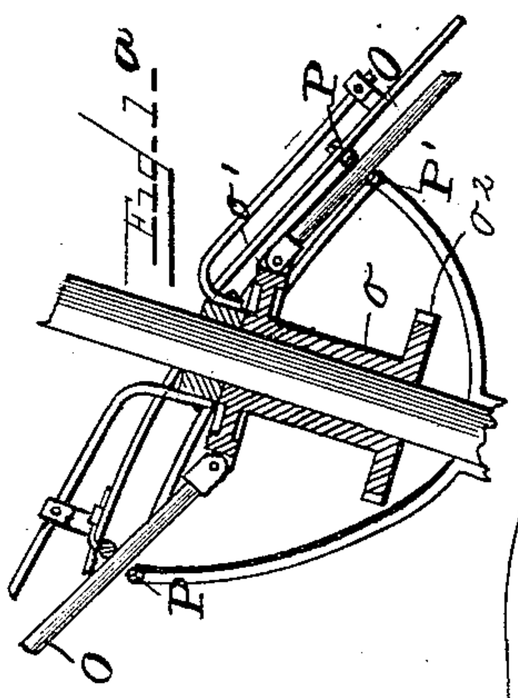
(No Model.) 8 Sheets—Sheet 1.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

No. 459,622. Patented Sept. 15, 1891.



Witnesses

G. A. Tauberschmidt.

J. D. Knigge Jr.

Inventors

Edward L. Baker and

Richard Emerson

By their Attorneys

Whitaker & Prevost.

(No Model.) 8 Sheets—Sheet 2.

E. L. BAKER & R. EMERSON.

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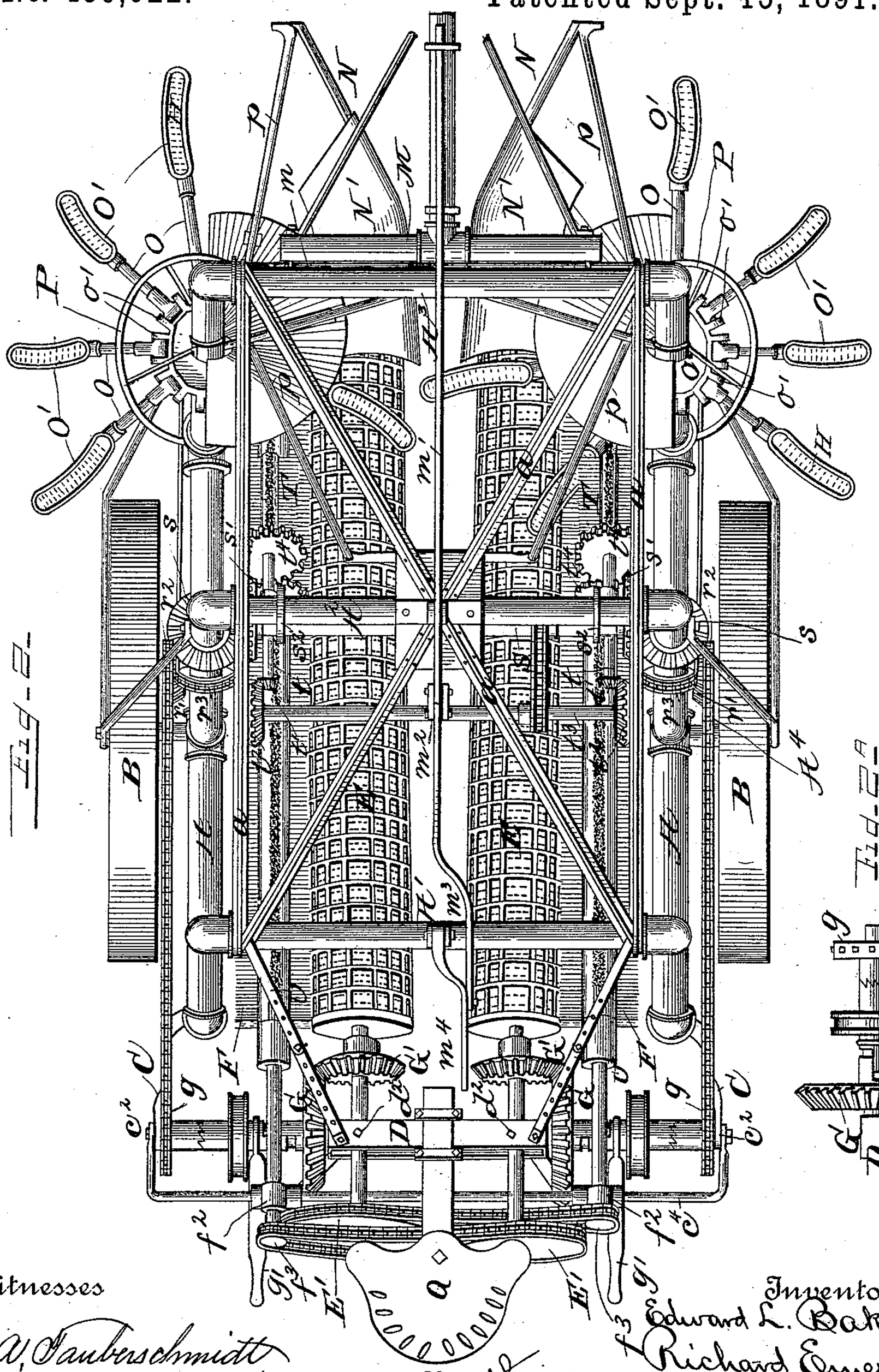

Fig. 2.

Fig. 2a.

Witnesses

G. A. Taubenschmidt.

L. D. Kingsbury

Inventors

Edward L. Baker

Richard Emerson

By their Attorneys

Whitaker & Prevost.

(No Model.) 8 Sheets—Sheet 3.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

No. 459,622. Patented Sept. 15, 1891.

Witnesses
G. A. Taubenschmidt.
J. D. Kingsbury

Inventors
Edward L. Baker and
Richard Emerson,
By their Attorneys
Whitaker & Prevost.

(No Model.) 8 Sheets—Sheet 4.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

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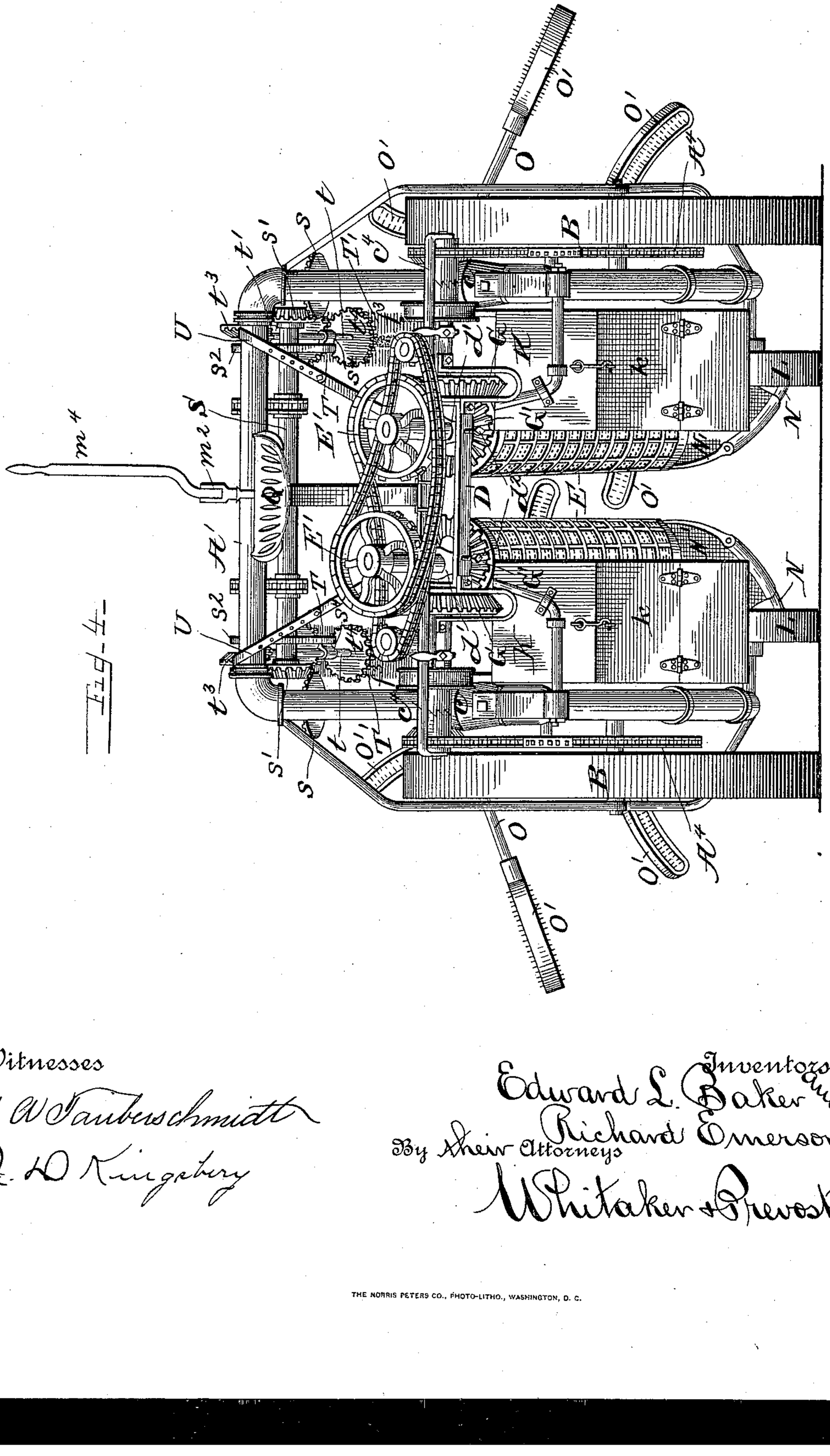

Fig. 4.

Witnesses
G. W. Tauberschmidt
L. D. Kingsbury

Inventors
Edward L. Baker and
Richard Emerson
By their Attorneys
Whitaker & Prevost.

(No Model.) 8 Sheets—Sheet 5.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

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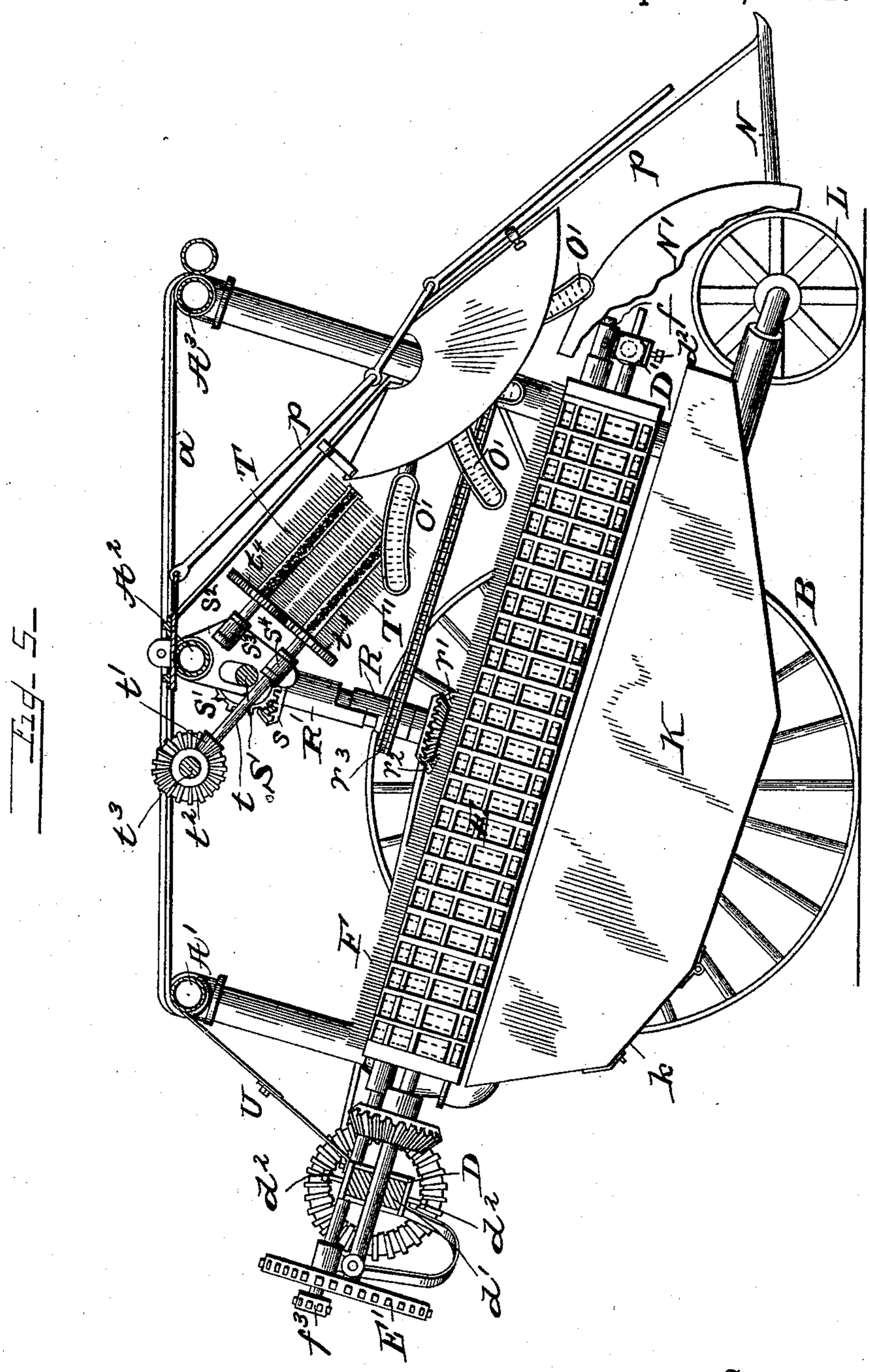

Witnesses

G. A. Tauberschmidt.

J. D. Kingsbery

Inventors

Edward L. Baker and

Richard Emerson

By their Attorneys

Whitaker & Prevost.

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E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

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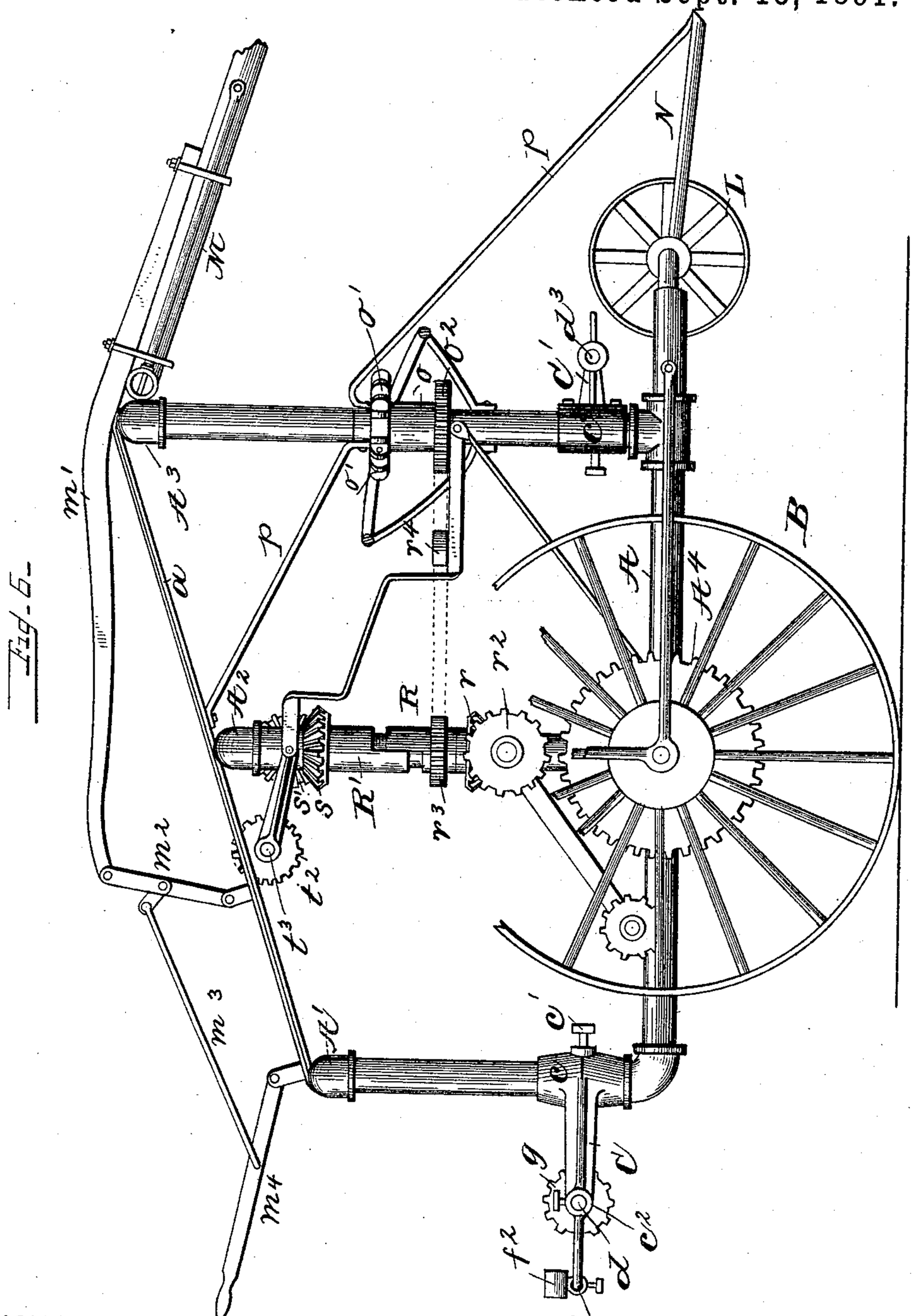


Witnesses

G. A. Fauberschmidt

J. D. Kingsbury

Inventors

Edward L. Baker

and Richard Emerson

By their Attorneys

Whitaker & Prevost.

(No Model.) 8 Sheets—Sheet 7.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

No. 459,622. Patented Sept. 15, 1891.

Fig. 7.

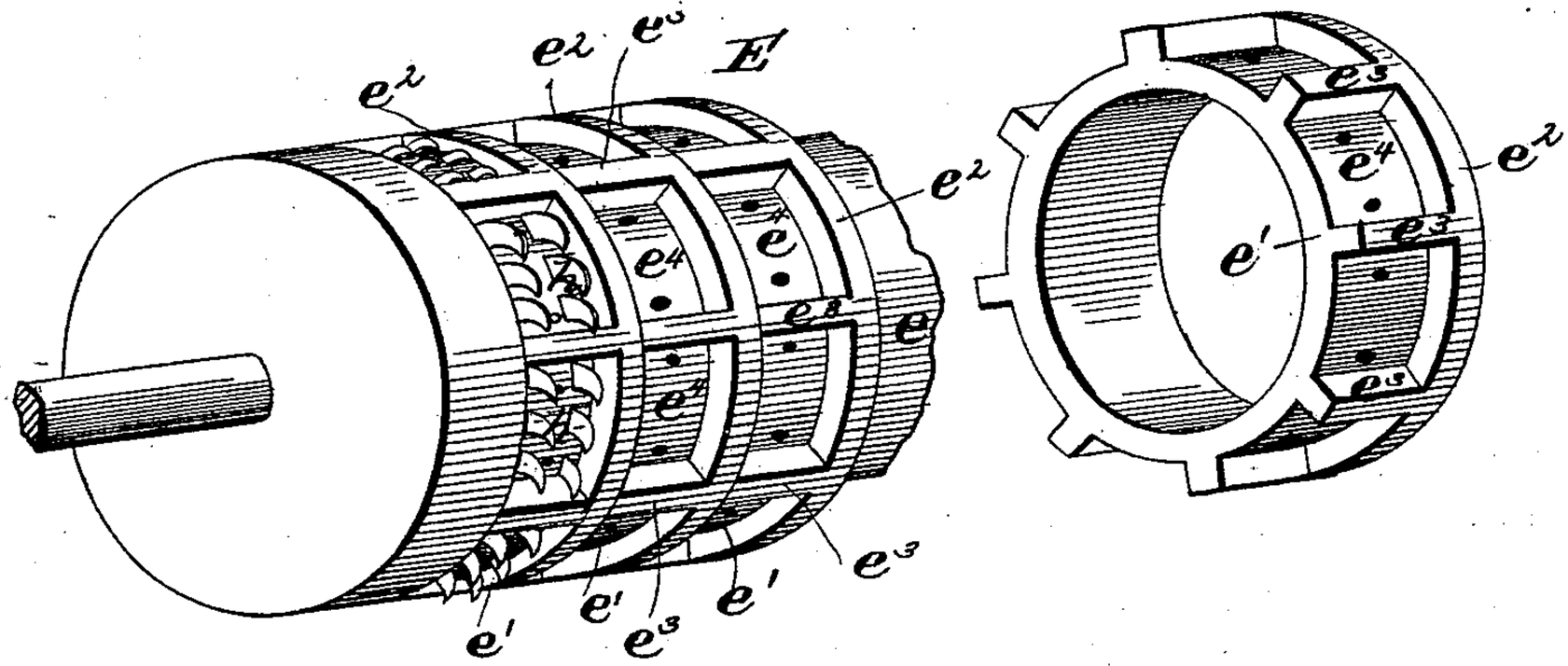


Fig. 8.

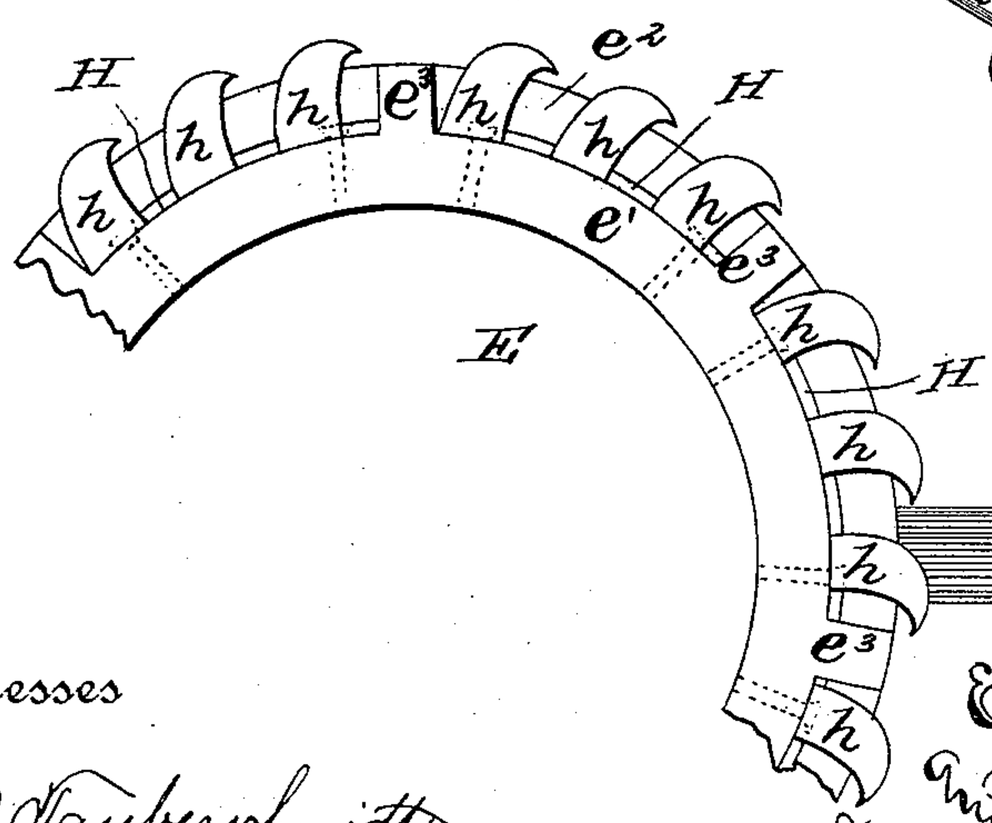
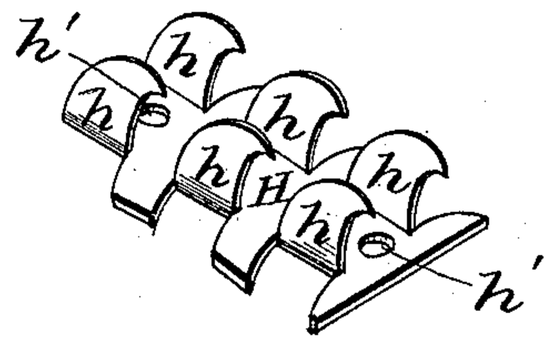
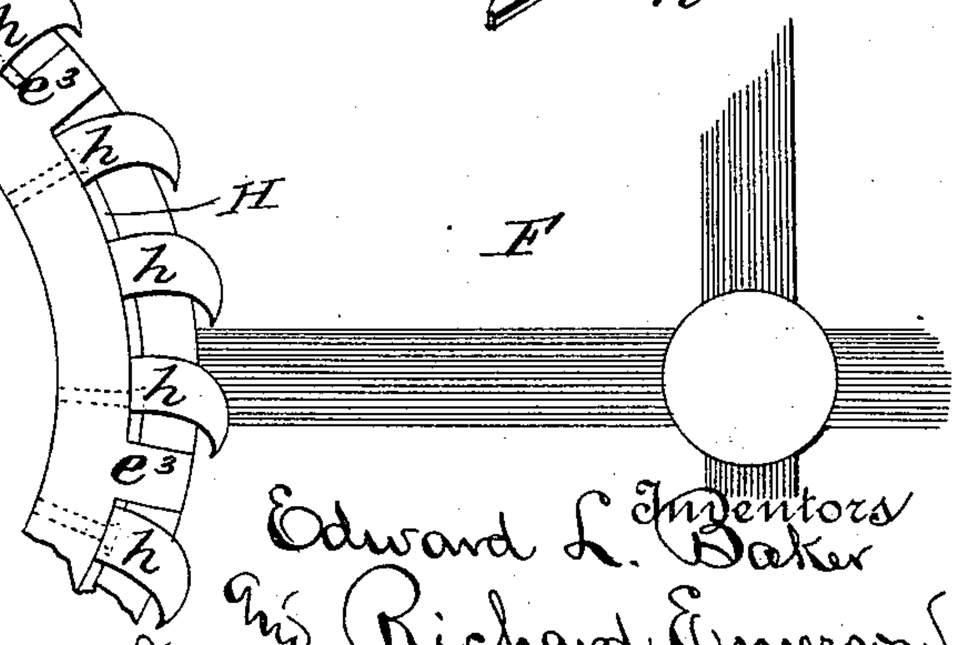


Fig. 9.





Witnesses

G. A Tauberschmidt,

J. O Kingsbery

Inventors

Edward L. Baker

and Richard Emerson

By their Attorneys

Whitaker & Prevost.

(No Model.)

8 Sheets—Sheet 8.

E. L. BAKER & R. EMERSON.

COTTON HARVESTING MACHINE.

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Fig. 10.

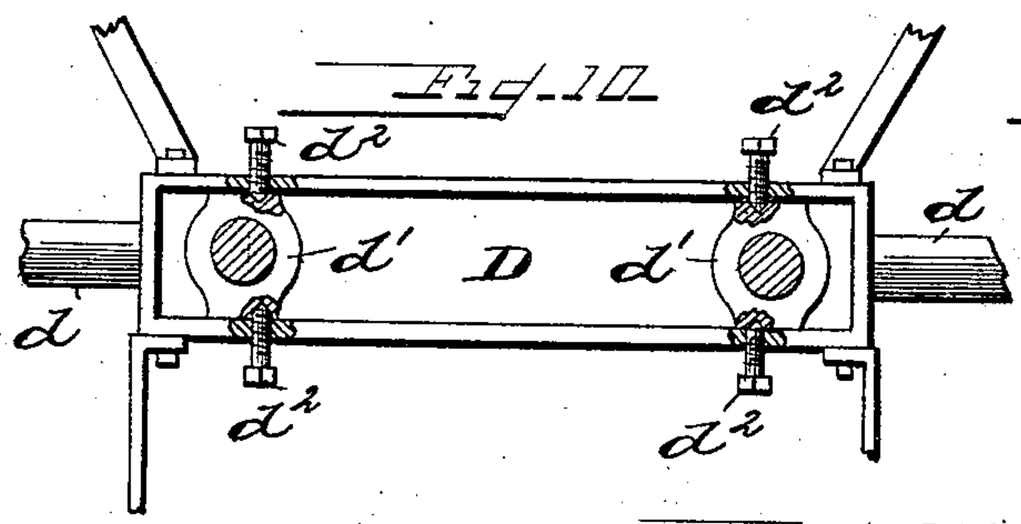


Fig. 11.

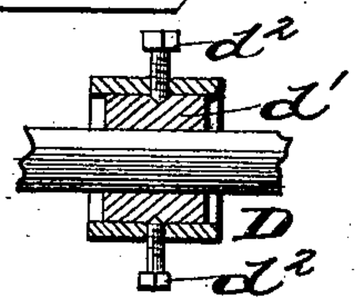


Fig. 12.

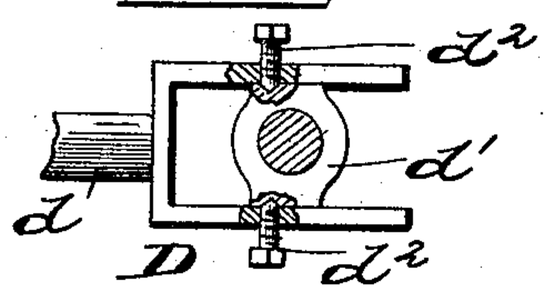


Fig. 13.

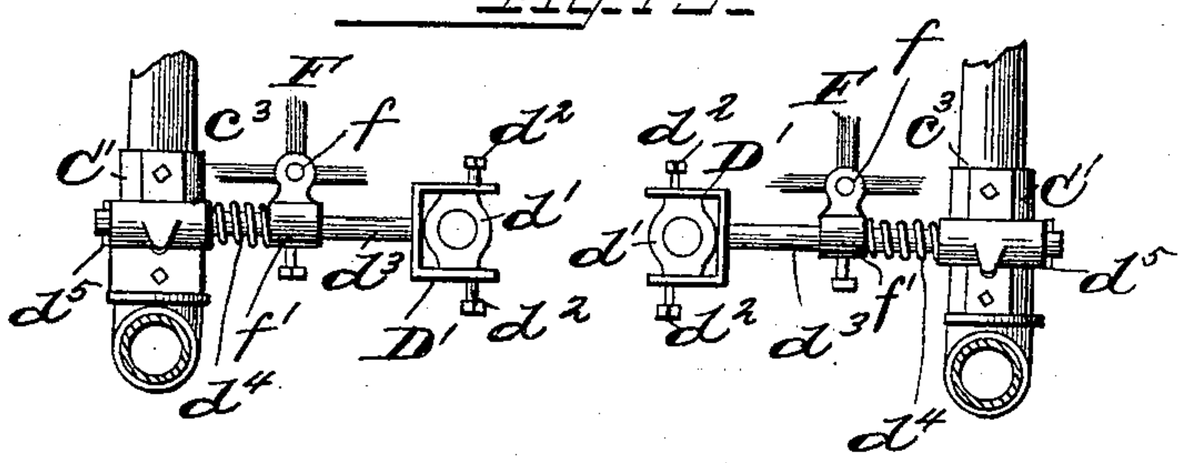


Fig. 14.

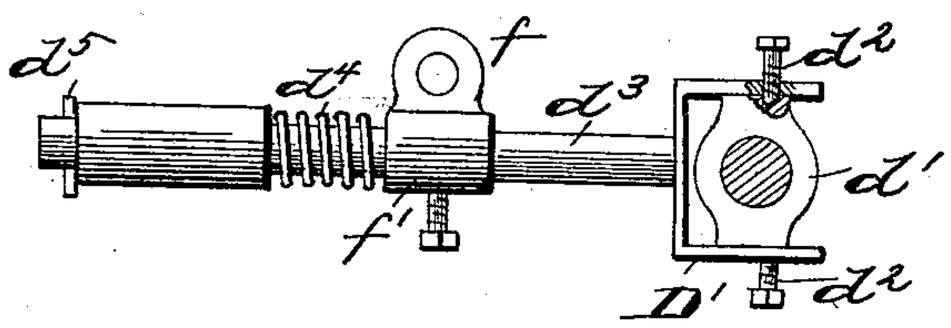
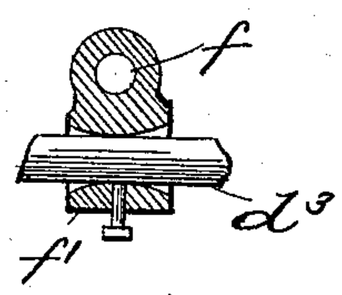


Fig. 15.



Witnesses

L. A. Faulbeerschmidt

J. D. Kingsbery.

Inventors

Edward L. Baker and

Richard Emerson.

By their Attorneys

Whitaker & Prevost.

UNITED STATES PATENT OFFICE.

EDWARD L. BAKER AND RICHARD EMERSON, OF RACINE, WISCONSIN.

COTTON-HARVESTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,622, dated September 15, 1891.

Application filed January 19, 1891. Serial No. 378,328. (No model.)

To all whom it may concern:

Be it known that we, EDWARD L. BAKER and RICHARD EMERSON, citizens of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Cotton-Harvesting Machines; and we 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.

Our invention is an improvement in cotton-harvesters; and it consists in the peculiar features of construction and combination of parts hereinafter fully described.

We have illustrated one form in which we have contemplated embodying our invention in the accompanying drawings, and the said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 is a side elevation of a cotton-harvesting machine embodying our invention. Fig. 1^a is a detail section of part of the mechanism. Fig. 2 is a top plan view of said machine. Fig. 2^a is a detail of a part of the mechanism. Fig. 3 is a front view of the machine. Figs. 3^a and 3^b are details of a portion of the cotton-picking devices. Fig. 4 is a rear elevation of the machine. Fig. 5 is a central longitudinal section of the machine. Fig. 6 is a view of the frame-work of the machine. Fig. 7 is a view of a portion of one of the cotton-stripping cylinders, showing one of the ring-sections forming the outer surface of the same detached. Fig. 8 is a view of a portion of one of said ring-sections, showing the stripping-teeth secured thereto. Fig. 9 shows one set of teeth stamped from a sheet-metal plate. Figs. 10, 11, 12, 13, 14, and 15 are detail views of the bearings for the cotton-picking devices and connected parts.

The main frame of our improved cotton-harvester is formed as shown in Fig. 6, in which A represents the horizontally-disposed bars of the frame, which are connected by three arched frames A′ A^2 A^3. This frame is preferably composed of metal, and we have shown it in this instance as formed from sections of metal pipe or tubing united in a suitable manner, thus giving great strength with comparative lightness. The horizontally-disposed bars A are provided with axle portions upon which are mounted the supporting-wheels B B. In order to secure the desired amount of rigidity in the frame and to prevent strain, the upper portions of the arches A′ A^2 A^3 are connected by suitable braces *a a*. Each of the standards of the arch A′ is provided at or near its lower end with a rearwardly-extending arm C, which is preferably secured to a collar *c* embracing said standard and adjustable vertically thereon by means of a thumb-screw *c*′. At or near the outer end this extension is provided with bearing or sleeve c^2. These extensions or brackets C support the rear bearings of the cotton-picking devices, which consists of a pair of rolls or cylinders adapted to rotate and are disposed longitudinally of the machine-frame. The rear bearings for the shafts of said rolls or cylinders are secured in a double-bearing support D, (shown in detail, Figs. 10, 11, and 12,) which support is provided at each end with a rod or stem *d*. The rods *d d* engage the collars c^2 of the brackets, and are secured therein by set-screws or other securing means.

The bearings are formed in blocks *d*′ *d*′, which are secured in place in the bearing-support by means of set-screws d^2 d^2, which engage said blocks eccentrically to the center of the shaft but in line with each other, thus forming a pivotal connection between the bearing-blocks and their support. The object of this construction is to allow the shafts of the cotton-picking rolls to be adjusted nearer together or farther apart, as required. For instance, if the bearing-blocks are in the position shown in Fig. 10, with the set-screws d^2 engaging said blocks on the side of the shafts nearer the center of the machine, and it is desired to adjust the shafts closer together, the set-screws are disengaged from said blocks and the blocks slipped along the shafts until they disengage the bearing-support. Each block *d*′ is then turned half-way round, as shown in Fig. 12, and the screws d^2 are replaced when by reason of the eccentric position of said screws the shafts and bearings will have been brought considerably nearer together. If it is desirable to separate the shafts, the operation is reversed. We may, however, use

sliding bearings and adjust them toward and from each other by means of screws, if desired.

The standards of the front or forward arch A^3 are provided with brackets C′, similar to the brackets C, and secured to collars c^3 adjustable vertically upon said standards by means of set-screws or other means. In each of these brackets is mounted a longitudinally-movable arm or rod d^3, which is provided on its outer end with a single bearing-support D′, as clearly shown in Fig. 13. Each of said bearing-supports is provided with an eccentrically-secured bearing-block d', held in position by set-screws d^2 of the same construction as those employed in connection with the double-bearing support D. The shafts of the two longitudinally-extending cotton-picking rolls or cylinders E E are mounted in the front and rear bearing-blocks d' d', so that the adjacent faces of said cylinders are separated a distance sufficient to permit the passage of cotton plants or bushes as the machine is drawn through the field.

Parallel with the cylinders or rolls E E are journaled the revolving stripping-brushes F F, which engage the outer sides of said rolls and strip or brush off the cotton picked by the rolls. The shafts of said brushes are journaled at the front of the machine in bearings f f, which are provided with collars f' f', engaging the rods d^3 d^3, and the rear ends of said shafts are supported in similar bearings f^2 f^2, secured in a similar manner to a curved rod or support c^4, which is bolted or otherwise secured to the main frame or to the rear brackets C, as shown in Fig. 6. The collars of these bearings are formed with their interior bores increasing from the center toward either end, as clearly shown in Fig. 15, and this construction allows the shaft to assume positions slightly angular with respect to the bearing-supporting devices without straining its bearings, as will be readily seen. The collar portion of each of the brush-bearings are provided with set-screws to secure them in the proper position on their respective supports, and this permits any adjustment of the brush-shaft with respect to the rolls or cylinders that may be required.

We provide the forward bearing-supporting devices with constructions whereby the rolls may yield laterally to allow for the varying thickness of the cotton-bushes, thus preventing strain on the parts. To this end we provide each rod d^3, between its supporting-bracket and a shoulder on said shaft—such as is afforded by the collar f' of the brush-bearing—with a retracting spring d^4. The rod, as before stated, is movable longitudinally in its bracket, and the outer end of said rod is provided with a pin d^5, as shown, or other suitable device for limiting the inward movement of the rod. It will thus be seen that when a great mass of the cotton branches comes between the rolls E and creates a sufficient pressure the rolls will yield, allowing the rods to slide outward a short distance in their brackets and compressing the springs d^4. As soon as the pressure is relieved the springs force the rolls back into their former positions. It will be noticed that the front bearings for the brushes being secured to the rods d^3 the brushes move laterally with the rolls, and the distance between them remains the same. The constructions of the collars f' of the brush-bearings allows the movement of the front end of the brushes without straining of parts, and the bearings for the rolls being secured in their supports by the pivotal connection formed by the set-screws hereinbefore described the lateral movement of the forward ends of said rolls produces no binding, the bearings being free to turn to accommodate themselves to the movements of the roll-shafts.

The cotton-picking rolls and brushes are driven from the main wheels of the machine in the following manner: The rods or shafts d d, which are formed integrally with the rear bearing-support or suitably secured thereto, are provided each with a beveled gear G and a sprocket-wheel g, loosely mounted upon said shaft by means of sleeves. A clutch is interposed between the gear and sprocket-wheel, (here shown as a saw-tooth clutch,) and this clutch is controlled by means of a pivoted hand-lever g', the free end of which is in position to be operated from the driver's seat Q. A beveled gear G′ on each of the roll-shafts engages one of the beveled gears G, and motion is imparted to the sprockets g from the driving-wheels by means of sprocket-chains engaging sprockets A^4, secured to rotate with the driving-wheels. This arrangement secures the proper revolution of both the cotton-picking cylinders. The rear ends of each roll-shaft is provided with a sprocket-wheel E′, which is connected by a sprocket-chain with a smaller sprocket f^3 on the shaft of the brush, which engages the other roll, thus giving the brushes a faster movement than the rolls and enabling them to sweep off the cotton from the same. The chains are left loose enough to allow for the adjustment of the rolls permitted by the eccentric bearing-blocks. It will be seen that the rolls, or either of them, may be disconnected from the operating mechanism by throwing the clutches out of engagement by means of the levers g'.

The form of construction of the cotton-picking rolls is shown clearly in the drawings, special reference being had to Figs. 7, 8, and 9. Upon the longitudinal shafts is secured a smooth cylinder e, of iron or other suitable material, upon which are slipped a series of flanged ring-sections e', which form the cotton-engaging portion of the roll. We employ a sufficient number of rings to cover the surface of the cylinder, and said rings are secured to turn with the cylinder in any suitable manner. One of these rings or sections e' is shown detached in Fig. 7. Each ring-

section is provided with a radially-extending flange e^2 at one edge, and from this flange a series of parallel webs e^3 extend to the other edge. When the rings are placed upon the cylinder, it will be seen that the ends of the webs e^3 e^3 of one ring-section will engage the flange e^2 of the adjacent section, thus forming a roll, the outer surface of which is divided into recessed portions e^4. These recesses may be of any desired shape or form. We have shown them as being rectangular and slightly longer in a plane transverse of the roll, but this is not essential. In these recesses e^4 e^4 are located the cotton-picking teeth, which are preferably stamped up from a piece of sheet metal, as shown in Fig. 9. In this view it will be seen that from the plate H six teeth h are stamped up. The horizontal portion of the plate is then provided with one or more holes or perforations h', which are engaged by screws, bolts, or rivets, which secure them to the ring-sections, as shown in Fig. 8. The teeth h are so formed that when they are placed in the recesses e^4 and riveted or otherwise secured in place the points of said teeth lie above the outer surface of the flange e^2 and webs e^3, as shown in Fig. 8; but the backs of said teeth are curved and extend outwardly farther than the points, so that the points lie below the plane of the curved or back portions of the teeth. By this construction the points of the teeth are shielded by the curved or arched backs from catching in the twigs or branches and yet extend up out of the recesses far enough to engage the loose cotton on the plants. The flanges or webs surrounding the recesses constitute raised portions, which co-operate with the similar portions of the opposing roll and rub out the cotton from the unopened bolls and assist in removing the cotton from the plant. The brushes F, which are located in such position as to engage the rolls forcibly and strip the teeth of the cotton are geared so as to strike the backs of the teeth first and move toward their points, thus wiping the cotton from the teeth.

Below the rolls E and brushes F are a pair of cotton boxes or receptacles K, one on either side of the machine, so located that the brush will sweep the cotton from the rolls E into said boxes, where it is retained until it is desired to empty the same. The rear end of each of these boxes is provided with a hinged door or cover K, provided with a suitable securing device, which door may be opened when it is desired to empty the box or receptacle. (See Figs. 1 and 4.) It will be seen that the receptacles K serve as guards to prevent the branches of bushes from slipping from between the rolls and becoming tangled in the driving-wheels or other parts of the machinery.

The main frame of the machine is provided forward of the front roll-bearings with a pair of small supporting-wheels L, as shown best in Figs. 1, 3, 5, and 6, to enable the machine to adapt itself easily to the uneven surfaces of the ground over which it travels; and to this end the draft devices, consisting in this instance of a tongue M, are pivotally connected with the frame by means of a rod m, passing through ears on the main frame and on said tongue. The tongue or other draft connection is provided with a rearwardly-extending connection m', which extends slightly in rear of the center of the machine and is connected to said frame by a toggle-lever m^2. A connection m^3 extends rearwardly from a point adjacent to the center of the toggle and is connected with a hand-lever m^4 in position to be reached from the driver's seat. It will be seen that by drawing back the lever m^4 the toggle-lever will be brought into a substantially straight line, and the front wheels of the machine will be raised from the ground, as shown in Fig. 6. This is especially desirable, when turning around, as it converts the machine into a two-wheeled machine and enables the turn to be made in a very small space. By moving the lever toward the front of the machine the front end of the machine will be depressed to conform to hollows in the ground when necessary.

The machine is provided at each side with suitable guards N and shields N', which serve to penetrate and separate the bushes as the machine advances and to keep branches, twigs, &c., from being caught in the machinery.

In order to assist the cotton-picking rolls in removing the cotton from the plants, we provide each of the standards of the front arch A^3 with revolving sweeps provided with cotton-picking teeth, as shown in Figs. 1, 2, 3, 5, and 6. To this end the said standards are provided with a revoluble sleeve o, to which are secured a series of ears o' o'. In these ears are pivoted a series of sweeps O, so as to be capable of revolving with said sleeve, having their outer ends capable of moving vertically with respect to said sleeve. The outer ends of the sweeps are provided with segment-shaped portions O', which are provided with raised flanges surrounding the same. In the recesses formed within said flanges are secured a series of tooth-plates H, having stamped-up teeth h, as before described, and these teeth are secured on both sides of said segment portions O', preferably by means of rivets passing through said tooth-plates and segments. Each standard is provided with suitable braces p p, extending to other rigid portions of the frame, and to these braces are secured a cam-guide P, and a similar guide P', parallel to the guide P, is supported by brackets extending from the lower part of said standards. The stems of the sweeps O engage the cam-shaped guides P P' and their vertical movements are controlled thereby. These cam-guides have their lowest portions at the front of the machine and rise toward the rear. The sweeps, therefore, as they move forward on

the outside of the standard move downwardly and as they move rearward on the inside rise through the cotton-plant, thereby piercing through the bush and gathering the cotton on the interior of the same. The operating devices for the two sets of sweeps are so timed that the arms of the one will alternate with those of the other set, as shown in Figs. 2 and 3. Motion is imparted to these sweeps by the following devices: Upon each of the standards of the arch A^2 is a revolving sleeve R, provided with a bevel-gear r, which engages a bevel-gear r', which is formed with or attached to a sprocket r^2, over which one of the main driving-chains passes. (See Figs. 1, 5, and 6.) Upon the sleeve R is also secured a sprocket r^3, from which a driving-chain extends to a similar sprocket o^2 on the sleeve o, thus imparting motion to the sweep from the driving-wheels of the machine. A belt-tightener r^4 may be secured on a suitable support in position to engage this chain, if desired, as shown in Figs. 1 and 6.

In order to remove the cotton gathered by the segment portions O′ of the sweeps O, the said segments are passed during a portion of their travel (preferably when in their most rearward position) between revolving brushes T T′, which brush off the cotton therefrom. Adjacent to the upper ends of the standards of arch A^2 is journaled a horizontal counter-shaft S, which receives motion from the sleeve R by means of a second sleeve R′, provided with a beveled gear s, engaging a beveled gear s' on the counter-shaft. Upon this shaft and the horizontal portion of the arch A^2 are hung two bearing-supports s^2 s^2, which are provided each with two bearings s^3 and s^4 for the shafts of the upper and lower brushes T T′, respectively. The lower brush-shaft t is extended rearward of its supporting-bearing and provided with a bevel-gear t', engaging a vertically-disposed bevel-gear t^2 on a counter-shaft t^3, supported in suitable bearings secured to the main frame, to which motion is imparted from counter-shaft S by means of sprocket-wheels and chains or other power connection. Motion is imparted from one brush-shaft to the other by means of intermeshing gears t^4 t^4. By means of this construction the brushes T T′ are caused to revolve, and as the sweeps pass between said brushes the cotton upon their segments is brushed off and drops upon the rolls E and brush F below, where it is caught between the roll and brush and swept into the cotton-box beneath.

In operation the machine is made to straddle a single row of cotton-plants as it is drawn through the field. The revolving sweeps serve the double purpose of reaching out for the branches of the bushes and drawing them in between the rolls and then under the influence of their cam-guides rising through the branches and stripping the cotton from the interior of the bush. The cotton-picking rolls rub out the cotton from the bolls and branches and the teeth gather the loose cotton, which is brushed together with that gathered by the sweep-segments into the cotton boxes or receptacles. The rolls can be adjusted to different distances apart, as before described, and, by means of the yielding bearing-supports before mentioned, will yield slightly to allow for the varying thickness of branches passing between them. It will be noticed that when in operative position, as best shown in Figs. 1 and 5, the rolls E′ incline upwardly from front to rear. By this arrangement they will gather the cotton from the base of the plant first and then that growing higher up. The rolls can be adjusted to almost any desired inclination by raising the adjustable sleeves and adjusting them upon the standards of the arch A′. In order to hold the rolls against accidental change of inclination, we prefer to provide the adjustable supports or braces U U, (see Figs. 2, 4, and 5,) which extend from the rear bearing-supports for the rolls to the arch A′ and assist in supporting the said rolls. The driver from the seat Q can control the operation of the rolls by means of the hand-levers g' g' and the clutches operated thereby, and can effect any desired position or inclination of the frame of the machine by means of the hand-lever m^4.

What we claim, and desire to secure by Letters Patent, is—

1. A cotton-harvester having two longitudinally-disposed cotton-picking rolls, and means for adjusting each end of each of said rolls vertically independently of its other end, substantially as described.

2. A cotton-harvester having two longitudinally-disposed cotton-picking rolls, means for adjusting each end of each of said rolls vertically and also laterally toward or from the other roll independently of its other end, substantially as described.

3. A cotton-harvester having two longitudinally-disposed cotton-picking rolls, means connected with the bearings of said rolls for adjusting said rolls to different distances apart, yielding bearing-supports for said rolls, and means for adjusting the forward and rear ends of each of said rolls vertically independently of each other, substantially as described.

4. In a cotton-harvester provided with two longitudinally-disposed cotton-picking rolls, the combination, with the shafts of said rolls, of bearing-blocks therefor, bearing-supports for said blocks, and retaining devices for said blocks mounted in said supports and engaging opposite sides of the said blocks, the center of said shaft-bearing being at one side of a line connecting said points of retention, whereby said blocks may be reversed to effect the adjustment of said rolls, substantially as described.

5. A cotton-harvester provided with two longitudinally-disposed cotton-picking rolls, bearing-blocks engaging the shaft of each of said rolls, bearing-supports engaging said

blocks on opposite sides of the same, and screws or bolts passing through said supports and engaging said blocks, said screws or bolts being located in line and in a plane at one side of the center of said shaft, substantially as described.

6. A cotton-harvester provided with two longitudinally-disposed cotton-picking rolls, bearing-blocks engaging the shaft of each of said rolls, bearing-supports engaging opposite sides of the bearing-blocks, said blocks having each a pivotal connection with said bearing-supports, the said pivotal connections being in line with each other and located in a plane at one side of the center of said shaft, substantially as described.

7. In a cotton-harvester provided with two longitudinally-disposed cotton-picking rolls, the combination, with the roll-shafts, of bearing-blocks for the said shafts and yielding-supports for said bearing-blocks, retaining devices connected with said supports, engaging opposite sides of said blocks, the center of the shaft-bearings in said blocks being at one side of a line connecting said retaining devices, said blocks being reversible in respect to their supports to adjust the positions of said roll-shafts, whereby said rolls may be adjusted and held subject to the same elastic pressure in each of their adjusted positions, substantially as described.

8. A cotton-harvester having two longitudinally-disposed cotton-picking rolls, stripping-brushes lying parallel to and engaging said rolls, bearing-supports and bearings for said rolls, and brushes permitting lateral movement of the same at one end, said brush-bearings being provided with collars engaging the bearing-supports, said collars having their apertures enlarged adjacent to each end, and adjusting-screws, substantially as described.

9. A cotton-harvester provided with cotton-picking rolls consisting of cylinders having flanged ring-sections engaging the same, said flanges forming raised surfaces, and teeth secured in the recesses formed by said raised surfaces, the points of said teeth standing slightly above said raised surfaces, but lying in a plane below the plane of the backs of said teeth, substantially as described.

10. A cotton-harvester having a cotton-picking roll consisting of a cylinder provided with a series of flanged rings having the longitudinally-extending webs, said flanges and webs forming a surface composed of raised and recessed portions, and teeth located in said recesses, substantially as described.

11. A cotton-harvester having two longitudinally-disposed cotton-picking rolls and a series of revolving sweeps provided with cotton-picking devices for reeling the plants into the space between said rolls and gathering cotton from said plant, substantially as described.

12. A cotton-harvester having two longitudinally-disposed cotton-picking rolls provided with teeth, a series of revolving sweeps, provided with cotton-picking devices, and cotton-stripping devices for said sweeps, substantially as described.

13. A cotton-harvester having two longitudinally-disposed cotton-picking rolls, a series of revolving sweeps located adjacent to the forward end of each of said rolls and provided with cotton-picking devices, and cam-guides in engagement with said sweeps, substantially as described.

14. In a cotton-harvester, the combination, with the longitudinally-disposed cotton-picking rolls and the stripping-brushes lying parallel thereto, of a series of revolving sweeps provided with cotton-picking devices, stripping-brushes for said sweeps, and cotton-receptacles for receiving cotton from the said stripping-brushes, substantially as described.

15. In a cotton-harvester, the combination, with the longitudinally-disposed cotton-picking rolls, of a series of revolving hinged sweeps provided with segmental portions having cotton-picking devices on both sides of the same, cam-guides for raising and depressing said sweeps, and stripping-brushes for engaging both sides of the segmental portions of said sweeps, substantially as described.

16. A cotton-harvester having an arched frame provided with vertically-disposed standards, sleeves mounted upon said standards, bearings supported by said sleeves, a pair of longitudinally-disposed cotton-picking rolls mounted in said bearings, and means for adjusting said sleeves on said standards, substantially as described.

17. A cotton-harvester having a series of sweeps provided with cotton-picking devices secured to a support adapted to be revolved about an axis, said sweeps being pivoted to said support and capable of movement on their pivots longitudinally of said axis, and inclined guides engaging said sweeps, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD L. BAKER.
RICHARD EMERSON.

Witnesses:
J. R. DYER,
E. BURBECK.