

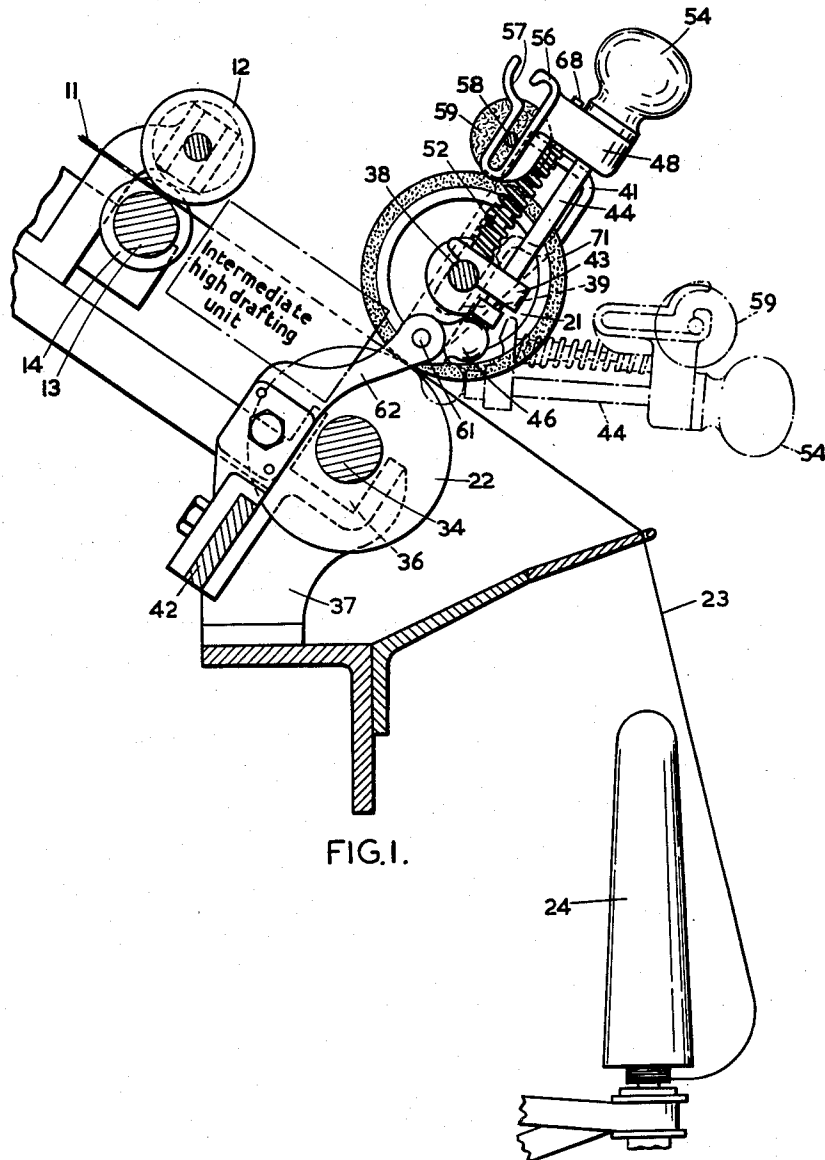
Jan. 19, 1954

G. H. AMBLER
PRESSURE-APPLYING DEVICE FOR THE DRAFTING
ROLLERS OF DRAFTING APPARATUS

2,666,232

Filed April 22, 1950

2 Sheets-Sheet 1



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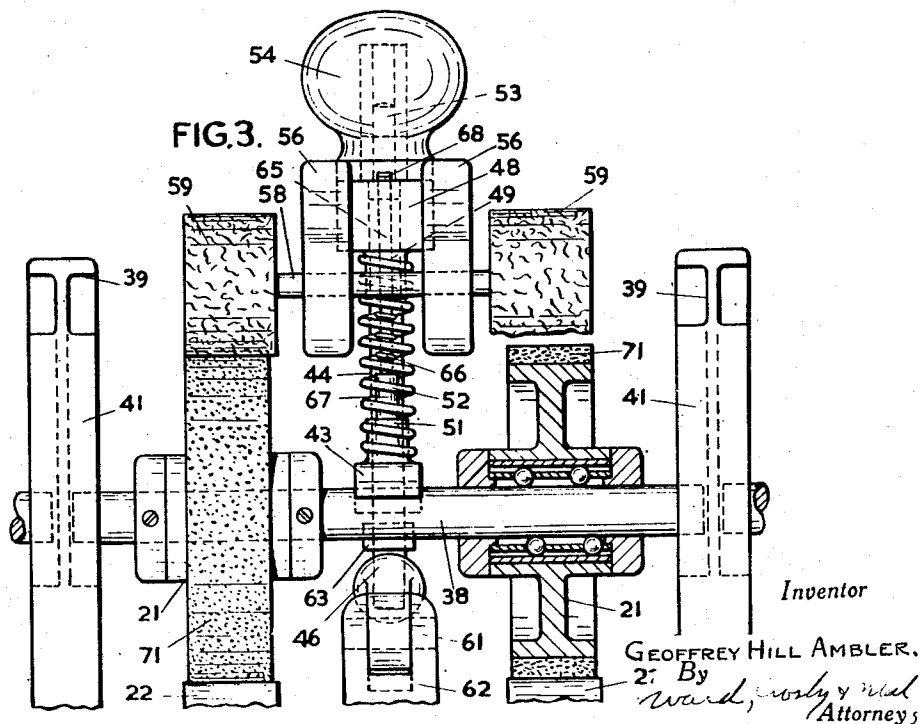
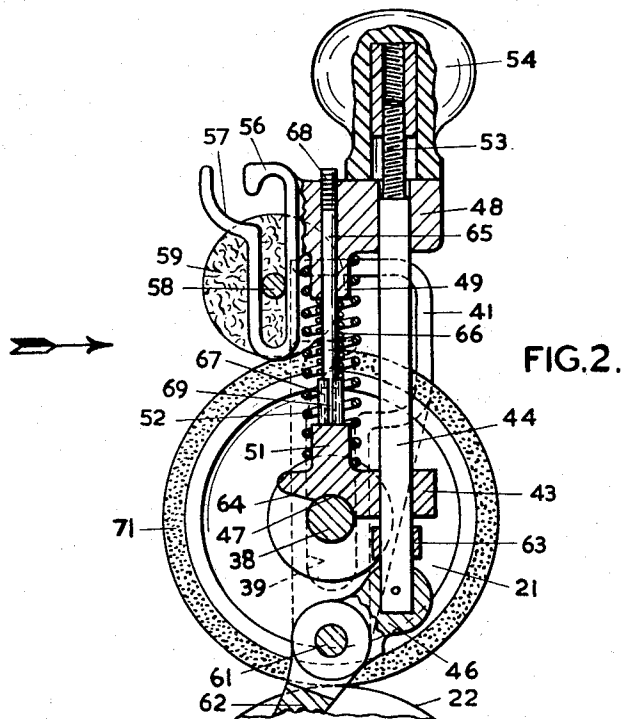
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UNITED STATES PATENT OFFICE

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PRESSURE-APPLYING DEVICE FOR THE
DRAFTING ROLLERS OF DRAFTING
APPARATUS

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Claims priority, application Great Britain
May 10, 1949

5 Claims. (Cl. 19—135)

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This invention relates to devices for applying pressure to drafting rollers in general, and especially to the upper of the drafting rollers of apparatus for the drafting of textile rovings or the like.

The upper rollers are usually arranged in pairs each having a common supporting shaft, each shaft being allowed to rest on a pair of inclined supporting surfaces, a spring pressure device being provided for each pair and arranged to bear on the shaft between the pair of rollers so as to apply pressure to the nip of the drafting rollers. The lower rollers are usually of fluted metal while the upper rollers are provided with a cover of softer material, e. g., cork.

A common form of spring pressure device consists of a hook member slidably mounted on a rod and spring urged into engagement with the roller shaft, the rod being pivotally mounted so as to be swung clear of the roller shaft when it is required to remove or raise the upper rollers. In such a construction, however, the spring pressure has been applied in a direction transverse to the inclined supporting surfaces with the result that the hook member has tended to bind on its supporting rod because of frictional forces produced by the traverse reaction of the inclined surfaces on the roller shaft. The result of such binding action of the hook member has been to cause an uneven pressure at the nip of the drafting rollers.

For instance, any eccentricity (or other irregularity), however slight, in either of the drafting rollers, will (during rotation of the rollers) cause movement of the upper roller shaft towards and away from the lower roller, and during any such movements, the frictional resistance arising from the binding action mentioned above will act to increase the pressure at the nip of the rollers as the upper roller shaft moves away from the lower roller and to decrease the pressure at the nip as the shaft moves towards the lower roller, with the result that the depression formed in the softer upper roller by the harder lower roller will vary in width. The effect of this is to cause the nip point of the rollers, i. e., the point on the meeting surfaces of the drafting rollers at which the fibres of the roving are first nipped, to move towards and away from a line passing through the centres of the drafting rollers, with the result that the action of the drafting rollers becomes uneven.

The importance of this slight binding does not appear to have been understood before; but experiments upon high draft machines (where the

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draft is 50 or 100 or 200 or more) have shown that marked improvement in operation results from the more even action of the drafting rollers brought about by the reduction of the friction between the shaft of the upper rollers and the guides against which it moves enabling higher drafts to be obtained and rendering the adjustment of the machine easier and less critical. This improvement has in particular been observed when the invention is combined with the high-draft apparatus described and claimed in my U. S. Patent No. 2,641,026, granted June 9, 1953, on application Serial No. 151,136, filed March 22, 1950, which application in turn was a continuation-in-part of my application Serial No. 18,524, filed April 2, 1948, and heretofore abandoned in favor of application Serial No. 151,136. And a still further improvement may be obtained by making the upper roller of cork (or other material) of a somewhat softer nature than that normally used. The present invention of course includes drafting machinery in which the bottom drafting roller is movable or is made of soft material in place of the top.

Thus the invention consists in the use in drafting machinery (and especially high-draft drafting machinery) of a mounting for a drafting roller which allows pressure to be applied to it without sufficient friction to cause binding which will render uneven the operation of the machine; and the invention consists in this either with or without the other improvements already referred to. This invention can in particular be advantageously combined with drafting apparatus for worsted fibres, and especially with drafting apparatus of the sort now commonly used for such fibres or high-draft apparatus derived therefrom.

One method by which the reduction in friction characterising the invention may be produced, in machines for giving drafts of say 100 of the type described in the aforesaid application, Serial No. 151,136, is the provision of an upper-roller mounting comprising a spring pressure device in which the pressure is applied to the roller axle in the direction of its movement. Where the roller axle moves in guides, this spring pressure will consequently be applied in the direction of the guides. The movement of the roller axle will normally be directly towards (and away from) the axle of the other drafting roller.

Because of the uneven action of the drafting rollers caused by any variation in the position of the nip point as mentioned above, the spring of the spring pressure device is preferably of such

a nature that its resilience is greater than that of the cover of the upper roller so that any irregularity in the drafting rollers will tend to compress the spring rather than the cover of the upper roller.

The spring pressure is conveniently adjusted by screw means, and according to a further feature of the invention, there is provided an indicating device calibrated in accordance with spring compression so as to indicate the degree of pressure applied to the drafting rollers.

By way of example, the invention will now be described in greater detail with reference to the accompanying drawings as applied to high drafting apparatus.

In the drawings:

Figure 1 is an elevation of part of a high drafting apparatus showing a pressure-applying device according to the invention applied to the upper of the drafting rollers.

Figure 2 is a sectional end elevation of the pressure-applying device drawn to a larger scale than Figure 1; and

Figure 3 is a side elevation of the apparatus shown in Figure 2, as viewed in the direction of the arrow in Figure 2.

Referring first to Figure 1, a roving 11 is passed through the nip of a pair of feed rollers 12 and 13, the lower roller 13 being formed with a pair of flanges 14 between which the upper roller 12 runs and presses on the roving 11, the pressure being provided by a spring device (not shown) in known manner. From the feed rollers 12 and 13, the roving is passed through an intermediate high drafting unit as indicated, such for example, among other possibilities, the type of unit disclosed in my above-mentioned applications, and which per se forms no part of the present invention. From there the roving is passed to the nip of a pair of drafting rollers 21 and 22 from which it passes in the form of yarn 23 to the bobbin of a cap-spinning device of known construction and generally indicated by reference numeral 24.

The mechanism described above constitutes a drafting unit of which there is one for each spindle of a spinning frame. The lower drafting rollers 22 are secured at intervals to a common driven shaft 34 mounted in bearings 36 supported in bearing brackets 37, while the upper drafting rollers 21 are freely mounted on ball bearings in pairs each having a common supporting shaft 38.

The pressure-applying mechanism for one pair of upper rollers 21 will now be described with particular reference to Figures 2 and 3 which are shown for convenience in an upright position.

The upper rollers 21 rest on the lower rollers 22, the common shaft 38 passing freely into parallel-sided recesses 39 formed in a pair of supporting brackets 41 mounted on a common rail 42 secured to the bearing brackets 37 and extending the whole length of the spinning frame. The recesses 39 are open at the top for the purpose of easy removal of the pair of rollers 21 when required, and the longitudinal axes of the recesses 39 are arranged to intersect the axis of the lower drafting roller shaft 34 so that the shaft 38 moves directly towards and away from the shaft 34.

Pressure is applied to the shaft 38 at a position intermediate the two rollers 21 by a hook member 43 slidably mounted with a very easy fit on a supporting rod 44 of square cross-section secured in a swivel member 46. The hook mem-

ber 43 extends at right angles to the rod 44 and is formed with a recess 47 adapted to engage the upper portion of the shaft 38. Slidably mounted with an easy fit on the rod 44 towards its upper extremity is an abutment member 48 formed with a spigot 49 around which and a similar spigot 51 on the hook member 43 is arranged a compression spring 52 extending between the abutment member 48 and the hook member 43 with its axis parallel to that of the rod 44. The upper extremity of the rod 44 is reduced and screw-threaded as indicated at 53 for engagement with the threaded bore of an adjusting knob 54. It will thus be seen that as the knob 54 is screwed on to the rod 44 the abutment member 48 is caused to slide down the rod, the spring 52 being thus compressed to apply pressure to the upper roller shaft 38 through the hook member 43. The abutment member 48 is formed with a pair of extensions 56 having open-ended slots 57 for the reception of a shaft 58 carrying a pair of felt clearing rollers 59 arranged to rest on the upper portions of the upper rollers 21.

The swivel member 46 is pivotally mounted at 61 in a supporting bracket 62 secured to the rail 42, the pivotal axis 61 being arranged to intersect the straight line joining the axes of the upper and lower rollers 21 and 22 and thus the longitudinal axes of the recesses 39. With this arrangement, when the rod 44 is swung upwardly from its inoperative position (shown in chain-dotted lines in Figure 1) towards its operative position (shown in full lines), the hook member 43 is caused to snap into position on the shaft 38 with the axis of the spring 52 intersecting the axes of the upper and lower drafting rollers 21 and 22. The spring thus exerts pressure on the shaft 38 in the direction of its movement in the recesses 39 so that there is no tendency of the shaft 38 to bind in the recesses 39, neither is there any turning moment applied to the hook member 43 so that it too is free from any tendency to bind on the rod 44. With such freedom from binding, any frictional forces tending to resist the action of the spring 52 are very slight, with the result that a very even pressure is exerted at the nip of the drafting rollers 21 and 22 with marked improvement in operation, particularly when drafting to the high degrees mentioned earlier.

For facilitating movement of the device into operative position, a collar 63 is secured to the rod 44 slightly below the operative position of the hook member 43 so as to prevent more than a slight movement of the hook member along the rod 44 when the device is swung clear of the shaft 38, and the nose of the hook member 43 is inclined at 64 so as to act as a cam for lifting the hook member against the pressure of the spring 52 as the nose of the hook member meets the upper surface of the shaft 38 during the lifting of the device into operative position. The term "hook member" used herein is intended to include any member having a depression adapted to engage a portion of the periphery of the upper roller shaft, the depression being so shaped that the hook member can be readily snapped into or out of operative position by a swinging movement of its supporting rod.

For the purpose of facilitating the application of substantially equal pressures to the nips of the drafting rollers throughout the length of the machine, each pressure-applying device is provided with an indicating device consisting of a rod 65 freely mounted in a bore in the abut-

ment member 48 co-axial with the spring 52, the rod 65 protruding through the abutment member and being urged against the spigot 51 by a light spring 66 arranged between the spigot 49 and a collar 67. The upper extremity of the rod 65 is calibrated by means of a series of rings 68 which are conveniently of different colours so that, as the spring pressure is adjusted by the knob 54, rings of different colour are observed protruding from the abutment member 48.

For the purpose of calibrating the indicators of the series of pressure-applying devices along the length of the machine in accordance with the corresponding springs 52 so that they have the same zero setting in relation to the coloured rings, the collar 67 is formed separately from the rod 65 and provided with a longitudinal slit 69 so that the collar can be pushed on to the rod with a tight fit. The pressure is then adjusted to a given value on the series of pressure-applying devices by the knobs 54 and the rods 65 pushed into the collars 67 sufficiently to leave the same colour protruding from the abutment member.

In this manner, even adjustment throughout the apparatus is facilitated by observing the colour of the protruding rings during adjustment of the pressure by the knobs 54.

The lower drafting roller 22 is formed from metal and is fluted as well known in the art, while the upper roller 21 is provided with a cover 71 of bonded ground cork of a somewhat softer nature than that normally used for drafting rollers. It is found that cork having a degree of shore hardness of between 55 and 80, gives much improved results over the harder cork previously used.

The invention is also suitable for use in combination with other types of high-draft machine than that referred to.

What I claim is:

1. Apparatus for drafting textile rovings or the like, comprising a lower drafting roller, an upper drafting roller freely mounted on a supporting shaft and arranged to rest on the lower roller, a mounting for the upper roller including a pair of guiding recesses in which the supporting shaft is arranged to rest, said recesses being arranged with their longitudinal axes intersecting the axis of the lower roller, and a spring-pressure device including a support mounted for pivotal movement about an axis intersecting said longitudinal axes so as to be capable of swinging away from the upper roller into an inoperative position, a rod forming part of said support and arranged (when in operative position) with its axis in a plane parallel to that containing said longitudinal axes, a hook member slidably mounted on said rod and formed with a depression for engagement with the upper portion of the upper roller shaft, an abutment slidably mounted for adjustment on said rod, a compression spring arranged between the hook member and the abutment so as to apply pressure to the hook member, said spring being arranged (when in operative position) with its axis in the same plane as said longitudinal axes, and a stop on said rod for preventing more than a slight movement of the hook member by the spring when the hook member is swung clear of the upper roller shaft, the hook member being formed with an inclined guiding surface for lifting the hook member against the action of the spring as the nose of the hook member engages the shaft as the pressure device is swung into operative position.

2. Apparatus for drafting textile rovings or the

like, comprising a lower drafting roller, an upper drafting roller freely mounted on a supporting shaft and arranged to rest on the lower roller, a mounting for the upper roller including a pair of guiding recesses in which the supporting shaft is arranged to rest, said recesses being arranged with their longitudinal axes intersecting the axis of the lower roller, and a spring-pressure device including a support mounted for pivotal movement about an axis intersecting said longitudinal axes so as to be capable of swinging away from the upper roller into an inoperative position, a hook member arranged to engage the upper portion of the upper roller shaft, an abutment member mounted on said support, a compression spring arranged between the hook member and the abutment member so as to apply spring pressure to the hook member, said spring being arranged (when in operative position) with its axis in the same plane as said longitudinal axes, means for adjusting the pressure applied to the upper roller by the spring, and an indicating device comprising a rod slidably mounted in said abutment member coaxially with the spring and arranged at one end to protrude through said abutment member and at the other end to bear on said hook member, said rod being spring-urged into engagement with said hook member and formed at its upper end with calibrations for indicating said spring pressure.

3. Apparatus for drafting textile rovings or the like, comprising a lower drafting roller, an upper drafting roller freely mounted on a supporting shaft and arranged to rest on the lower roller, a mounting for the upper roller including a pair of guiding recesses in which the supporting shaft is arranged to rest, said recesses being arranged with their longitudinal axes intersecting the axis of the lower roller, a spring pressure device including a supporting rod mounted for pivotal movement about an axis intersecting said longitudinal axes so as to be capable of swinging away from the upper roller into an inoperative position, a hook member and an abutment member slidably mounted on said rod and extending transversely therefrom, said hook member being arranged to engage the upper portion of the upper roller shaft, a compression spring arranged between the hook member and the abutment member with its axis parallel to that of said rod, knob means arranged in threaded engagement with the upper portion of said rod and arranged to bear against the abutment so that the spring pressure can be adjusted by relative rotation of said knob means and rod, and an indicating device comprising a rod slidably mounted in said abutment member coaxially with the spring and arranged at one end to protrude through said abutment member and at the other end to bear on said hook member, said rod being spring-urged into engagement with said hook member and formed at its upper end with calibrations for indicating said spring pressure.

4. Apparatus for drafting textile rovings or the like, comprising a lower drafting roller, an upper drafting roller freely mounted on a supporting shaft and arranged to rest on the lower roller, a mounting for the upper roller including a pair of guiding recesses in which the supporting shaft is arranged to rest, said recesses being arranged with their longitudinal axes intersecting the axis of the lower roller, and a spring-pressure device including a support mounted for pivotal movement about an axis intersecting said longitudinal axes so as to be capable of swinging away from

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the upper roller into an inoperative position, a hook member arranged to engage the upper portion of the upper roller shaft, an abutment member mounted on said support, a compression spring arranged between the hook member and the abutment member so as to apply pressure to the hook member, said spring being arranged (when in operative position) with its axis in the same plane as said longitudinal axes, means for adjusting the pressure applied to the upper roller by the spring, and an indicating device comprising a rod slidably mounted in said abutment member co-axially with the spring and arranged at one end to protrude through said abutment member and at the other end to bear on said hook member, said rod being spring-urged into engagement with said hook member and formed at its upper end with calibrations of contrasting colors for indicating said spring pressure.

5. Apparatus for drafting textile rovings or the like, comprising a lower drafting roller, an upper drafting roller freely mounted on a supporting shaft and arranged to rest on the lower roller, a mounting for the upper roller in which the roller is capable of movement towards and away from the lower roller, said mounting including guiding means for the upper roller shaft for constraining the shaft to move with its axis substantially in a plane containing the axis of the lower roller, and a spring pressure device including a support pivotally mounted so as to be capable of swinging away from the upper roller into an inoperative position, a rod forming part of said support and arranged (when in operative position) with its axis in a plane parallel to that

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containing the roller axes, a hook member slidably mounted on said rod and formed with a depression for engagement with the upper portion of the upper roller shaft, an abutment slidably mounted for adjustment on said rod, a compression spring arranged between the hook member and the abutment so as to apply pressure to the hook member, said spring being arranged (when in operative position) with its axis in the same plane as the roller axes, and a stop on said rod for preventing more than a slight movement of the hook member by the spring when the hook member is swung clear of the upper roller shaft, the hook member being formed with an inclined guiding surface for lifting the hook member against the action of the spring as the nose of the hook member engages the shaft as the pressure device is swung into operative position.

GEOFFREY HILL AMBLER.

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