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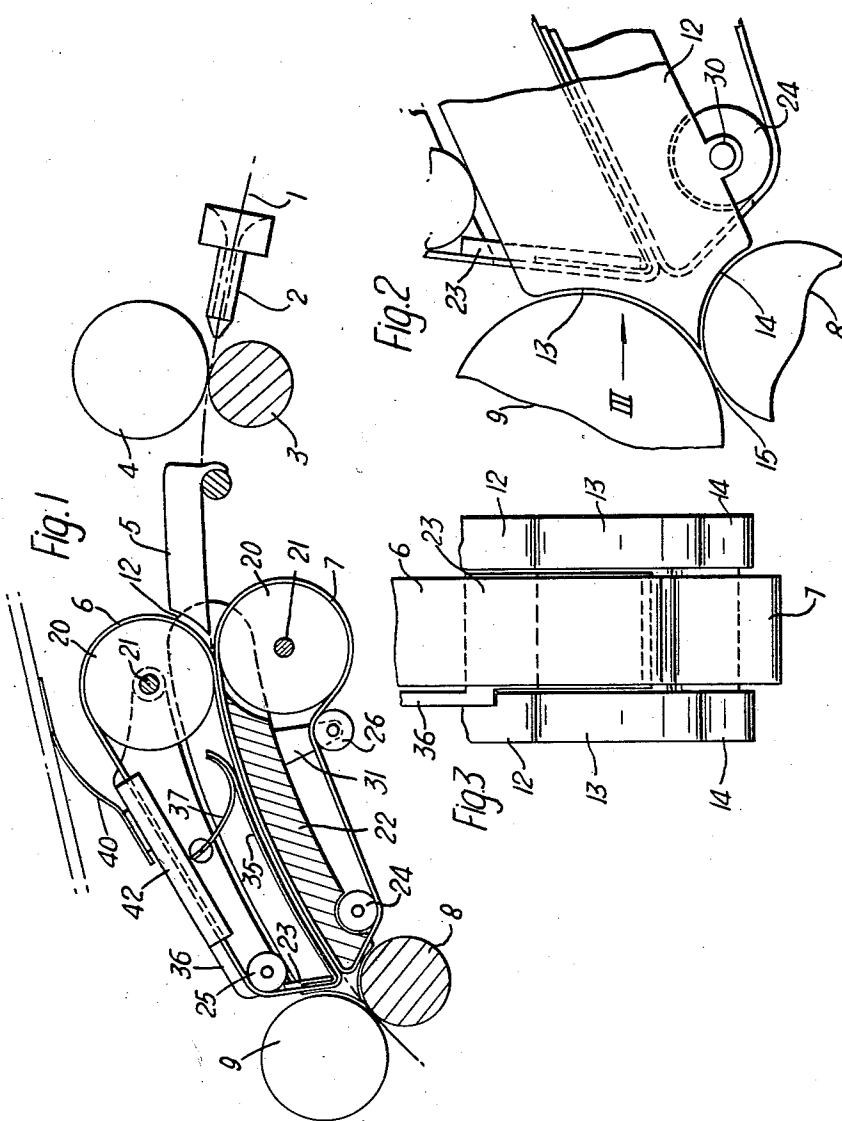
J. K. P. MACKIE

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TEXTILE DRAFTING APPARATUS

Filed April 17, 1961

2 Sheets-Sheet 1



Inventor
John K. P. Mackie
By *Kemon, Palmer, Stewart & Tolson*
Attorneys

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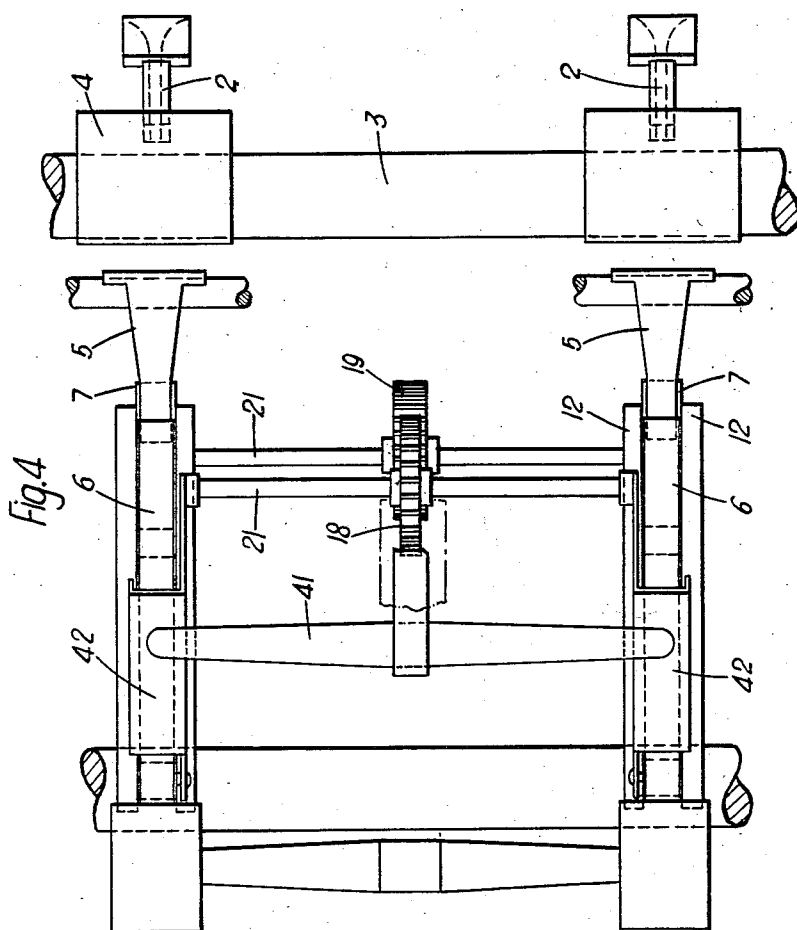
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Inventor

John K. P. Mackie

By
Kemon, Palmer, Stewart & Eschbrook
Attorneys

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TEXTILE DRAFTING APPARATUS

John K. P. Mackie, Belfast, Northern Ireland, assignor to James Mackie & Sons Limited, Belfast, Northern Ireland, a British company

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4 Claims. (Cl. 19—249)

This invention relates to drafting apparatus of the double apron type, in which the sliver is controlled in the drafting zone between a pair of moving aprons each in the form of a continuous belt driven by a driving roller over which it passes. The invention is concerned particularly with such devices when fitted to spinning frames for the direct spinning of textile yarns from sliver and also when fitted, for example, to roving frames or when used for finisher drawing operation.

Before passing to the aprons in such a device the sliver normally passes along a conductor which controls the width of the incoming sliver and as it leaves the aprons to pass to the drafting rollers the sliver passes through a further conductor which has the effect of condensing the sliver to a width suitable for spinning. With all types of fibre there is a tendency for the sliver to spread laterally during its passage along the aprons and the conductor preceding the drafting rollers is intended to correct this spread.

The difficulties caused by this lateral spread are not so great when treating flax and jute slivers, for example, but in the treatment of crimped fibres such as crimped viscose or other artificial or synthetic fibres or wool, the sliver is of a much bulkier nature and has a considerably greater tendency to spread laterally during its passage along the apron. As a consequence the sliver has to be condensed quite abruptly before passing to the drafting rollers and it is found that instead of taking place regularly the condensation tends to occur spasmodically, producing irregularities in the yarn. A further effect arising from the lateral spread of the sliver is that it tends to depart from a roughly rectangular cross-section and to become attenuated at the edges so that the side portions are not controlled by the aprons. This again gives rise to irregularities in the yarn.

According to the present invention side control surfaces are provided which extend along the control aprons and beyond them towards the nip of the drawing rollers. These serve to restrain the fibres laterally thus restricting the width of the sliver and avoiding the lateral spread referred to above. Moreover, the need for further condensation before passing to the drawing rollers is avoided. Although this is of particular advantage in connection with the bulkier slivers referred to above, a construction in accordance with the invention is found to improve the drafting of all types of sliver to a marked extent. The fact that no conductor requires to be inserted for the condensation of the fibres between the ends of the aprons and the drawing rollers means that this gap may be reduced in length so that the control of the fibres is more complete. Although the fibres passing over the gap are controlled at the sides, there is no control at the top or bottom, but this is an advantage rather than otherwise because it avoids the tendency for fibres to accumulate between the bottom apron and the bottom of the conductor which occurs when a conductor is fitted. In the absence of the conductor the drawing roller serves to act as a lap preventer in that it removes the fibres from the apron more positively and avoids any build-up of fibres which might otherwise lead to slubs in the yarn.

Preferably the side control surfaces are provided by members which are shaped so as to extend into and con-

form with the configuration of the nip between the drawing rollers. In this way the gap between the tips of the members and the drawing rollers may be made as small as reasonably possible. In view of the fact that the drawing pressing roller is normally covered with rubber, there is a small amount of distortion when pressure is applied to it and the gap between the tips of the side members and this roller must be sufficiently large to avoid any risk of contact when the roller is distorted.

It is important that at the end of their common path of travel both aprons should pass close to the nip between the drawing rollers. For this purpose they may pass around guide members located between the side control surfaces so as to constitute a nose portion to the assembly of aprons which can be introduced close to the nip of the drawing rollers. This is facilitated by turning the aprons back on themselves at a relatively sharp angle and for this purpose the guide members may be stationary and anti-friction rollers may be provided in addition to the guide members. In order to reduce the angle described by the aprons around the stationary guide members and thus to reduce the friction the anti-friction rollers require to be positioned so that this angle lies between 30° and 90°. Over this range it is found that the friction introduced is not objectionable.

When using such stationary guide members, the lower of the two may form a bridge between the side control surfaces and also a support for the upper run of the lower apron. By making this bridge slightly convex upwardly the pressure between the two aprons is augmented and the control over the drafting action is correspondingly improved. The upper guide member may be formed as an offset extension from a member lying above the side control surface on one side of the aprons and this member may be pivoted around the axis of a drafting roller for the top apron, being loaded so as to apply pressure to the top apron guide member. This pressure may be further augmented by the inclusion of a leaf spring bearing downwardly on the lower run of the upper apron to press it against the lower apron. By ensuring positive pressure between the two aprons in this way, the control of the fibres during drafting is further improved.

A construction in accordance with the invention will now be described with reference to the accompanying drawings, in which:

FIGURE 1 is a sectional elevation of the drafting apparatus;

FIGURE 2 is a detailed view to an enlarged scale of part of the apparatus shown in FIGURE 1;

FIGURE 3 is a view of the parts shown in FIGURE 2 seen along the line of the arrow III; and

FIGURE 4 is a plan view corresponding to FIGURE 1, and showing two adjacent units of a multi-unit machine.

Turning first to FIGURE 1, the sliver which is shown as 1 passes via a feed conductor 2 to feed rollers 3 and 4 and thence by way of an intermediate conductor 5 to the drafting apparatus. This comprises an upper apron 6 and a lower apron 7 between which the sliver passes and which control it as it is drafted by the drawing rollers 8 and 9. As so far described, the apparatus is of the well known type. In addition to the control by the aprons 6 and 7, however, lateral control is also provided by a pair of side plates, one of which is seen in FIGURE 1 at 12. The aprons 6 and 7 instead of being considerably wider than the sliver as is normally the case are made in the form of relatively narrow belts as seen from FIGURES 3 and 4 of a width slightly less than the natural width of the sliver so that the side plates act directly on the sides of the sliver, preventing the lateral spread referred to previously and maintaining the sliver in a generally rectangular cross-section during drafting. Moreover the

width of the conductor 5 is less than that of the aprons so as to restrict the width of the sliver accordingly.

The important feature of the construction is that the side plates extend beyond the end of the aprons as seen most clearly in FIGURE 2. As seen from this figure, the tips of the plates are shaped at 13 and 14 so as to conform with the configuration of the space between the drawing rollers 8 and 9 and thus to extend right into the nip between the two rollers which is indicated as 15. The gaps between the shaped portions of the side plates and the two rollers are made as small as reasonably possible consistent with the need to avoid the possibility of direct contact, particularly in view of the possible distortion of the drawing pressing roller 9 as previously mentioned. By extending the side plates into the nip in this way, the control of the fibres is maintained until it is taken over by the drawing rollers 8 and 9 and the complete control thus provided leads to the formation of a more regular and better yarn.

At their intaking ends the aprons pass around rollers 20 which are positively driven and these rollers are of sufficiently large diameter to leave space between their axles 21 for the passage of the side plates which extend back as far as the intermediate conductor 5, both rollers being narrow faced to enter between the side plates. The axles 21 are geared together by means of pinions 18 and 19 seen in FIGURE 4 but the remainder of the drive is not shown. At the other end of the aprons, rollers cannot be used because in order for the aprons to extend reasonably close to the nip 15, they need to turn back on themselves relatively sharply as seen in FIGURES 1 and 2. For this purpose they pass around guides at these corners the lower of which is shown as 22 and the upper as 23. To reduce the angle of contact with the guides and hence the friction, each apron also passes around an anti-friction roller shown respectively as 24 and 25, the upper apron 6 passing directly back to its driving roller and the lower apron 7 passing around a further idler roller 26. The rollers 24 and 26 turn in bearings formed in lugs 30 and 31 extending downwardly from the side plates 12.

The lower guide 22 forms a bridge member between the side plates 12 which are secured directly to it. The bridge member is slightly convex upwardly so that the two aprons follow a slightly curved path and are consequently pressed together. The pressure between them is augmented by a leaf spring 35 which bears against the lower run of the upper apron 6 and extends for rather more than half the length of the run. At its forward end the leaf spring 35 is secured to the plate 23. As better seen from FIGURES 2 and 3, the guide 23 is formed as an offset extension of a member 36 which is pivoted about the axle 21 of the upper roller 20. The member 36 lies above the side plate 12 on one side of the apron 6 and the plate 23 extends downwardly and laterally from it so as to guide the upper apron as previously described.

The member 36 also carries a further leaf spring 37 which presses against the free end of the spring 35. This latter spring is naturally straight and the action of the spring 37 is to cause the spring 35 to conform with the curvature of the bridge 22 and thus increase the downward pressure on the lower run of the upper apron 6. The member 36 in its turn is loaded by means of a somewhat stouter leaf spring 40 which bears downwardly on a cross member 41 seen in FIGURE 4. This in its turn bears against a transverse portion 42 of the member 36 and as also seen from FIGURE 4 a single cross member 41 applies pressure to two adjacent units. The downward pressure applied by the leaf spring 40 is transmitted di-

rectly to the upper apron at one end by the plate 23 and indirectly by the combination of the two further leaf springs 35 and 37, and at the same time pressure is also applied to the axle of the top apron driving roller.

The fact that the members 36 of adjacent units are individually pivoted and loaded independently of one another means that each can move without affecting the other and thick parts of the sliver may pass between the aprons of one unit without affecting the operation of any other. As shown, the loading is by means of a spring, but it may equally well be produced by means of a weight. It has been found that with the apparatus just described, larger drafts can be applied than with conventional apparatus and more even yarn spun. Moreover, the apparatus permits spinning of finer yarn counts than previously possible direct from untwisted sliver of a wide variety of fibres.

I claim:

1. Drafting apparatus for textile slivers comprising:

a pair of feed rollers and a pair of drafting rollers spaced from each other;

a pair of cooperating draft control aprons positioned between said feed and drafting rollers;

a pair of parallel side control surfaces extending along opposite sides of said aprons, the forward ends of said surfaces being shaped to extend into and conform to the configuration of the nip of said drafting rollers, said control surfaces being spaced laterally from each other a distance substantially equal to the width of sliver being processed so as to engage the sliver on opposite sides thereof throughout its passage between said aprons and further between the ends of said aprons and the nip of said drafting rollers;

an upper guide member and a lower guide member said members being located between said side control surfaces, said aprons at their ends adjacent to said drafting rollers passing around said guide members;

and anti-friction rollers over which said aprons pass, said rollers being so positioned that the angle described by said aprons in passing around said guide members is between 30° and 90°.

2. Drafting apparatus as defined by claim 1 in which said lower guide member forms a bridge between said side control surfaces and a support for one of said aprons and in which said upper guide member is pivotally mounted and in which biasing means are provided to urge said upper guide member toward said lower guide member.

3. Drafting apparatus as defined by claim 2, in which said biasing means comprises a leaf spring.

4. Apparatus as defined by claim 1 and including upper and lower drive rollers for said aprons, said drive rollers having a width less than the spacing between said side control surface and being mounted therebetween.

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