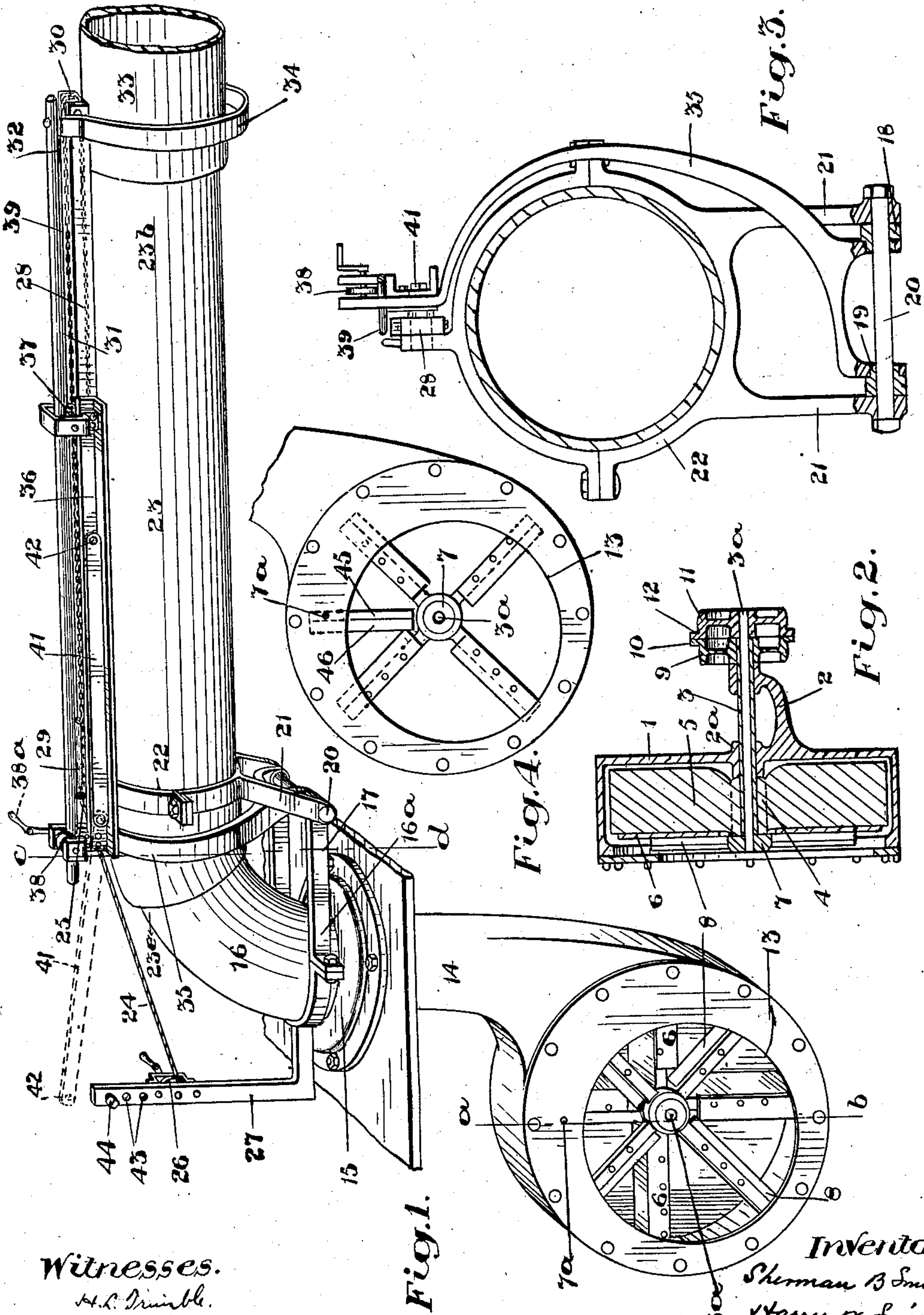


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S. B. & H. W. SMITH.  
PNEUMATIC STRAW STACKER.

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# UNITED STATES PATENT OFFICE.

SHERMAN B. SMITH AND HARRY W. SMITH, OF HAMILTON, ONTARIO, CANADA.

## PNEUMATIC STRAW-STACKER.

No. 891,299.

Specification of Letters Patent.

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Application filed August 1, 1907. Serial No. 386,648.

*To all whom it may concern:*

Be it known that we, SHERMAN B. SMITH and HARRY W. SMITH, both of the city of Hamilton, in the county of Wentworth and Province of Ontario, Canada, have invented certain new and useful Improvements in Pneumatic Straw-Stackers; and we hereby declare that the following is a full, clear, and exact description of the same.

10 This invention relates to pneumatic straw stackers and has for its object the improvement of the fan and the stacker pipe used in such machines.

15 The straw stacker according to this invention comprises a fan housing having an opening at one side thereof, a fan rotatably mounted in the fan housing and provided with fan blades having knives on their radial edges adjacent to the opening of the fan housing, a knife or knives coöperating with the knives of the fan blades, an exit for the fan housing, a rotatable elbow connected to the exit, an adjustable stacker pipe detachably connected to the elbow, means for adjusting the stacker pipe on the elbow to vary the inclination of the former relatively to its horizontal position, means for supporting the adjustable stacker pipe when connected with the elbow, and means for slidably supporting the adjustable stacker pipe when disconnected from the elbow.

30 For an understanding of this invention reference is to be had to the following description and to the accompanying drawings, in which:—

35 Figure 1, is a perspective view of the pneumatic stacker. Fig. 2, is a section on the line *a b* Fig. 1. Fig. 3 is a section on the line *c d* Fig. 1. Fig. 4 is a view of the fan showing a modification of the same.

40 Like characters of reference refer to like parts throughout the specification and drawings.

45 The fan housing 1, having an opening 13, at one side thereof is provided with a bracket 2 having aligned bearings 2<sup>a</sup>, in which is mounted a hollow shaft 3, containing the central spindle 3<sup>a</sup>. Upon the hollow shaft 3, is mounted the fan having fan blades 5. The radial edges of the fan blades 5, adjacent to the opening 13, are provided with knives 6. Upon the spindle 3<sup>a</sup>, adjacent to the knives 6, is mounted a knife wheel 7, to the radial arms of which are fixed knives 8, the edges of which are opposed to the edges of the knives 6. On the hollow shaft 3, is mounted a pul-

ley wheel 9, having a peripheral flange 10. On the spindle 3<sup>a</sup>, is mounted a pulley 11, having a peripheral flange 12 adjacent to the flange 10, to prevent the belts moving from one pulley to the other. The pulleys 9 and 11 are driven from the same power pulley but the belt for the pulley 11 is crossed, so that the knife wheel 7, will rotate in the opposite direction to the knives 6. The plane of rotation of the knives 8 is in close proximity to that of the knives 6, so that, when the straw is drawn into the fan housing, it will be engaged by the knives and cut into short lengths. The opening 13, provided in the fan housing for the entry of the straw is preferably eccentric to the center of the fan, as it is found in the field of actual experience that the straw is sucked into the fan housing with greater ease than when the opening 13 is concentric with the center. When it is not desired to cut the straw, the driving belt for the pulley 11, may be removed and replaced un-crossed, so that the knife wheel will rotate in the same direction as the fan knives 6.

80 When the straw is required to be cut into medium lengths, the belt can be removed from the pulley 11 and the knife wheel 7 stationarily fixed to the side of the fan housing 1, by any suitable means such as a set screw 7<sup>a</sup> passing through the side of the fan housing. When the straw is required in long lengths, the knife wheel 7 is removed from the spindle 3<sup>a</sup> and an arm 45 is secured to the side of the fan housing. To the inner side of the arm 45 is secured a knife 46 similar to the knives 8. Fitted to the exit 14, of the fan housing, is an ordinary turntable base 15, upon which is revolubly mounted the elbow 16. A collar 16<sup>a</sup> surrounds the elbow 16 and from the collar 16<sup>a</sup> extend forwardly arms 17 provided with bearings 18 having internal bosses 19. Through the bearings 18 passes the spindle 20. Upon the spindle 20 are mounted the supporting arms 21 for the supporting collar 22 of the adjustable stacker pipe 23. The elbow 16 is curved in an arc of a circle having for its center the center of the spindle 20. The adjustable stacker pipe 23 is movable over the elbow 16, which is preferably slightly flexible. The joint 23<sup>a</sup>, at the junction of the stacker pipe 23 and the elbow 16, when the stacker pipe 23 is in approximately a horizontal position, forms an angle of about 85 degrees with the plane of the turn table, and the stacker pipe 23 is of a sufficiently greater diameter than the elbow



16, to enable it to slide freely over the latter during its adjustment to its various positions. The movement of the stacker pipe 23, on the elbow 16, is effected by a cord 24, attached to a hook 25 at the upper part of a collar 22, and passing around a manually operable drum 26, rotatably mounted in the standard 27 extending upward from the collar 16<sup>a</sup>, at the rear of the elbow 16. Forwardly extending from the collar 22 is the usual beam 28, having a manually operable pulley 29 at its inner end, and a pulley 30 at its outer end. Passing round the pulleys 29 and 30, is the chain 31, attached to the outer section 33, of the stacker pipe 23, which, as is usual in straw stackers, is slidable over the inner section 23<sup>b</sup>. Loosely surrounding the outer section 33, of the stacker pipe 23, is a ring 34 attached to the end of the beam 28. The ring 34, is placed at the point of balance of the stacker pipe 23, when the latter is contracted. Upon the bosses 19, of the arms 17, is oscillatingly mounted an arm 35, curved to partially surround the stacker pipe 23. The end of the arm 35 is situated above the stacker pipe 23 and adjacent to the beam 28. Forwardly extending from the top of the arm 35, is a bar 36 carrying on its outer end a roller 37. At the top end of the arm 35 is a roller 38, situated in a plane slightly higher than that of the roller 37, and the roller 38 is preferably provided with an actuating crank 38<sup>a</sup>. Passing under the roller 38 and over the roller 37 is a rod 39 pivotally connected at its outer end to the ring 34. The rod 39 is preferably of annular cross section to facilitate its movement on the rollers 37 and 38. Pivoted at one of its ends, to the bar 36 near the rear end thereof, is a rod 41 having an aperture 42 at its other end. The rod 41 normally lies along the bar 36 as shown in full lines in Fig. 1, but it may be swung over to extend behind the bar 36 as shown in dotted lines Fig. 1. Bolt apertures 43 are formed through the standard 27, so that the rod 41 can be connected to the standard 27 by a bolt 44 passed through the apertures 42 and 43. When it is desired to turn the stacker pipe 23 in a limited space, as might become necessary, for instance, when the straw stacker was being used in a barn or like restricted space, the stacker pipe is collapsed as much as possible, the rope 24 is slackened until the end 23<sup>a</sup> of the stacker pipe can clear the outer end of the elbow 16, and the rod 41 is swung over and connected to the standard 27 by a bolt 44 which passes through the aperture 42 and one of the bolt apertures 43. The cord 24 is then disconnected from the hook 25 and lastly the spindle 20 is removed from the bearings 18. When the spindle is removed the only function of the arms 17 is to support the lower end of the curved arm 35, the upper end of which is retained in position by the rod 41, and the collar 22, which normally

supports the inner end of the stacker pipe, is free to turn in any direction to clear the elbow. The stacker pipe 23 and its outer section 33 are now only supported by the ring 34, which as stated above, is placed at the point of balance of the stacker pipe when the latter is collapsed. The ring 34 is only supported by the rod 39 capable of longitudinal movement between the rollers 37 and 38 and being of circular shape in cross section, also capable of an oscillating movement about its own axis to enable the ring 34 and stacker pipe to be turned outwards from the arm 35. This movement permits the stacker pipe 23 to be rocked sidewise, and until its inner end, moving towards the left, Fig. 3, clears the end of the elbow 16. The stacker pipe can then be pulled inwards, the rod 39 sliding over the rollers 37 and 38, until half the stacker pipe extends on either side of the turntable, the space required for turning the stacker pipe being thus reduced by one half of its length when collapsed. The turntable can then be rotated until the elbow 16 points in the direction towards which it is desired that the stacker pipe should extend, and the above proceedings reversed, the stacker pipe being ultimately set up in the desired position.

Having thus fully described our invention what we claim as new and desire to secure by Letters Patent is:

1. A pneumatic stacker comprising a fan housing having an opening at one side thereof, a fan rotatably mounted in the fan housing, a straw cutting knife mounted on the radial face of one of its blades adjacent to the opening in the fan housing, a second knife coöperating with the first mentioned knife to cut the straw as it enters the fan housing through the opening thereof, and means for effecting the rotation of the fan.

2. A pneumatic stacker comprising a fan housing having an opening at one side thereof, a fan rotatably mounted in the fan housing having straw cutting knives mounted on the radial faces of its blades adjacent to the opening of the fan housing, a knife wheel rotatable about the same axis as the fan, the knives of which are revoluble in an opposite direction to, and, coöperate with the knives of the fan to cut the straw as it enters the fan housing through the opening thereof, means for effecting the rotation of the fan, and other means for effecting the rotation of the knife wheel.

3. A pneumatic stacker comprising a fan housing having an opening at one side thereof, a fan rotatably mounted in the fan housing, having straw cutting knives mounted on the radial faces of its blades adjacent to the opening of the fan housing, a knife wheel rotatable about the same axis as the fan, the knives of which are revoluble in an opposite direction to, and, coöperate with the knives



of the fan to cut the straw as it enters the fan housing through the opening thereof, means for effecting the rotation of the fan, and means for effecting the rotation of the knife wheel in the opposite direction to the rotation of the fan.

4. A pneumatic stacker comprising a fan housing having an opening at one side thereof, axial bearings on the fan housing, a hollow shaft rotatably supported in the bearings, a fan mounted on the hollow shaft within the fan housing and having straw cutting knives mounted on the radial faces of its blades, a pulley wheel external to the fan housing on the hollow shaft, a central spindle within the hollow shaft, a knife wheel, having radial arms mounted on the central spindle, knives fixed to the radial arms of the wheel in such manner as to cooperate with the knives on the fan to cut the straw as it enters the fan housing through the opening thereof, a pulley wheel mounted on the central spindle external to the fan housing, and means for detachably securing the knife wheel to the fan housing.

5. A pneumatic stacker comprising a fan housing, having an exit extending therefrom, and an opening in one of its sides, the opening being eccentric to the axis of the fan, a double bearing at the side of the fan housing opposite to the opening, a hollow shaft rotatably supported in the double bearing, a fan within the fan housing mounted on the hollow shaft having knives mounted on the radial faces of its blades adjacent to the opening of the fan housing, a pulley wheel external to the fan housing mounted on the hollow shaft, a central spindle within the hollow shaft, a knife wheel having radial arms mounted on the central spindle, knives fixed to the radial arms of the knife wheel in such manner as to cooperate with the knives on the fan to cut the straw as it enters the fan housing through the opening, a pulley wheel mounted on the central spindle external to the fan housing, and means for detachably securing the knife wheel to the fan housing.

6. A pneumatic stacker comprising a fan housing, a rotary fan, an exit for the fan housing, an elbow rotatably connected to the exit, an adjustable stacker pipe capable of being adjusted over the elbow, means for detachably connecting the adjustable stacker pipe to the elbow, means for effecting the adjustment of the stacker pipe over the elbow and means for slidably supporting the stacker pipe when disconnected from the elbow.

7. A pneumatic stacker comprising a fan housing, a rotary fan, an exit for the fan housing, an elbow rotatably connected to the fan exit, a supporting arm projecting from the elbow, a stacker pipe capable of adjustment over the elbow, a collar for the stacker pipe having an arm to be detachably connected to the first mentioned arm, a standard

extending upwardly from the elbow at the rear of the same, a manually operable drum rotatably mounted in the standard, a cord wound on the drum and connected to the upper part of the collar, and means for slidably supporting the stacker pipe when the collar arm is disconnected from the arm projecting from the elbow.

8. A pneumatic stacker comprising a fan housing, a rotary fan, an exit for the fan housing, an elbow rotatably connected to the exit, a forked supporting arm projecting from the elbow, having aligned apertures in the ends thereof, and bearing bosses co-axial with the apertures, an adjustable stacker pipe capable of being adjusted over the elbow, a collar for the stacker pipe having a downwardly extending forked collar arm with apertures in the ends thereof corresponding to the apertures in the ends of the forked supporting arm, a spindle passing through the apertures of the collar arm and supporting arm and removable therefrom, a standard extending upwardly from the elbow at the rear of the same, a manually operable drum rotatably mounted in the standard, a cord wound on the drum and connected to the upper part of the collar, and means for slidably supporting the stacker pipe when the spindle is removed from the apertures of the collar arm and supporting arm.

9. A pneumatic stacker comprising a fan housing, a rotary fan, an exit for the fan housing, an elbow rotatably connected to the exit, a forked supporting arm projecting from the elbow having aligned apertures in the ends thereof, and bearing bosses co-axial with the apertures, an adjustable stacker pipe capable of being adjusted over the elbow, a collar for the stacker pipe having a downwardly extending forked collar arm with apertures in the ends thereof corresponding to the apertures in the ends of the forked supporting arm, a spindle passing through the apertures of the collar arm and forked supporting arm and removable therefrom, a standard extending upwardly from the elbow at the rear of the same, a manually operable drum rotatably mounted in the standard, a cord wound on the drum and connected to the upper part of the collar, a curved supporting arm journaled on the bearing bosses of the forked supporting arm extending around one side of the stacker pipe, a bar connected to the curved supporting arm and extending forwardly along the upper part of the stacker pipe, a roller mounted on the outer end of the bar, a second roller mounted on the inner end of the bar in a plane above that of the first mentioned roller, a collar loosely surrounding the stacker pipe, a rod passing over the first mentioned roller and under the second mentioned roller and pivotally connected to the last mentioned collar, a rod pivoted to the



inner end of the bar, and means for detachably connecting the rod to the standard.

10. A pneumatic stacker comprising a fan housing, a rotary fan, an exit for the fan  
5 having an elbow rotatably connected to the exit, a forked supporting arm projecting from the elbow having alined apertures in the ends thereof and bearing bosses co-axial with the apertures, an adjustable stacker  
10 pipe capable of being adjusted over the elbow pipe, a collar for the stacker pipe having a downwardly extending forked collar arm with apertures in the ends thereof corresponding to the apertures in the ends of the  
15 forked supporting arm, a spindle passing through the apertures of the collar arm and forked supporting arm and removable therefrom, a standard extending upwardly from the elbow at the rear of the same, a manually  
20 operable drum rotatably mounted in the standard, a cord wound on the drum and connected to the upper part of the collar, a curved supporting arm journaled on the bearing bosses of the forked supporting arm, ex-

tending around one side of the stacker pipe, 25  
a bar connected to the curved supporting arm, and extending forward above the stacker pipe, a roller mounted on the outer end of the bar, a second roller mounted on the inner end of the bar in a plane above that  
30 of the first mentioned roller the stacker pipe consisting of two sections one of which is slidable on the other, means for causing the slidable section to move on the other section,  
35 a collar loosely surrounding the movable section at the point of balance of the stacker pipe, a rod passing over the first mentioned roller and under the second mentioned collar, a tie rod pivoted to the inner end of the bar, and means for detachably connecting the tie  
40 rod to the standard.

Hamilton, June 24th, A. D. 1907.

S. B. SMITH.

HARRY W. SMITH.

Signed in the presence of—

JNO. P. STANTON,

NELLIE ALWAY,

LYMAN LEE.