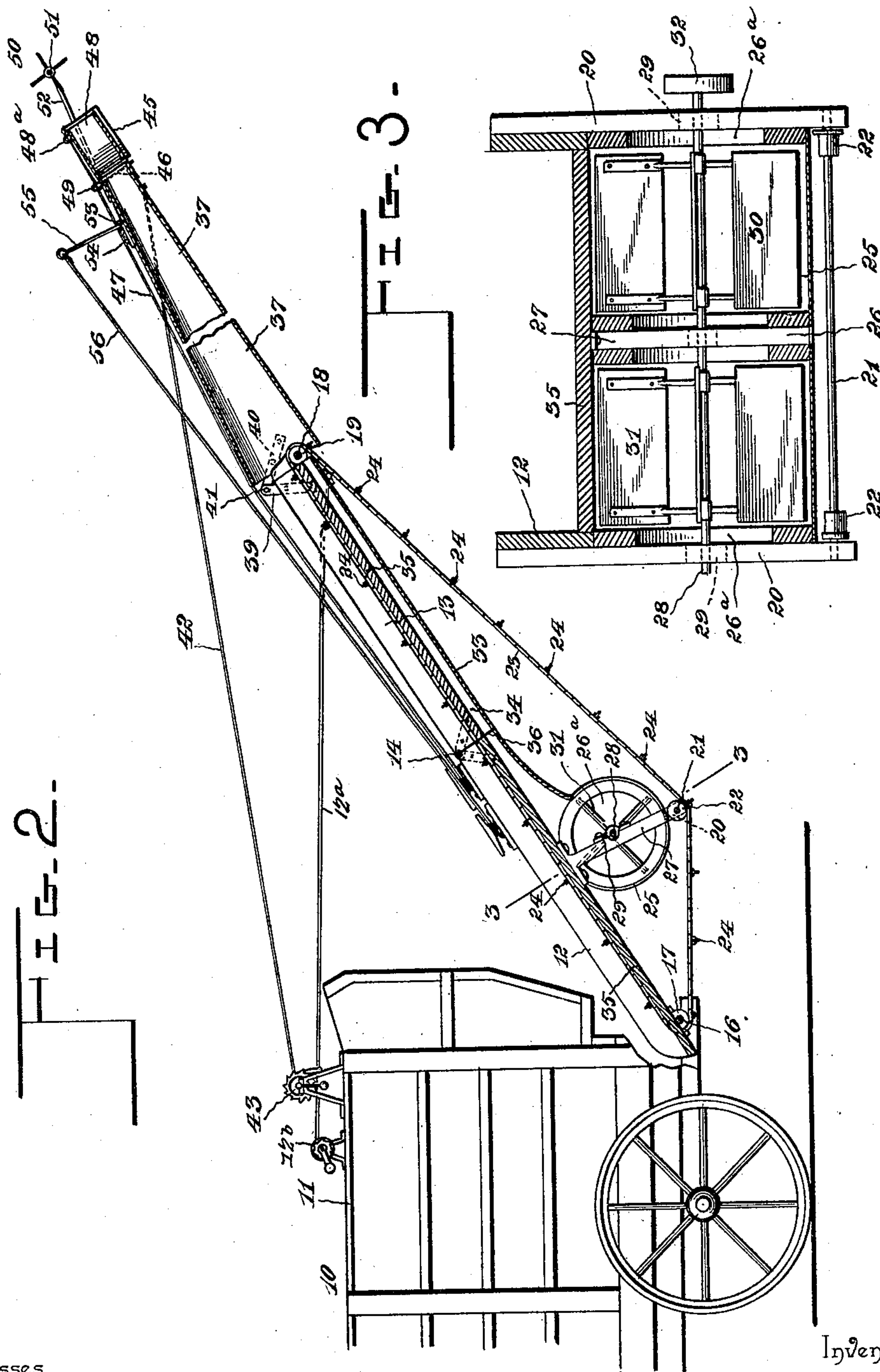
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UNITED STATES PATENT OFFICE.

JOHN CHIAL, OF LAKE PARK, MINNESOTA, ASSIGNOR OF ONE-HALF TO
N. E. ANDERSON, OF SAME PLACE.

STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 639,711, dated December 26, 1899.

Application filed July 11, 1899. Serial No. 723,471. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHIAL, a citizen of the United States, residing at Lake Park, in the county of Becker and State of Minnesota, have invented a new and useful Straw-Stacker, of which the following is a specification.

This invention relates to improvements in straw-stackers for grain-separators and threshing-machines; and the primary object is to provide a pneumatic mechanism adapted to be applied to and used in connection with an ordinary endless carrier mechanism with which many threshers and separators are equipped, thus combining the desirable features of a pneumatic stacker with an ordinary mechanical stacker for the purpose of conveying the straw to a distance without interfering with the necessary operations of the thresher or separator.

A further object is to provide an improved type of pneumatic-stacker mechanism which may be folded or adjusted with an ordinary jointed endless stacker-conveyer, and one element of the pneumatic-stacker mechanism is arranged to be folded upon the separator or thresher, so as to be out of the way and enable the endless conveyer to be used independently of the pneumatic appliances.

A further object of the invention is to arrange the parts for service in a manner to blow away the straw which may have a tendency to return with the endless carrier, to make the idle returning length or lead of the endless carrier travel by without striking the blast-fan casing of the pneumatic stacker, and to insure a full supply of air to the duplicate fan for increasing the capacity thereof, while at the same time the fan-shaft is supported to run steadily and freely.

A further object of the invention is to provide a baffle-reel for retarding the energy of the blast at the delivery-mouth of the stacker-tube for the purpose of regulating the distance to which the straw may be blown, such baffle-reel being easily adjusted with relation to the delivery-mouth of the stacker-tube.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts,

which will be hereinafter fully described and claimed.

To enable others to understand the invention, a preferred embodiment thereof is illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a plan view of the improved pneumatic-stacker mechanism applied in operative relation to an ordinary endless straw-conveyer, which is shown as connected with the delivery end of a grain-separator. Fig. 2 is a longitudinal vertical sectional elevation on the plane indicated by the dotted line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section through the blast-fan and one member of the ordinary stacker-frame, the plane of the section being indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of the adjustable stacker-tube forming a part of the pneumatic-stacker appliance.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

In order that others skilled in the art may understand the manner of using my improved pneumatic-stacker mechanism, I have illustrated the same in operative relation to an ordinary grain separator or thresher and a mechanically-driven endless straw-stacker.

10 designates the rear end portion of a separator or thresher provided with the usual deck 11, on which are mounted the appliances for raising or lowering the ordinary stacker-frame of a mechanically-driven endless straw-carrier. The members 12 13 of this stacker-frame are jointed or hinged together, as at 14, to enable them to be folded relatively one to the other in the usual well-known way, and the inner member 12 of said stacker-frame is provided with hinge-castings 15, the latter being loosely fitted on a carrier-driving shaft 16. This shaft is journaled on a part of the separator and is driven therefrom in a well-known manner, the shaft being provided with driving pulleys or sprockets 17. At the outer end of the member 13, forming a part of the stacker-frame, is journaled an idle carrier-shaft 18, provided with the pulleys or sprockets 19, which serve to guide the chains or belts of an endless straw-conveyer.

The frame for the endless stacker-conveyer is supported and adjusted by the usual cable 12^a, which may be connected to a windlass 12^b on the deck of the separator; but as these parts may be of the usual or any preferred construction I have not considered it necessary to more fully illustrate or describe the same.

20 designates a pair of struts or bars which are applied to opposite sides of the member 12, forming a part of the stacker-frame, said struts being secured firmly to the frame member 12 and extending downwardly therefrom in parallel relation one to the other. The lower ends of these struts or bars carry suitable journal-bearings, in which is mounted an idle guide-shaft 21, which is provided with the pulleys or sprockets 22. These struts or bars serve to support the idle guide-shaft at a considerable distance below the stacker-frame, so as to leave a considerable space between said frame and said shaft 21, in which space is arranged the fan-casing for the blast-fan, whereby said blast-fan may be disposed in compact relation to the stacker-frame and its shaft may be supported by the struts or bars 20. The endless straw carrier or conveyer 23 consists of the usual belts or chains connected by the series of cross-slats 24, said endless carrier being operatively fitted to the shafts 16, 18, and 21 for propulsion by the shaft 16, the idle shaft 21 serving to direct the slats on the returning length or lead of the endless conveyer from striking against the fan-casing 25. This fan-casing is arranged between the fixed struts or bars 20 and also between the idle shaft 21 and the stacker-frame, said fan-casing being secured in place in any suitable way. The fan-casing is divided in the plane of the longitudinal axis of the stacker-frame, so as to form a transverse opening 26, (clearly indicated by Fig. 3,) which opening provides for the free ingress of air to the duplicate blast-fans at the middle of said fan-casing. The ends of the fan-casing have the inlet-ports 26^a, and in the slot 26 of said casing is arranged a bearing-bar 27, the latter being fastened to the stacker-frame to lie parallel to the struts or bars 20. A fan-shaft 28 extends centrally through the divided casing 25 and transversely across the stacker-frame, said fan-shaft being journaled in suitable bearings 29, which are secured in alined positions on the bars 20 27, thus supporting the fan-shaft at its middle portion, as well as at its end portions, for the purpose of making the shaft run steadily in its bearings. The blast-fans 30 31 may be of any suitable construction and are secured to the shaft 28, so as to lie within the members of the divided fan-casing. It is to be observed that the fan-casing and the fans therein extend the full width of the stacker-frame and air-inlets are provided at each end of the divided fan-casing for insuring a full and free supply of air to each fan, whereby a blast-fan of large capacity is disposed compactly below and supported

directly by a part of an ordinary stacker-frame. One end of the fan-shaft is extended beyond a bearing 29 on an outer strut for the reception of a pulley 32, the latter adapted to be propelled by a belt from the cylinder-shaft or other part of the separator or thresher.

33 designates the casing for the wind-trunk 34, that leads from the casing 25 of the blast-fan. The members 12 13 of the stacker-frame are provided with the bottom boards 35, and this wind-trunk casing 33 is secured to the stacker-frame and its bottom boards, so that the latter will close the upper side of the wind-trunk and form a part thereof. The lower end of the wind-trunk is joined in a suitable way to the blast-fan casing, said wind-trunk being of a length to extend to the outer end of the member 13, forming a part of the stacker-frame. It will thus be observed that the blast of air from the duplicate fan is conveyed by the wind-trunk along the bottom of the stacker-frame and delivered at the point where the endless conveyer 23 travels around the stacker-frame on its return to the thresher or separator. This is one of the important features of this invention, because the blast from the wind-trunk is very strong at this point, so that the straw which would have a tendency to return with the carrier and clog up the space below the stacker-frame is thoroughly blown away from the carrier and its slats, whereby the under side of the stacker-frame is kept in a condition free from accumulation of straw. When the improved stacker mechanism is employed in connection with a jointed stacker-frame, it is found desirable to make the wind-trunk 34 foldable with the sectional jointed frame, and to this end the wind-trunk 34 has its casing divided, as at 36, on a plane coincident with the joint 14 between the members of the stacker-frame. The joint between the meeting edges of the divided wind-trunk may be of any suitable character; but as the members 12 13 of the stacker-frame normally occupy an abutting relation at the joint 14 when the stacker-frame is unfolded for use it will be seen that the members of the divided wind-trunk may occupy a like relation one to the other when the stacker mechanism is in service, thus minimizing the leakage of air through the divided wind-trunk.

One of the important elements of the improved pneumatic-stacker mechanism is a stacker-tube 37, which is fastened to embrace the outer end of the ordinary straw-conveyer and to lie in alinement with the wind-trunk of the blast-fan, whereby this stacker-tube is adapted to receive the straw from the endless carrier and the blast from the wind-trunk of the blast-fan, thus enabling the stacker-tube to carry the straw away from the separator for any desired distance under the energy of the blast from the duplex fan. This stacker-tube is preferably, although not essentially, of metallic construction, said tube being tapered and straight throughout its length to

carry away the straw with maximum efficiency by reason of the absence of angles or corners in the blast-passage of said tube. The stacker-tube may be of any desirable length; but I prefer to make the tube with a flat bottom, converging sides, and a rounded or curved top. By inclining the sides of the stacker-tube so as to converge toward the outer end thereof the inner end of the stacker-tube is formed with a wide receiving-mouth, the width of which is equal to the width of the stacker-frame, while the depth of the receiving-mouth exceeds the depth of the stacker-frame. The outer end of the stacker-tube is curved, as at 38, to enable the gate-valves, presently described, to occupy a compact relation thereto.

39 40 designate pairs of hinge-arms, which are secured firmly to the outer end of the stacker-frame and the inner end of the stacker-tube, respectively, and the pair of arms on each side of the stacker tube and frame are inclined so as to overlap one another for the purpose of pivotally connecting the arms by the bolts or pins 41. The stacker-tube is thus hingedly connected to the stacker-frame in a manner for said tube to unfold in a position to assume an aligned relation to the stacker-frame and the wind-trunk, whereby the wide broad mouth at the inner end of the stacker-tube may receive the straw from the endless conveyer and the blast from the wind-trunk, the inner end of the stacker-tube fitting closely around the sides of the stacker-frame and the casing 33 of the wind-trunk, so as to reduce the leakage of air. The stacker-tube, which is hinged to the stacker-frame, is adapted to be raised on the pivots 41 by a hoisting-cable 42, which is coiled on a windlass 43, the latter being journaled in suitable supports on the deck of the threshing-machine.

44 45 designate the gate-valves, which are curved to conform to the delivery-mouth 38 of the stacker-tube, each valve being hinged thereto, as at 46. The valves are adapted to be forced to their open positions by the blast and straw passing through the stacker-tube; but under some conditions it is desirable to control the gates independently and to close or partly close one or the other of the gates for the purpose of directing the straw in one direction laterally of the stacker-tube, so as to deliver more straw to one side of the stack than to the other. To this end the operating-cables 47 are employed, said cables having their outer ends fastened individually to the gates at the free ends thereof. The cables pass through a common guide 48^a, which is fastened to the wind-tube at the middle thereof, and from thence each cable is led through another guide 49, fastened near one edge of the stacker-tube, the outer ends of the cables being crossed, as shown. Said cables extend to the deck of the threshing-machine, or they may extend only to the stacker-frame, the in-

ner ends of the cables being fastened to a suitable cleat or otherwise confined in place.

From the foregoing description, taken in connection with the drawings, it will be observed that I have provided a blast-fan and a wind-trunk for use in connection with an ordinary jointed and shiftable stacker-frame which carries an endless stacker-conveyer, said blast-fan being carried by one member of the stacker-frame. The wind-trunk is divided in a plane coincident with the joint of the stacker-frame, so as to be foldable with the latter, and this wind-trunk is arranged to deliver the air-blast at the delivery end of the endless stacker-conveyer, whereby the blast carries away the straw which may have a tendency to return with the under lead or length of the endless conveyer. In connection with the mechanically-operated endless stacker and with the blast devices I have associated a pneumatic stacker-tube, which may be adjusted to prolong the length of the stacker mechanism for the purpose of conveying the straw by the energy of the air-blast after the straw has been discharged from the endless conveyer. To adjust the pneumatic stacker-tube into coöperative relation with the endless conveyer, it is necessary to arrange the stacker-tube substantially in alinement with the stacker-frame and the endless conveyer in order that the air-blast and the straw may enter the stacker-tube at a common point; but, as has been explained, the stacker-tube may be raised so as to be out of alinement with the endless conveyer, so that the straw may be discharged upon the pile directly from the endless stacker.

50 designates a baffle-reel, consisting of a series of blades arranged radially with respect to a common shaft 51, to which said blades are secured in a suitable way. This reel-shaft is journaled in bearings on the parallel arms 52, which are secured to a horizontal rock-shaft 53, the latter being journaled in bearings 54 on the stacker-tube. The ends of the rock-shaft are prolonged beyond the sides of the stacker-tube, so that the arms 52 may work or play freely without striking the stacker-tube when raising or lowering the baffle-reel. The arms 52 extend forward from the rock-shaft for suitable distances to support the baffle-reel beyond the delivery-mouth of the stacker-tube, said baffle-reel being supported by the arms in a position at right angles to the longitudinal axis of the stacker mechanism. The rock-shaft 53 has a crank-arm 55, to the extremity of which is fastened an adjusting-cable 56, the latter being confined on or clamped to a device on the deck of the threshing-machine or on the stacker-frame. The rock-shaft may turn in its bearings under the weight of the reel to allow the arms to descend for the purpose of interposing the reel in the path of the blast and the straw issuing from the stacker-tube, whereby the reel will be rotated under the energy of the

blast and will retard the straw, so as to regulate the distance which the straw will be blown under the influence of the blast. It is evident that by lowering the reel sufficiently to interrupt the blast and cause the straw to impinge forcibly against the reel the blast cannot throw the straw for any considerable distance beyond undesirable limits; but when the reel is interposed only partly in the path of the blast the latter will carry the straw farther from the stacker-tube, because the energy of the blast will not be entirely broken up by impact against the reel. The reel is adapted to be rotated by the energy of the blast to make it self-clearing, thus minimizing any tendency of the reel to become clogged.

Although the pneumatic stacker mechanism is shown and described in connection with a jointed two-part stacker-frame, it is not desired to limit the invention to a mechanically-operated stacker of this type, because the pneumatic stacker may be used in connection with a single-section jointless mechanical stacker—as, for instance, with the section 12—and a conveyer adapted thereto.

One of the important advantages obtained by a wind-stacker used in connection with a mechanically-operated endless conveyer resides in the fact that the pneumatic appliances are not so closely related and connected with the separator or thresher as to interfere with the operation of the elemental parts of such separator. The separator is open at its delivery end for the free escape therefrom of the chaff and straw which lodge upon the endless conveyer mechanism, the latter serving to carry the straw and chaff to the outer end of the stacker-frame and to deposit the same in the path of a strong blast issuing from the wind-trunk of the blast-fan. The straw is thus delivered into the wide mouth of the stacker-tube, and the energy of the blast is utilized to convey the straw through the stacker-tube, the latter discharging the straw at the desired place of deposit remote from the separator or thresher.

Under some conditions it is desirable to use the endless carrier mechanism independently of the pneumatic stacker devices. For attaining this end the belt which drives the fan-shaft may be slipped off the pulley 32 and the windlass 43 may be rotated to elevate the stacker-tube and fold the latter upon the deck of the threshing-machine. In this operation of elevating the stacker-tube the hinge-arms 39 40 coact to lift the inner end of the stacker-tube above the outer end of the stacker-frame, thus permitting the straw to be discharged from the endless carrier without hindrance from the pneumatic stacker appliances.

Changes may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention embodied. Hence it is not desired to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what is claimed is—

1. In a straw-stacker substantially such as described, the combination with an endless mechanically-driven conveyer extending beyond the delivery end of a threshing-machine or separator, and a frame for said conveyer, of a blast-fan arranged to deliver a blast of air at the delivery-point of said endless conveyer, and a pneumatic stacker-tube supported on said conveyer-frame substantially in alinement with the conveyer and having its receiving-mouth embracing the delivery end of said conveyer and the point of discharge of the blast-fan, substantially as and for the purposes set forth.

2. In a straw-stacker substantially such as described, the combination with a stacker-frame extending beyond the delivery end of the threshing-machine or separator and an endless conveyer thereon, of a wind-trunk supported by said conveyer-frame and extending longitudinally thereof, a blast-fan adapted to deliver an air-blast to said wind-trunk, and a stacker-tube supported in alinement with the wind-trunk and the endless conveyer for coöperation therewith and adapted to prolong the length of the stacker mechanism beyond the threshing-machine, said stacker-tube receiving the contents of the endless conveyer and the blast from the wind-trunk, substantially as and for the purposes set forth.

3. In a straw-stacker substantially such as described, the combination with a conveyer-frame and an endless conveyer thereon, of a blast-fan supported by said frame, a wind-trunk supported by and extending longitudinally of the conveyer-frame and communicating with said fan and terminating at the point of delivery of the conveyer, and a straight stacker-tube arranged in alinement with the endless conveyer and the wind-trunk to prolong the stacker mechanism beyond the threshing-machine, said stacker-tube being mounted on or carried by the stacker-frame and receiving at a common point the blast from the wind-trunk and the contents of the conveyer, as and for the purposes set forth.

4. In a straw-stacker substantially such as described, the combination with a stacker-frame and an endless conveyer supported thereby, of a blast-fan, a wind-trunk communicating with said fan and supported by the stacker-frame to extend from said fan-casing and terminating at the delivery-point of the conveyer, and a tapering stacker-tube mounted on the stacker-frame substantially in alinement with the endless conveyer and the wind-trunk, to receive the load of the conveyer and the blast from the wind-trunk at a common point, substantially as set forth.

5. In a straw-stacker, the combination with a stacker-frame, and a conveyer thereon, of a blast-fan, a wind-trunk, a stacker-tube turning on a horizontal axis afforded by a hinged connection with said stacker-frame and ad-

justable thereon into alinement with said conveyer and the wind-trunk, and means for elevating the stacker-tube irrespective of any movement of the stacker-frame, substantially as described.

6. In a straw-stacker, the combination of a stacker-frame, and an endless conveyer, of a blast-fan, a wind-trunk, a stacker-tube, and hinge-arms attached to the stacker-frame and the stacker-tube respectively, and said arms pivoted together for elevating the stacker-tube above the plane of discharge of the conveyer, substantially as described.

7. In a straw-stacker, the combination with a jointed stacker-frame, and an endless conveyer, of a fan supported on one member of the stacker-frame, a divided wind-trunk extending from the fan-casing to the point of discharge of the conveyer, and said wind-trunk foldable with the stacker-frame, and an adjustable stacker-tube carried by said stacker-frame, substantially as described.

8. In a straw-stacker, the combination with a jointed stacker-frame, and an endless conveyer, of a blast-fan supported on one member of said stacker-frame, a divided wind-trunk extending from the fan-casing to the point of delivery of the conveyer, the division in the wind-trunk being coincident with the joint in the stacker-frame, and an adjustable stacker-tube mounted on the stacker-frame, substantially as described.

9. In a straw-stacker, the combination with a jointed stacker-frame, and an endless conveyer thereon, of struts or bars fixed to the inner member of said stacker-frame, a blast-fan having its casing supported between the struts or bars and its shaft journaled in bearings thereon, a jointed wind-trunk secured to the underside of the stacker-frame to be foldable therewith, and a stacker-tube having a hinged connection with the stacker-frame and adjustable in alinement with the wind-trunk and said endless conveyer, substantially as described.

10. In a straw-stacker, the combination with a jointed stacker-frame and an endless conveyer, of a transversely-divided fan-casing supported by the inner member of the stacker-frame and with the respective members of said casing provided with air-inlets at each end thereof, a fan-shaft extending through said divided casing, fans on said shaft, a divided wind-trunk supported on the under side of the stacker-frame in communication with both members of the divided fan-casing, and a stacker-tube mounted on the stacker-frame in alinement with the endless conveyer and the wind-trunk, substantially as described.

11. In a straw-stacker, the combination with

a jointed stacker-frame, of depending struts fast therewith, a fan-casing supported by said struts on the under side of the stacker-frame, a jointed wind-trunk secured to the stacker-frame to be foldable therewith and communicating with said casing, a fan-shaft journaled in the struts and carrying the fans, an idle shaft journaled on said struts below the fan-casing, an endless conveyer traversing the frame and guided by the idle shaft below the fan-casing, and a stacker-tube mounted on the stacker-frame substantially in alinement with the endless conveyer and the wind-trunk, substantially as described.

12. In a straw-stacker, the combination of a pneumatic stacker-tube, the gates hinged thereto, a revoluble baffle-reel having the blades, and means for supporting said reel beyond the gates of the stacker-tube and in the path of the blast therefrom, substantially as described.

13. In a straw-stacker, the combination of a stacker-tube, the gates hinged thereto, a rock-shaft mounted on said tube and provided with an operating-arm, and with the pair of supporting-arms, the latter extending beyond the gates, a baffle-reel revolubly mounted in the arms, for adjustment with the rock-shaft and supported in advance of said gates, and means for rocking the shaft to shift the position of the baffle-reel with relation to the tube, substantially as described.

14. In a straw-stacker, the combination with a pneumatic stacker-tube, of the independently-hung gates at the delivery-mouth thereof, and operating-cables connected individually with said gates and arranged to close the gates separately against the action of the blast thereon, substantially as described.

15. In a straw-stacker, the combination with a mechanically-driven stacker-conveyer extending beyond the delivery end of a threshing-machine or separator, of a blast-fan arranged to deliver a blast at the point of discharge of said stacker-conveyer, and a stacker-tube supported substantially in alinement with the stacker-conveyer and prolonging the total length of the combined elements of the stacker mechanism, said stacker-tube arranged to receive the load from the stacker-conveyer and the blast from the said fan at a common point, as and for the purposes described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN CHIAL.

Witnesses:

JOHN BEGGIN,
A. O. HOUGLUM.