(No Model.)

F. F. LANDIS.

PNEUMATIC STRAW STACKER.

No. 522,758. Patented July 10, 1894.

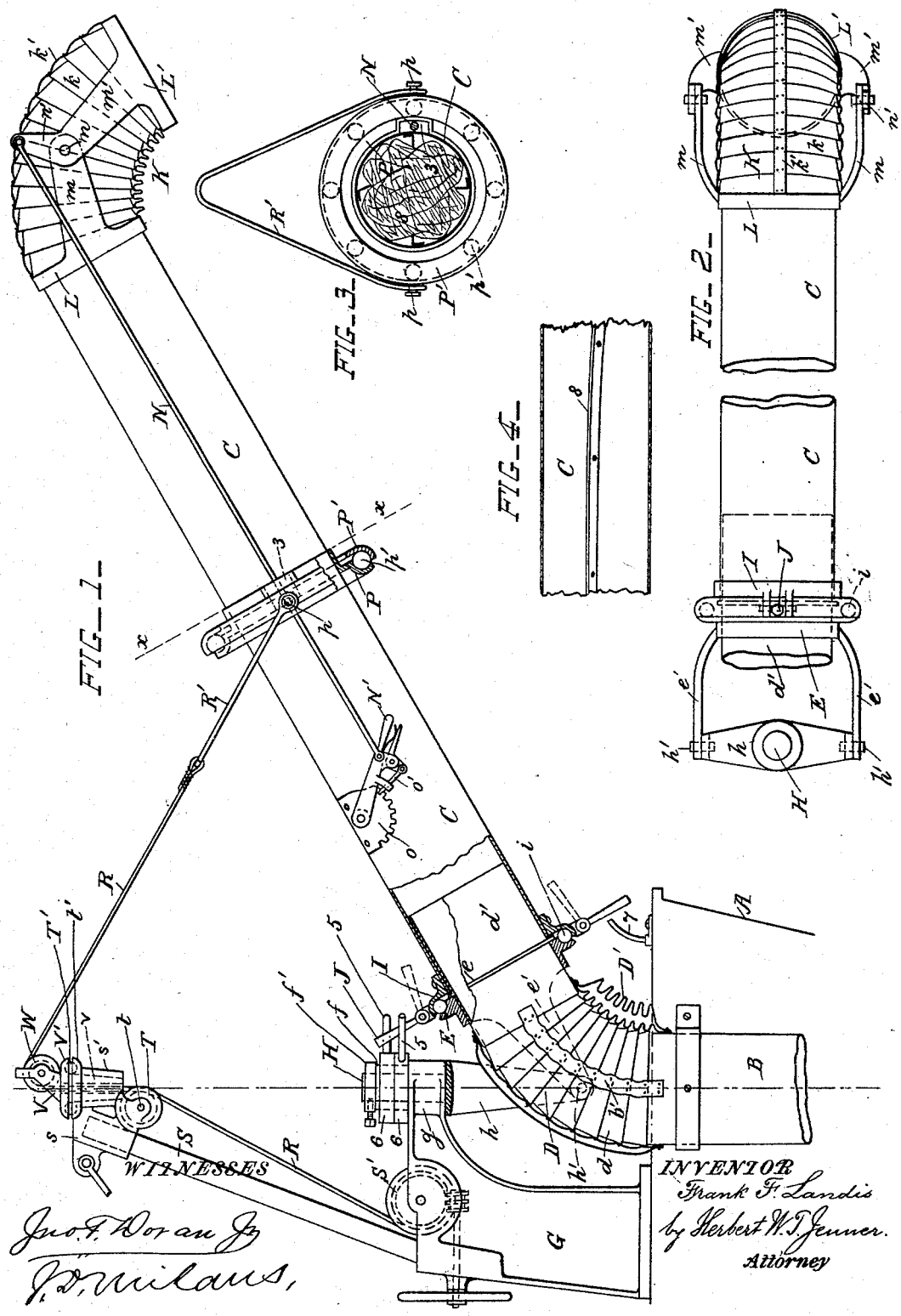

FIG. 1.

FIG. 3.

FIG. 4.

FIG. 2.

WITNESSES

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PNEUMATIC STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 522,758, dated July 10, 1894.

Application filed January 24, 1894. Serial No. 497,892. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Straw-Stackers; 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 pneumatic straw stackers used in connection with thrashing machines; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings: Figure 1 is a side view of the straw stacker, partly in section. Fig. 2 is a plan view of the discharge pipe. Fig. 3 is a cross section through the discharge pipe, taken on the line *x x* in Fig. 1. Fig. 4 is a longitudinal section through a portion of one of the pipes of the straw stacker.

A is a portion of the casing of a grain separator; and B is the delivery pipe through which the straw is driven by a blast of air in any approved manner. The pipe B is secured to the separator casing.

C is the revoluble discharge pipe which is made of a length sufficient to stack the straw to any desired height.

D is a flexible junction pipe which connects the pipes B and C, and permits the pipe C to be moved in every direction both vertically and circumferentially.

The pipe D preferably consists of a series of articulated conical segments *d*. The lower end of the pipe D is secured to the pipe B, and the upper end is provided with a cylindrical end piece *d'*. The segments are preferably connected together and to the said end piece by three or more leather straps *b'*, the straps being secured to the segments of the series at points which are never overlapped by the next adjacent segments. The segments are inclosed in a tube D' of flexible material, such as canvas, which is practically air-tight.

E is a collar mounted on the end piece *d'*, and *e* is a narrow collar secured on the end piece *d'* above the collar E and bearing against it. The collar E is provided with the rearwardly-projecting arms *e'*.

G is a standard secured to the separator casing and provided with a bearing *g* arranged vertically over the center line of the delivery pipe B.

H is a shaft journaled in the bearing *g*, and provided with a yoke *h* at its lower end. The ends of the yoke *h* are pivoted to the ends of the arms *e'* by the pins *h'*. The bearing *g* has a circular extension *f* above the top of the standard, and *f'* is a collar secured to the top of the shaft H and bearing against the top of the extension *f*, so that the shaft H cannot slide downward in the bearing. The shaft and yoke hold the flexible pipe extended and permit it to be moved about to a limited extent in every direction.

The lower end of the pipe C is slid upon the upper end of the end piece *d'* and is provided with a collar I. The collar I may bear against the collar E, or any approved anti-friction devices may be interposed between them. A series of balls *i* is shown between the said collars as the preferred means for making them work as frictionless as possible.

The pipe C may be revolved in either direction by hand, and may be provided with any convenient handles or projections for that purpose. J are the handles which are preferred for this purpose. These handles are hinged to the collar I so that they may be folded over in line with the pipe C. The friction of the hinges is ordinarily sufficient to hold the handles in any desired position, but any approved form of retaining springs or catches may be used for that purpose, if desired.

A deflector K is provided at the mouth of the discharge pipe, for throwing the straw downward onto the stack. This deflector may be of any approved construction and is preferably adjustable in every direction. The preferred form of deflector, illustrated in the drawings, consists of a series of articulated conical segments *k*, similar to those of the flexible pipe D but more conical as the deflector pipe requires to be bent around to a more acute angle than the pipe D. The segments *k* are connected together by three or more leather straps *k'* similar to the straps of the pipe D. No inclosing air-tight tube is

used, as the escape of air is desirable at this point. The end segments of the deflector pipe are secured to the end pieces L and L′, the end piece L being secured to the upper end of the pipe C. The end pieces L and L′ are respectively provided with arms *m* and *m′* upon each side, and these arms are pivotally connected together by the pins *n*. One of the arms *m′* has a projecting arm *n′* which forms together with the arm to which it is attached a kind of bell-crank lever, and the arm *n′* affords a means for the attachment of a rod for regulating the discharge angle of the deflector pipe.

N is the regulating rod pivoted to the arm *n′* and arranged longitudinally of the pipe C. The lower end of the rod N may be provided with any convenient form of catch for holding it in position. By preference a handle N′ is pivoted to the lower end of the rod N. This handle is pivoted to the notched quadrant bracket *o* secured to the pipe C, and is provided with an ordinary spring-actuated detent *o′*.

P is a collar secured upon the pipe C at about the middle of its length.

P′ is a collar or ring which is slipped over the collar P, and *p′* are anti-friction balls interposed between the said collars. Lugs or pins *p* are provided on the collar P′, and the lifting cord R is connected to these lugs by means of the bail R′.

The collar P is provided with an aperture 3 on one side for the passage of the rod N, so that the pipe C can be revolved upon its axis without any risk of the said rod striking the bail R′.

The lifting cord may be connected to any approved form of lifting and supporting device. The device preferred for this purpose consists of a standard S having any approved form of windlass S′ at its lower part where it can be operated conveniently by a man on the top of the separator. The standard S is provided with a cap *s* at its top, and a conical bearing *s′* arranged substantially on the vertical center line of the pipe B. A vertically arranged sheave T is journaled on a pin *t* at the lower part of the bearing *s′*.

V is a bracket provided with a flange V′ and a tubular stem or shank *v*. The shank *v* is journaled in the bearing *s′*, and T′ are balls interposed between the flange V′ and the flange *t′* at the top of the bearing *s′* to reduce the friction. A sheave W is journaled in the bracket V and the lifting cord is carried over the sheave W, through the tubular shank *v*, past the sheave T and down to the barrel of the windlass. The sheaves W and T keep the cord R on the center line of the delivery pipe and permit the discharge pipe to be swung around without changing its angle.

The discharge pipe may be swung around by hand, or the pressure of the blast may be utilized to move it automatically. In order to make the discharge pipe swing around automatically, the deflector pipe is bent over as shown in Fig. 1 and is turned a little to the right or left according to the desired direction of motion. The discharge pipe is then propelled automatically in the reverse direction from that in which it discharges, by the force of the current of air and straw issuing from the deflector pipe and impinging against the atmosphere.

In order to reverse the direction of the motion of the discharge pipe at the extremities of its swing, the stops 5 are provided. These stops are preferably adjustable and may be attached to any stationary part of the machine. The drawings show the stops 5 projecting from collars 6 which are adjustably secured upon the extension *f* of the bearing *g*, in the path of the upper handle J. The stops 5 may be screwed into the collars, and form the means for securing the collars to the extension *f*, or the collars may have independent fastening devices. The stops may be set to give the discharge pipe any desired length of arc of travel. When the pipe arrives nearly at one end of its travel, the handle strikes the stop at that end, and the inertia of the pipe causes it to move sufficiently farther to cause the stop to partially revolve the pipe by pressing against the handle, thereby turning the deflector pipe on the axis of the discharge pipe, in the opposite direction, and reversing the motion of the discharge pipe.

Stops 7 may be attached to the top of the separator casing to effect the reversal of the swinging motion of the discharge pipe, if desired. These stops 7 are used when the deflector pipe is pointed upward instead of downward, as is the case in topping high stacks so as to give them pointed or acute-angled tops suitable for shooting off the rain.

The delivery and discharge pipes are preferably circular in cross-section, but they may be of other cross-section. They may be plain straight pipes, or they may have one or more ribs or guides 8 secured longitudinally inside them. The object of this guide or guides is to prevent undue friction between the straw and the sides of the pipe. The straw is held by the guide at a little distance from the side of the pipe and small constantly-open air channels are formed in the angles between the guide and the side of the pipe. These air passages are very effective in permitting the current of straw to be re-established in the pipe when the pipe has accidentally become choked, which may occur, for instance, by the operator holding the discharge pipe too long in one position and allowing the straw to pile up close in front of the discharge opening of the deflector pipe. The guides may be arranged parallel with the axis of the pipe or they may be arranged spirally so as to cause the straw to revolve inside the pipe. The guides may be radial to the axis of the pipe or inclined.

What I claim is—

1. In a pneumatic straw stacker, the combination, with a stationary delivery pipe, and a flexible junction pipe secured thereto and provided with a cylindrical end piece having a collar on it; of a collar mounted on the said end piece behind the aforesaid collar and provided with rearwardly projecting arms, a yoke pivoted to the said arms and revoluble upon the axis of the delivery pipe, and a support for the said yoke, whereby the said junction pipe is held extended and is movable in any direction, substantially as set forth.

2. In a pneumatic straw stacker, the combination, with a stationary delivery pipe, and a flexible junction pipe secured thereto and provided with a cylindrical end piece having a collar on it; of a collar mounted on the said end piece behind the aforesaid collar and provided with rearwardly projecting arms, a yoke pivoted to the said arms and provided with a shaft arranged on the axis of the delivery pipe, a standard provided with a bearing for the said shaft to turn in, and a collar secured to the shaft above the said bearing, whereby the said junction pipe is held extended and is movable in any direction, substantially as set forth.

3. In a pneumatic straw stacker, the combination, with a stationary delivery pipe, a flexible junction pipe secured thereto and provided with a cylindrical end piece having a collar *e* on it, a collar E mounted on the said end piece behind the collar *e*, and means for supporting the collar E and permitting the junction pipe to be moved around in any direction; of a discharge pipe revolubly connected with the said end piece and provided with a collar for transferring the downward thrust of the discharge pipe to the collar E, and means—such as a cord—for supporting the discharge pipe, substantially as set forth.

4. The combination, with the discharge pipe provided with an adjustable deflector, of a collar secured to the said pipe and provided with an aperture for the deflector operating device to pass through, and a second collar or ring surrounding the first said collar and provided with projections for the attachment of the supporting cord, substantially as set forth.

5. In a pneumatic straw stacker, the combination, with a revoluble and automatically swinging discharge pipe provided with a deflector at its upper end; of projecting handles hinged to the lower part of the said pipe and foldable in line with it, and stationary stops for the said handles to strike, when turned outward, at the ends of the travel of the pipe, substantially as set forth.

6. In a pneumatic straw stacker, the combination, with a swinging discharge pipe, and a deflector at the upper end thereof, operating to deflect the blast to one side, thereby causing the pipe to swing automatically in one direction; of trip mechanism operating to move around the deflector at the end of the travel of the said pipe, thereby reversing its direction of travel automatically, substantially as set forth.

7. In a pneumatic straw stacker, the combination, with a revoluble and automatically swinging discharge pipe provided with a deflector at its upper end and a projection at its lower end, of stationary stops for the said projection to strike against, whereby the said pipe and deflector are moved around and caused to swing in the opposite direction, substantially as set forth.

8. In a pneumatic straw stacker, the combination, with a revoluble and automatically swinging discharge pipe provided with a deflector at its upper end and a projection at its lower end; of a stationary support provided with a bearing, the collars adjustably secured upon the said bearing and provided with stops for the said projection to strike at the ends of the travel of the said pipe, whereby the direction of its swinging motion is reversed, substantially as set forth.

9. In a pneumatic straw stacker, the combination, with the delivery pipe, and the flexible junction pipe; of the swinging discharge pipe connected to the upper end of the said junction pipe and provided with a longitudinal projecting rib on its inside operating to preserve a small air passage throughout the length of the pipe, substantially as set forth.

10. In a pneumatic straw stacker, the combination, with a swinging stacker pipe, of a series of ribs arranged longitudinally and spirally inside the pipe, substantially as set forth.

11. In a pneumatic straw stacker, the combination, with a stationary delivery pipe, a flexible junction pipe, provided with a collar *e*, a collar E on the upper end of the said junction pipe, below the collar *e*, and means for supporting the collar E and permitting the junction pipe to be turned around in any direction; of a revoluble discharge pipe connected to the said junction pipe and provided with a collar I, and a series of balls interposed between the said collars E and I, substantially as set forth.

12. In a straw stacker, the combination, with the delivery pipe, the flexible junction pipe, and the swinging discharge pipe; of a stationary standard, the cap *s* secured to the top of the standard and provided with the short conical bearing *s'*, and the sheave T; the bracket V provided with a sheave W, and a tubular shank journaled in the said bearing; antifriction balls interposed between the said bracket and the top of the said bearing; and a lifting cord passing through the said shank, over the said sheaves, and supporting the discharge pipe, substantially as set forth.

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

FRANK F. LANDIS.

Witnesses:
ALF. N. RUSSELL,
D. B. RUSSELL.