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PATENTED AUG. 13, 1907.

O. BERGSTRAESSER.

APPARATUS FOR LOOSENING AND SPREADING OUT CUT TOBACCO.

APPLICATION FILED OCT. 2, 1906.

Fig. 1.

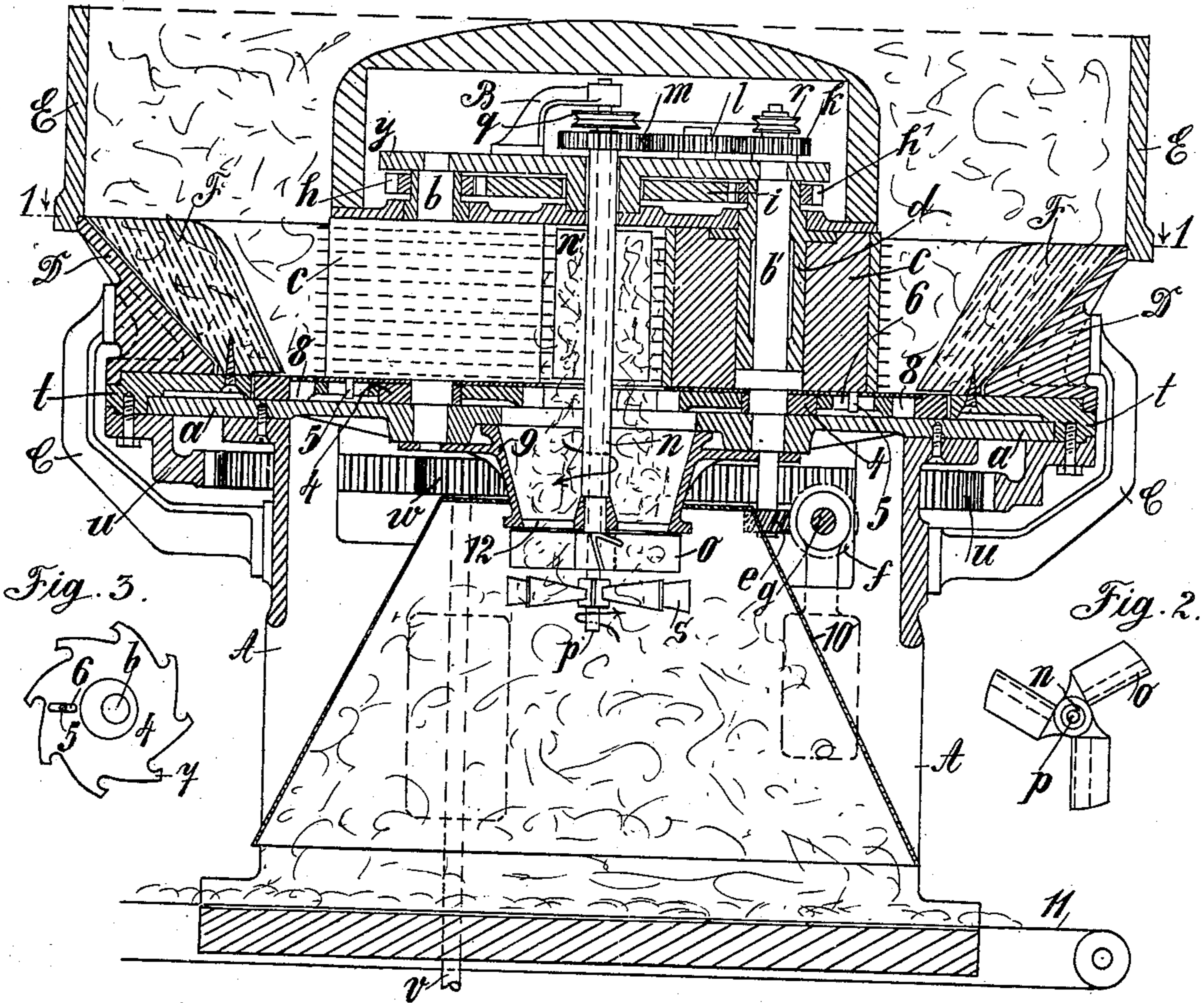


Fig. 3.

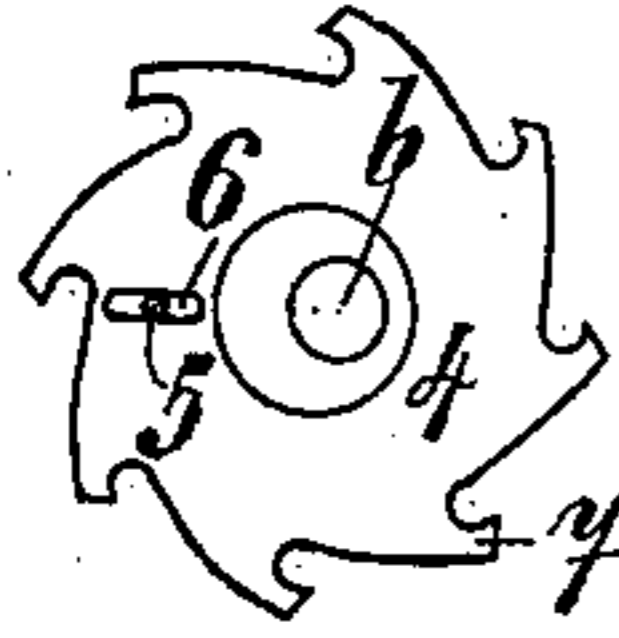


Fig. 2.

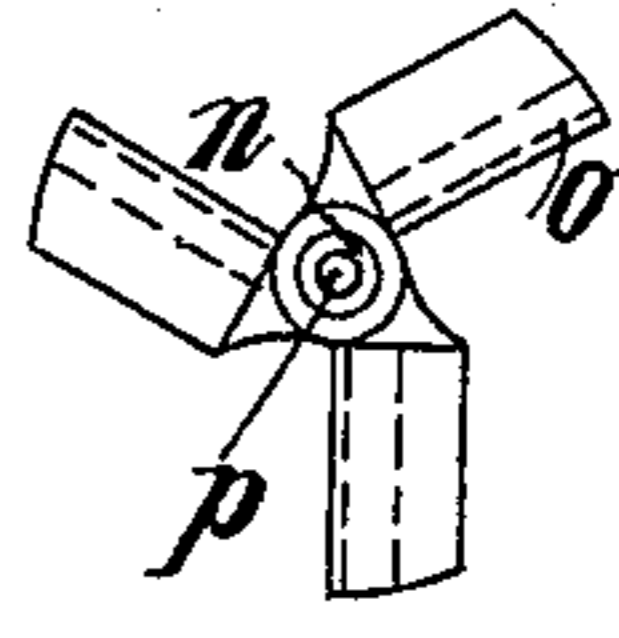
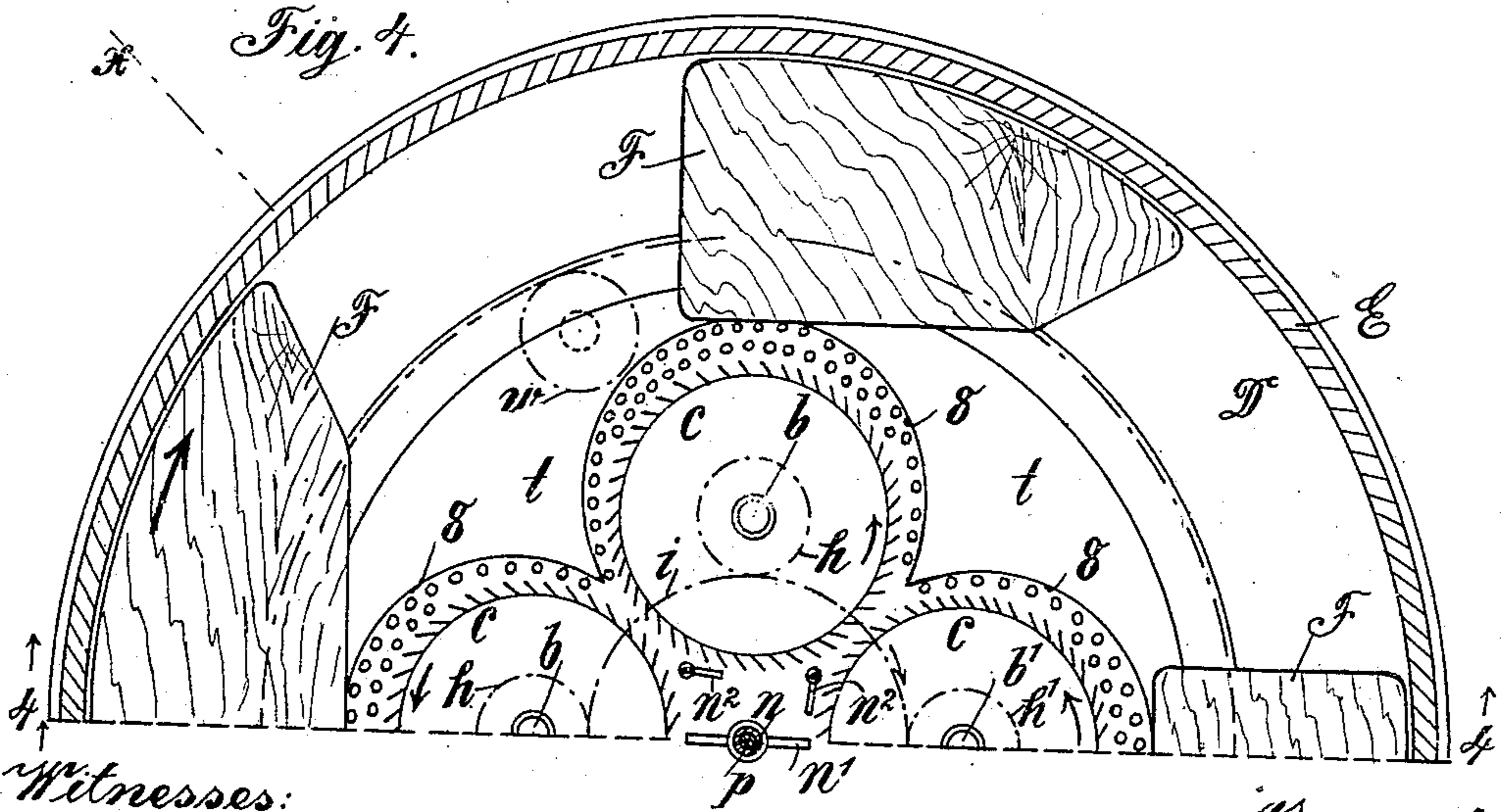


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR LOOSENING AND SPREADING OUT CUT TOBACCO.

No. 863,015.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed October 2, 1906. Serial No. 337,040.

To all whom it may concern:

Be it known that I, OTTO BERGSTRAESSER, a subject of the Grand Duke of Hesse, residing at Dresden, Saxony, Germany, have invented certain new and useful
5 Improvements in Apparatus for Loosening and Spreading Out Cut Tobacco, of which the following is a specification.

Hitherto known devices for loosening and spreading out finely cut tobacco, work with a group of horizontal
10 needle rolls, the rolls rotating with different speeds, and partly intermittently, according to the object for which each of them is intended. The loosened fibers finally fall from the last roll in radial or tangential direction, in the shape of a fiber shower corresponding to the length
15 of the roll.

The present invention relates to a novel construction and working of such apparatus and is characterized by a set of vertical needle rolls.

The peculiar features of the invention will be best
20 understood by examining a construction in which the vertical rolls are arranged in a closed circle forming a hollow space in the center of said circle. The rolls seize the tobacco supplied to them from the outside, and convey the fibers towards the said hollow space, each roll
25 forming a combing roll for the other. In the hollow space the fibers are removed by a rotating stripping-off device, and fall in the direction of the axes of the rolls. A centrifugal wheel may rotate together with the stripping-off device, or two centrifugal wheels rotating in
30 opposite directions on two concentric spindles may be arranged in the path of the falling tobacco fibers. By this means the fibers removed and allowed to fall by the stripping off device are spread out. It is, however, possible to make the spread out fibers into a rope for immediate
35 conversion into cigarettes, by arranging within the path of the falling or spreading fibers, a flattened funnel or hopper and under the hopper, a band traveling in its longitudinal direction and receiving the shower of fibers.

Such a construction of an apparatus according to the present invention is illustrated in Figure 1 in vertical longitudinal section on line 4—4 of Fig. 4. Fig. 2 shows a paddle wheel detached; Fig. 3 a disk with hook shaped grippers likewise detached. Fig. 4 is a
45 cross-section on line 1—1 of Fig. 1.

On a bed plate *a*, supported by a bottom frame A and provided in the center with a circular opening, are mounted vertical spindles *b*. At their upper ends, the spindles *b* are connected by a covering plate *y*. On the
50 spindles *b* are secured hollow hubs *d* of needle rolls *c*. The vertical spindle *b'* of one needle roll is extended upwards and downwards. On its bottom extension is mounted a worm wheel *e* driven by a worm *f* mounted on a driving spindle *g* for rotating the spindle *b'*. The
55 rotation of the spindle *b'* is transmitted by a toothed

wheel gear to the spindles of the other needle rolls and the said toothed wheel gear comprises a driving wheel *h'* secured to the hollow hub of the needle roll belonging to the spindle *b'*, a central wheel *i* which is mounted loosely on a downwardly projecting boss of the covering
60 plate *y* and wheels *h* secured on the hollow hubs of the remaining needle rolls.

The upper extension of the spindle *b'* carries a toothed wheel *k* which, as a driving wheel, transmits the rotation of the spindle *b'* by means of an intermediate
65 wheel *l*, to a driven wheel *m* secured to a spindle *n* guided in the covering plate *y*, the toothed wheels *k l m* transmitting the movement with increased speed. The spindle *n* passes through the hollow space inclosed by the four needle rolls *c*, and carries at its bottom end a
70 small paddle wheel *o* (shown detached in Fig. 2) and in its center a soft rubber or leather blade *n'* which is utilized as a stripping off device for clearing the needle rolls. Fixed stripping off devices *n''* are also arranged in proximity to the needle rolls, said devices also serving
75 to prevent fiber being thrown back into the needle rolls after being removed by the blade *n'*.

The spindle *n* is hollow and through it passes a spindle *p* which is guided in a bracket B mounted on the covering plate *y* and is rotated by a grooved pulley *q*,
80 driven from a smaller grooved pulley *r* mouned on the top end of the spindle *b'*. By crossing the driving cord, the spindle *p* is caused to rotate in the opposite direction to the driving spindle *b'*. To the bottom end of the spindle *p* is secured a paddle wheel *s*, which with the
85 paddle wheel *o* serves to spread or scatter the fiber in a uniform shower. To the bottom frame A is connected, by means of brackets C, a feed hopper D which is also provided with a cylindrical superstructure E adapted to receive the mass of tobacco to be separated.
90

In the feed hopper surrounding the concentrically arranged needle rolls, are wedge-shaped drivers F adapted to stir and move the tobacco toward the needle rolls. These drivers are carried by a circular bottom plate *t* provided with a toothed rim *u* and may
95 rest against the oblique surface of the hopper D. The toothed rim *u* is driven from a spindle *v* through a toothed wheel *w*, whereby the drivers F are rotated concentrically around the set of rolls.

Between the bed plate *a* and the needle rolls *c*, are
100 disks 4, the shape of which is shown in Fig. 3. These disks 4 are loose, mounted eccentrically on the spindles *b* of the rolls, and are driven by tappets 5 in the needle rolls working in slots 6 of the disks. At their periphery the disks are provided with hook shaped
105 grippers 7 traveling in slots 8 arranged immediately below and in front of the rolls, but covered by gratings, said grippers being adapted to carry away fiber which may drop below and escape the needle rolls to the discharge opening. To the underside of the bed plate *a*
110

is secured a hopper neck 9, constituting the discharge opening and below it is a larger flattened hopper 10. Under the said flat hopper 10 a conveyer band 11 travels in horizontal direction for carrying off the op-
5 erated and discharged tobacco.

The working of the apparatus is as follows:—From the finely cut tobacco surrounding them the needle rolls *c* remove fibers which, with their tangentially arranged needles, they pull towards the center on the
10 side rotating inwards. The needles of one roll, rotating inwards, meet, at the junction between each two rolls, the needles rotating outwards of the adjoining roll, which remove the excess from the fibers seized by the former. The fiber fleece carried on by the nee-
15 dles passes into the hollow space between the rolls and is then removed, by the quickly rotating rubber blades of the stripping off device *n'*. It has been found unnecessary to make the stripping-off device to engage with the needles of the rolls. It is sufficient if it just
20 glides over the said needles. Probably the movement of air produced by the rotating blades, and the adhesion or friction between the fibers of the fleece, cause even the fibers which are not directly seized by the stripping-off device to come out from the needles. In
25 this way, it is possible to make the stripping-off device with rubber blades, but instead of the rubber blades, toothed combs might be arranged, engaging with the needles of the rolls.

The fixed stripping-off devices *n*², loosely mounted
30 on their pins, have been found advantageous, as they prevent accumulation of tobacco fibers at the junction between the rolls. They are pressed outwards against the needles of the rolls, partly by direct contact with the rubber blades, and partly by the shock of the fibers
35 flying in the hollow chamber, and must be really considered as being more in the nature of screens, than that of stripping-off devices, for they prevent the fibers already removed by the rotating stripping-off device, from being again thrown against the fleece-covered
40 circumference of the rolls and from being retained by the fleece of the needles.

The fibers detached from the rolls in the above described manner, fall in the shape of a cylindrical fiber shower through the hole in the bottom plate *a*, into the
45 hopper neck 9, and, if it is desired to loosen tobacco, which is to be treated subsequently, into a box arranged below it.

In the construction illustrated in the drawing, it is intended, however, to form the fibers into a rope. The
50 hopper 10 converts the cylindrical fiber shower into a strip-shaped one. The paddle wheels *o* and *s* arranged directly under the neck 9, and rotating in opposite directions, spread out the fibers in a uniform and loose manner, the rotation of the two wheels in the opposite
55 direction preventing in any case any interference with the movement of the fibers removed from the stripping-off device, which could lead to their forming lumps. In order to insure loosening of any lumps, the upper wheel *o*, in the construction illustrated, coöperates,
60 by means of its angularly bent blades (see cross-section in Fig. 1) with cross-bars 12 arranged in the neck 9, the action being that of shears which however do not cut but merely knock off the fibers suspended on the cross-bars.

65 It is possible that the fiber shower obtained from a

cylinder by flat compression, will not be of the same density throughout. Nevertheless, a uniform rope will be produced, as the band 11 is constantly moving in the direction of the fiber shower.

The drivers *F* arranged in the feed hopper and ro- 70 tating concentrically with the set of needle rolls, prevent the rolls from running idly, after having treated all the fibers within their reach, that is to say, they constantly supply new fibers to the rolls. The wedge-shaped form of the drivers insures better movement 75 of the tobacco.

The slots 8 arranged immediately below and in front of the rolls and covered by gratings, serve to receive tobacco which had not been seized by the needles, and which was separated from the contents of the hop- 80 per when the tobacco fibers were seized. From this space it is conveyed into the space inside the rolls by means of the disks 4 provided with hook-shaped grippers and rotated by the needle rolls.

It was mentioned in the introduction that the peculiar features of the invention appear in the clearest possible way in the construction illustrated in the drawing, with a set of rolls arranged in the shape of a closed circle, but it is obvious that some of the rolls may be omitted as a number of rolls less than sufficient to form 90 a closed circle will operate to good advantage and further some of the rolls may operate solely as combing rolls, in view of which I do not wish to be limited herein to the specific arrangement shown and described. 95

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes, and a stripping-off device adjacent to said rolls. 100

2. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, and a rotating stripping-off device in said space. 105

3. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping off device, and fixed stripping-off devices in said space. 110

4. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, and a feed hopper surrounding said needle rows. 115

5. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space and a centrifugal wheel arranged below said space. 120

6. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent 125 130 135

rolls, a rotating stripping-off device in said space and two centrifugal wheels mounted on concentric spindles and means to rotate said wheels in opposite directions.

7. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, and a centrifugal wheel arranged below said space and cooperating fixed cross-bars in proximity to said centrifugal wheel.

8. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, a centrifugal wheel arranged below said space, a flattened hopper arranged below said space to receive fibers falling therefrom, an endless band below said hopper and means to give travel to the band in a longitudinal direction relatively to the hopper.

9. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, a feed hopper surrounding said needle rows, and wedge shaped

drivers arranged circumferentially within said hopper and means to rotate said drivers.

10. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, a feed hopper surrounding said needle rows, a series of slots arranged within said hopper, immediately below and in front of the needle rolls, gratings covering said slots, and means to remove tobacco, falling into said slots therefrom, and carry it to below said inclosed space.

11. In apparatus for loosening and spreading out cut tobacco, and in combination, a plurality of needle rolls rotatable on vertical axes and arranged adjacent to each other so as to inclose a space, the needles of said rolls being arranged in rows, the rows of each roll alternating with and engaging between needle rows of the adjacent rolls, a rotating stripping-off device in said space, a feed hopper surrounding said needle rows, a series of slots arranged within said hopper, immediately below and in front of the needle rolls, gratings covering said slots, rotatable disks with peripheral grippers engaging in said slots, and means to rotate said disks.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

OTTO BERGSTRAESSER.

Witnesses:

OTH. HOCK,

RICHARD IFFERTE.