May 2, 1944. T. P. ROONEY 2,347,967

TEXTILE DRAFTING DEVICE

Filed Sept. 15, 1941

Fig. 1.

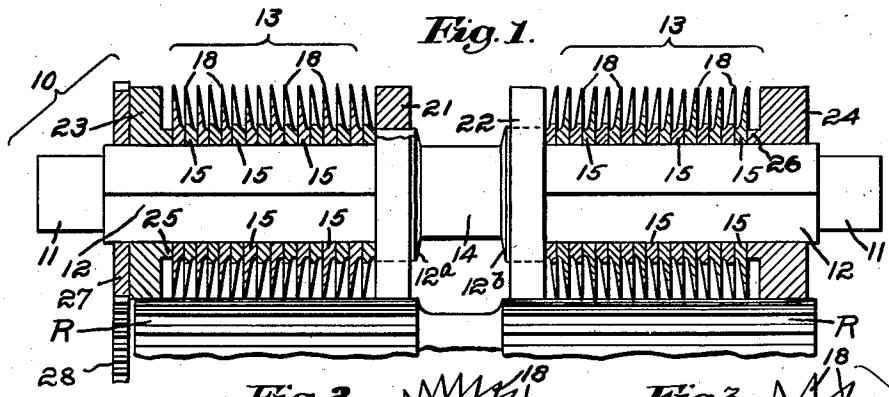


Fig. 2.

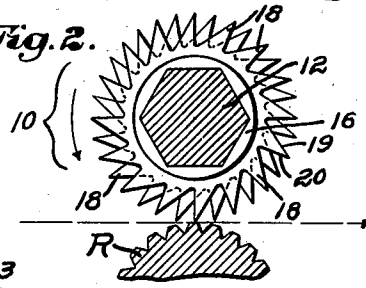


Fig. 3

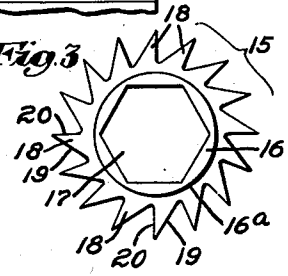


Fig. 4.

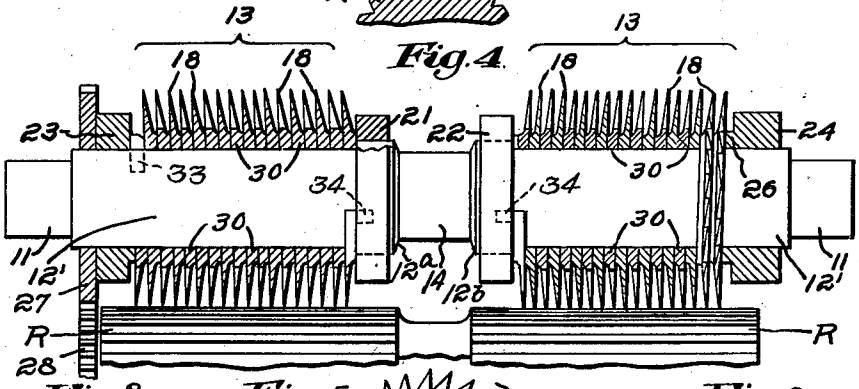


Fig. 8.

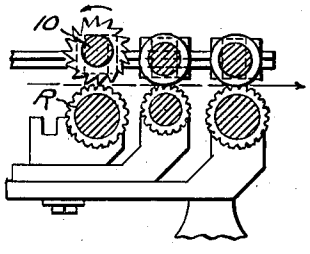


Fig. 5.

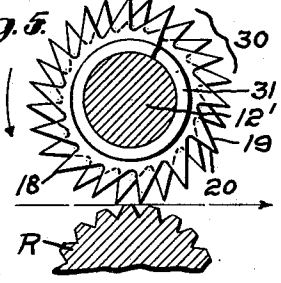


Fig. 9.

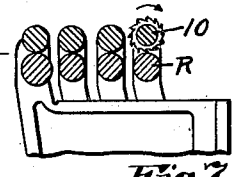


Fig. 7.

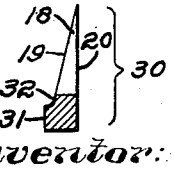
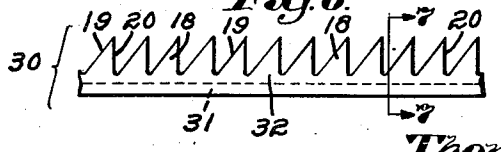


Fig. 6.



Inventor:
Thomas P. Rooney,
by Emery, Booth, Townsend, Miller & Weidner
Attys.

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TEXTILE DRAFTING DEVICE

Thomas Peter Rooney, Fall River, Mass.

Application September 15, 1941, Serial No. 410,840

5 Claims. (Cl. 19—142)

My present invention pertains to drafting and parallelizing fibrous materials preliminary to or in conjunction with spinning them into yarns, threads and the like for textile purposes. More particularly it aims to provide a novel, durable and otherwise improved comber-drafting instrumentality of the roll type adapted for use in various roll positions and arrangements in any of the known or preferred roll frames, and especially in connection with and as an improved feature of the Rooney system of high or long drafting.

In the drawing representing by way of example certain embodiments of the invention,

Figs. 1 and 2 are respectively a longitudinal and a vertical section through one form of my novel roll device, showing also a portion of an underlying roll with which it cooperates;

Fig. 3 is a side or end elevation of an individual toothed disc element of the roll of Figs. 1 and 2;

Figs. 4 and 5 are views similar to Figs. 1 and 2 showing another embodiment of the invention;

Figs. 6 and 7 illustrate a portion of a component toothed strip element of the roll of Figs. 4 and 5, in side elevation and in section on the line 7—7 of Fig. 6, respectively; and

Figs. 8 and 9 represent rolls such as those of the preceding figures, partly diagrammatically, in two positions or roll combinational arrangements in roll drafting or spinning frames.

In further detail, referring now to Figs. 1 to 3, the novel roll structure there exemplified, indicated as a whole by the numeral 10, comprises a spindle having end bearings 11, 11 and between them any desired or appropriate number of lengths or portions 12, 12 for supporting the fibre-engaging and drafting elements to be described. In Fig. 1 two such supporting, core or boss portions 12 along the spindle are illustrated by way of example. These core portions 12 preferably are non-round, being herein represented as hexagonal in section, for reasons to be noted in connection with the elements 15 mounted on them. The corresponding fibre-engaging or drafting portions of the roll are for convenience indicated each as a whole by the numerals 13, 13. At adjacent ends of the portions 12 of the spindle the latter is provided with integral or other collars 12a and 12b respectively, spaced to present between them the usual cylindrical portion 14 for cooperation with the saddle or other weighting means.

The drafting portions 13 of the roll are in this instance made up of a multiplicity of toothed discs or annular or disc-like elements 15, one of which is seen separately in Fig. 3. Each includes a main part or body 16 having a central and preferably non-round aperture 17, see Fig. 3, in this instance hexagonal, for reception on the like-shaped spindle portions 12. While in some cases the discs 15 may be permitted to rotate on the roll spindle, some such non-rotative mounting of the discs as shown for example in Figs. 1 to 3 is generally found more efficient, the entire roll 10 including the multiplicity of discs then being rotatable as a unit.

As seen separately in Fig. 3, each disc 15 is serrated around its circumference, to provide it with a peripheral series of elongated teeth 18. These are equally spaced angularly of the disc, are concentric with it and of uniform radial extent, so that they terminate outwardly along a given circumference about the disc center. Thus the teeth 18 of a multiplicity of the discs disposed in side-by-side relation along the roll, as at 13, 13, define a common cylindrical fibre-engaging formation.

Preferably these roll teeth 18 are pointed or substantially so, their points desirably being acute, for easy entrance between the fibres of a sliver or the like being advanced between such multi-toothed roll 10 and an underlying roll such as indicated at R in Figs. 1 and 2 sufficiently for the purposes of the present disclosure. This inter-fibre entrance by the teeth, and the attendant paralleling and combing action upon the fibres is facilitated and augmented, consistently with adequate strength and stiffness for the teeth, by a tooth construction as illustrated, in which the leading edge 19 of each tooth 18 is inclined rearwardly from its base, that is, away from the direction of rotation of the roll, as indicated by the arrow in Fig. 2, wherein the direction of sliver or other fibre travel is from left to right as indicated. The opposite or trailing edges 20 desirably are truly radial or approximately so. Thus a closer spacing and greater number of teeth, having the desired inclination of leading edge, and of the given radial extent and given angular width of base, is afforded for a disc of given diameter than with a non-raked tooth formation or an isosceles triangular shaping thereof. However, considerable latitude is permissible in the particular tooth form and arrangement within the scope of the invention.

Noting particularly Fig. 1, it will be seen that the individual teeth 18 taper outwardly not only as viewed from the side of a disc, or from the end of a roll, but also in a direction axially of the roll, that is, as viewed in longitudinal section as in said Fig. 1. The body or hub portions 16

of the discs are of substantial thickness, adequate to serve as spacers between the rows of teeth of succeeding discs. These hub or spacer portions 16 of the discs may be defined circumferentially by annular shoulders 16a, the material of the discs outwardly thereof, between the shoulders 16a and the bases of the teeth 18 being of a reduced thickness, from which the teeth themselves project. Thus a calculated degree of lateral flexibility, semi-rigidity or controlled stiffness may be afforded the teeth, depending also on the metal or other stock material employed for the serrated discs. Desirably the discs are stamped or died out of a sheet stock, leaving the discs, including their teeth, flat at one side face, that at the left as viewed in Fig. 1, and providing the annular shoulder 16a, and the tapered side faces of the teeth, at the other side face of the disc, that at the right in Fig. 1 and as seen in Fig. 3.

For purposes of symmetry, balance and fibre direction the toothed discs 15, when provided with one inclined and one vertical side face as illustrated, preferably are formed as lefts and rights respectively for those roll drafting portions 13, 13 at the opposite sides of a weight receiving portion 14 of a roll; that is, at the left-hand and the right-hand portions respectively of Fig. 1. By lefts and rights I refer to provision of the disc hub portions 16 and of the inclined side faces of the teeth 18 at one or the opposite side face of the discs, but with the inclined edges 19 and the radial edges 20 of the teeth 18 disposed so that at any and all drafting portions 13 of the roll the inclined edges 19 will lead and the radial edges 20 will trail. The particular disc 15 shown separately in Fig. 3 happens to be a left. Similarly, the sectional view of Fig. 2 will be understood as taken on the left portion of Fig. 1 and looking toward the right, assuming that the direction of roll rotation in said Fig. 1 is such as to move the bottom portion of the toothed roll, and hence also the fibrous material, toward the viewer. The disc construction such as illustrated in Figs. 1 to 3 is found desirable from the manufacturing and other standpoints but it will be understood that where such considerations are not important the hub or spacer parts such as 16a may be separately formed and also that the acutely pointed teeth 18 may be symmetrical or substantially so in section lengthwise the roll rather than with one side face perpendicular or more nearly so than the other.

It is also preferred that the teeth in adjacent circumferential rows, that is, those of succeeding discs, be staggered or offset circumferentially of the roll. Such angular offsetting is simply accomplished in the example of Figs. 1 to 3 by providing the discs with the same and even number of teeth 18 in conjunction with the central aperture 17 of hexagonal form. When installing the discs upon the spindle each is positioned as if rotated 60° relative to the one preceding, thereby affording the staggered or offset disposition for the teeth of succeeding discs, as evident in Fig. 2. In this manner all the discs may be identical, a distinct advantage from the manufacturing and maintenance viewpoint. Other structural arrangements for affording a staggered disposition for the teeth, at regular intervals or otherwise, may be utilized within the contemplation of the invention.

The pointed-tooth rolls 10 as here disclosed may be of standard dimensions, such as 1⅛ in., 1¼ in., etc. in overall diameter at their toothed drafting portions 13. The number and size or fineness of the teeth may be varied within a considerable range, but in most instances at least sixteen teeth are found desirable, with a length or radial extent at lest approximately one-third the radius of the disc as a whole. For example, in a roll of 1¼ in. diameter and having discs with sixteen teeth each, the latter may efficiently have a length, radially, of ¼ in. or thereabouts. A suitable thickness of stock for such disc is approximately $\frac{1}{16}$ to $\frac{3}{32}$ in., providing a corresponding spacing lengthwise the roll between adjacent tooth points. For clearness in illustration the roll of Figs. 1 to 3, as also that of Figs. 4 and 5, has been somewhat enlarged above actual size, as related to a normal or average sized 1⅛ or 1¼ in. roll, or else may be regarded as representative of a substantially oversized roll. As noted, the fineness of the teeth may be varied within considerable limits and in this and other respects the views are not to be regarded as necessarily to scale.

The toothed discs 15 of Figs. 1 to 3 are held in position axially of the roll, if desired with some slight capacity for lateral play between discs, as by means of fibre or other bearers or annular members 21, 22 on the collars 12a, 12b of the spindle, at the inner ends of the drafting portions 13, and removable fibre or other bearing collars 23, 24 fitted tightly onto the other or outer ends of said drafting portions. Said outer collars 23, 24 preferably are formed with a central spacer element or boss as at 25 and 26, or such spacer means may be provided by separate rings or washers. In the Figs. 1 to 3 embodiment the collars or annular members 21 to 24 serve as bearers and rotation assisting members, being of substantially the same diameter as the toothed discs 15, so as to rest upon the periphery of the underlying roll R. Desirably but not necessarily in all cases, depending somewhat upon the nature of the fibrous material being drafted and the height of draft, speed of rotation and other factors, provision is made for positive driven relation between the toothed upper roll 10 and the under roll R with which it cooperates, as by means of the special end gearing as represented at 27, 28. In some instances, however, the disc-positioning collars may be of less diameter than the discs, as for example in the modification of Figs. 4 to 7, in which cases the multi-toothed rolls contact the lower rolls of their pairs merely at the points of the disc teeth 18.

In the form of the invention as exemplified in said Figs. 4 to 7, wherein corresponding parts are similarly numbered as in Figs. 1 to 3, the teeth 18 of the fibre-engaging peripheral portions 13 of the roll are formed as integral elements of a continuous strip or serrated wire 30, a short length of which is shown separately in Figs. 6 and 7.

As best seen in section in Fig. 7, such strip, which per se may be generally similar to but preferably somewhat finer than what is known as garnet wire, has a relatively thick connecting base and spacer portion 31 and an intermediate zone 32 of reduced thickness, from which the inclined and tapered teeth 18 project. This strip or wire 30 is helically disposed on the spindle portions 12', 12', which may be cylindrical or other shape, the ends of the strip being conveniently anchored in place upon the spindle. Such anchoring may for example be effected, as to either or both ends, by insetting the wire ends into the spindle core, as at 33, or into an anchor washer provided for the purpose, or by offsetting them

axially and inserting them into the collars 12a, 12b. The teeth 18 of the strip 30 may be the same or substantially so, as to size and shape, for similar sizes of rolls, as in Figs. 1 to 3, with the similar result that in succeeding peripheral rows of teeth, which rows in this instance are slightly inclined or spiralled about the spindle, the teeth are staggered or offset, as seen in Fig. 5.

The rolls 10 of my present invention in certain respects and for various purposes represent an improvement upon those of my prior Patent No. 1,933,222. They are useful as the upper roll of any roll pair such as referred to in that patent, and indeed in substantially any upper roll position, two instances being shown more or less diagrammatically in Figs. 8 and 9. These multi-toothed rolls, moreover, are especially suited for use in conjunction with the Rooney system of high-drafting, in the upper rear or break-draft position, in a three-roll arrangement as at 10 in Fig. 8 or a four-roll arrangement as at 10 in Fig. 9, as fully disclosed and claimed in the copending application of Elwin H. Rooney, Ser. No. 417,118, filed October 30, 1941. As noted, however, the rolls of my present invention are susceptible of use in other drafting systems and arrangements. And while the particular frames as diagrammatically represented in Figs. 8 and 9 are typical respectively of the classes of slubbers, intermediate and roving frames and the class of drawing frames, it will be understood that the rolls here concerned, either as to a three-roll, four-roll or other arrangement, are not limited to use in any given frame, including spinning frames.

My invention is not limited to the particular embodiments thereof as herein illustrated and described, its scope being set out in my claims as follows:

I claim:

1. For use in a roll frame for the preparation of fibrous yarns, threads and the like for textile purposes, an upper rear fibre-parallelizing and drafting roll comprising a spindle providing a core and having end bearings, the spindle presenting a circumferential fibre-engaging portion between the bearings, said fibre-engaging portion composed of a multiplicity of concentric annular rows of radially pointed teeth, the teeth individually tapering both radially and axially of the roll and each having its leading edge inclined rearwardly away from the direction of roll rotation, each tooth being of a radial extent at least about one-third of the roll radius, the tooth rows being regularly spaced axially of the roll, with the teeth of each row evenly distributed along a given circumference common to all rows and with adjacent rows having their teeth relatively offset angularly, retaining collars at the ends of the multiplicity of tooth rows, and concentric means at the bases of the teeth of each row for supporting them on the spindle core and axially spacing the adjacent rows.

2. A textile drafting roll for upper rear positions in drawing, spinning and like roll frames, said roll comprising a spindle including a core, end bearings and an intermediate circumferential drafting portion, such drafting portion having positioned concentrically on it a multiplicity of circular discs each presenting a peripheral series of radially pointed teeth having their bases adjoining circumferentially, the teeth individually tapering both radially and axially of the roll and each having its leading edge inclined rearwardly away from the direction of roll rotation, each tooth being of a radial extent at least about one-third of the roll radius, means for non-rotatively associating the discs and the spindle core with the teeth of adjacent discs relatively offset angularly, and axial spacer means for the teeth of successive discs.

3. A textile drafting roll for upper rear positions in drawing, spinning and like roll frames, said roll having an overall diameter of but about 1 or a few inches as customary for standard textile frame drafting purposes and comprising a spindle including a core, end bearings and an intermediate circumferential drafting portion, such drafting portion having wound edgewise thereon a continuous ribbon-like metallic strip element formed with pointed serrations along one edge and having a relatively wider supporting and spacing base portion along the opposite edge, said element applied and secured to the spindle so that the points of said serrations define a cylindrical outer surface for the roll, said serrations individually having a uniform angular extent so calculated with respect to the roll diameter as to stagger them in succeeding individual winds, and said serrations each having a radial extent of at least about one-third of the overall roll radius.

4. A textile drafting roll for upper rear positions in drawing, spinning and like roll frames, said roll having an overall diameter of but about 1 or a few inches as customary for standard textile frame drafting purposes and comprising a spindle including a core, end bearings, a plurality of circumferential drafting portions axially spaced by a weight-receiving portion, each of said drafting portions having a ribbon-like pointedly serrated strip wound edgewise continuously from end to end of the respective drafting portion with its serration points radially disposed, said serration points having a radial extent of at least about one-third of the overall roll radius, and said serrated strips being oppositely wound upon adjacent drafting portions of the roll in directions to lead inwardly from the roll ends for the purposes of inward direction of the drafted fibres.

5. A textile drafting roll for upper rear positions in drawing, spinning and like roll frames, said roll comprising a spindle including a core, end bearings and an intermediate circumferential drafting portion, such drafting portion having positioned concentrically on it a multiplicity of circular discs each presenting a peripheral series of radially pointed teeth having their bases adjoining circumferentially, each tooth having a radial extent of at least about one-third the disc radius and being tapered both radially and axially of the disc, and having a leading edge inclined away from the direction of roll rotation, said core drafting portion having an equilateral cross-sectional contour, each disc being centrally apertured for fitted non-rotative reception on said core portion, the teeth of the respective discs being of such number and so disposed relative to the disc apertures as to effect uniform angular offsetting of the teeth of succeeding discs by installation thereof in relative positions as if turned through an angle corresponding to that subtended by one or more of the faces of the equilateral core portion, and means for presenting the teeth of successive discs in axial spaced relation.

THOMAS PETER ROONEY.