The invention is concerned with the constructional arrangement of worsted spinning machines, more particularly with the drafting apparatus incorporated therein, the object being to provide an improved form of machine which will be capable of performing a drafting operation in accordance with what is hereinafter referred to as "Ambler's method," by which is meant the method claimed in the specification of United States Letters Patent No. 2,641,026 of the drafting apparatus manufactured and sold under the said Letters Patent has been designed specifically for the purpose of converting existing machines to adapt them for Ambler's method of drafting; having regard to the wide diversity of such existing machines as were or are capable of such conversion, both with respect to their structural dimensions and to their age, it was an obvious requirement that this apparatus should be produced in a form which would be adapted for adjustment, with a sufficient degree of flexibility in assembly methods, to enable it to be installed in accurate alignment with and in relation to the existing rollers and other parts of the machine.

The drafting operation by Ambler's method requires inter alia the provision of twist-control means in which the roving is passed between two outwardly moving surfaces located close to the drafting nip, which surfaces are in practice constituted by the peripheral surfaces of a pair of cooperating tongueed and grooved rollers (hereinafter termed "tension rollers"), and a channel-shaped member (termed a "flume") by which the roving is prevented from rotating about its own axis in the region between said tongueed and grooved rollers and the drafting nip.

In the construction of new worsted spinning machines intended expressly for operation in accordance with Ambler's method, as distinct from the provision as hitherto of fittings or attachments for application to existing machines, the present invention proposes (a) that the bottom tension roller shall be supported in brackets carried by a beam mounted on the skeletal structure of the machine with capability of slidable movement longitudinally thereof, said beam carrying at each spinning unit a guide bracket to which the flume and the top tension roller bracket is pivoted, (b) gear means providing a driving connection between the bottom and top tension rollers, (c) a driving shaft extending lengthwise of the machine and gears making a driving connection between said shaft and a gear on each bottom tension roller, and (d) means for reciprocally moving the beam together with all the mechanism supported thereon to ensure even wear of the drafting rollers. Means are also provided for the easy removal of the top tension roller and its supporting bracket as a unit.

The manner in which the invention may be carried into effect is hereinafter described with reference to the accompanying drawings, which illustrate the drafting apparatus of a worsted spinning machine incorporating a preferred embodiment of the invention. In said drawings, Fig. 1 is an end elevation of the drafting apparatus; Figs. 2 and 3 are views thereof as seen in the direction of the arrows A and B (Fig. 1), respectively, the top drafting rollers being omitted; Figs. 4 and 5 are sections on the lines IV—IV and V—V, respectively, of Fig. 2; and Fig. 6 is a fragmentary sectional view similar to FIG. 5, showing the top tension roller and the flume bracket in the raised or inoperative position.

Referring to Figs. 1—6 of the drawings, the skeletal structure of the machine includes the inclined columns 10, 10, which carry housings 11 mounted for slideable movement thereon, and are fixed to bearer members 12 on which are supported the bearings 13 of the shaft 14 of the front bottom drafting rollers 15. The front drafting rollers are shown at 16 in Figs. 1 and 4. In Fig. 5, rollers 29 and 30 are respectively the back bottom and top drafting rollers. The housings 11 support between them a longitudinal shaft 17, and the forward part 111 of each housing 11 also provides a mounting for a captive nut 18 which cooperates with a lead screw 19 fixed in the subjacent member 12. Said nut is combined with a skew gear meshing with a skew gear 20 fixed on the shaft 17. Thus, by rotation of the shaft 17 the position of the housings, and the apparatus supported thereby, can be adjusted in grooves to the nip of the rollers 15, 16 in a direction parallel to the axes of the lead-screws 19, i.e., parallel to the path of the roving. One of the plurality of rovings treated by the machine of the invention is illustrated by the center line 50 in Fig. 6. Each set of rollers 15, 16, 29 and 30 and the drafting assembly 51 (Fig. 5), and, as shown in Fig. 2, these drafting assemblies 51 define predetermined spaces 52 between themselves.

Mounted on each forward housing part 111, by means of a horizontal pin 21, is a bracket 22, and between each pair of such brackets 22 is a longitudinal beam 23 which is used to support at each spinning unit a guide bracket 24 to which is pivoted a combined flume and carrier 25 which includes the top tension roller 26. Elements 23—26 form part of a tension roller unit assembly 53 (Fig. 2) which extends across all of the draft assemblies 51 intermediate the front and back rollers thereof. The tension roller unit assembly further includes a bottom tension roller or shaft 27 which is supported in bearers 28 mounted on the beam 23. The lower tension shaft 27 is common to all of the draft assemblies 51 and is rotationally mounted from the beam 23 and is substantially parallel thereto, this lower tension shaft 27 also extending transversely across the paths of the plurality of rovings 50. The lower tension shaft 27 includes a plurality of spaced annular grooves 54, one of which is shown in FIG. 5, these grooves being situated opposite the path of each roving 50. Gears 271 integral with said roller 27 are arranged to mesh with gear means 261 on the top tension rollers when the members 25 occupy the position shown in Fig. 5. The gears 271 are coaxial with the lower tension shaft 27 and are respectively associated with the spaced annular grooves 54 which are formed in the lower tension shaft 27. It will be noted that these gears 271 (FIG. 2) are respectively situated in the predetermined spaces 52 between the draft assemblies 51. The top tension rollers 26 which form part of the carriers 25 are respectively provided with angular tongues 55 which respectively rotationally engage the respective grooves 54 of the lower tension shaft 27. One of the tongues 55 is shown in Fig. 5. The gear means, 261 respectively provided on the top tension rollers 26 respectively, are in direct engagement with the gears 271 of the lower tension shaft 27 so that the top tension rollers 26 will be rotated in unison with the rotation of the lower tension shaft.

Said brackets 22 are so proportioned in relation to the housings 111 as to be capable of a certain degree of endwise movement with respect to the pins 21. Such movement, which is necessary to ensure that the wear of the surfaces of the drafting rollers 15, 16 is evenly distributed over the width thereof, is effected by the rotation of the transverse drive shaft 31 at inter-
vals on which is a worm gear 32 which meshes with a worm-wheel 33 carried on a shaft 34 bearing an eccentric 35 the operative face of which is confined between two blocks 36, 36 which are mounted on a fixed part 37 of the machine frame. The arrangement is such that the reaction of the rotating eccentric 35 against said blocks 36, 36 is such as to cause the assembly of parts connected with the shaft 31 to be reciprocated longitudinally. Thus, the shaft 31 together with the worm gear 32 and the remaining elements 33-37 form a means for reciprocating the beam 23, together with the lower tension shaft 27 and the plurality of carriers 25, as a unit transversely to the path taken by the rovings 50.

The transverse drive shaft 31 is employed to confer driving motion on the top and bottom tension rollers 27, 26. A gear 38 on the shaft 31 drives a train of gears 39, 40 the latter of which meshes with a gear 41 on the bottom tension roller 27, and the latter transmits motion as aforesaid to the top tension roller 26.

For a new machine the invention provides a simpler and cheaper form of construction than that of the attachments heretofore obtainable. The parts of the mechanism are readily assembled and are easily rendered available for cleaning. By these means also it is possible to achieve a more uniform setting as between individual driving units, and the initial setting is unlikely to become disturbed in use.

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

1. In apparatus for the single stage drafting of a plurality of parallel spaced individual rovings of textile fibers including a plurality of draft assemblies respectively provided for said plurality of individual rovings of textile fiber, each draft assembly having front and back drafting rollers and said draft assemblies respectively defining predetermined spaces between themselves, the improvement in combination comprising a rotatable transverse drive shaft having a worm gear thereon, a tension roller unit assembly common to and extending across all of said draft assemblies intermediate the front and back rollers thereof and extending substantially parallel to said drive shaft and being axially movable as a unit with respect to said drive shaft, said tension roller unit assembly including; a beam extending transversely across the paths of said plurality of said rovings at substantially right angles thereto, a lower tension shaft rotatably mounted from said beam and substantially parallel thereto, said lower tension shaft also extending transversely across said paths of said plurality of said rovings, being common to all of said draft assemblies, and including a plurality of spaced annular grooves integrally formed therein opposite the path of each roving, a gear co-axial with said lower tension shaft associated with each of said spaced annular grooves and integrally formed in said lower tension shaft, said gears being respectively situated in said predetermined spaces between said draft assemblies, a plurality of brackets being respectively fixed to said beam, a plurality of carriers respectively provided for said plurality of draft assemblies and respectively hingedly mounted on said brackets; each of said carriers including a top tension roller having an annular tongue for rotationally engaging a respective groove of said lower tension shaft, gear means mounted upon said top tension roller in direct engagement with its respective gear of said lower tension shaft for rotating said top tension roller in unison with rotation of said lower tension shaft, and a flume combined and turnable with each of said carriers for guiding the rovings after they ad-

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