Jan. 31, 1939. J. W. NASMITH 2,145,491

COMBING MACHINE

Filed May 27, 1936 3 Sheets-Sheet 1

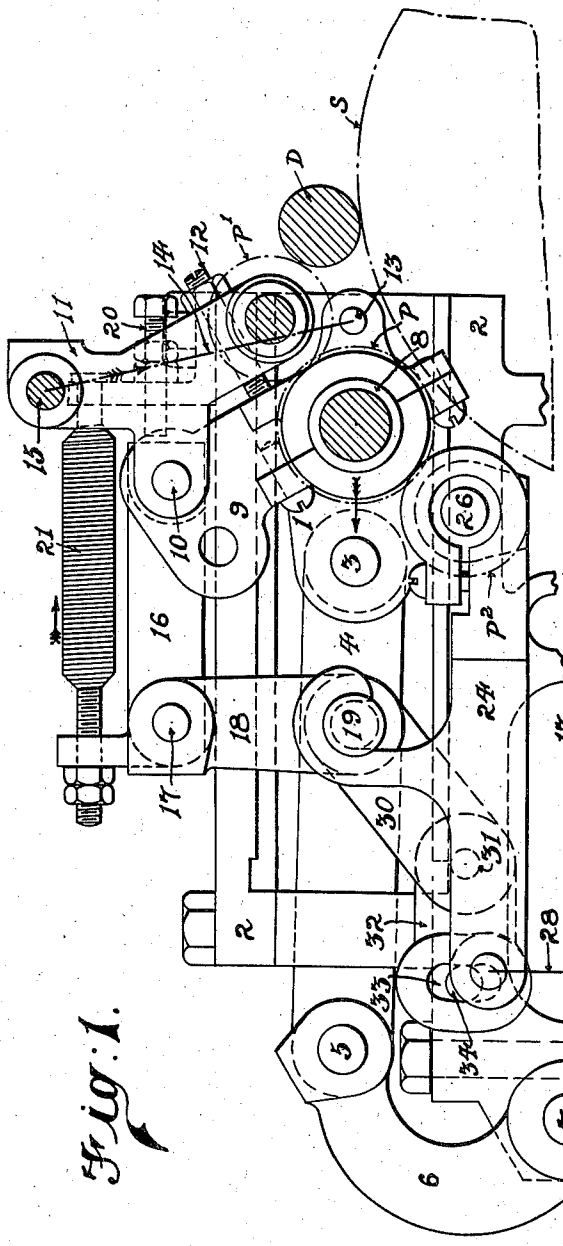


Fig. 1.

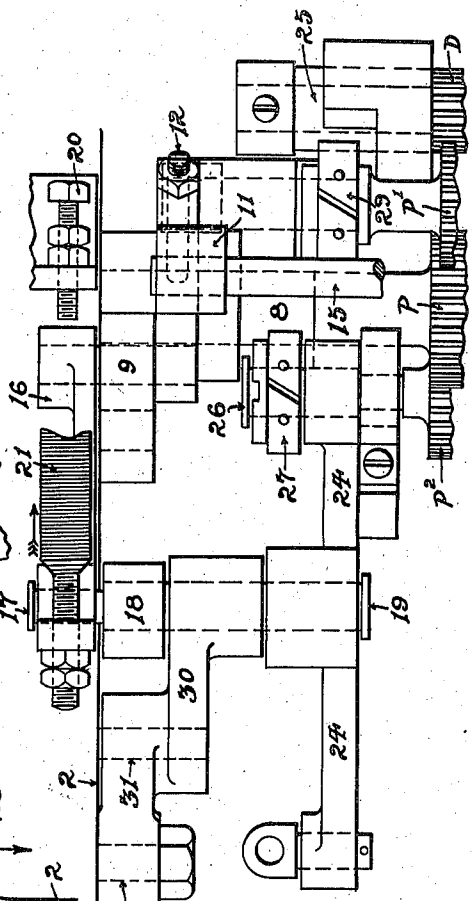


Fig. 2.

Inventor:-
John William Nasmith
By His Attorney:-
J. D. Cornwall

Jan. 31, 1939. J. W. NASMITH 2,145,491

COMBING MACHINE

Filed May 27, 1936 3 Sheets-Sheet 2

Fig: 3.

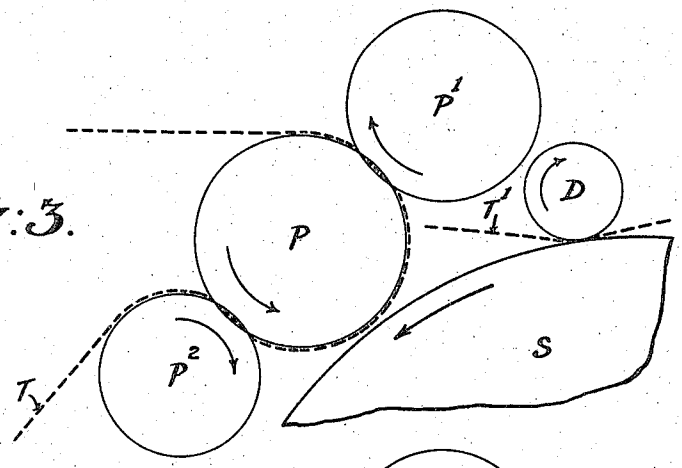


Fig: 4.

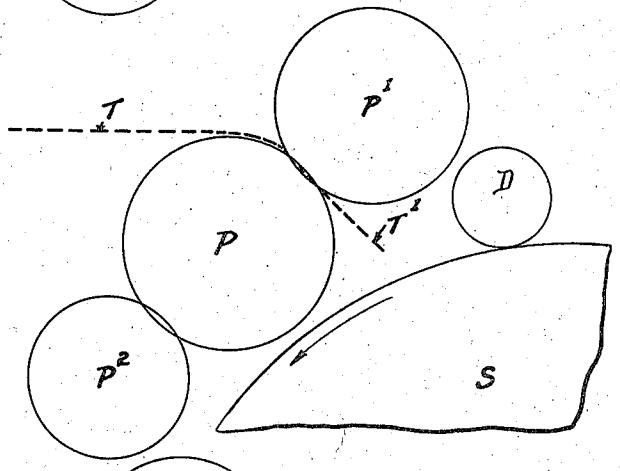
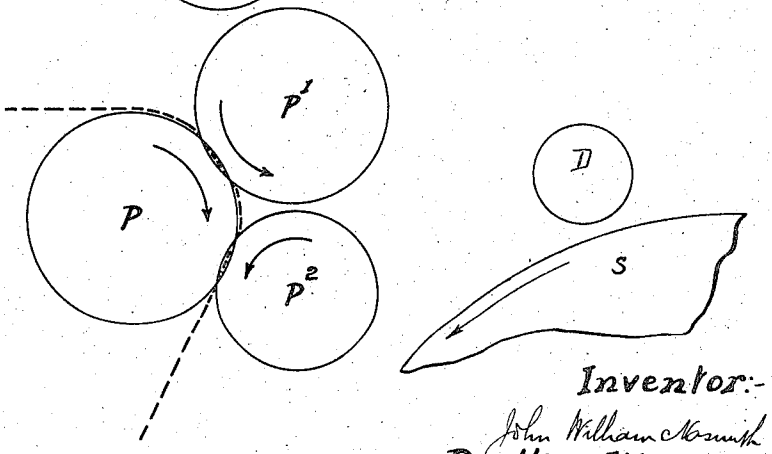


Fig: 5.



Inventor:-
John William Nasmith
By His Attorney:-

Jan. 31, 1939. J. W. NASMITH 2,145,491

COMBING MACHINE

Filed May 27, 1936 3 Sheets-Sheet 3

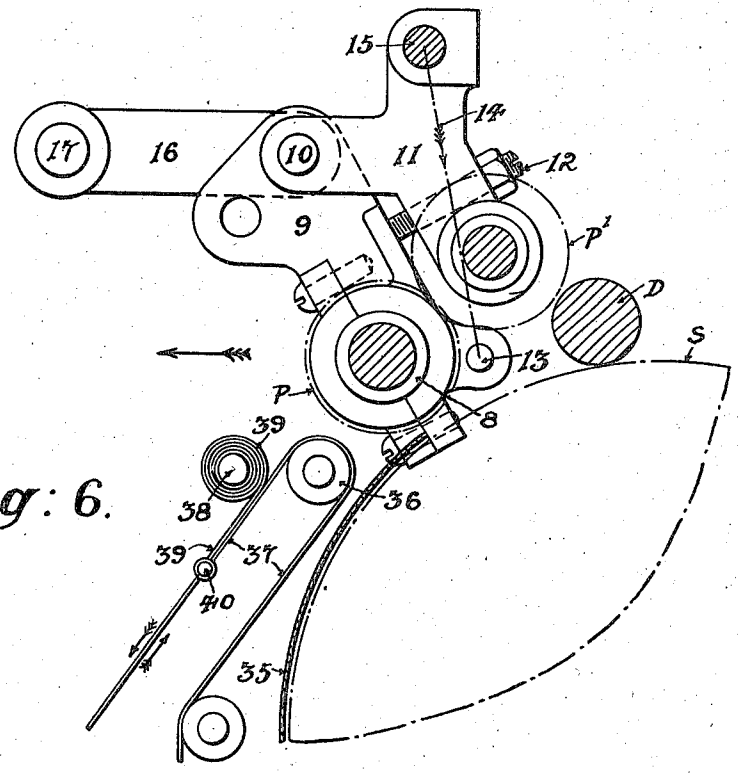


Fig: 6.

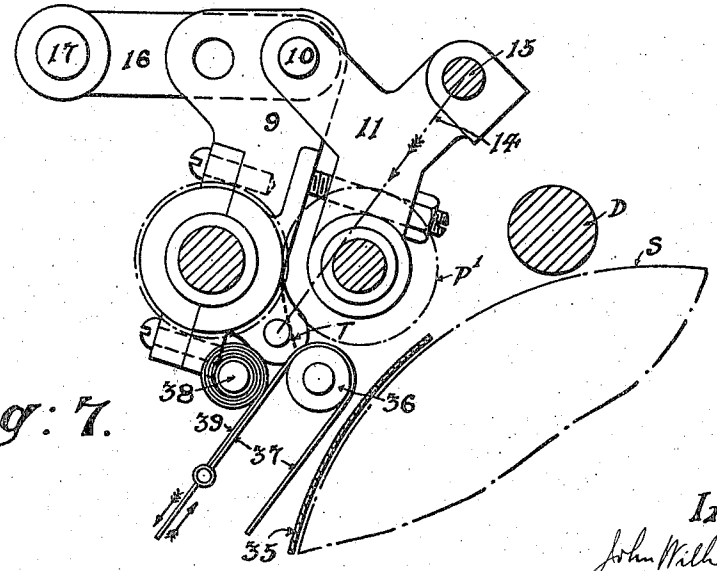


Fig: 7.

Inventor:-
John William Nasmith
By His Attorney:-

Patented Jan. 31, 1939 2,145,491

UNITED STATES PATENT OFFICE

2,145,491

COMBING MACHINE

John William Nasmith, Heaton Mersey, Manchester, England

Application May 27, 1936, Serial No. 82,011
In Great Britain April 1, 1936

10 Claims. (Cl. 19—121)

In the specifications of United States Letters Patent numbered 1,892,317 and 1,828,377 which Letters Patent were granted to me, there is shown a detaching mechanism for combing machines for textile fibres which mechanism gives, as compared with previous mechanisms for the purpose, a relatively high production. In the arrangement described in the first named specification with reference to Figure 1 of the drawings accompanying the same a defect appears which is common to all combing machines in which the end for piecing is delivered backwardly and comes adjacent to the running combing cylinder, namely, that there is at each stroke a small but perceptible loss of serviceable fibre which is carried to waste, due to the friction of the combing cylinder against the free pendent end T of the fleece when it is drawn up into the rollers in a direction opposite to the constant direction of rotation of the cylinder. In Figure 2 of the said specification the end T is not left free and pendent but passes downwardly loosely to be taken up between the rollers P and P^2.

It is the object of the present invention to provide a piecing mechanism for combing machines which mechanism will not only avoid the loss of serviceable fibre before referred to in any combing machine in which such loss is experienced but will also exercise a very advantageous positive control, in any combing machine to which it may be applied, upon the backwardly delivered end of the fleece during the backing off and throughout the operation of piecing.

With this object in view the invention consists in piecing roller mechanism in combing machines for textile fibres, in which mechanism the piecing point of a piecing roller pair is positively moved in a direction away from the detaching point and combing cylinder for the backing off of an end of fleece for piecing purposes, and again arrives at its original position for piecing after such backing off, with guide and control means moved in synchronism with the movements of the said end to engage and control the same during the backing off and subsequent piecing.

In one constructional example the lower piecing roller may be mounted to slide bodily to and from the detaching point and combing cylinder, with a lower guide and control roller, in constant rotating contact therewith, mounted to move upwardly behind the lower piecing roller as the latter moves away for backing off and to be moved into its normal position by the return of the lower piecing roller. The backed off end of the fleece in this construction is engaged by the nip of the lower piecing roller and guide and control roller.

In another constructional example the guide and control roller just referred to may be replaced by a guide and control member reciprocating in a linear direction to engage and control the backed off end of the fleece, the reciprocating movement of this member being in synchronism with the movements of the said end as it is backed off and returned during piecing, and which end it engages during these operations. With very long fibres such as wool such a reciprocating member is very beneficial, inasmuch as it engages and guides the end of the fleece upon a plane surface as compared with the first construction set forth above, where the guide and control means for the fleece end consist of rollers with consequent roller nip.

For a complete understanding of the invention, these two examples of construction will now be described with a convenient and practical arrangement of parts in each case, reference being had to the drawings annexed, wherein:

Figure 1 is a cross section through the rollers of the combing head showing the mechanism for supporting and operating the movement of the piecing roller assembly with a lower guide and control roller;

Figure 2 is a plan of Figure 1;

Figures 3, 4 and 5 are diagrammatic views showing the relation of the rollers of the construction illustrated in Figures 1 and 2, at different stages in the operation of the machine; and

Figures 6 and 7 show two portions of the piecing roller assembly with a control and guiding member reciprocating in a linear direction.

The constructional details will first be described with reference to Figures 1, 2, 3, 4 and 5 for a clear understanding of the later description contained herein of the functions of the various parts. Referring to these figures the lower piecing roller P which is fluted is mounted in bearings 1 which are slidably mounted in guides formed in a base 2 fixed to the framing of the machine. Each roller bearing carries a pin 3 on which hinges a link 4, the other end of which pivots upon a pin 5 fixed in the upper end of a lever 6 on the shaft 7 which latter is oscillated at the appropriate time by a suitably shaped cam in the headstock of the machine to slide the bearings of roller P to and fro to a desired extent. The bearings 1 carry liners 8 which project beyond the bearings 1 and are clipped therein, and free to rock on the liner 8 is an arm 9 in which

is fixed a pin 10 on which pivots a further arm 11 having formed therein a bearing for the upper piecing roller P^1, which is also fluted. It will be understood that these parts are duplicated at the other end of the rollers. A screw 12 in the arm 11 contacts with the arm 9 and serves to regulate the depth to which the flutes of the surface of the roller P^1 engage with those of the roller P. A pin 13, carried in a projection cast on the arm 9 receives the end of a tension spring the position of which is represented at 14 and which spring constantly applies tension in the direction of the arrow. The other end of the spring 14 is anchored to a bar 15 mounted in the arm 11 and its tension keeps the screw 12 in contact with the arm 9, the rollers P and P^1 thus being kept constantly in engagement. When the roller P is in its position close to the combing cylinder S as shown in Figures 1, 3 and 4, an expansion ring 29 loose on the bearings of the roller P^1 and concentric with such roller makes contact with a bush 25 Figure 2 on the roller D which is the detaching roller operating as described in the prior specification of United States Letters Patent No. 1,921,203 granted to me and which bush with the expansion ring serves to adjust the distance between the roller P^1 and the detaching roller D. This ring is not shown except in Figure 2, but it is similar to and serves the same purpose as that described and claimed in the specification of United States Letters Patent just referred to. When the roller is slid in the direction of the arrow Figure 1, the roller P^1 falls into the gap which opens between roller P and roller D, rolling round the roller P as will now be described.

Hinged on the pin 10 is a link 16 pivoting at its other end on a pin 17 fixed in the link 18 which swings on the pin 19. The end of the link 16 abuts against a set screw 20 carried on a part fixed on the part 2, and which screw serves to position the pin 17, link 16 and pin 10. A tension spring 21 pulls constantly in the direction of the arrow and maintains the link 16 against the screw 20, except when the roller P approaches near the position shown in Figure 1, when the expansion ring 29 Figure 2 on the bearing of the roller P^1 makes contact with the bush 25 on the detaching roller D and forces the link 16 off the screw 20, the pull of the spring 21 keeping the roller P^1 in proper relation to the roller D. It will be obvious that the further the pin 10 is adjusted to the right the further will the roller P^1 be forced round the roller P when the latter slides to the left to assume the position shown in Figure 5.

In the construction shown the bearing of an under roller P^2, which roller serves as a guide and control and is fluted, is formed in an arm 24 which pivots on the adjustable pin 19. Concentric with this roller P^2 and loose on the pin 26 is an expansion ring 27 which makes contact with a steel ring not shown in the drawings to avoid complication clipped on the projecting bush or liner 8 of the roller bearing 1 and which expansion ring serves to regulate the depth to which the flutes of the roller P^2 shall engage with those of the roller P. The rollers P and P^2 are kept constantly in engagement by a tension spring indicated at 28 which spring pulls in the direction of the arrow shown. Disengagement of the spring 28 permits of the arm 24 being lifted from the pin 19 and drawn back for cleaning purposes when necessary. The pin 19 is fixed in the bracket 30 which hinges upon a pin 31 which in turn is fixed in the base member 2, and cast with 30 is an arm 32 with slot 33 which permits of adjustment for the accurate positioning of the bearings of the roller P^2. A screw 34 secures the arm 32 to the base 2 in the desired position. Figure 2 shows some of the parts in plan; all necessary duplication of parts is effected at the other ends of the rollers P and P^2.

The construction illustrated in Figures 6 and 7 of the accompanying drawings will now be described. Beneath the roller P and close to the combing cylinder S, from which it is separated by a sheet metal guard 35, is fitted a light roller 36 around which passes a light apron 37 of thin leather or of other suitable material. A further roller 38 is mounted in bearings and is provided with a spring tending when the roller 38 is rotated by a pull in one direction, to return the said roller in the reverse direction when the pull is no longer exerted upon it. Around this latter roller is wrapped or coiled a length of light apron 39 similar in character to the apron 37. The lower extremities of the latter, not shown, are secured to an oscillating drum, and both aprons 37 and 39 are secured to a rod 40 which is given reciprocating motion in the plane of the contiguous apron surfaces, in any manner. Thus, a pull downwardly upon the rod 40 will draw the connected apron surfaces downwardly and on return movement such surfaces move upwardly, the effect of the spring ensuring this as regards apron 39. It will be understood that the rest of the mechanism, except the lower roller P^2 now omitted, is the same as that described with reference to Figures 1 and 2, only sufficient of this mechanism being shown in Figures 6 and 7 to make clear the co-operation of the piecing rollers and the double apron 37–39.

The details of mechanical constructions having now been made clear the functioning of the same will now be described first with reference to Figures 1, 2, 3, 4 and 5, that is to say where the lower roller P^2 is employed; and then with reference to Figures 6 and 7 where the double apron 37–39 is substituted for the said lower roller.

Referring to Figures 1 and 2 and also to the diagrammatic Figures 3, 4 and 5 the forward end of the fleece being detached or drawn off by the detaching roller D and being about to be pieced on to the previously detached fleece delivered backwardly for the purpose and lying around the roller P and between the latter and the roller P^2, is shown at T^1, Figure 3. The rollers in their operation at this point are all rotating in the direction of the respective arrows marked thereon and continue to do so until the rear end of the detached fleece T^1 joining and being pieced to T has reached the position shown at T^1, Figure 4. Rotation of the rollers then ceases and the roller P is drawn away to the position shown in Figure 5. The roller P^1 moves around the roller P, being compelled to that movement by the position of pin 10 until the roller P^1 is close to the roller P^2 which, as the roller P withdraws, is permitted to rise behind the roller P under the influence of the tension spring 28, the proximity of the two rollers P^1 and P^2 being governed by the position of the pin 10 adjusted by means of the screw 20. The whole assembly then dwells an instant in the position of Figure 5 and during that dwell the reverse rotation of the rollers commences in the direction of the arrows seen in this figure, when

the rear tips of the detached fleece pass straight and undisturbed into the nip of the rollers P and P^2. The reverse rotation of the rollers still continuing, the roller P moves back to its original position near the cylinder, Figure 3, when the direction of rotation is again reversed and the operation is repeated. It will be understood that the rear end of the newly detached fleece remains in the position T^1, Figure 4, until reverse rotation begins during the dwell in the position shown in Figure 5 so that the tips are delivered straight into the nip of the roller P, P^2 without crumpling or disarrangement.

When, in place of the under roller P^2 as controlling means for the end of the fleece, the double apron 37–39 is employed, the rollers P and P^1 remain in position and the roller P^1—roller P being moved bodily as before described—descends until it nearly touches that part of the apron 37 which passes over the roller 36, Figure 7. In this figure the roller P is shown in its position remote from the cylinder S where the reverse rotation commences. The rear tips of the fleece are not carried quite so far into the nip of the rollers P, P^1 and rest as shown at T on the apron 37. The movement of the latter commences in the direction of the downwardly pointing arrow just as the roller P commences its reverse rotation, for delivery of the backed off end of the fleece, and the so delivered end is carried down between the contiguous faces of the aprons 37–39 for a distance which corresponds to the length delivered by the rollers. The movement of the double apron is reversed in synchronism with the reversal of the roller rotation, which takes place as before explained.

The rotation of the roller P may be effected by any suitable means such for example as by cams, racks, and pinions as seen in the patent specification of Thomson and Barker's British Patent specification No. 2,109 of 1883.

The mechanical details given for the purpose of imparting sliding movement to the roller P; for the control of the roller P^1 to cause it to roll round the roller P during such movement of the latter; and for the movement of the under roller P^2 when that is employed, may be varied as will be understood. It will be appreciated also that the advantages of the full control of the backed off end T, obtained by this invention, may be obtained also in forms of combing machines other than that described in the prior United States Patent No. 1,892,317.

I claim:—

1. Piecing mechanism in a textile combing machine having upper and lower piecing rollers, combed tuft detaching means, and a combing cylinder, in which mechanism the nip of the piecing rollers is movable from the detaching point after each piecing operation is completed or substantially so and is again movable towards such point during or immediately after the backing off of an end of fleece for subsequent piecing, with reciprocating guide and control means positively engaging such backed off end in its reciprocating course and moving with it in its length in both directions at equal speed therewith and thus without friction thereon.

2. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides horizontally to and from the detaching point and combing cylinder position of the machine, a rotatable upper piecing roller in rolling contact with the lower piecing roller at all positions of the latter and movable upon an arc thereof as such lower piecing roller slides, and a lower guide roller also maintaining such contact with the lower piecing roller, and bodily movable upon an arc thereof as it slides.

3. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position of the machine, a rotatable upper piecing roller in rolling contact with the lower piecing roller at all positions of the latter, and a control member having a plane surface to receive an end of fleece backed off for piecing, such control member reciprocating in the direction of its length in synchronism with the movements of the lower piecing roller and thus with the movements of the backed off end.

4. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder of the machine, a rotatable upper piecing roller in rolling contact with the lower piecing roller as the latter rotates and slides, and a double apron having contiguous faces engaging between them a backed off end of fleece, such double apron reciprocating in the direction of its length in synchronism with the movements of the lower piecing roller and thus with the movements of the backed off end of fleece.

5. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position, a rotatable upper piecing roller movable upon an arc of the lower piecing roller during sliding movement of the latter, bearings therefor, spring controlled supports for such bearings and a guide roller also maintaining rolling contact with the said lower piecing roller, and movable upon an arc thereof as such lower piecing roller slides.

6. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position, a rotatable upper piecing roller, bearings therefor, spring controlled supports for such bearings and a control member for a backed off end of fleece such control member reciprocating in the direction of its length and in synchronism with the movements of the lower piecing roller and thus of the backed off end of fleece.

7. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position, a rotatable upper piecing roller, bearings therefor, spring controlled supports for such bearings and a double apron having contiguous faces engaging between them a backed off end of fleece, such double apron reciprocating in the direction of its length in synchronism with the movements of the lower piecing roller and thus of the backed off end of fleece.

8. In a combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position, a rotatable upper piecing roller in rolling contact with the lower piecing roller as the latter rotates and slides to roll upon an arc thereof, a lower guide roller also in rolling contact with the lower piecing roller, movable arms in which the

bearings of such guide roller are borne, and spring means controlling such arms to maintain the guide roller and lower piecing roller in contact at all positions of the latter.

9. In combing machine for textile fibres, a lower piecing roller, bearings in which the said roller rotates and also slides bodily to and from the detaching point and combing cylinder position of the machine, an upper piecing roller, bearings for such roller, spring controlled arms supporting such bearings to maintain the upper and lower piecing rollers in constant rolling contact, a guide roller, movable arms in which such guide roller is borne, and spring means controlling such arms to maintain the lower piecing roller and guide roller in constant rolling contact at all positions of the former.

10. Piecing mechanism in a textile combing machine having upper and lower piecing rollers, combed tuft detaching means, and a combing cylinder, in which mechanism the nip of the piecing rollers is movable from the detaching point after each piecing operation is completed or substantially so and again movable towards such point during or immediately after the backing off of an end of fleece for subsequent piecing, with reciprocating guide and control means positively engaging such backed off end in its reciprocating course and moving at equal speed therewith, and means for rolling the upper piecing roller upon the lower piecing roller for downward direction of the backed off end and for returning such roller, such roller movements being in synchronism with the movements of the guide and control means.

JOHN WILLIAM NASMITH.