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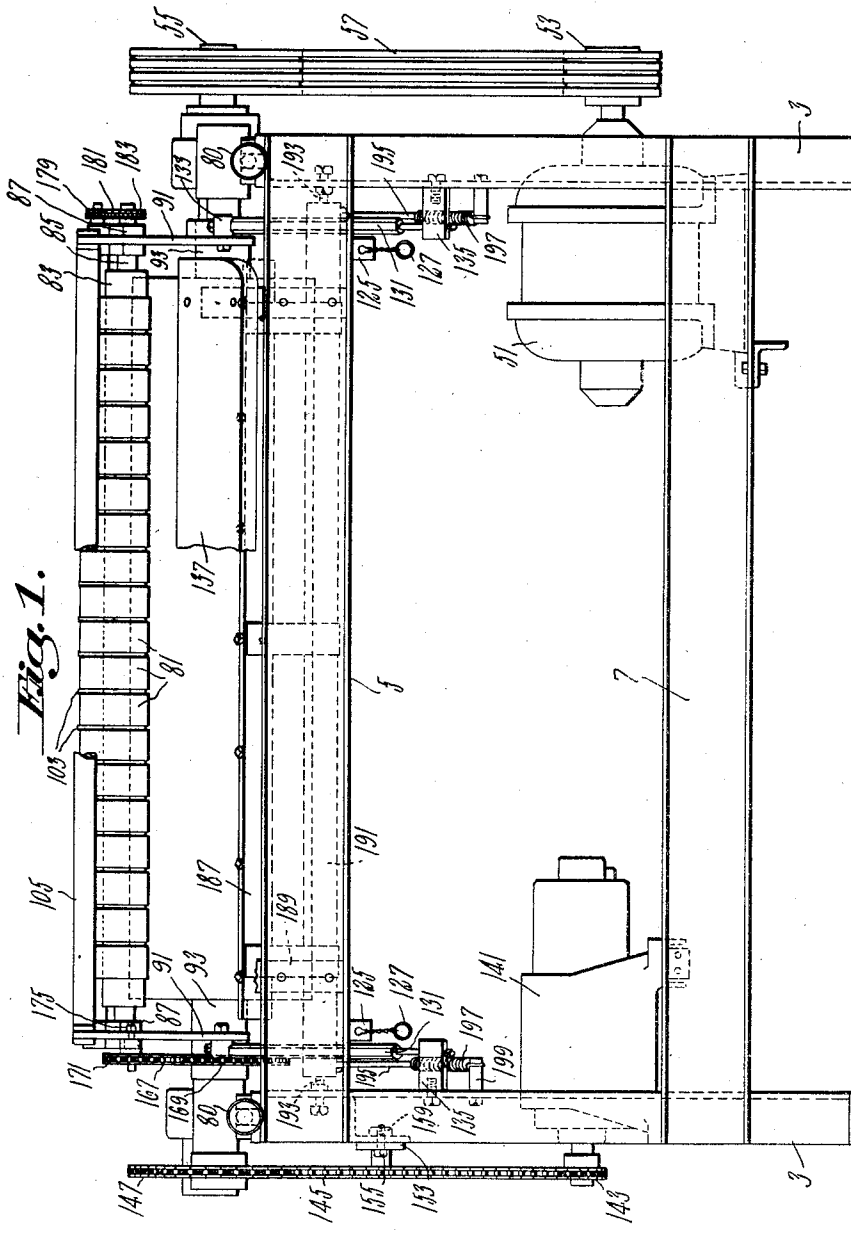
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2,405,032

FUR COMBING AND IRONING MACHINE

Filed June 26, 1943

4 Sheets-Sheet 1



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Fig. 3.

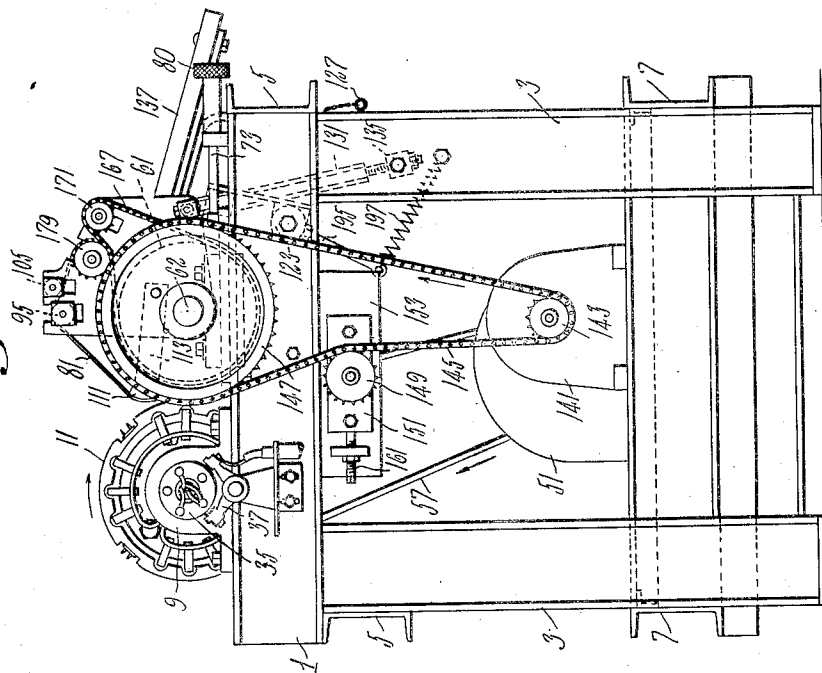
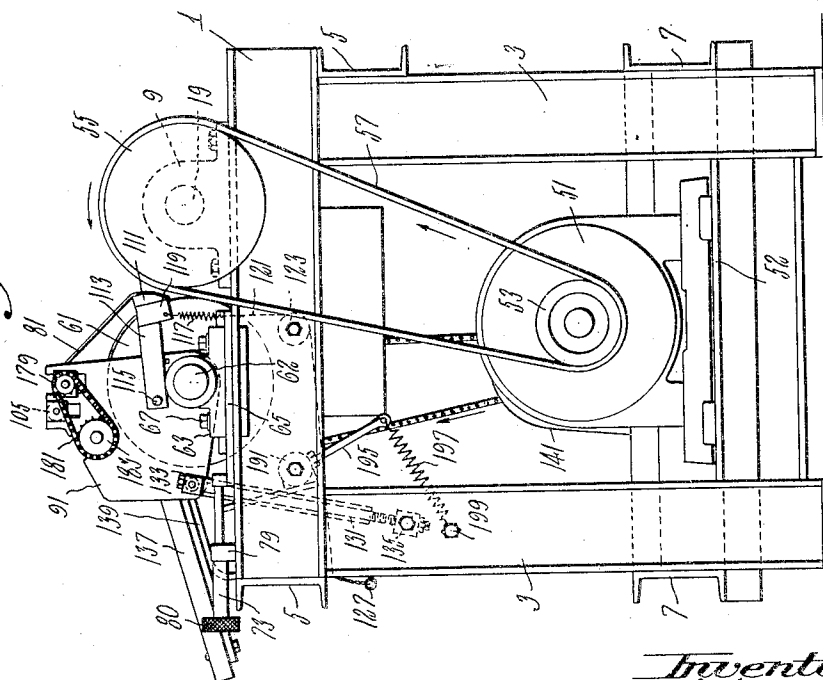


Fig. 2.



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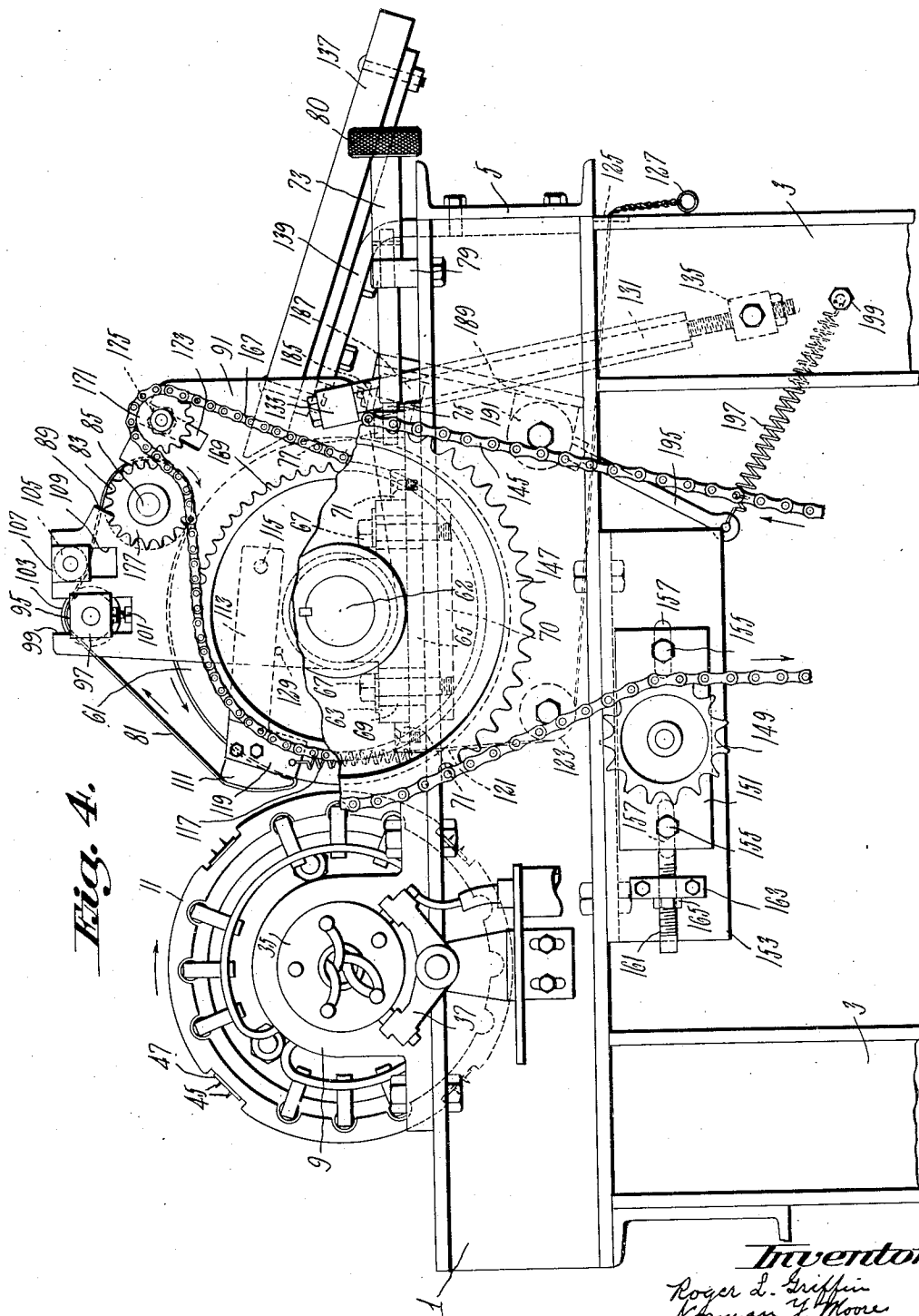


Fig. 4.

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UNITED STATES PATENT OFFICE

2,405,032

FUR COMBING AND IRONING MACHINE

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20 Claims. (Cl. 69—27)

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The present invention relates to machines for operating upon the fur of skins or pelts and more particularly to machines designed and constructed especially to comb and iron the fur thereof, such as the wool of woolskins, to straighten the fibres and impart thereto a pleasing sheen or lustrous appearance.

The object of the present invention is to provide a machine of the above type which shall operate at high speed with improved results, which shall have complete and positive control of the work as it is fed and presented to the combing and ironing instrumentalities, and which may be easily and quickly adjusted by the operator to adapt it for various types and conditions of skins and to regulate the effects produced.

With these objects in view the present invention consists in the devices and combinations of devices hereinafter described and more particularly defined in the claims.

In the accompanying drawings which illustrate a woolskin combing and ironing machine embodying our invention, Fig. 1 is a front elevation with certain parts broken away for clearness of illustration; Fig. 2 is a side elevation of the same looking from the right of Fig. 1; Fig. 3 is a similar side elevation looking from the left of Fig. 1; Fig. 4 is a side elevation, on an enlarged scale, showing the upper portion of the machine looking from the left of Fig. 1, with portions broken away; Fig. 5 shows in elevation the combing and ironing roll detached and before it has been provided with the heating and combing elements; Fig. 6 is a longitudinal, sectional view of the left hand end portion of the same, on an enlarged scale; Fig. 7 is an end elevation of such roll looking from the left of Fig. 6; Fig. 8 is a transverse sectional view on line 8—8 of Fig. 6 looking toward the left in the direction of the arrows; and Fig. 9 is a fragmentary, transverse sectional view, on a still larger scale, of the peripheral portion of the roll showing the combing devices and method of mounting the same on the roll.

The machine of the drawings comprises briefly a combing and ironing roll with the combing devices and the ironing faces alternately spaced around the periphery of the roll. Electrical heating devices within the roll, with external control devices, maintain the desired ironing temperature.

The work is presented to the combing and ironing roll by means of a rotating bed roll against which the woolskins are held by means of a plurality of spaced, endless, traveling feed belts driven and guided by suitably placed feed and ten-

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sion rolls. A pressure plate, positioned close to the bite of the combing and bed rolls and around which the feed belts pass, controls the presentation of the skins to the combing and ironing roll.

Driving means are provided for the two rolls, the combing and ironing roll being rotated at relatively high linear speed, such, for example, as three thousand feet per minute, while the bed roll and feed belts travel at a relatively low linear speed, such as eight feet per minute.

The machine is provided with conveniently placed inclined work table to facilitate the presentation by the operator of the skins to the feed devices. Also a wiper is provided for removing any foreign matter from the face of the bed roll.

The frame of the machine shown in the drawings is of welded channel iron construction, comprising the short horizontal top side members 1 supported upon the front and back vertical members 3, with the long front upper transverse member 5 and lower front and back transverse members 7.

Mounted in the bearings 9 supported upon the upper side members 1 is the combing and ironing roll 11. Preferably these are ball bearings and one of them is arranged for axial movement to provide for the elongation of the shaft through expansion by heat. The roll is shown in end elevation, incorporated in the machine, in Figs. 3 and 4, and in side elevation, apart from the machine, in Fig. 5, and in enlarged axial sectional view in Fig. 6. As shown in the latter figure, the roll is made up of a series of cylindrical sections or members 13, each having a central hub 15 and web 17 and fixedly secured upon the shaft 19 by means of the split tapered sleeve 21. The adjacent side faces of these sections 13 are formed with cooperating annular aligning shoulders and grooves 23. Each section is also formed with a series of circular bores 25 in four groups of three each, see Figs. 7 and 8, to receive the heating units, and with three bolt holes 27 through which are passed long bolts 28 for clamping these sections together.

The bores 25 and bolt holes 27 are positioned so that when the bolt holes are aligned and the bolts inserted, the bores 25 in each section are also aligned throughout the length of the rolls. By making the rolls in separate sections and machining each before assembling, many manufacturing difficulties are avoided as, for example, the drilling of the small bores of a fraction of an inch in diameter through the long roll, which may be several feet in length. Furthermore, there is less wastage on account of imperfect castings.

Also, more perfect balancing of the roll can be secured, and this is of importance where a roll of the required size and weight is normally rotated at such high speed as 1000 R. P. M.

The sections are first assembled upon the shaft, conveniently by first heating the hub of an end section, positioning it on the shaft and forcing home a split taper sleeve, then adding in the same manner one after another the intermediate sections, and finally the other end section. The sections are then secured together by means of the clamping bolts, and the roll surface is given a finishing cut. The four longitudinal slots 29 are next planed in the periphery of the roll, the outer corner of the following side of each slot being slightly relieved, as shown at 31 in Fig. 9, to avoid liability of damage to the wool when the ironing face 33 contacts the same.

The heating units for the roll are of a well known tubular type comprising an outer steel tube of a diameter to have an easy driving fit within the bores 25. Within the tubes are the heating elements which consist of helical coils of resistance wire embedded in a core of refractory material. These heating elements are connected together in pairs at one end of the roll, the right hand end in Fig. 1, and these pairs are so connected to one another and to the three contact rings 35 on the other end of the roll shaft, that through the brushes 37 bearing on the rings and suitable switch connections, the pairs of heating units may be connected either all in parallel to give the high heat, or with each two pairs of heating units in series to give the low heat, whichever is required in the opinion of the operator. In order that these contact rings and brushes may be mounted upon the free end of the shaft, that is, outside the bearing 9, this portion 39 of the shaft is formed with the axial bore 41, and smaller inclined passages 43 to receive the connections from the several heater elements. See Fig. 6.

The combing devices for the roll comprises two rows of steel teeth 45 fixed in staggered relation in the metal plate 47 secured in the slots by means of screws 49. The combing and ironing roll is driven by the motor 51 supported upon sub-base 52 on the machine frame and connected with the roll shaft through multiple grooved pulleys 53 and 55, and the V-belts 57, as shown in Figs. 1 and 2.

The feed roll 61 for supporting and presenting the work to the ironing roll is secured upon shaft 62 which is mounted in bearings 63 supported upon the bearing plates 65 which in turn rest upon the top members 1 of the frame of the machine. Bearings 63 and plates 65 are adjustably secured in position by means of bolts 67 passing through slots 69 in the bearings and plates and through round holes in the top frame members, being screwed into the steel clamping bars 70. The abutment blocks 71 secured to the plates 65 hold the bearings 63 from movement with respect thereto. By loosening the bolts 67 the plates and the bearing blocks 63 supported thereon may be moved upon the frame members 1 to bring the bed roll the proper distance from the feed roll in accordance with the character of the work and the degree of combing and ironing desired.

Conveniently, this adjusting movement of the bed roll is effected by means of the pair of horizontal shafts 73, with their inner threaded reduced ends 75 passing through the internally threaded studs 77 mounted in the bearing plates 65. Fixed bearing studs 79 in the top frame

members 1 permit rotation of the shaft 73 but hold them from axial movement. Knurled heads 80 are provided on the ends of the shaft 73 to rotate the latter. Thus, when the heads are turned, the bearing plates 65 and bearings carried thereby will be adjusted to bring the feed roll nearer to or farther from the combing and ironing roll. When the proper adjustment has been made, the bolts 67 will be tightened and the parts retained in their adjusted position.

Cooperating with the bed roll to feed the skins to the combing and ironing roll are the feed belts 81 arranged in a series of spaced, parallel endless belts positively driven by a pair of feed rolls at the same linear speed as the periphery of the bed roll, with one leg of each belt engaging the wool face of the skin to hold the leather face of the skin in close contact with the face of the bed roll, thus insuring a positive and uniform feeding movement of the skin to and past the combing and ironing instrumentalities.

The rolls for supporting, driving, guiding and tensioning the feed belts comprise a positively driven, smooth faced top feed roll 83 mounted upon a shaft 85 pivoted in bearing blocks 87 slidably mounted in the inclined slots 89 formed in the upper marginal portion of the feed supporting plates 91, one on each side of the machine. These plates, as shown in Figs. 2, 3 and 4, are of approximately trapezoidal shape and provided with hubs 93 forming bearings through which passes the bed roll shaft 62 upon which the supporting plates are thus pivoted.

A second positively driven feed and guide roll 95 is pivotally mounted in the bearing blocks 97 positioned in vertical slots 99 at the top of the supporting plates, being vertically adjustable therein by means of adjustment stud 101, with lock nut. This roll is provided with a series of annular ribs 103, spaced from one another the width of the individual belts to maintain the latter in desired spaced parallel relation.

Intermediate the top feed roll and the guide roll is the smooth-faced take-up roll 105 idly rotated in bearings in blocks 107 which are freely movable vertically in the slots 109 in the supporting plates 91. This take-up roll rests upon the top surfaces of the feed belts 81 between the top feed roll and the guide roll, and by reason of its weight maintains the desired belt tension.

The lower legs of the feed belts, which press the skins against the bed roll, are guided and supported at the point where they leave the skins by a pressure plate 111 around which the belts pass. This plate is positioned close to the bite of the bed roll and the combing and ironing roll, and turns the belts upwardly and backwardly to the guide roll 95. The plate consists of a wedge-shaped bar of steel extending across the face of the feed roll and is secured at each end to the supporting arms 113 pivoted on the studs 115 fixed in the supporting plates 91. The pressure plate is yieldingly held depressed by means of the tension springs 117 secured at their upper ends to downward extensions 119 of the supporting arms 113, and at their lower ends to the pull chains 121 which pass downwardly around the idler pulleys 123 and thence horizontally through the latching plates 125 to the pull rings 127, thus permitting the operator to adjust the tension of springs 117 which oppose the pull of the feed belts 81. Pins 129 fixed in the supporting plates 91 limit the downward movement of the supporting arms and the pressure plate carried thereby.

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The purpose of the wedge-shaped plate is to provide a support for the feed belts as close as possible to the point where the combing and ironing instrumentalities operate upon the wool, thus maintaining full control of the skin during the feeding and the combing and ironing operations, and insuring uniformly perfect results.

It will be noted that the feed belts and their driving, supporting, guiding and tensioning devices are all carried upon the supporting plates which are pivoted to turn about the axis of the feed roll. Thus the position of all of these parts relative to one another remains unchanged irrespective of how the plates may be adjusted angularly upon their pivots from time to time. Such adjustment may be required for the purpose of positioning the supporting plate nearer to or further from the bite of the rolls in accordance with the character of the work. Such adjustments are effected by means of the adjusting bars 131, hexagonal in transverse section, to receive an actuating wrench, the upper ends being of reduced diameter and passing through the studs 133, pivotally mounted in the supporting plates, and the reduced lower ends being threaded and passing through blocks 135 pivotally supported on the inner faces of the vertical frame members 3.

To facilitate the presentation of the skins to the feed roll and feed belts by the operator, an inclined feed table 137 has been provided mounted upon the brackets 139 secured to the inner faces of the cross-member 5 of the frame.

The bed roll 61, the top feed and guide rolls 83 and 85, and the feed belts 81 are all driven from the gear motor 141 having a low speed driving sprocket 143 connected by a chain 145 with the large sprocket 167 fixed upon the bed roll shaft 62. The proper tension on this chain is obtained by adjustment of the idler sprocket 149 engaging the outer face of the left hand leg of the chain, as shown in Fig. 3. The idler is mounted upon the base 151, which in turn is adjustably secured to the right angled bracket 153 bolted to the under face of the transverse top member 1, the securing bolts 155 passing through holes in the idler base 151 and through the horizontal slots 157 in the bracket 153 with nuts 159 on their inner ends. See Fig. 1.

The idler base and idler may be adjusted to give the desired tension to the chain by means of the threaded abutment stud 161 which passes through a threaded opening in the boss 163 on the bracket 153 with lock nut 165. By first loosening the lock nut on the stud and the securing nuts 159 on bolts 155, the stud 161 may be turned in one direction to force the idler base and idler to the right in Fig. 4, to tighten the chain, or the stud may be turned in the opposite direction to permit movement of the parts to the left to loosen the chain as required, after which the several nuts are tightened to hold the parts securely in adjusted position.

The top feed roll 83 is driven from the bed roll shaft 62 by means of a chain 167 driven from the sprocket 169 fixed upon such shaft and passing over the idler sprocket 171 pivotally supported on a bearing stud mounted in the inclined slot 173 in the left hand supporting plate, as seen in Fig. 4. Loosening the clamping nut 175 permits the adjustment of the bearing block inwardly and outwardly of the slot to give the desired tension to the chain.

The top feed roll 83 is driven from this chain by means of the sprocket 177 fixed upon the left hand end of the shaft 85 of the feed roll, which

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sprocket engages the outer face of the top leg of the chain 167 driven from the bed roll shaft. The relative diameters of sprockets 177 and 169 are such that the peripheral speeds of top feed roll 83 and bed roll 61 are equal.

The driving means for rotating the guide roll 95 for the feed belts comprises a sprocket 179 fixed upon the right hand end of the guide roll shaft, as shown in Fig. 1, driven by the short chain 181 from the driving sprocket 183 fixed upon the right hand end of the shaft 85 of the top feed roll 83. These sprockets are of such relative sizes that the guide roll, although of smaller diameter than the feed roll, is nevertheless driven at the same peripheral speed as those of the feed roll 83, belts 81, and bed roll 61.

In order to prevent the improper presentation of the work to the combing and ironing roll by reason of foreign material adhering to the face of the bed roll and raising the skin at that point above the surface of the roll, clearing or cleaning devices for the bed roll have been provided which are held yieldingly against the face of the roll as the latter rotates to remove any adhering pieces of skin or other material. This wiper mechanism, shown in Figs. 1 and 4, comprises a piece or strip of felt or other suitable material 185 extending across the width of the roll and clamped to the wiper blade 187 carried on the supporting arms 189 extending from the tubular supporting shaft 191 pivoted on the studs 193 fixed in the web of the top horizontal frame members 1. Depending from each end of the shaft 191 are the tension arms 195, the lower ends of which are attached to one of the ends of the tension springs 197, the other ends of the springs being anchored upon the studs 199 fixed in the vertical frame members 3. The tension springs thus hold the felt face of the wiper blade in close yielding contact with the surface of the bed roll to remove therefrom any foreign material which might displace the skin and cause improper combing and ironing, or even damage to the skin of such raised portion.

In the operation of the machine the operator, before setting the machine in motion, adjusts the controls of the heating units to cause high heat to be applied to combing and ironing roll. As soon as the desired temperature of the roll is attained, the two motors are started, the small low speed gear motor driving the feed roll and the belts, and the large high speed motor driving the combing and ironing roll.

The operator now puts a skin upon the feed roll table, with the wool side up, and advances it by hand to the bed roll and then under the feed belts. Thereupon the roll and belts act positively to feed the skin at uniform speed to the combing and ironing rolls where the combing teeth and the ironing surfaces, traveling at high speed over the slower moving skin, comb out and iron the wool fibres, not only straightening and fixing them in straightened condition, but also imparting a pleasing lustrous finish thereto. For best results the skin is passed through the machine several times in different directions.

If during the operation of the machine, due to slow presentation of the skins by the operator, the combing and ironing roll tends to become too hot, the operator by means of the hand controls, puts it on low heat and continues thereafter to shift from one heat to the other as conditions may require. From time to time the operator may also change the adjustment of the presser plate, as changes in the character of the work or the de-

sired treatment of the fur may require, by shifting angularly the supporting plates which carry the feed belts unit by means of the adjusting bars.

Where in the specification and claims reference is made to the bite of the combing and ironing roll and of the bed roll, this is to be understood to mean the point where the surfaces of these rolls are closest together.

Having thus described the invention, what is claimed is:

1. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, a plurality of spaced feed belts contacting the work on the opposite side thereof from the bed roll and cooperating with the bed roll to feed the work, and means for actuating the rolls and belts.

2. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, a plurality of spaced feed belts contacting the work on the opposite side thereof from the bed roll and cooperating with the bed roll to feed the work, and means for actuating the combing and ironing roll at high linear speed and the bed roll and the feed belts at the same low linear speed.

3. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for supporting and feeding the work, said rolls being rotatably mounted in normally fixed relation to one another with their peripheral faces closely adjacent, traveling feed belts contacting the work on the opposite side thereof from the bed roll, means positioned between the rolls and adjacent the bite thereof for supporting and guiding the belts, and means for actuating the rolls and belts.

4. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, a plurality of spaced feed belts cooperating with the bed roll to feed the work, a presser plate positioned between the rolls and around which the feed belts pass for pressing the work against the bed roll, and means for actuating the rolls and belts.

5. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, said rolls being rotatably mounted in normally fixed relation to one another with their peripheral faces closely adjacent, a plurality of spaced feed belts cooperating with the bed roll to feed the work, a wedge-shaped presser plate positioned between the rolls adjacent the bite thereof and around which the feed belts pass, yielding supporting devices for the plate normally urging the plate closer to the periphery of the feed roll and nearer the bite of said roll, and means for actuating the said rolls.

6. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, said rolls being rotatably mounted in normally fixed relation to one another with their peripheral faces closely adjacent, a plurality of spaced feed belts cooperating with the bed roll to feed the work, a presser plate positioned between the rolls adjacent the bite thereof, yielding pivoted means for supporting the presser plate, and means for actuating the rolls and belts.

7. A fur combing and ironing machine having,

in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, a plurality of spaced feed belts contacting the work on the opposite side thereof from the feed roll and cooperating with the bed roll to feed the work, supporting, guiding and tensioning devices for the belts, and means for actuating the rolls and belts.

8. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, a plurality of spaced feed belts cooperating with the bed roll to feed the work, supporting, guiding and tensioning devices for the belts, means pivotally mounted coaxially with the bed roll for supporting said devices, and means for actuating the rolls and belts.

9. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for presenting the work to the combing and ironing roll, said rolls being rotatably mounted in normally fixed relation to one another with their peripheral faces closely adjacent, a plurality of spaced feed belts cooperating with the bed roll to feed the work, supporting and driving rolls for the belts, a tensioning roll for the belts, a presser plate for supporting the belts adjacent the bite of the combing and ironing roll and of the bed roll, adjustable common supporting means for the belt supporting and driving rolls, the tensioning roll and presser plate, and actuating mechanism for the combing and ironing roll, the bed roll and the feed rolls with the adjacent faces of the combing and ironing roll and of the feed roll moving in the same direction.

10. A fur combing and ironing machine having, in combination, a frame having horizontal side members, a combing and ironing roll, a bed roll for directly supporting the work, bearings for said rolls, the bearings for one of said rolls being permanently secured to the horizontal side members of the frame, the bearings for the other roll being provided with slots, bolts passing through the slots for securing said bearings to said horizontal side members in normally fixed, unyielding position, and adjusting screws for adjusting said slotted bearings when the bolts are loosened to move one of said rolls toward and from the other roll.

11. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, a bed roll shaft, supplementary feeding devices pivoted coaxially with the bed roll and comprising movable means contacting the work on the opposite side from the bed roll, and connections for actuating said means from the bed roll shaft.

12. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, a bed roll shaft, supplementary feeding devices pivoted upon the bed roll shaft and comprising movable means contacting the work on the opposite side from the bed roll, connections for actuating said means from the bed roll shaft, and means for normally supporting the bed roll in fixed position, said means having provision for adjusting the bed roll and supplementary feeding devices as a unit toward and from the combing and ironing roll.

13. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, a shaft for the bed roll, supplementary feeding devices pivoted coaxially with the bed roll com-

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prising a plurality of feed belts contacting the opposite side of the work from the bed roll, means for supporting and driving the belts including a floating feed roll, a floating idler roll, a fixed guide roll, and connections from the bed roll shaft for actuating the feed and guide rolls.

14. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, feed belts engaging the opposite side of the work from the bed roll, supporting and driving mechanism for the belts, means pivoted coaxially with the bed roll and carrying the belt supporting and driving mechanism, a lever pivoted on said means, a presser plate on the lever, and a tension spring connected at one end to the lever and adjustably connected at the other end to vary its tension.

15. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, a supplementary feeding unit comprising feed belts, feeding and guiding rolls therefor, a presser plate for supporting the belts, means for supporting the rolls and plate pivoted coaxially with the bed roll, and devices for adjusting the supplementary feeding unit rotatably about the bed roll.

16. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, a supplementary feeding unit comprising side plates pivoted coaxially with the bed roll and having bearing-receiving marginal slots, bearings mounted in the slots, feeding and guiding and idler rolls in the bearings, the bearings for the feeding and idler rolls floating in their slots, a yieldingly mounted presser plate supporting the belts and carried by the side plates, and means for actuating the feeding and guiding rolls.

17. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, said rolls being rotatably mounted in normally

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fixed, unyielding relation to one another with their peripheral faces closely adjacent, means positioned between said rolls and adjacent the bite thereof and cooperating with the bed roll for presenting the work to the combing and ironing roll, and means for actuating the rolls.

18. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, said rolls being rotatably mounted in normally fixed, unyielding relation to one another with their peripheral faces closely adjacent, means positioned between said rolls and adjacent the bite thereof for cooperating with the bed roll for presenting the work to the combing and ironing roll, said means being adjustably positioned with respect to the bite of said rolls, and means for actuating the rolls.

19. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work and adjustable toward and from the combing and ironing roll through a limited range, said rolls being rotatably mounted in normally fixed, unyielding relation to one another with their peripheral faces closely adjacent, means positioned between said rolls and adjacent the bite thereof and cooperating with the bed roll for presenting the work to the combing and ironing roll, and means for actuating said rolls.

20. A fur combing and ironing machine having, in combination, a combing and ironing roll, a bed roll for directly supporting and feeding the work, said rolls being rotatably mounted in normally fixed, unyielding relation to one another with their peripheral faces closely adjacent, yieldingly supported means positioned between said rolls and adjacent the bite thereof and cooperating with the bed roll for presenting the work to the combing and ironing roll, and means for actuating said rolls.

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