(No Model.) 3 Sheets—Sheet 1.

F. F. LANDIS.

PNEUMATIC STACKER.

No. 567,031. Patented Sept. 1, 1896.

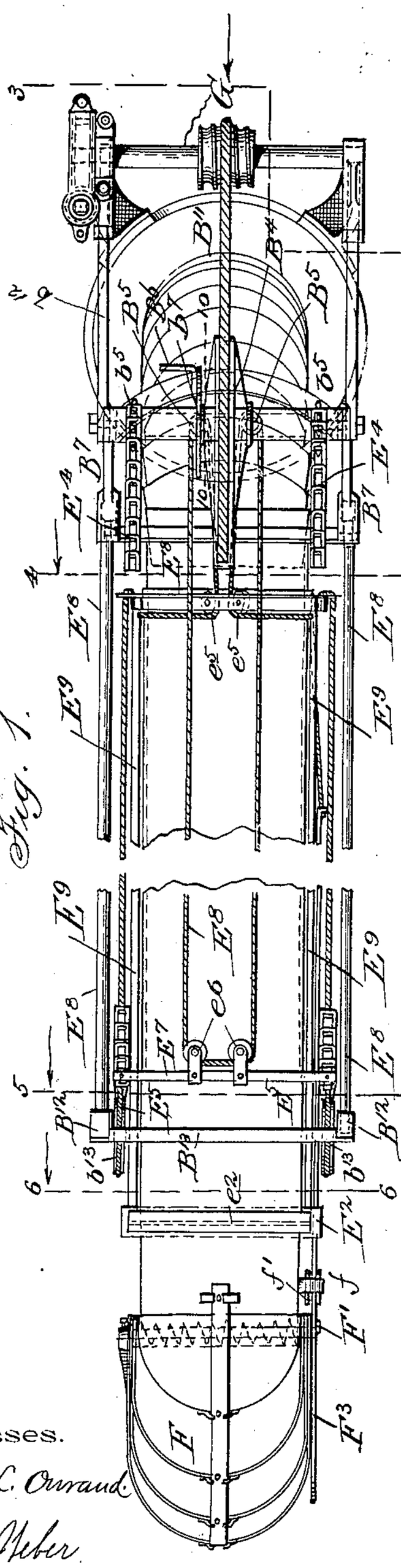

Fig. 1.

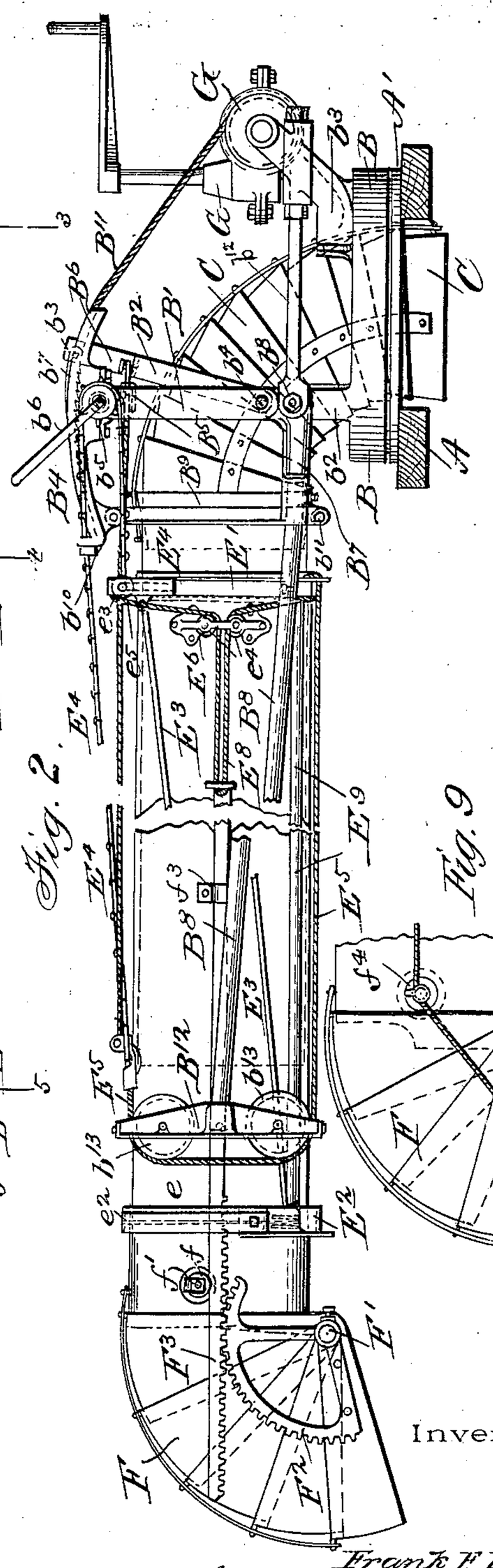

Fig. 2.

Fig. 9.

Witnesses.

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(No Model.) 3 Sheets—Sheet 2.

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PNEUMATIC STACKER.

No. 567,031. Patented Sept. 1, 1896.

Fig. 3.

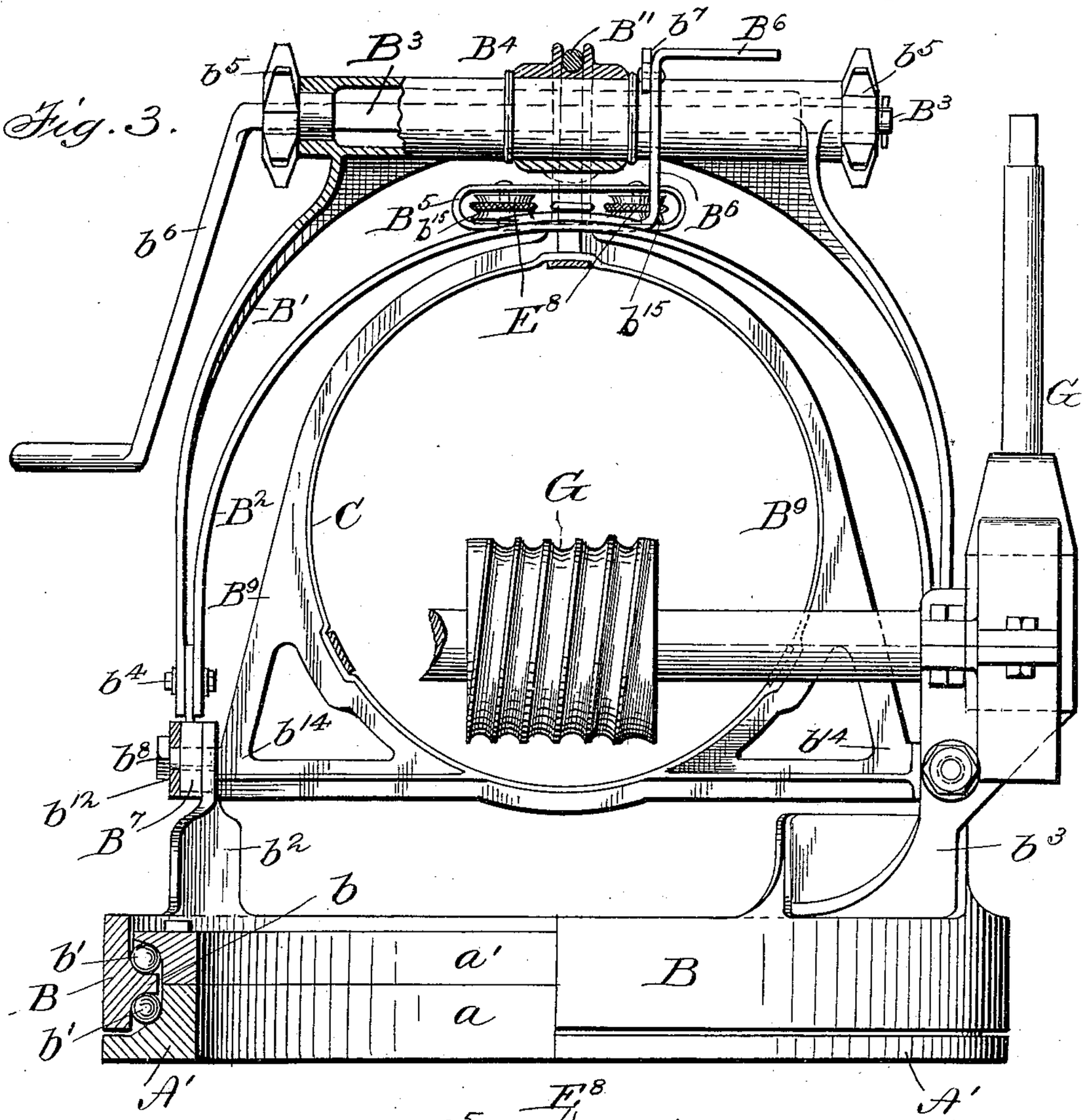
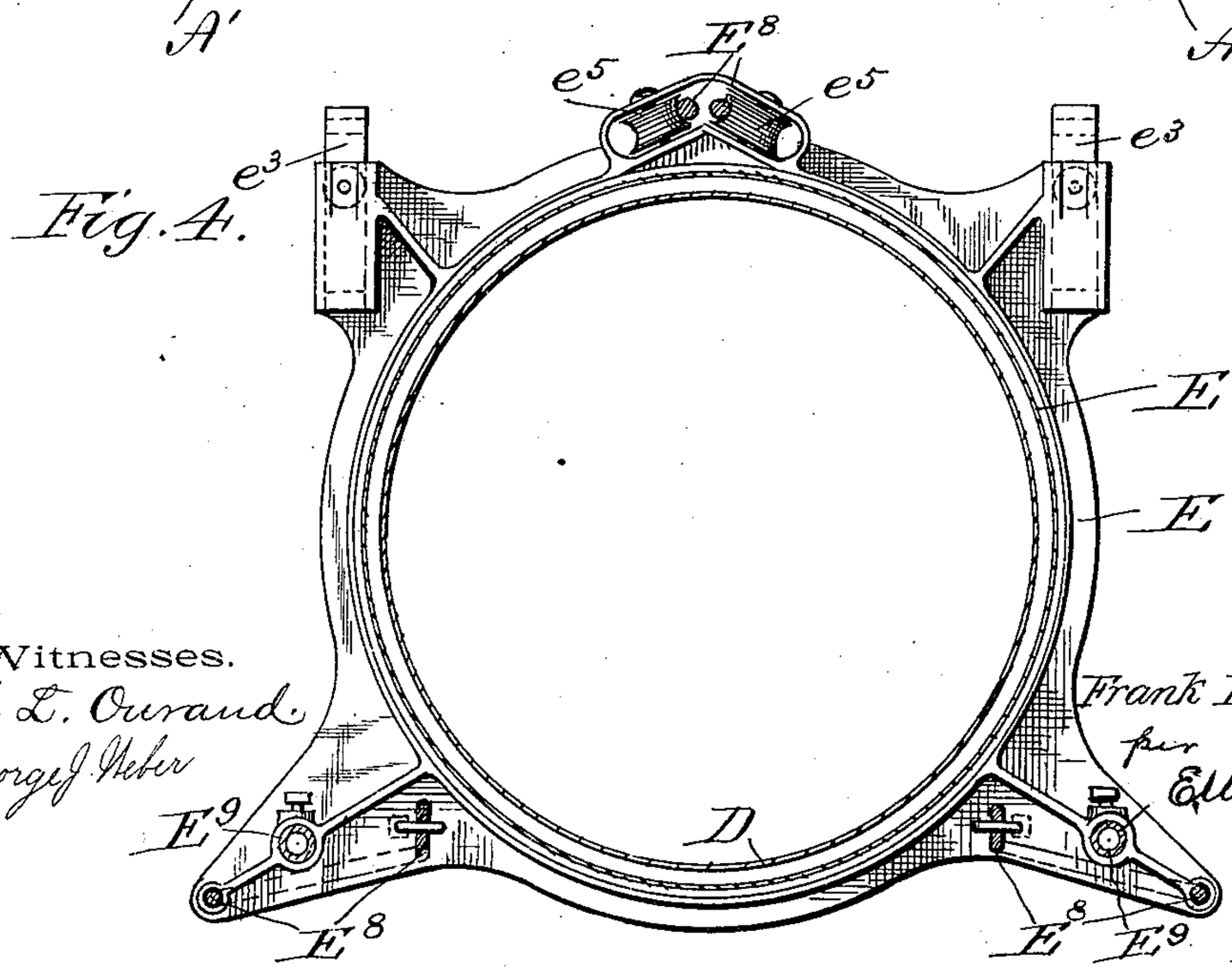


Fig. 4.



Witnesses.
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George J. Heber

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(No Model.) 3 Sheets—Sheet 3.

F. F. LANDIS.

PNEUMATIC STACKER.

No. 567,031. Patented Sept. 1, 1896.

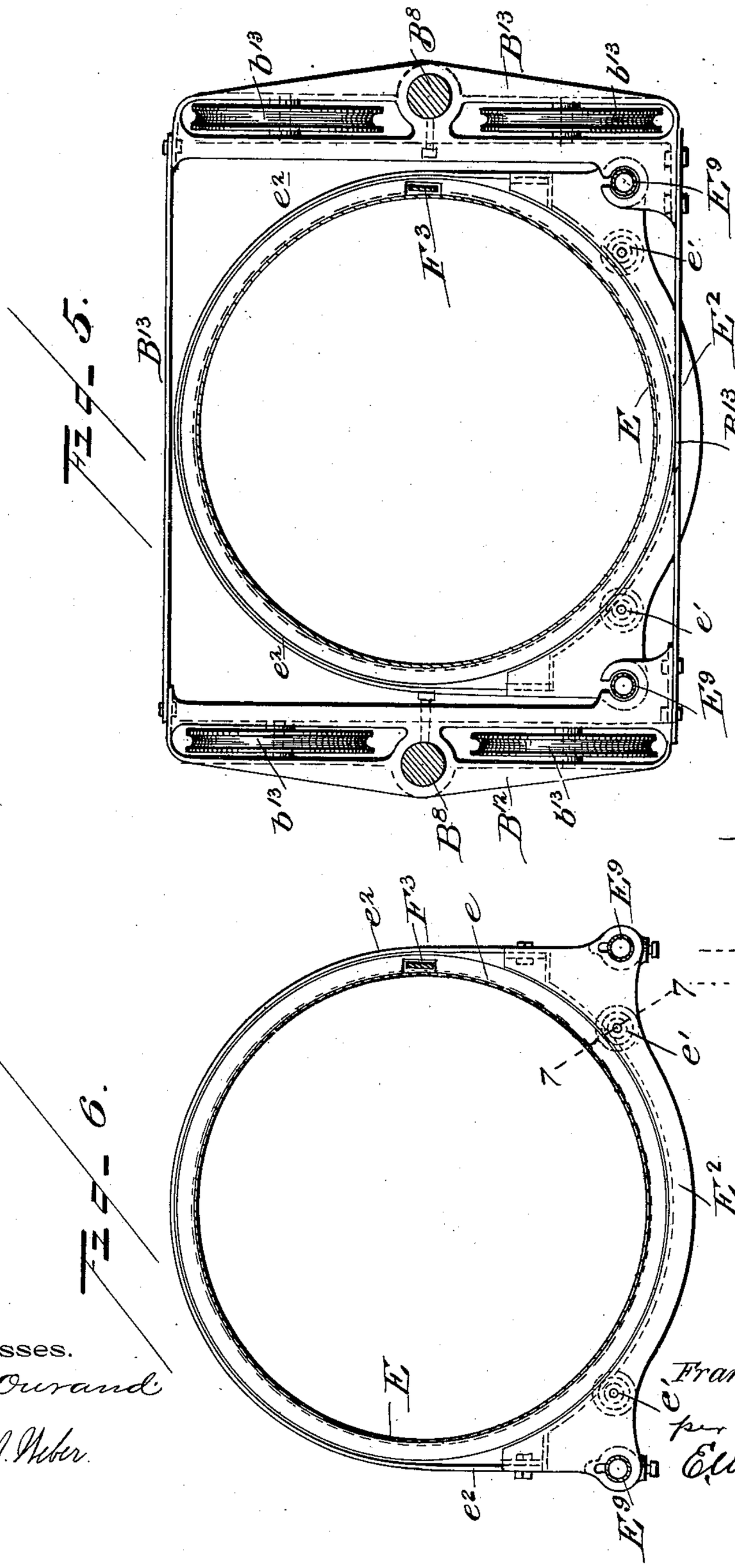

Fig. 5.

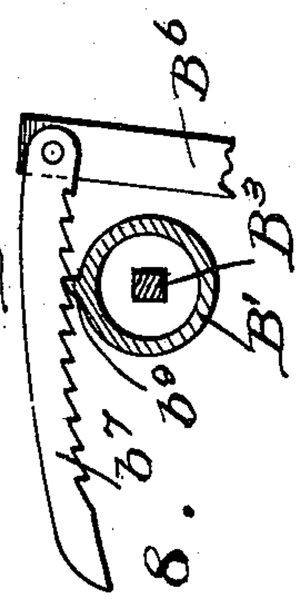

Fig. 8.

Fig. 6.

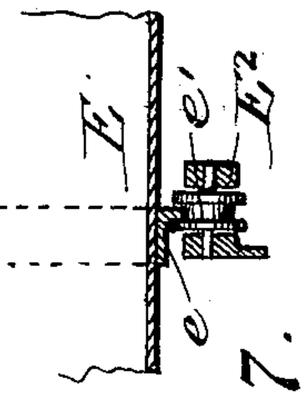

Fig. 7.

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UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

PNEUMATIC STACKER.

SPECIFICATION forming part of Letters Patent No. 567,031, dated September 1, 1896.

Application filed May 15, 1896. Serial No. 591,701. (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 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.

My said invention relates to pneumatic straw-stackers of the general construction shown and described in several patents heretofore issued to me; and it consists particularly in the means for supporting and operating the telescopic tube-section of the discharge-chute, the arrangement of the parts thereof, whereby said section is made revoluble on its axis as well as longitudinally adjustable, and in various other novel details in the construction and arrangement, as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a top or plan view of the discharge-chute of a pneumatic stacker embodying my said invention; Fig. 2, a side elevation of the same; Fig. 3, a rear elevation, partly in section, as seen when looking in the direction indicated by the arrows from the dotted line 3 3 in Fig. 1; Fig. 4, a cross-section as seen when looking in the direction indicated by the arrows from the dotted line 4 4 in Fig. 1; Fig. 5, a similar view as seen when looking in the direction indicated by the arrows 5 5 in same figure; Fig. 6, a similar view as seen when looking in the direction of the arrows from the dotted line 6 6; Fig. 7, a detail cross-section on the dotted line 7 7 in Fig. 6; Fig. 8, a detail section looking upwardly from the dotted line 8 8 in Fig. 1, and Fig. 9 a detail view showing a modified form of the hood-operating devices.

In said drawings the portions marked A represent the top of the separator of the threshing-machine, to which the stacker is attached; A′, the base or track plate on which the turn-table is mounted; B, said turn-table; C, the lower flexible section of the discharge-chute; D, the next section thereof; E, the telescopic section; F, the hood or deflector, and G the winch for raising and lowering the discharge-chute as a whole. Said several parts are in themselves of a general construction and arrangement similar to that shown and described in my application Serial No. 579,438, except in the manner of and means used in mounting and operating the section E and the improvements in details hereinafter particularly pointed out. A brief description only of many of said parts will therefore be sufficient to enable the construction and operation to be correctly understood, the detailed description being confined to said novel features.

The frame or top A of the separator and the base or track plate A′ thereon are, in main, of any usual or desired construction.

The turn-table B is an annular casting of sufficient size and strength to support the stacker structure. It is mounted on the base A′ by means of ball-bearings, as shown most clearly in Fig. 3. A flange a extends up from the inner edge of said base A′, and a ring a' with an overhanging top edge is bolted thereon. On the inner face of the turn-table, midmay of its height, is formed a flange b, which divides the space between the overhanging edge of the ring a' and main face of the base A′ into two ball-races, in which balls b' are mounted, the diagonally opposite corners of the races being formed rounded, as shown. By this means said turn-table is supported on the balls in all directions, with the consequent well-known advantages. Near the front of said turn-table, on both sides thereof, are formed or secured vertical brackets or standards b^2, to which the portions of the frame which support the sections of the chute are pivoted. Other standards b^3 are formed or secured on its opposite rear corners on which the winch G is mounted. Angle-arms B^7 are pivoted at their angles to the top of said standards b^2 on the pivot-bolts b^8, and are formed with sockets in the front ends of their horizontal arms, in which the lower ends of the braces B^8 (preferably formed of tubing)

are secured by set-screws or other suitable means. The vertical arm of each of said parts extends above said pivot-bolts b^8 but a short distance and carries the pivot-bolt b^4, on which the lower ends of the yokes B′ and B^2 are pivoted, one on each end of said pivot-bolts, on opposite sides of said arms. Said yoke B′ is formed with a horizontal tubular top, in which a square shaft B^3 is mounted, carrying a sprocket-wheel b^5 on each end, the hubs of said sprocket-wheels extending to within the ends of said tubular top and forming the journals on which said shaft is supported and operated. A crank b^6 is formed on one end of said shaft for operating it, for a purpose to be explained hereinafter. The yoke B^2 is simply a curved bar and has a sheave-frame B^5 connected to its top in the center thereof. An arm B^6 is also secured thereto and extends up to a point slightly above the top of the yoke B′, and is then bent into a horizontal position to form a handle. A rack-bar b^7 is pivoted to said arm near said bend, as shown, and extends forward over said yoke B′, on which a catch or detent b^9 is formed with which said rack-bar engages (see Fig. 8) to hold said yoke in the desired adjustment, for the purpose which will be hereinafter more fully explained.

The rope-guide B^4 is mounted to rock on the center of the horizontal top of the yoke B′, as shown, and is of the form and construction heretofore used by me, or may be of any approved and suitable construction. A ring B^9, having laterally-extending brackets b^{14} on its lower side, with gudgeons formed on their extremities, is pivotally connected at its top with the front end of said rope-guide on the pivot-bolt b^{10}, and said gudgeons on its lower corners are mounted in perforations in ears b^{11}, formed on the lower sides of the horizontal branch of the angle-arms B^7. The distance from the pivot-bolt b^4 to the pivotal connection of the rope-guide with the horizontal top of the yoke B′ is substantially the same as the distance between the pivot-bolt b^{10} and the gudgeons on the lower corners of the brackets b^4. The frame thus formed by the yoke B′, the ring B^9, the rope-guide B^4, and the angle-arms B^7 are all supported from the pivot-bolts b^8 and winch-cord B^{11}, and are yielding in the direction of the chute or discharge-pipe, and allow all other parts which are elevated or lowered by the winch-cord to be uniformly supported by the chains E^4 and ropes E^5, regardless of the slight variations in the length thereof consequent upon wear or the variations in temperature. The winch cord or cable B^{11} is attached at its front end to the front of the rope-guide B^4 and at its other end to said winch G, forming the means for elevating and lowering the chute or discharge-pipe and supporting it at whatever elevation desired. Brace-rods b^{12} tie the front standards b^2 and the rear standards b^3 together, being mounted at the front ends on one end of the pivot-bolts b^8 and secured to said rear standard by being inserted through an eye therein with a nut on their outer ends or in any other suitable manner. The braces B^8 are preferably formed of tubing because of its lightness and strength, but may be of other suitable form or material, if desired. Their lower ends are securely mounted in the sockets in the parts B^7, as before stated, and their forward ends extend to a point somewhat in front of the front end of the section D of the chute at an angle which will bring them to points opposite the axis of said section. On their front ends are mounted sheave-frames B^{12} by means of a socket formed in the center of each of said frames, in which the front end of the appropriate brace is secured. Said two sheave-frames are joined together at the top and bottom by means of cross bars or straps B^{13}, thus forming a substantially rectangular frame. A pair of sheaves b^{13} are mounted in each of said sheave-frames, one above and one below the rods or braces B^8. This pivoted structure, consisting of the braces, sheave-frames, and connecting-straps, serves, through the means to be presently described, to support the outer end of the discharge tube or chute from the top of the yoke B′ and winch to which said yoke is connected.

The section C of the discharge tube or chute connects the pipe leading from the exhaust or blow fan with the main section D, and is composed of sections flexibly connected to telescope or fold one over the other in the well-known manner. The section D of said chute is of the common tubular form and needs no special description. Its rear end is mounted in and supported by the ring B^9 and fits over the outer end of the section C. The telescoping section E of said chute slides upon the outer surface of the section D, and its inner end rests in an annular frame or ring E′, and near its forward end a yoke E^2 is connected therewith. Said ring E′ is formed with radially-extending brackets on its four corners, (see Fig. 4,) and in suitably-formed seats in the lower brackets the rear ends of braces or rods E^9 are secured by set-screws, as shown, or otherwise. Said braces extend forward and are secured at their forward ends to the yoke E^2 in seats provided therefor near its ends. Brace-rods E^3 extend from ears formed on the upper brackets of ring E′ to and connect with said yoke at or near the points of connection with the braces E^9. At the point where said section or tube E rests in said yoke it is surrounded by an angle-iron hoop *e*, the flange of which rests in grooves in the faces of small rollers *e′*, one of which is mounted in a suitable housing formed in said yoke near each end thereof. A strap e^2 extends over said tube E, connecting one end of the yoke with the other, and thus securing said tube from being dislodged from its position therein.

Said strap e^2 may be of metal or simply a leather strap fastened to one end of the yoke, passing over the tube and buckled to the other end, the connection being such that, while the tube is held securely in position, yet it will be permitted to revolve freely on said rollers in said yoke when desired. Sockets are formed in the brackets on the top side of the ring E′, in which standards e^3 are mounted. Connected to each of said standards is one end of a sprocket-chain E^4, which extends back under the sprocket-wheel b^5 on the appropriate end of the shaft B^3 up and over said sprocket-wheel, with which it engages, and forward a distance at least equal to the length of the longitudinal movement of the section E to the desired point, where it is joined to a rope E^5, which passes down over the top sheave b^{13} on the appropriate side of the tube, down and under the lower sheave of the pair and back to the lower side of the ring E′, where it is secured to the bracket on the proper side thereof. A belt is thus formed on each side of the tube, which is connected to both the upper and lower corners of said ring E′, its intermediate portions passing over the driving or operating wheel on the shaft supported in bearings at a point in the rear of said ring, and the sheaves b^{13}, supported at a point in front of said ring. By this means the rotation of said sprocket-wheels b^5 through said shaft B^3 and crank b^6 thereon operates to move the frame composed of the parts E′, E^2, E^3, and E^9, which carries the revoluble telescoping section E in or out, as desired, the rods E^9 preferably passing through and sliding in ways formed on the lower inside corners of the sheave-frames B^{12}. (See Fig. 5.) Said sheave-frames and the pivoted structure of which they form the outer end are also supported by said chain and rope belts, as well as the sliding frame which carries said tube-section E. Said frame and tube-section are so supported by this arrangement that the outer end of the structure is practically balanced; that is, the weight of said outer end being on said belts tends to pull back upon the upper side of the ring E′ and forward on its lower side, which has an elevating tendency on the outer end of the frame, of which said ring constitutes the rear end, which carries the telescoping section and hood. As said frame is extended, increasing the strain, the force which tends to elevate said outer end is also increased, and when it is shortened it is diminished correspondingly. By changing the points of attachments between the ends of the chains E^4 and the standards e^3, or by adjusting said standards up or down, and thus increasing or diminishing the length of the base of the angle, chutes of different lengths and weights may be balanced. By this arrangement the adjusting devices are rendered very sensitive and can be manipulated with great ease. The section E is rotated by the following means: On its side, near its rear end, a sheave-frame E^6 is secured, in which a pair of sheaves e^4 are mounted. On the top of the ring E′ another sheave-frame is formed, in which a pair of sheaves e^5 are mounted. At about the point of connection between the ropes and chains E^5 E^4 a cross-bar E^7 is connected at each end to opposite links of said chains. A pair of sheaves e^6, mounted in appropriate housings, are secured to said cross-bar. At a point in front of said sheave-frame E^6 a rope E^8 starts and extends back and over the top one of the sheaves e^4, then around the tube-section E to the nearest one of the sheaves e^5, then around said sheave and back to the appropriate sheave b^{15}, carried by the sheave-frame B^5 on the yoke B′, around said sheave and forward to and over both sheaves e^6 on the cross-bar E^7, back to the other sheave b^{15} in the frame B^5, around sheave, back to the other sheave e^5, over said sheave, down and around the other side of the tube-section E and over the other sheave e^4 to the point of beginning, both ends being preferably connected at this point to means for operating the hood, as will be presently described. It will thus be seen that a pull upon one branch of the rope E^8 at any point will draw against one of the sheaves e^4 toward one of the sheaves e^5 and rotate said tube-section E to bring said sheaves toward each other until the desired point has been reached, while a pull in the other direction will reverse the operation, thus permitting said section to be rotated in whatever direction and to whatever point is desired.

The hood or deflector F is of substantially the same construction as that shown in my Patent No. 537,691, being composed of sections pivoted on a pintle F′ and adapted to fold over each other, a coiled spring (shown in Fig. 1 by dotted lines) being mounted on said pintle to normally hold said sections distended. To the outer section is secured a toothed segment F^2, which is concentric with said pintle, with which a rack-bar F^3 engages. Said rack-bar is composed of a very thin metal strip and supported on the side of the section E in guides f^3, being held into engagement by a roller f, mounted in a suitable housing f' near the point of juncture with said hood. This metal strip passes under said roller, through a notch in the hoop e, through said guides f^3, back alongside said section E, to the rope E^8, to the ends of which it is connected in any desired manner. Said rope E^8 thus affords the means for drawing back the rack-bar F^3 and thereby folding up the hood-sections, as well as the means for revolving the tube-section E. By drawing back the yoke B^2 said rope and rack-bar are also drawn back, as will be readily understood, and the hood folded up to the desired degree, at which point said yoke is secured by the engagement of the rack-bar b^7 with the detent b^9 on the top of the yoke B′. (See Fig. 8.) To unfold said hood, it is only necessary to release said

rack-bar b^7 and permit the spring to unfold it to the desired degree and reëngage said rack-bar and detent to secure it there.

In Fig. 9 I have shown a modified form of the hood-contracting device wherein an arm F^4 is rigidly secured to the end of the pintle F′, and a cord or rope connects its outer end with the ends of the rope E^8, passing over a sheave f^4, appropriately mounted in a housing on the side of the tube-section E; but I prefer the construction shown in Figs. 1 and 2, as it is non-elastic and non-flexible; but, as will be readily seen, both forms make an operating device for folding up the hood which in no way interferes with the revolving of the telescoping tube-section E, which is an essential feature in this stacker.

The winch G is or may be of any form found suitable for the purpose, that shown being substantially a well-known form, such as is shown in my application above named. It is supported on the rear side of the turn-table B in bearings on the standards b^8, and is operated in the well-known manner.

The operation is as follows: The stacker structure as a whole is elevated or lowered from the winch G through the cable B^{11}, the frame pivoted to the rope-guide B^4, the belts composed of the chains and ropes E^4 and E^5, and other frames and supporting devices described. When it is desired to extend the section E of the chute, the crank b^6 is turned to rotate the shaft B^3 and sprocket-wheels b^5 in the direction required to operate the belts composed of the chains and ropes E^4 and E^5 to draw the ring E′ and the frame connected therewith, in which said section is mounted, outwardly, and when it is desired to draw it in, or shorten the chute, the operation is reversed. When it is desired to turn the mouth of the hood or deflector in either direction, the section E, which carries it, is rotated to secure the desired result by pulling on the rope E^8, as before described. The hood is folded up and allowed to distend by the manipulation of the yoke B^2 and rack-bar b^7, as before described. As said longitudinal or rotary adjustments of said section E are effected the various ropes and belts are self-adjusting, so that they are under like tension at all times. Thus the cross-bar E^7, being carried by the chains E^4, as said chains move in adjusting said section so does said cross-bar which carries the sheaves b^6, on which is a portion of the rope E^8, in or out, as the movement may be, and takes up or pays out said rope as required to maintain its tension. By this construction and arrangement a stacker is provided possessed of many advantages over others in use, among which may be mentioned: A rotary adjustment is secured by which the mouth of the deflector may be pointed in any desired direction without adding the weight of the extra parts to the outer end of the chute, necessitating the use of stronger supporting and operating devices with the consequent added expense of building, and at the same time the longitudinal adjustments are in no wise interfered with. Both sections of the chute are entirely relieved of all strain, except of their own weight, as they lie in the supporting-frames, which receive all the strain from the tension of the ropes and belts used in supporting and manipulating the stacker. Either of the sections D or E may be entirely removed without disturbing the supporting-frames, or raising and lowering or telescoping devices, by simply disconnecting the cords which fold up the hood. Thus I am able to use unusually light material and secure a stacker capable of more convenient and ready adjustment, with the consequent well-known advantages.

While I have illustrated but one means of rendering the telescoping section of the chute revoluble, it will be understood, of course, that I do not limit myself to the specific means shown, but regard my invention as including, broadly, a revoluble telescoping section of a discharge-chute, regardless of the specific means used to effect the adjustment.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pneumatic straw-stacker chute provided with a section which is extensible and which is also revoluble around its axis, substantially as set forth.

2. In a pneumatic straw-stacker, the combination with the base and non-extensible section of the chute, of a revolubly-mounted extensible section, substantially as set forth.

3. In a pneumatic straw-stacker, the combination, of the base, the flexible section, the non-extensible section connected therewith, and a revolubly-mounted telescoping section thereon, and means for revolving the same.

4. In a pneumatic straw-stacker, the combination, of a turn-table, the lower end of the stacker-chute connected thereto, a revolubly-mounted extensible section having a flexible hood on its outer end, and a single means for folding said hood and revolving said section, substantially as set forth.

5. In a pneumatic stacker, the combination of a revolubly-mounted telescoping section carrying a flexible or foldable hood on its outer end, and means for revolving said section, which means is also connected with and operates the hood-folding device, substantially as set forth.

6. In a pneumatic stacker, the combination of a revolubly-mounted extensible section, which section is mounted in and carried by a slidable frame, and said frame, substantially as set forth.

7. In a pneumatic stacker, the combination, of the main portions of the chute, a revoluble extensible section mounted in a frame, said frame, means for supporting and means for sliding it, substantially as set forth.

8. In a pneumatic straw-stacker, the com-

bination, of the main portions of the chute, an extensible section revolubly mounted in and supported by a slidable frame, said frame, and the supporting and telescoping devices connected thereto, substantially as set forth.

9. In a pneumatic stacker, the combination of the turn-table, the main sections of the chute mounted thereon in a suitable supporting-frame, said frame, forwardly-extending braces or rods pivoted thereto, sheaves in suitable frames on the forward ends of said braces, a slidable frame, belts connected to said slidable frame for operating it, and passing over said sheaves on the outer end of said pivoted braces or rods for supporting it, and a tube-section mounted in said slidable frame, substantially as set forth.

10. The combination, in a pneumatic stacker, of the supporting-frame, the chute-sections, and the slidable frame composed of the ring, E′, the yoke, E^2, the rods, E^9, and braces E^3, and the section, E, mounted in and carried by said frame, substantially as set forth.

11. The combination, in a pneumatic stacker, of the revolubly-mounted section, E, a supporting-frame consisting of a ring which surrounds its lower end, a yoke and strap which surround its outer end, and brace-rods which rigidly secure said ring and yoke together, a flanged hoop on said tube-section at the point where it rests in said yoke, and rollers with grooved faces mounted in said yoke, the flange of said hoop resting in the grooves of said rollers, substantially as set forth.

12. In a pneumatic stacker, the combination, of the supporting-frame, the yoke, B′, forming a part thereof, the sprocket-wheels on the shaft carried by said yoke, the sheave-frames, B^{12}, carried on the forward ends of rods pivoted at their rear ends to said frame, the slidable frame mounted to slide in ways in said sheave-frames, the chain and rope belts connected at opposite ends to opposite sides of the rear end of said slidable frame, and passing over said sprocket-wheels and the sheaves in said sheave-frames, and the tubular sections mounted in said frames, substantially as set forth.

13. In a pneumatic stacker, the combination of an outer slidable supporting-frame consisting of two right-angled triangles composed of the parts such as the ring, E′, and rods, E^9, and, E^3, means for supporting the structure from a point in the rear of said frame consisting of belts which pass over sheaves located in front of the ring, E′, one end of each being connected to the lower side, and the other to the top side of said ring, the points of attachment being variable to different distances apart, and said sheaves, substantially as set forth.

14. In a pneumatic stacker, the combination of the outer slidable frame, the ring, E′, forming the base thereof, the adjustable standards, e^3, mounted in the upper corners of said ring, and the supporting devices connected thereto, substantially as set forth.

15. In a pneumatic stacker, the combination, of the main section of the chute, a revolubly-mounted extensible section thereon, and means for revolving said section consisting of a rope connected to one side thereof and passing around the same in each direction and over suitable stationary parts, whereby pulling on one or the other of the branches of said rope will revolve said section in the desired direction, substantially as set forth.

16. In a pneumatic stacker, the combination, of the main section of the chute, a revoluble section mounted in the frame of which the ring, E′, is the base or lower end, said frame, a sheave-frame secured near the lower end of said tube-section, E, another sheave-frame formed in the top of said ring, E′, sheaves mounted in each of said frames, a rope passing from a point behind said ring over the sheaves in the frame on its top, and down around said tube-section in each direction to the sheaves in the frame on its side, over said sheaves, and a retaining device to which the ends are connected at a point in front thereof, substantially as set forth.

17. In a pneumatic stacker, the combination of the main section, the revolubly-mounted extensible section thereon, and the rope, E^8, for operating it, which rope passes from a point on the side of said section near its rear end, over a sheave on its side, up over a sheave, e^5, on the ring, E′, back over a sheave in the frame, B^5, forward over the sheaves, e^6, on the cross-bar, E^7, back over the other sheave in the frame, B^5, forward over the other sheave, e^5, down over the other side of the tube and over another sheave alongside the first, to the point of beginning and there attached suitably, and said sheaves and supporting devices, all said parts combined substantially as set forth.

18. In a pneumatic straw-stacker, the combination, of the base, the turn-table, the frame composed of the yoke, B′, the ring, B^9, the parts, B^7, and the rope-guide, B^4, pivoted together and mounted on a pivot, said yoke, B′, and ring, B^9, being arranged to maintain a substantially parallel relation to each other, the stacker-chute mounted in and supported from said structure, and the winch and cable for supporting and adjusting it, substantially as set forth.

19. In a pneumatic stacker, the combination, of the main section of the chute, the revoluble extensible section thereon, a hood or deflector carried on the outer end thereof made up of sections adapted to fold together from a common pintle, a spring for normally holding said sections distended, a toothed segment on the outer end of said pintle, and a rack-bar mounted in suitable guides on the side of said tube and engaging with said

toothed segment, its rear end being connected to means for drawing it back, whereby said hood may be folded, substantially as set forth.

20. In a pneumatic stacker, the combination, of the main section of the chute, the hood on the outer section made up of folding sections secured on a pintle, a toothed segment on said pintle, a rack-bar engaging with said segment and extending back alongside said chute and connected to means by which it may be operated, substantially as set forth.

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

FRANK F. LANDIS.

Witnesses:
T. S. CUNNINGHAM,
S. B. RINEHART.