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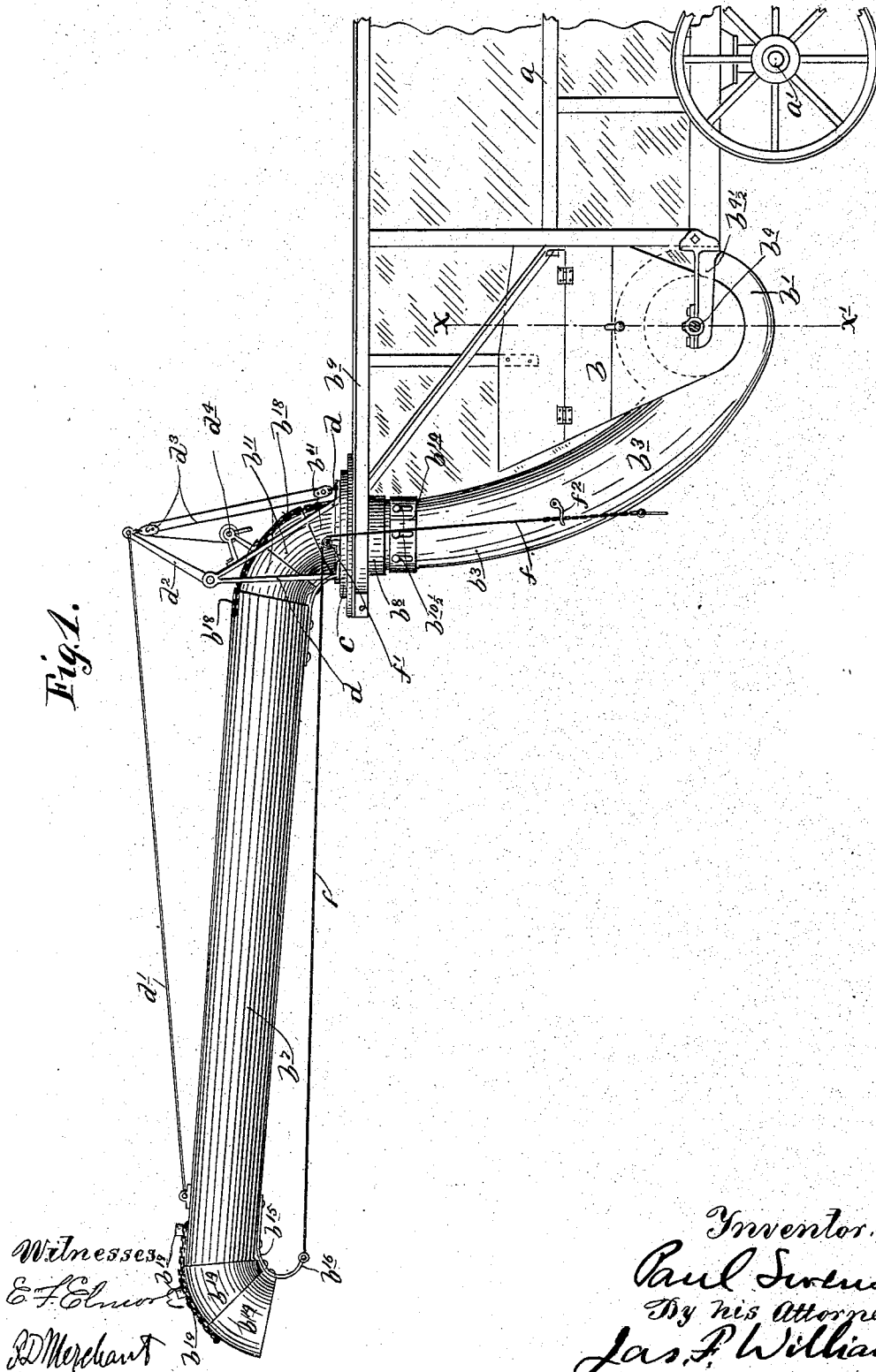
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P. SWENSON.
PNEUMATIC STACKER.

No. 534,381.

Patented Feb. 19, 1895.

Fig. 1.



Witnesses
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By his Attorney.
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(No Model.)

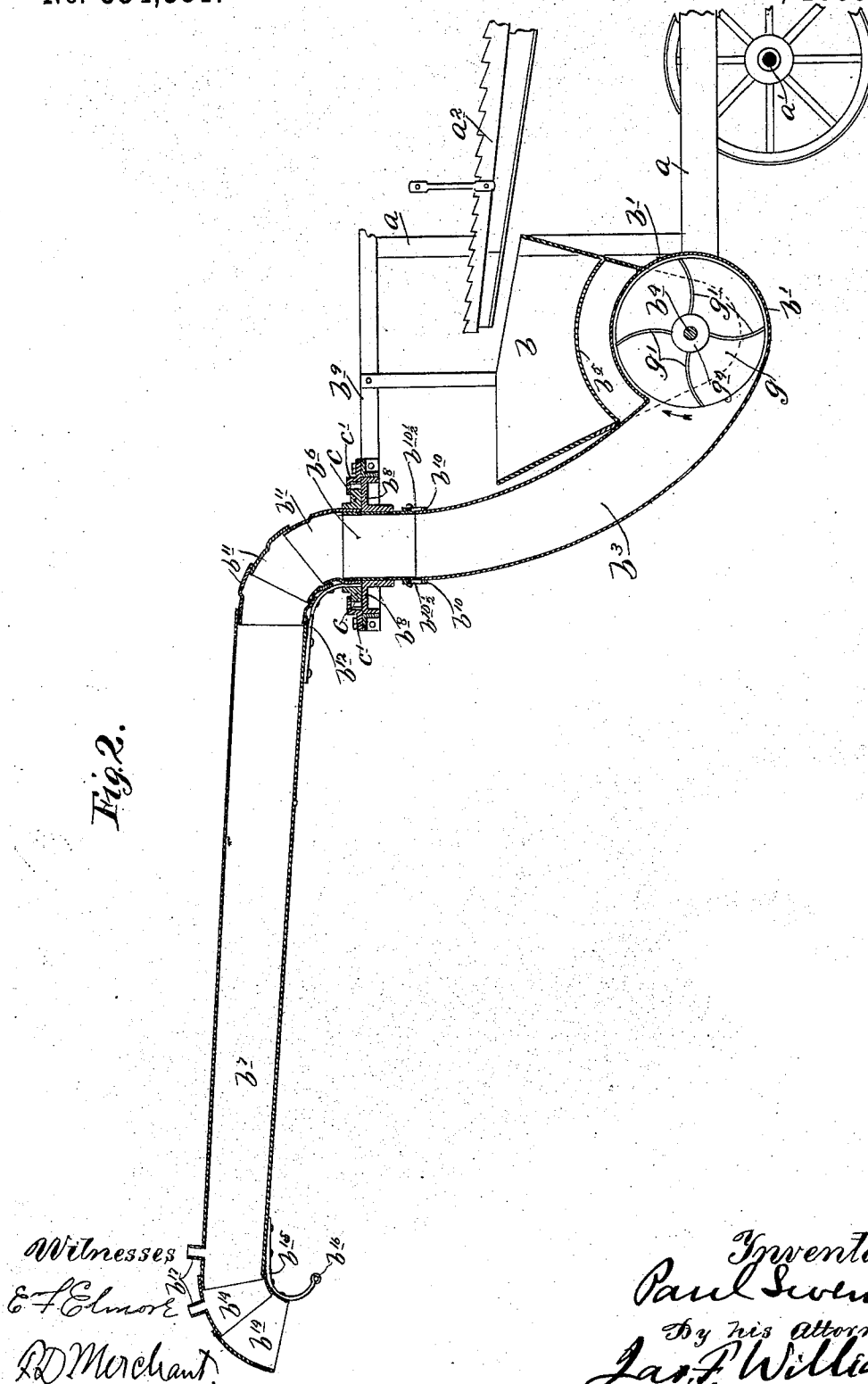
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Fig. 2.



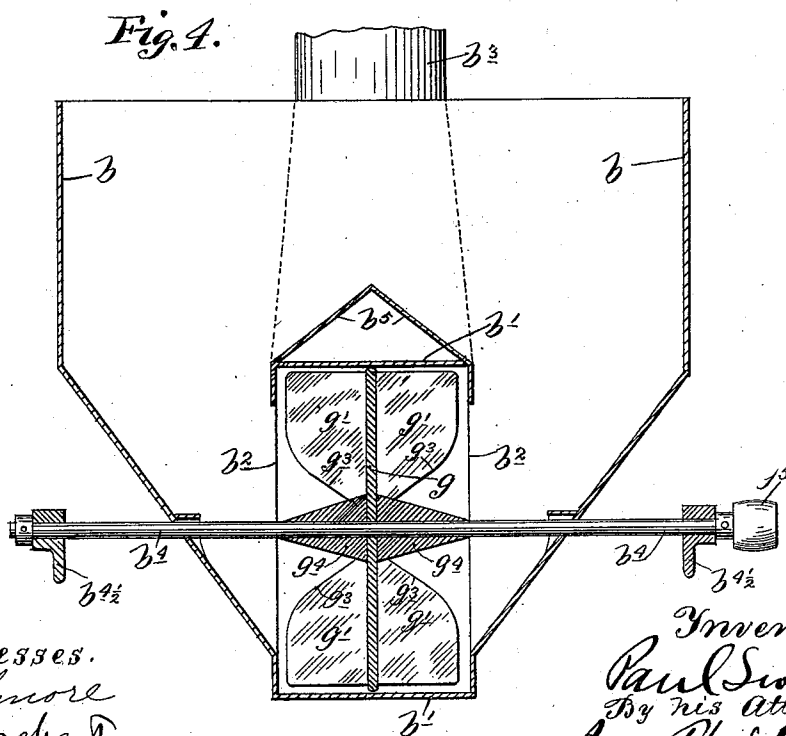
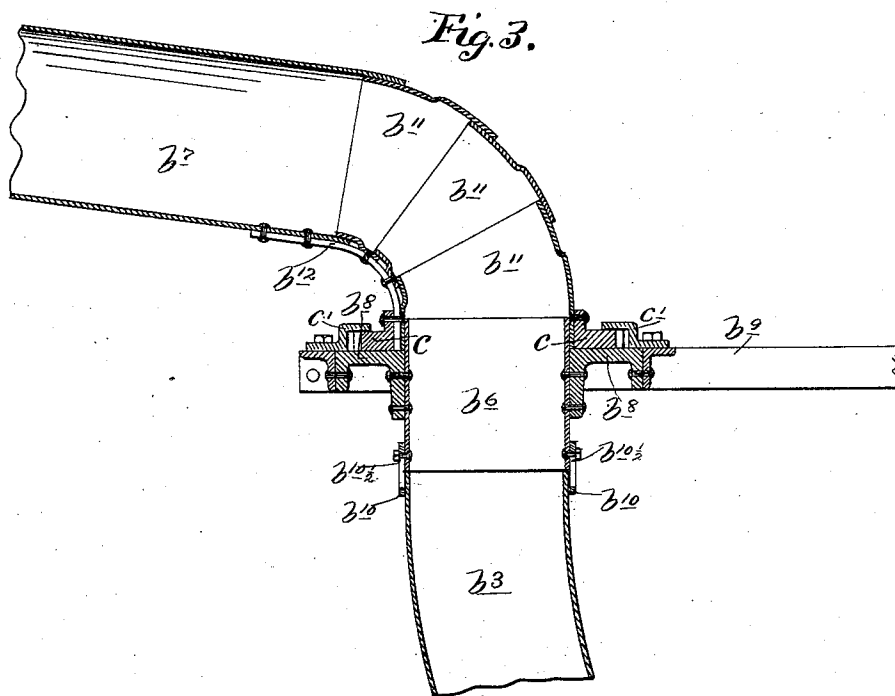
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UNITED STATES PATENT OFFICE.

PAUL SWENSON, OF MINNEAPOLIS, MINNESOTA.

PNEUMATIC STACKER.

SPECIFICATION forming part of Letters Patent No. 534,381, dated February 19, 1895.

Application filed July 26, 1894. Serial No. 518,641. (No model.)

To all whom it may concern:

Be it known that I, PAUL SWENSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Pneumatic Stackers for Thrashing-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.

My invention relates to pneumatic stackers, for co-operation with thrashing machines, and has for its object to improve the construction of the same, in point of efficiency, lightness, durability and cost.

To these ends, my invention consists in the novel features hereinafter fully described and defined in the claims.

The accompanying drawings illustrate my invention, wherein like letters refer to like parts throughout the several views.

Figure 1 is a left side elevation, showing my improved stacker, as applied to an ordinary thrashing machine, some parts being broken away. Fig 2 is a vertical longitudinal section, taken centrally through the stacker, trunk, and separator, with some parts broken away. Fig. 3 is an enlarged view, showing the main elbow joint of the conveyer trunk, said view being taken on the same sectional line as Fig. 2. Fig. 4 is a transverse vertical section, taken on the line X X' of Fig. 1.

a represents a part of the separator frame, a' the rear truck, and a^2 the rear or delivery end of the straw-carrier of an ordinary thrashing machine.

Before going into the details of my attachment, it may be premised that the stacker trunk, and preferably also the fan case and hopper are formed of some light sheet metal, which give to the same the maximum strength with the minimum of weight.

Immediately under the delivery end of the straw carrier a^2 , is located the receiving hopper b , having located centrally thereof and formed rigidly therewith the fan-case b' , having both of its sides open to the interior of said hopper as shown at b^3 ; and opening at its rear peripheral edge into an extended tubular section b^3 , which section b^3 consti-

tutes the receiving end or a portion of the stacker trunk. The parts of the stacker, just described, are pivotally mounted on a transverse fan shaft b^4 , mounted in bearing-brackets b^4 , projecting from the opposite rear corners of the thrasher frame.

It will be noted, that the upper portion of the fan case b' , is provided with an angular deflecting ridge b^5 , which prevents the accumulation of straw on top of the same.

The tubular sections b^6 and b^7 , taken in connection with the section b^3 , before referred to, constitute the body of the stacker-trunk. Of these parts, b^6 is a vertically disposed rigid section, held by a bearing bracket b^8 , secured between and tying together, a pair of angle iron braces b^9 , projecting rearward from the opposite sides of the thrasher frame.

The section b^3 , when thrown in its upper position, as shown in the drawings, registers with the lower end of the section b^6 , and is held in position by a vertically movable locking b^{10} , secured to said section b^6 by slots and pins b^{10} , and overlapping the upper end of said section b^3 .

It is obvious, the section b^3 is releasable from the section b^6 , by raising the lock-ring b^{10} , and that the same may be turned down, to afford better access to the interior of the separator.

The delivery section b^7 is connected to the section b^6 by a flexible elbow joint, composed of a series of curved cylindrical sections b^{11} , which telescope with each other and the trunk-sections b^6 b^7 . These sections b^{11} and the adjoining end of the section b^7 are independently secured by rivets, or otherwise, to a flat leaf spring b^{12} , which on account of its peculiar function may be termed a back-bone spring.

The lower end of the lower section b^{11} telescopes around the upper portion of the section b^6 , and constitutes a pivot on which the delivery section b^7 may be given its lateral pivotal motion.

Surrounding and rigidly secured to the lower member of said sections b^{11} is an annular gear c , securely held in place on the upper face of the bearing bracket b^8 , by keepers c' . In the practical operation of the machine, automatically driven and controlled gearing

would be provided, engaging with said gear *c*, for imparting an oscillatory motion to the outer end of said delivery section *b*⁷, but as said mechanism constitutes no part of my present invention, the same has for the purpose of clearness and simplicity been omitted.

The outer end of the section *b*⁷ is provided with a deflector, which is formed by a construction similar to that of the elbow joint, already described, and in which the curved telescoping sections *b*¹⁴, are secured together and to said section *b*⁷, by a light back-bone spring *b*¹⁵, having a back turned projecting end *b*¹⁶. One of the sections *b*¹⁴ and the outer end of the section *b*⁷, are, as shown, provided with vent or escape tubes *b*¹⁷, the purpose of which will be explained later on.

d is a truss or bracket, rising from and carried by the annular gear *c*.

To the outer end of the stack section *b*⁷ is secured one end of a guy-rope *d*¹, having its other end secured to the upper end of a lever *d*², pivoted at its lower end to the bracket *d*. *d*³ is a block and tackle, connecting the upper free end of said lever *d*² with the base of said bracket *d*, and having its loose end wound on a windlass *d*⁴, supported also from said bracket *d*.

As is evident, by means of the windlass and block and tackle described, the free end of the lever *d*² may be drawn down, which through the rope *d*¹ will raise the delivery end of the trunk section *b*⁷, or vice versa.

To the projecting end *b*¹⁶, of the spring *b*¹⁵ is secured one end of a pull-rope *f*, which passes over a guide-sheave *f*¹, carried by the annular gear *b*⁸, and secured at its depending end by a spring-catch *f*², on the trunk section *b*⁸.

To prevent excessive movement of the sections of the elbow joint and the deflector, chains, shown respectively, at *b*¹⁸ *b*¹⁹, are secured to said sections and to the body of the trunk, with sufficient amount of slack between each joint, to permit the greatest required movement.

On the fan-shaft *b*⁴ within the fan case *b*¹, is mounted a fan of novel construction, comprising a disk or dividing plate *g*, provided with fan-leaves or blades *g*¹, projecting from the opposite sides of said disk.

It will be noted that the fan blades are beveled toward the center of the fan, so that under the action of centrifugal force, the straw can more readily pass through the fan. It should be further noted, that the straw which is fed in from the opposite sides of the fan does not come in contact until the same has been forced through the fan and into the trunk, and further, that the disk will offer no irregular surface for the lodgment of the straw.

To further facilitate the action of the fan, and to prevent the straw from winding around the fan-shaft, a pair of reversely positioned cones *g*⁴ are placed around said fan-shaft on opposite sides of the disk *g*.

*g*⁵ is a pulley, secured to one outer end of the shaft *b*⁴, for imparting motion to the same.

Respecting the action of the elbow joint, it is evident that the back bone spring *b*¹² serves not only to tie the sections together, but also serves as a spring, tending to throw the joint in a straight line position. The tension of the spring *b*¹² would, of course, be less than that required to sustain the weight of the outer end of the stack; but may be made, however, of sufficient strength to render the power required to raise the stack comparatively small.

In the action of the deflector, the sections *b*¹⁴ are drawn downward and held in the position desired, by means of the cord *f* and latch *f*², which puts the spring *b*¹⁵, under an increased strain. By giving slack to the rope *f*, said spring *b*¹⁵ by its tendency to straighten will throw said sections *b*¹⁴ into straight line with the trunk section *b*⁷. By this means, the proper adjustment may be effected.

Respecting the purpose of the vent tubes *b*¹⁷, the same serve to relieve the pressure at the point of delivery, by permitting a portion of the air to escape from the trunk, after its work has been done, thus lessening the blowing and scattering action of the discharged straw.

The operation of the device as an entirety is as follows: The straw is delivered from the carrier *a*² into the hopper *b*, from which it is taken in by the fan and under the combined action of centrifugal force and the air pressure created by the fan, is forced into the trunk section *b*³, as already indicated; and from thence, by the pneumatic pressure of the fan, will be forced on through the trunk and discharged at the deflector *b*¹⁴. As before indicated, the delivery end of the trunk is given a vibratory motion in a horizontal plane, by mechanism not shown, which serves to spread the discharge straw over considerable surface. The delivery end of the stacker is raised, as the stack is built up, and the deflector is turned down to give the proper delivery, as the stack is raised, by means already fully described.

The general advantages of my stacker, as described, may be briefly summarized as follows: In the first place, the device is made more efficient by the improved form of the trunk sections and flexible joints, and more particularly by the improved form of fan, which, by its peculiar construction, removes all possibility of the straw becoming entangled with the same, and permits centrifugal force to become effective to clear the fan-blades of the straw. In the second place, the control of the delivery end of the stacker is accomplished with great ease and efficiency, while at the same time, the whole device is very strong and neat in appearance. Finally, by the provision of the vent openings near the delivery end of the trunk, which relieves the pressure in the trunk, just before the straw is discharged, a better straw-stack may

be made, as the blowing action on the straw, which has been discharged, is greatly lessened, as before stated.

When the stacker is out of use, as when traveling over roads, it may be thrown forward on its vertical pivot and made to overlie the frame of the thrasher.

It will be understood, of course, that various alterations in the details of construction, might be made without departing from the spirit of my invention. For instance, the spring b^{15} of the deflector might be so formed as to tend to throw the sections b^{14} into their curved position, and the pull-cord f , be attached to the upper part of one of said sections and used to draw the deflector into its straight line position.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a pneumatic stacker, a stacker-trunk provided with one or more flexible joints, formed by telescoping curved sections, and a common leaf or "back-bone" spring to which said sections are independently secured, the tension of which spring tends to throw said sections into one of their extreme positions, substantially as described.

2. In a pneumatic stacker a stacker-trunk having the elbow joint formed by the telescoping sections b^{11} , and the leaf or "back-bone" spring b^{12} to which said sections b^{11} are independently secured, the tension of which spring tends to throw said sections into a straight line, substantially as described.

3. In a pneumatic stacker, a stacker-trunk provided with the deflector, formed by telescoping curved sections b^{14} , and the leaf or "back-bone" spring b^{15} , to which said sections b^{14} are independently secured, substantially as and for the purpose set forth.

4. In a pneumatic stacker, a stacker trunk provided with the deflector, formed by the telescoping curved sections b^{14} , the leaf, or "back bone," spring b^{15} , to which said sections b^{14} are independently secured, said spring having the projecting end b^{16} , and the draw cord f , for putting said spring under tension, substantially as described.

5. The combination with a fan-case open to receive the stock from both of its sides and open at its periphery to discharge said stock, of a fan in said case, comprising a central

dividing disk, separating the fan-case into two distinct compartments fixed on a driving shaft, and provided with radial fan blades projecting from the opposite sides of said disk, whereby the stock which is fed in from the opposite sides with the fan case will not be united or entangled while passing through the fan, substantially as described.

6. In a pneumatic stacker, the combination with the stacker trunk and hopper, of a fan-case open at both of its sides to the interior of said hopper and opening at its periphery into said trunk, and a fan in said fan-case, comprising a fan-shaft and a central dividing disk separating the fan case into two distinct compartments and having radial blades projecting from the opposite sides of the same, substantially as and for the purpose set forth.

7. In a pneumatic stacker, the combination with the stacker trunk and hopper, of a fan-case open at both of its sides to the interior of said hopper and opening at its periphery into said trunk, and a fan in said fan case, comprising the fan shaft and the central dividing disk separating the fan-case into two distinct compartments and having the radial blades projecting from the opposite sides of the same, said blades being beveled toward the center of the fan, substantially as and for the purpose set forth.

8. In a pneumatic stacker, the combination with the stacker trunk and hopper, of the fan-case b' , open to said hopper from its opposite sides, as shown at b^2 , and the fan in said case, comprising the fan shaft b^4 , the dividing disk g , the fan blades g' having beveled or tapered surfaces g^3 and the pair of deflecting cones g^4 on said fan shaft, said parts operating substantially as described.

9. In a pneumatic stacker, the combination with the hopper b , the fan-case b' and the trunk section b^3 , all rigidly secured together and pivotally mounted on the fan-shaft b^4 , of the fixed trunk section b^6 , and the lock ring b^{10} secured to said section b^6 by slots and pins b^{10a} , substantially as described.

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

PAUL SWENSON.

Witnesses:

JAS. F. WILLIAMSON,
E. F. ELMORE.