March 12, 1957 R. S. SCHAAB 2,784,477

PILE PROCESSING MACHINE

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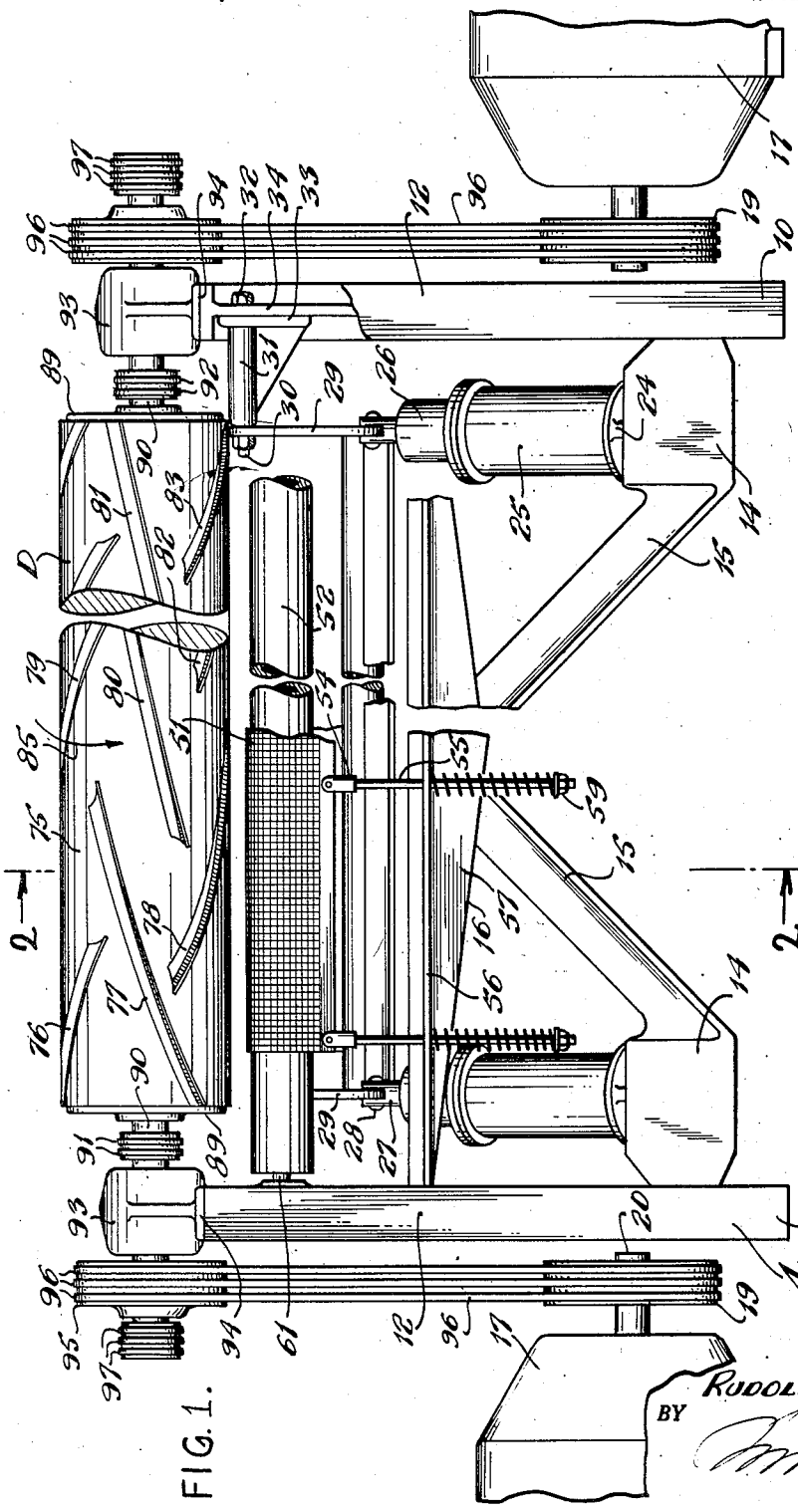


FIG. 1.

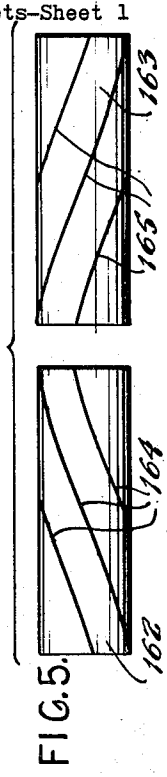


FIG. 5.



FIG. 4.

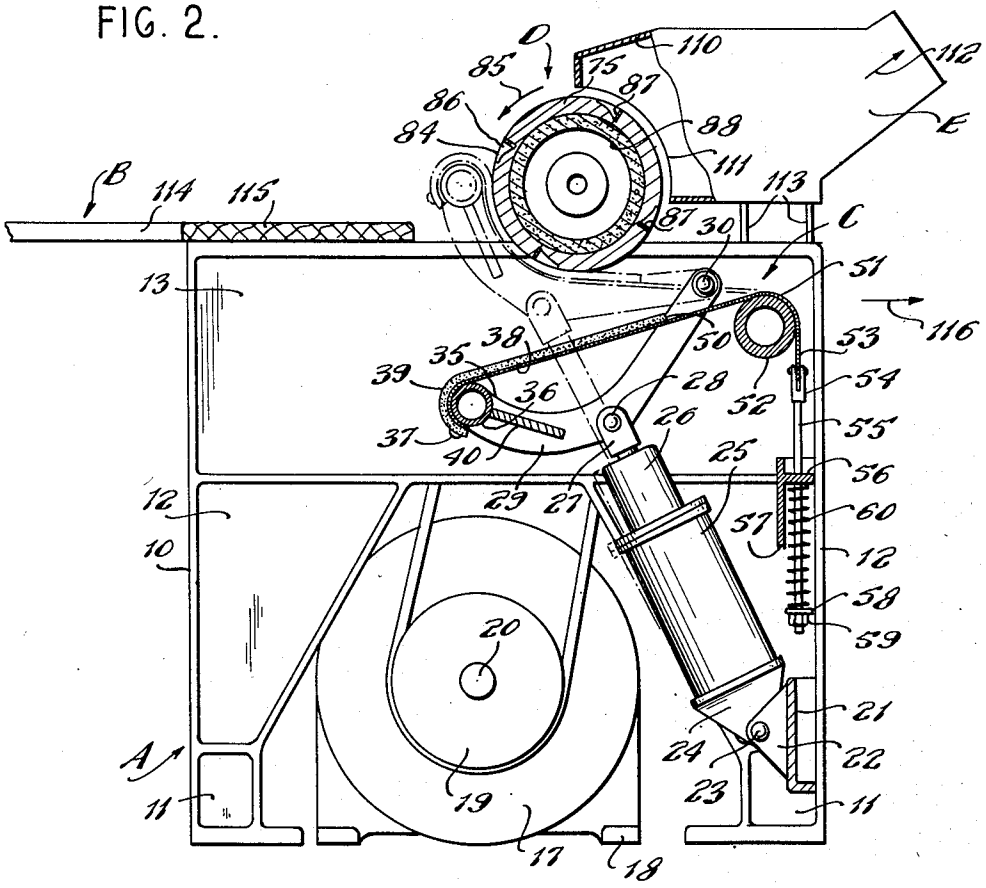
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FIG. 2.



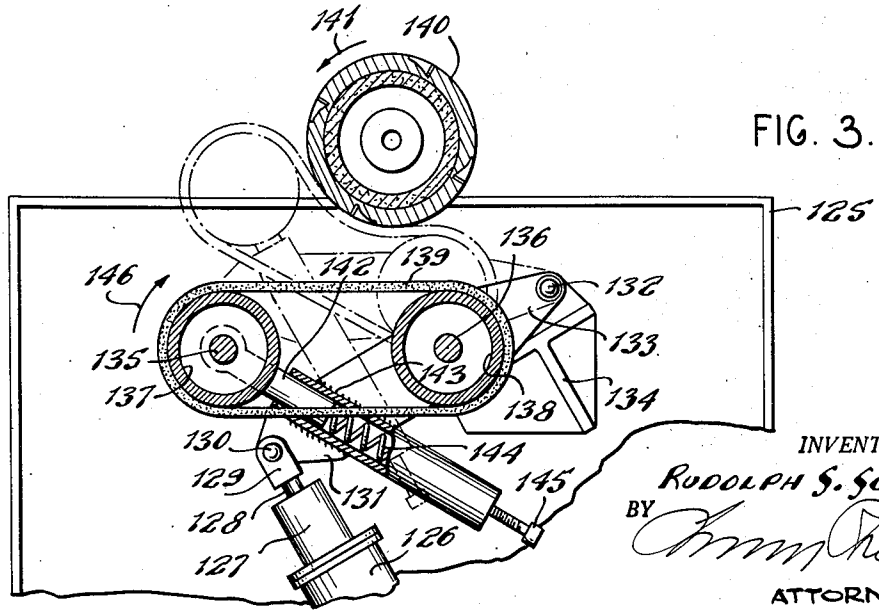


FIG. 3.

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United States Patent Office 2,784,477 Patented Mar. 12, 1957

2,784,477

PILE PROCESSING MACHINE

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Application June 26, 1951, Serial No. 233,613

12 Claims. (Cl. 26—2)

The present invention relates to a pile processing machine and procedures and it particularly relates to a machine and procedure for enhancing and improving the quality and texture of a pile, whether woven or otherwise applied to a textile material.

Although the present invention will be particularly directed to the processing and treatment of pile fabrics, it is to be understood that it has a wide application to the processing and treatment of various types of woven, knitted or felted fabrics upon which it is desired to obtain soft, velvety or nap surface effects by straightening the projecting fibres.

It is among the objects of the present invention to provide a novel machine and procedure for surfacing textile fabrics, particularly those having pile and similar surfaces, which will give assurance that such pile will be enhanced and modified so as to have an improved hand without damaging or weakening the fabric and at low cost with a minimum of labor.

Another object is to provide a novel pile fabric finishing machine and process for enhancing and refurbishing the pile, which will give the pile a rich, lustrous and non-crushable effect as a result of relatively short treatment without damaging the fabric or the pile, and without decreasing its normal wear or durability.

Still further objects, and advantages, will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, it has been found most desirable to provide a relatively long cylinder having a plurality of grooves therein curved steel edge faces for combing the pile or processing the same or for similar surfacing of the fabric.

The cylinder should usually be heated to an elevated temperature which, however, will not damage the pile during the time of contact therewith and desirably the grooves on the cylinder with their relatively sharp ironing edges or faces are so spaced that they will assure uniform treatment of the entire pile without streaking or otherwise giving excess or under-treatment to any portions of the fabric.

In the desired construction, the rotating heated cylinder is mounted in a fixed position while the fabric or material being treated is elevated against the cylinder and caused to undergo the ironing, combing, beating or rubbing treatment under a substantial amount of controlled pressure.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Fig. 1 is a front elevational view of a pile fabric processing machine according to the present invention, partly broken away so as to enable a lessening in width of the machine.

Fig. 2 is a transverse, vertical sectional view upon the line 2—2 of Fig. 1.

Fig. 3 is a vertical transverse sectional view similar to Fig. 2 of an alternative embodiment.

Fig. 4 is a diagrammatic plan view of an alternative ironing cylinder construction which may be substituted for that shown in Figs. 1 to 3.

Fig. 5 is a diagrammatic plan view of still another cylinder construction which may be substituted for that shown in Figs. 1 to 3.

Referring to Figs. 1 and 2, there is shown a frame A provided with a table B, an upwardly and downwardly reciprocable support arrangement C for the fabric or other article being treated, an ironing roller arrangement D and an exhaust arrangement E.

The machine frame has the side members **10** which have the feet **11**, the legs **12** and the top support structure or table support structure **13**, as shown in Fig. 2.

Extending upwardly and inwardly from the structures **14** are the oblique beams **15** which support the structure **16**. The motor structure **17** has the support feet **18** and it drives the pulley **19** by the shaft **20**.

To the rear of the frame A are positioned the structures **21** having the forwardly projecting ears **22** with the pivotal connections **23**. The pivotal connections **23** connect to the downwardly depending elements **24** of the pneumatic or hydraulic cylinder members **25**. The cylinder members **25** receive the reciprocable pistons or tubular elements **26**.

The pistons or reciprocable elements **26** have the upwardly extending actuating members **27** which are of clevis shape and have a pivotal connection at **28** to the U-shaped bars or brackets **29**. The brackets **29** are pivotally mounted at **30** upon the bearing members **31**, which bearing members in turn are mounted by the bolts **32** upon the structural elements **33** and **34**.

Connecting the forward ends **35** of the arms or brackets **29** is the pipe or tube **36**.

On the tube **36** by the rivet or bolts **37** are mounted the canvas or wire mesh support member **38** and the felt or other soft covering element **39**. The rib **40** attached to the tubular member **36** and extending between the brackets **29** supports and reinforces the tube **36** between the brackets **29**.

The felt blanket as shown in Fig. 2 terminates at **50** but the canvas support **38** extends as indicated at **51** over the fixed tubular member **52** until it is engaged at **53** by the clevis members **54** at the upper ends of the rods **55**. The rods extend through and are supported by the webs **56** on the brackets **57**. At the lower end of the rods **55** there are provided washers **58** and the nuts **59**, which washers **58** bear against the springs **60** which at their other ends bear against the webs **56**.

The tubular member **52** is supported at its ends by the rods **61** on the side frame **10**.

The ironing roller D has a cast-iron or cast steel outer shell **75** upon which there are a series of curved grooves **76**, **77**, **78**, **79**, **80**, **81**, **82** and **83** so arranged as to cover the entire surface of the fabric being treated.

As best shown in Fig. 2, each groove has a shallow or approach **84** with a direction of rotation as indicated by the arrow **85** and a relatively deep rear face **83** which has a hard metal, replaceable steel blade **87** which does the actual combing or processing of the fibres.

closed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member, a lever rotatably mounted on the member with the rotational axis adjacent to the circumference of the ratchet segment, a locking bar on said lever having opposite curved faces positioned generally perpendicular to the radius from the rotational axis of the lever, said segment having a series of spaced generally radially extending bar receiving notches with faces complementary to the respective faces of the bar when in bar receiving position, said rotational axis of the lever being at a point adjacent a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch.

2. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite faces positioned generally perpendicular to the radius from the rotational axis of the lever and the faces, said segment being subject to a rotative load and having a series of spaced generally radially extending bar receiving notches with faces complementary to the respective faces of the bar when in bar receiving position, said rotational axis of the lever being within an angular distance of a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch such that the component of the force resulting from application of a rotative load tending to disengage the bar from the notch is less than the frictional force on the respective contacting faces.

3. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite arcuate faces positioned generally perpendicular to the radius from the rotational axis of the lever and the faces, said segment having a series of spaced generally radially extending bar receiving notches with arcuate faces complementary to the respective faces of the bar when at bar receiving position, said rotational axis of the lever being within an angular distance of five degrees inside of a line tangent to an arc about the axis of said segment struck through the centers of the faces of said notch.

4. A mechanical action for artificial limb joints comprising a relatively stationary member and a ratchet segment rotatably mounted on the member on the axis of rotation of the joint, a lever rotatably mounted on the member with the rotational axis adjacent to and exterior of the circumference of the ratchet segment, a locking bar on said lever having opposite arcuate faces of radius of curvature determined by the distance between the rotational axis of the lever and the respective face, said segment having a series of spaced generally radially extending bar receiving notches with arcuate faces complementary to the respective faces of the bar, said rotational axis of the lever being at a point within an angular distance of 15 degrees on either side of a line tangent to an arc centered at the axis of said segment and through the centers of the faces of a notch in bar engaging position, the faces of said notches having positions wherein said last faces are in engagement substantially throughout their areas with the respective faces of the bar when in bar engaging position.

5. A mechanical action for artificial limb joints comprising a pair of members wherein one member is adapted for attachment to a natural limb, parallel plates on one of the members, the other of said members comprising a tubular sleeve rotatably mounted on said plates providing thereby an articulating joint for said action, a ratchet segment fixed on said sleeve having a series of spaced generally radially extending notches, a lever pivotally mounted at a center of rotation on said one member, a locking bar fixed transversely on the lever, and an alternator connected between the lever and one of said members adapted to releasably hold said bar out of notch engagement position, said bar having opposite notch contacting faces curved in the same general direction and said notches having opposite curved bar engaging faces complementary to and adapted to engage the respective faces of the bar when in bar engaging position.

6. A mechanical action for artificial limb joints comprising a relatively stationary member adapted for attachment to a natural limb, parallel plates on said member and a tubular sleeve rotatably mounted on said plates providing thereby an articulating joint for said action, a ratchet segment fixed on said sleeve having a series of spaced generally radially extending notches, a lever pivotally mounted at a center of rotation on said member, a locking bar fixed transversely on the lever, a spring on said member normally urging said bar toward a notch engagement position, and an alternator connected between said member and the lever adapted to releasably hold said bar out of notch engagement position, said bar having opposite notch contacting faces of arcuate form and of radius determined by the distance between the respective face and said center of rotation of the lever, said notches having opposite bar engaging faces of arcuate form complementary to and adapted to engage the respective faces of the bar when in bar engaging position.

7. A ratchet resistant mechanical action for artificial limb joints comprising a base, a ratchet segment rotatably mounted on the base and a locking bar having a pivotal mounting on said base, said locking bar having opposite segment-engaging faces curved in the same general direction about the axis of said pivotal mounting, said segment having a series of peripheral bar receiving notches with opposite faces respectively complementary to the faces on said bar.

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Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

2. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, each of said grooves extending part way around said cylinder, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

3. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, said grooves extending at substantial inclinations to each other so each part of the fabric will be subjected to the same amount of treatment, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

4. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, and means to enable adjustment of the tension on said belt, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

5. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, said belt being mounted by springs and means to stretch said belt against said roller, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

6. An elongated multi-grooved ironing roller for a processing machine of the type having a belt to be moved against and away from said roller to carry the fabric, and electrical means to heat and drive said roller, said roller having a plurality of overlapping grooves each extending part of the length of the cylinder, and pneumatic means to press said belt against said roller, each of said grooves commencing at one end of the roller and terminating short of the other end of the roller, the terminating portions of said grooves overlapping one another in the direction of rotation of said roller.

7. An ironing roller for a pile and nap fabric ironing machine, said roller being of the internally electrically heated type and being rotated at a high speed in contact with the fabric and being fixed in position while the fabric being treated is elevated into contact with the roller to enhance the pile or nap and give it a rich, lustrous and non-crushable effect, said roller having a plurality of curved grooves extending from the end thereof toward the center of the roller but none extending the full length of the cylinder and the end of each said groove toward the center of the roller being overlapped by the next adjacent groove which will extend longitudinally beyond the end of said groove.

8. A pile textile ironing roller comprising a rotary driven elongated internally heated cylinder with a plurality of grooves cut into the peripheral cylindrical surface of the cylinder extending longitudinally from the ends of the cylinder toward the mid-portion of the peripheral cylindrical surface of the cylinder and inclining around the cylinder forwardly in the direction of rotation and rearwardly away from the direction of rotation and terminating without reaching the other end of the cylinder, the terminal portions of the grooves overlapping one another in the direction of rotation.

9. The roller of claim 8, said roller being provided with means to press the pile textile against it while the roller is rotating.

10. The roller of claim 8, said roller being provided with an exhaust to remove any dust and dirt therefrom.

11. The roller of claim 8 in which each valley is provided with a hard metal replaceable steel blade on one side thereof which carries on the actual processing of the pile.

12. The roller of claim 8, said roller being provided with a belt-like carrier which may be pressed against the roller.

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