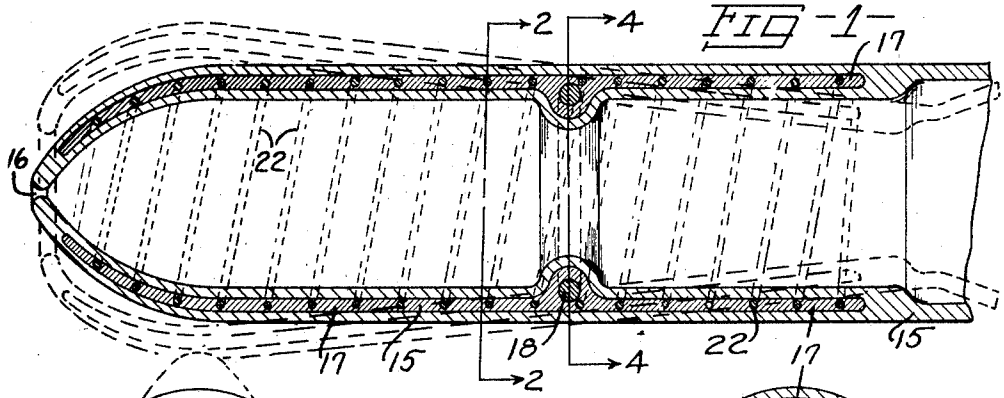
March 26, 1929. K. L. HERRMANN 1,707,010

APPARATUS FOR PICKING COTTON

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FIG-1-



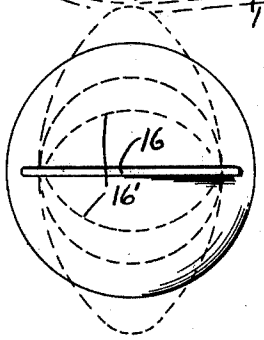


FIG-3-

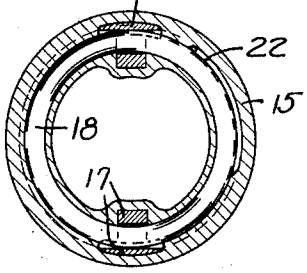


FIG-4-

FIG-2-

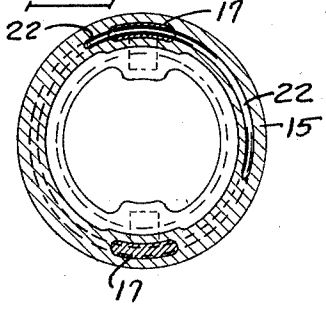
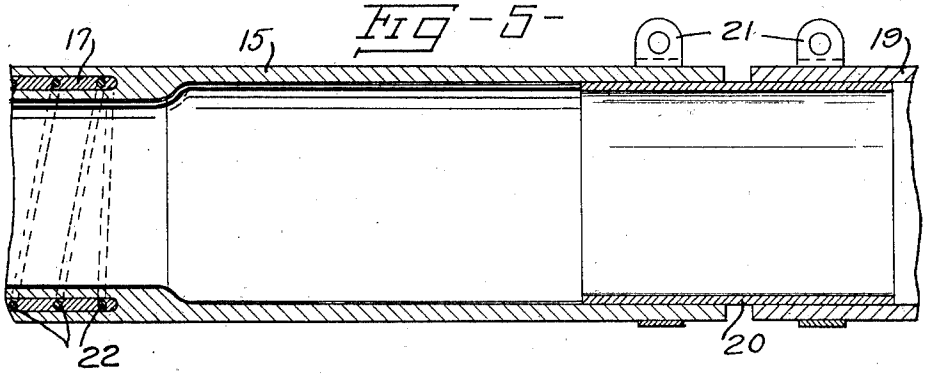


FIG-5-



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APPARATUS FOR PICKING COTTON

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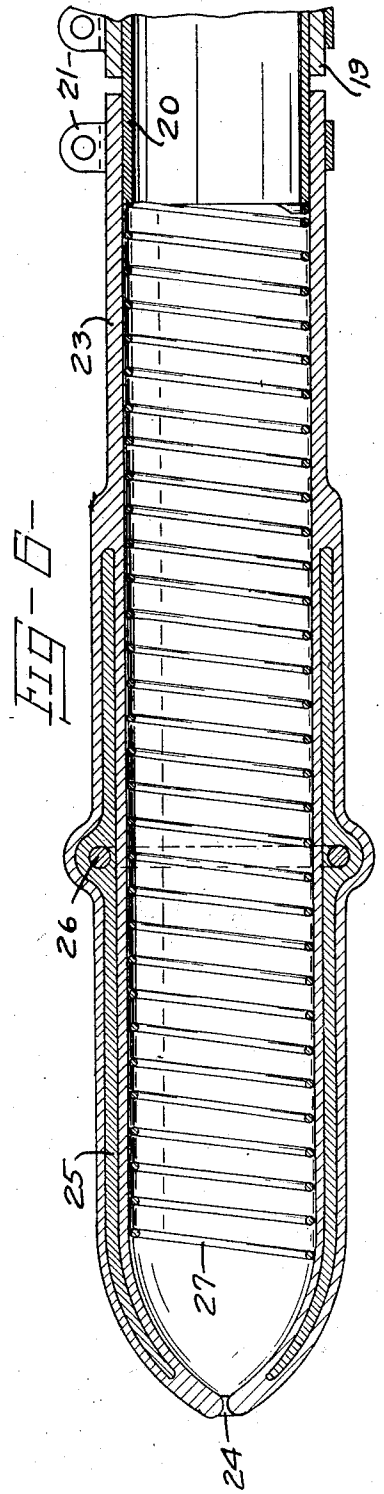


FIG-6-

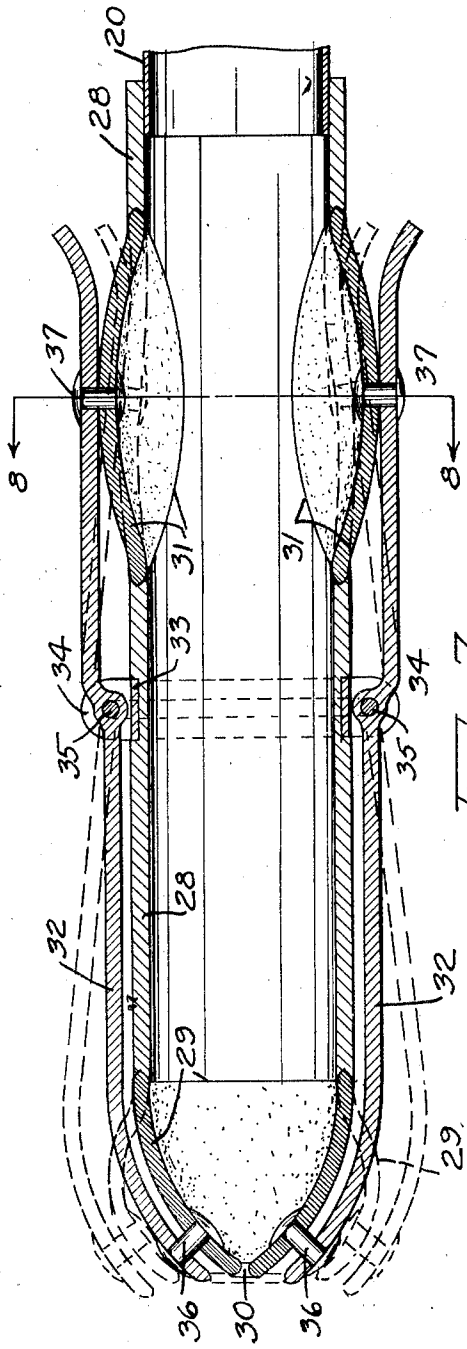


FIG-7-

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APPARATUS FOR PICKING COTTON

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FIG-8-

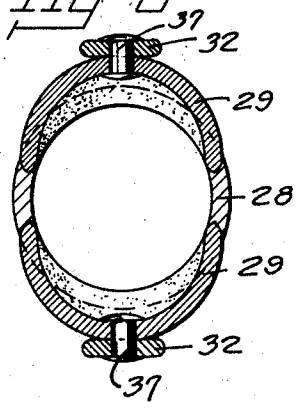


FIG-9-

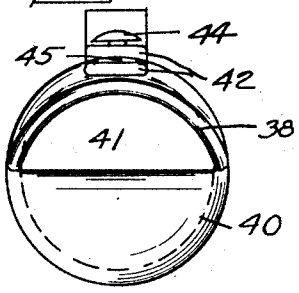


FIG-10-

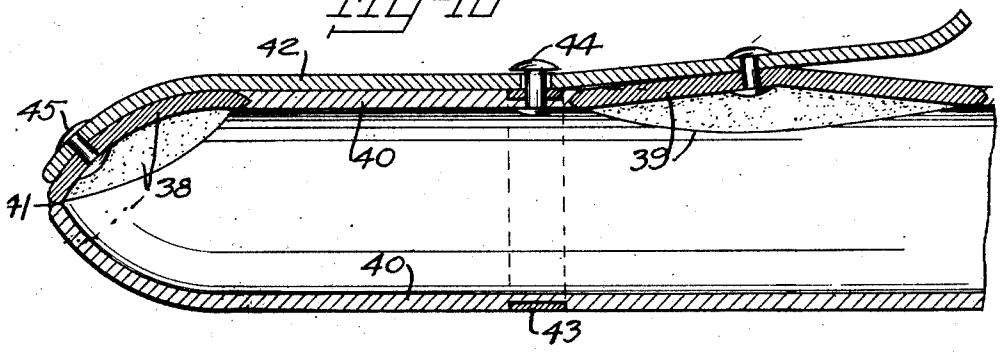
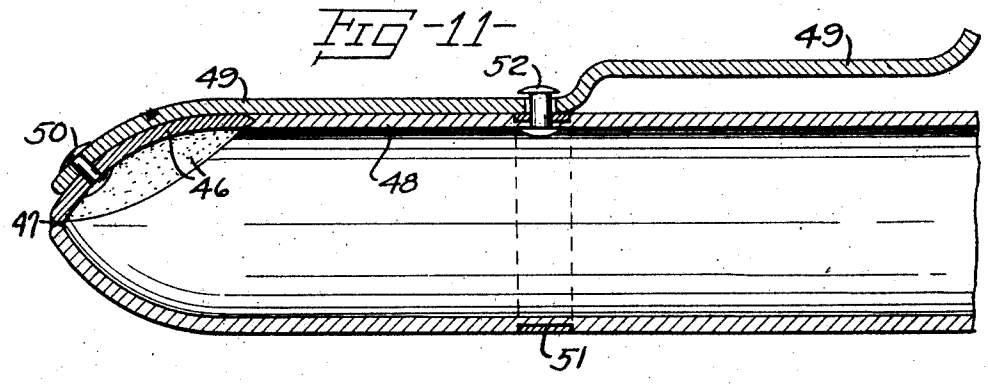


FIG-11-



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PICKING COTTON.

Application filed June 26, 1926. Serial No. 118,305.

This invention relates to cotton picking machinery of the vacuum operated type, and particularly to the picking nozzles used in conjunction therewith, the principal object being to provide such a nozzle that will be capable of withstanding the vacuum, or suction, within the system without being collapsed or deformed thereby, and will be so constructed as to be capable of certain manual distortion in order to provide at will an opening for the introduction of a cotton boll when presented thereto.

Another object is to provide a cotton picking nozzle having a normally closed slotted end, such slot being capable of being manually deformed to present an opening.

Another object is to provide a cotton picking nozzle having a normally closed slotted end, such end being formed of flexible material so as to be readily deformable, and means incorporated in said nozzle for preventing collapsing of said nozzle due to the vacuum therein, with suitable manually operable means for causing said end to be deformed whereby said slot will be temporarily transformed into an opening.

Another object is to provide a cotton picking nozzle comprising a flexible walled hollow member provided with a normally closed slotted end, one or more pivotally mounted longitudinally extending inflexible members being imbedded therein whereby said slot may be distorted into an opening upon pressure being applied to said members, suitable resilient metallic means being also imbedded in said walls and co-operating with said members for resisting the normal suction within said nozzle which tends to collapse said walls.

Another object is to provide a cotton picking nozzle comprising a flexible walled hollow member provided with a normally closed slotted end, one or more longitudinally extending pivotally mounted rigid members being co-operatively associated with the walls thereof, and suitable flexible reinforcing means being provided for preventing the walls thereof from being collapsed by the suction within the nozzle.

Another object is to provide a hollow cotton picking nozzle having a normally closed slotted end, the end of said nozzle being distortable whereby said slot may be deformed into an opening.

Another object is to provide a hollow cotton picking nozzle provided with a normally closed slotted end, said end being flexible, and means co-operating with said end whereby the slot may be deformed to provide an opening.

Another object is to provide a hollow cotton picking nozzle provided with relatively inflexible wall portions and flexible wall portions, one end being closed and slotted and the slot being bounded on at least one side by a flexible wall portion, and manually operable rigid means co-operatively associating with said flexible wall portions for distorting said slot into an opening.

A further object is to provide a hollow cotton picking nozzle having a normally closed slotted end, the walls of said nozzle being provided for against collapsing from the suction therein, said end incorporating a flexible wall tending to close said slot due to the action of the suction within the nozzle, and manually operable means associated with said flexible wall for distorting the slot into an opening.

The above being among the objects of the present invention, the same consists of certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above and other objects in view.

In the accompanying drawings which show a suitable embodiment of the present invention, and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a longitudinal sectional view taken centrally through the main body portion of a cotton picking nozzle embodying the present invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is an end view of the front end of the nozzle of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1.

Fig. 5 is a longitudinal sectional view taken centrally through the rear end portion of the nozzle of the preceding figures, showing the construction thereof and a preferable method of securing the nozzle to its suction hose.

Fig. 6 is a longitudinal sectional view taken centrally through a modified construction of the nozzle of the preceding figures.

Fig. 7 is a longitudinal sectional view taken centrally through another modified form of nozzle.

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

Fig. 9 is a front end view of the nozzle shown in Fig 10, showing the end in distorted position to form an opening.

Fig. 10 is a longitudinal sectional view taken centrally through another modified form of nozzle.

Fig. 11 is a longitudinal sectional view taken centrally through still another modified form of nozzle.

The present invention deals with nozzles for that type of cotton picking machines in which hoses or flexible tubes are extended from a source of suction and are equipped with normally closed nozzles at the free ends thereof, the nozzles being so constructed as to be capable of uncovering or otherwise providing an opening therein at will whereby when the nozzle is presented to a boll of cotton and operated to provide such opening, the suction within the nozzle will withdraw the boll of cotton into the nozzle and the same will be carried through the hose to a suitable place of deposit.

The present invention further contemplates the use of a nozzle provided with a normally closed slotted end provided with a flexible wall, means being provided for manually distorting such wall to temporarily transform the slot into an opening for the introduction of the cotton boll, it being thus distinguished from that type of nozzles in which a permanent opening provided with a controllable cover is used to accomplish the same end.

I have previously suggested the use of a nozzle of the present type wherein the entire walls thereof were flexible, and have provided longitudinally extending pivotally mounted rigid members imbedded therein, for the purpose of manually affecting the distortion of the slotted end into the required opening, but I have discovered that in some cases where the walls of such nozzles were unduly flexible, and in cases where a relatively high suction has been used, the walls thereof have had a tendency to collapse to such an extent as to interfere with the proper working thereof, and it is to remedy such abnormal conditions that the present construction has been invented. In accordance with the present invention I provide means for counteracting such collapsing tendency of the walls of the nozzle while at the same time the flexibility of the walls at the points where distortion is required, is retained.

To illustrate, in Fig. 1 is shown a nozzle of tubular shape provided with flexible walls 15 which converge to close one end thereof, this end being provided with a normally closed slot 16 extending centrally cross-wise thereof. Imbedded within the walls 15 and extending longitudinally of the nozzle at diametrically opposite points on either side of the slot 16 are two rigid metallic members 17 which are pivotally supported on a ring 18 also imbedded in the walls 15 just rearwardly of the center of the members 17, the forward ends of which terminate short of the slot 16. The suction within this nozzle draws the end walls together to normally close the slot 16, this action being accentuated due to the face that the suction acts on a longer portion of the members 17 forwardly of the ring 18 than rearwardly thereof. The members 17 stop short of the rear end of the nozzle which may be secured to a hose such as 19 by a conventional sleeve such as 20 and hose clamps such as 21. In operation the nozzle is grasped by the hand at a point adjacent the rear ends of the members 17 and squeezed, thus drawing the rear ends of the members 17 towards each other, as indicated by dotted lines in Fig. 1, and forcing the opposite or forward ends thereof apart as indicated by dotted lines in Figures 1 and 3, thus distorting the slot 16 into an opening as indicated by the dotted lines 16′ in Fig. 3. The end of the nozzle thus distorted is presented to a boll of cotton which is withdrawn by the suction into the nozzle through the opening thus formed, as previously described. Upon release of the pressure of the hand the parts return to normal position with the end closed. As also previously described, if the walls 15 are unduly flexible, or the suction within the nozzle particularly high, and if in such case the walls 15 were supported or reinforced only by the members 17 and ring 18, they might possibly be drawn together or collapse and thereby interfere with the proper functioning of the nozzle. To provide against such a possibility, means are employed in the present invention to counteract this tendency. The means employed in the present case is a light coil of spring wire 22 which is coiled through the members 17 for substantially their full length, and extending as near to the slot 16 as is practical without restricting the ability thereof to be distorted. The wire 22 is coiled through the members 17 before the same are vulcanized into the flexible walls 15, and are such that when the nozzle is completed, it is reinforced against collapsing due to the suction therein, but the wire 22 is sufficiently flexible to allow manual distortion of the nozzle, as previously explained, without interfering with the correct operation of the same.

In Fig. 6 a modification of the nozzle construction illustrated in the previous figures is shown. The construction in this nozzle is substantially the same as the previously explained nozzle in its essential details, it being provided with flexible circular sectioned walls 23, a slot 24 in its normally closed end wall, and longitudinally

extending members 25 pivoted on a ring 26, corresponding to the walls 15, slot 16, members 17 and ring 18 respectively, except in this case the ring 18 is set further out radially in respect to the members 25 than are the members 17 in respect to the ring 18, so as to provide a perfectly smooth and unbroken cylindrical interior surface up to a point where the forward end converges to form the slot 24. In this case a coil spring 27 is employed similar to the spring wire 22 of the previously explained nozzle, but instead of being directly associated with the members 25 as is the spring 22 with the members 17, and imbedded in the walls of the nozzle, it is provided as an auxiliary part and is inserted after the nozzle has been fully completed otherwise, it preferably being of slightly greater normal outside diameter than the inside diameter of the nozzle, and being slightly compressed radially when introduced into and when in position within the nozzle as indicated in Fig. 6. It is also preferably of such a length as to abut against the sleeve 20 by which the nozzle is connected to the hose 19, so that any tendency thereof to work back out of the nozzle is effectively prevented. The operation of this nozzle and the function of the spring 27 is the same as the previously explained nozzle and spring 22.

In Fig. 7 is illustrated another form of this type of nozzle. In this form the main portions 28 of the nozzle walls are formed sufficiently rigid to withstand any suction therein without the aid of any reinforcing means. The closed end portion 29 of the nozzle in which the slot 30 is provided is of flexible and readily distortable material such as the walls of the previously described nozzles, as are also two areas 31 adjacent the rear end of the nozzle and at points diametrically opposite to each other and on opposite sides of the slot 30. The portions 28 may be of any rigid or semi-rigid material to which the flexible portions 29 and 31 may be vulcanized or otherwise secured. This construction necessitates the longitudinally extending operating members 32 and supporting pivot ring 33 to be situated exteriorly of the walls 28, the ring 33 in this case being set into the surface of the walls 28 and being provided with extending ears 34 to which the members 32 are pivotally connected by the pins 35. The forward ends of the members 32 are connected to the flexible wall portions 29 adjacent the slot 30 by rivets such as 36 or by other suitable means so that upon pressure being applied to the rear ends of the members 32 the wall portions 29 will be distorted and the slot 30 will be transformed into an opening as indicated by the dotted lines. The wall areas 31 are formed to extend slightly outwardly from the normal surface of the nozzle, and the rear ends of the members 32 are secured to the mid-portion thereof by rivets such as 37 or other suitable means. The purpose of securing the rear ends of the members 32 to the flexible wall portions 31, and in providing the portions 31, is to take advantage of the tendency of the suction within the nozzle to collapse the walls thereof in order to aid in the operation of the nozzle. The suction within the nozzle tends to draw in the wall areas 31 which are connected to the rear ends of the members 32, thus tending to spread the forward ends of the members 32, this tendency being offset by the suction which also tends to close the end wall portions 29. The size of the areas 31 may be so proportioned that the suction acting thereon nearly balances the suction on the end portion 29, so that a minimum of pressure on the rear ends of the members 32 will be required to cause the slot 30 to be transformed into an opening when presented to a boll of cotton to be picked.

In Fig. 10 is shown a slight modification of the nozzle construction illustrated in Fig. 7. In Fig. 10 only two relatively small areas 38 and 39 of flexible material are provided, the remainder 40 of the walls being of rigid or semi-rigid material capable of withstanding the suction within the nozzle unreinforced and without distortion. In this case the flexible end portion 38 bounds one side of the slot 41 only, the rigid wall portion 40 bounding the other side. The single longitudinally extending operating member 42 used in this form of nozzle is pivotally supported on the ring 43 by a rivet 44 loosely engaging the same, its rear end being secured to the midportion of the flexible portion 39 by a rivet 44 in a similar manner and for the same purpose as the members 32 and portions 31 are joined together in Fig. 7, and the forward end is secured to the flexible wall portion 38 by a rivet 45 in a similar manner and for the same purpose as the corresponding parts in Fig. 7. In operation, when the rear end of the member 42 is depressed, aided by the suction on the flexible wall portion 39, the flexible wall portion 38 only adjacent the slot 41 is distorted to form an opening for the introduction of a cotton boll.

In Fig. 11 is shown a still further modification of the nozzle illustrated in Fig. 7, and, as shown, constitutes a slight change only over the construction shown in Fig. 10. In this case only a single flexible wall portion 46 is employed, and that corresponding to the flexible wall portion 38 of Fig. 10, it bounding one side of the slot 47, and the entire remainder 48 of the walls of the nozzle being of rigid or semi-rigid material. The single longitudinally extending member 49, corresponding to the member 42 of Fig. 10, is secured to the flexible wall portion

46 adjacent the slot 47 by a rivet such as 50, or by other suitable means, and is pivotally secured to the supporting ring 51 adjacent its center by the rivet 52, the rear end thereof being extended rearwardly from the ring 51 in spaced relation to the body of the nozzle in order to provide sufficient clearance for the proper operation thereof. The pressure required to operate this construction will, of course, be relatively greater than that necessary in the construction shown in Fig. 10 as no co-operating flexible wall portion is provided, but the member 49 may be extended back sufficiently to require but small pressure in any case. The operation of this nozzle, with exception of the flexible wall portion 39 of Fig. 10, is identical with the form shown in that figure.

In the construction shown in Figures 1, 5 and 6, and particularly in the first two figures, that portion of the nozzle rearwardly of the rear ends of the metallic operating members 17 is relatively flexible and has a tendency to collapse under the suction within the nozzle, and this tendency is, of course, transmitted to the rear ends of the members 17, tending to draw them together and open the slit 16. The degree of collapsing tendency is also dependent upon the distance between the rear ends of the members 17 and the forward end of the sleeve 20. This collapsing tendency is taken advantage of by sliding the sleeve 20 towards or away from the rear ends of the members 17 until the desired collapsing tendency of the walls is transmitted to the rear ends of the members 17, so that the rear ends of the members 17 may be drawn towards each other with the most practical amount of manual pressure thereon for the particular person operating the nozzle. This same idea is also employed in the constructions shown in Figures 7 and 10, the sleeve 20 in such cases being adjusted in respect to the flexible portions 31 and 39 respectively to control the effect of the suction on such portions relative to the rear ends of the members 32 and 42 respectively.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is:—

1. A cotton picking nozzle comprising a hollow member provided with a normally closed slotted end, a portion of the wall of said nozzle bounding said slot being flexible, and manually operable means associated with said flexible portion whereby the same may be deformed, thereby to temporarily distort said slot into an opening.

2. A picking nozzle for a suction type of cotton picking machine, comprising a hollow member the main portions of the walls of which are relatively inflexible, said member being provided with a flexible end portion forming a wall of a normally closed slot, and manually operable means co-operating with said flexible end portion for separating the walls of said slot.

3. A cotton picking nozzle comprising a hollow member provided with a normally closed slotted end, the main portion of said nozzle being relatively inflexible, a flexible wall area bounding one side of said slot, and a pivotally mounted operating member co-operating with said flexible area for manually temporarily deforming the same whereby to distort said slot into an opening.

4. A cotton picking nozzle comprising a hollow member provided with a normally closed slotted end, the main portions of the walls of said nozzle being relatively rigid and other portions being flexible, one of said flexible portions bounding a side of said slot and another of said flexible portions being spaced rearwardly therefrom, an inflexible operating member the ends of which are operably secured to said flexible portions, and means for pivotally supporting said operating member between its ends.

5. A cotton picking nozzle for a suction type cotton picking machine comprising a hollow member provided with a normally closed slotted end, the greater portion of the walls of said nozzle being inflexible and supporting flexible wall portions, one of said flexible wall portions comprising said slotted end, and being of sufficient inherent rigidity to maintain said slot in closed position under the normal operating suction within said nozzles.

6. A cotton picking nozzle comprising a hollow member provided with a normally closed slotted end, the main portion of the walls of said nozzle being relatively nondistortable and said end being readily distortable, and rigid operating members pivotally mounted between their ends and secured at their forward ends to said flexible end and having their rear ends operatively connected to flexible wall areas whereby to aid in the operation of said operating members to temporarily deform said slot into an opening.

7. A cotton picking nozzle provided with relatively nondeformable wall portions and flexible wall portions, one of said flexible wall portions constituting a closed end for said nozzle and being provided with a slot, manually operable rigid members pivotally mounted between their ends and having one end thereof operatively connected to said end portion adjacent said slot, and the opposite ends of said rigid members being operatively connected to other flexible wall portions.

8. A picking nozzle for a suction type

cotton picking machine, comprising a hollow member provided at one end with converging walls closing said end, and a normally closed slot in said end, the main body portion of said nozzle formed of a relatively inflexible material and another portion thereof including a lip of said slot being formed of an elastic material of sufficient inherent rigidity to remain in its normal position unaided under the normal operating suction within said nozzle.

9. A picking nozzle for a suction type cotton picking machine, comprising a hollow member terminating at one end in a slotted normally closed end, the main body portion of said nozzle formed of a substantially non-deformable material, and the walls of said terminal end formed of a readily distortable material provided with a normally closed slot therethrough, said distortable material being inherently sufficiently rigid to maintain said slot in closed position under the normal operating suction within said nozzle and sufficiently elastic to permit temporary deformation thereof whereby to separate the lips of said slot.

10. A picking nozzle for a suction type cotton picking machine comprising a hollow member open at its base end and closed at the tip end, the main body portion of said member being formed of a substantially non-deformable material, and said tip end being formed of a self-sustaining readily deformable material provided with a self closing slot normally adapted to remain in closed position under the normal operating suction within said nozzle.

11. A picking nozzle for a suction type cotton picking machine, comprising a hollow member provided with an end terminating in a self-closing slot, a lip of said slot being formed of flexible material, a flexible wall portion in said nozzle remote from said slot acted upon by the normal operating suction within said nozzle, an inflexible member co-operating with both said lip and said wall portion pivoted between its ends, and adjustable means for controlling the effective area of said wall portion acting upon said member.

12. A picking nozzle for a suction type cotton picking machine, comprising a hollow member provided with a self-closing slotted end, a portion of the walls of said nozzle bounding said slot being flexible, a portion of the walls of said nozzle remote from said slot being flexible and distortable by the normal operating suction within said nozzle, a rigid member operatively connecting said flexible wall portions pivotally mounted between its ends, and adjustable means for varying the effect of distortion of the second mentioned flexible portion on said rigid member.

13. A picking nozzle for a suction type cotton picking machine, comprising a hollow member terminating in a self-closing mouth, the wall area around said mouth formed of flexible material, a second flexible wall area remote from said mouth acted upon by the normal operating suction within said nozzle, means connecting said wall areas whereby relative movement of one causes movement of the other, and adjustable means slidably received within said nozzle for varying the effective area of said second wall area acted upon by said suction.

Signed by me at Detroit, Michigan, U. S. A., this 23rd day of June, 1926.

KARL L. HERRMANN.