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ROLLER-TYPE DRAFTING APPARATUS OF TEXTILE SPINNING AND ANALOGOUS MACHINERY

Filed Sept. 23, 1950 3 Sheets-Sheet 1

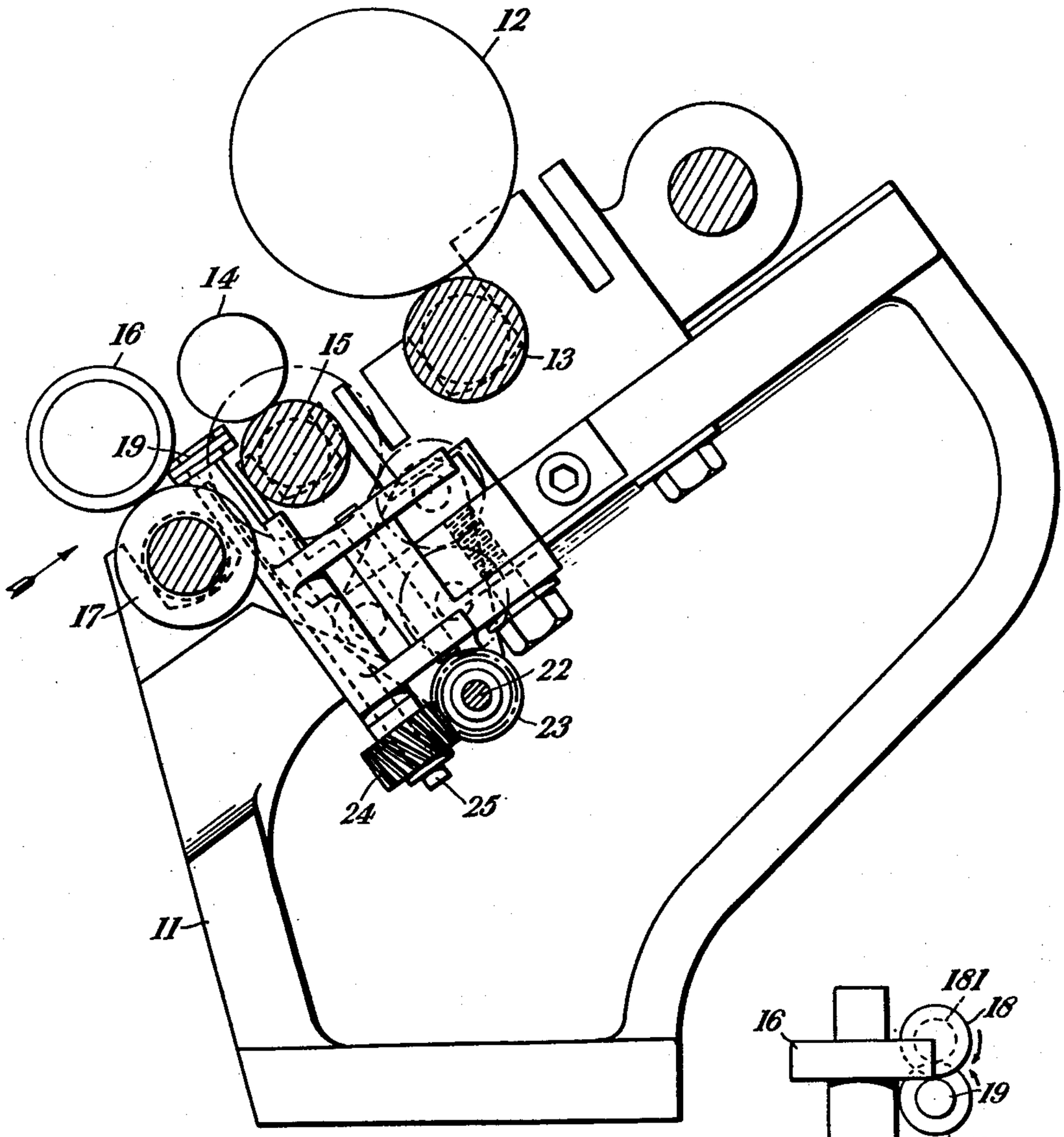

Fig. 1.

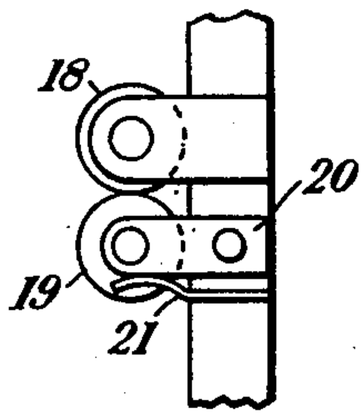

Fig. 2.

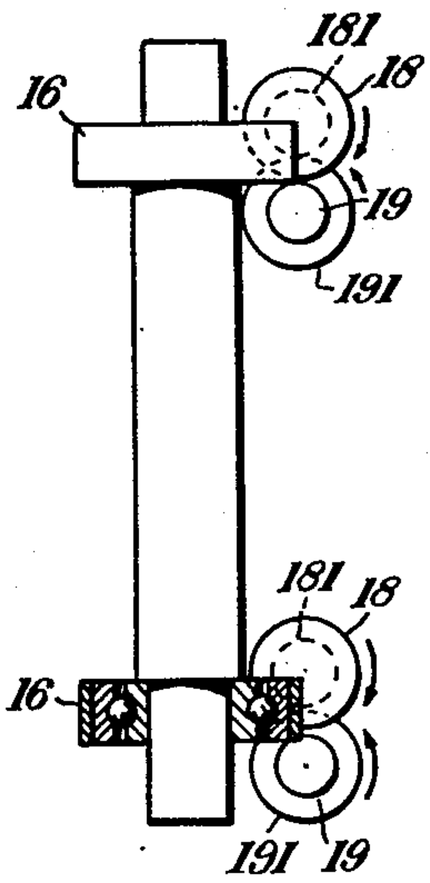

Fig. 3.

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ROLLER-TYPE DRAFTING APPARATUS OF TEXTILE SPINNING AND ANALOGOUS MACHINERY

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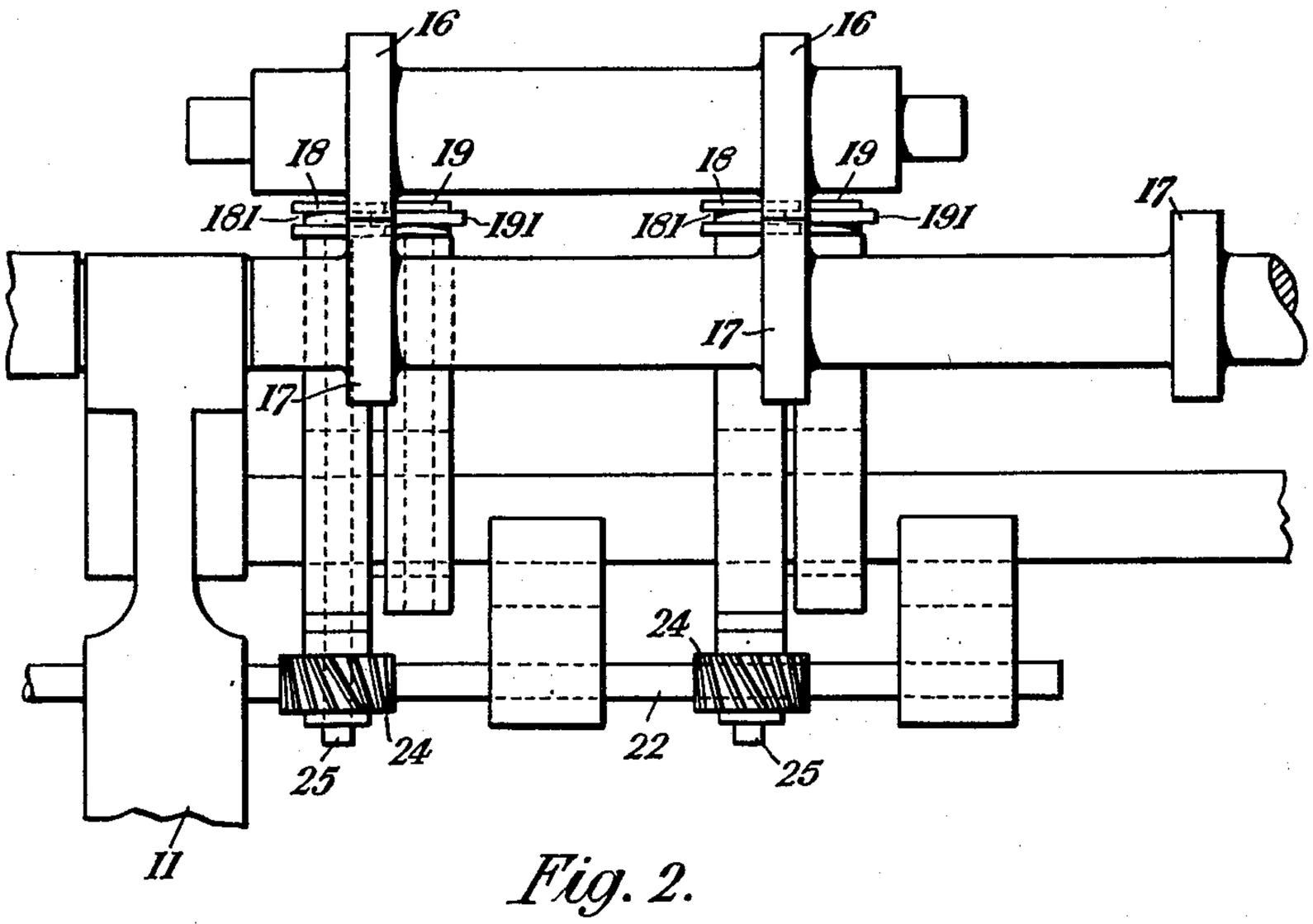

Fig. 2.

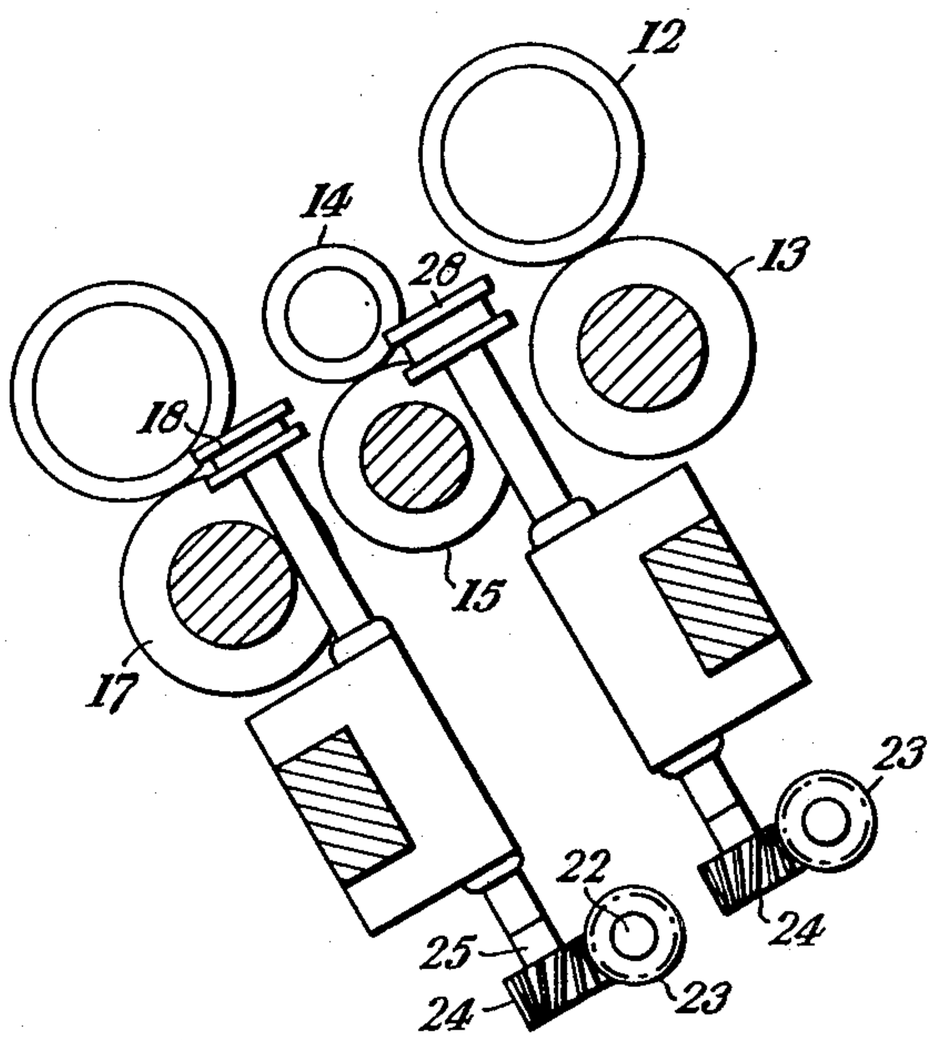

Fig. 6.

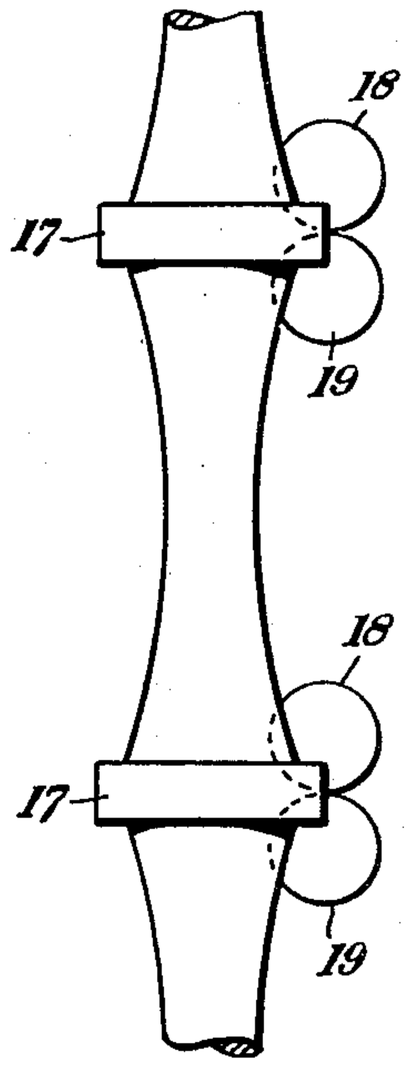

Fig. 3a.

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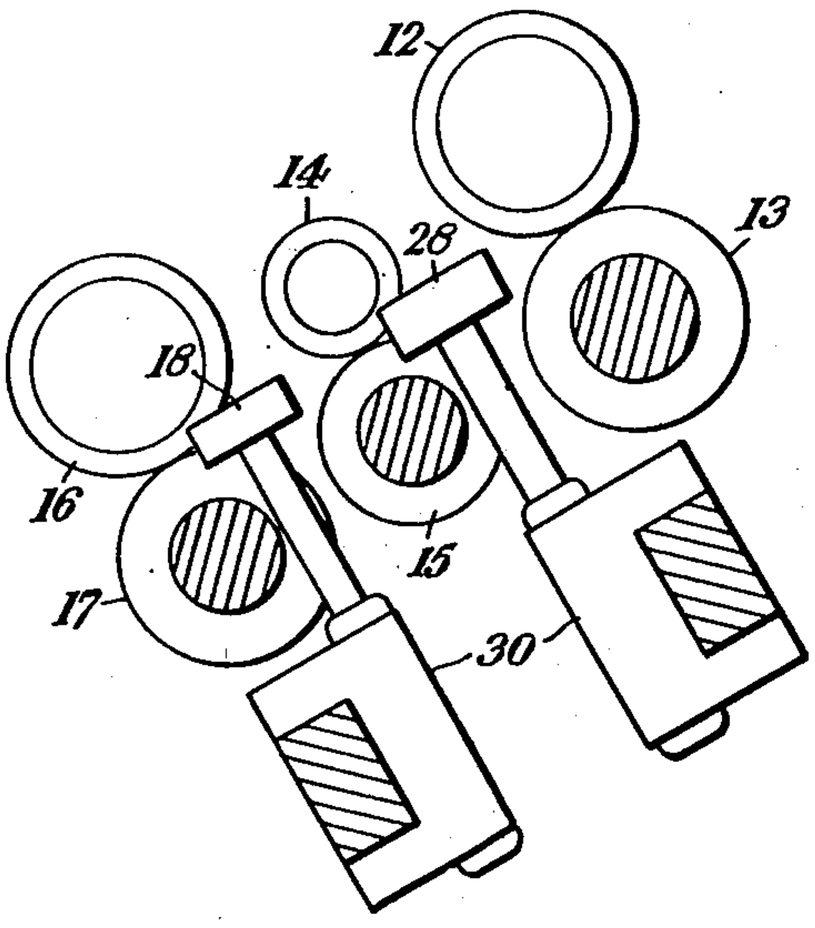

Fig. 7.

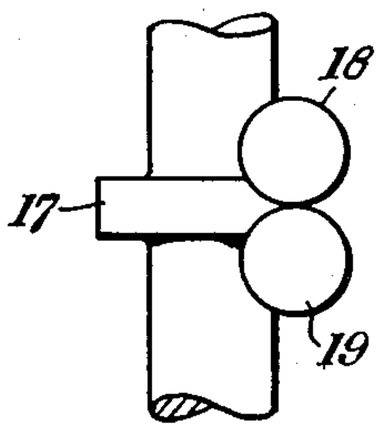

Fig. 8

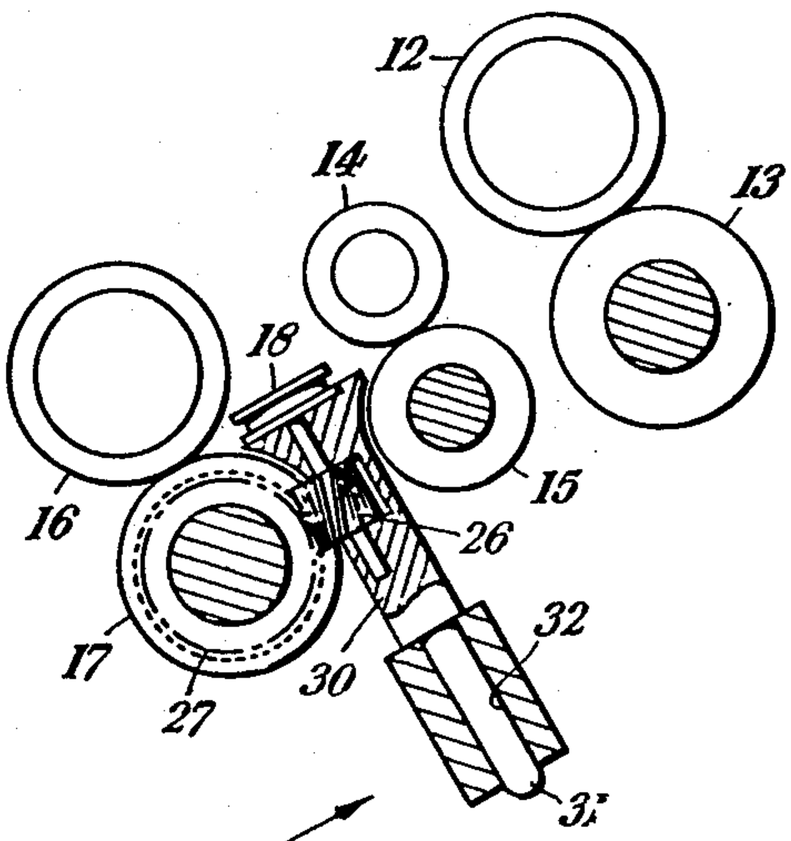

Fig. 4.

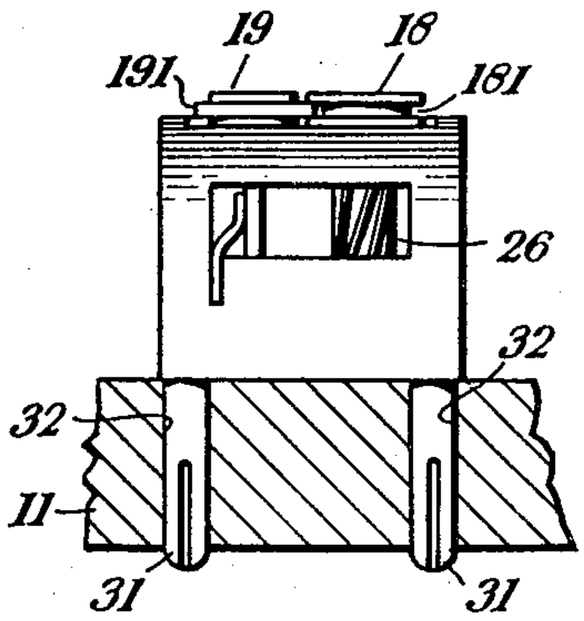

Fig. 5.

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2,624,074

ROLLER-TYPE DRAFTING APPARATUS OF TEXTILE SPINNING AND ANALOGOUS MACHINERY

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In Great Britain October 3, 1949

13 Claims. (Cl. 19—130)

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This invention is concerned with textile spinning and analogous machines employing drafting apparatus in which the sliver, roving or the like is attenuated by its passage between pairs of rollers rotating at relatively different speeds. It is well-known that the production of a roving or yarn of uniform strength and regularity in such machines requires that the fibres shall be subjected to a close control in their passage through the drafting zones, a requirement which is the more important in high draft systems. Hitherto this feature of control has been sought by the use of stationary condensers or reducers of many different shapes and forms, single- and double-apron apparatus, small diameter presser rollers and other expedients intended to restrict the outward spread of the flanking fibres induced by the drafting action, but this result has not yet been completely achieved. In addition to the aforesaid forms of stationary condenser it has also been proposed to confine the sliver between the upper and lower faces of two overlapping discs, disposed between two sets of drafting rollers. The axes of rotation of the aforesaid discs, which are positively driven in opposite directions, are offset from the path of travel of the sliver, so that the sliver-engaging face of each disc has a component of motion in a forward direction. The object of the present invention is to provide new or improved apparatus giving better fibre control than has been possible with existing devices, enabling higher drafts and greater regularity of yarn or roving to be attained.

In a textile drafting apparatus according to the present invention, there is provided in respect of each end of the fibrous material, a pair of rollers (hereinafter termed the "control rollers") which rotate in opposite directions and are disposed in relation to a pair of drafting rollers so that the line of the nip of the control rollers is at, or approximately at, right angles to that of the nip of the drafting rollers, the arrangement being such that the material passes between and is subjected to the controlling influence of the cooperating faces of the control rollers immediately before entering the nip of the drafting rollers.

The control rollers may have plain cylindrical working faces, or they may be respectively tongued and grooved, the tongue of one roller working within the groove of the other roller, in which case the body of fibres under treatment will pass between the cylindrical faces of the rim of the tongued roller and the base of the grooved roller, whilst being confined between the sides of the groove of the latter.

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The nature of the invention and the manner in which it is to be performed will be more clearly understood from the following detailed description of certain embodiments of the invention in its application to the drafting apparatus of a textile spinning machine, reference being had to the accompanying drawings. In said drawings, Fig. 1 is a partially diagrammatic cross-sectional view of the roller-stand and its associated parts, Fig. 2 is a fragmentary view of the same as seen in the direction of the arrow in Fig. 1, and Fig. 3 is a separate plan of a drafting unit with which one form of the present improved control rollers is associated. Figs. 1 to 3 illustrate control rollers of tongued and grooved formation, whereas Fig. 3*a* is a similar view of Fig. 3 depicting a modified form of drafting roller in conjunction with control rollers of plain cylindrical form.

Fig. 4 is a fragmentary sectional view depicting alternative means for driving the control rollers, and Fig. 5 is a detail of the control roller assembly seen separately, as viewed in the direction of the arrow indicated in Fig. 4.

Fig. 6 is a fragmentary sectional view of a drafting apparatus in which tongued and grooved control roller assemblies are provided in conjunction with both the front and intermediate drafting units. Fig. 7 is a similar view to Fig. 6 of an apparatus employing plain cylindrical control roller assemblies.

Fig. 8 is a detail view illustrating the relative positions of the drafting units and the control rollers, when using drafting rollers having narrow bosses.

Fig. 9 is a detail illustrating one practical means for maintaining the control rollers in operative relationship.

In Fig. 1, the reference numeral 11 indicates the roller stand. Three lines of rollers are shown, 12 and 13 being the upper and lower feed rollers, 14 and 15 the intermediate rollers, and 16 and 17 the front drafting rollers. Mounted between the intermediate rollers 14, 15 and the front rollers 16, 17, in the closest possible proximity to the nip of the latter are two control rollers 18 and 19, there being a separate pair of such control rollers for each end of the material undergoing drafting treatment.

In the embodiment illustrated by Figs. 1 to 3, the roller 18 has a peripheral groove 181 which receives a peripheral tongue 191 provided on the roller 19, said tongue 191 being a close working fit in the groove 181. Said control rollers are supported upon shafts which are respectively mounted for rotation in opposite directions about axes which are perpendicular to the plane con-

taining the lines of nip of the front and intermediate rollers 16, 17 and 14, 15. The direction of rotation of the control rollers 18, 19 is indicated by the arrows in Fig. 3, and is such as to assist the progressive movement of the fibres towards the drafting rollers 16, 17. The arrangement is such that the body of fibres passes through the nip of the control rollers 18, 19 immediately before entering the nip of the drafting rollers 16, 17. That is to say, the fibres are compressed between the tongue 191 of the roller 19 and the base of the groove 181 of the roller 18, being thereby compressed in a direction at right angles to the direction of the nipping action of the rollers 16, 17.

Means are provided for urging the control rollers 18, 19 towards each other, so as to maintain their compressive action upon the fibre body irrespective of its instantaneous thickness. For this purpose I may, for example, mount one of the control rollers, say the roller 19, upon a pivotal arm 20, and to provide a leaf spring 21 which is arranged to bear against the side of said arm 20 in such fashion as to press the roller 19 against the roller 18. Such an arrangement is illustrated in Fig. 9.

In an alternative embodiment illustrated in Fig. 3*a*, the control rollers 18 and 19 are of plain cylindrical form, and it will be understood that whichever form of control rollers is adopted, their working faces may be plain, corrugated, coated with cloth or other suitable roller-covering material, as may be best adapted to provide the requisite degree of the control which they exercise over the fibres passing between them.

The depth of the working faces of the control rollers 18, 19 need only be sufficient to cater for the thickness of the sliver or fibre body being processed; it is accordingly possible to arrange for the nip of the control rollers to be located very closely to the nip of the drafting rollers with which they are associated. It desired, for this purpose the control rollers may be made of radially tapering thickness, enabling their thickness at the peripheries to be reduced without impairing their strength.

The control rollers 18, 19 may be rotated by the frictional contact of the fibre body passing between them, or one or both of them may be driven positively. In the embodiment illustrated in Figs. 1 and 2, the roller 18 is driven from a line-shaft 22 through the medium of a worm 23 thereon which meshes with a worm-wheel 24 which is fixed on an extension 25 of the shaft carrying said roller 18. In the alternative embodiment depicted in Figs. 4 and 5, the roller 18 is driven by a worm-wheel 26 meshing with a worm 27 on the shaft of the drafting roller 17. Thus arranged, the control rollers 18, 19 constitute means for progressively and continuously presenting the leading tips of the fibres in a straight line to the drafting rollers 16, 17 with little or no splaying of the fibres. It will also be evident that the use of such a form of condensing means exercises a substantially less degree of frictional retardation on the fibres than has been customary in existing stationary forms of condenser.

The control rollers may be applied to any one or more of the zones of a multi-stage drafting apparatus. Figs. 6 and 7 illustrate examples in which a supplementary control assembly is associated with the intermediate drafing rollers 14, 15, in addition to that provided for the front drafting rollers 16, 17. The depth of the working face of the said supplementary rollers, of which

one is indicated at 28, is greater than that of the rollers 18, 19 by reason of the fact that the fibre body is of greater thickness at the intermediate drafting stage.

It may even be found desirable to employ more than one pair of control rollers 18, 19 arranged in tandem in a single drafting zone, according to the spacing between the lines of drafting rollers, the degree of draft required, and the extent of the necessary control of the fibre body.

To facilitate the removal of an assembly of control rollers, for purposes of cleaning or replacement, the assembly may be mounted as a unit in a common block, as shown at 30 in Figs. 4 to 6, the block 30 being supported on pins 31 which are received in sockets 32 in a suitable fixed part of the roller stand 11. This form of mounting is particularly advantageous when the control rollers are driven from the drafting roller, as hereinbefore described with reference to Figs. 4 and 5.

It will be manifest that a substantially closer setting of the nip of the control rollers to the nip of the drafing rollers can be obtained when the drafing rollers are made with narrow bosses as depicted in Figs. 2, 3, 3*a*, and 8, as compared with the setting attainable when drafting rollers are provided having bosses of conventional width. In the construction of Fig. 8 the control rollers 18, 19 can be brought forward without impingement of any parts thereof against the boss of the drafting roller.

The adoption of the principle of using narrow bossed rollers renders it possible to use for a weighted top roller, e. g. the rollers 16 or 14, a shaft carrying a series of ball- or roller-bearings, the outer race of each bearing constituting a boss of the roller. In such case, the shaft itself is stationary, being fixedly carried by a suitable support, and it is possible to operate the rollers for long periods without relubricating.

A further advantage of the narrow bossed top roller is the fact that it is easier by reason of its narrow dimension to renew the roller covering or cot which is usually provided. In order further to facilitate cleaning of the rollers they may be made as shown in Fig. 3*a*, wherein the parts between adjacent bosses are so shaped that fibres which may escape laterally from the drafting stage and which fall on the roller, will tend to accumulate thereon at a position as far as possible remote from the boss.

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

1. In a textile drafting apparatus a pair of cooperating drafting rollers and a pair of contra-rotating control rollers disposed in relation to said drafting rollers, so that the nip of the control rollers is at, or approximately at, right angles to the nip of the drafting rollers, and so that the working faces of one of said pairs of rollers project beyond the adjacent tangent plane of the other pair of rollers towards the nip of the latter, the rollers of at least one of the pairs including bosses and the width of the bosses of one of said pairs of rollers being less than the spacing between the axes of the other pair of rollers.

2. A structure as claimed in claim 1 in which it is the working faces of the control rollers which project toward the nip of the drafting rollers and beyond the adjacent tangent plane of the latter.

3. Apparatus as claimed in claim 1, wherein the cooperating faces of the control rollers are cylindrical.

4. Apparatus as claimed in claim 1, wherein the control rollers are respectively tongued and grooved, the tongue of one roller being arranged to work within the groove of the other roller, so that the fibre body is condensed between the peripheral rim of the former and the base of the groove of the latter.

5. Apparatus as claimed in claim 1, comprising means for resiliently urging the cooperating faces of the control rollers towards each other.

6. Apparatus according to claim 1, wherein a pair of such control rollers is provided in operative, overlapping relationship to preceding and following pairs of drafting rollers.

7. Apparatus according to claim 1, wherein the control rollers are driven by frictional contact with the fibre body passing between them.

8. Apparatus according to claim 1, comprising means for imparting a positive drive to a control roller so that its rotation assists the forward passage of the fibre body toward the associated drafting rollers.

9. Apparatus as claimed in claim 1, comprising means for imparting a positive drive to a control roller so that its rotation assists the forward passage of the fibre body toward the associated drafting rollers, and wherein connecting gearing is provided from a line shaft to the driven control roller.

10. Apparatus as claimed in claim 1, comprising means for imparting a positive drive to a control roller so that its rotation assists the forward passage of the fibre body toward the associated drafting rollers, and wherein a shaft supports the driven control roller and gearing is provided connecting the shaft to one of the associated drafting rollers.

11. Apparatus as claimed in claim 1 wherein provision is made of a roller stand, and a common block detachably mounted on the roller stand, a pair of control rollers being mounted in the block so that the control roller assembly constitutes a removable unit.

12. Apparatus as claimed in claim 1 wherein the drafting rollers are provided with bosses narrower than the spacing between the shafts of the control rollers, said bosses extending between said control roller shafts so that the control roller nip is disposed in close proximity with that of the drafting rollers.

13. Apparatus as claimed in claim 1, wherein the drafting rollers are fashioned with narrow bosses only sufficiently wide to accommodate the fibre body without traversing movement of the latter, the said bosses being constituted by the outer races of ball- or roller-bearings mounted on a fixed shaft.

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