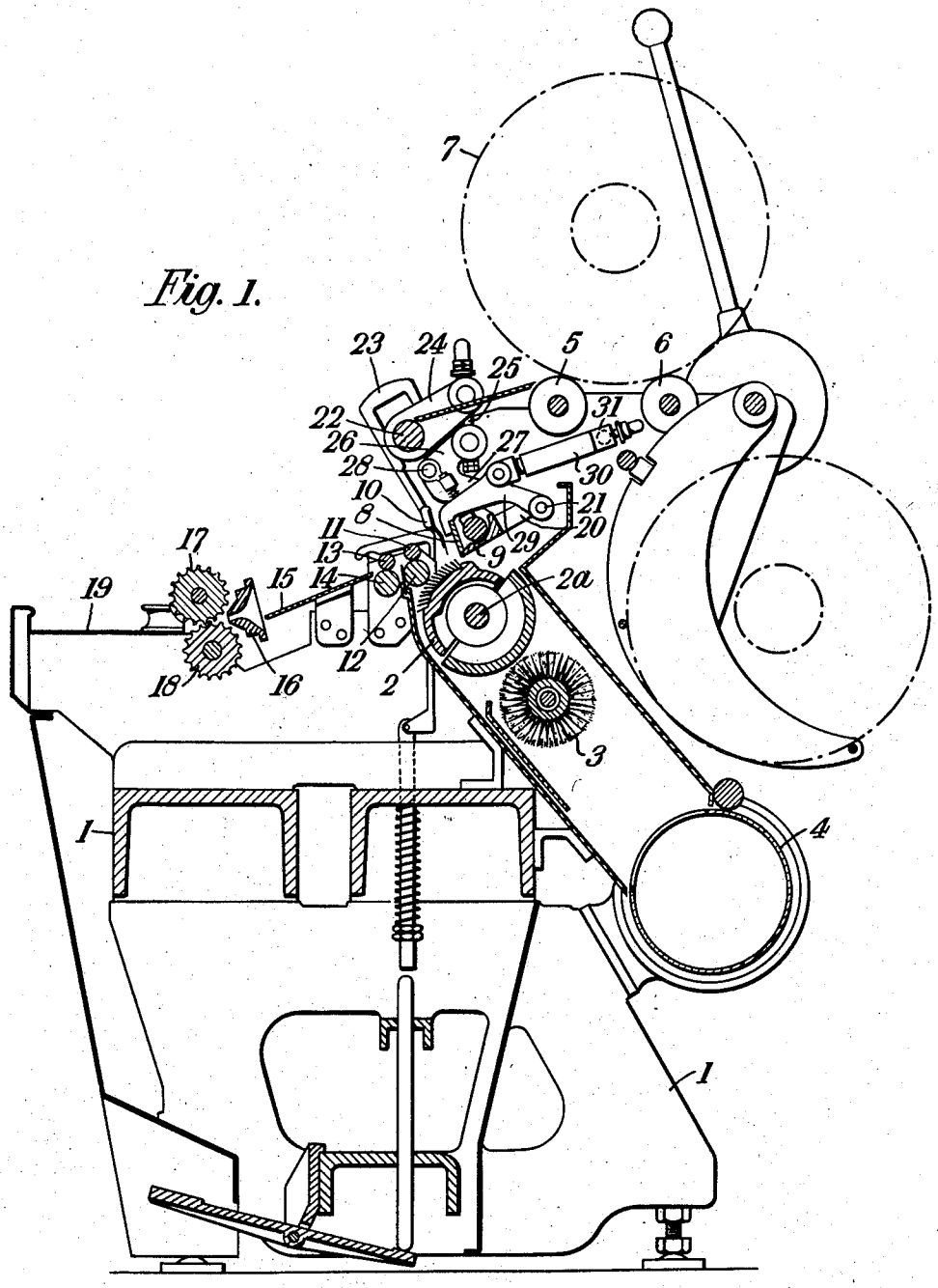
July 21, 1959 J. R. FOSTER 2,895,177

TEXTILE COMBING MACHINES

Original Filed Oct. 12, 1953 3 Sheets-Sheet 1

Fig. 1.



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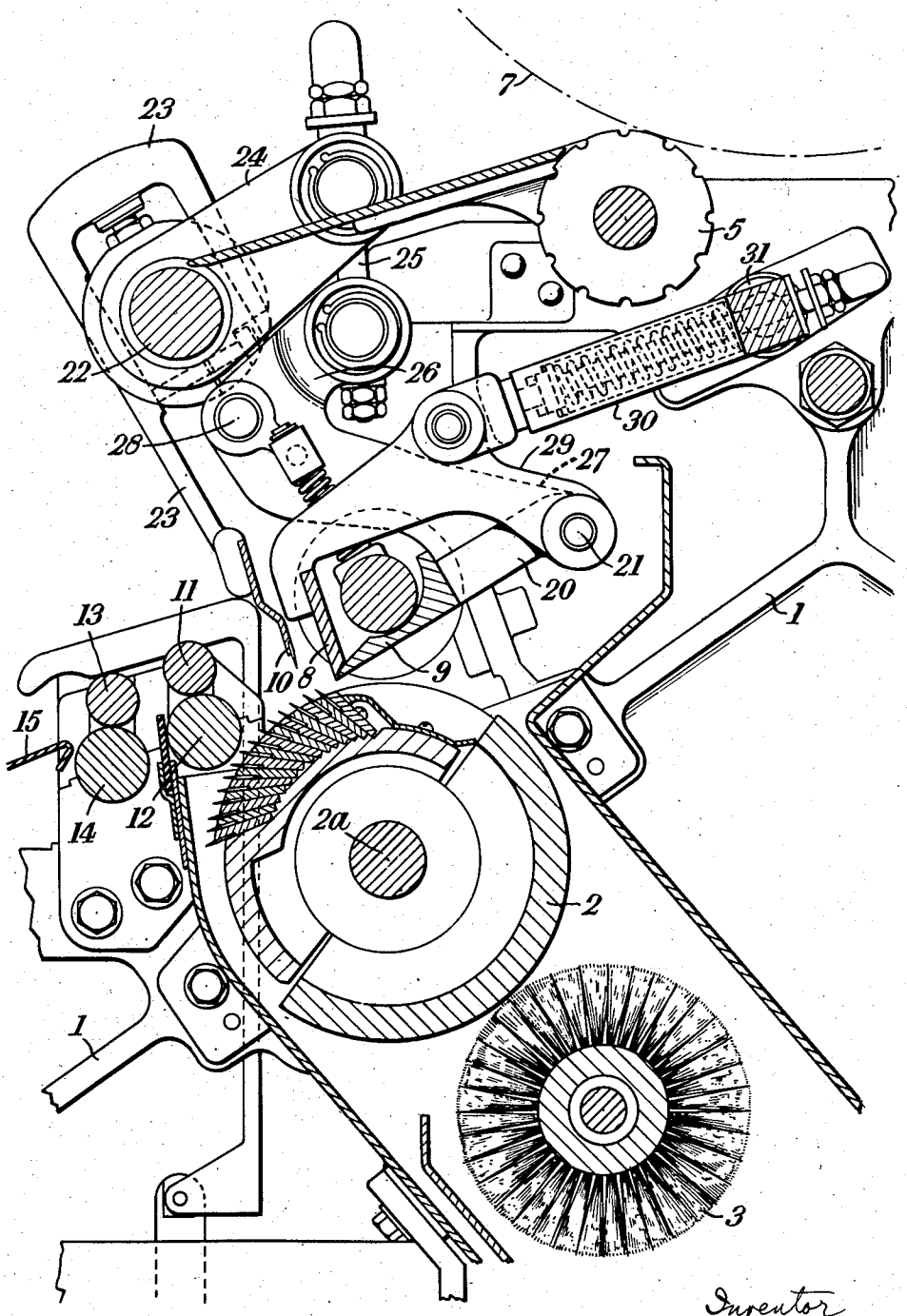


Fig. 2.

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Original Filed Oct. 12, 1953 3 Sheets-Sheet 3

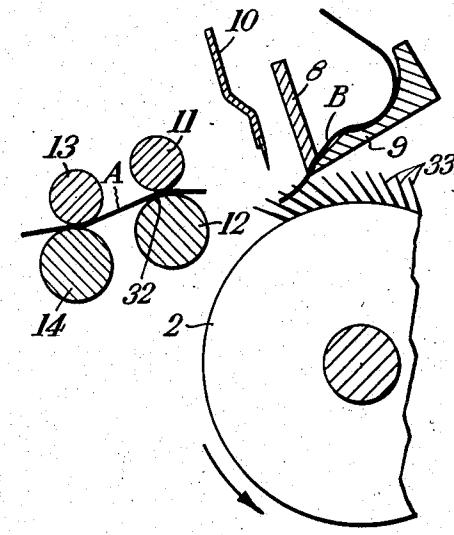


Fig. 3.

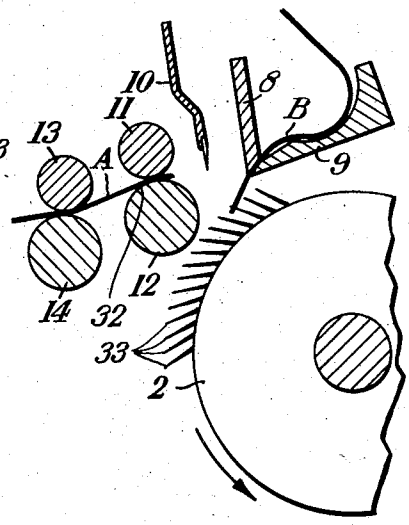


Fig. 4.

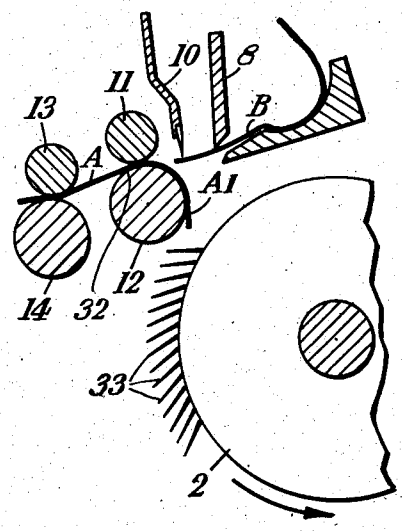


Fig. 5.

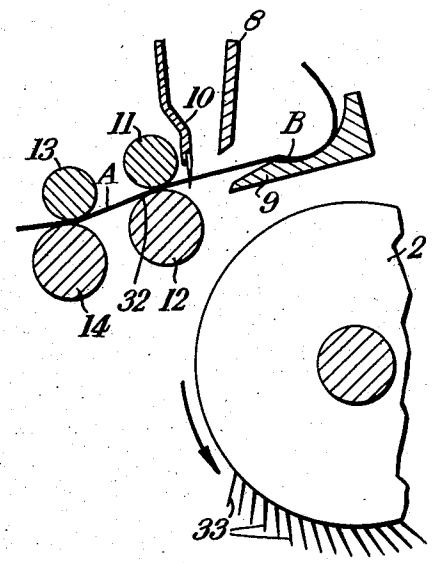


Fig. 6.

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United States Patent Office 2,895,177 Patented July 21, 1959

2,895,177

TEXTILE COMBING MACHINES

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Original application October 12, 1953, Serial No. 385,633, now Patent No. 2,781,556, dated February 19, 1957. Divided and this application March 3, 1955, Serial No. 491,821

Claims priority, application Great Britain October 14, 1952

2 Claims. (Cl. 19—120)

The invention relates to textile combing machines, this application being a division of my application Serial No. 385,633, filed October 12, 1953, now Pat. 2,781,556, Feb. 19, 1957. The said application as filed had for its object an improved constructional arrangement of a combing machine whereby increased production can be obtained without loss of quality, by operating at higher speed than had theretofore been practicable. The invention covered thereby provided improved means for mounting and operating the top comb and nipper mechanism, and also an improved constructional arrangement of the detaching and piecing mechanism, and this latter is the subject of the present application.

Machines of the type referred to herein contain forward and back pairs of detaching rollers, top and bottom rollers in each pair, and an object of the invention covered herein is so to arrange and construct the same that one, and preferably two highly desirable results will be obtained. These are, firstly, when the fringe of the pieced web is reversed, it shall be caused to curve downwardly about the rear surface of the bottom back roller, so as to be held clear of the leading edge of the oncoming tuft held in the nippers; and secondly, the back rollers must be so arranged as to permit the nearest possible approach of the top comb and the nippers to the nip of said rollers without fouling the surface of the upper roller.

Further, the object of the invention is so to arrange the detaching rollers and coacting parts that the above-mentioned results will be obtained in a simplified construction in comparison with prior combing machines, such as the well-known Heilmann and Nasmith combers, in which provision is made for oscillating or displacing the top back detaching roller forward and back in reference to the bottom back roller, periodically, with the intention of obtaining similar results to those above mentioned. In my invention herein all four rollers revolve about fixed axes, the axes of the back rollers being situated at higher points than the axes of the corresponding front rollers, which causes the pieced web on reversal to make contact with the surface of the bottom back roller before entering the nip of the back rollers; and also, in my preferred construction, the axis of the upper back roller is located in advance of the vertical plane containing the axis of the bottom back roller, whereby the second of the above-mentioned desirable results is obtained.

Attention is hereby directed to the accompanying drawings, illustrating a preferred embodiment of the invention. In the drawings:

Fig. 1 is a transverse section of the machine;

Fig. 2 is an enlarged sectional view of the parts of the machine which are intimately associated with the combing elements, as seen at the end of the cylinder combing stage, the nippers still being closed;

Fig. 3 is a sectional view of the comb cylinder, the nipper mechanism, the top comb, and the detaching roller assembly, shown in the position respectively occupied at the commencement of the cylinder combing stage; and

Figs. 4, 5 and 6 are similar to Fig. 3, but are varied to depict the positions of the parts at three subsequent stages in the combing cycle.

Referring to the drawings, the operating members are supported by main frame, **1**. **2** is the comb cylinder, **3** the stripping brush thereof and **4** the aspirator duct used to conduct away the short fibres removed by the comb cylinder **2**. The shaft of the comb cylinder is indicated at **2a**. **5**, **6** are rollers upon which a lap **7** of material to be combed is placed so that it may rotate freely as the combing operation proceeds. **8** and **9** are respectively the top and bottom nippers and **10** is the top comb. **11**, **12** and **13**, **14** are respectively back and front pairs of detaching rollers, all of which are mounted for rotation about fixed axes. **15** is a plate adapted to lead the combed material through a funnel **16**, whence it is delivered by the rollers **17**, **18** to a longitudinal delivery plate **19**.

The lower nipper **9** is carried by a frame of which the side members **20** are jointed at the rear by a shaft **21**. In the space above the comb cylinder **2** is located the rocking shaft **22** upon which the top comb **10** is suspended to oscillate therewith by means of brackets **23**. Each of a pair of levers **24** fixed to the shaft **22** is connected by an adjustable link **25** to an arm **26** of a bell-crank lever **26**, **27** which is pivoted at **28** and the other arm **27** of which supports at its extremity the pivot shaft **21** of the upper nipper frame, the arrangement being such that the requisite oscillating action of the nipper frame is derived from the rocking movement of the shaft **22** through the members **24**, **25**, **26**, **27** and **21**. The amplitude of the nipper movement can be adjusted by regulating the effective length of the link **25**.

The upper nipper **8** is carried by levers **29** loosely pivoted on the shaft **21** and each of which is connected by an extensible drag link **30** with a fixed anchorage **31**. By these means the nippers are caused automatically to open when the lower nipper **9** is swung forwardly after the cylinder combing stage.

In a previous known arrangement the nipper mechanism is suspended from a rocking shaft (such as rocking shaft **22** shown herein) located above the comb cylinder, and to which the nipper frame is fixed, the top comb being carried by a fixed pivot and linked to the nipper frame so as to move synchronously therewith. In the arrangement described herein, however, the radius of the oscillating movement of the nipper assembly about the axis **28** is substantially less than would be the case if the nippers were suspended directly from the rocking shaft **22**.

The reduction in length of stroke of the nippers is of particular advantage where a high machine operating speed is sought, and produces various beneficial results, among which the following are mentioned:

(1) The reduced stroke enables the velocity of movement of the nippers to be reduced correspondingly, which, among other advantages, lessens the tendency of the fringe held by the nippers to be distributed.

(2) It is not possible, in conventional combers, to reverse the detaching rollers to turn back the fringe of the previously combed material until the last row of cylinder needles has passed the detaching rollers. It is therefore desirable that the rear position of the nippers (i.e. the position occupied during the cylinder combing operation) should be situated as closely as possible to the detaching rollers, so that this "dead" period is reduced to a minimum, the time saved thereby being employed to increase the period devoted to some other operation in the combing cycle. The reduced nipper stroke of the present invention diminishes this "dead"

period, the time saved being used to augment the period devoted to the turn-back of the detaching rollers. By this means, the velocity of the turn-back is reduced, this producing better technological operating conditions.

(3) It is accepted that the speeds at which the detaching and top combing operations are performed may not be increased beyond a certain limit without deterioration in the quality of the output material. In the present invention the reduced stroke and velocity of the nippers enables the nipper head to enter the detaching zone earlier in the comber cycle than would otherwise have been the case. The period devoted to the detaching operation is consequently increased and, although the machine itself is running at greatly increased speed, the speed of the detaching operation is not increased to the same extent. The rate of production may therefore be enhanced without loss of equality.

The constructional arrangement of the detaching rollers will now be described. These comprise a front pair **13**, **14**, and a rear pair, **11**, **12**, the axes of all of the same being fixed. It will be seen that the front pair **13**, **14** are so located with respect to the back pair **11**, **12** that the web A makes contact with the bottom back roller at **32** i.e. forward of the nip of the rollers **11**, **12**. The web A is maintained between the nips of the rollers **11**, **12** and **13**, **14** until the rollers are reversed (Fig. 4). That is to say, in the present embodiment the nip of the rollers **13**, **14** is located at a lower level than that of the rollers **11**, **12** so that the web A is inclined from the point at which it leaves the nip of the rollers **13**, **14**, the surface of the roller **12** lying in the path of the web at a point displaced from the nip of the rollers **11**, **12** towards the rollers **13**, **14**. This arrangement has the effect of inducing in the web A a tendency, when fed backward through the nip of the rollers **11**, **12**, to curve downwardly about the rear surface of the roller **12**, and to take up the position shown at A_1 in Fig. 5.

Fig. 3 shows the relative positions of the parts as the needles **33** of the comb cylinder **2** commence to comb the new tuft of uncombed material B, which is held between the nippers **8**, **9**. The combed web A has still to proceed a short distance further through the detaching rollers before its motion is reversed preparatory to piecing. When the parts reach the positions shown in Fig. 4, the cylinder combing stage is almost complete and the nipper assembly and top comb have commenced their forward movement towards their piecing positions. After the comb cylinder needles **33** have passed the new tuft B towards the position shown in Fig. 5, during which movement they may brush down the fringe A_1 of the combed web A, the nippers **8**, **9** open, allowing the new tuft to be fed forwards into contact with the web A, and as the fringe A_1 and the leading edge of the new tuft B are grasped by the rollers **11**, **12**, the top comb **10** is brought to position to perform the final combing operation on the remainder of the new tuft B. The parts have now reached the position shown in Fig. 6.

It will be observed that the lower position of rollers **13**, **14** with reference to rollers **11**, **12**, ensures that the tuft, A, upon completing its forward movement prior to reversal, as shown in Fig. 4, clings to and curves about a segment of the fluted roller, **12**, extending from a point indicated roughly at **32** to the nip of rollers **11**, **12**. It has been found that, because of this, tuft A will continue to follow the curvature of roller **12**, after passing through the nip of rollers **11**, **12**, upon reversal, to a much greater extent than would be the case if the nip of rollers **13**, **14** were on the same level as the nip of rollers **11**, **12**, as is shown in Fig. 5 at A_1.

In order that the presence of the upper back roller **11** will not hinder the nipper assembly and top comb from moving as closely as possible to the nip of the back rollers **11**, **12** during the piecing operation, and in order that the necessity for any transitory movement of the back rollers may be avoided, the axis of the roller **11** is located somewhat in advance of the vertical plane containing the axis of the roller **12**, as is indicated in the drawings.

The relative location of the front and rear pairs of detaching rollers provided by this invention is further advantageous in that it permits the settings of the top comb and the nippers, and the rate of feed of material, to be adjusted to suit a variety of materials of different types, different staple lengths and of other variable characteristics.

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

1. In a textile combing machine including a comb cylinder and a top comb, in combination, a nipper assembly, a detaching mechanism, the nipper assembly being arranged to supply a web of material to said detaching mechanism, said detaching mechanism comprising front and back spaced roller pairs, each consisting of an upper roller and a lower roller, all four of the rollers being reversably rotatable about fixed axes, said comb cylinder and said top comb cooperating to comb respectively the leading edge of said supply web and the trailing edge of the web held by the detaching mechanism, said nipper and said detaching mechanism being cooperative to cause the combed leading edge of the supply web to be pieced onto the trailing edge of the combed web held by the detaching mechanism before reaching the nip of the back roller pair, the axis of said back rollers being situated at higher points than the axes of the corresponding front rollers, to cause the pieced web when fed toward the nipper to travel substantially tangential to the surface of the bottom back roller when at a point displaced from the nip of the back roller toward the front rollers.

2. In a textile combing machine including a comb cylinder and a top comb, in combination, a nipper assembly, a detaching mechanism, said nipper assembly being arranged to supply web to said detaching mechanism, the latter comprising front and back spaced roller pairs each consisting of an upper roller and a lower roller, all four of the rollers being reversably rotatable about fixed axes, and means including said comb cylinder and said top comb cooperating to comb respectively the leading edge of said supply web and the trailing edge of the web held by the detaching mechanism, said nipper and said detaching mechanism being cooperative to cause the combed leading edge of the supply web to be pieced onto the trailing edge of the combed web held by the detaching mechanism before reaching the nip of the back roller pair, the axes of said back rollers being situated at higher points than the axes of the corresponding front rollers, and the axis of the upper back roller being located in advance of the vertical plane containing the axis of the bottom back roller.

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