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PREPARING MACHINE

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Fig. 1.

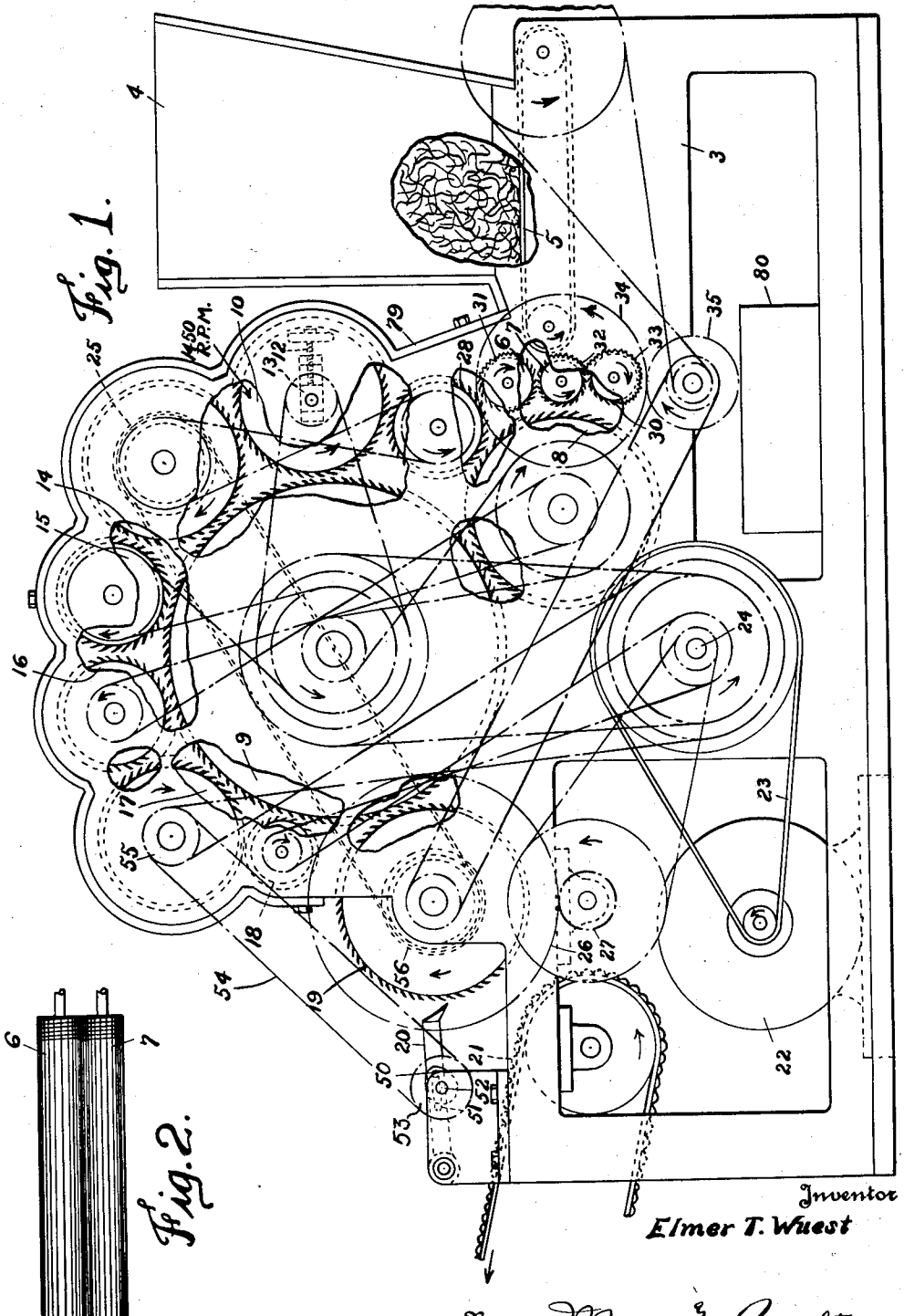


Fig. 2.

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PREPARING MACHINE

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14 Claims. (Cl. 19—99)

This invention relates to a preparing machine for cotton and like materials to be worked from a coarse or crude state to one of refinement.

An object of the invention is to provide a machine for the above stated purpose, which with a great saving of space and elimination of mechanical parts, will deliver prepared cotton bats or laps of extreme refinement and fine texture.

Another object is to provide a cotton preparing machine with means for repeatedly returning crude material to the initial feeding point of the machine, prior to reception by the worker and carding rolls of the machine, whereby to introduce the material to said worker and carding rolls in such a condition as to preclude the occurrence of knots or lumps in the bat or lap formed at the discharge end of the machine.

A further object of the invention is to provide means associated with the crude material return means above mentioned, whereby the grade and speed of discharge of the material may conveniently be regulated.

These and other objects are attained by the means described herein and disclosed in the accompanying drawing, in which:

Fig. 1 is a side elevational view of the improved machine, showing in a somewhat diagrammatical form the various parts and means for actuating said parts.

Fig. 2 is an elevational view showing a pair of toothed rolls such as are utilized in the machine of Fig. 1.

Heretofore it was common practice to run crude cotton or the like through a plurality of Garnett machine sections in order to effect ultimately the formation of a bat or lap having no knots or lumps therein. Each Garnett machine section occupied a great amount of space and required considerable power for its operation, and of necessity the Garnett machine sections were placed one behind another thereby rendering difficult the economic placing of such machines in the required manner, in a manufactory. By means of the device of this invention there is accomplished, in a single section, better results than are obtained by the use of several Garnett machine sections, resulting in a considerable saving of space, power, and mechanism. The device of the invention comprises a frame 3 upon which is mounted a hopper 4 for reception of crude cotton or like material, which material is advanced, by means of a suitable conveyor 5, to the feed rolls 6 and 7 of the machine. The feed rolls rotate in opposite directions and each preferably is provided with teeth pointing in the direction opposite to its rotational movement.

Rotatably mounted adjacent to the feed roll 7 is a roll known as a taker-in roll 8 rotated in a clockwise direction and having teeth thereon pointing in the direction of rotation. The taker-in roll operates at a high speed, compared to that of the feed rolls, so that it may tear the fed material from the feed rolls and advance said material to the main cylinder 9 which rotates in counter-clockwise direction and has teeth pointing in the direction of its rotation. In order to give an idea of the relative roll speeds, it may be stated that the taker-in roll rotates at a speed of approximately 145 revolutions per minute, while the R. P. M. of the main cylinder approximates 330.

The taker-in roll is disposed immediately in advance of a crude material return roll 10 having a counter-clockwise rotational movement and teeth pointing in the direction of rotation, said roll 10 having its teeth normally spaced from the teeth of the main cylinder and which spacing may be varied by any suitable means such as a feed screw 12 arranged to advance and retract the bearing block 13 in which the axle of the roll 10 is journalled. The roll 10 operates at a high speed, for example 1450 R. P. M., and its function is to remove lumpy or knotty material from the main cylinder and to return that character of material to the feed rolls 6 and 7 for a second feeding to the taker-in roll. If, after the second feeding, the knots or lumps are not completely eliminated, they will again be picked up by the return means 10 and reinserted into the feeding mechanism. Thus, lumpy or knotty material will never have introduction to the worker and carding rolls which are disposed about the periphery of the main cylinder. From the foregoing it is readily understood, therefore, that a given lump or knot of material might repeatedly be fed to the machine a number of times before it is completely torn apart and conditioned for reception by the worker and carding rolls. The rolls which operate on the conditioned material are the worker 14, the stripper 15, the worker 16, the fancy 17, the fancy stripper 18, and the final doffer roll 19. Material carried by the final doffer roll 19 may be removed therefrom by any suitable means such as an oscillating comb 20 which deposits the material upon a suitable bat or lap conveyor 21. The roll 14, and those to the left of it, are to be regarded as the "worker and carding rolls", whereas roll 10 and those below

it constitute the intercepting and returning mechanism, which is their primary function.

Power for actuating the various rolls may be supplied by a motor 22 which, by means of a belt or chain 23, transmits rotational movement of the motor shaft to a counter-shaft 24 from which the various rolls are driven. In order to simplify the showing of means for driving the rolls, there is indicated conventionally a number of belts and chains, the application of which is readily understood by persons skilled in the art of machine manufacture and operation. It is deemed unnecessary, therefore, that the manner of rotating every roll be described and explained in detail, since the directions of rotation are indicated and the belt or chain drives simply illustrated. It should be sufficient to state that the doffer 14 may be rendered variable as to its speed of rotation by providing any suitable means for the purpose, such as a stepped pulley 25, and that the speed of the final doffer 19 may be similarly varied by changing the ratio of gears 26 and 27. By means of any suitable arrangement such as the foregoing, the speed of rotation of the stripper 28 may be varied between the speeds of approximately 15 and 150 R. P. M.

The stripper 28, it should be noted, rotates in counter-clockwise direction and has teeth pointing in the direction of rotation. Said stripper is spaced from the main cylinder so as not to cooperate therewith, but the teeth of the stripper serve to remove material from the crude material returning roll 10 and to assist in directing said material toward the feed rolls 6 and 7. The stripper 28, therefore, necessarily is located near the feed rolls or in such a position as to direct the comparatively heavy material, such as seeds and chaff, from the roll 10 to the feed rolls. The finer material conveyed by the stripper 28 may be removed therefrom by the taker-in roll, and advanced to the main cylinder without having to pass through the feed rolls 6 and 7 with the coarser material.

By adjusting the means 12—13 associated with the crude material return roll 10, it is possible to control the character of material that will remain on the main cylinder and be worked by the various carding and worker rolls. By varying the speed of the return roll stripper 28, the amount of material that will pass through the carding mechanism, may be regulated.

The feed rolls 6 and 7, and the cleaning roll 30 may be gear driven at about 3 R. P. M. by means of the gears 31, 32, and 33, which are fixed to the shafts of the respective rolls 6, 7 and 30, gear 32 being rotatable with a large gear 34 which is in mesh with a gear 35 rotated directly or indirectly from the counter-shaft 24. The shafts to which the gears 31 and 33 are fixed, may be journalled in the frame, said shafts being rotated by means of intermeshing of the gears 31 and 33 with the driven gear 32. The pivoted comb 20 may be oscillated by means of a crank or eccentrically disposed extending member 50 working in an elongated slot 51 in the comb member. The shaft 52 to which the eccentric is fixed may have secured thereon a pulley 53 driven by means of a belt 54 receiving motion from a power driven pulley of the machine, for example, the pulley 55. A stepped pulley is indicated at 56, which cooperates with stepped pulley 25 for the purpose of changing the relative speed of roll 14. It is to be understood, as stated before, that the use of other speed changing means is within the scope of the invention.

By reference to Fig. 1 of the drawing, it is readily appreciated that seeds, chaff, and other heavy material unsuited for use in the preparation of batts, are rejected and thrown by the rolls 10 and 28 in the general direction of the feed rolls. Some of the heavier particles may gravitate or be directed by roll 8 into a suitable container 80, while some may reach the conveyor 5 and re-enter the feed rolls. These rejected particles will not cling to the rolls after having been stripped of their enveloping fibers during the intercepting and returning operation, and they will therefore readily fall into the container 80; and inasmuch as only choice and selected material is permitted to reach the worker and carding rolls 14 to 19 inclusive, the rolls are maintained always in a clean condition and their life is prolonged due to the absence of hard and lumpy particles which, in the prior machines, had the undesirable effect of turning or wearing off the sharp points of the roll teeth.

The high speed intercepting and return roll 10 has still another function. This roll 10, being ahead of the working and carding rolls 14 to 19 inclusive, and operating at a high speed, precludes the passage to the working and carding rolls of all such long and tough threads as would have a tendency to undesirably wind themselves permanently upon, and between the teeth of, the worker and carding rolls when the machine is used for operating upon rags, cloth, or any woven materials. In prior machines, especially the Garnett machines wherein there was provided no high speed roll such as 10 in advance of the comparatively slowly rotating workers and carders, it was not uncommon to find the slowly rotating rolls so wound with tough and long threads as to impair efficiency of the rolls to the extent that the machines had to be stopped and the rolls picked or cleaned periodically. By providing the high speed intercepting and return roll 10 having rotational movement in the direction of rotation of the main cylinder and with its teeth pointing in the direction of its rotation, the foregoing difficulty is avoided because the teeth of the roll 10 grasp the long tough threads and suddenly reverse their direction of travel so as to hook the threads over one or more teeth of the main cylinder and break them into lengths which cannot wind about the worker and carding rolls. It should be evident that a slowly rotating roll 10 would merely strip a long tough thread from the main cylinder without breaking it, or it would permit such a thread to pass on to the slowly rotating worker and carding rolls, there to become wound upon the worker and carding rolls and be packed between the teeth to impair the efficiency of the carding mechanism. Long and tough threads of silk and other tough material found amongst rags and woven fabrics, are readily and effectively prepared for the formation of batts by the improved means of this invention. Ordinary Garnett machines are found to be incapable of effective preparation of materials that are handled without difficulty by the improved machine herein illustrated and described.

From the foregoing description and explanation of operation, it is observed that means are provided whereby one machine section, by reason of the intercepting and returning mechanism located at the head of the device, is made to accomplish the work of a number of Garnett machine sections placed in tandem relation, and that there is effected, consequently, a reduction

in the floor space and power required. Simplification and elimination of mechanism also is apparent, as there is required only one carding unit which is all that is necessary for carding fibers after subjection thereof to the lump intercepting and returning means of the invention.

What is claimed is:

1. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith and a feeding means for advancing lumpy crude material toward the main cylinder, of means including a high speed toothed roll working on the material of the main cylinder ahead of the carding elements for intercepting tearing and returning a portion of the crude material to the feeding means prior to reception of the material by the carding elements, while permitting finer particles of material suitable for the carding operation to pass to the carding elements and means for rotating the high speed toothed roll at a surface speed at least as great as that of the main cylinder.

2. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith and a feeding means for advancing lumpy crude material toward the main cylinder, of means for intercepting and returning lumps of crude material to the feeding mechanism, while permitting finer particles of material suitable for the carding operation to pass to the carding mechanism, said means including a high speed toothed roll set to the main cylinder in advance of the carding elements and rotating at a surface speed at least as great as that of the main cylinder, and means for adjusting the high speed toothed roll toward and from the main cylinder for controlling the amount of material that may reach the carding elements and controlling, consequently, the output of the machine.

3. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith, and a feeding means for lumpy crude material, of toothed roll means operating adjacent the feeding means for tearing particles of material from the feeding means and advancing them toward the main cylinder, a high speed roll working at a surface speed greater than that of the main cylinder and associated with the main cylinder for intercepting and returning a portion of the crude material to be re-fed to the first mentioned toothed roll means prior to the reception of said material by the carding elements, while permitting finer particles of material suitable for the carding operation to pass to the carding elements for substantially stripping the high speed roll at least as fast as it removes the material from the main cylinder.

4. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith, and a feeding means for lumpy crude material, of toothed roll means operating adjacent the feeding means for tearing particles of material from the feeding means and advancing them toward the main cylinder, a high speed toothed roll disposed in advance of the carding elements and operating at a surface speed greater than that of the main cylinder and set to the main cylinder for intercepting, tearing, and returning a portion of the crude material to be re-fed to the toothed roll means prior to the reception of said crude material by the carding elements while permitting finer particles of material suitable for the carding operation to pass to the carding elements, and means for adjusting the high speed toothed roll toward and from the main cylinder to control passage of material to the carding elements.

5. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith, and a feeding means for lumpy crude material, of toothed roll means operating adjacent the feeding means for tearing particles of material from the feeding means and advancing them toward the main cylinder, means including a toothed roll rotating at a surface speed greater than that of the main cylinder and associated with the main cylinder for intercepting and returning lumps of crude material to be re-fed to the toothed roll means prior to the reception of said lumps by the carding mechanism, while permitting finer particles of material suitable for the carding operation to pass to the carding mechanism, and a variable speed stripper for said intercepting and returning means arranged to subject the intercepted material to the action of the toothed roll means and the feeding means.

6. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith, and a feeding means for lumpy crude material, of toothed roll means operating adjacent the feeding means for tearing particles of material from the feeding means and advancing them toward the main cylinder, high speed toothed roll means having a surface speed at least as great as that of the main cylinder and associated with the main cylinder for tearing, intercepting and returning lumps of crude material to be re-fed to the toothed roll means prior to the reception of said crude material by the carding mechanism, while permitting finer particles of material suitable for the carding operation to pass to the carding mechanism, and a stripper for said intercepting and returning means arranged to return the intercepted material to the action of the toothed roll means and the feeding means.

7. The combination with a carding mechanism comprising a main cylinder having carding elements associated therewith, and a feeding means for lumpy crude material, of toothed roll means operating adjacent the feeding means for tearing particles of material from the feeding means and advancing them toward the main cylinder, a high speed toothed roll operating in advance of the carding elements and set to the main cylinder for intercepting and returning lumps of crude material to be re-fed to the toothed roll means prior to the reception of said lumps by the carding mechanism, while permitting finer particles of material suitable for the carding operation to pass to the carding mechanism, means for rotating the high speed toothed roll at a surface speed at least as great as that of the main cylinder, a stripper for said intercepting and returning means arranged to subject the intercepted material to another action of the toothed roll means and the feeding means and means for adjusting the high speed toothed roll toward and from the main cylinder.

8. The combination with a carding mechanism comprising toothed elements and a feeding means for advancing crude material to the carding mechanism, of means in advance of the carding mechanism comprising a high speed toothed roll adjustable toward and from the carding mechanism and having its teeth pointing in a direction such as to grasp and suddenly reverse the direction of movement of long strand crude material

fed toward the carding mechanism and to thereby hook the long strand material over one or more teeth of a carding mechanism element for breaking the long strand material into lengths shorter than the circumference of the carding mechanism elements in order to preclude winding of the long strand material around said carding elements, and means for rapidly rotating the high speed toothed roll at a surface speed at least as great as that of the main cylinder.

9. The combination with a carding mechanism comprising toothed elements including a main cylinder and a feeding means for advancing crude material to the carding mechanism, of means in advance of the carding mechanism comprising a high speed toothed roll set to the main cylinder and having its teeth pointing in a direction such as to grasp and suddenly reverse the direction of movement of long strand crude material fed toward the carding mechanism and to thereby hook the long strand material over one or more teeth of a carding mechanism element for breaking the long strand material into lengths shorter than the circumference of the carding mechanism elements in order to preclude winding of the long strand material around said carding elements, and means for rapidly rotating the high speed toothed roll at a surface speed greater than the surface speed of the main cylinder.

10. The combination with a carding mechanism including toothed carding elements and a cooperative rotating main cylinder having teeth pointing in the direction of its rotation, and a feeding means for advancing crude material to the carding mechanism, of means in advance of the toothed carding elements comprising a high speed toothed roll having its teeth spaced from the teeth of the main cylinder and pointing in a direction such as to grasp and suddenly reverse the direction of movement of long strand crude material fed toward the carding mechanism and to thereby hook the long strand material over one or more teeth of the main cylinder for breaking the long strand material into lengths shorter than the circumference of the toothed carding elements in order to preclude winding of the long strand material around said carding elements, and means for rapidly rotating the high speed toothed roll in the same direction of rotation as the main cylinder and at a surface speed greater than that of the main cylinder.

11. The combination with a carding mechanism including toothed carding elements and a cooperative rotating main cylinder having teeth pointing in the direction of its rotation, and a feeding means for advancing crude material to the carding mechanism, of means in advance of the toothed carding elements comprising a high speed toothed roll having its teeth spaced from the teeth of the main cylinder and pointing in a direction such as to grasp and suddenly reverse the direction of movement of long strand crude material fed toward the carding mechanism and to thereby hook the long strand material over one or more teeth of the main cylinder for breaking the long strand material to preclude winding of the long strand material around said carding elements, and means for rapidly rotating the high speed toothed roll in the same direction of rotation as the main cylinder and at a surface speed greater than that of the main cylinder.

12. The combination with a carding mechanism comprising toothed elements including a main cylinder and a feeding means for advancing crude material to the carding mechanism, of a high speed toothed element in advance of the carding mechanism and operating at a higher surface speed than the main cylinder and spaced at such a distance from the main cylinder of the carding mechanism elements as to intercept and reject lumps, seeds and foreign objects fed toward the carding mechanism by the feeding means.

13. The combination with a carding mechanism comprising toothed elements including a main rotating cylinder and a feeding means for advancing crude material to the carding mechanism, of means in advance of the carding mechanism comprising a high speed toothed roll rotating at a surface speed at least as great as that of the main cylinder, and means for precluding overloading of the carding mechanism and comprising an adjustable element for moving the high speed toothed roll toward and from one of the toothed elements of the carding mechanism.

14. The combination with a carding mechanism comprising toothed elements including a main cylinder and a feeding means for advancing crude material to the carding mechanism, of a high speed toothed element rotating at a surface speed at least as great as that of the main cylinder and set to the main cylinder in advance of the carding mechanism, for intercepting lumps, seeds, and foreign objects carried by the main cylinder, adjusting means associated with the high speed toothed element for moving said element bodily toward and from the main cylinder for removal of the foreign objects and seeds from the machine in advance of the carding means with predetermined degrees of completeness, whereby to preclude overloading of the carding means.

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