No. 649,575. Patented May 15, 1900.

J. GARDINER.

PNEUMATIC STACKER ATTACHMENT FOR SEPARATORS.

(Application filed Dec. 29, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

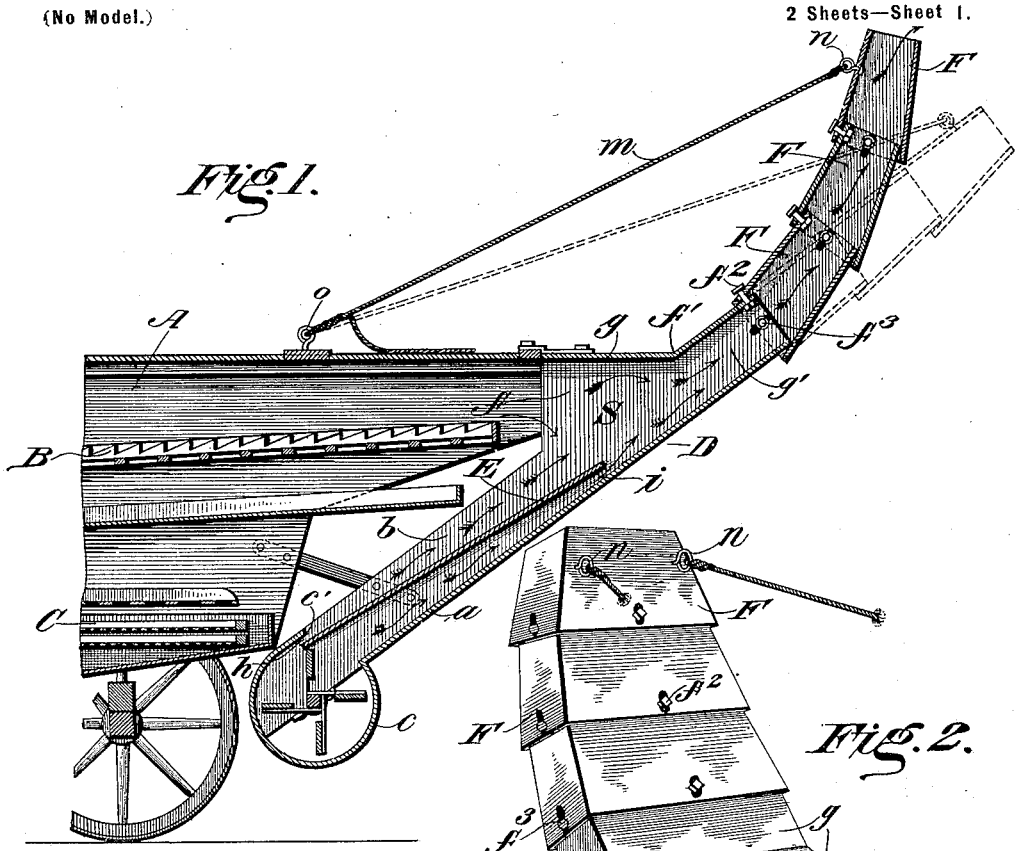


Fig. 2.

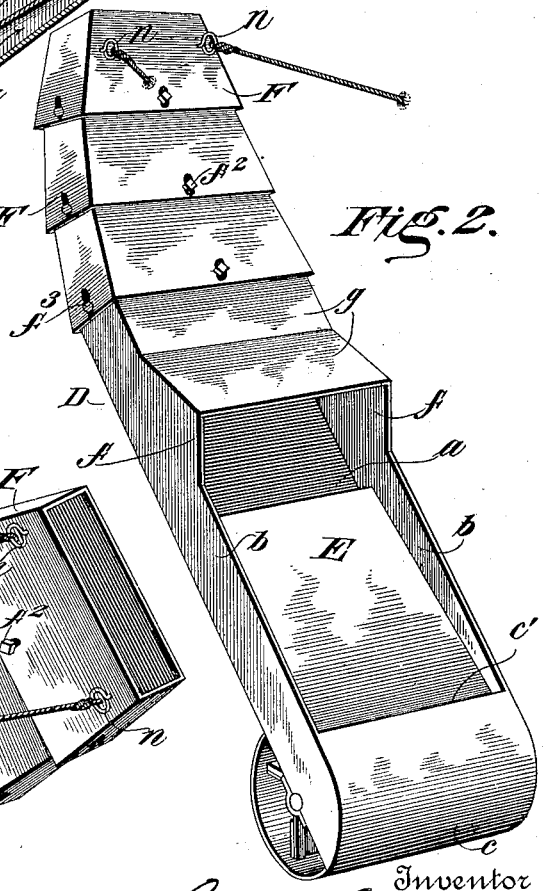
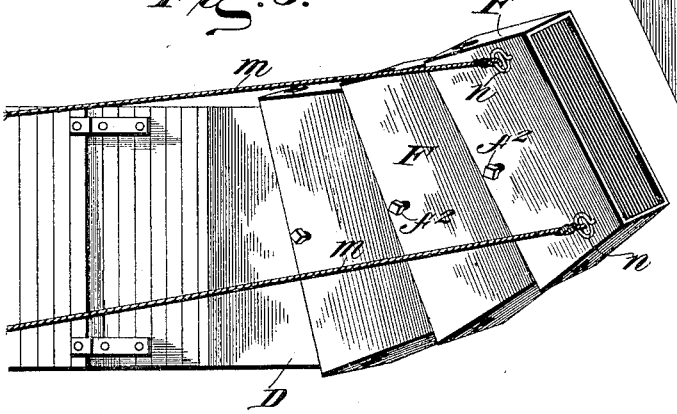


Fig. 3.



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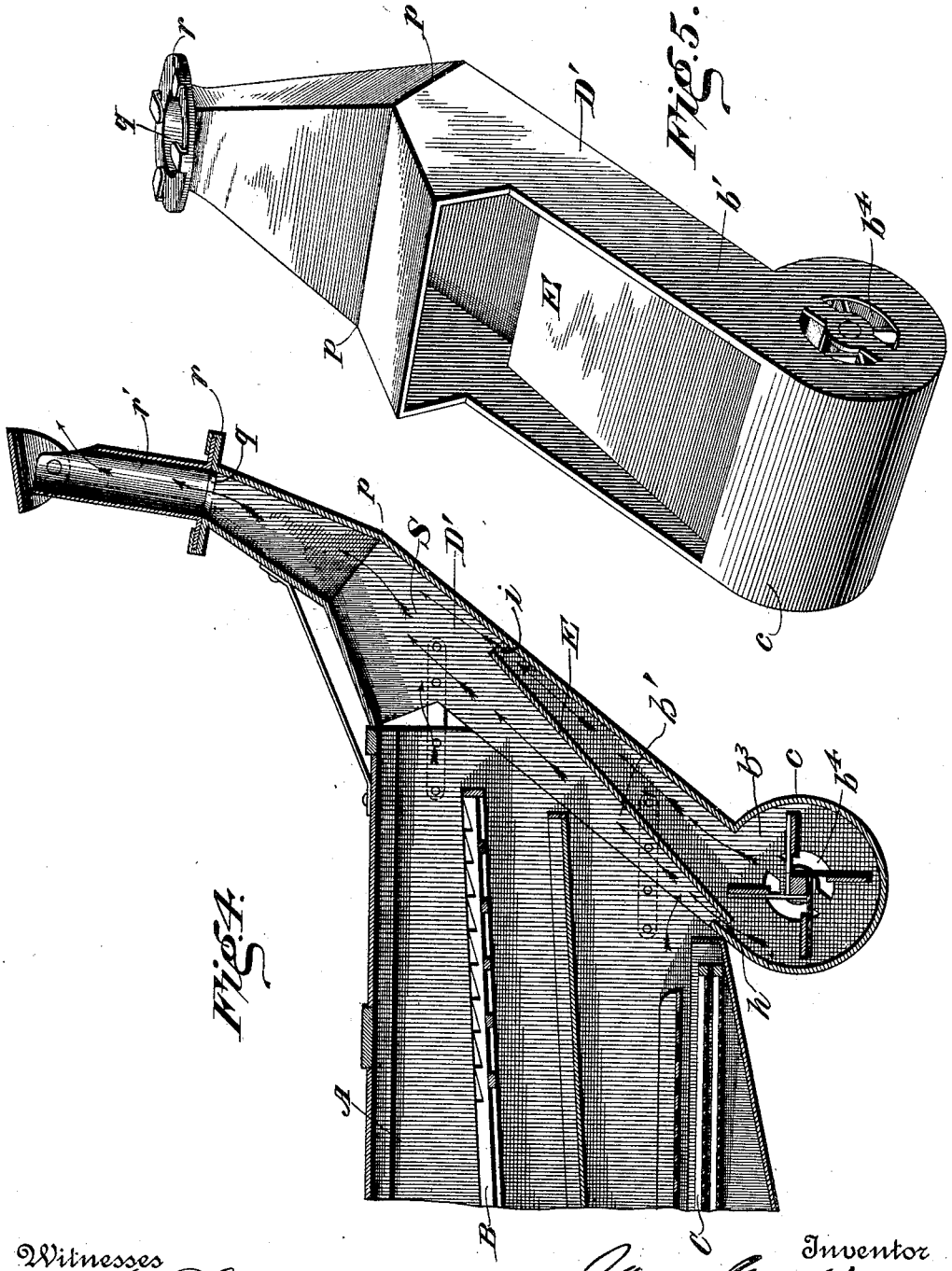

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UNITED STATES PATENT OFFICE.

JAMES GARDINER, OF NEEPAWA, CANADA.

PNEUMATIC-STACKER ATTACHMENT FOR SEPARATORS.

SPECIFICATION forming part of Letters Patent No. 649,575, dated May 15, 1900.

Application filed December 29, 1899. Serial No. 741,933. (No model.)

To all whom it may concern:

Be it known that I, JAMES GARDINER, a subject of the Queen of Great Britain and Ireland, residing at Neepawa, in the county of Neepawa and Province of Manitoba, Canada, have invented certain new and useful Improvements in Pneumatic-Stacker Attachments for Separators; 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 improvements in pneumatic stackers adapted to be applied to threshing-machines, separators, or the like in a simple and convenient manner.

The primary object of the present invention is to provide an improved combined stacker and blower possessing advantages in the matter of simplicity of construction and operation, durability of parts, and efficiency in action.

In evolving the invention the principal aim has been to entirely dispense with the usual conveyer commonly used to convey the straw or the like to the stacker from the machine to which the latter is attached and to locate the fan in such a position with relation to the other parts of the apparatus that no chaff, dust, or straw can come in contact therewith, and, further, to divide the blast from said fan into two separate currents, forming, in effect, a double blower.

The invention will first be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification and then pointed out in the claims at the end of the description.

In said drawings, Figure 1 represents a vertical central sectional view of a portion of the rear end of a threshing-machine with the improved stacker attached thereto, the latter also being shown in section and the flexible section thereof elevated in full lines and lowered to its normal position in dotted lines. Fig. 2 is a view in perspective of the stacker detached from the machine, the flexible section being shown as elevated. Fig. 3 represents a detail plan view of the stacker attached to the machine, the flexible section of the stacker being shown elevated and adjusted to one side. Fig. 4 represents a central vertical sectional view of a portion of the rear end of a threshing-machine having a stacker attached thereto embodying a modification of my invention, the latter also being shown in section; and Fig. 5 is a view in perspective of the modified form of stacker illustrated in Fig. 4.

Referring to the drawings, in which like letters of reference indicate corresponding parts in all the figures, A designates a portion of a threshing-machine, B the straw-shaker screens, and C the riddles thereof, all of any ordinary well-known construction and shown only as an example illustrative of one of the uses of the invention.

The letter D designates the stacker, adapted to be attached to the rear open end of a threshing-machine, separator, or the like, and is, as shown, preferably arranged at about an angle of forty-five degrees with relation thereto. The stacker comprises in its construction a bottom board *a*, which should be of a width equal to that of the machine to which it is attached, and sides *b*, which rise from the bottom and project a suitable distance beyond the same at the lower end thereof. These sides at their lower front corners are preferably struck on the arc of a circle concentric with the center of the circular fan-casing *c*. The latter, starting from the point where the bottom *a* ends, curves around the curved front corners of the sides, to which it is attached, and terminates at a point adjacent to the rear end of the riddles. As shown, the projecting ends of the sides serve to close the upper half of the ends of the fan-casing, leaving the other half open for the admission of air to the fan. The ends of the fan-shaft, which carries a fan of suitable dimensions, are journaled in bearings secured to the lower edges of the projecting ends of the sides *b*, at the center of the fan-casing, the shaft being driven by any suitable source of power. (Not shown.) The sides *b*, near their upper ends on the front edges, are provided with angular projections *f*, the upper edges of which are designed to be approximately in a horizontal plane with the top of the threshing-machine, separator, or the like, to which the stacker is attached, while the front edges are adapted to abut against the rear edges of the sides of the machine. From a point *f'* to their ends the

sides b may be of a width equal to their lower portions and the upper edges of the projections f, and the upper edges of the sides, from the point f' to their ends, are provided with a suitable covering g, forming, preferably, in effect, a continuation of the top covering of the thresher. It will be noted with reference to the drawings that this construction provides a narrow opening or constricted neck portion g' at the upper end of the stacker, which facilitates the massing together compactly of the straw and chaff as it is about to be discharged. Also the upper covering at this point serves to hold the straw down into the current of air from the fan.

From the terminal point c' of the top of the fan-casing to where the covering g joins the top covering of the thresher or separator the stacker is entirely open, approximating in effect a hopper-mouth adapted to receive the straw and the chaff from the separator, though at comparatively widely separated points.

The letter E designates a blast-dividing imperforate diaphragm or division-board designed to divide the blast from the fan into two separate currents. The width of the diaphragm should be the same as the upwardly-opening mouth of the fan-casing, and starting from a point slightly below and beneath the edge c' of the latter it extends to a point approximately in a horizontal line with the rear end of the straw-shakers and in close proximity to the bottom a. By thus arranging the diaphragm or blast-divider it is disposed at an angle with relation to the bottom of the stacker-chute and provides a narrow slit or opening h between its lower end and the fan-casing and a similar opening i below the diaphragm between its upper end and the bottom a. These openings form the outlets for the blast from the fan, the diaphragm dividing said blast into an upper chaff-carrying current, and a lower main current of greater volume for expelling the commingled straw and chaff. This division of the draft produces the effect of a multiple blower, the requisite blast for the same emanating from a single fan. The upper side of the diaphragm presents a smooth unbroken surface over which the chaff passes freely without sticking or leaving a deposit behind.

The construction so far described constitutes the permanent part of the stacker or that part which is firmly but removably attached to the separator. As shown, such securing means may consist of straps bolted to the machine and stacker near the bottom and top thereof.

Upon the upper end or contracted neck portion of the stacker-chute is attached a conducting-tube, preferably flexible, consisting of a series of tapering box-like sections F, the lower one of which fits over the upper end of the stacker-chute and is loosely connected thereto at the top and sides, as by bolts f^2 f^3, respectively, working in slots, as shown. To the upper end of this section the second section of the series is similarly fitted and connected, and so on throughout the whole series of sections. In the drawings three such sections are shown, as this number, it is thought, is sufficient to properly conduct the straw and chaff to the stack; but a greater or less number of sections may be used. Each section is made slightly tapering, as shown. Hence at the end of the series the discharge-opening is considerably contracted, causing the commingled straw and chaff to be discharged in a somewhat compact mass, thus preventing the material from being scattered over a wide area. Owing to the loose connection between the several sections at the points mentioned a limited movement either up or down or from side to side is permitted, as clearly shown in Figs. 1 and 3. For accomplishing such movement, I may employ ropes m, secured to eyebolts n on the front side of the upper section of the flexible tube, said ropes at their opposite ends passing through eyes o on the top of the thresher or separator, then wrapped upon themselves or otherwise secured, holding the adjustable flexible section in position to direct the straw and chaff in any desired direction. This adjustable flexible conducting tube or conduit admits of no loss of the pressure of the wind and effectually prevents any back pressure of the same. As before stated, the movements permitted by the connections between the sections F are limited, and by loosely connecting said sections, as already explained, the bolts f^2 f^3 do not interfere with either the up-and-down or lateral movements desired. It is obvious that the adjustment or movement of each one of the said sections need only be quite limited relatively and still a considerable range of movement of the discharge end of the outermost section will be affected, assuming the connections of the flexible conducting-tube with the neck portion of the stacker-chute to be the main center upon which the said tube turns when adjusted in either direction.

In Figs. 4 and 5 of the drawings I have illustrated a slightly-modified form of the stacker, which is denoted by the letter D', the main difference residing in the omission of the flexible hood or chute and in tapering the sides, top, and bottom from the point p to a point q, forming a constricted opening at said point. Around said opening a turntable r is secured in any suitable manner and adapted to support adjustably thereon a cylindrical discharge-tube r', as shown. The sides b' are provided at their lower ends with circular portions b^3, which in this instance form the ends of the fan-casing, suitable openings b^4 being made in said ends for the admission of air to the fan. Otherwise the construction of the device, its application to a separator, and operation are substantially the same as in the preferred form.

The operation of the stacker may be briefly

stated as follows: The chaff from the riddles falls on the diaphragm at the lower end thereof, where it is immediately taken up by the current from the fan, and is carried thereby along the upper surface of the division-board in the direction of the arrows in Fig. 1 until it reaches the straw-receiving chamber, (marked S in the drawings,) where it mingles and mixes with the straw coming from the straw-screens. At this point the lower current issuing from beneath the division-board joins the upper current and combining into one strong blast carries off the commingled chaff and straw to be stacked.

As illustrated in the drawings the invention is shown as attached to a threshing-machine or separator of a well-known construction; but I desire it to be understood that the stacker can be applied to any machine for handling straw, chaff, or grain without in the least interfering with the working parts of the latter, as its operating parts are self-contained and its operation is entirely independent of that of the separator. Further, I do not desire to limit myself to the precise construction shown and described, as various changes in details of construction and arrangement of parts may be made without departing from the spirit and scope of my invention.

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

1. A pneumatic-stacker attachment for grain-separators, the same comprising a fan located at the rear end of the riddle, a main receiving and conducting chute leading from the fan-casing and having an open front facing the rear end of the separator and extending upwardly from the riddle, an enlarged intermediate portion or mixing-chamber, and a reduced or contracted neck or exit, together with a blast-dividing diaphragm or division-board arranged transversely of said chute beyond the riddle, so as to divide the air issuing from the fan into an upper and lower current within the chute; substantially as described.

2. A pneumatic-stacker attachment for grain-separators, comprising a fan, a main inclined receiving and conducting chute having a narrow or contracted neck at its upper end, and an open front side or hopper-like elongated mouth for receiving the straw and chaff discharged from the separator, a suitably-covered top adapted to hold the straw down in the current of air from the fan, an inclined blast-dividing diaphragm arranged transversely of the chute below the open front or hopper-mouth and intermediate the fan and contracted neck, providing contracted draft-outlets between the latter and the top of the fan-casing at its lower end and between the bottom of the chute and the diaphragm at the upper end thereof, substantially as described.

3. A pneumatic-stacker attachment for grain-separators, comprising an inclined main receiving and conducting chute having an open front, an incased rotary fan located at the lower end thereof, a blast-dividing diaphragm above the fan, disposed transversely of the open front side of the chute and inclined at an angle with relation to the bottom thereof forming separate draft-conduits above and below said diaphragm dividing the blast from the fan into an upper chaff-carrying current and a lower straw-carrying current, a straw receiving and mixing chamber above the diaphragm, and a cover for said chamber adapted to hold the straw down in the current of air from the fan; said chamber terminating in a contracted neck opening into a conducting chute or tube extending from said neck, for directing the commingled straw and chaff to the stack, substantially as described.

4. A pneumatic-stacker attachment for grain-separators, the same comprising an inclined main receiving and conducting chute having an open front, and a neck or contracted discharge end, an intermediate mixing-chamber, an incased rotary fan at the lower end of the chute, the same being arranged adjacent the rear end of the riddle of the separator, a blast-dividing diaphragm entirely within the chute designed to divide the blast from the fan into two separate currents, and to receive upon its upper surface the chaff from the riddles, and an adjustable flexible discharge chute or tube forming a continuation of said neck; substantially as described.

5. In a pneumatic-stacker attachment for grain-separators, an inclined receiving and conducting chute having an open front, and located at the rear ends of the shaker-screens and riddles of the separator, means beyond the rear ends of the riddles for forcing air into the lower end of said chute, an imperforate inclined partition dividing the chute into separate conduits, a straw receiving and mixing chamber above said partition, a contracted neck communicating with said chamber, and an adjustable flexible discharge chute or conduit extending from said neck, said flexible chute comprising tapering sections loosely connected together, substantially as shown and for the purpose described.

6. In a pneumatic-stacker attachment for grain-separators, a receiving and conducting chute having an open front or side adapted to abut against the rear open end of the thresher or separator to which it is attached and means for supporting it at a suitable inclination with relation thereto, means located at the rear end of the riddles for forcing air in the lower end of said chute, an inclined partition above said air-forcing apparatus arranged entirely beyond the riddles and transversely of the open front of the chute, and dividing the blast into upper and lower currents within the chute which are combined in a single strong draft at the upper end of the partition, a chaff and straw mixing chamber at the terminus of the partition, there being

a contracted exit opening into a conducting tube or chute movably supported upon said exit and adapted to be adjusted sidewise or raised or lowered, substantially as described.

7. In a pneumatic-stacker attachment for grain-separators, an upwardly-inclined chute having a fan at its lower end, the same being located beyond the rear ends of the riddles, a contracted neck or exit portion and an intermediate straw and chaff mixing chamber, together with an imperforate partition between said fan and mixing-chamber the same being independent of the riddles and inclined with respect to the bottom of the chute, so as to provide an air-conduit above and one below the partition with provision for discharging the greater volume of air in the lower conduit, and combining the two currents in the mixing-chamber so as to forcibly expel commingled straw and chaff therefrom.

8. In combination with the straw and chaff receiving chute, the fan or blower located at the lower end thereof, beyond the rear end of the riddles, and provided with a single discharge-spout, an imperforate partition for dividing the blast of air into separate currents which are united above the partition, the latter extending partly across the discharge-spout and being inclined with respect to the bottom of the chute so as to provide a contracted exit from the fan-casing above the partition, and space for a greater volume of air below the same, there being a contracted exit for the latter, substantially as described.

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

JAMES GARDINER.

Witnesses;
G. McCONAGHY,
JOHN F. RALPH.