

G. BEEKMAN.
PICKER FOR COTTON HARVESTERS.

No. 487,509.

Patented Dec. 6, 1892.

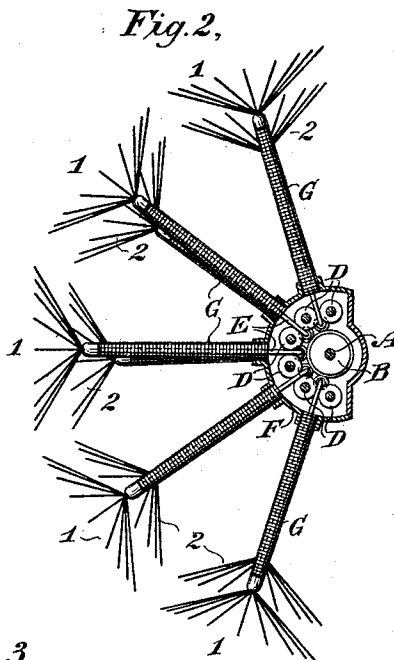
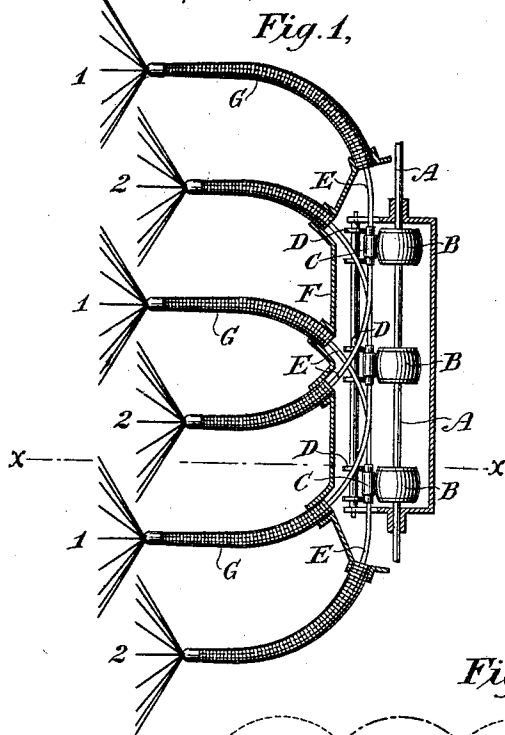
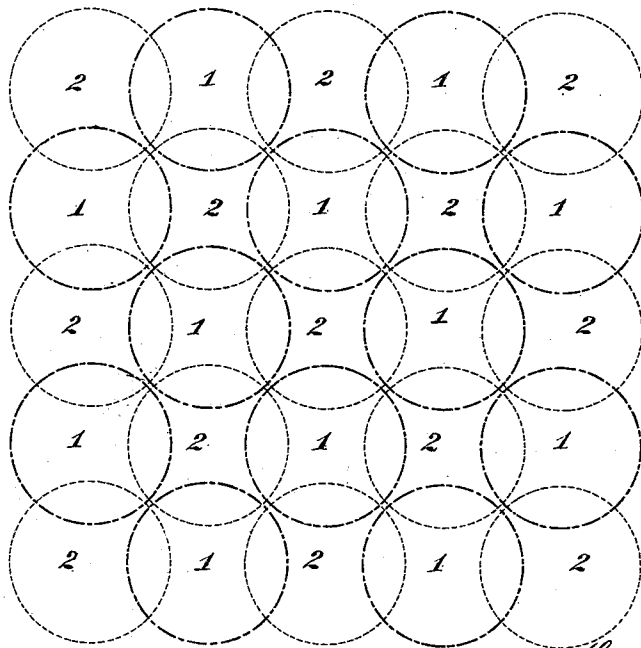


Fig. 3,



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Fig. 4,

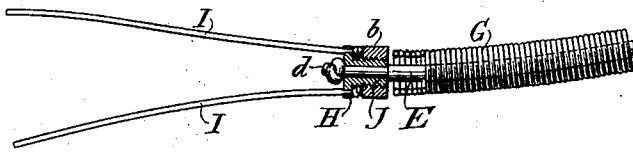


Fig. 5,

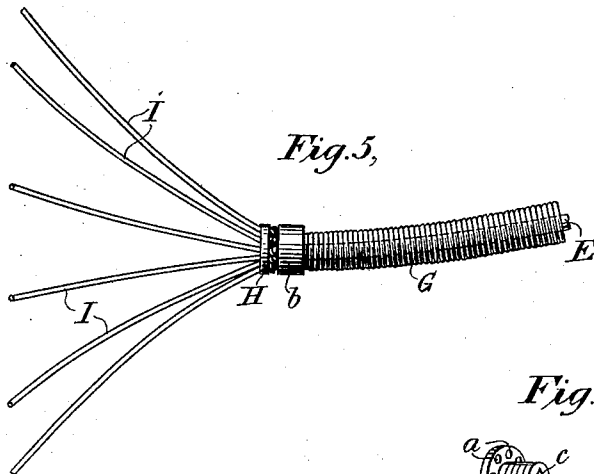


Fig. 7,

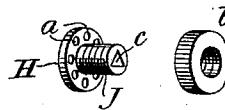
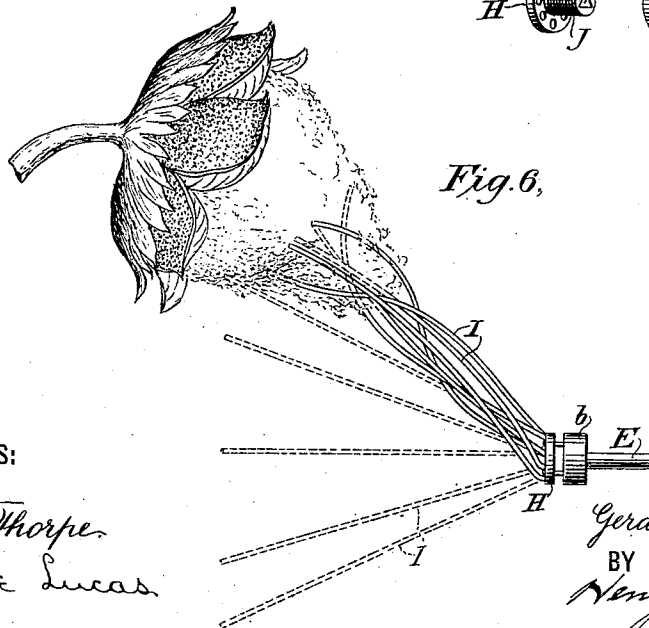


Fig. 6,



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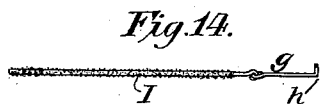
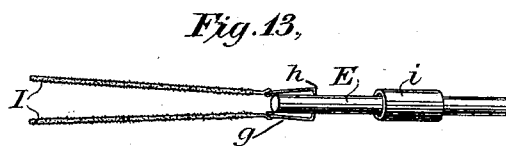
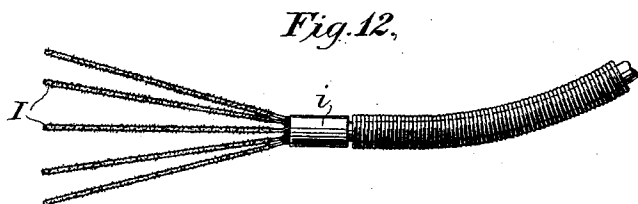
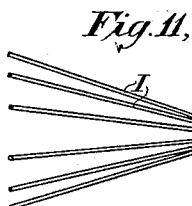
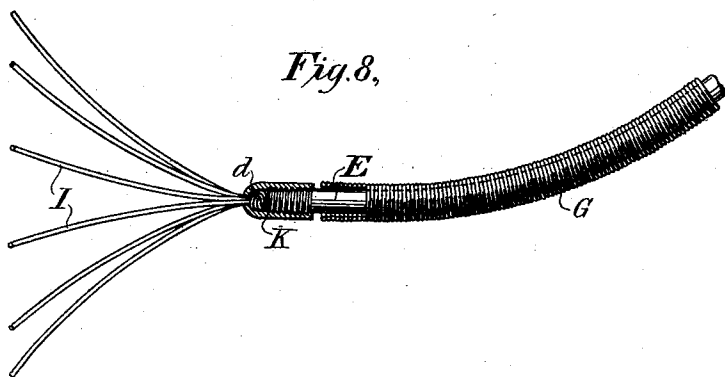
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Fig. 15,

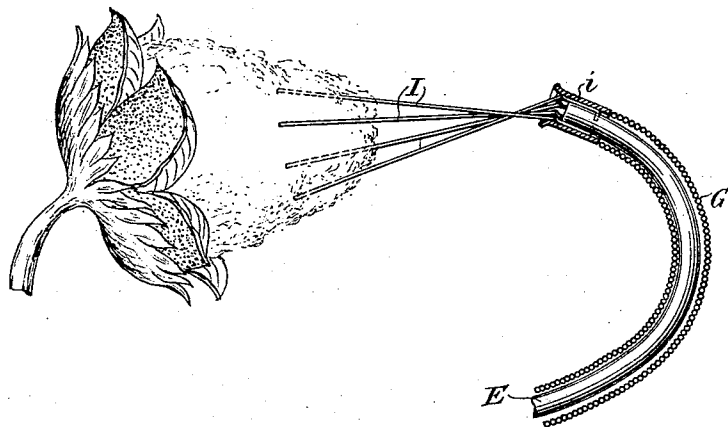


Fig. 16,

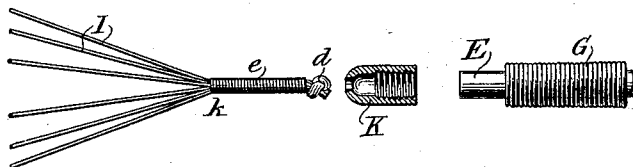
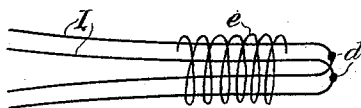


Fig. 17.



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UNITED STATES PATENT OFFICE.

GERARD BEEKMAN, OF NEW YORK, N. Y.

PICKER FOR COTTON-HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 487,509, dated December 6, 1892.

Application filed January 22, 1892. Serial No. 418,871. (No model.)

To all whom it may concern:

Be it known that I, GERARD BEEKMAN, a citizen of the United States, residing at the city, county, and State of New York, have invented certain new and useful Improvements in Pickers for Cotton-Harvesters, of which the following is a specification.

My invention relates to what may be termed "torsional pickers," or those which are adapted to adhere to and extract cotton by means of their rapid rotation on their own axes while searching the plant.

In my Letters Patent No. 427,218, dated May 6, 1890, and in subsequent patents I have shown and described a picker consisting in a flexible rotary shaft or string or cord projecting beyond the elastic arm, which contains and supports the picker, so as to present an elongated free end thereof having a fibrous, barbed, or other suitably-roughened surface adapted for adhesion. As soon as the picker obtains a hold upon the fibers of the cotton in the plant its pull will constantly increase both by the wrapping of the cotton fibers around the picker and also by the tendency to twist the cotton fibers into a rope beyond the end of the picker, and thus extract all the cotton from the bottom of the boll.

The object of my invention is to extend the efficiency of the picker by so constructing it as to insure its access to every part of the cotton-plant.

My invention consists in a rotary picking-stem having at its extremity a plurality of sub-stems attached to and rotating with said main stem. The device thus composed is of tassel-like form, and when it revolves the individual strands, which are free at their extremities, expand centrifugally, thereby extending over a larger area than would be covered by the free extremity of a single strand. When the centrifugally-separated sub-stems encounter the cotton in the boll of the plant, one or more of them is arrested and the rest, following in the circle of rotation, are thrown together therewith, and the collected strands then knit themselves into the cotton and twist together therewith and with each other, forming an effective extractor while the machine advances.

Having reference to the accompanying drawings, in which similar letters and figures of reference indicate corresponding parts throughout the several views, Figure 1 is a sectional elevation of a group of my improved pickers, showing one suitable form of mechanism for rotating them rapidly; Fig. 2, a horizontal section of Fig. 1, taken on the line $x x$, further showing the plurality of pickers in the group; Fig. 3, a diagrammatic projection showing the relative position of the centrifugal pickers when expanded; Fig. 4, an enlarged view showing in detail one suitable form of construction of the pickers, the parts appearing in section and the position of the sub-stems being that occupied when at rest; Fig. 5, a side elevation of the picker, indicating the position of the sub-stems when centrifugally separated during rotation; Fig. 6 indicates the manner in which the cotton is seized when encountered by the picker. Fig. 7 shows in perspective some of the details of suitable construction of the parts in Fig. 4. Fig. 8 is an enlarged sectional side elevation showing a second form or modification in the construction of the picker. Figs. 9, 10, and 11 are detail views sectionally showing the parts in Fig. 8 detached; Fig. 12, an enlarged side elevation showing a third form or modification of construction; and Figs. 13 and 14, detail views of the detached parts of Fig. 12. Fig. 15 illustrates the operation of the device shown in Figs. 12, 13, and 14, the parts appearing in section, and also illustrates a feature of modification of said device. Fig. 16 represents a fourth form or modification of construction of the multiple picker, and Fig. 17 indicates the mode of construction of said form.

The mechanism embodied in Figs. 1 and 2 is illustrated as exemplary of suitable means for operating the pickers, although my present invention is in no wise limited to such specific form of driving mechanism. Said driving mechanism is similar in general features to that described and claimed in my separate patent application, Serial No. 389,932, filed April 22, 1891, in which there are several such picker-cases or groups of pickers, as shown herein in Fig. 1, attached to a rotary

frame, whereby each group of pickers is revolved backward in an orbit at substantially the same rate of speed as the motion of the harvester over the ground. Thus a retrograde movement of the pickers is obtained, whereby they advance and retreat among the branches of the bush, traveling with the same, and search for every ripe portion of cotton that may be exposed.

10 The mechanism in Figs. 1 and 2 consists in a driving-shaft A, bearing friction-rollers B, upon which the bobbins C are pressed into contact by idle-spindles D, supported in suitable bearings in the case F. Each bobbin C
15 bears two flexible shafts or stems E, projecting in each direction from its axis, supporting the picking device. The case F is provided with flexible arms G, composed of coiled wire or other material which will yield when in
20 contact with the branches of the plant. The shafts E rotate freely in the tubular arms G.

I have shown the extremities of the shafts E in Figs. 1 and 2 as located at variable distances from the case F, so that alternate members of the pickers designated by the numeral 1 in Figs. 1, 2, and 3 project farther from said
25 case than the remaining alternate members designated by the numeral 2. Interference is thus avoided between the extremities of adjacent sets of sub-stems when they are revolved. The feature of placing the different
30 pickers some in advance and others in retired positions, thus herein illustrated, is applicable to other forms of picking-stems than those of the character herein claimed.

The construction in Figs. 4 to 7, inclusive, is as follows: The ends of the rotary shafts or stems E, as shown in Fig. 4, have collars H
40 firmly secured to them, and to these collars H are secured the series of sub-stems I, having free extremities. The collar H has perforations *a* (shown in Fig. 7) for the reception of the sub-stems I, which are knotted at their inner ends and inserted through said
45 perforations. The shank J of the collar H is externally screw-threaded, and a retaining-nut *b* is screwed thereon, so as to compress or confine the knots in the sub-stems and prevent their displacement. The secure
50 attachment of the main rotary stem E to the collar H and its shank J is effected by means of a triangular hole *c*, through which the end of said shaft E is drawn and knotted at *d*, as appears in Fig. 4. The collar *b* serves to in-
55 close the end of the flexible tubular arm G and guard the shaft therein, so as to prevent the cotton being caught thereon or forming an obstruction to the operation of the machine.

60 It will be seen that by means of the above-described construction the individual sub-stems I when worn or injured may be easily removed and replaced independently by unscrewing the collar *b* a short distance and
65 without disturbing the shaft E, which is adapted to yield with a sufficient outward

motion by reason of its flexibility to permit such withdrawal of the collar *b* against the extremity of the tubular arm G.

The construction in Figs. 8 to 10, inclusive, 70 is as follows: The inner ends of the sub-stems I are knotted together at *d*, as in Fig. 11, and inserted through the opening *e* in the end of the thimble K. (Shown in Fig. 9.) The thimble K is provided with an interior screw-
75 thread *f*, Fig. 9, whereby it is adapted to be secured upon the end of the main stem E, composed of leather or other suitable material. If the material employed be compressi-
80 ble, as in the case of leather, the end of the shaft E may be left blank, as seen in Fig. 10, adapting itself to the screw-thread *f* when the thimble is turned in place, securing it firmly thereon. Owing to the extremities of the
85 shafts E being rotated in different directions, according as they are connected to the upper and lower ends of the bobbins C, the screw-threads *f* in the modification of Fig. 8 should be cut right and left accordingly.

The modification shown in Figs. 12, 13, and 90 14 consists as follows: The sub-stems I are jointed to the barbed shanks *g*, so as to move freely in all directions. The shanks *g* are adapted for being secured to a shaft E, into which the barbs *h* of said shanks are pressed
95 when placed in position, and a collar *i* is afterward pushed forward, so as to envelop and bind the several said shanks. In Fig. 14 one of the several stems I thus constructed is shown. This species of modification in the mode of
100 attachment is especially adapted to the employment of wires to compose the sub-stems I. The wires designed to be so employed are coated with suitable material for promoting their ad-
105 herence to the cotton—such, for example, as liquid india-rubber—into which the wires are immersed and afterward dried. The collar *i* may be modified in its position and also flared at its extremity, if desired, as indicated in
110 Fig. 15, whereby to restrain the centrifugal separation of the wires I and prevent their being entangled about the arm G, bearing them when they are covered with cotton, or partially so. The collar *i* thus modified also
115 serves to restrain or limit the angular motion of the wires I with reference to the extremity of the shaft E, so that when the said wires engage with the cotton-bush and detain the
120 extremity of the shaft E as the machine progresses a too-abrupt angle for the transmission of motion is prevented.

Fig. 15 indicates the position referred to and shows the temporarily-curved position of the shaft E and the elastic arm G, due to its resiliency during the act of pulling the
125 cotton from the boll.

In Figs. 16 and 17 I illustrate a modification, wherein the multiple picking-strands I are bound together or formed into a single
130 stem beyond the end of the arm G by means of a winding cord or wire *e*. In its application to the flexible character of the stems I—

such as in Fig. 8--the mode of attachment of such stem corresponds to that in said Fig. 8. Fig. 17 indicates that said strands I may be composed of looped strings knotted at *d*, each having both free ends utilized to form the pickers. The assembled knots of the loops are together inserted in the thimble K and attached to the shaft E, while at a suitable distance from the said thimble the strands are bound together by the binder *e*. The stem portion of the picker thus formed is somewhat resilient and may, if desired, be given increased resiliency by the introduction of a wire spring through its structure. In its application to the rigid character of stems I or wires--such as in Figs. 12 to 15, inclusive--the feature in Fig. 16 may be modified by the employment of universal joints at the point *k*, where said wires diverge from the stem *e*. Such universal joints may be of the same character as those shown between the parts I and *g* in Figs. 13, 14, and 15. The purpose of the modification illustrated in Fig. 16 is that of preventing a too-abrupt angle between any of the sub-stems or wires I and the axis of the shaft E during the act of rotation when the parts are in a position corresponding to that in Fig. 15, and, moreover, the flanged collar *i* may be used in conjunction with the stem *e* at the part *k* thereof, the stem and collar co-operating to the common end of preventing the stems I from doubling back on the shaft or flexible arm bearing them when the same is advanced endwise into the bush. The part *e* in Fig. 16 constitutes substantially a flexible extension of the shaft E, which itself forms a picker beyond the end of the arm or sheath G.

The main stem or rotary shaft E may be composed of any suitable material--such as porpoise-hide or cord or coiled-wire flexible shafting. The sub-stems I may also be composed of different suitable material--such as wire, cord, or roughened or coated needles--or may be of such various character as described in my aforesaid Letters Patent No. 427,218. The sub-stems I may be either flexible or rigid, as also the main stem or shaft E may be either flexible, as shown, or rigid when projected in a rectilinear axis.

In operation the multiple stems I of the picker being centrifugally separated, as in Fig. 5, by rotation of the shaft E during the advancement of the machine in contact with the rows of cotton-plants, and the plurality of pickers thus composed and adjacently located in the relation indicated in Fig. 3, the entire area or space occupied by the branches of the plant and intervening them will be searched. When one or more of the multiple strands or sub-stems I encounter a portion of cotton in the boll of the plant, at whatever portion of their orbit about the axis of the main stem E, such one or more sub-stems I will become arrested at its extremity; but owing to the continuing rotation of the main

stem E the remaining stems I will quickly follow and entwine themselves together and with the cotton, so as to knit into the same in the manner illustrated in Fig. 6. As the machine progresses in its travel the cotton thus adhering securely to the multiple strands is spun upon itself into a rope-like form and withdrawn from the boll.

The operation of the wires or needles shown in Fig. 12 is substantially the same as above described with reference to Fig. 6, excepting that the sub-stems thus rigidly composed assume a spirally-crossed position, as indicated in Fig. 15, when entwined with the cotton, the cotton being similarly extracted in all substantial respects.

Each individual sub-stem I at its initial contact with the cotton in the boll has its centrifugal rotary motion arrested. The other centrifugally-rotating sub-stems I swing into contact with the sub-stem thus arrested and tend to rope themselves about it, so as to engage with the cotton adjacent thereto, as in Fig. 6, more effectively than could a single stem engage, which I have heretofore described in my aforesaid Letters Patent. The action of any individual stem I, forming the radius of a centrifugally-developed circle, is thus capable by its contact with the cotton of conveying or transmitting the rotation of the main stem E in any divergent direction. As compared with former devices, it will be seen, therefore, that the searching capacity of my present picking device is enlarged from the axis of rotation that would be occupied by a single stem or picker to the area of a circle having a radius approximately the length of the sub-stems or pickers I, as shown.

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

1. In a cotton-picking device, the combination of a main rotary stem or shaft and a plurality of flexibly-attached subordinate stems branched therefrom, having independent extremities.

2. In a picker for cotton-harvesters, the combination of a main rotary stem, a plurality of flexibly-attached subdivisional stems having free extremities, each revolving about the axis of the said main stem and adapted to diverge centrifugally when the latter is rotated and to rope upon themselves when arrested in their orbit of centrifugal rotation, for the purpose described.

3. In a picker for cotton-harvesters, a main rotary stem, a non-rotary sheath containing the same, a flexible extension of the main stem projecting beyond the sheath, and at the extremity of said flexible extension a series of subordinate stems adapted to be separated centrifugally by the rotation of the said main stem.

4. In a picker for cotton-harvesters, a main flexible rotary stem, a flexible sheath containing the same, and at the extremity of

said stem a multiple stem-picker, substantially as described.

5 The combination, in a picking device for cotton-harvesters, with a suitable support, of an aggrouped series of rotary picking-stems projecting horizontally therefrom, the extremities of alternate members of said stems occupying a comparatively-advanced

position, and those of the remaining alternate members a comparatively-retired position of projection beyond the said support, for the purpose described.

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Witnesses:

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