

No. 800,705.

PATENTED OCT. 3, 1905.

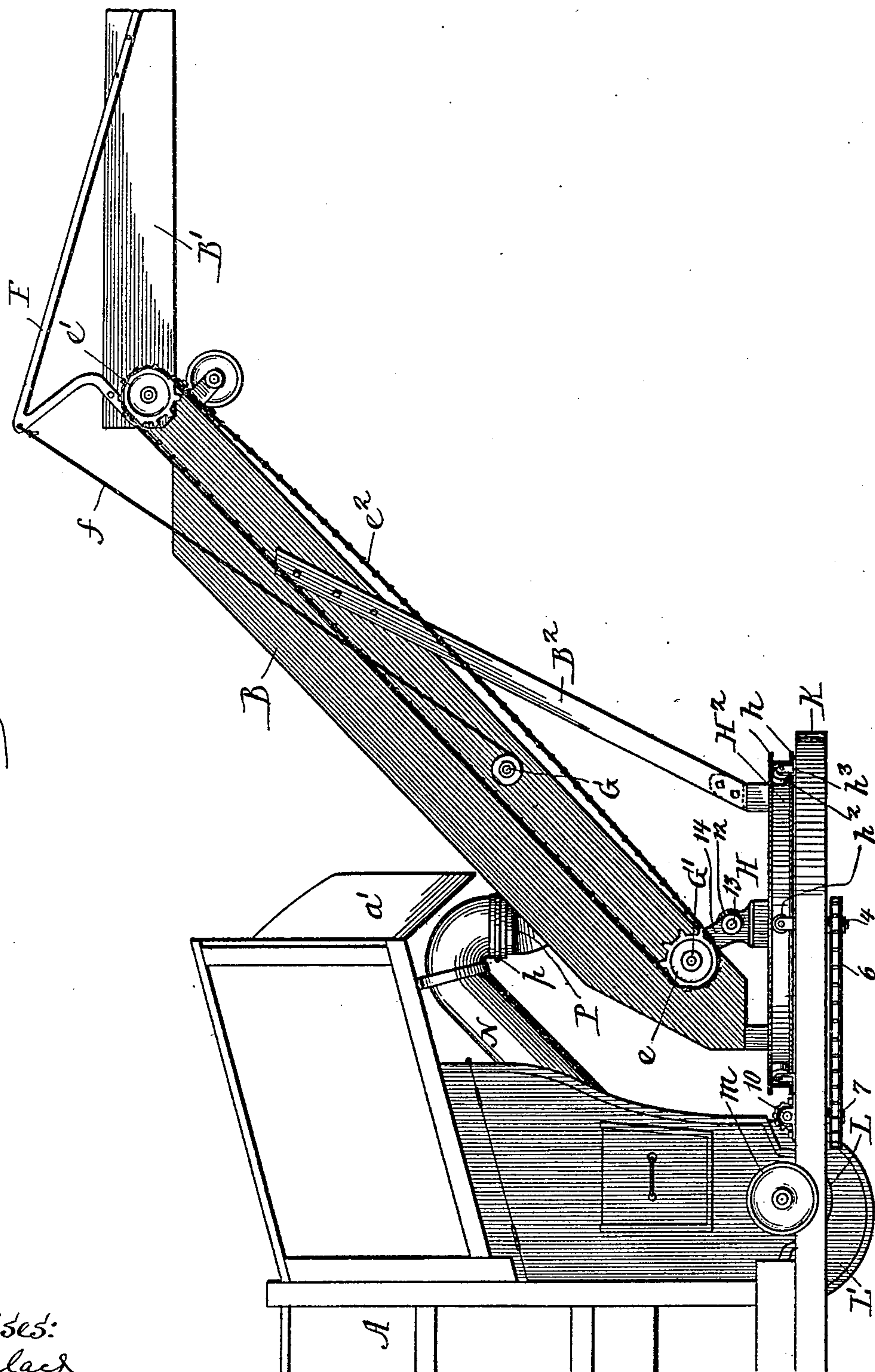
O. C. ZIMMERMAN.

STRAW STACKER FOR THRESHING MACHINES.

APPLICATION FILED NOV. 24, 1902.

5 SHEETS—SHEET 1.

Fig 1.



Witnesses:
Fred Gulack
Alberta Adamick

Inventor:
O. C. Zimmerman
By *Paula Fisher*
his Attorneys.

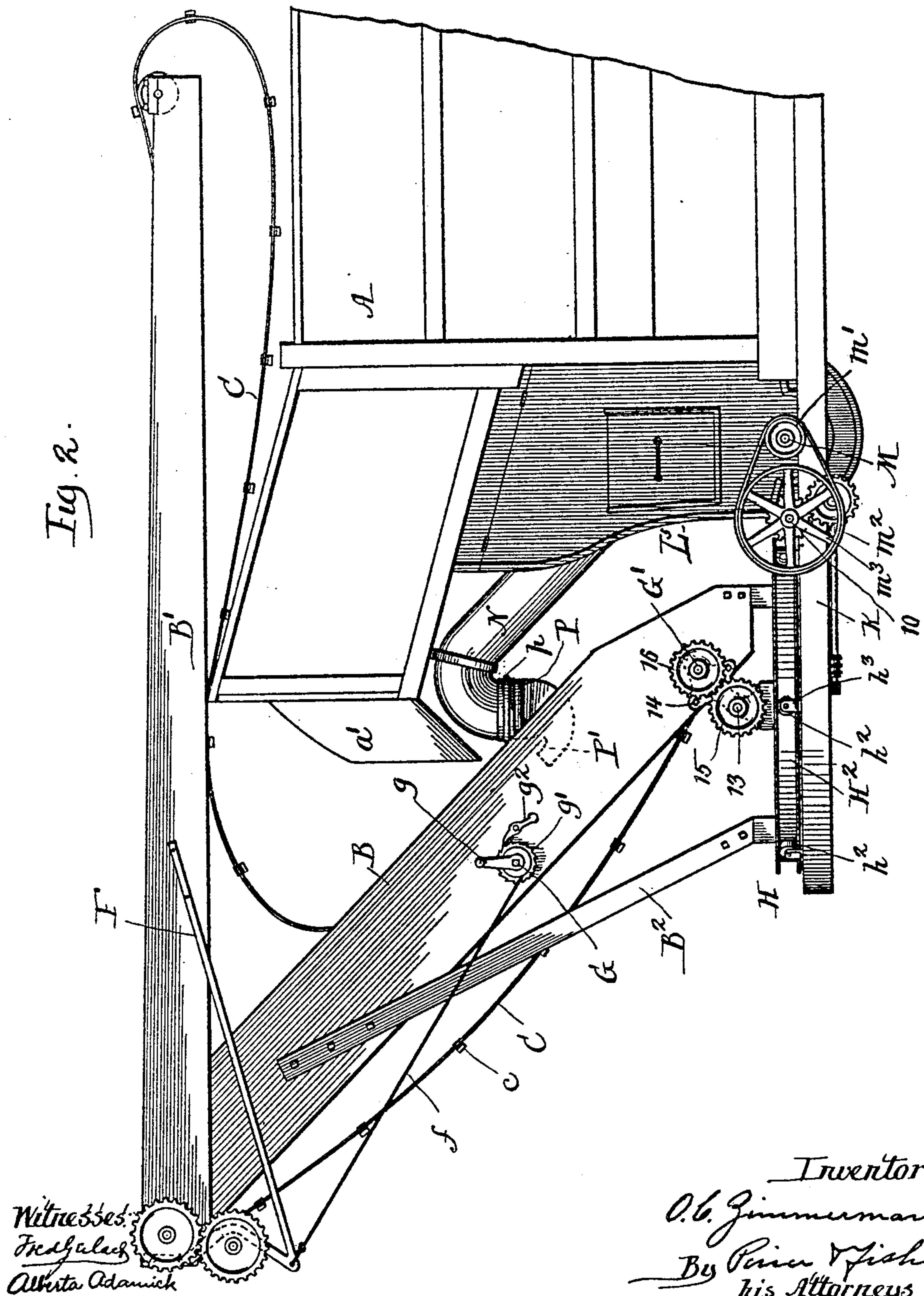
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Witnesses:
Fred Gulack
Alberta Adamick

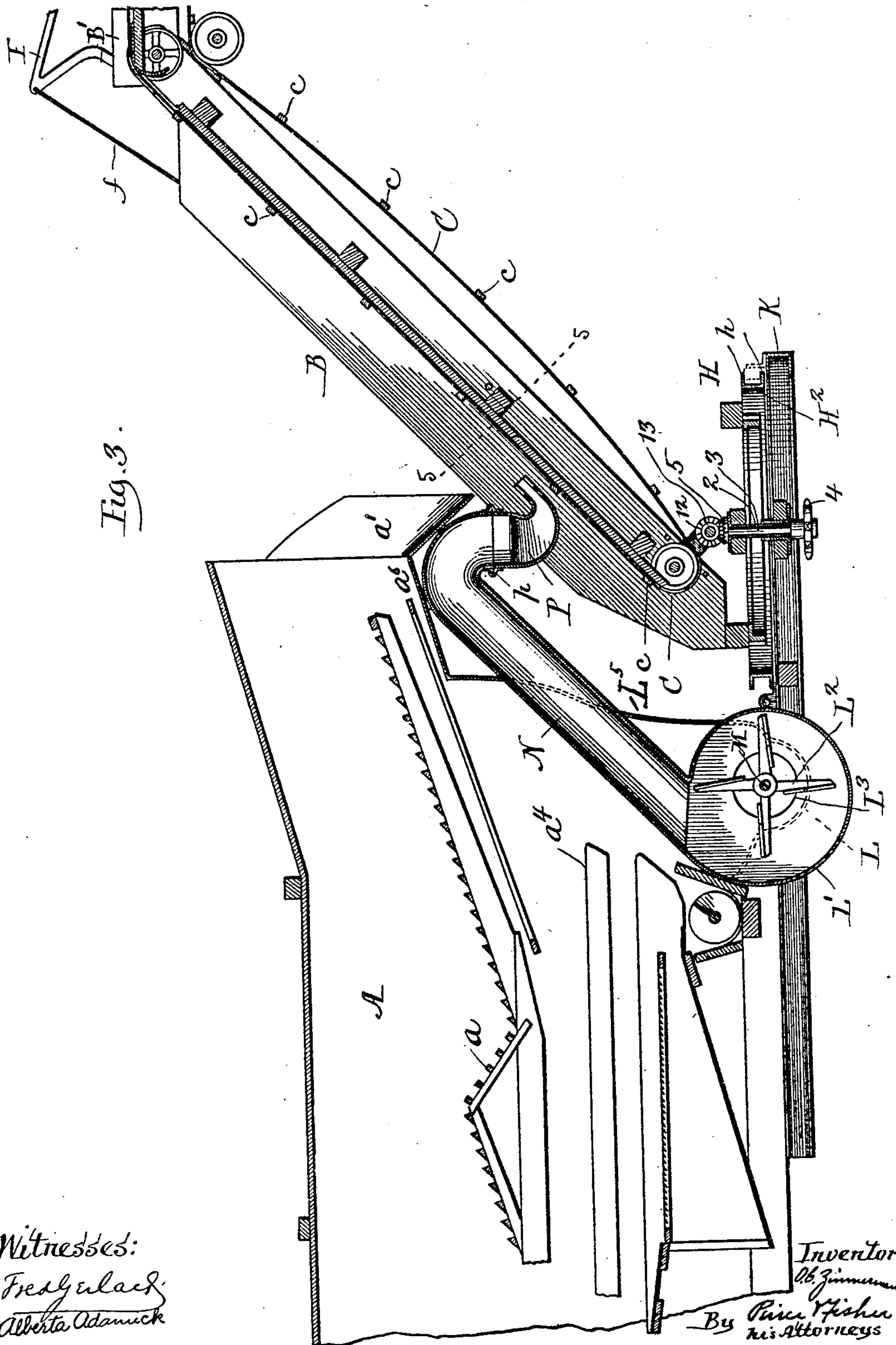
Inventor:
O. C. Zimmerman
By Perin & Fisher
his Attorneys

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6 SHEETS--SHEET 3.



Witnesses:
 Fredy Enack
 Alberta Adamuck

Inventor.
O. B. Zimmerman
by Fisher
Attorneys

No. 800,705.

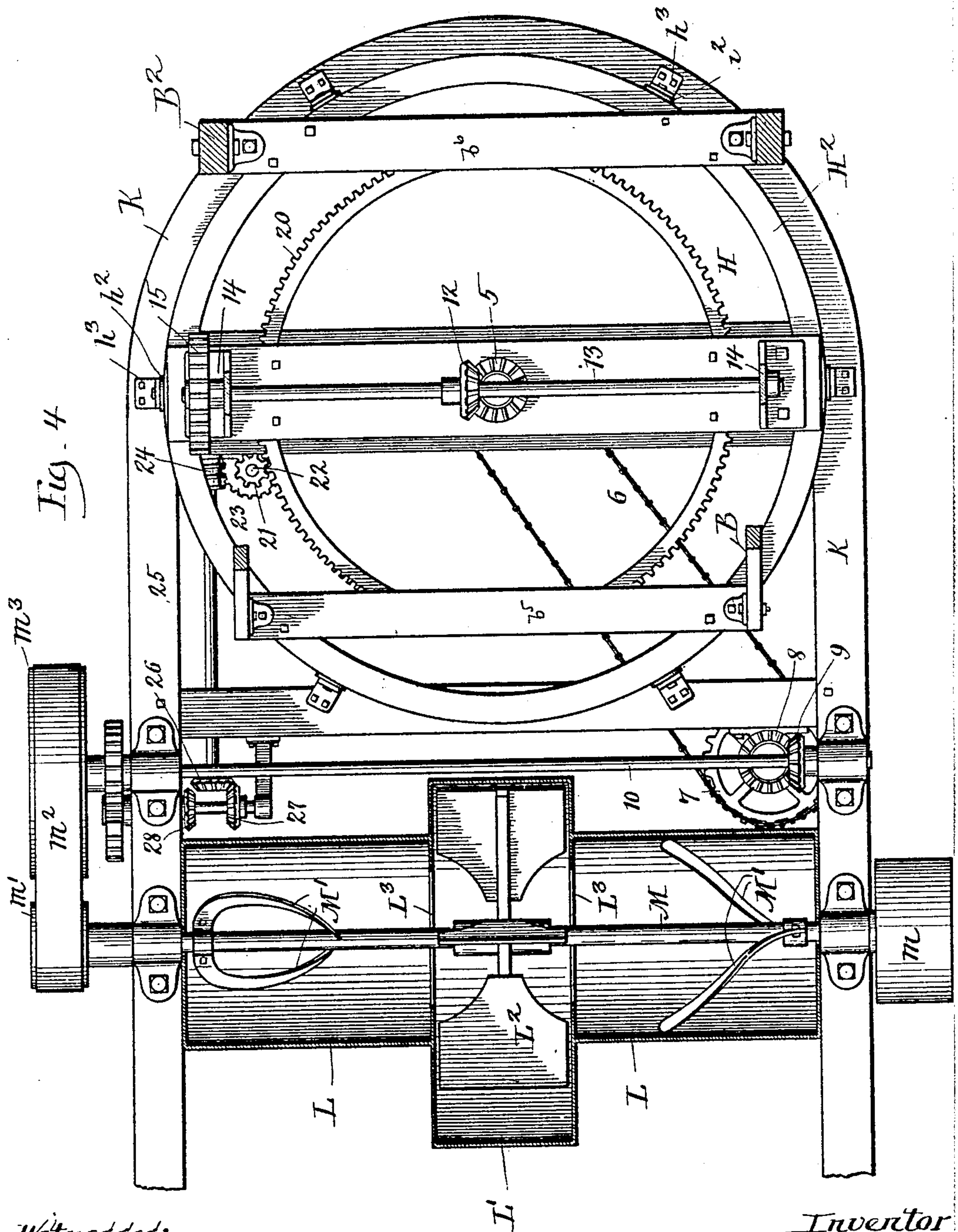
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O. C. ZIMMERMAN.

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APPLICATION FILED NOV. 24. 1902.

5 SHEETS—SHEET 4.



Witnesses:
Fred Gulack
Alberta Adamick

Inventor
O.C. Zimmerman
By Price & Fisher
his Attorneys.

No. 800,705.

PATENTED OCT. 3, 1905.

O. C. ZIMMERMAN.

STRAW STACKER FOR THRESHING MACHINES.

APPLICATION FILED NOV. 24. 1902.

5 SHEETS--SHEET 5.

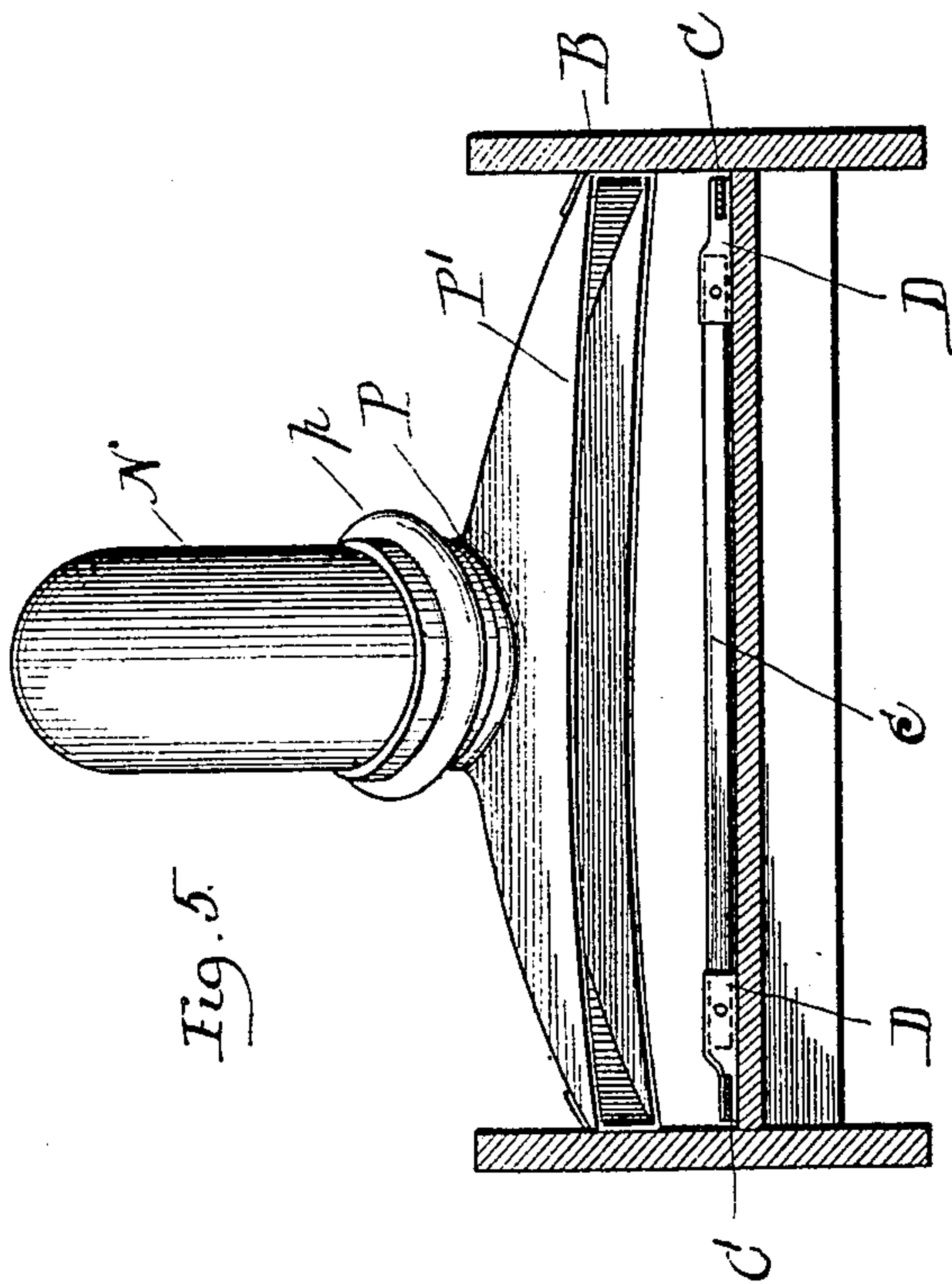


Fig. 5.

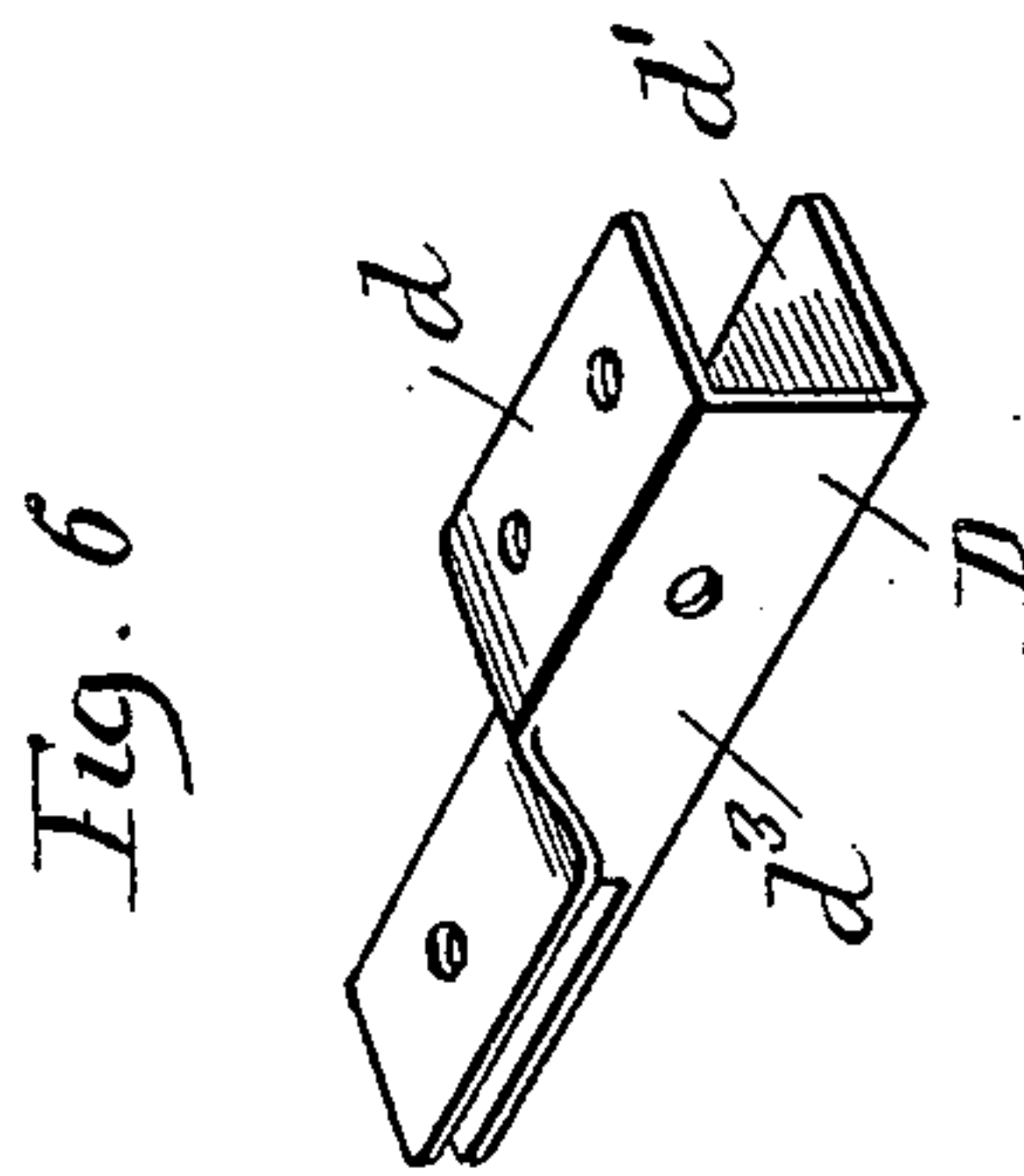


Fig. 6

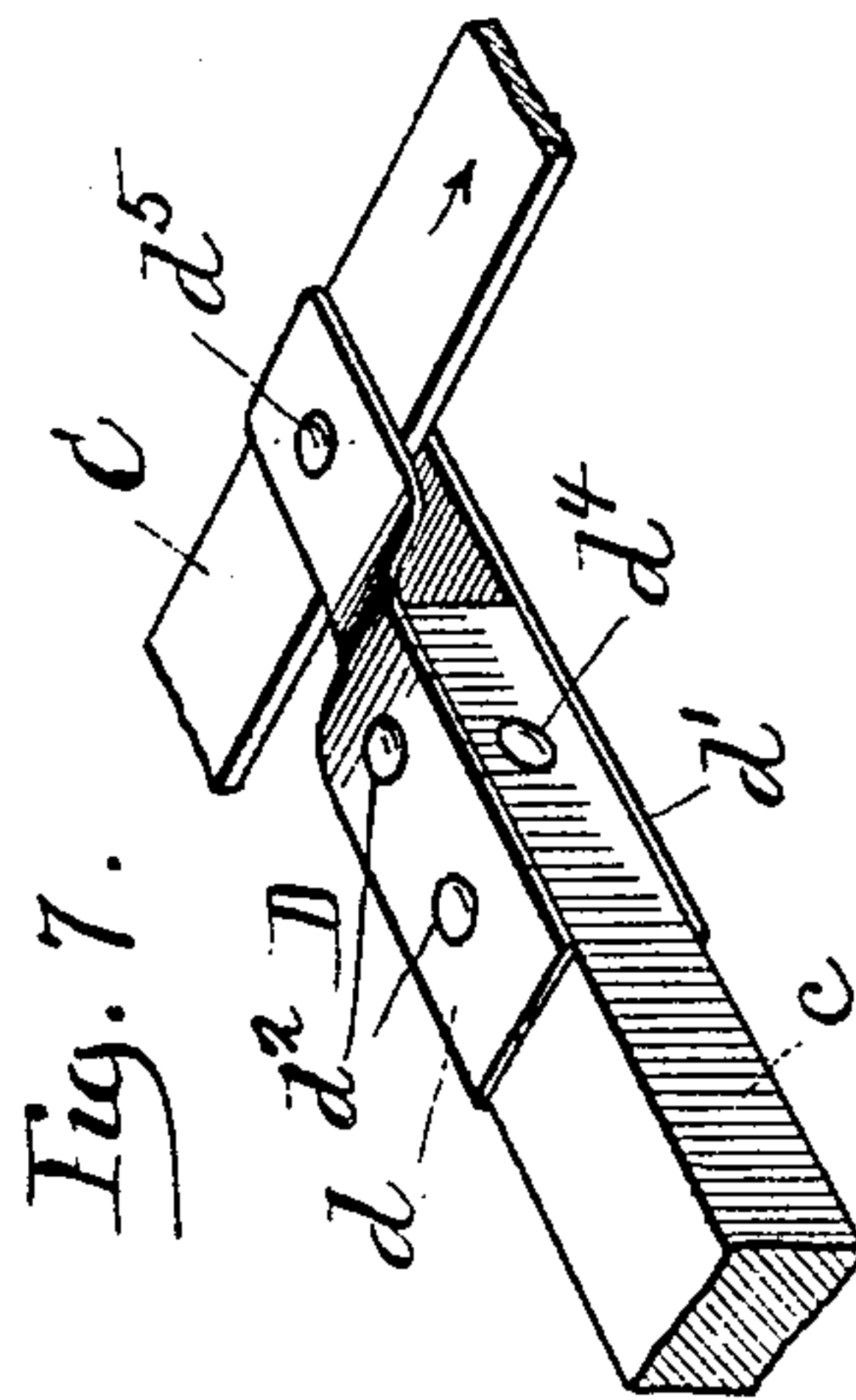


Fig. 7.

Witnesses:
Fred Gulack
Alberta Adamick

Inventor:
O. C. Zimmerman
By Price & Fisher
his Attorneys.

UNITED STATES PATENT OFFICE.

ORRIN C. ZIMMERMAN, OF CHAPIN, IOWA.

STRAW-STACKER FOR THRESHING-MACHINES.

No. 800,705.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed November 24, 1902. Serial No. 132,520.

To all whom it may concern:

Be it known that I, ORRIN C. ZIMMERMAN, a citizen of the United States, and a resident of Chapin, in the county of Franklin, State of Iowa, have invented certain new and useful Improvements in Straw-Stackers for Threshing-Machines, of which the following is a full, clear, and exact description.

In automatic straw-stackers as now commonly constructed the straw chute or elevator is ordinarily supported not only by the turn-table, but also by rods, cables, or the like, that extend back to the top of the frame of the separator, at the rear of which the straw chute or elevator is mounted.

One main object of the present invention is to provide a straw chute or elevator that shall be, as it were, self-contained, so that its sections may be supported by the turn-table without the necessity of rods or cables extending from the chute or elevator to the separator-frame.

In the form of the invention illustrated in the accompanying drawings the straw chute or elevator is shown as mounted upon a turn-table supported at the rear end of the separator; but it will be readily understood that inasmuch as the straw chute or elevator is supported by the turn-table independently of connections leading to the top of the separator the invention might be readily and advantageously employed by mounting the turn-table upon a separate truck.

The straw-stackers that are now most commonly used in connection with threshing-machines may be divided into two general classes. In the one class the straw is raised to the required height along a stacker frame or elevator by means of endless belts or like conveyer mechanism. In the other class (commonly known as "pneumatic" stackers) the straw is carried to the required height through a trunk or chute by a strong blast of air.

So far as I am aware the present invention presents the first instance of stacking mechanism for threshing-machines comprising a traveling conveyer working within a chute and serving to carry the straw to the stack in combination with a pneumatic tube or air-blast pipe, whereby material is delivered into the chute so that it can be carried along the chute by the conveyer mechanism.

The conveyer type of straw-stacker is preferred by many users, but is objectionable in that no adequate provision has been heretofore made for carrying away the chaff from

the separator. One main object is to overcome this objection; and to such end the invention broadly consists in combining with a straw-stacker having suitable conveyer mechanism, whereby the straw is delivered onto the stack, of an air-blast pipe adapted to receive and discharge the chaff. Preferably the straw passes from the separator-rakes directly into the straw chute or elevator separate from the chaff; but the invention is designed to cover the general feature of a stacker with conveyer mechanism to discharge straw onto the stack in combination with an air-blast pipe for receiving the chaff, whether the straw issue directly from the rakes onto the conveyer or be delivered otherwise thereto. In the preferred form of apparatus the pneumatic chaff-trunk has its discharge end arranged to deliver the chaff into the straw-elevator, so that it may be discharged with the straw.

A further feature of the specific embodiment of the invention is providing the pneumatic chaff-trunk with a hinged or swivel portion adapted to swing with the straw-elevator and its conveyer mechanism.

Figure 1 is a view in side elevation of the rear end of a threshing-machine having my invention applied thereto. Fig. 2 is a view similar to Fig. 1 from the opposite side of the machine, but showing the upper section of the straw elevator or stacker turned backward over the rear end of the thresher. Fig. 3 is a view in central vertical longitudinal section through the parts shown in Figs. 1 and 2. Fig. 4 is an enlarged view, in horizontal section, through the chaff-trough and its fan, the turn-table of the straw elevator or stacker frame being shown in elevation. Fig. 5 is an enlarged view, in vertical section, on line 5 5 of Fig. 3. Fig. 6 is an enlarged detail view in perspective, showing an improved fastener for connecting the bars of the straw-conveyer to their endless belts. Fig. 7 is a detail perspective view showing the manner of applying the fastener illustrated in Fig. 6.

A designates the rear end of the threshing-machine, that will be provided with rakes α or like means for carrying the straw to the tail of the machine, whence it will pass down the incline α' into the lower section B of the straw chute or elevator. As shown, this straw chute or elevator is formed of lower and upper sections B and B', that are hinged together at their abutting ends, and through these sections travel the endless conveyer-belts C, to

which are attached the cross bars or slats *c*. In order to securely and effectively connect the cross bars or slats *c* to the conveyer-belts C, I have devised the fasteners D. (Illustrated in Figs. 6 and 7 of the drawings.) These fasteners are preferably formed of sheet metal with sides *d* and *d'* to receive the rivets *d*², that pass through the ends of the slats *c*, the sides *d* *d'* being connected by the back *d*³, perforated to receive the bolt or rivet *d*⁴, that also passes through the end of the corresponding slat. The sides *d* and *d'* are prolonged, as shown, and are separated a sufficient distance to receive the belt C at the corresponding side of the conveyer, and the end portions of the sides *d* and *d'* are perforated to permit the fastener to be securely riveted to the belt, as at *d*⁵. The fastener D affords a most effective means for connecting the bars or slats *c* to the conveyer-belts C and are particularly advantageous in that they allow the slats *c* to be secured to the fasteners in both vertical and horizontal direction. The conveyer-belts C pass over suitable pulleys mounted upon transverse shafts journaled in the sections of the straw chute or elevator, these shafts being driven, preferably, by sprocket-wheels *e* *e'* and a sprocket-chain *e*².

In order to enable the outer section B' of the stacker chute or elevator to be raised and lowered, I prefer to provide the rear end of this section B' with the angular bars or brackets F, that are bolted to the sides of the chute and extend upwardly and forwardly, as shown in Fig. 1, the apex of each of these bars or brackets F having connected thereto a winding cord or cable *f*, that passes downward and around a winding-drum on a winding-shaft G, that is journaled in the lower section B of the straw chute or elevator. One end of the shaft G (see Fig. 2) is provided with a crank-handle *g* and with a ratchet-wheel *g'* and retaining-pawl *g*². By turning the shaft G the operator can raise and lower the outer section B' of the straw chute or elevator in keeping with the height of the stack to be constructed.

The lower section B of the straw chute or elevator is mounted upon a turn-table H, the section B being braced by the bars B², that extend upward from the turn-table. By reference more particularly to Figs. 1 to 4 it will be seen that the extreme lower ends of the side bars of the section B are mounted upon a transverse bar *b*⁵, that is secured to the turn-table, while the lower ends of the brace-bars B² are secured to a transverse bar *b*⁶, bolted to the turn-table. By this construction the lower section B is held stationarily with respect to the turn-table H and in a vertically-inclined position. Hence it will be seen that as the turn-table is revolved in manner to be presently described the relatively stationary section B of the straw chute or elevator and the hinged section B' will be swung; but these sections will at all times be sustained

by a turn-table and without the necessity of employing any rods or cables leading to the top of the separator-frame. As shown, the turn-table H comprises an annular track H², having flanges *h*, within which set the anti-friction-rollers *h*², that are carried by brackets *h*³, bolted to the end frame K, as clearly shown in Figs. 1 to 4 of the drawings. The end frame K is preferably formed of a U-shaped metal bar, bent as shown, the inner ends of this bar being suitably secured to the rear end of the main frame of the threshing-machine.

Centrally through the turn-table H passes a bearing-sleeve 2, through which extends a short vertical shaft 3, the lower end of which carries a sprocket-wheel 4, while its upper end is provided with a bevel gear-wheel 5. The sprocket-wheel 4 is connected by chains 6 with a sprocket-wheel 7, that is connected by bevel-gears 8 and 9 with the drive-shaft 10, suitably journaled upon the end frame K. The beveled gear-wheel 5 at the top of the shaft 2 meshes with a beveled pinion 12, that is keyed to a shaft 13, that is journaled in suitable brackets 14, that rise from the turn-table H. The outer end of the shaft 13 carries a gear-wheel 15, that meshes with a corresponding gear-wheel 16, that is keyed to one end of the shaft G', that is journaled in the lower end of the section B of the straw chute or elevator. To the turn-table H is fixed an annular rack or gear 20, with which meshes a pinion 21, that is keyed to a short vertical shaft 22, (see Fig. 4,) this shaft 22 being provided with a worm-wheel 23, that meshes with a worm 24, fixed to a shaft 25, journaled beneath the frame K. The inner end of the shaft 25 is provided with a beveled pinion 26, adapted to be driven by either of the clutch-pinions 27 and 28 in manner well understood by those familiar with this class of devices. The clutch-pinions 27 and 28 are mounted upon a shaft suitably geared to the drive-shaft 10, and any suitable provision may be made for shifting the pinions 27 and 28 so that either of these pinions may be brought into gear with the pinion 26. It will be understood that motion is transmitted from the drive-shaft 10 through the clutch-pinions 27 and 28 to the shaft 25, the worm 24 and worm-wheel 23 and the pinion 21 and rack 20 to the turn-table H, thereby causing this table to swing back and forth in order to bring the straw chute or elevator to the desired position for directing the straw onto the stack.

From side to side of the end frame K extends a trough L, the open top of which is beneath the rear end of the separator-conveyer *a*⁴ and in position to receive the chaff as it passes therefrom. The chaff-trough L is connected to the casing L' of the fan L², and preferably this casing and fan are located centrally of the trough, the two sections of the trough entering the eyes L³ of the fan.

The fan L^3 is mounted upon a shaft M, that is journaled in suitable bearings at the sides of the frame K. One end of the shaft M is furnished with a drive-pulley m , while the opposite end of the shaft is provided with a pulley m' , from which motion will be transmitted, as by a belt m^2 , to a pulley m^3 upon the drive-shaft 10. Upon the shaft M are arranged the spiral blades or arms M' , that serve to agitate the chaff and move it toward the eyes L^3 of the fan-casing L' and insure that it shall be drawn into the casing L' by the suction of the fan L^2 . From the rear edge of the trough L extends upwardly the end plate or wall L^5 , that joins the base a^6 of the discharge end of the machine.

From the fan-casing L' and through the end plate or wall L^5 extends upwardly the chaff trunk or chute N, whereby the discharge of the chaff is effected. In the preferred form of the invention the upper end of the chaff-trunk N extends rearwardly and is bent downwardly, as shown in Fig. 3, its lower end being provided with an extension P, that is connected by a swivel-joint p with the depending lower end of the trunk N. (See Figs. 3 and 5.) The swivel extension P of the chaff-trunk is expanded laterally, as at P' , as clearly shown in Fig. 5 of the drawings, and is turned upwardly, as shown in Fig. 3, so as to distribute the chaff from side to side of the straw chute or elevator and drive it upwardly into the straw that is discharging from the tail of the machine and is being carried away by the conveyer mechanism of the straw-chute. By reference more particularly to Fig. 3 of the drawings it will be seen that the center of oscillation of the extension P of the chaff-trunk is concentric with the center of oscillation of the straw chute or elevator, and inasmuch as the expanded mouth of the trunk extension P lies between the sides of the straw-chute section B it will be seen that the extension P of the chaff-trunk will swing in unison with the straw chute or elevator.

It is manifest that the details of construction above set out may be varied within wide limits without departing from the spirit of the invention.

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

1. In a straw-stacker, the combination with a straw chute or elevator having suitable traveling conveyer mechanism therein for mechanically delivering the straw onto the stack, of an air-blast pipe through which material will pass from the threshing apparatus to the chute and means for forcing air through said air-blast pipe.

2. In a straw-stacker, the combination with a straw-chute having a bottom and side walls and with an endless traveling conveyer operating in said chute to convey the straw through

said chute, of an air-blast pipe having its inner end arranged to receive material from the threshing apparatus and having its outer end arranged to deliver said material to the chute.

3. In a straw-stacker, the combination with a straw-chute having a bottom and side walls and having an endless traveling carrier therein to convey the straw to the stack, of an air-blast pipe extending between the threshing apparatus and the chute, the discharge end of said air-blast pipe being arranged to turn laterally with the movements of the chute.

4. In a straw-stacker, the combination with the straw chute or elevator having suitable traveling conveyer mechanism therein for mechanically delivering the straw onto the stack, of an air-blast pipe adapted to receive the chaff and means for producing a blast of air to cause the passage of chaff through said pipe.

5. In a straw-stacker, the combination with the straw chute or elevator having suitable traveling conveyer mechanism therein for mechanically delivering the straw onto the stack, of an air-blast pipe adapted to receive the chaff, said pipe having its discharge end arranged to deliver the chaff to the straw chute or elevator and means for producing a blast of air to cause the passage of chaff through said pipe.

6. In a straw-stacker, the combination with the straw chute or elevator having suitable endless conveyer mechanism therein for raising the straw, of an air-blast pipe adapted to receive the chaff separated from the straw, the discharge end of said pipe being connected to swing in unison with the straw chute or elevator and means for producing a blast of air to cause the passage of chaff through said pipe.

7. In a straw-stacker, the combination with the straw chute or elevator having endless conveyer mechanism therein for raising the straw, of an air-blast pipe arranged to discharge into the inner end of the straw-chute and provided at its discharge end with a swivel extension arranged to swing in unison with the straw chute or elevator.

8. In a straw-stacker, the combination with the straw chute or elevator having conveyer mechanism therein for raising the straw, of an air-blast pipe adapted to receive the chaff separated from the straw, the discharge end of said pipe being provided with a swinging extension having a laterally-expanded mouth arranged opposite the straw chute or elevator.

9. In a straw-stacker, the combination with the straw chute or elevator having suitable mechanical conveyer mechanism therein for raising the straw, of a trough adapted to receive the chaff, an air-blast pipe connected to said trough for carrying away the chaff the discharge end of said pipe being arranged in proximity to the inner end of the straw-chute and a fan for forcing the chaff through said pipe.

10. In a straw-stacker, the combination with the straw chute or elevator having suitable mechanical conveyer mechanism therein for raising the straw, of a trough arranged to receive the chaff as it falls from the separator mechanism, a fan-casing connected to said trough, a fan within said casing and a chaff-trunk leading from said fan-casing and having its discharge end in proximity to the inner end of the straw chute or elevator.

11. In a straw-stacker, the combination with the straw chute or elevator having suitable traveling conveyer mechanism therein for raising the straw, of an open trough arranged to receive the chaff as it issues from the separator, a shaft within said trough provided with stirring-blades, a fan-casing communicating with said trough, a fan carried by said shaft and a chaff-trunk leading from said fan-casing to the inner end of the straw-chute to carry away the chaff.

12. In a straw-stacker, the combination of a turn-table and means for revolving the same, a straw chute or elevator having conveyer mechanism therein for receiving the straw, said chute being formed of two sections hinged together, the lower section being mounted stationarily upon the turn-table, an endless traveling conveyer within said straw-chute for delivering the straw to the stack and an air-blast pipe adapted to receive material from

the threshing-machine and convey it to the inner end of the straw-chute.

13. In a straw-stacker, the combination with the swinging straw chute or elevator having conveyer mechanism therein for raising the straw, of an air-blast pipe adapted to receive the chaff separated from the straw, said air-blast pipe being provided at its discharge end with an extension arranged in proximity to said straw chute or carrier and pivoted to swing concentric therewith.

14. In a straw-stacker the combination with the straw chute or elevator having conveyer mechanism therein for raising the straw, of a turn-table whereon said chute or elevator is mounted, a transverse shaft at the base of said chute or elevator, suitable gearing connecting said shaft to the conveyer mechanism, a central shaft extending upwardly through said turn-table and geared to said transverse shafts, an annular rack carried by said turn-table, gearing engaging said rack and whereby the swinging of the turn-table is effected, a grooved annular rail fixed to said turn-table and antifriction-rollers engaging said grooved rails.

ORRIN C. ZIMMERMAN.

Witnesses:

GEORGE A. STEARNS,
IGNATZ WERNERT.