

(No Model.)

3 Sheets—Sheet 1.

H. WYMAN.

WOOL COMBING MACHINE.

No. 385,690.

Patented July 3, 1888.

Fig. 1.

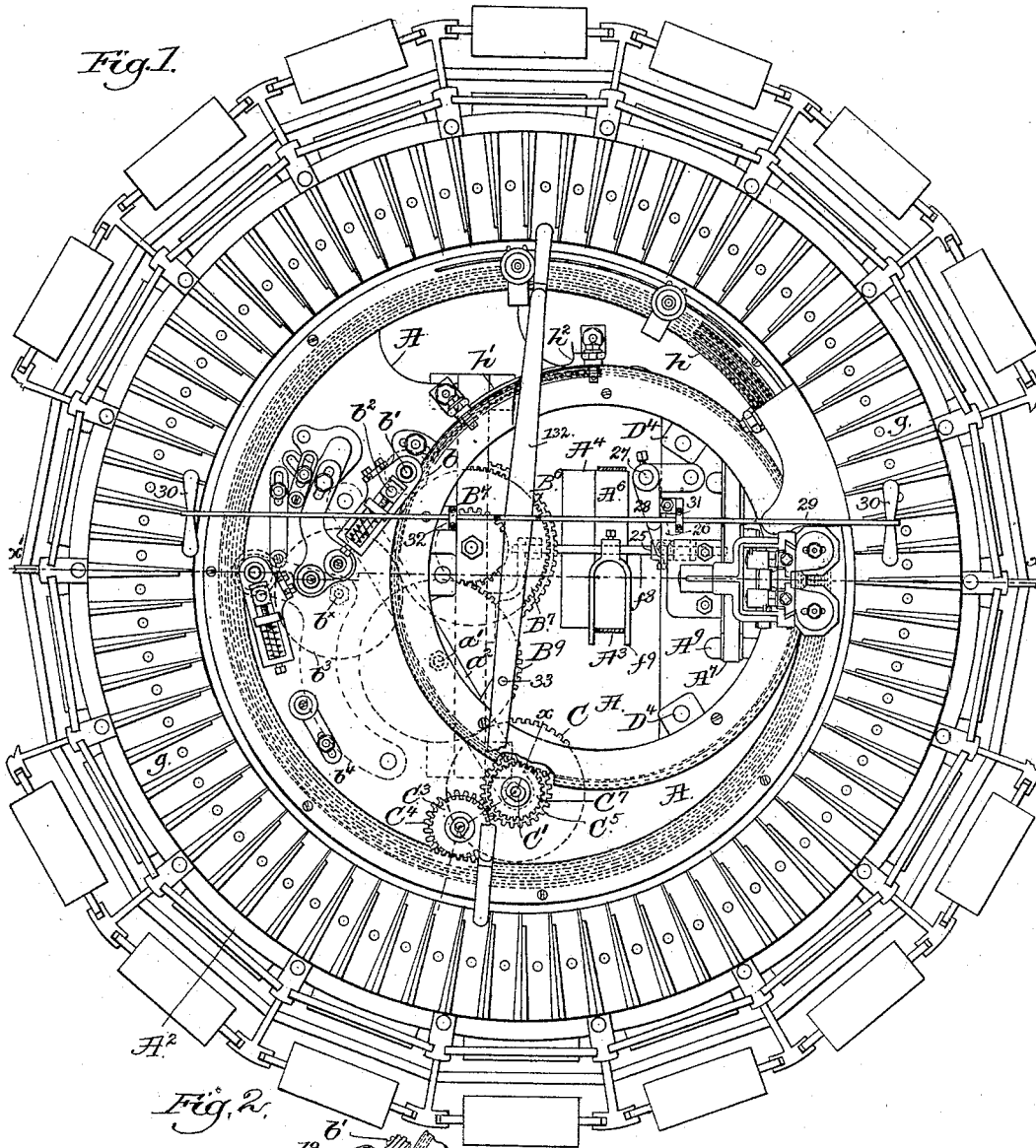


Fig. 2.

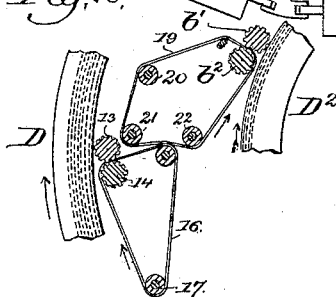
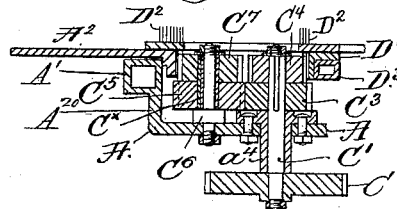


Fig. 3.



Witnesses.

Howard F. Eaton,

John F. C. Prinkett

Inventor.

Horace Wyman.

by Crosby & Gregory,
Attys.

(No Model.)

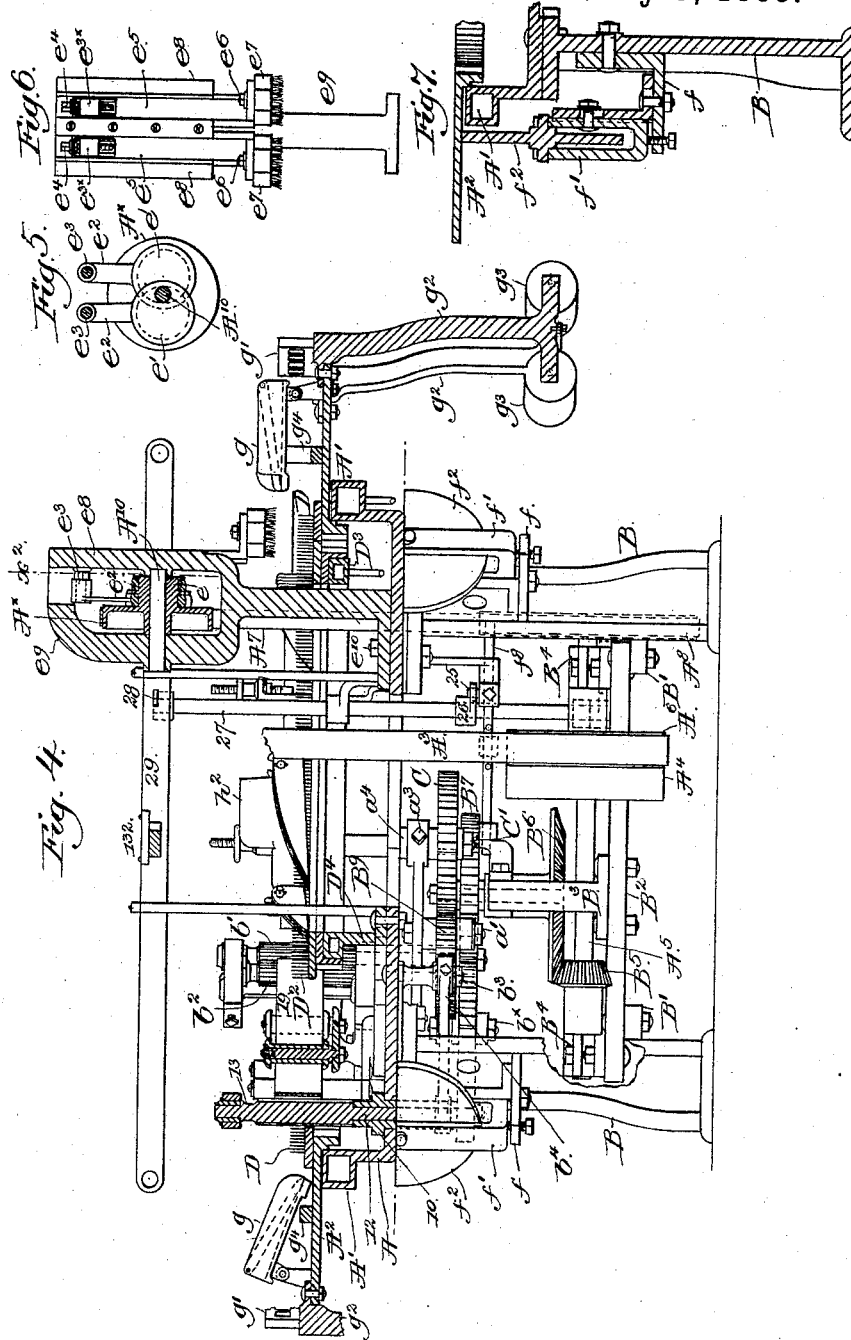
3 Sheets—Sheet 2.

H. WYMAN.

WOOL COMBING MACHINE.

No. 385,690.

Patented July 3, 1888.



Witnesses.
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(No Model.)

3 Sheets—Sheet 3.

H. WYMAN.

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Fig. 8.

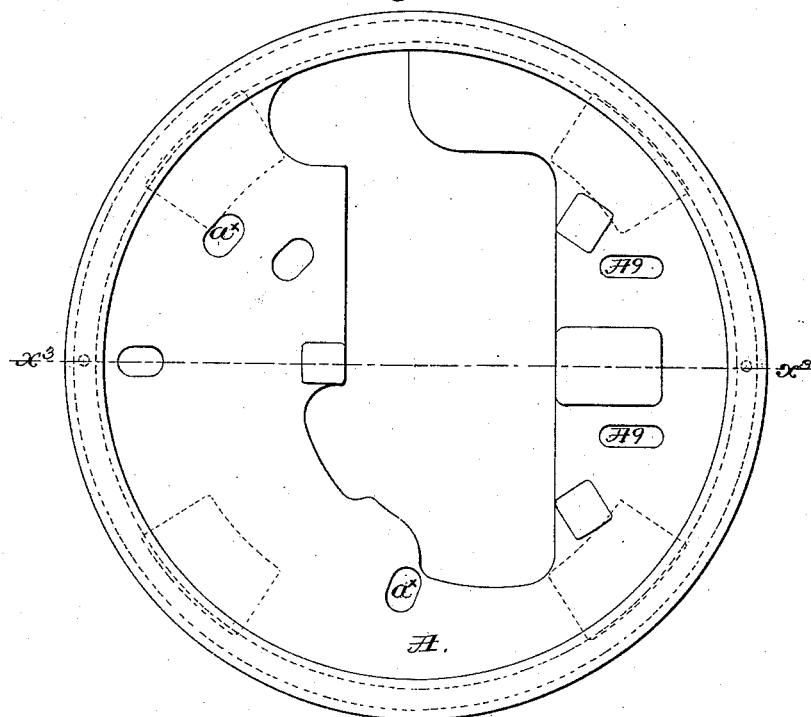


Fig. 9.

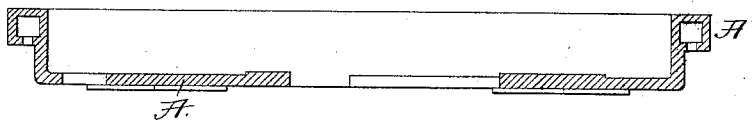
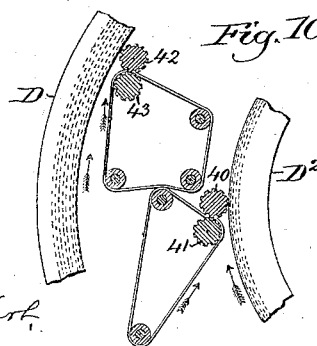


Fig. 10.



Witnesses.

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UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE CROMPTON LOOM WORKS, OF SAME PLACE.

WOOL-COMBING MACHINE.

SPECIFICATION forming part of Letters Patent No. 385,690, dated July 3, 1888.

Application filed November 1, 1887. Serial No. 253,953. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, and State of Massachusetts, have invented an Improvement in Wool-Combing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object to improve the construction of that class of wool-combing machine known as the "Noble," the aim of my invention being to simplify the construction of the working parts and improve the
15 quality of the combing.

The peculiar construction and combination of the parts of my improved machine with relation one to the other, as will be described, although run at faster speed than other combing-machines known to me, are such that the
20 working strain and vibration are less than heretofore, it being a great desideratum in this class of machine to gain the maximum of speed combined with the minimum of twisting strain and vibration, the steadiness of operation of
25 the parts, working even at increased speed, resulting in the production of better combing.

In accordance with my invention I have so constructed the working parts, and especially
30 the wool and noil comb circles—the wool circle outermost—that the belt to drive the machine from a counter-shaft overhead is passed down through the noil-comb circle, and is passed about the main shaft of the machine
35 located below the bed-plate near the floor, the bearings for the said shaft being very rigid, and attached, preferably, to the base of the machine-frame. The main shaft is provided with a gear for rotating the two comb circles,
40 their connected parts, and the drawing-off rolls, the said shaft also having a pulley which receives a belt by which to rotate a short shaft having a suitable eccentric or eccentrics, or their equivalents, such as cams, to actuate
45 one or more dabbing-brushes attached to carriages adapted to slide in vertical guideways, one brush ascending as the other descends, both running consequently at the same rather than at different speeds; but, as herein provided
50 for, the shaft actuating the dabbing-brushes is

rotated at a much faster speed than the shaft for actuating the comb-circles.

By the employment of two dabbing-brushes run at high speed, as stated, rather than one brush, it is possible to more uniformly crowd
55 the wool down into the teeth of the combs at about the tangent points of the two circles; and, further, by the employment of two small dabbing-brushes of substantially the same size and shape, preferably octagonal in shape, it is
60 possible to partially rotate the same upon their carriers as the brushes become worn in use, thus reducing the cost of brushes.

It has been found by practical trials that by the use of a large inside noil-comb circle—
65 say one greater in diameter than one-half the diameter of the wool-comb circle—whereby the two comb-circles are caused to approach each other in diameter, and thus practically increase the extent of their surfaces nearly in
70 contact, the noil-comb circle will retain a very much larger amount of long wool or "top," especially if the wool is properly dabbed into the nearly coincident teeth of the two circles, than by the use of small noil-comb circles of
75 less than half the diameter of the wool-comb circle, such as commonly employed in the so-called "Noble" comb, while the outside or wool-comb circle will still carry the usual
80 amount, the long wool drawn from the two comb-circles by their respective drawing-off rolls, when united, producing a "sliver" nearly as much in quantity as that produced from the common Noble comb with its two noil-comb
85 circles and their two sets of drawing-off rolls combined with the two sets of drawing-off rolls for the large wool-comb circle, thus making four slivers in all to be united.

It has not been found practicable to run a dabbing-brush motion beyond a certain number
90 of reciprocations per minute, and as there must be a proper relation between the number of dabs of the brush and the velocity at which the teeth of the circles move under the brush, it follows that the speed with which the circles
95 move is limited by the number of dabs given by the brush; but by the use of two dabbing motions the speed of the circles can be very much increased over that wherein only one is used—a result which is not attainable
100

with the small noil-comb circles common to the Noble comb.

My invention is limited to the use of one noil-comb circle inside of the wool-comb circle of a greater diameter than one-half that of the wool-comb circle, each circle having co-operating with it a single pair of vertically-arranged drawing-off rolls, an opening being made through both circles and the bed-plate, the gearing of the machine being so located as to provide an uninterrupted passage for the driving-belt from above through the circles and bed-plate to the driving-pulley located below the machine; and I have also provided the machine with means to move the two circles at different circumferential speeds, so as to provide for drawing the wool from the two ends more nearly in radial lines, as will be described.

To obtain the high speed mentioned and consequent large production from the comb, the means to feed the wool to the circles must also be adapted for this high rate of speed, and consequently I have combined with the parts or elements mentioned an endless series of wool-boxes, which revolve with the outside or wool-comb circle, and I have also combined with the parts aforesaid a set of plows to lift the wool from the pins of the wool-comb circle and a feed apparatus to place the wool continuously over the two circles preparatory to being dabbed into the pins by the dabbing-brush, the said brush, boxes, and plow being substantially as common to the Noble comb.

The principal elements, therefore, embraced in my improved comb are the driving-shaft, located below the machine for stability; the bed-plate having an opening or passage through it for the driving-belt, thus admitting of driving the main shaft from either above or below, according to the location of the main shafting of the mill; the practically long point of substantial contact or coincidence or tangent point of the two circles; the double-acting dabbing-brushes; the endless series of wool-boxes revolving with the wool-comb circle receiving wool from balls of wool, also traveling with the said comb-circle, whereby the feed of the wool upon the pins of the two circles is continuous, and means to impart differential speeds to the two circles, all co operating to enable the machine to be run at a high rate of speed.

It is a great desideratum in combing wool to avoid as much as possible the formation of sharp angles in the fiber, and when but one noil comb circle is employed within the wool-comb circle it is obvious that the fiber, after leaving the dabbing-brushes, (where the teeth of the two comb-circles separate to draw the wool apart,) will be sharply bent about the teeth of the noil-comb circle, especially if both comb-circles travel at the same surface speed. To obviate this, the inner or smaller noil-comb circle is herein shown as driven at a slower surface speed, so that the strain on the fiber is maintained as straight and direct as possible.

To gain great strength and stiffness for the parts, and at the same time cheapen the construction of the machine, I have made the bed-plate as a single casting, its top being cored to constitute an annular steam chamber as well as an annular guide for the top plate carrying the wool-comb circle, the feed-boxes, and the arms or brackets supporting the balls or rolls of wool-roping to be combed, the bottom of the said bed-plate being provided with an opening at a point below the center of the inner or noil-comb circle and outside of it for the passage of the driving-belt and the escape of the noils, the said bed-plate also serving to support the said stand constituting the guide for the dabbing-brushes, and also the stands for holding and adjusting the drawing-off rolls and their co operating belts.

Figure 1 is a top or plan view, partially broken away, of a wool-combing machine embodying my invention, the belts of the drawing-off rolls being omitted; Fig. 2, a detail showing parts of the two comb circles, the drawing-off rolls, and their belts, the rolls being in section, the figure also showing the guide-rolls for the belt. Fig. 3 is a sectional detail in the line x , Fig. 1; Fig. 4, a partial vertical section in the dotted line x' , Fig. 1. Fig. 5 is a sectional detail to the left of the dotted line x'' , Fig. 4, chiefly to show the two eccentrics to actuate the dabbing-brushes; Fig. 6, a front elevation of the stand and guides with the carriages and their attached dabbing-brushes; Fig. 7, a sectional detail to illustrate one of the supports for the bed-plate and for the top plate. Figs. 8 and 9 show a top view of the bed-plate and a section thereof in the line x^3 ; and Fig. 10 is a modification, to be referred to, of the drawing-off rolls and belts.

The bed-plate A has integral with it and rising from it vertically a wall or curb, A²⁰, at the top of which and integral with it is cast the steam-chamber A', the latter forming an annular guide for the usual bed-plate, A. The bottom or central part of the bed-plate (see Fig. 8) is cut away centrally, as shown in Figs. 4 and 8, to receive the driving-belt A³, deriving its motion from a pulley upon any usual or suitable counter-shaft, the said belt acting upon a fast pulley, A⁴, attached to the main shaft A⁵ of the combing-machine and located perpendicularly below the opening in the bed-plate, the said belt in Fig. 4 being shown as being on the loose pulley A⁶ at the side of the fast pulley.

The opening referred to in the bed-plate is large enough to permit the passage downward through it of the noils at a point outside the noil-comb circle D². The bed-plate has also made in it holes, as at A⁹, for the passage of the belt A⁷, employed to rotate the shaft A¹⁰, which effects the reciprocation of the dabbing-brushes, to be described, the said belt being extended over a pulley, A⁸, (see dotted lines, Fig. 4,) on the main shaft A⁵ and over a pulley, A¹⁰, fast on the shaft A¹⁰.

The bed-plate referred to is supported from the floor upon suitable legs or uprights, as B, provided with lugs, as B', to which is bolted a bottom plate, B², upon which is erected a bearing-yoke, B³, and suitable bearings, as B⁴, for the main shaft A⁵. The main shaft A⁵ has attached to it a beveled pinion, B⁵, which engages and rotates a beveled gear, B⁶, secured to a shaft having its bearing in the yoke B³. The said shaft, above the said yoke, has secured to it a toothed gear, B⁷, and yet above it a toothed pinion, as B⁸. (See Fig. 1.) The pinion B⁸ engages an intermediate gear, B⁹, loose on a stud, a', secured to a cross-bar, a², attached by suitable set-screws, as a³, to bearing-sleeves a⁴, (one of which is shown in Fig. 4.) the said bearing-sleeves being adjustably attached, as in Fig. 3, to the interior or bottom portion of the bed-plate in holes a^x. (See Fig. 8.) This gear B⁹ is best shown in Fig. 1, where it is represented partially by full and partially by dotted lines. The said intermediate pinion engages a gear, C, (shown by dotted and full lines in Fig. 1, full lines Fig. 4, and in section in Fig. 3,) the said gear being fast upon a shaft, C', extended upward through the bearing-sleeve a⁴ referred to, bolted to the bed-plate, the said shaft having keyed to it a gear, C², and a pinion, C⁴. The gear C² engages a gear, C⁵, of corresponding size, secured to a short sleeve, C³, fitted to revolve about a stud, as C⁶, erected upon the said bed-plate.

The sleeve referred to has fixed to it a pinion, as C⁷.

The two gears C² and C⁵ are of the same size and run at the same speed; but the pinions C⁴ C⁷ are of different sizes, so that the parts driven by them are actuated at different speeds. In practice the pinions may be changed for others of different diameter, so that any desired difference in speed may be attained for the comb-circles D and D² driven by them. Herein the top plate, A², attached in usual manner to the larger or wool-comb circle D and toothed in usual manner, (see Fig. 7,) is driven by the pinion C⁷. The pinion C⁴, however, engages the toothed annular flange at the outer side of the plate D', to which is attached in usual manner the smaller or noil-comb circle D², the said plate D' resting upon, moving over, and being guided by an annular cast-metal steam-chamber, D³, (shown in section in Fig. 3,) the said steam-chamber being of usual construction and having legs or feet D⁴. (see Fig. 4,) which are bolted upon the interior or bottom portion of the bed-plate.

As herein shown, the pinion C⁴ is smaller than the pinion C⁷, and as a result thereof, the noil-comb circle D², it having usual teeth, is driven at a slower surface speed than the wool-comb circle D, such difference in speed, as hereinbefore stated, avoiding sharp bends or angles in the wool or fiber being drawn from the wool-comb circle by the inner noil-comb circle.

The toothed gear B⁷, referred to, engages a small pinion, b, (shown by dotted lines in Fig.

1,) fast upon the shaft, to which is secured the main roll b' of the set of vertical drawing-off rolls co-operating with the noil-comb circle D², the other drawing-off roll co-operating with it being marked b². The gear B⁷ also engages an intermediate gear, b³, loose on a stud, b^x, fast on a cross-bar, b⁴, (shown by dotted lines, Fig. 1,) hung from the under side of the bed-plate, one end of the said cross-bar being attached by suitable bolts to a bearing-sleeve, as 10, through which is extended the shaft, as 12, of the roll 13, which constitutes the main drawing-off roll of the pair of vertical drawing-off rolls 13 14 co operating with and taking the wool from the wool-comb circle D. The rolls 13 14 receive between them the belt 16, which is extended over guide-rolls 17 18, while the rolls b' b² receive between them a belt, 19, which is extended over guide-rolls 20, 21, and 22, the roll 18 occupying such position with relation to the rolls 21 and 22 as to enable the belts 16 and 19 to nip the wool between them close to the rolls 13 14, thus bringing the belts in most compact space.

The hub of the pulley A* (shown best in Figs. 4 and 5) is provided with two like eccentrics, e' e', they having, however, their points of highest throw set opposite to each other. Each of these eccentrics is surrounded by an eccentric strap, as e², which is made to engage a stud, as e³, projecting from the rear side of a block, as e^{3x}, adjustably connected by an adjusting-screw, as e⁴, with a carriage, as e⁵, to the lower end of which is adjustably attached by a set-screw, as e⁶, a dabbing-brush, e⁷, the rotation of the eccentrics causing the carriages e⁵ e⁵, both alike, to be reciprocated vertically in guideways e⁸ on the upper part of an upright or standard, e⁹, supported upon and bolted to the bed-plate by a bolt, as e¹⁰, the said dabbing-brushes being so actuated that one ascends while the other descends.

The speed of rotation of the short shaft A¹⁰ is so much faster than the speed of rotation of the main shaft A⁵, that the dabbing-brushes are made to descend with great frequency, so as to gradually and uniformly crowd the wool into the teeth of both the wool and noil comb circles at their tangent points, or where the two circles are nearly or substantially coincident.

The dabbing-brushes e⁷ are made smaller than usual and of a regular rather than of an irregular shape—that is, of such shape that they may be turned more or less about the carriages to which they are attached and yet operate in their new positions.

The adjustment or partial rotation of the dabbing-brushes, herein shown as octagonal, enables the brushes to be adjusted to compensate for wear. It is obvious, however, that these brushes might be circular or hexagonal and yet operate in substantially the same manner.

By locating the driving-shaft A⁵ in the lower part of the frame-work of the machine, close to the floor, it becomes practicable to run the machine at high speed without imparting un-

due or injurious vibration or oscillation to the parts, which cannot be done when the power to drive the machine is applied to the machine through a cross-shaft arranged in pillars erected upon the bed-plate.

To sustain the weight of the top plate, A^2 , and its attached parts common to the Noble combing-machine—such, for instance, as the wool-boxes g , the sliver-guides g' , and the brackets g^2 and rolls g^3 , which support the balls of roping to be combed—the legs B have bolted to them brackets f , to which are adjustably attached bearings f' , which support sheaves or friction-rolls f^2 , upon which rest and run the said top plate, A^2 . This top plate, A^2 , has mounted upon it the usual incline, g^4 , to lift the wool-boxes at the proper times to draw off from the balls the proper length of roping, and co-operating with the teeth of both the wool and noil comb circles are and will be employed suitable plows, as at h and h' , which operate in usual manner, the one to lift the wool from the teeth of the wool-comb circle just before it arrives at the dabbing-brushes, the other lifting the noils from the noil-comb circle just before it reaches the discharge plate h^2 , of usual construction, which acts to take away the noils and pass them down through the opening at the bottom of the bed-plate. The driving-belt A^3 is extended through the fork f'' of a belt-shipper rod, f^3 , adapted to slide in suitable guides forming part of the frame-work. The shipper-rod f^3 has a lug, 25, (see Fig. 4,) provided with a pin which enters a slot in an arm, 26, connected to the lower end of a vertical rock-shaft, 27, the upper end of the said shaft having an arm, 28, the free end of which is extended through a hole (see Fig. 4) in the main shipper-handle or slide-bar 29, mounted to slide in suitable guides, as 31 32, and provided at its opposite ends with handles, as 30, so that the operator can stop the machine from diametrically-opposite points. This handle 29 is also notched or otherwise made to have connected to it an auxiliary shipper handle or lever, 132, pivoted at 33, and adapted to be engaged at diametrically-opposite points of the machine.

I have shown and described the main shaft as rotated from a counter-shaft arranged above the machine, such being the usual location of counter-shafts, the belt being thus entirely out of the way of the operator and enabling him to at any time have unimpeded access to the balls of wool-roping, which is not the case when the driving-belt is arranged outside the frame-work.

I desire it to be understood that I should consider it within the scope of my invention if the main shaft were driven from a belt extended from a pulley or a counter-shaft at the ceiling of a room below the floor on which the combing-machine rests.

The guide-rolls and the rolls b^2 and 14 are sustained upon studs or pins rising from brackets or arms which are adjustably secured in position, all in usual manner.

In that embodiment of my invention shown in Fig. 1 the drawing-off rolls co-operating with the larger comb-circle holding the wool first take the wool from the said wool-comb circle and carry it forward in the direction of rotation of the two comb-circles, the wool-sliver so taken from the wool-comb circle being carried by suitable belts to the drawing-off rolls, which co-operate with the smaller or noil-comb circle, where those fibers worth saving and taken from the noil-comb circle are delivered upon the stronger sliver of wool taken from the wool-comb circle.

By arranging the drawing-off rolls for the noil-comb circle at a considerable distance in advance of the drawing-off rolls for the larger wool-comb circle, I am enabled to make the wool-comb circle of greater diameter than were the said drawing-off rolls in substantially a radial line drawn from the center of the large comb-circle, and by depositing the wool saved from the noil-comb circle upon the sliver taken from the wool-comb circle, instead of the reverse of such operation, I am enabled to save stock and make the ultimate sliver delivered from the machine more uniform; but, as shown in Fig. 10, the drawing-off rolls 40 41 for the noil-comb circle D^2 might be arranged to act first in the direction of rotation of the said comb-circles, and the drawing-off rolls 42 43 for the wool-comb circle operate second, as in said figure, and such an arrangement of drawing-off rolls and their usual belts would be within the scope of my invention.

I claim—

1. In a wool-combing machine, the following instrumentalities, viz: the bed-plate, the wool-comb circle, the noil-comb circle within it, of a diameter greater than one-half the diameter of the wool-comb circle, and having an opening through it suitable to receive a driving-belt from above to a pulley below the said noil-comb circle, a main shaft supported upon the frame-work below the said wool and noil comb circles, its driving-pulley located perpendicularly below the opening in the said noil-comb circle, a pair of vertically-arranged drawing-off rolls for each of the said comb-circles, gearing between the said main shaft and the said drawing-off rolls and comb-circles to rotate them, an endless revolving series of wool-boxes, and means to lift the boxes and feed the wool therefrom, the combination being and operating substantially as described.

2. The wool comb circle, the noil-comb circle within it, of a diameter greater than one-half of the diameter of the wool-comb circle, a pair of vertically-arranged drawing-off rolls for each of the comb-circles, the main shaft supported on the frame-work below the bed-plate and comb-circles, the vertical shaft C' , gearing whereby said shaft C' is driven by the main shaft, and spur-gearing from the vertical shaft to the combs and the two sets of drawing-off rolls, to operate substantially as described.

3. The wool-comb circle, the noil-comb circle within it, of a diameter greater than one-

half of the diameter of the wool-comb circle, the endless series of wool-boxes moved in unison with the wool-comb circle, means to lift the said wool-boxes in succession to feed wool to the pins of the circles, a pair of vertically-arranged drawing-off rolls for each of the comb-circles, the main shaft A⁵, supported on the frame-work below the bed-plate and comb-circles, the vertical shaft C', and gearing whereby the said shaft C' is driven by the main shaft and spur-gearing intermediate the vertical shaft and the two sets of drawing-off rolls and the wool and noil comb circles, to operate substantially as described.

4. In a wool-combing machine, the following instrumentalities, viz: the bed-plate, the wool-comb circle, the noil-comb circle within it, having an opening through it suitable to receive a driving-belt from above to a pulley below the said noil-comb circle, a main shaft supported upon the frame-work below the said wool and noil comb circle, its driving-pulley located perpendicularly below the opening in the said noil-comb circle, a pair of vertically-arranged drawing-off rolls for each of the said comb-circles, gearing between the said main shaft and the said drawing-off rolls and comb-circles to rotate them, an endless revolving series of wool-boxes, means to lift the boxes and feed the wool therefrom, a shaft located above said main shaft, means to rotate it, a dabbing-brush, its carriage, and means between the shaft located above the main shaft and the said carriage to actuate the latter, substantially as described.

5. The wool-comb circle and the smaller noil-comb circle arranged within it, combined with the vertically-arranged drawing-off rolls for the wool-comb circle and the drawing-off rolls for the noil-comb circle, an endless revolving series of wool-boxes, and with means,

substantially as described, to rotate the wool-comb circle and its wool-boxes and the inner noil-comb circle at different speeds, for the purpose set forth.

6. In a wool-combing machine, the open bed-plate A, the wool-comb circle, the noil-comb circle within it, of a diameter greater than one-half of the diameter of the wool-comb circle, the main shaft A⁵, located below the said bed-plate, means for driving said comb-circles from said main shaft, a pulley fast on the said main shaft vertically below the opening in the noil-comb circle, the driving-belt A³, extended from above the said bed-plate through it and the said noil-comb circle and about the said fast pulley, the endless revolving series of wool-boxes, means to lift them to feed the wool to the pins of the said circles, a dabbing-brush, its carriage, the shaft A¹⁰, provided with means to operatively connect it with and to reciprocate the said carriage, pulleys A* and A⁸ on the shafts referred to, and a belt, A⁷, to connect the said pulleys, the pulleys A* and A⁸ being of different diameters, whereby the shaft A¹⁰ is rotated at a faster speed than the shaft A⁵, to operate substantially as described.

7. The wool-comb circle and the smaller single noil-comb circle arranged within it, combined with the vertically-arranged drawing-off rolls for the wool-comb circle and the drawing-off rolls for the noil-comb circle, and with gearing to rotate the said comb-circles at different speeds, as and for the purposes set forth.

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

HORACE WYMAN.

Witnesses:

JUSTIN A. WARE,
CHARLES M. EDWARDS.