(No Model.) 2 Sheets—Sheet 1.

G. E. WILLETT.

MACHINE FOR COMBING AND MIXING BRISTLES, &c.

No. 350,649. Patented Oct. 12, 1886.

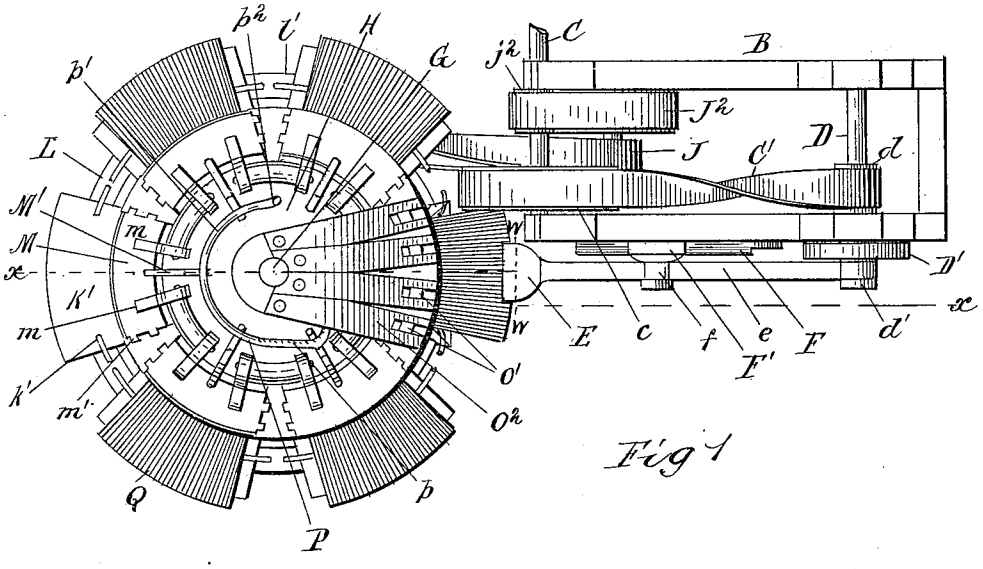


Fig 1

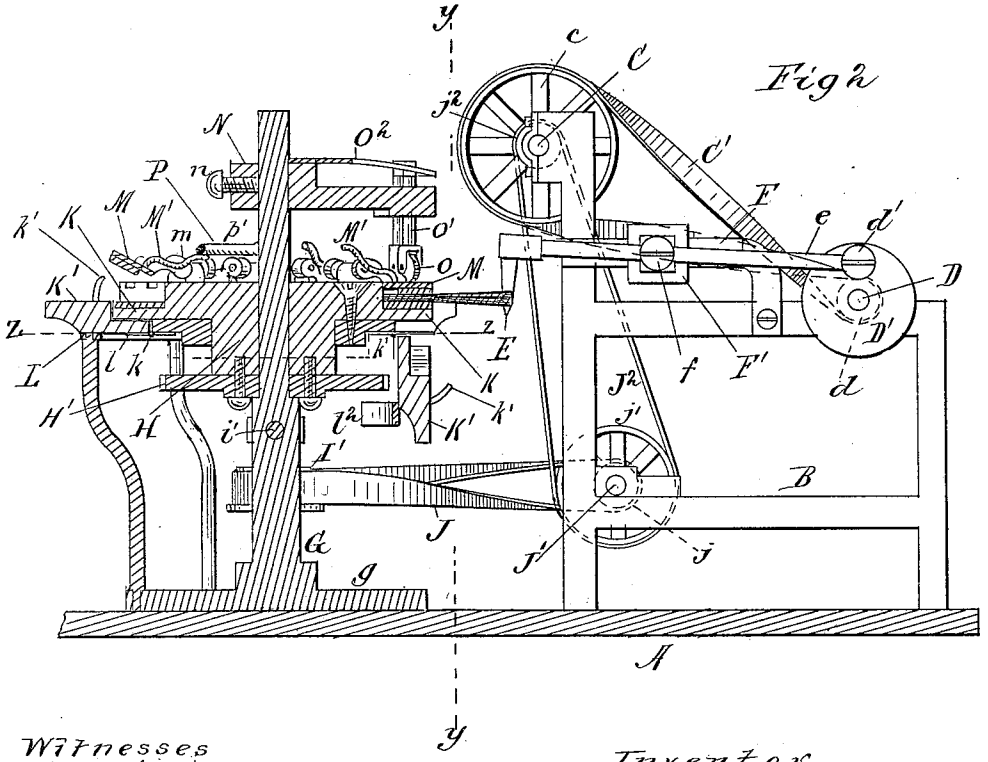


Fig 2

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(No Model.) 2 Sheets—Sheet 2.

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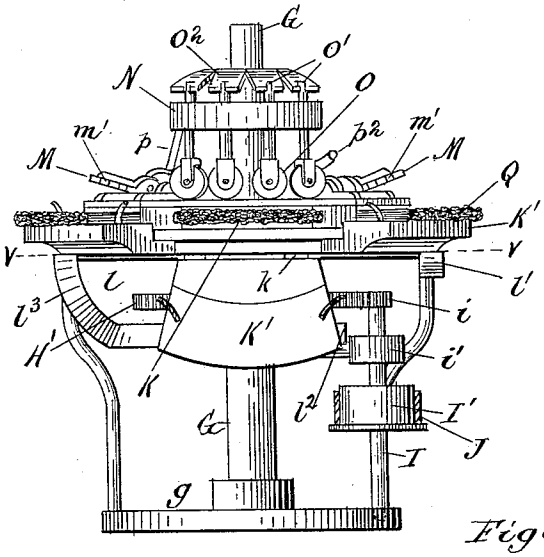


Fig 3

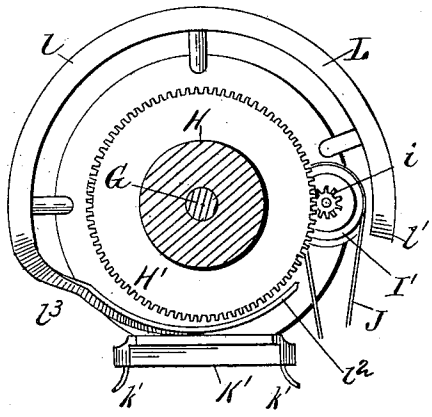


Fig 4

Fig 5

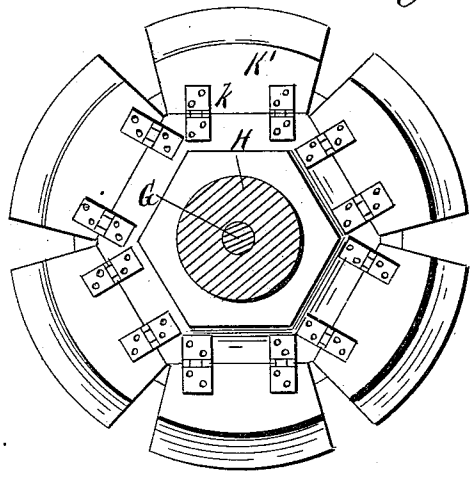


Fig 6

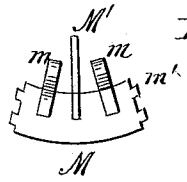
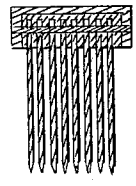


Fig 7



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UNITED STATES PATENT OFFICE.

GEORGE E. WILLETT, OF ENGLEWOOD, ILLINOIS.

MACHINE FOR COMBING AND MIXING BRISTLES, &c.

SPECIFICATION forming part of Letters Patent No. 350,649, dated October 12, 1886.

Application filed December 12, 1885. Serial No. 185,535. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. WILLETT, a citizen of the United States, and residing at Englewood, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Machines for Combing and Mixing Bristles, Tampico, &c., which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a machine embodying my invention; Fig. 2, a sectional view of the same, taken on the line *x x* of Fig. 1; Fig. 3, a sectional view taken on the line *y y* of Fig. 2; Fig. 4, a detail plan section taken on the line *z z* of Fig. 2; Fig. 5, a bottom plan sectional view taken on the line *v v* of Fig. 3; Fig. 6, a detail view of one of the holding-plates detached, and Fig. 7 a detail sectional view taken on the line *w w* of Fig. 1.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to machines for combing and mixing bristles, tampico, and other like fibers used in the manufacture of brushes, its object being to produce a machine in which the bristles, &c., may be thoroughly mixed and combed, so that the fibers will be cleaned and left in a uniform position without crossing or tangling.

My present invention is in the nature of an improvement upon the construction set forth in Letters Patent No. 142,427, granted to George Willett, September 2, 1873.

I will now proceed to describe a construction in which I have practically carried out my invention in one form, and will then particularly point out in the claims those features which I deem to be new and desire to protect by Letters Patent.

In the drawings, A represents the base upon which the machine is mounted, which base may be the floor of the room, or any other suitable platform. The machine consists of two parts connected only by the belting which transfers the power from the one to the other, one part consisting of the comb and its operating mechanism, and the other of a revolving table to hold the bristles or other fibers and bring them into position to be subjected to the operation of the comb.

B indicates the frame-work which supports the comb and its operating mechanism. The drive-shaft C is mounted in the upper part of this frame-work, and is supplied with power in any suitable manner. A pulley, *c*, on this drive-shaft transmits, by means of a cross-belt, C′, and pulley *d*, the power to the comb-actuating shaft D. This shaft is provided on its projecting outer end with a crank-wheel or crank, D′, to which one end of the comb-bar *e* is pivoted, as shown at *d′*, the comb E being attached to the opposite end of the comb-bar.

F indicates a slide or way attached to the frame B, and F′ a sliding block mounted on the said way and having the comb-bar *e* pivoted to it at *f*. The slide F and sliding block F′ are arranged at a height equal to the highest point reached by the crank-pin *d′*, and preferably at a height slightly above the said point, for the purposes hereinafter described.

The comb may be of any suitable construction—such, for instance, as that shown in Fig. 7 of the drawings—although this construction forms no feature of my invention, and therefore needs no detailed description.

G indicates a vertical shaft or standard provided with a foot, *g*, by means of which it is attached to the base A. Upon the reduced upper portion of this shaft is mounted the revolving table H, which turns freely upon the said shaft. This table has attached to its lower portion in any suitable manner a gear-wheel, H′, which meshes with a small pinion, *i*, on a shaft, I, having its lower end stepped in a bearing in the standard-foot *g*, as shown in Fig. 3 of the drawings, its upper portion being supported by a bearing, *i′*, attached to the standard G. The shaft I is provided with a pulley, I′, from which a belt, J, is carried over a pulley, *j*, attached to a shaft, J′, mounted in the frame B. This shaft is connected by means of a belt, J², and suitable pulleys, *j′ j²*, to the drive-shaft C. By this means the power is transmitted from the drive-shaft to the revolving table H, which is thus turned upon the shaft G at a slow rate of speed.

The revolving table H is provided at its outer edge with a series of bed-plates upon which the bristles rest, and with a corresponding number of holding-plates to hold the bristles in place upon the bed-plates, as herein-

after described. Each bed-plate consists of a fixed portion, K, which forms a part of or is rigidly attached to the revolving table H, and an outer hinged portion, K′, which extends beyond the fixed portion, level with the same when in position, and is hinged to the table H, as shown at *k* in Figs. 2 and 3 of the drawings. These hinged portions K′ of the bed-plates are supported in position by means of a cam-guide, L, constructed in the manner shown in detail in Fig. 4 of the drawings. This cam is provided with a flat or horizontal portion, *l*, arranged immediately underneath the projecting hinged bed-plates K′ for about two thirds of the circumference of the table, the said hinged portions resting upon this flat portion *l*, which holds them in a position level with the fixed portions K. One end of the cam-guide L terminates at *l′* at one side of the comb, the other end being depressed in advance of this point, as shown at l^2, and merging into an incline, l^3, which leads up to the horizontal portion *l*. It will be seen that as the table rotates the hinged portions of the bed-plates will, as they successively reach the point *l′*, drop down, being no longer sustained by the cam-guide, and will remain in this lowered position until they strike the incline l^3, which will lift them again gradually to their former position on a level with the fixed portions of the bed-plates. The hinged portions K′ are provided with outwardly-bent arms *k′*, for the purposes hereinafter described.

The holding-plates M are arranged immediately above the fixed parts K of the bed-plates, with the dimensions of which they correspond, and are hinged to the table H by means of lugs *m*, or in any other suitable manner. They are provided at each end with projecting lugs *m′*, which fit within corresponding recesses in the upper face of the table H, for the purpose hereinafter stated, and are preferably faced with felt or some other similar material, as are also the fixed portions of the bed-plates, for the purpose of better holding the bristles. These holding-plates are supported and operated by the following mechanism:

N represents an arm adjustably secured to the projecting upper end of the shaft G by means of a set-screw, *n*, or in any other suitable manner. A series of pressure-rollers, O, is mounted on stems O′, extending upward through bearings in the arm N, which latter is provided with a series of springs, O^2, which bear against the upper end of the said stems and force them downward. The arm N and the pressure-rollers mounted therein are so arranged that these latter are at a point immediately opposite to the comb, as shown in Figs. 1 and 2 of the drawings. These rollers bear upon the upper surface of each holding-plate as it passes under them, and hold the said plate firmly upon the fibers, which rest upon the bed-plate underneath during the operation of combing.

P indicates a cam-guide which is attached to the arm N, or to any other suitable fixed portion of the frame, and which operates in conjunction with inwardly-projecting arms M′, attached to the holding-plates M. The cam P is provided with an inclined portion, *p*, and a horizontal portion, *p′*, terminating at p^2, as shown in Fig. 1 of the drawings. The incline *p* serves to raise the holding-plates successively by pressing downward the arms M′ as they come in contact with the said incline, and the horizontal portion *p′* serves to hold the holding-plates in this raised position during the greater portion of the revolution of the table, the plates dropping when they reach the termination p^2 of the cam, the arm M′ becoming free at this point from the cam.

In the operation of the machine, the attendant stands at that part of the table diametrically opposite to the comb, at that point in Fig. 1 where one of the bed-plates is shown without any bristles in place upon it. The attendant places upon the bed-plate in front of him two or more layers of differently-colored bristles, tampico, or other fibers, and spreads the said layers upon the bed-plate, their position when in place being indicated by the reference-letter Q in the several figures of the drawings. Each successive bed-plate as it comes opposite the attendant is supplied with fibers in a similar manner. As each bed-plate, with its layer of bristles, approaches near to the comb the arm M′ of the holding-plate M passes clear of the extremity p^2 of the cam P and the holding-plate drops, thus clamping the inner ends of the bristles between the plate and the fixed portion K of the bed-plate. The hinged portion K′ of the bed-plate next passes clear of the termination *l′* of the cam L and leaves the fibers held between the holding-plate and fixed portion of the bed-plate with the greater portion of their length projecting, as shown in Figs. 1 and 2 of the drawings. As the table continues its revolution the holding-plate passes underneath the pressure-rollers O, which press it firmly upon the fibers and prevent these latter from being torn out from between the two holding-jaws by the action of the comb. The bristles are now subjected to the combing and cleaning action of the comb, which brings the fibers into parallelism, while at the same time it removes any loose ends or dirt. It will be observed, as hereinbefore pointed out, that the slide F′, to which the comb is pivoted, is arranged a little above the extreme upper point attained by the crank-pin *d′*, which operates the comb. By reason of this construction the comb enters the fibers at a point immediately adjacent to the edge of the table with an almost direct vertical downward movement, and is then drawn outward, being depressed a very little during the outward movement, and having no upward movement whatever until entirely clear of the extremities of the fibers. This movement of the comb is highly important, since it resembles more nearly the action of combing as practiced by hand, and avoids any upward motion of the

comb among the fibers, which would tend to disarrange the same, which upward motion would be unavoidable if the comb were given the ellipsoidal motion consequent upon placing the slide F′ on a line between the fibers and the shaft D. After each lot of fibers has been subjected to the action of the comb, and has passed clear of the same, the hinged portion K′ of the bed-plate strikes the incline l^2 of the cam L, and is brought up into its original position again, thereby supporting the projecting ends of the fibers. The fibers being thus supported, the holding-plate is no longer necessary, and is lifted by reason of the contact of the arm M′ with the incline p of the cam P, the holding-plate being held in this position until it once more reaches the termination p^2 of said cam. When the fibers have once more been brought opposite the workman, he gathers them up in his hands, forms a bundle of them, turns them end for end, and places them once more upon the bed-plate, the operation of forming the bundle mixing the various-colored fibers together, while the placing of them end for end subjects the ends of the fibers which were previously untouched by the comb to its action at the proper time. The operation may be continued indefinitely until the fibers are thoroughly mixed and combed, when they may be removed from the bed-plate and others substituted. The outwardly-bent arms k' of the hinged portions K of the bed-plate enable these portions as they rise to gather in the fibers toward the center, and prevent any loose fibers from projecting at the sides. The lugs m' on the holding-plates M serve, in conjunction with the recesses in the table H, in which they fit, to prevent any of the fibers from being caught in the radial space between the ends of each holding-plate and the edges of the table adjacent thereto. By adjusting the arm N up or down upon the shaft G the pressure of the springs O^2 upon the stems of the pressure-rollers O, and consequently the pressure of these latter upon the holding-plates, may be regulated, and in case the cam-guide P is attached to this arm, as in the construction shown, this guide may be simultaneously adjusted by the adjustment of the arm to raise the holding-plates to a greater or less extent, as desired.

It is obvious that various modifications in the details of construction and arrangement of the parts may be made without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to the precise details hereinbefore described, and shown in the drawings.

I am aware of Letters Patent No. 240,036, granted April 12, 1881, to A. S. Miles, which show a revolving tray provided with an annular space into which bristles are discharged from a trough, and I therefore do not wish to be understood as claiming such a construction.

I am also aware that holding-plates for holding bristles, tampico, and the like have been provided with facings of rubber, such a construction being shown in Letters Patent No. 159,209, granted January 26, 1875, to W. F. Parks and L. F. Lannay. The rubber, however, injures the fibers, not only by reason of its chemical composition, but also on account of the fact that it retains the oil and dirt upon its surface, so that these substances accumulate in such a way as to injure the fibers which are afterward placed between these holding-plates.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for combing bristles, the revolving table provided with holding plates or jaws to receive and hold the bristles and present them successively to the action of the comb, substantially as and for the purposes set forth.

2. In a machine for combing bristles, &c., the combination, with the comb, of a revolving table provided with holding plates or jaws to receive and hold the bristles and present them successively to the action of the comb, and means for operating the comb, substantially as set forth.

3. In a machine for combing bristles, &c., the revolving table provided with a series of bed-plates to receive the bristles, and holding-plates to hold the bristles in place upon the bed-plates, substantially as and for the purposes specified.

4. The combination, with the revolving table provided with bed-plates to receive the bristles, of holding-plates hinged to the table above the bed-plates, and a cam-guide to raise and lower the holding-plates, substantially as and for the purposes specified.

5. The combination, with the revolving table and its bed-plates, of the hinged holding-plates and their operating-cam, and pressure-rollers arranged to bear on the holding-plates, substantially as and for the purposes specified.

6. The combination, with the revolving table and the holding-plates hinged thereto, of the pressure-rollers O, having stems O′, the adjustable arm N, through which the said stems pass, and the springs O^2, substantially as and for the purposes specified.

7. The combination, with the revolving table, of the bed-plates consisting of a fixed portion, K, and a hinged portion, K′, and a cam-guide to operate the said hinged portion, substantially as and for the purposes specified.

8. The combination, with the revolving table provided with the holding-plates M, and a cam-guide to operate the same, of the bed-plates consisting of a fixed portion, K, and a hinged portion, K′, and a cam-guide to operate the said hinged portion, substantially as and for the purposes specified.

9. The combination, with the table provided with suitable bed-plates and recesses, of the holding-plates provided with projecting lugs to fit within the recesses, substantially as and for the purposes specified.

10. The combination, with the hinged portions K′ of the bed-plates, of the outwardly-bent arms *k′*, attached thereto, substantially as and for the purposes specified.

11. The combination, with the comb-actuating shaft and its crank, of the comb-bar provided at one extremity with a comb and connected to the crank at its other extremity, and a sliding block mounted on a suitable slide or way, to which block the comb-bar is pivoted at a point between its extremities, substantially as specified.

12. The combination, with the comb-bar and its actuating-crank, of the sliding block, to which the comb-bar is pivoted, the said block being mounted on a way arranged at a height equal to or slightly above the highest point reached by the crank, substantially as and for the purposes specified.

GEORGE E. WILLETT.

Witnesses:
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IRVINE MILLER.