

Mar. 20, 1923.

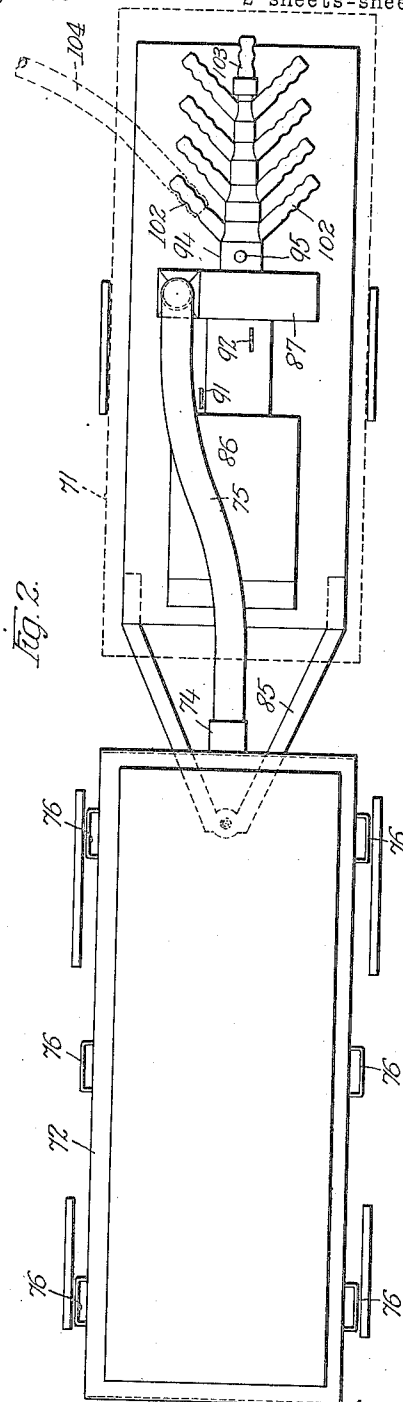
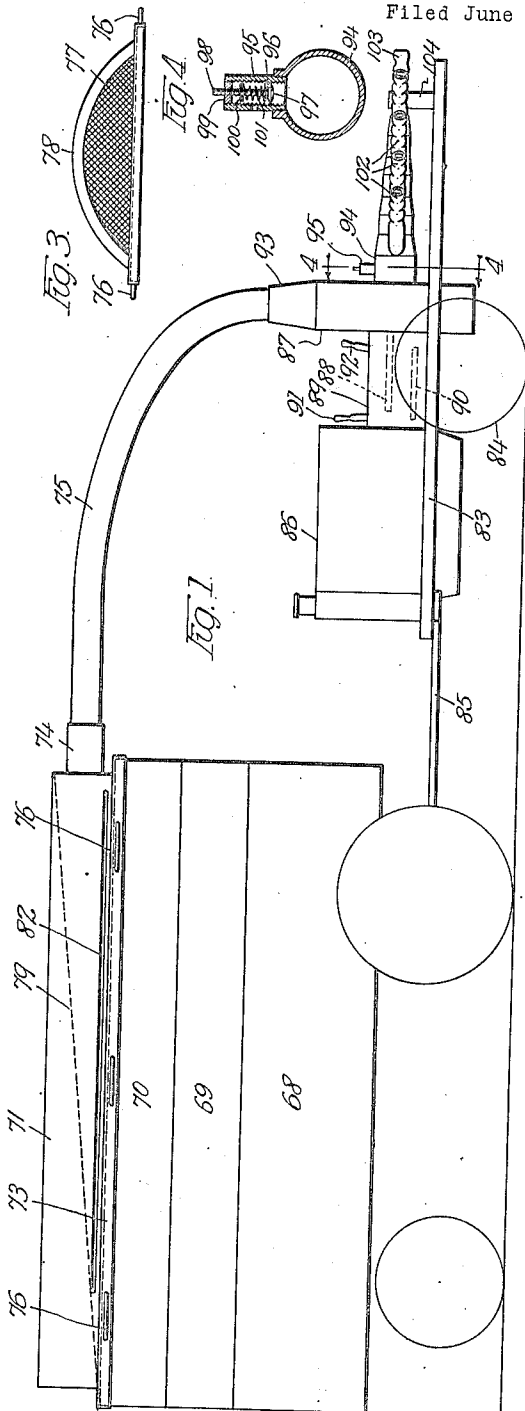
J. H. McELROY

1,448,930

METHOD OF AND APPARATUS FOR PICKING COTTON

Filed June 3, 1920

2 sheets-sheet 1



Inventor:
John Howard McElroy

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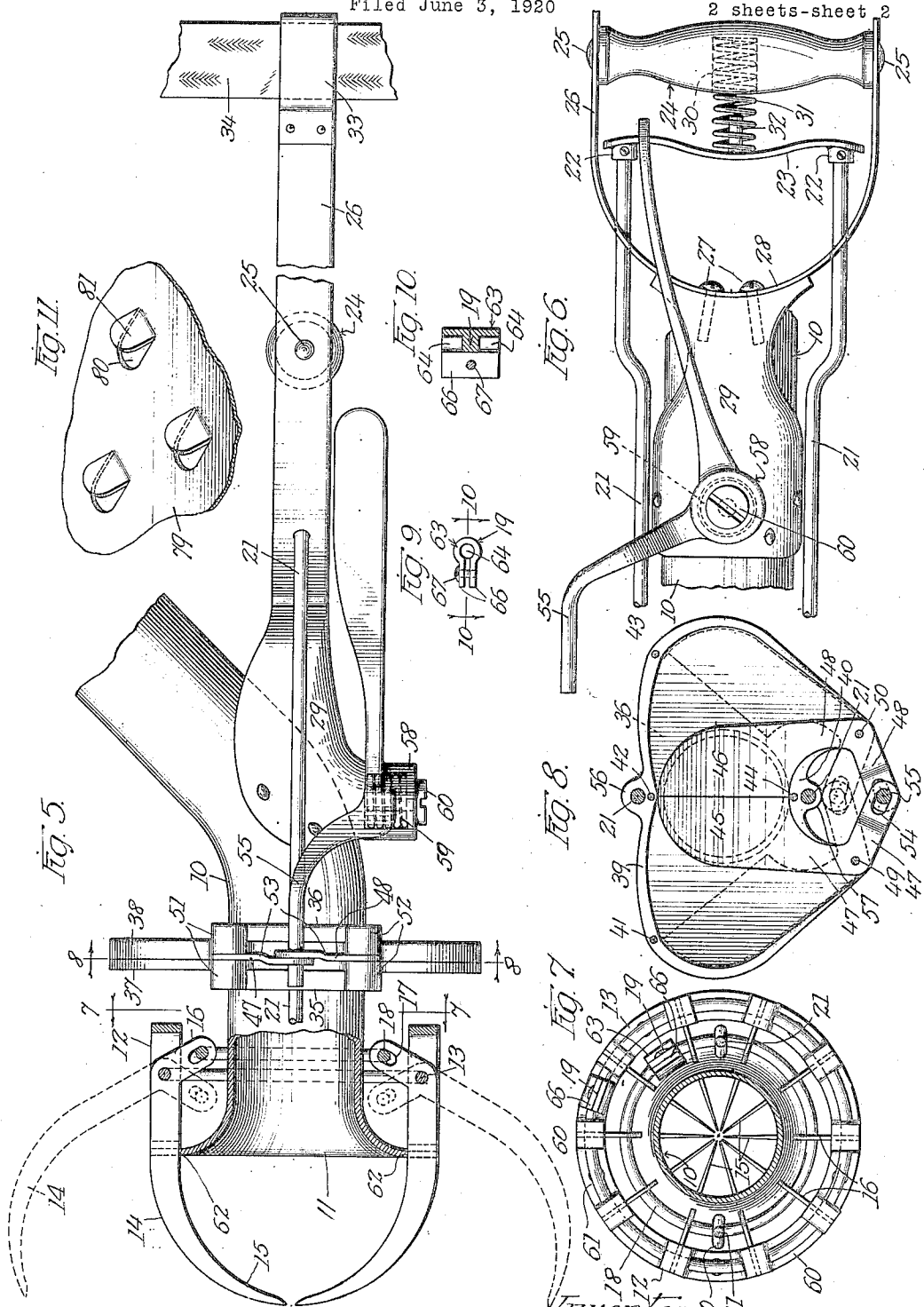
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Inventor: John Howard McElroy

Patented Mar. 20, 1923.

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UNITED STATES PATENT OFFICE.

JOHN HOWARD McELROY, OF CHICAGO, ILLINOIS.

METHOD OF AND APPARATUS FOR PICKING COTTON.

Application filed June 3, 1920. Serial No. 386,157.

To all whom it may concern:

Be it known that I, JOHN HOWARD McELROY, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Method of and Apparatus for Picking Cotton, of which the following is a full, clear, and exact specification.

My invention is concerned with apparatus for picking cotton, and is designed primarily to produce a picking nozzle and valve mechanism therefor that can be operated by a novel method satisfactorily to pick cotton under a much wider range of conditions than any other apparatus with which I am acquainted.

To this end it consists primarily in the employment of a plurality of knives preferably so associated with the picking nozzle that they ordinarily stand in an open position which does not interfere with the nozzle being applied to the boll after which they may be closed by an inward radial movement so as to bring their points substantially together at the base of the boll, enclosing it in a basket, as it were, the inner surface of which is formed by the sharp edges of the knives. Then, by a movement of the nozzle away from the plant, the knives slice through the hull and draw the cotton out without any of the hull, since the sharp edges of the knives will slice through the hull but will not cut the cotton.

My invention is further concerned with a valve mechanism for controlling the air that can be operated in any position of the knives, so that the cotton may be picked entirely by suction without any use of the knives if it is dead ripe, and can be easily detached, or the cotton can be entirely removed from the boll by a pulling action before the air is applied so as to prevent any of the boll being drawn in with the fiber and seeds.

My invention is further concerned with a specific form of valve mechanism which is peculiarly adapted for use in cotton pickers.

My invention is further concerned with pneumatic cotton pickers generally, and has among different objects that of providing a cover mechanism adapted to be combined with such a picker and with any one of a number of wagons or other vehicles employed in picking a field so that as one

wagon is being filled by the picker, the others may be employed to haul the cotton to the gin, and which, when emptied, are returned to the field and have the cover applied and the picker attached so that they can be filled serially.

It is finally concerned with a novel picker outfit that can be attached to the rear of a wagon or other vehicle and be drawn thereby while a portion of the field is being picked and the wagon filled thereby, and when one wagon is filled it can be attached to an empty wagon returned from the gin, and so on.

To illustrate my invention, I annex hereto two sheets of drawings in which the same reference characters are used to designate identical parts in all the figures of which—

Fig. 1 is a side elevation somewhat diagrammatic of a wagon having my novel cover applied to the bed thereof and the picker attached to the rear thereof and drawn thereby;

Fig. 2 is a top plan view of the parts shown in Fig. 1;

Fig. 3 is an elevation of the front end of the cover showing a screened outlet;

Fig. 4 is a vertical section, on an enlarged scale on the line 4—4 of Fig. 1;

Fig. 5 is a view of a nozzle embodying one feature of my invention, with a portion of the end in central longitudinal section with the knives shown in their open position in full lines;

Fig. 6 is a view of a portion of the handle mechanism as seen from the under side of Fig. 5;

Figs. 7 and 8 are sections on the lines 7—7 and 8—8 respectively of Fig. 5;

Fig. 9 is an end elevation of a connecting clip employed in my invention;

Fig. 10 is a view of the same in section on the line 10—10 of Fig. 9; and

Fig. 11 is a perspective view of a portion of a section employed in the cover.

The basis of each picker is a rigid, but light, metal tube 10, as thin as practical consistent with its necessary strength. The nozzle end 11 is preferably flared, and is provided with a plurality of ears 12, in which are pivoted the knives 14 having thin cutting blades with their preferably concavely curved inner edges 15 sharpened so they will slice cleanly through any ordinary vegetable fiber, but not with a razor-like

edge that would cut the cotton fiber. The bell crank portion 16 of these knives have the slots 17 therein through which pass the ring 18 which preferably has the two slightly separated ends connected by a removable clip 19 shown in Figs. 9 and 10 so that the knives can be readily removed for sharpening, their pivots being formed by a similar ring 13 provided with a similar removable clip 19, so that when the clips are removed, the rings 13 and 18 can be turned so as to bring their separated ends to any knife which is to be removed. It will be understood that the ends of both of these rings 13 and 18 are separated a distance slightly greater than the thickness of the knives. The ring 18 also passes through the eyes 20 of a pair of rods 21 extending rearwardly along the tube 10 and secured at their ends in the lugs 22 formed at the ends of the movable handle grip member 23 which is normally held away from the stationary handle grip-piece 24 which is secured, as by the screws 25, between the sides of the yoke 26, which may be formed of a strip of metal bent into the shape shown and secured by the screws 27 in the curved seat 28 of the casting 29 which is riveted or otherwise secured to the tube 10 at the point where it curves so that the axis, so to speak, of the handle is a continuation of the axis of the nozzle. The grip 24 has a transverse recess 30 therein which receives one end of the helically coiled expanding spring 31, the other end of which is held in place by the stud 32 projecting rearwardly from the center of the grip member 23. It will be obvious that this spring 31 serves to hold the knives 14 in the open position shown in dotted lines in Fig. 5, but that when they are to be moved to the full line position of Fig. 5, all that is necessary is to pull the piece 23 toward the handle by the fingers of the hand grasping the handle 24. If it is desired to have some of the weight of the picker off of the hand so as not to tire the wrist, I may extend the strip 26 at both ends beyond the handle 24 to a point reaching well up on the forearm, where the ends will be turned back to form the loops 33 through which a leather strap and buckle 34 may be passed to hold the ends snugly on the forearm. It will be understood that the end of the tube 10 beyond the curve is attached to the customary flexible air tube leading to the casing of the exhaust fan which sucks the air through the tube, or to the vacuum receptacle if it be employed in that system. The nozzle is applied to the cotton boll with the knives opened, and if necessary, as will be herein explained, the knives are brought to the full line position ready to slice through the hull and pull out the cotton without the hull, even if the boll is unopened. This enables me to pick a field

speedily at greater intervals and still secure all the cotton with substantially none of the hulls, as if they are green the knife will slice through them, whereas if they are dried, the bolls are fully opened and the knives need not be closed.

While I might employ my above described nozzle with different sorts of valves for controlling the suction, I preferably employ the novel valve which I have shown in Figs. 5 and 8, and which is conveniently interposed in pipe 10 by making the latter in two pieces and securing it in the adjacent ends of the annular flanges 35 and 36 formed on the two casing pieces 37 and 38, which are of the same general design, except that the piece 38 is provided with the flanges 39 and 40 at the top and sides, and at the bottom respectively, through which flanges are passed the screws or rivets at 41, 42, 43 and 44 into the companion piece 37 to secure them together and still leave between them just enough space to accommodate the two valve sections or vanes 45 and 46, which are symmetrical, and are composed of sheet metal having the substantially semi-circular body portions with the bell crank extensions 47 and 48 by which they are pivoted at 49 and 50 between the pairs of registering ears 51 and 52 with which the pieces 37 and 38 are provided. The extensions 47 and 48 are each slightly offset, as seen at 53, and have the slots 54 therein through which extends the end of the lever 55 by which they are moved. In the full line position of Fig. 8, it will be seen that the straight edges of the fans 45 and 46 meet to close the valve, but when the lever 55 is moved to the dotted line position, they are thrown out, as seen, quickly opening the passage entirely free of any constriction, and are moved entirely out of the path of the cotton, so that as soon as it passes them they can be thrown back to their closed position by the spring to be described, and the passage closed, without the liability of any cotton being caught therein to interfere with their subsequent operation. The pieces 37 and 38 are preferably both provided with registering lugs 56 and 57 which have guiding apertures therein through which pass the rods 21. The lever 55 is of the shape clearly shown in Figs. 5 and 6, and has its operating end near the handle 24 so that by swinging the thumb of the hand grasping the handle downward, the lever can be swung from its full line position in which the valve is closed to the dotted line position in which it is fully open. To return the spring automatically to the closed position of the valve, I form a cup 58 at its fulcrum, and in the cup I place the helically coiled torsion spring 59 which has one end secured to the lever and the other end to the casting 29 on which it is pivoted by

the set-screw 60 so that the torsion of the spring 59 holds the lever yieldingly in the full line position. With this construction of the valve, it will be seen that it is held closed by the spring 59 and that it can be opened by the operator at any time irrespective of the position of the knives, so that the suction can be applied before or after they are closed, or without operating them at all.

It will be readily understood that my novel method of picking cotton, as herein-after defined by claim 1, might be carried out without any nozzle by having a plurality of properly shaped knives associated with the thumb and fingers of the hand so that the knives could be closed over the hull and then drawn away to slice through the boll and pull out the cotton, after which the hand would be opened to drop it.

As seen in Figs. 5 and 7, the lugs 12 are preferably made by a strip of metal bent so as to form the elongated slots between the adjacent parallel portions thereof which are separated by the thickness of the knife blade, while the ten lugs shown are connected by the curved portions 60 which are preferably secured by the rivets 61 to the rear of the periphery of the nozzle which is flared so that it extends substantially at right angles to the axis thereof. It will be understood that a recess 62 is cut in said periphery to accommodate each of the knives when they are moved to their closed position.

As seen in Figs. 9 and 10, the clips 19 may be considered as having the tubular central portion 63 with the aperture 64 of the diameter of the rings 13 and 18 bored therein, leaving a projection 65 separating them. Projecting from the body portion are the two separated extensions 66 which spring apart far enough so they may be passed over the ends of the rings until the latter are seated in the recesses 64. A screw 67 is passed through an aperture in one of the extensions 66 and threaded into an opposed aperture so that by tightening the screw 67, the clip is clamped on the rings to hold them closed and in position. When the knives are to be removed, the clips 19 are removed, and the rings 13 and 18 turned to bring the separated ends in register with the particular knife to be removed.

It will be understood that the foregoing features of my invention may be employed in connection with any desired mechanism or system for picking the cotton by suction, but I preferably employ them in connection with the outfit shown on Sheet 1, where 68 represents the bed of an ordinary wagon which can be moved by any power, and which when it is used to pick cotton will be provided with the side boards 69 and 70,

and upon the top side boards, I place the novel cover 71, which constitutes an important part of my invention. This cover is preferably formed of sheet metal, and consists of the comparatively narrow horizontal portion 72 having the flange 73 projecting downwardly from all four sides; the dimensions of the parts 72 being sufficient so that the cover will fit readily upon the top of the wagon bed or on the top of the side boards if they are used, and if it is desired to enclose the cotton in the bed in a net or cloth, such a net or cloth may be placed therein with its edges overlapping the top of the wagon bed or of the side boards. The central portion of the cover is preferably arched, as shown, and at one end, the rear end, when the picker trails the wagon, is the inlet nozzle 74, to which is secured the flexible pipe 75. As the cover has to be removed every time a wagon is filled, I provide it with the handles 76 on the sides thereof which can be engaged by forks or otherwise so that four or more of the pickers can readily lift the cover when it is to be moved from one wagon to another. At the opposite end from the inlet nozzle 74, I provide an outlet aperture 77, of much greater capacity than the inlet aperture, and this outlet aperture is preferably protected by a screen 78. Extending from above the inlet aperture 74 to the end of the cover beneath the outlet aperture 77 is a sheet of preferably flat metal 79, which is secured at its edges to the inside of the cover, and the portion of the cover above this sheet of metal 79 might be omitted, if desired. This sheet of metal 79 has struck up from its body numerous tongues forming perforations 80, as seen in Fig. 11, and the tongues 81 are preferably retained and are directed toward the inlet 74, so that the cotton which is blown into the inlet and against the under side of the metal sheet 79 by an action like that of a wind stacker, is thrown rearwardly and downwardly, filling the wagon bed, and the compressed air entering the wagon with the cotton is free to expand and escape through the apertures 80, which are plentiful enough so that the air can expand readily and has no tendency to carry the cotton with it through the apertures 80, the tongues of which extend in the direction that would tend to hold the cotton back if by any chance it could pass through one of the apertures 80. I preferably employ means for varying the pressure of the air delivering the cotton to the wagon bed, using the greatest pressure at the start so that the cotton will be thrown to the other end of the wagon and pile up filling that end, and the pressure may be reduced as it fills up until finally the wagon bed is entirely filled.

In order that the amount of cotton in the bed can be seen and the pressure regulated accordingly, I preferably place in the cover beneath the plate 79 a strip 82 of glass through which the cotton as it piles up to the top can be seen.

To furnish the suction, I preferably provide a truck 83 shown diagrammatically in Figs. 1 and 2, which preferably has only a pair of wheels 84, and has a tongue or forward extension 85 adapted to be connected to the rear end of the wagon running gears by a bolt and clevis so that the truck will trail after the wagon and stand substantially level on level ground. On the forward end of the truck I have placed a gas engine 86, which may be an ordinary automobile engine, and the truck will also carry a supply of fuel, not shown. To the rear of the engine 86, I secure upon the truck a fan casing 87 of the ordinary wind stacker construction and the shaft 88 of the fan will extend rearwardly toward the engine, it being in a gear casing 89 into which may extend the clutch member and driven shaft 90 of the engine, the two shafts being connected by the customary change speed gearing so that the speed of the fan can be regulated to a nicety. The apparatus will be provided with a clutch lever 91 to control the engine clutch and also with a gear shift lever 92 to control the speed of the fan.

The fan casing 87 has the customary outlet nozzle 93 to which the pipe 75 is fastened. The inlet of the fan casing, which preferably is concentric with the shaft 88, has the cylinder 94 connected therewith, which cylinder preferably contains the release valve mechanism shown in Fig. 4, where a vertical cylinder 95 is secured therein and has the valve seat 96 secured therein, with which co-operates the valve 97 having the preferably threaded valve stem 98 extending upward therefrom through an aperture in the guide disk 99, which may be threaded into the top of the cylinder 95. A nut 100 is screwed down on the valve stem to regulate the degree of exhaustion at which the valve 97 automatically opens, the valve being held normally closed by the helically coiled expanding spring 101 in the cylinder between the valve seat annulus 96 and the nut 100. The purpose of this valve is to open automatically when the vacuum gets beyond a certain degree, as is possible of occurrence in case picking should cease, or substantially so.

The cylinder 94 is, as seen in Figs. 1 and 2, tapered down by sections, and has preferably a pair of nipples 102 projecting therefrom at each reduction, and it terminates in a single nipple 103, which is preferably supported by the standard 104 from the bed of the truck. It will of course be understood

that the internal cross area of the cylinder at 94 is equal to the combined cross-sectional area of all nine of the nipples 102 and 103 illustrated, and that the cross-sectional area of the cylinder at any point will be equal to that of all of the nipples beyond it. Each of these nipples 102 and the nipple 103 is provided with a flexible hose 104^a of a sufficient length so that the pickers can work out on each side as far as seems desirable. These flexible hose are of course air-tight, and non-compressible under any suction to which they are subjected. Each of the hose will be provided with a nozzle, such as is shown in Figs. 5 to 7, although it will be understood that I might employ in connection with the apparatus shown in Figs. 1 and 2 a different nozzle from that shown in Figs. 5 and 7.

While I have shown and described my invention as embodied in the forms which I at present consider best adapted to carrying out its purpose, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a cotton picker, the combination with a nozzle, of a plurality of knives surrounding the end thereof, and means for moving said knives from their open position in which they do not obstruct the nozzle so it can be placed over the boll to their closed position in which they embrace the same, and vice versa.

2. In a cotton picker, the combination with a nozzle, of a plurality of knives pivoted adjacent the edge of the nozzle and surrounding the same, and means for swinging said knives radially from their open position in which they do not obstruct the nozzle so it can be placed over the boll to their closed position in which they embrace the same, and vice versa.

3. In a cotton picker, the combination with a nozzle, of a plurality of knives associated therewith, means for moving said knives from their open position in which they do not obstruct the nozzle so it can be placed over the boll to their closed position in which they embrace the same, and vice versa, and a valve for controlling the suction through the nozzle operable in any position of the knives.

4. In a cotton picker, the combination with a nozzle, of a plurality of boll opening members associated therewith, means for moving said members from their open position in which they do not obstruct the nozzle so it can be placed over a boll to their closed position in which they embrace the same, and vice versa, and a valve for controlling

the suction through the nozzle operable in any position of the boll opening members.

5. In a cotton picker, the combination with a nozzle, of a valve casing associated therewith, a pair of vanes pivoted in said casing and having body portions with their meeting edges each designed to close one-half of the passage, a spring for holding the valve closed, and a lever for quickly separating said vanes.

6. In an apparatus of the class described, the combination with a vehicle having a bed, of a cover for its bed having an inlet at one end thereof, a screened outlet of greater capacity than the inlet, a suction device, means for operating the same, cotton picking nozzles associated with the suction device, and a pipe connecting the discharge outlet of the suction device with the inlet of the wagon cover.

7. In an apparatus of the class described, the combination with a vehicle having a bed, of a cover for its bed having an inlet at one end thereof, a screened outlet of greater capacity than the inlet, said cover including a perforated screen plate extending the length of the bed, a suction device, means for operating the same, cotton picking nozzles associated with the suction device, and a pipe connecting the discharge outlet of the suction device with the inlet of the wagon cover.

8. In an apparatus of the class described, the combination with a vehicle having a bed, of a cover for its bed having an inlet at one end thereof, a screened outlet of greater capacity than the inlet, said cover including a perforated screen plate extending the length of the bed and having tongues struck therefrom extending upwardly and toward the inlet, a suction device, means for operating the same, cotton picking nozzles associated with the suction device, and a pipe connecting the discharge outlet of the suction device with the inlet of the wagon cover.

9. As a new and useful article of manufacture, a cover for vehicle beds resting on the top thereof and having an inlet pipe at one end and a screened outlet of greater capacity than the inlet.

10. As a new and useful article of manufacture, a cover for vehicle beds having an inlet pipe at one end and a screened outlet of greater capacity than the inlet, said cover including a perforated screen plate extending the length of the bed and having tongues struck therefrom extending upwardly and toward the inlet.

11. In a cotton picking apparatus, a screen plate beneath which the cotton is delivered having tongues struck up from the bottom thereof and extending upward and backward toward the inlet.

12. As a new and useful article of manufacture, a cover for vehicle beds resting on the top thereof and having an inlet pipe at

one end and a screened outlet of greater capacity than the inlet, with a plurality of handles at each side.

13. As a new and useful article of manufacture, a cover for vehicle beds having an inlet pipe at one end and a screened outlet of greater capacity than the inlet, with a narrow downwardly projecting flange on all four edges adapted to seat it firmly upon the top of a wagon bed.

14. As a new and useful article of manufacture, a cover for vehicle beds having an inlet pipe at one end and a screened outlet of greater capacity than the inlet, with a narrow downwardly projecting flange on all four edges adapted to seat it firmly upon the top of a wagon bed and having a plurality of handles at each side projecting outwardly from the flange.

15. In a cotton picking apparatus, the combination with a nozzle and a tube for the same, of a handle adapted to be gripped by one hand attached to the nozzle, and an extension from the handle adapted to be connected to the arm to take some of the weight off of the hand.

16. In a cotton picking apparatus, the combination with a nozzle, of picking fingers pivoted in the nozzle, a handle secured to the rear of the nozzle, a gripping member parallel to the handle, a spring interposed between the gripping member and the handle, and connections from the gripping member to the picking fingers for swinging the latter as the gripping member is pulled toward the handle.

17. In a cotton picking apparatus, the combination with a nozzle, of picking fingers pivoted in the nozzle, a handle secured to the rear of the nozzle, a gripping member parallel to the handle, a spring interposed between the gripping member and the handle, and connections from the gripping member to the picking fingers for swinging the latter as the gripping member is pulled toward the handle, said connections consisting of a pair of rigid rods connected to the gripping member and a ring connected to bell crank arms on each of the fingers.

18. In a cotton picking apparatus, the combination with a nozzle consisting of a tube having picking fingers pivoted at the outer end thereof and having the other end curved out of alignment, of a forked handle member secured to the curved part of the tube in alignment with the main axis thereof, a handle in the handle member, a gripping member parallel with the handle, a spring interposed between the gripping member and the handle, and connections from the gripping member to the picking fingers for swinging the latter as the gripping member is pulled toward the handle.

19. In a cotton picking apparatus, the

combination with a nozzle consisting of a tube having picking fingers pivoted at the outer end thereof and having the other end curved out of alignment, of a forked handle member secured to the curved part of the tube in alignment with the main axis thereof, a handle in the handle member, a gripping member parallel with the handle, a spring interposed between the gripping member and the handle, connections from the gripping member to the picking fingers for swinging the latter as the gripping member is pulled toward the handle, a valve member between the fingers and the handle, and a lever pivoted to the forked handle member for one end to operate the valve and the other end terminating near the gripping member for the purpose described.

20 20. In an apparatus of the class described, the combination with a nozzle, of a ring surrounding the nozzle, a plurality of knives fulcrumed on said ring, and a removable

section in the ring for removing the knives one by one.

21. In an apparatus of the class described, the combination with a nozzle, of a ring surrounding the nozzle, a plurality of knives fulcrumed on said ring, a second ring for swinging the knives passed through slots therein, and a removable section in each of the rings for removing the knives one by one.

22. In a cotton picker, the combination with a plurality of nozzles, of a hand operated valve in each nozzle, a suction device, a casing for the same, a tube connecting each of the nozzles with the suction device, and a release valve in or adjacent the casing which opens when the vacuum in the casing passes a certain degree.

In witness whereof, I have hereunto set my hand and affixed my seal, this 1st day of June, A. D. 1920.

JOHN HOWARD McELROY. [L. S.]