S. METCALFE.

WOOL-COMBING MACHINE.

No. 185,772. Patented Dec. 26, 1876.

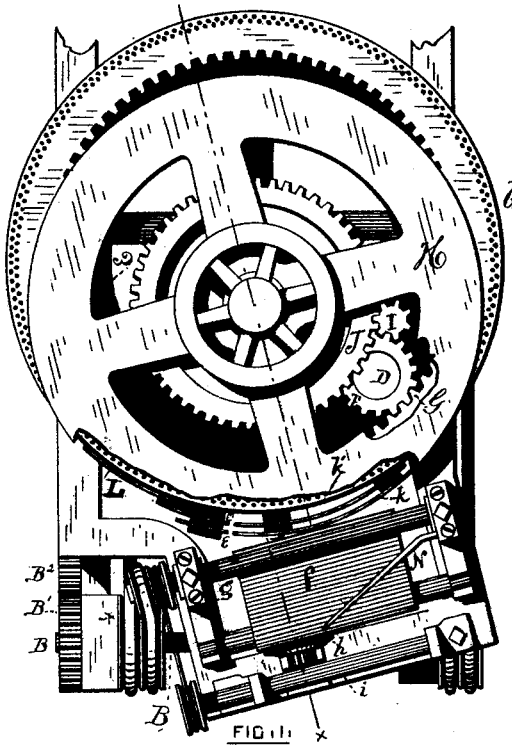

FIG. 1.

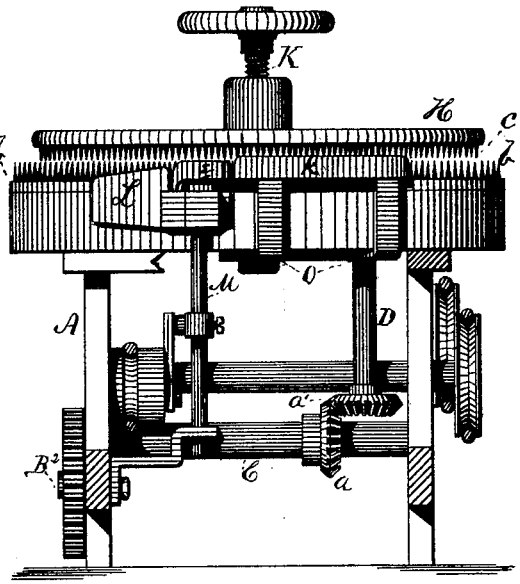

FIG. 2.

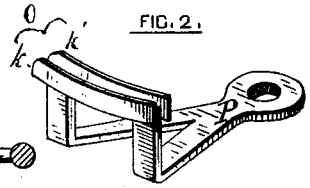

FIG. 5.

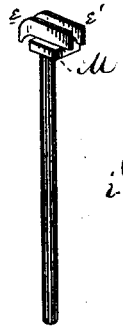

FIG. 4.

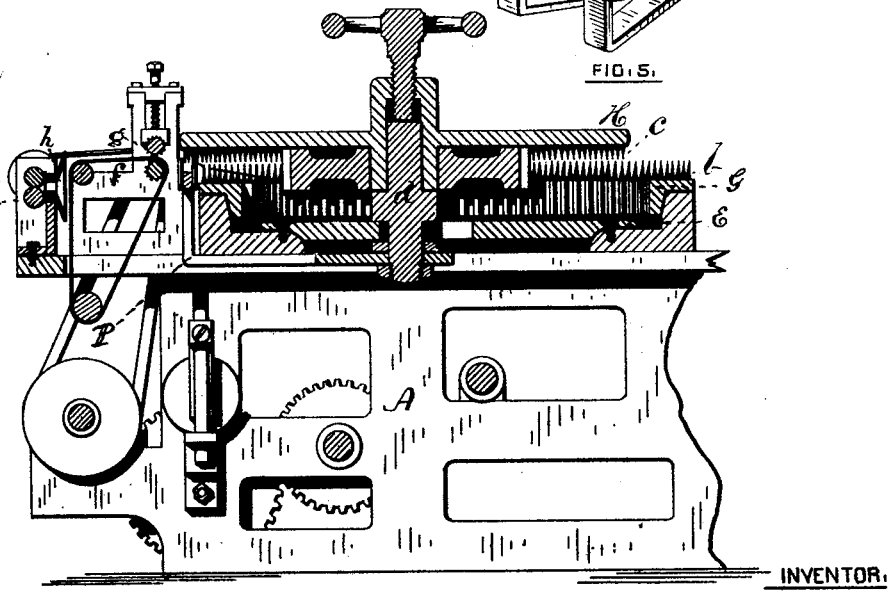

FIG. 3.

WITNESSES.

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IMPROVEMENT IN WOOL-COMBING MACHINES.

Specification forming part of Letters Patent No. **185,772**, dated December 26, 1876; application filed February 12, 1876.

To all whom it may concern:

Be it known that I, SAMUEL METCALFE, of Poquonock, in the town of Windsor, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Wool-Combing Machines; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

The invention hereinafter described is an improvement upon the well-known "Lister" machine for combing wool; and consists in certain features, which will be particularty described in their relation to, and connection with, the other parts of the machine.

Referring to the drawings, A represents the main frame of the machine. The power is applied to a driving-pulley on the end of the shaft B, Fig. 1. This shaft carries a toothed wheel, B^1, which engages with the intermediate pinion B^2, from which motion is communicated to the shaft C, Fig. 2, by means of a gear-wheel (not shown) on the end of the shaft. The shaft C, through the medium of the bevel-gear wheels *a a'*, gives motion to the vertical shaft D, which is supported in a long sleeve-bearing depending from an annular plate, E, Figs. 1 and 3, constituting a part of the main frame. The upper end of the shaft D carries a toothed wheel, F, which engages with the interior gear cut on the annular plate G, and causes the latter to revolve in a horizontal plane on a circular track supported by the annular plate E. Around the exterior edge of this revolving ring or annulus two or more rows of spur-points are set, alternating in position with each other, and extending vertically upward, as shown at *b*, Figs. 2 and 3. The function which these spur-teeth perform is to receive and hold the tufts of wool or material to be combed, which are supplied to the toothed annulus as it revolves from suitable feeding mechanism, and which, in the "Lister" machine, consists of two vibrating frames set, respectively, on eccentric shafts, and working in alternation with each other in approaching toward and retreating from the traveling toothed annulus, by a four-motion movement, which enables the sliver held in the feeders, respectively, between fluted feeding-rollers, which rollers have a slow rotary movement, derived from the rotation of the eccentric shaft, upon which the feeders are mounted, to be drawn downward upon the spur-teeth, whereby, as the feeders retreat, tufts are drawn out of the sliver and left upon the spur-teeth, in a manner analogous to that in which the operation of filling combs by hand is performed. The material, as it is deposited upon the spur-points, is carried along by the revolution of the toothed annulus G for a certain distance, when the free ends of the succession of tufts, or continuous "beard," as it is called, of material is combed by the action of suitably-arranged combing mechanism. The machinery by which the ends of the tufts or beard projecting beyond the circular rows of holding-teeth is combed is not shown in the drawing; neither is the feeding mechanism for filling the combs shown, for the reason that both mechanisms are well understood by those familiar with the construction and operation of combing machinery.

It is to be understood, therefore, that in the machine containing my improvements the "Lister" system of revolving annulus, carrying rows of holding-teeth, combined with suitable feeding mechanism for filling the teeth with tufts from the previously-prepared sliver, and with suitable mechanism for combing the free ends of the tufts, is to be employed.

The first feature of my invention consists in the devices by which the tufts of material can be transferred from the spur-points, by which they were held when one of their ends was combed, to a set of gill-comb teeth, through which the tufts are to be subsequently drawn, whereby the other ends or butts of the tufts are combed.

H, Fig. 1, is a comb, which is, in form, a circular plate of about twelve inches less diameter than the circular revolving plate or annulus G, Fig. 3. It is furnished around its exterior edge with several rows of gill-teeth, *c*, Figs. 2 and 3, which project vertically downward. The plate H is mounted on a vertical stud-pin, *d*, as shown in section at Fig. 3,

around which it is capable of revolving by means of the pinion I, Fig. 1, which derives its motion from the toothed wheel F, Fig. 1, on the shaft D, and engages with the gear-wheel J on the under side of the circular comb-plate H. By means of the adjusting-screw K the relative distance which the teeth of the comb shall occupy with respect to the circular rows of holding spur-points *b* can be varied at pleasure. The path of revolution of the gill comb teeth *c* intersects the path of revolution of the holding spur-points *b*, so that at the place where the combed wool is to be taken off the machine, the extent to which the path of revolution of the gill-teeth projects beyond the path of revolution of the holding-points shall be about one-quarter of an inch, more or less, depending upon the condition of the material as to cleanliness, and provision should exist for varying this distance by making the stud-pin *d* adjustable in its position by means of a slot and clamp-screws, or other convenient means. As the circular rows of holding-teeth revolve, the material held by them, which has already had its free ends combed, comes into contact with the inclined face of a stationary plate, L, Fig. 2, which is concentric with the revolving toothed annulus G, and is located in a vertical plane passing through the intersection of the paths of revolution of G and H, whereby the material is lifted off the spur-points *b* and transferred to the gill-teeth *c*. A presser, M, (shown in perspective at Figs. 2 and 4,) has a constant up and-down movement given to it by means of a crank or eccentric, and, acting upon the under side of the material, lifts it farther, and presses it well into the teeth of the gill-comb. The face of the presser is rounded or inclined next to the plate L, and the two vertical plates *e e'*, of which its head is composed, are far enough apart to allow the rows of gill teeth to enter between them when the presser is raised to the highest point.

The next operation of the machine is to draw off the material in the form of a web, which is gathered together into a sliver by passing through a trumpet-mouth. This operation is effected in this machine, as in others of its class, by means of an endless apron, *f*, fluted drawing-rollers *g*, trumpet *h*, and delivery-rollers *i*. By this operation the material is drawn through the gill comb teeth *c*, and thereby its combing is completed.

As in this machine it is intended that both the long and the short staple of the material shall be drawn into the web and compose the sliver, it is desirable to provide some means for preventing the very short staple from following the endless apron and running off into waste without mixing with the web, and the device hereinafter next described is one which has heretofore been employed for this purpose in combing-machines. N is a light rod or bar of metal, pointed at its end, which is secured to some convenient part of the frame which supports the rollers of the drawing-apron, and bears with a light pressure upon the apron. It is arranged to lie angularly with the path of travel of the apron, and its point terminates near the flaring mouth of the trumpet *h*. Its office is to form a barrier, against which the short fibers of the material running to waste will be arrested, and then, in combination with the traveling apron, give to such fibers movement in a direction toward the web, and compel them to finally join the sliver. Any preferred shape or contour may be given to this device so long as it is not deprived of the function which it is intended to perform.

Another feature of my invention is the guard O. (Shown in top view at Fig. 1, and detached at Fig. 5.) It consists of two plates, *k k'*, which stand vertically, and are attached to a radius-arm, P. These plates are of the curvature of an arc of the circle in which the gill-comb teeth *c* move, and are at a distance apart sufficient to allow such teeth, as the plate to which they are affixed revolves, to pass freely.

This guard serves a treble purpose: First, it presses the material between the gill-comb teeth while the drawing-apron is acting to draw the material through the teeth; secondly, the front plate *k* sustains the teeth against the effect of any unusual strain in the drawing-off operation; and, thirdly, it prevents dirt and noils escaping from the points of the comb-teeth becoming mixed with the web of combed stock.

The radius-arm P is attached to the stud-pin *d*, so that the proper relation of the guard-plates *k k'* to the gill-comb is always preserved, whatever adjustment may be made of the revolving disk-plate H relatively to the revolving disk-plate G.

The noils and dirt which adhere to the gill-comb are removed by revolving clearer-brushes in a well-understood way, which is not shown in the drawings, and needs no description.

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

1. The combination, in a machine for combing fibrous material, of a set or sets of spur-points for holding the material revolving around a common center, a set or sets of gill-comb teeth, also revolving around a common center, but whose path of revolution intersects the plane of the path of the holding-points, as described, and a stationary inclined plane, or equivalent device, for transferring the material from the holding-spurs to the gill-comb, substantially as specified.

2. The combination, in a machine for combing fibrous material, of a set or sets of spur-points for holding the material revolving around a common center, a set or sets of gill-comb teeth, also revolving around a common center, but whose path of revolution in-

tersects the plane of the path of the holding-points, as described, and a vibratory presser, M, for packing the material between the teeth of the gill-comb, substantially as specified.

3. The combination, in a combing-machine, of a circular revolving gill-comb, guard-plates *k k'*, concentric with such comb, for holding the material between the comb-teeth while it is being drawn through them, and a drawing-off apron and drawing-rollers for drawing the material through the comb, substantially as described.

4. The combination of a circular revolving comb, as described, suitable drawing-off mechanism, as described, and stationary guard-plates concentric with the row of comb-teeth, and extending below their points, to prevent the noils and dirt from being incorporated with the drawn-off sliver, substantially as described.

5. The combination of a circular revolving comb, as described, suitable drawing-off mechanism, as described, and the stationary plate *k*, to give support to the comb-teeth against unusual strains from the pull of the drawing-off mechanism, substantially as specified.

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Witnesses:

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