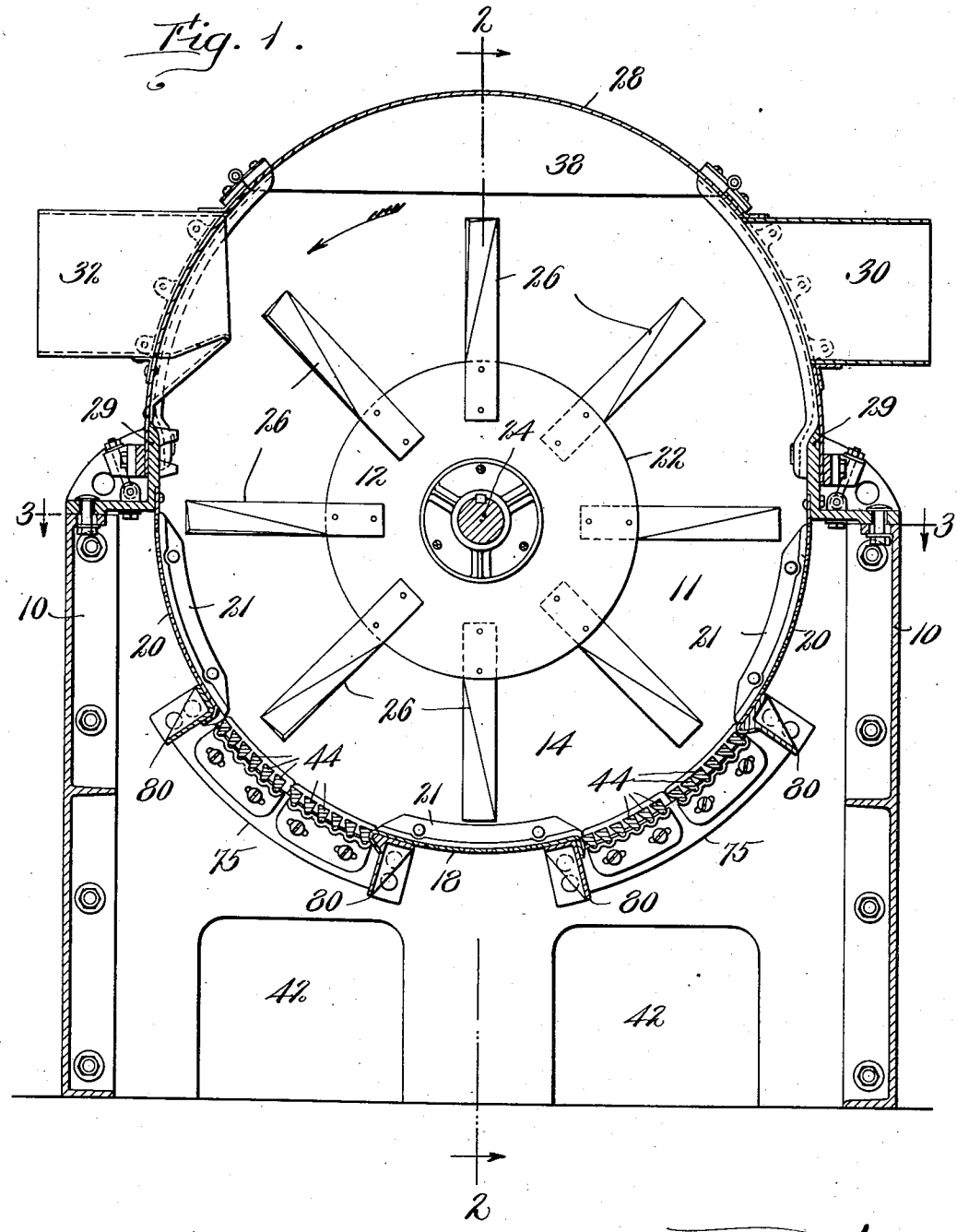
March 19, 1935. J. MOSS 1,995,266

COTTON CLEANER

Filed Aug. 14, 1930 5 Sheets-Sheet 1

Fig. 1.



Inventor
Joseph Moss,
By Robert K. Randall
Atty.

March 19, 1935. J. MOSS 1,995,266

COTTON CLEANER

Filed Aug. 14, 1930 5 Sheets-Sheet 2

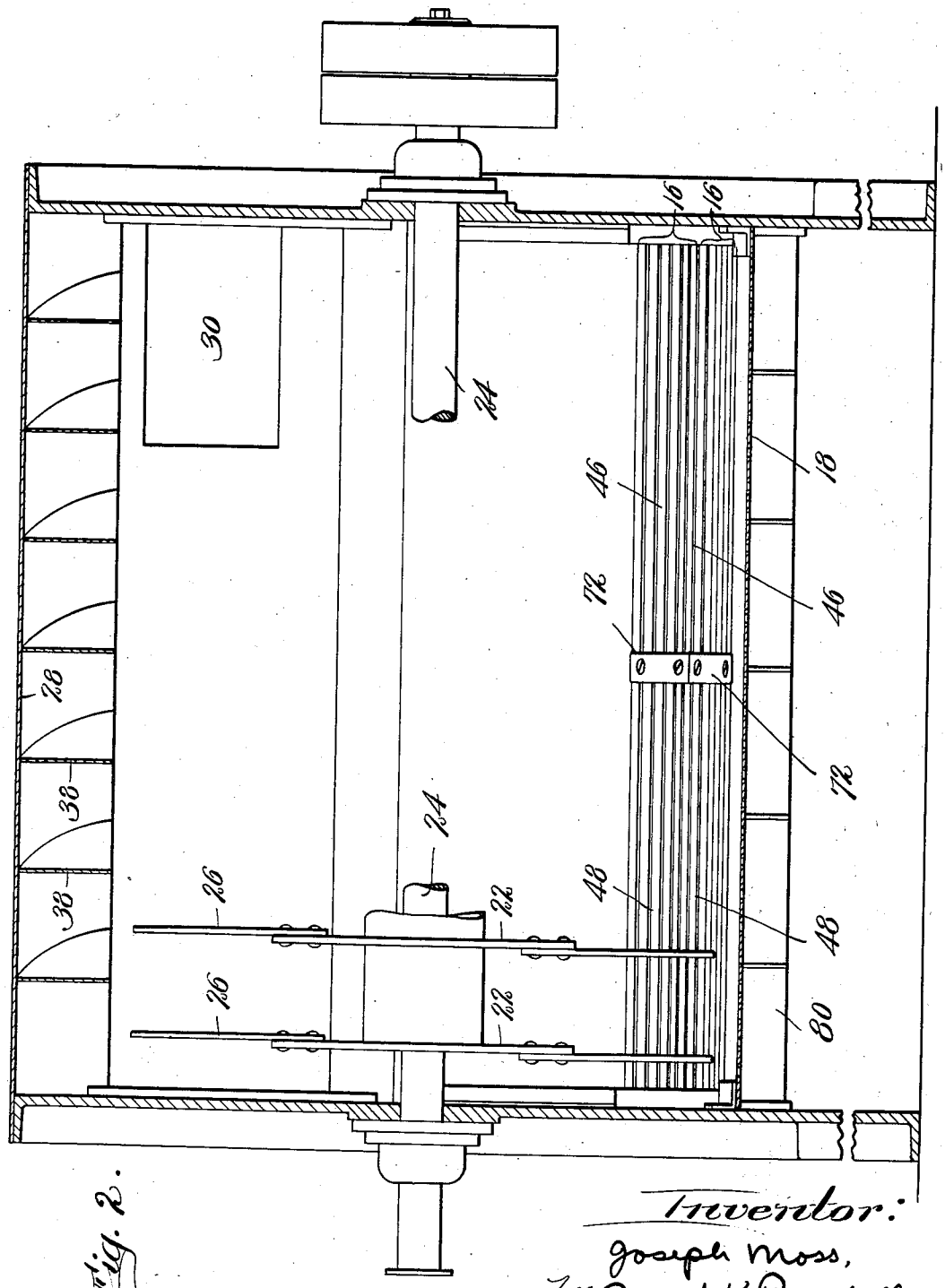


Fig. 2.

Inventor:
Joseph Moss,
by Robert K. Randall,
Atty.

March 19, 1935. J. MOSS 1,995,266

COTTON CLEANER

Filed Aug. 14, 1930 5 Sheets-Sheet 3

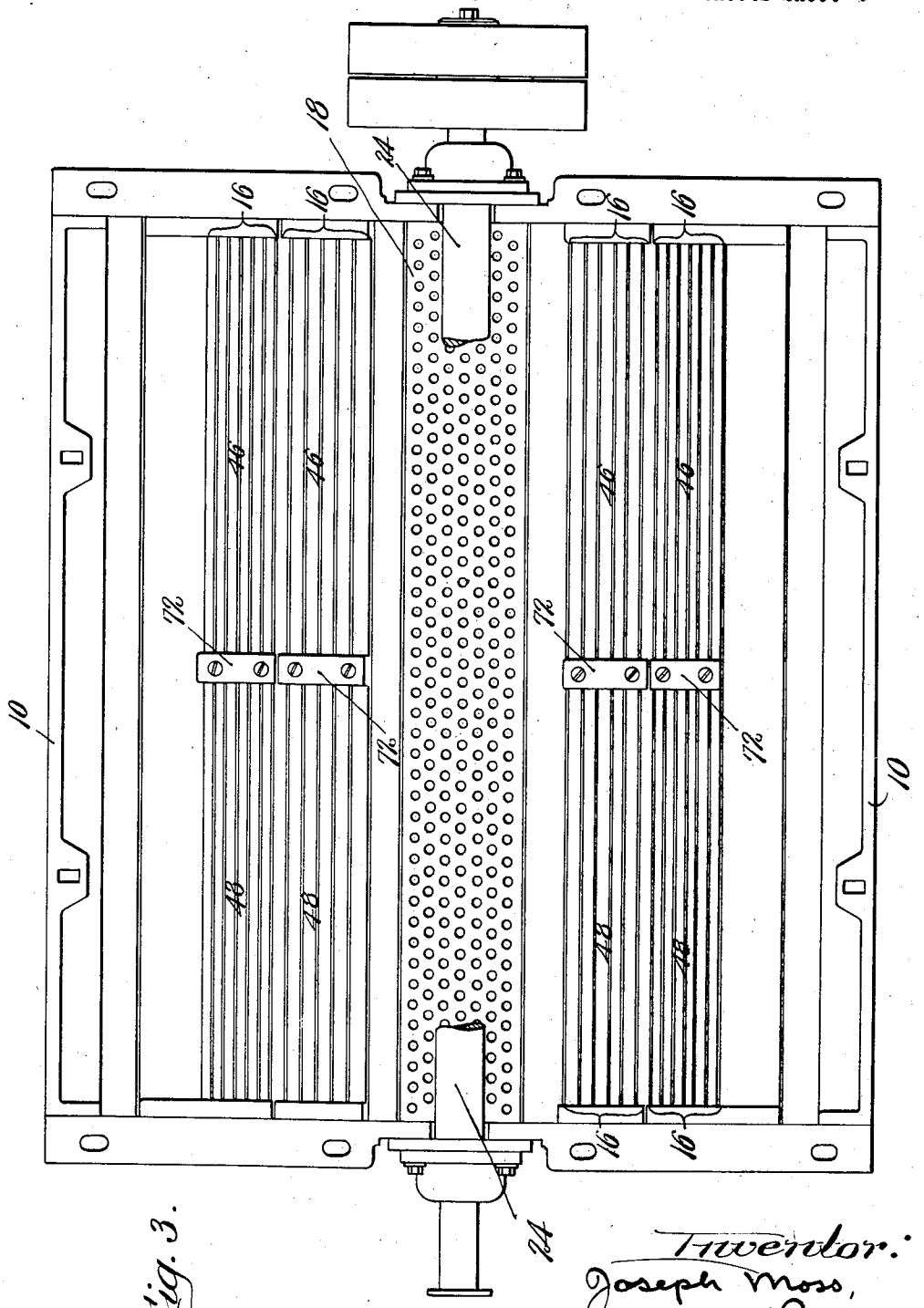


Fig. 3.

Inventor:
Joseph Moss,
by Robert K. Randall,
Atty.

March 19, 1935. J. MOSS 1,995,266

COTTON CLEANER

Filed Aug. 14, 1930 5 Sheets-Sheet 4

Fig. 4.

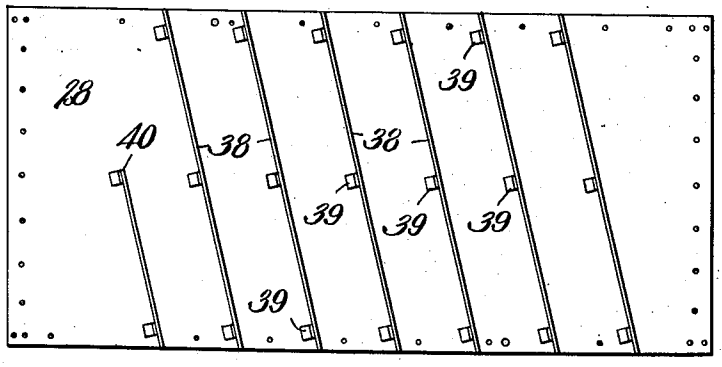


Fig. 5.

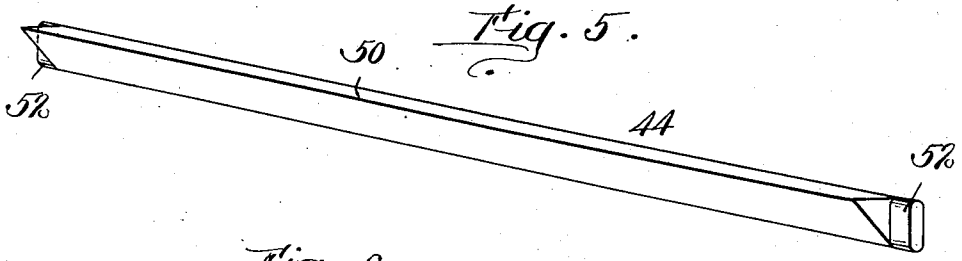
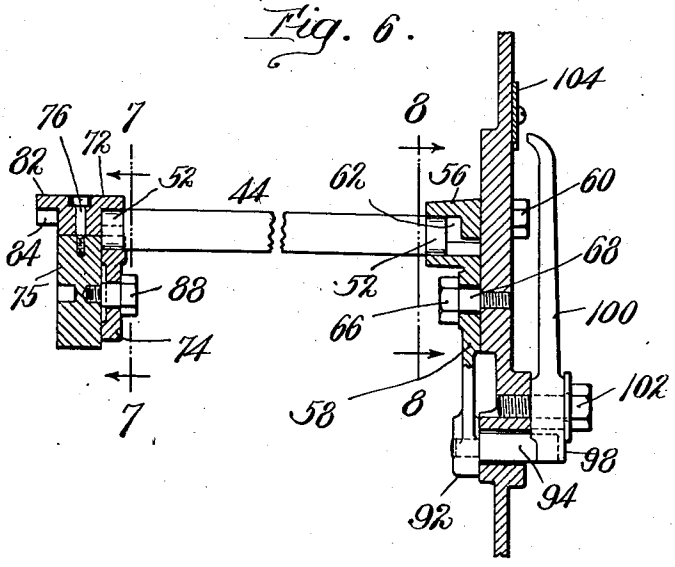


Fig. 6.



Inventor:
Joseph Moss,
by Robert K. Randall,
Atty.

March 19, 1935. J. MOSS 1,995,266

COTTON CLEANER

Filed Aug. 14, 1930 5 Sheets-Sheet 5

Fig. 7.

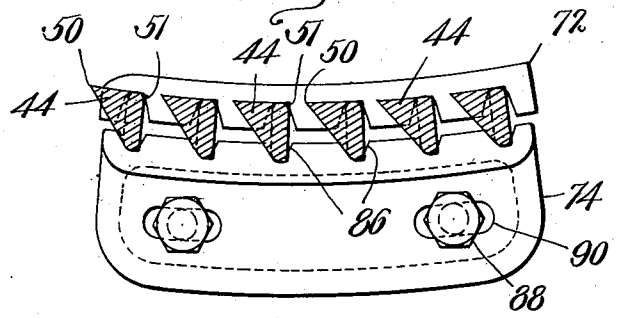
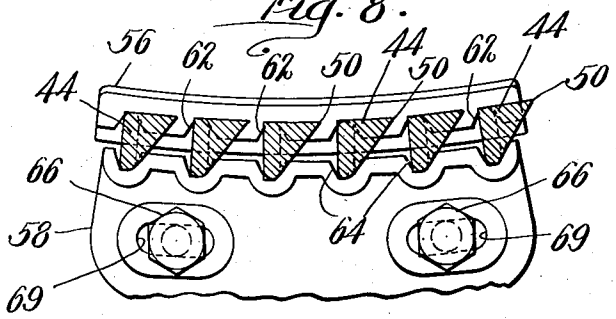


Fig. 8.



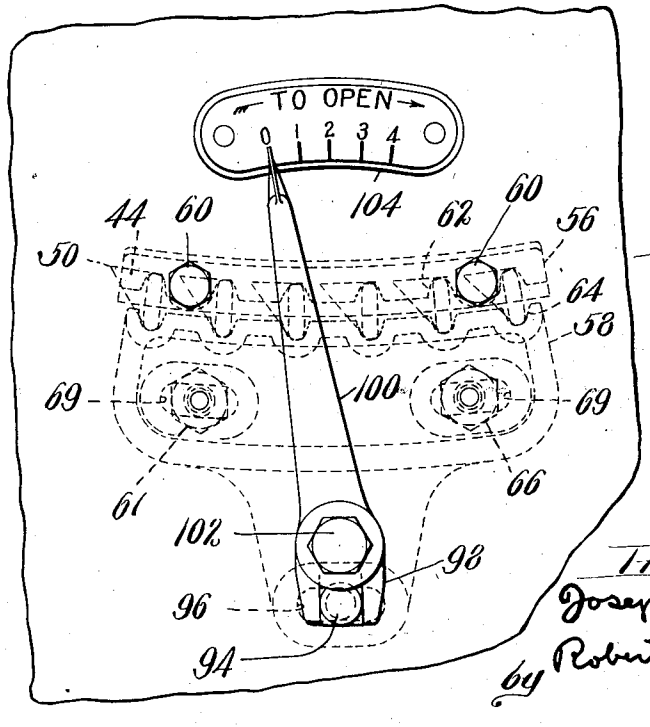


Fig. 9.

Inventor
Joseph Moss,
by Robert K. Randall,
Atty.

Patented Mar. 19, 1935 1,995,266

UNITED STATES PATENT OFFICE

1,995,266

COTTON CLEANER

Joseph Moss, Woonsocket, R. I., assignor, by mesne assignments, to Whitin Machine Works, Whitinsville, Mass., a corporation of Massachusetts

Application August 14, 1930, Serial No. 475,275

11 Claims. (Cl. 19—90)

The present invention relates to cotton cleaners.

The objects of the present invention are to provide a cotton cleaner which will clean more effectively and with less waste than the usual existing types of cleaners, to provide for uniform treatment of all particles of cotton with consequent uniformity of cleaning, to provide for varying and modifying the character of the cleaning action to suit the various grades of cotton and the extent of its progress through the machine, to provide simple and convenient adjustment of the cleaning instrumentalities without the necessity of stopping the machine or of gaining access to the interior, and to provide simple and accurate means for indicating at the outside of the machine the adjustment thus attained.

With these objects in view, one feature of the present invention comprises a cleaner having a rotor, and a plurality of sets of opening and cleaning instrumentalities, such as grid-bars disposed end to end longitudinally of the rotor and with each set adapted for independent adjustment of its action, to provide for the changing condition of the cotton in passing along the length of the cleaning chamber. For example, on certain kinds of cotton, at the inlet end of the machine, where the cotton is closely matted, the sets are adapted to be adjusted for considerable raking and cleaning action to open up the cotton and to free the larger particles of foreign matter. On the other hand, near the outlet end of the machine, where the cotton has been well opened up and loosened, and where the remaining foreign particles are of a different character, the sets may be adjusted for a different degree of action, as for instance diminished action in order that not only may small foreign particles be effectively ejected, but also that there may be little appreciable loss or waste of the cotton through the openings between the grid-bars. The improved construction permits a reversal of these relative degrees of action of the sets, to suit cotton of different character. Although any number of separate longitudinally arranged sets may be employed, adapted to permit progressively closer or wider adjustments as between the respective sets, from one end to the other of the machine, in practice it is found that two of such sets placed end to end give sufficient range of modification of the action to accomplish the desired result of thoroughly effective cleaning with no appreciable waste. As many of these longitudinally-paired sets may be disposed around the circumferential path of the rotor as is desired or necessary to effect thorough cleaning.

Another feature of the invention comprises means acting to cause the passage of each tuft of cotton across the grids a definite predetermined number of times, whereby uniform cleaning and opening action on all of the cotton is assured. This means, in its preferred form, consists of a plurality of obliquely disposed cotton directing passages, arranged to receive the cotton and to advance it by a definite fraction of its longitudinal travel from the inlet to the outlet at each revolution of the rotor. By this feature, it is necessary that each particle of cotton shall traverse the several grids in succession in a definite helical path, a feature of considerable importance when grid settings of progressively modified adjustments are employed.

Other features of the invention relate to an improved form of grid-bar, and certain features of adjusting and indicating the adjustment of the grid-bars, and to other novel features of construction, combinations and arrangements of parts, hereinafter described and particularly defined in the claims.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which,—

Fig. 1 is an elevation in transverse section of the preferred form of cleaner embodying the features of the present invention.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on line 3—3 of Fig. 1.

Fig. 4 is an internal view of the top of the cleaning chamber, looking upward, showing the cotton directing passages.

Fig. 5 is a perspective view of a grid-bar.

Fig. 6 is a sectional detail view showing the mounting of the grid-bars.

Fig. 7 is a section on line 7—7 of Fig. 6.

Fig. 8 is a section on line 8—8 of Fig. 6.

Fig. 9 is a detail view of the operating and indicating lever for adjusting the grid-bars.

The illustrated embodiment of the invention consists in a horizontal cleaner having a frame 10, supporting a cleaning chamber 11, within which is mounted horizontally a rotor 12 of the well-known Buckley or porcupine type. The lower part of the cleaning chamber is formed as a cylindrical cage 14 disposed concentrically with the rotor. This cage carries the opening and cleaning instrumentalities, including the sets of grid-bars or grids, indicated generally at 16 and hereinafter to be described in detail, as well as the perforated plates 18 and 20. The plates are supported on longitudinal angle-irons 80 secured to the frame and by the frame-pieces 29, and are held in shape by segments 21 applied to the end-frames.

The rotor comprises a series of spaced plates 22 secured to the main shaft 24. Each plate has a plurality of inclined blades 26 secured thereto and extending radially toward the cage, the combination forming a beater-unit.

The cleaning chamber has a top portion of generally cylindrical contour surmounting the cage. The top, as shown in Fig. 1, is mounted on the upstanding semi-circular portions of the end-frames, and attached to the frame pieces 29, and is elevated to a position eccentric to the rotor, so that the upper portion 28 of the top is spaced a considerable distance from the ends of the blades. There is an inlet 30 at one end and an outlet 32 at the other end of the machine. A current of air continuously maintained through the inlet and outlet introduces the cotton into the chamber and assists in carrying it through the chamber to be exhaused at the outlet. The machine is also provided with pivoted doors to permit access to the rotor.

The top, in the space above the rotor is provided with a plurality of depending baffles or vanes 38 conforming along their upper edges to the curvature of the top, soldered or otherwise secured to the top over their entire engaging edges, and braced by angles 39. The lower edges of the vanes or baffles are herein shown as straight and horizontal, but may be curved to conform more closely to the path of the rotor blades if desired to increase their effect. As shown in Fig. 4, the vanes are arranged obliquely to form between them a plurality of passages, inclined toward the outlet. The vanes are preferably pitched or slanted so as to have a lead or component of extent along the axis of the rotor approximating the spaced relation between two adjacent plates 22 of the rotor. The last vane, at the outlet end of the machine, extends only partially across the cover as indicated at 40 to permit the cotton to pass freely to the outlet.

In operation, the cotton is carried to the rotor by a current of air passing from the inlet to the outlet. The cotton is engaged and whirled by the blades, and is also advanced through the cleaning chamber by the air current, as well as by the combined fanning and impelling action of the inclined blades of the rotor. In passing over the perforated plates and the grids, the cotton is opened, and any foreign particles, such as dirt, motes, and leaves, are dislodged and pass through the perforations and between the grid-bars, and are permitted to escape into the lower part of the casing, from which they are occasionally removed through the clean-out doors 42.

In rotating through the upper part of the cleaning chamber, the cotton is thrown off the blades by centrifugal force and enters the oblique passages between the baffles. By the inclination of these passages, the cotton is positively advanced toward the outlet by a definite distance for each revolution. Upon leaving one of the passages, the cotton descends into range of the blades on the rotor, and since the pitch of the baffles corresponds to the spacing between adjacent plates or beater-units 12 of the rotor, it will be picked up by the next succeeding section of the rotor. It will be seen that the bulk of the cotton is therefore constrained to pass over the grids a definite and practically fixed number of times, closely related to the number and pitch of the baffles, and that all fibers of the cotton receive substantially equal treatment.

A basic feature of the invention comprises the arrangement of the grid-bars 44 longitudinally of the machine, as hitherto in certain instances, so as to be opposed at substantially right angles to the impact of the fiber as the latter is whirled around by the blades 26 of the rotor, but with the novel provision of having the grid-bars discontinuous and interrupted in the length of the machine so that the bars at one end may be adjusted to give a different action upon the fiber from that of the bars at the other end of the machine. To this end, in the present embodiment, the grid-bars 44 are made of a length substantially half of that of the rotor chamber, (where it is found that two opposed sets give sufficient modification of the action at one end of the chamber against the action desired at the other), each set being individually supported at midlength of the machine.

Each of the two sets thus disposed in end-to-end relation and meeting at midlength of the machine comprises six of the grid-bars 44 of the type shown in Fig. 5, having a long portion of triangular cross-section to form the fiber-supporting face 44 and the working or raking and cleaning edge 50 presented to the rotating tufts of cotton. At the ends the grid-bars are formed integrally with short fins 52 by means of which the bars are adjustably supported in the machine. The fins are provided with rounded upper and lower edges.

The bars of each set or grid are supported at opposite ends in fixed upper guide-members and movable lower guide-members, by the adjustment of which the rake and opening of the bars and their spaced relation to the rotor may be varied. The upper and lower guides at the outer end of the grid are shown respectively at 56 and 58. The upper guide 56 consists of an arcuate bracket conforming to the curvature of the cleaning chamber and projecting inwardly from the frame of the machine to which it is secured by bolts 60, being provided with a plurality of sockets or grooves, 62, six in number, to receive the fin ends of the six grid-bars. The lower guide 58 comprises a plate formed with an arcuate upper surface having sockets 64 opposed to the sockets of the upper guide. The lower guide is slidably mounted on bolts 66 threaded into the inner face of the machine frame and formed with smooth shanks 68 which are received in arcuate slots 69 of the guide concentric with the axis of the rotor.

At their inner ends, in accordance with the invention, the bars are supported by a fixed upper guide 72 and a movable lower guide 74. The upper guide is an arcuate member, T-shaped in cross-section, Fig. 6, having its bottom surface resting on a center girt 75, to which the guide is secured by bolts 76. The girt is supported on the longitudinal angle irons 80. The overhanging portions 82 of the guide 72 are formed in their under surfaces with sockets 84. A single upper guide 72 serves for engagement with the opposed or meeting ends of the grid-bars of the respective sets 46, 48, longitudinally disposed in paired relation. The inner lower guide 74 is similar in general construction to the outer lower guide 58, having the fin sockets 86 in its upper surface, and being slidably mounted on bolts 88 which are secured in the center girt 75 and which pass through arcuate slots 90 of the guide.

It will be seen that by swinging the outer lower guide 58 on the bolts 66, about the axis of the shaft 24 as a center, the bars are rocked about the upper edges of the fins as pivots to vary the rake and opening of each set. The motion of the bars at their inner ends is transmitted to the inner lower guide 74. If the outer guide 58 is swung to the left, as viewed in Fig.

9, the bars are rocked in a clockwise direction to increase the rake and the openings between bars, and to carry their working edges 50 closer to the path of the blades 26, thus increasing the opening and cleaning action of the cotton; conversely, movement of the guide toward the right diminishes the rake and the bar opening and retracts the working edges. The six bars of each grid or set are simultaneously adjusted, but each of the sets is capable of independent adjustment.

In accordance with another feature of the invention, in order to permit an accurate adjustment of the grids without the necessity of gaining access to the interior of the machine, external means are provided for moving the guides and also for indicating the adjustment. To this end, the outer lower guide 58 of each set or grid is formed with a depending portion 92 carrying a pin 94 which projects through an arcuate slot 96 in the machine frame. The pin engages in the bifurcated end 98 of an adjusting lever 100 which is pivoted on a bolt 102 threaded into the frame. The lever is extended to form a pointer cooperating with a scale 104, which indicates the extent of opening of the grid-bars. To adjust the bars of any grid, it is only necessary to loosen the bolt 102, and then to swing the lever 100 to the proper position on the scale. The bars are then secured in adjusted position by tightening the bolt. Since the pointer end of the lever is of considerable length, the adjustment of the bars may be made with great nicety.

All of the bars of any set or grid are simultaneously adjusted by the lever. The several grids are provided with independent adjusting levers, whereby any desired adjustment or combination of adjustments may be made. In general, it is desirable that the sets 46 of grids at the inlet end be adjusted for considerable rake and wide opening to remove the larger particles of foreign matter, and that the grids of the sections 48 adjacent to the outlet be adjusted for smaller rake and narrower opening to prevent loss of cotton and yet to remove finer particles of foreign matter. In special instances, depending on the character of the cotton, this arrangement may be reversed. The four grids at each side of midlength of the cleaning chamber are not necessarily adjusted to the same position, a progressively finer adjustment in the direction of rotation of the cotton being in many cases desirable.

The grid-bars 44 of the invention are of novel and improved construction, giving an increased range of adjustment to vary their action on the fiber with a lessened range of movement of the adjusting devices. They are provided with the fin 52 at each end by means of which they may be rotated about an axis lying in the plane of their working faces presented toward the rotor and also lying in the seats 62, 84, of the various fixed segments 56, 72, as set forth in my copending application, Serial No. 570,579, filed Oct. 23, 1931, but in the present instance the fin 52 is located so as to have its terminus which engages the seats 62, 84, as nearly in line with the back edge 51 of the working face as is structurally possible, so as to bring the axis of rotation of each bar likewise as close to this edge 51 as can be, in order that the radius about which the working edge 50 swings during angular adjustment may be as long as possible and thus give the greatest actual movement of each working edge toward the beater and away from its neighboring grid-bar, or vice versa, for a given degree of axial rotation of each grid-bar. This arrangement, combined with the disposition of the length of the fin 52 at right angles to the radius joining the working edge 50 with its axis, gives the utmost attainable variation in the opening, rake, and spaced relation of the working edges with respect to the path of the beater-blades, within the limits of the dimensions of the width of working faces and depth of fins of the grid-bars. This permits the range of movement of the movable segments 58, 74, to be held within narrow limits, resulting in an improved structure which holds the grid-bars firmly in adjusted position at the extremes of adjustment as well as at intermediate settings, thus making for accurate setting and the avoidance of undesired vibration under the high-speed action of the beater-blades and attendant wear of the fins and supports.

The construction and arrangement of the baffles 38 are of considerable importance. Since they are disposed directly above the rotor, symmetrically with respect to the vertical axial plane of the rotor, and define passages along which the greater part of the cotton is compelled to pass as much through directing the course of the rapidly circulating air carried around by the blades 26 as by mechanical contact of the cotton with the sides and top of the passages, they assure a definite advance of the cotton for each revolution of the cotton around the interior surface of the cleaning chamber. Thus, the cotton is compelled to travel in a more or less definite helical path through the cleaner, first to traverse the relatively open grids 46 of the inlet end a definite number of times, and then the grids 48 of the outlet end which are adjusted for a different degree of cleaning action. In no event does any of the cotton escape the double cleaning action of both sets of grids.

The oblique passages between the baffles serve to determine the length of time each tuft of cotton is allowed to remain in the cleaning chamber, and the extent of cleaning and opening action effected thereon by the grid-bars, and thus to prevent the cotton hesitating and accumulating within the chamber in its passage from the inlet to the outlet thereof. When heavy charges of fiber are fed into the cleaning chamber, the cotton is prevented from traveling around the chamber in constant contact with a given beater-unit or units, and in a circular path, without advancing axially, which action would result in the introduction of curl and other injury to the character of the cotton thus massed. Heretofore it has been necessary to modify the fan-speed and beater-speed for each material change in the rate of feed of the cotton to the cleaner. Now, however, through the provision of these oblique passages, it becomes unnecessary to change the speed of rotation of the beater and the force of the air draft through the cleaning chamber to accommodate relatively wide fluctuations in the rate of feed of fiber through the cleaning chamber, which greatly increases the utility and simplicity of operation of the improved device.

While I have illustrated and described certain forms in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular forms

shown, or to the details of construction thereof, but what I do claim is:—

1. A cotton cleaner having, in combination, a rotor, a plurality of sets of opening and cleaning instrumentalities cooperating with and disposed end to end longitudinally of the rotor, and means for independently adjusting at least one set of opening and cleaning instrumentalities with respect to its endwise-adjacent set while in working position.

2. A cotton cleaner having, in combination, a chamber having an inlet and an outlet adjacent opposite ends thereof, means causing the cotton to traverse the chamber in helical paths including a rotor in the chamber, and a plurality of sets of opening and cleaning instrumentalities disposed longitudinally of the rotor, the several sets having progressively modified opening and cleaning adjustments in proportion to the travel of the cotton lengthwise of the rotor and its approach to the outlet.

3. A cotton cleaner having, in combination, a rotor, a chamber having an inlet and an outlet adjacent opposite ends thereof, a plurality of grids arranged in sets disposed end to end longitudinally of the rotor, and means for independently adjusting the several sets while in working position.

4. A cotton cleaner having, in combination, a rotor, a chamber having an inlet and an outlet adjacent opposite ends thereof, a plurality of grids each comprising a plurality of grid-bars, the grids being arranged in several sets longitudinally of the rotor, and means for mounting the grid-bars having provision for independent adjustment of the grid-bars of the several sets while in working position.

5. A cotton cleaner having, in combination, a rotor, a chamber having an inlet adjacent one end and an outlet adjacent the other end of the rotor, a plurality of sets of grid-bars arranged end to end longitudinally of the rotor, and means for mounting the grid-bars, the bars at one end being mounted with wider openings than those at the other end.

6. A cotton cleaner having, in combination, a rotor, a chamber having an inlet adjacent one end and an outlet adjacent the other end of the rotor, a plurality of sets of grid-bars arranged end to end longitudinally of the rotor, and means for mounting the grid-bars, the bars at one end having greater rake than those at the other end.

7. A cotton cleaner having, in combination, a chamber having an inlet and an outlet adjacent opposite ends, a rotor, a plurality of sets of grid-bars, and independent devices for adjusting each set while in working position, each adjusting device having provision for simultaneously adjusting all of the bars thereof to equal degrees.

8. A cotton cleaner having, in combination, a rotor, a plurality of sets of grid-bars arranged end to end longitudinally of the rotor, an internal girt, outer guides for each set of bars comprising a fixed upper guide and a movable lower guide, and inner guides including a movable lower guide for each set of bars and an upper fixed guide secured to the girt and having portions overhanging the girt and forming pivotal points for the grid-bars on opposite sides thereof.

9. A cotton cleaner having, in combination, a rotor, a plurality of sets of grid-bars arranged end to end longitudinally of the rotor, outer guides for each set of bars comprising a fixed upper guide and a movable lower guide, having opposed sockets to receive the ends of the bars, an internal girt, a movable lower guide for each set of bars having bar-receiving sockets, and mounted on the girt, and a fixed upper guide secured to the girt and having portions overhanging the girt, the overhanging portions having sockets to engage grid-bars on opposite sides of the grit.

10. A cotton cleaner having, in combination, a rotor, a plurality of sets of grid-bars arranged end to end longitudinally of the rotor, an internal girt, outer guides for each set of bars comprising a fixed upper guide and a movable lower guide, and inner guides including a movable lower guide for each set of bars and an upper fixed guide secured to the guide and having portions overhanging the girt for engagement with grid-bars on opposite sides thereof, and means for independently adjusting the movable outer guides of the different sets, the movable inner guides being actuated through their respective grid-bars.

11. A grid-bar for fiber-cleaning machines having, in combination, a fiber-contacting face, a working edge at one side of such face, and a two-point bearing, one of such points lying in the plane of such face and substantially the width of the face away from the working edge, and the other point lying in a line at right angles to the plane of the face and passing through the first point.

JOSEPH MOSS.