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D. RAWL.

COTTON PICKER.

No. 574,218. Patented Dec. 29, 1896.

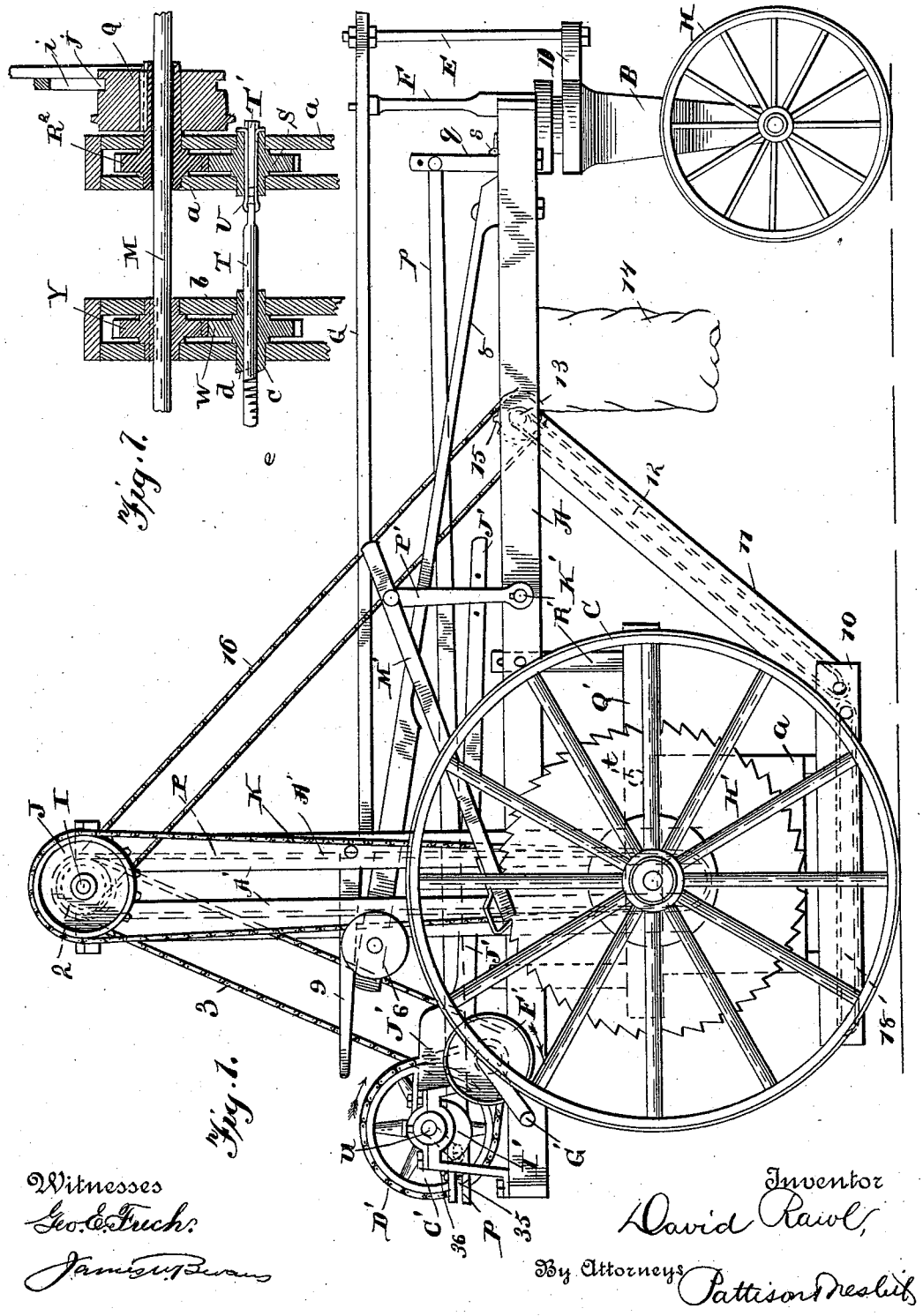

Fig. 1.

Fig. 1.

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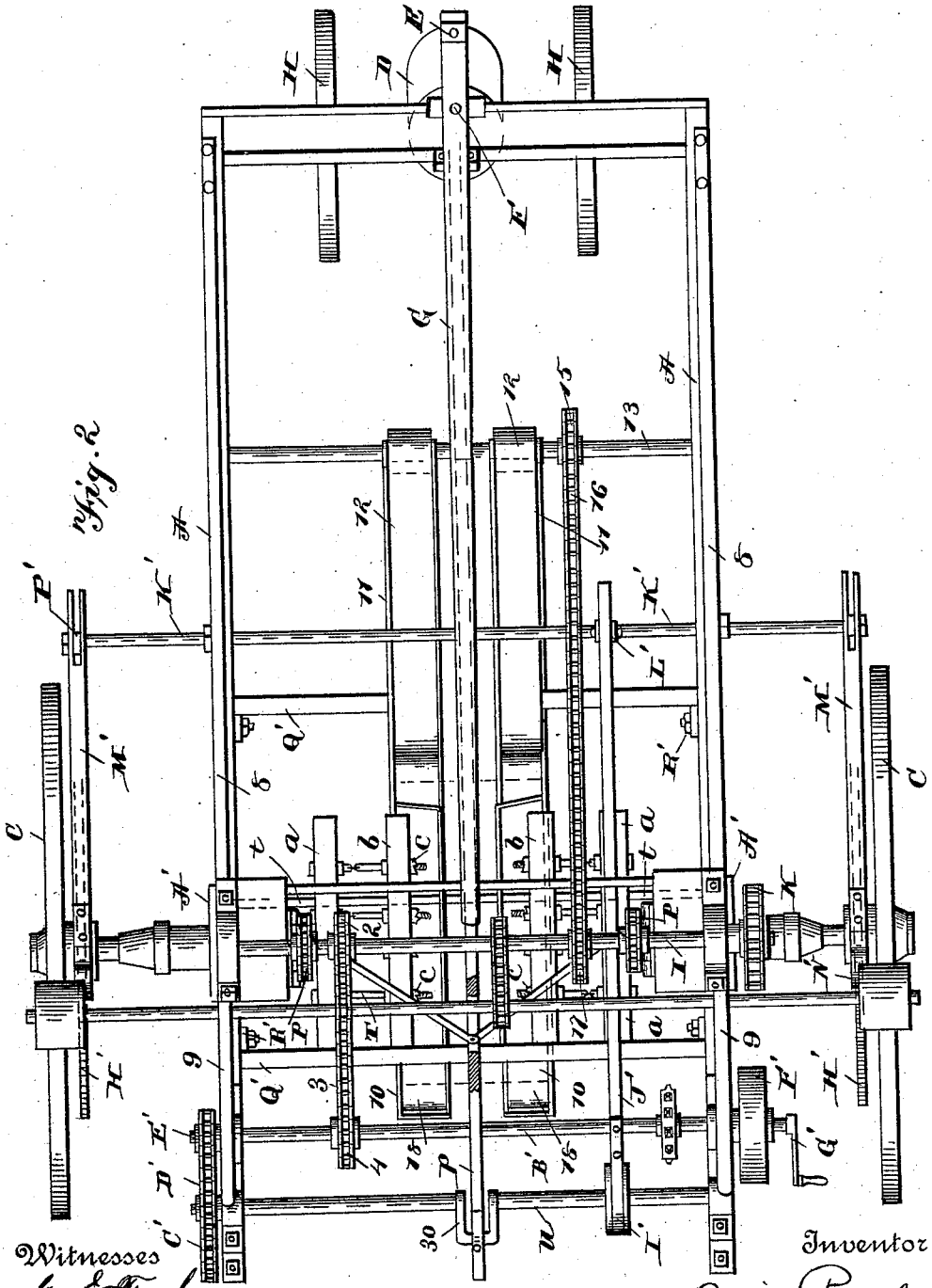

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(No Model.) 5 Sheets—Sheet 3.

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COTTON PICKER.

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Fig. 3.

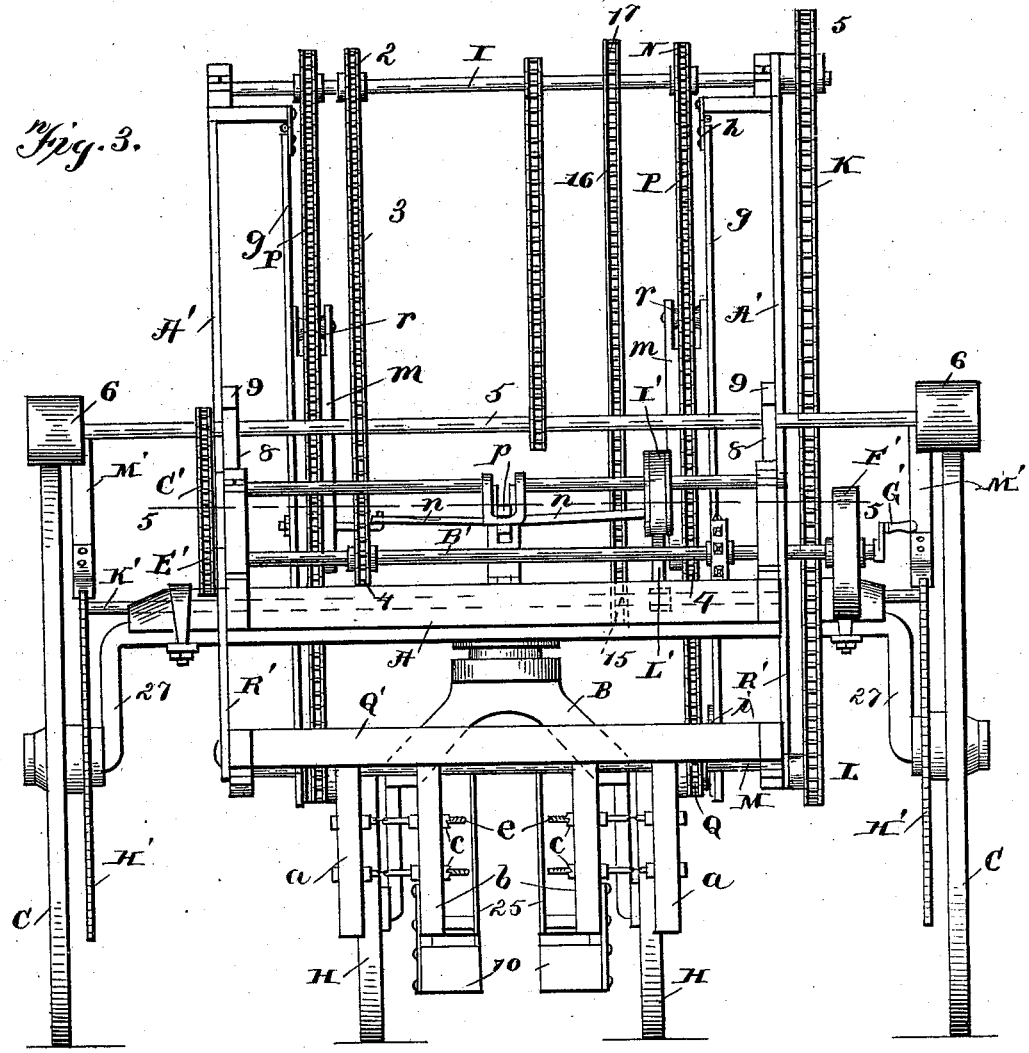
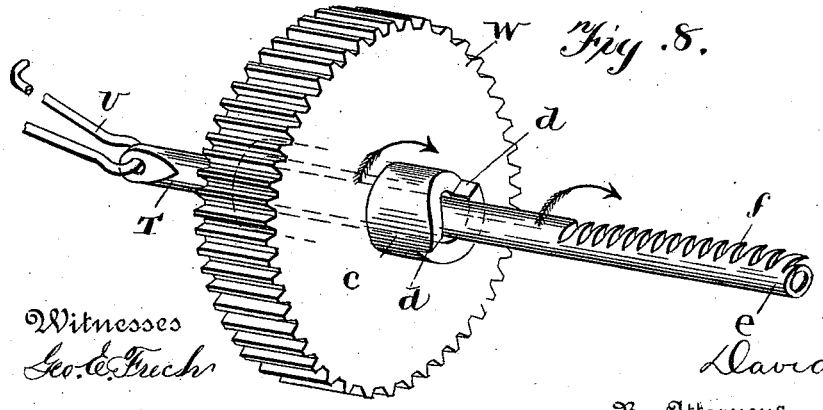


Fig. 8.



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(No Model.) 5 Sheets—Sheet 4.

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COTTON PICKER.

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Fig. 4.

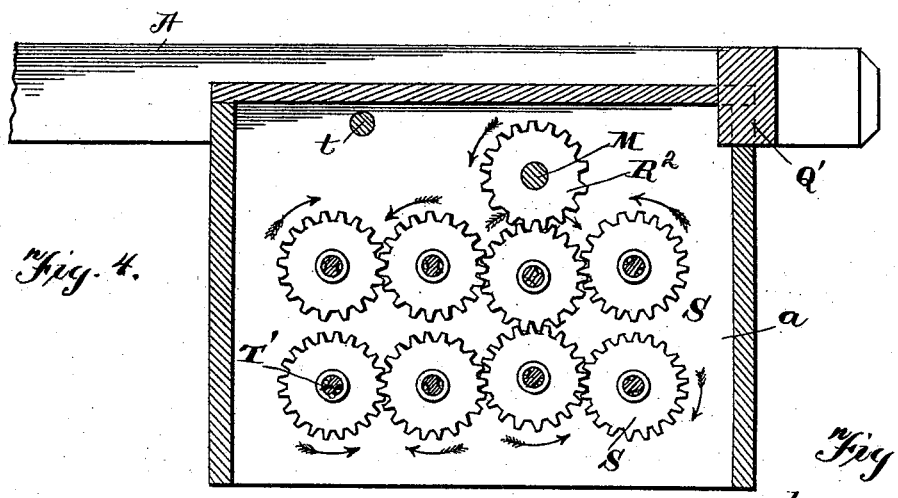


Fig. 6.

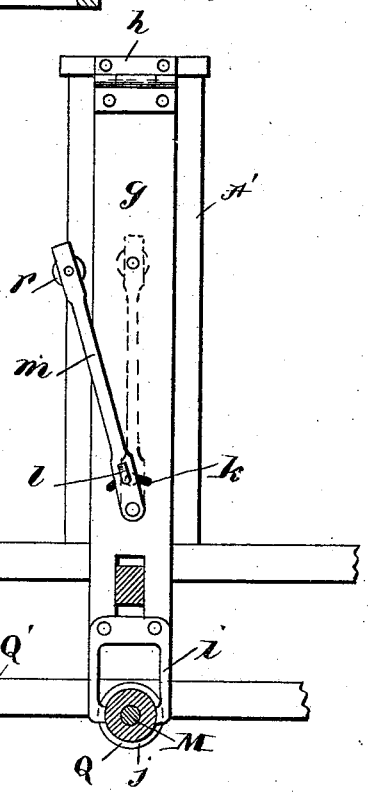
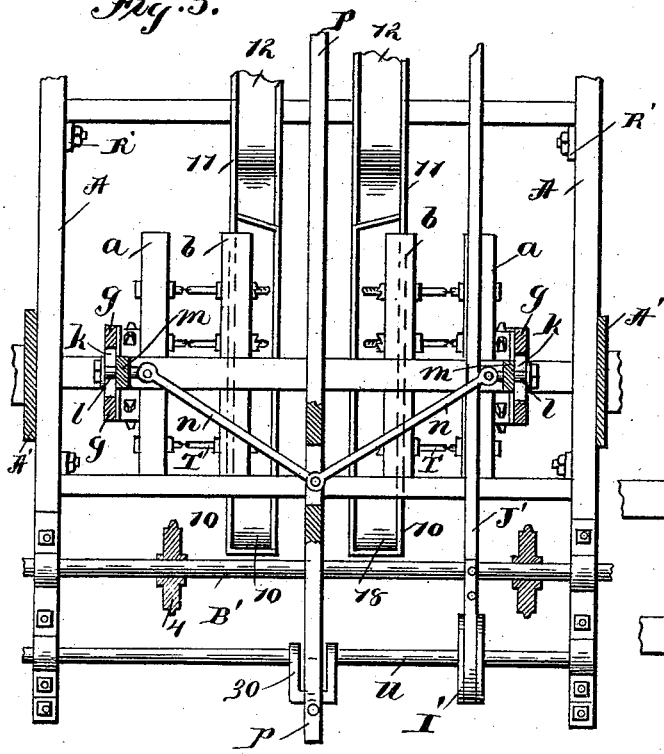


Fig. 5.



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(No Model.) 5 Sheets—Sheet 5.

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COTTON PICKER.

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Fig. 9.

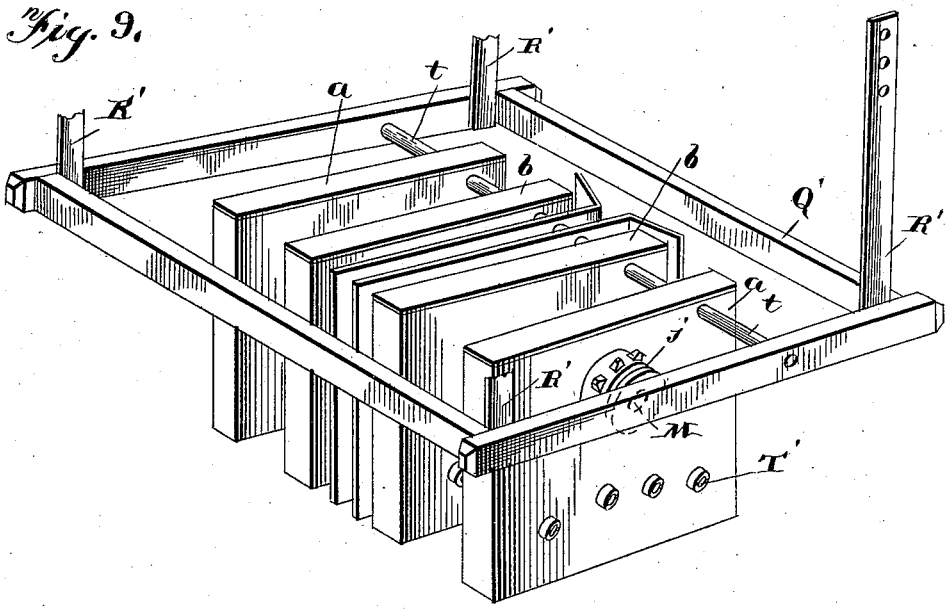


Fig 10.

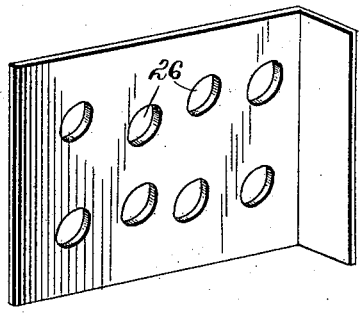
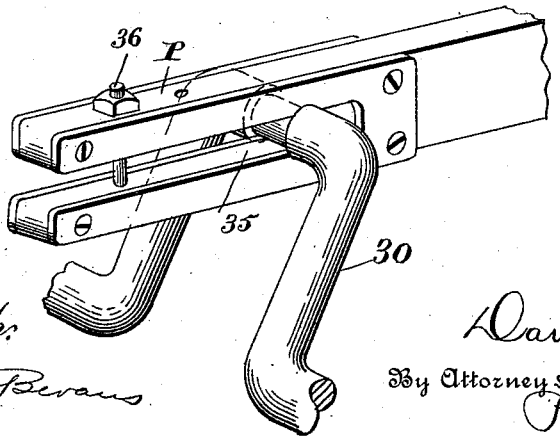


Fig. 11.



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UNITED STATES PATENT OFFICE.

DAVID RAWL, OF BATESBURG, SOUTH CAROLINA.

COTTON-PICKER.

SPECIFICATION forming part of Letters Patent No. 574,218, dated December 29, 1896.

Application filed January 31, 1896. Serial No. 577,596. (No model.)

To all whom it may concern:

Be it known that I, DAVID RAWL, of Batesburg, in the county of Lexington and State of South Carolina, have invented certain new and useful Improvements in Cotton-Pickers; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in cotton-pickers, and it pertains to that class of pickers having a series of revolving spindles which are thrust into the cotton for gathering it and then withdrawn therefrom, the cotton to be then removed from the spindles and conveyed to a suitable receptacle or receptacles.

In the accompanying drawings, Figure 1 is a side elevation of a cotton-picker embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a rear elevation of the same. Fig. 4 is an interior view of the movable box carrying the gears for rotating and thrusting the gathering-spindles. Fig. 5 is a detailed plan structural view taken on the dotted line 5 5, Fig. 3, and showing particularly the devices for thrusting the spindles in and withdrawing them from the cotton-plants. Fig. 6 is an enlarged detailed view of one of the swinging arms carrying a yoke which effects the thrust of the spindles, looking at the same from the inner side. Fig. 7 is an enlarged detailed sectional view taken transversely through the upper end of the spindles and cleaning-gear boxes. Fig. 8 is an enlarged detached perspective view of the gathering-spindles shown in connection with one of the cleaning-gears. Fig. 9 is a detached perspective view of the frame which carries the picking mechanism, the boxes carrying said mechanism being shown in position thereon. Fig. 10 is a detached perspective view of one of the cotton retaining or cleaning plates. Fig. 11 is a detached view of the outer end of the pitman which actuates the thrusting mechanism of the spindles.

Referring to the drawings, A indicates the rectangular frame, the main and supporting frame of the vehicle portion of the picker. This frame is supported upon the wheels C through the medium of an upwardly-bent axle 27, by means of which small supporting-wheels may be used and yet afford ample room for the picking mechanism beneath it. Extending upward in a line over the axle 27 are the standards A′. These standards A′ are carried by the main frame and disconnected from the picker-carrying frame Q, so that the picker-frame may be adjusted to adapt it for rows of cotton-plants of different heights without affecting the said standards.

B′ is the driving-shaft of the machine, situated upon the main frame A in rear of the supporting-axle. In rear of this driving-shaft B′ is a shaft *u*, extending parallel therewith, both of said shafts extending transverse the main frame. The driving-shaft B′ is provided with a handle G′, by which it may be rotated, and with a band or sprocket wheel F′ or with a crank adapted to be connected with any desired motor, such as gas or steam or electric, placed in a suitable position upon the frame. I prefer to drive the entire machine by an engine of some character, but which forms no part of my present invention and need not therefore be either shown or described in this connection, it being understood that any compact form of motor could be adapted for use in connection with my machine.

The shaft *u* is driven from the shaft B′ through the medium of a sprocket-chain D′, passing around a sprocket-wheel E′ upon the shaft B′ and around a large sprocket-wheel C′ upon the shaft *u*.

Situated at the upper end of the standards A′ is a shaft I, extending transverse the machine, and this shaft is driven from the driving-shaft B′ through the medium of a sprocket-chain 3, passing around the sprocket-wheel 2 upon the shaft I and around the sprocket-wheel 4 of the shaft B′, as clearly shown. This shaft I drives the gathering-spindles and the cleaning-gears, as will appear farther on.

The picker-frame Q′ is suspended upon the supporting-bars R′, which have their upper ends provided with a series of openings and bolted to the main frame A, and through the medium of these series of openings the picker-frame is capable of vertical adjustment, as will readily be understood, to adapt the gathering-spindles supported by the picker-frame to plants of varying heights. Extend-

ing across this picker-frame is a driving-shaft M, having at one of its projecting ends a sprocket-wheel L, around which a driving sprocket-chain K passes, the said chain passing also around a sprocket-wheel J upon a correspondingly-projecting end of the upper shaft I. Suitably supported in fixed positions upon the picker-carrying frame Q′ are the boxes *b*, which carry the cleaning-gears W. These gears are provided with hubs journaled in the boxes, as shown clearly in Fig. 7, their inner ends or hubs *c* projecting beyond the boxes and provided with notches forming shoulders *d*, which, as will be described farther on, cause the cotton to be removed from the gathering-spindles *e*. These cleaning-gears W are driven through the medium of the gears Y, which are rigidly attached to the driving-shaft M. The hubs of these cleaning-gears W are hollow, and the gathering-spindles *e* pass loosely through them to be reciprocated back and forth therethrough, the spindles being connected with the spindle-actuating gears S, carried by the reciprocating boxes *a*, situated at points outside of the boxes *b* and extending parallel therewith. The spindles are preferably flexibly connected with their driving-gears S, as shown clearly in Figs. 7 and 8, through the medium of a doubled wire U, having its ends bent laterally to engage notches formed in the outer ends of the driving-gears, the said U-shaped connections passing through the driving-gears and the wedge T′ forced therein to spread the connection and make it tight within the gears, as will be readily understood.

The spindle-driving gears S are driven through the medium of the gears R^2, which have outwardly-extending collars or hubs secured or keyed within sprocket-wheels Q. These sprocket-wheels are thus firmly connected with the driving-gears R^2, and the sprocket-gears Q are provided with grooves *j* to receive the yokes *i* upon the lower ends of the swinging arms *g*. The driving-shaft M passes loosely through the driving-gears R^2, and the reciprocating boxes *a* are supported upon this driving-shaft and the transversely-extending shaft *t*. (Clearly shown in Fig. 9.) The upper end of the swinging arms *g* are connected by means of a hinge or equivalent connection *h* to the upper ends of the standards A′, and these swinging arms are moved back and forth in a line transverse the machine in a manner to be described farther on. The sprocket Q is driven through the medium of a sprocket-chain P, passing around a sprocket-wheel N upon the shaft I.

Attention is called at this point to the fact that the sprocket J, which drives the shaft M for driving the cleaning-gears W in a manner before described, is about twice the circumference of the sprocket N, so that the cleaning-gears W are driven in the same direction as the gathering-spindles *e*, but about twice as rapidly.

The gathering-spindles *e* are formed with forwardly and outwardly projecting teeth *f*, and the teeth are formed upon the spindles in slightly spiral form. The reciprocating spindle-gear boxes *a* are operated through the medium of a pitman *p*, which is actuated by means of a crank formed upon the shaft *u*. The pitman *p* has its forward end supported by a hinge arm or bracket *q* and is connected near its rear end to the swinging arms *g* through the medium of the link *n*. (Clearly shown in Fig. 5.) These links extend forward, as clearly shown, so that as the pitman reciprocates back and forth it causes the links to spread, which draws the swinging arms in and out, and the swinging arms carrying the yokes *i* upon their lower ends, engaging the groove *j* in the sprocket Q, it moves the boxes *a* back and forth uniformly, as will be readily understood, for the purpose of thrusting the spindles through the cleaning-gears W into the cotton-plants, while at the same time the spindles are revolving and gather the cotton, and then to withdraw them therefrom.

Cleaning or retaining plates 25, as clearly shown in Fig. 10, are situated just inside of the boxes B, which carry the cleaning-spindles, and these cleaning or retaining plates are provided with a series of openings 26 corresponding to the number of spindles, and the spindles as they are being thrust out and drawn in pass through these openings 26.

The movement of the spindles inward into the cotton and gathering the cotton while they are revolving, and then as they are withdrawn therefrom they pass through the collars *c*, and the shoulders upon these collars cause a continuous cam motion upon the cotton, tending to force it outward, the cam being about equal to the inclination of the gathering-teeth *f*. In addition to this the cleaning-gears are revolving about twice as rapidly as the gathering-spindles, and this causes the rotation of the cotton upon the spindles faster than the rotation of the spindle which carries it, and it is found that this motion very effectually releases the cotton from the teeth *f* and forces it outward, it being prevented from passing beyond the cleaning-plates 25 and then dropped downward into the receptacles 10, situated at a point directly below the space between the plates and the boxes *b*. The cotton being removed from the spindles as they pass into the cleaning-collars *c*, it drops down into the boxes, as will be readily understood, being held between the retaining-plates and the boxes and falls upon a carrier-belt 18, from which it is transmitted to a carrier-belt 12, situated in the inclined trough 11, and thence carried upward into the bags 14, placed to receive it. The carrier mechanism is driven through the medium of the shaft 13, extending transverse the forward portion of the machine, around which the belts 12 pass, as clearly shown in Fig. 2, and this shaft is driven through the medium of a chain 16, passing around a sprocket 17 upon the shaft I.

The chains p, which drive the gears Q, are held under proper tension, should they become loose through the adjustment of the machine, by means of the arms m, carrying rollers r at their upper ends, which engage the chains, as clearly shown in Figs. 3 and 6, the adjustment of these arms m being effected through the medium of a bolt l, which passes through them and through a curved slot k in the swinging arms g, and this same bolt serves to unite the outer ends of the links n to this swinging arm g for effecting the inward and outward movement of the boxes a, before fully described.

The back-and-forth horizontal adjustment of the arms m serve to regulate the throw of the boxes by moving the outer ends of the links n nearer to or farther from the inner pivoted ends, thus causing them to be straightened more or less by the pitman p.

One of the important features of my invention is that the machine remains still while the gathering-spindles are being thrust into the cotton-plant, and then when withdrawn within the retaining-plates 25 the machine is automatically moved forward a short distance before they are again thrust into the cotton-plant. This movement is effected through the medium of the ratchet-wheels H′, firmly attached to the supporting-wheels C. Pawls M′ have their forward ends pivotally connected to crank-arms P′. connected firmly to a transversely-extending shaft K′. The opposite ends of these pawls M′ are provided with dogs N′, adapted to engage the ratchet-wheels H′. The shaft K′ is reciprocated through the medium of a pitman J′, having its forward end connected to a crank-arm L′ of the shaft K′ and its rear end connected with an eccentric I′, carried upon the shaft Q′.

By reference to Fig. 3 it will be seen that the eccentricity of the eccentric I′ corresponds or extends in the same direction as the crank 30, which actuates the pitman p. Owing to this corresponding direction of the crank 30 and the eccentric I′ they move in unison, as will be readily understood, so that the pitmen J′ and p are moved forward simultaneously. The forward movement of the pitman p, as before described, causes the withdrawal of the gathering-spindles from the cotton-plant, and the forward thrust or movement of the pitman J′ causes a forward movement upon the pawls M′, and thereby through the dogs carried upon the rear ends of the said levers effects a forward movement upon the ratchet-wheels after the gathering-spindles have been withdrawn from the cotton-plant, thus moving the machine forward a short distance ready to cause the thrust of the gathering-spindles into an ungathered portion of the row. By having the machine quiet while the gathering operation is performed the bruising of the green cotton-pods is prevented, so that the forward movement of the machine is not effected until the gathering-spindles are withdrawn from the plant.

Another important feature of my invention is in causing the gathering-spindles after being thrust within the plants to remain there sufficiently long before being withdrawn to fill themselves with the gathered cotton. This is effected through the providing of the rear end of the pitman p with a slot 35, so that the crank 30 after it has thrust the gathering-spindles into the plants by its rearward movement, and in the continuation of its rotation it moves forward in the slot 35 without any forward movement of the pitman p, as will be readily understood, thus leaving the gathering-spindles in the cotton-plants sufficiently long to fill themselves with cotton before the crank 30 engages the forward end of the slot 35 to withdraw them therefrom. It will be readily understood that such a mechanism as this is very effectual and important in cotton-pickers.

Extending transverse the machine and supported upon spring-arms H is a shaft 5 in rear of the standards A′ and carrying at each end friction-wheels 6, normally resting over the peripheries of the supporting-wheels C. The shaft 5 is operated through the medium of a chain or belt passing around the sprocket thereon and upon the shaft I, as clearly shown in Fig. 3, and the friction-wheels 6 are caused to engage the peripheries of the supporting-wheels C by the downward pressure of the arms 9, which extend rearward within reach of a person walking behind the machine, or upon a seat situated in a convenient position for the operation thereof, the driving-chain being sufficiently slack to permit downward movement of the shaft 5. The function of these devices is to enable the steering of the machine while it is passing along the row by the pressure of either one of the friction-wheels upon the proper wheel to straighten the movement of the machine, but more especially for the purpose of driving the machine continuously and for turning it around at the end of the row.

The steering of the machine is also effected through the medium of a lever G, intermediately pivoted upon the forward end of a standard F of the machine, the extending end of this lever G engaging a rod D, extending upward rigidly from the forward projection of the forward truck B, which truck carries the forward supporting and steering wheels H. This forward truck is capable of being turned upon its central axis, and by the manipulation of the rear end of the rod G the direction of the machine is under the control of the operator, as will be readily understood.

The gathering-spindles e are formed by flattening one end of the spindle, cutting in one edge of the flattened portion the serrations f, and then rolling it around, forming a tube of the gathering end, as clearly shown in Fig.

8, the overlapping toothed edge extending beyond the surface of the hollow portion.

From the above description it will be seen that I have produced, through the combinations fully described and shown, a machine capable of automatically gathering cotton from one part of the row, withdrawing the gathering mechanism from the plants, and automatically moving to an ungathered portion of the row to have the operation automatically repeated. However, I do not limit myself to the automatic arrangement, for the movement of the machine might be effected in other ways independent of the gathering mechanism and at the proper time.

I here describe carrying-belts for the purpose of receiving and elevating the gathered cotton into the bags; but it is only shown as one means of disposing of the cotton, in that a suction or other mechanism may be used for delivering the gathered cotton to any desired point upon the machine without affecting in any manner my invention, which does not pertain to any particular conveying device.

The length of time the gathering-spindles remain in the cotton-plants can be regulated by the lengthening or shortening of the slot 35 in the lever *p* through the medium of the adjustable bolt 36 or other mechanical equivalent.

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

1. In a cotton-picker, the combination with a thrust picking mechanism adapted to enter the plants, of a propelling mechanism therefor and an intermittently-operated mechanism for propelling the picker when the cotton-picking mechanism has been withdrawn from the plants.

2. In a cotton-picker, the combination of the supporting and driving wheels carrying ratchet-wheels, a thrust picking mechanism and means for driving the same, and a reciprocating device driven by the thrust mechanism to engage the ratchet of the wheels when the thrust mechanism has withdrawn the picking devices from the cotton, the parts combined to operate as described.

3. A picking mechanism, comprising a stationary frame carrying a series of rotating cleaning devices, a movable frame carrying a series of rotating gathering devices passing through the cleaning devices, a driving-shaft extending through the frames, the driving-shaft carrying a rigid pinion meshing with the rotating cleaning devices, and a gear situated loosely upon the driving-shaft and carried by the movable frames, said gear meshing with and driving the gathering devices, substantially as described.

4. In a cotton-picker, the combination of a thrust gathering mechanism, an intermittent actuating mechanism for the vehicle, a driving mechanism common to the thrust mechanism and the vehicle-driving mechanism, and reciprocating devices actuated by the driving mechanism, said reciprocating mechanism operating alternately and connected respectively with the thrust and vehicle-driving mechanisms, the same adapted to operate as described.

5. In a cotton-picker, the combination with a thrust gathering mechanism, of a driving mechanism including a crank, and a pitman having one end adapted to operate the thrust gathering mechanism, the opposite end of the pitman provided with an elongated slot through which the crank passes, for the purpose of permitting the thrust gathering mechanism to remain in the cotton for a predetermined time regulated by the length of the slot, substantially as described.

6. In a cotton-picking machine, the combination of a thrust gathering mechanism, a driving mechanism including a crank, a pitman actuating the thrust gathering mechanism, said pitman provided with an elongated slot receiving the said crank, and an adjustable means projecting within the said pitman-slot whereby its length is adapted to be regulated for the purpose of regulating the time the thrust mechanism shall remain in the cotton, substantially as described.

7. A cotton-picking mechanism comprising a stationary frame carrying a series of rotating hollow cleaning devices, a movable frame carrying a series of rotating gears, a series of spindles projecting through the hollow rotating cleaning devices, the spindles being flexibly connected with the gears on the movable frame, whereby binding of the spindles in the rotating cleaning devices is prevented, substantially as described.

8. A combined gathering and cleaning device comprising a hollow rotatable cleaning device having cams constructed to engage and force the cotton outward, and a spindle projecting through the said hollow cleaning device and provided with a spiral serrated flange, substantially as shown.

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

DAVID RAWL.

Witnesses:
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D. O. HOLSTON.