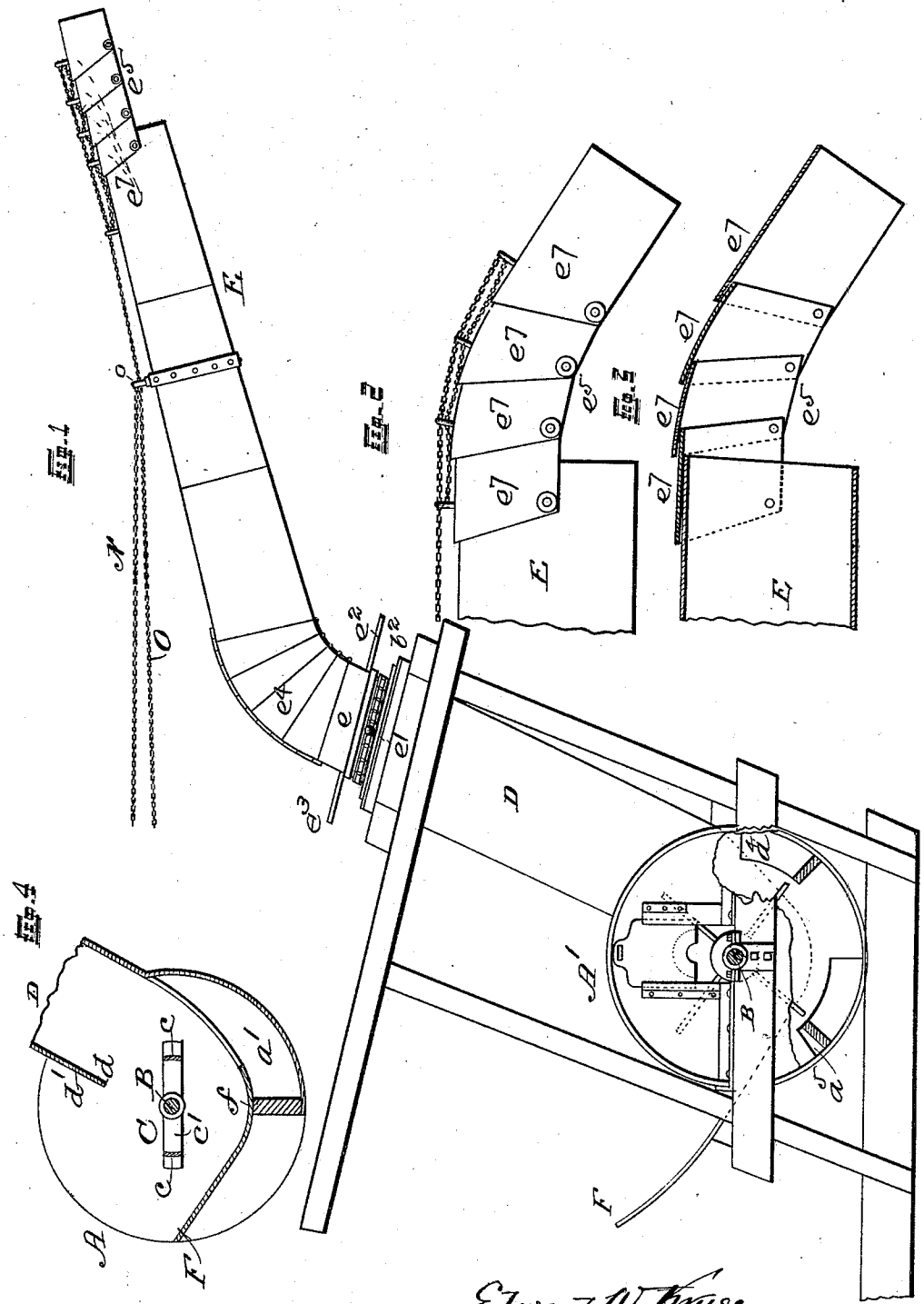
(No Model.) 4 Sheets—Sheet 1.

E. W. KRUSE.

STRAW STACKER.

No. 513,400. Patented Jan. 23, 1894.



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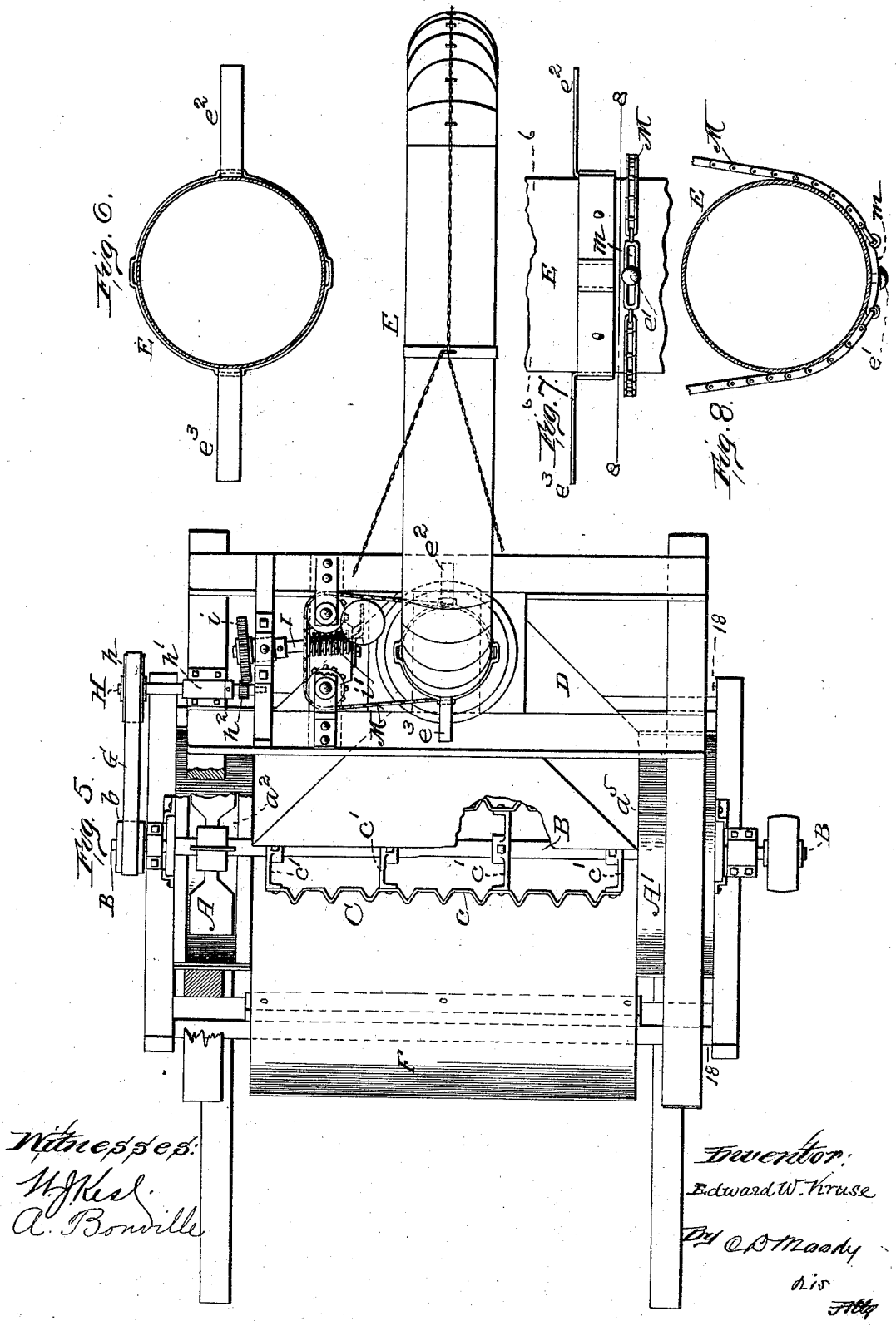

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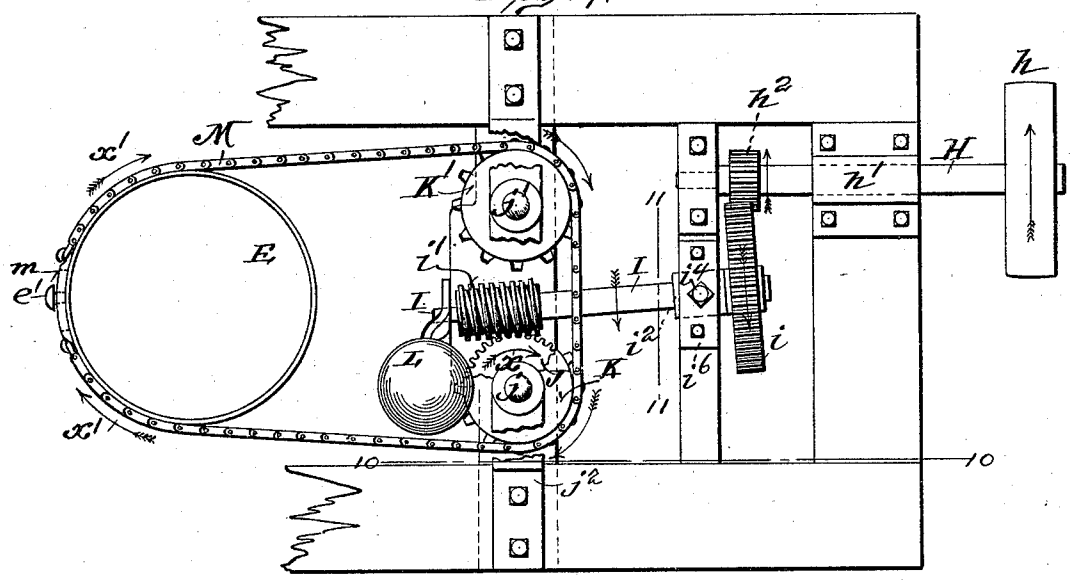
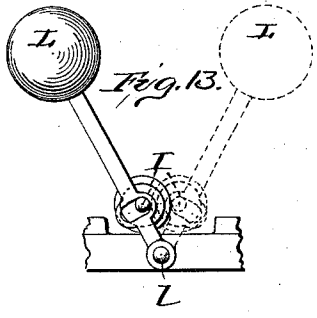
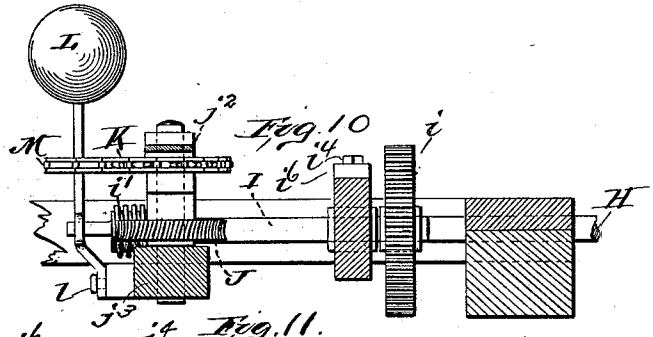
Fig. 9.







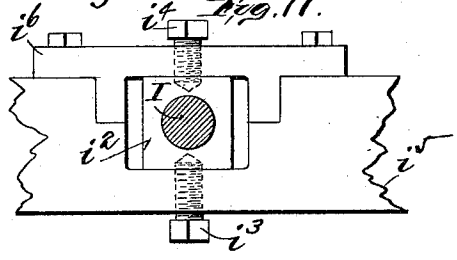
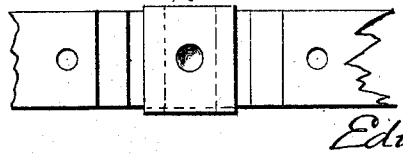


Fig. 12.



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E. W. KRUSE.

STRAW STACKER.

No. 513,400. Patented Jan. 23, 1894.

Fig. 14.

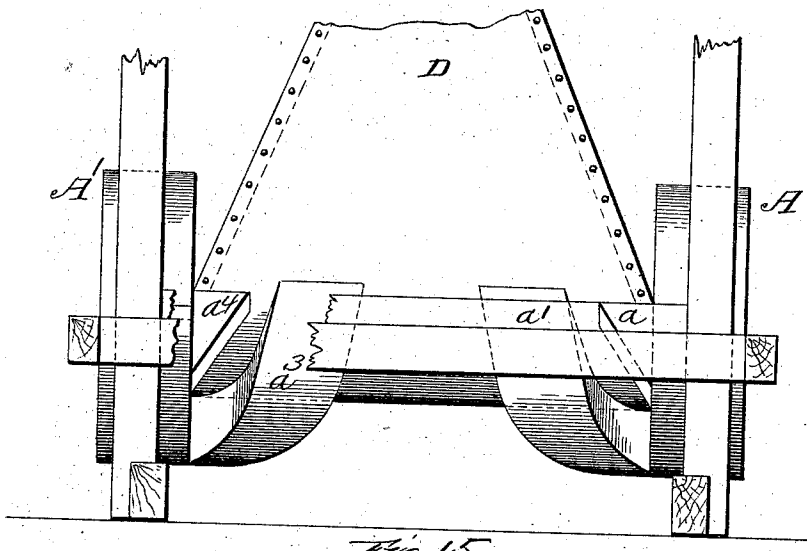


Fig. 15.

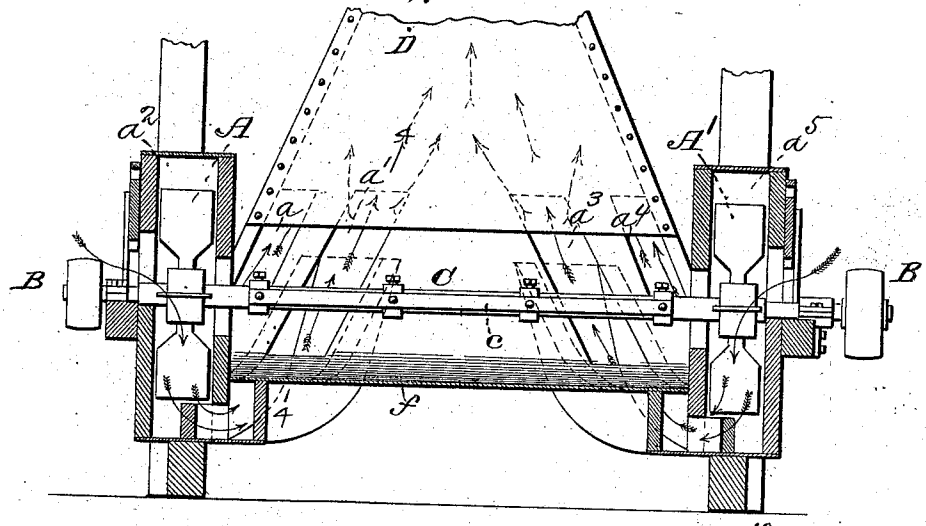


Fig. 17.

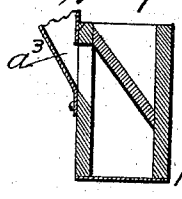
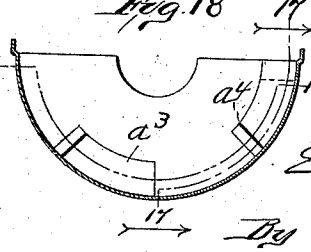


Fig. 18



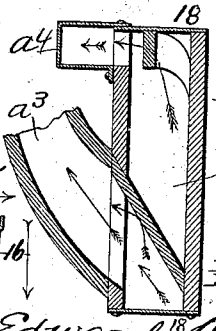


Fig. 16

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UNITED STATES PATENT OFFICE.

EDWARD W. KRUSE, OF HIGGINSVILLE, MISSOURI.

STRAW-STACKER.

SPECIFICATION forming part of Letters Patent No. 513,400, dated January 23, 1894.

Application filed April 5, 1893. Serial No. 469,196. (No model.)

To all whom it may concern:

Be it known that I, EDWARD W. KRUSE, of Higginsville, Missouri, have made a new and useful Improvement in Straw-Stackers, of which the following is a full, clear, and exact description.

The improvement relates more especially, but not entirely, to that class of straw stackers in which an air current is employed in moving the straw. As such straw stackers have heretofore been constructed and operated the straw is not fed directly into the air-flue but into a passage which connects with the air-flue, and in consequence this difficulty is experienced. The air current within the air-flue, if strong enough to carry the straw, exerts sufficient back-pressure into the passage through which the straw is passed to prevent the proper delivery of the straw into the air-flue. The movement of the straw is therefore hindered if not wholly arrested and the feeding mechanism becomes clogged. To obviate this difficulty, as well as to provide an improved straw-stacker, is an aim of the present improvement, which consists partly in the means for delivering the straw into the air current, partly in the means for regulating the horizontal oscillation of the delivery pipe, partly in the means for adjusting the outer end portion of the delivery pipe, and partly in minor details of construction, substantially as is hereinafter set forth and claimed, aided by the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the improved mechanism under consideration; a portion of the casing of the near fan, and a portion of the frame, broken away; Fig. 2 a side elevation, upon an enlarged scale, of the outer end-portion of the delivery pipe; Fig. 3 a detail, being a vertical section of the lower portion of the elbow at the outer end of the delivery pipe; Fig. 4 a vertical, longitudinal, section of the feeder and the adjoining portion of the boot, the section being on the line 4—4 of Fig. 15; Fig. 5 a plan of the improved mechanism, portions of the construction being broken away to exhibit parts beyond; Fig. 6 a horizontal section on the line 6—6 of Fig. 7, which Fig. 7 in turn is a side elevation of the inner end of the delivery pipe; Fig. 8 a horizontal section on the line 8—8 of Fig. 7; Fig. 9 a view which is similar to that of Fig. 8, but including the mechanism employed in effecting the horizontal oscillation of the delivery pipe; Fig. 10, a vertical section on the line 10—10 of Fig. 9; Fig. 11 a vertical section on the line 11—11 of Fig. 9; Fig. 12 a plan of the parts shown in Fig. 11, the cap removed; Fig. 13 a side elevation of the shifting lever of the delivery pipe oscillating mechanism; Fig. 14 a rear-elevation, partly broken away, of the boot of the stacker; and the parts immediately therewith connected; Fig. 15 a cross sectional elevation, the section being taken in front of the boot, and showing the boot and the feeder in elevation and the air-moving devices in section; Fig. 16 a horizontal section on the partly straight and partly curved line 16—16 of Fig. 18; Fig. 17 a vertical section on the curved line 17—17 of Fig. 18, which in turn is a vertical section on the line 18—18 of Fig. 5 and also of Fig. 16.

The same letters of reference denote the same parts.

The air-current is generated preferably by means of a pair of air-moving devices such as the fans A, A′. The fans in practice are attached to the same shaft B, and the device, C, for feeding the straw into the air-current is preferably attached to the same shaft. The feeder, C, is arranged between the fans, and the boot, D, into which the air current generated by the fans is delivered, and the feeder are so relatively arranged and constructed as to enable the feeder to deliver the straw directly into the boot. That is, in place of spacing the flue through which the air current passes at some distance from the field of the feeder, the flue and feeder are immediately together, the feeder being arranged as closely as possible to the entrance to the boot, and the air passage or passages which conduct the air current from the fan or fans to the boot being connected with the boot in the immediate vicinity of the feeder, and all preferably so that the course of the air current or currents delivered into said boot shall intersect, or immediately pass the field of the operation of the feeder, and to this end the construction shown I consider the most desirable. Two passages, a, a', may lead from the chamber, a^2, of the fan A, and two other passages a^3, a^4, may lead from the chamber, a^5, of the

other fan A′, and the outlets from the passages into the boot are substantially in line with each other as shown. The passages, *a*, *a′*, &c., are shaped substantially as shown to direct the air-currents, which are delivered through them respectively, upward into the boot, and the boot extends upward and also tapers, and at its upper end it connects with the delivery pipe, E, which in turn is extended suitably to conduct and discharge the straw in a favorable manner for stacking it.

Another feature of the improvement is the special construction of the feeder, for the feeder must not only be arranged as stated to transfer the straw immediately into the air-current but it must also itself be contrived to facilitate the introduction of the straw into the air-current. It must be constructed so that the straw in passing it shall not, by reason of the air pressure in the flue, be turned backward to become wrapped upon any shaft or analogous part which constitutes the frame work of the feeder. A feeder in the form of a shaft or cylinder having pins projecting radially therefrom does not answer well; the pins act like comb-teeth to straighten the stalks, and the stalks as they pass into the air-flue are bent, by reason of the air-pressure, upward and around the shaft or cylinder and become wound thereupon to such an extent as to clog the action of the feeder. This difficulty occurs, but not to so great an extent, when such teeth are used upon an openwork cylinder. A solid shaft or cylinder with flat cleats arranged longitudinally thereon is an improvement upon the constructions just described, but is not wholly satisfactory in that the straw is liable to bank in front of it. An openwork cylinder with flat cleats arranged longitudinally also answers in a measure.

The preferable form of the feeder is shown at C. It consists substantially of waved or serrated bars, *c*, arranged parallel with the shaft B, but spaced apart therefrom to provide air passages between the bars and shaft, and sustained in position by means of arms, *c′*, that are carried by the shaft B, substantially as shown. As many of the arms, *c*, as may be found desirable are used. I prefer two, as shown. By such a construction the advantages of an openwork feeder are obtained as well as the benefit derived from anything of the nature of the cleat, and at the same time by means of the waved form of bar shown a sufficient grip is obtained upon the straw to feed it, and at the same time without a tendency to straighten the stalks, and as a result the straw is delivered past the feeder into the air-flue and is borne by the air current upward into the boot and thence into and through the delivery pipe to be delivered therefrom suitably to form the stack.

By means of the openwork feature of the feeder the air pressure is exerted more or less upon both sides of the bar, *c*, which for the time being is bearing upon the straw, and in consequence of this the straw is less liable to be turned backward to be wound upon the bar.

An apron, F, which at its inner edge connects with the boot, substantially as shown, serves to support the straw as it is fed into the air-flue. The feeder, when arranged to the best advantage, is substantially between the point, *f*, at which the apron joins the boot and the lower end, *d*, of the front wall, *d′*, of the boot, substantially as shown in Fig. 4.

The inner end, *e*, of the delivery pipe is journaled upon the upper end, b^2, of the boot to enable the delivery pipe to be oscillated horizontally during the delivery of the straw. The means for effecting and regulating the oscillation of the pipe are substantially as follows:

G represents a belt leading, from a pulley, *b*, upon the shaft B, to a pulley, *h*, upon a shaft H that is journaled at *h′* in the frame work of the machine. The shaft is also provided with a pinion, h^2, that engages with a gear wheel, *i*, attached to a shaft I. This last named shaft is adapted to be oscillated horizontally to enable a worm, *i′*, with which it is provided, to be engaged with either the gear wheel, J, or another gear wheel, not shown, and to this end the bearing, i^2, in which the shaft I is held, is pivoted to enable it to follow the shaft in its movement. In the present instance the bearing is pivoted by means of the screws i^3, i^4, which respectively pass upward through the frame, i^5, and downward through the cap, i^6, and engage in the bearing substantially as shown in Figs. 11 and 12. The gear-wheels with which the worm *i′* coacts are attached respectively to the shafts *j*, *j′*, which are arranged vertically and journaled in the bars j^2 and j^3. Said shafts are also, and respectively, furnished with the sprocket wheels K, K′. The wheel J is attached to the shaft *j* beneath the wheel K, and the other gear-wheel with which the worm *i′* is adapted to be engaged is attached to the shaft *j′*, beneath the wheel K′. The shaft, I, also engages with a weighted lever L which is pivoted at *l* to adapt the lever to be shifted as indicated by its two positions shown respectively in the full and in the broken lines in Fig. 13. A chain, M, passes around the sprocket wheels K, K′, and also around the pipe E. The chain has an elongated link, *m*, which receives a stud, *e′*, upon the pipe. By communicating motion to the shaft H, which in the present instance is driven from the shaft B, the shaft I is rotated, and in consequence that one of the gear wheels, with which the worm, *i′*, chances to be engaged is driven and with it the sprocket wheel above it, and say in the direction indicated by the arrow *x* in Fig. 9. The chain M is in consequence moved in the same direction, as indicated by the arrows *x′*, and as soon as the end of the link, *m*, comes to a bearing against the stud *e′* the oscillation of the delivery pipe, E, is initiated in the same direction, and the mo-

tion continues until the pipe has been swung around far enough to cause an arm, e^2, upon the pipe to encounter the lever L, and carry it past a perpendicular position, whereupon the lever swings upon its pivot into the other one of its positions and in such movement the shaft I is turned upon its pivot to cause the worm i' to be disengaged from the wheel J and to be brought into engagement with the other described wheel beneath the sprocket wheel K'. The chain M in consequence is moved in the opposite direction, and as soon as the opposite end of the link m comes to a bearing against the stud e' the pipe E begins to be swung in the opposite direction to that in which it has been previously moved.

I do not broadly claim the shifting of a delivery pipe for the purpose under consideration. My improvement relates rather to the means for arresting the oscillation for a brief period at the ends of the movement of the delivery pipe, and this is accomplished by means of the described elongated link m and the stud e'. For, by this means, after the delivery pipe has been swung to one end of its stroke it is allowed to remain in that position, and meanwhile continue to deliver the straw at the end of the stack until the chain has been shifted far enough back in the opposite direction to act upon the stud upon the pipe; and when the pipe has been shifted to the opposite end of its stroke it is again allowed to remain stationary until the chain again acts on it, and so on at each stroke of the pipe, the arm e^3, upon the pipe acting to shift the lever L in one direction, and another arm, e^3, upon the opposite side of the pipe operating in a similar manner to restore the lever to its opposite position.

To enable the delivery pipe to be pointed more or less upward a telescoping elbow, e^4, is embodied in it in the vicinity of the boot, and by means of a cord, N, the pipe beyond the elbow can be raised or allowed to drop. By means of another similar elbow, e^5, introduced into the pipe near the extreme outer portion e^6 thereof said portion is adapted to be pointed more or less upward or downward. A cord, O, leads through the eye o, upon the pipe, and connects with the sections, e^7, of the elbow, e^5, and by drawing upon the cord the pipe-portion e^6, is elevated, and by loosening the cord the pipe-portion drops to point more in a downward direction.

I claim—

1. The combination of the fan shaft, the fans and the feeder, said fans and feeder being on said shaft, the boot, and the air passages leading from said fans on each side of the feeder to said boot, substantially as set forth.

2. The combination, in a straw stacker, of the boot, the apron leading to said boot, the fans, the air passages leading from said fans into said boot, the openwork feeder, and the shaft carrying said fans and feeder, said feeder being arranged at the junction of said apron and boot, substantially as described.

3. In a straw stacker, the combination of the boot, the oscillating delivery pipe, the chain having the elongated link, the stud upon the delivery pipe, and the shaft having the worm gear and operated by the driving mechanism, as set forth said chain being carried around said pipe and sprocket wheels, substantially as and for the purpose described.

4. The combination of the boot, the delivery pipe the stud upon said pipe, the chain, the sprocket-wheels and their shafts, the oscillating shaft, I, carrying the worm, and the gear wheel i, on said shaft and operated by the driving mechanism, as set forth, the adjustable weighted lever and the arms upon said pipe, substantially as described.

Witness my hand this 24th day of March, 1893.

EDWARD W. KRUSE.

Witnesses:
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LAFAYETTE W. BRELSFORD.