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UNIVERSAL SPINNING FRAME

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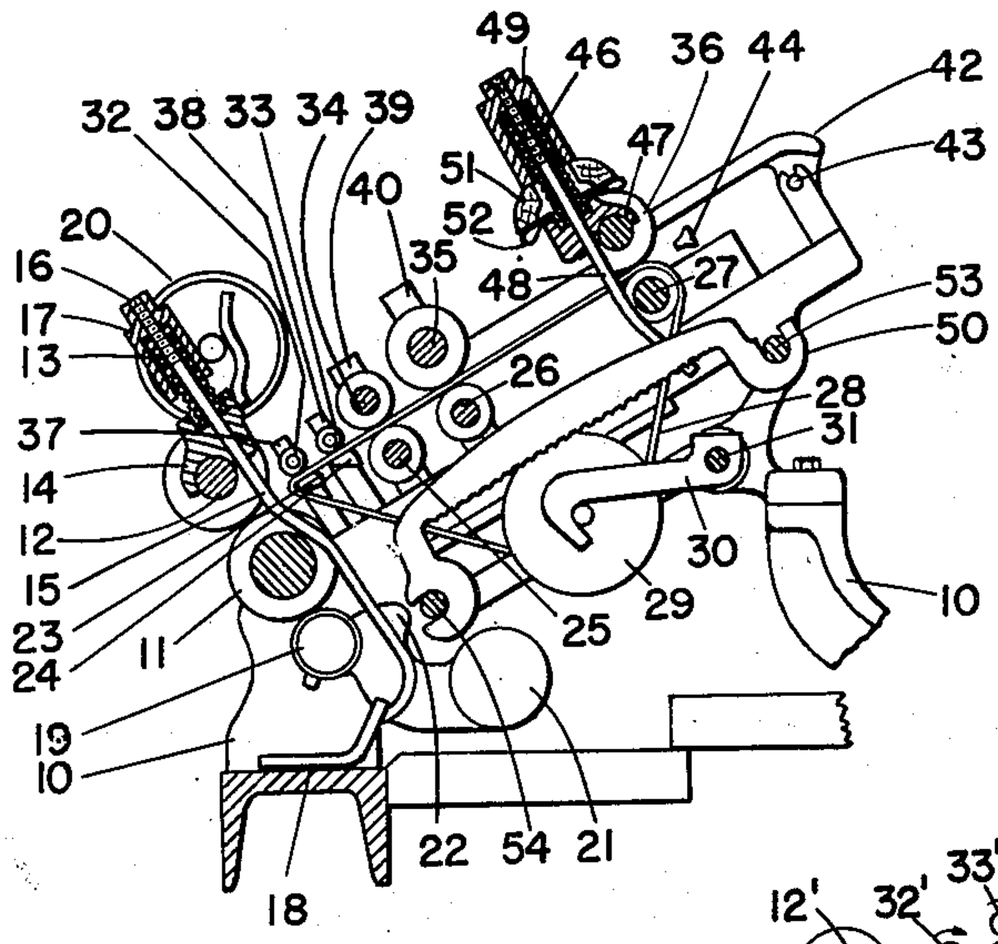

Fig 1

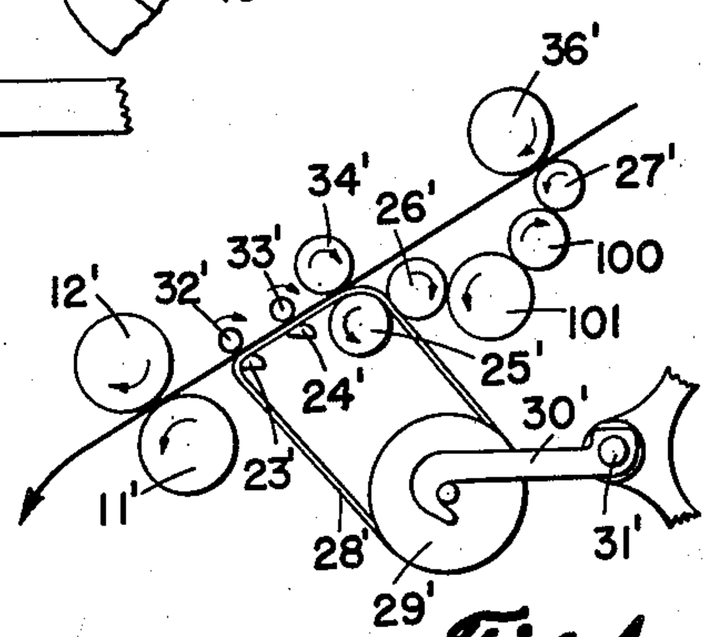

Fig 4

Fig 2

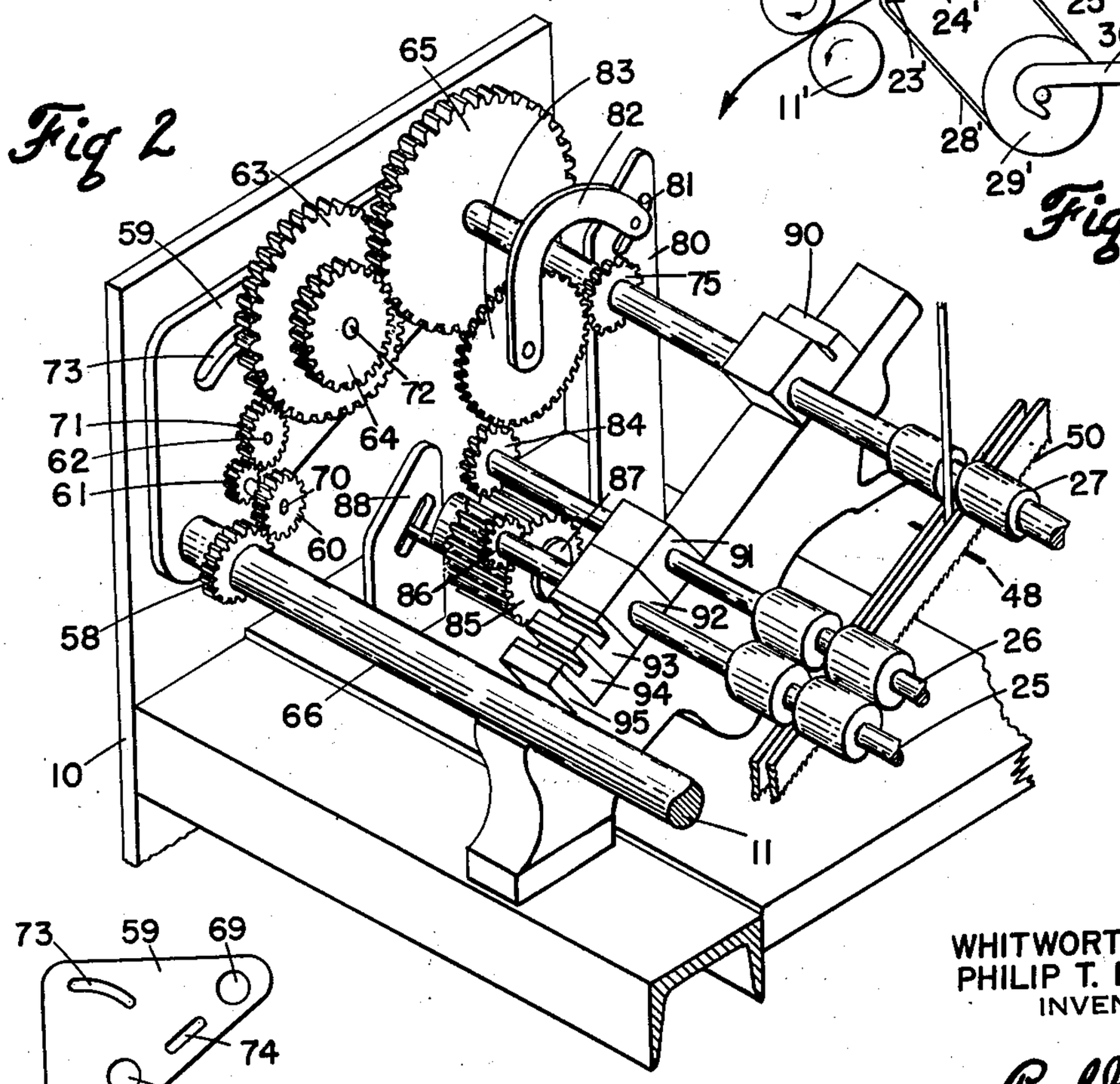

Fig 3

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UNIVERSAL SPINNING FRAME

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1 Claim. (Cl. 19—131)

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This invention relates to a novel drafting device such as a final spinning frame for use in the preparation of an exceptionally large variety of textile yarn, strands, or threads, which are simultaneously twisted and wound on bobbins after drafting in the usual manner.

More particularly, the invention is directed to a draft frame having substantially universal application insofar as fiber length is concerned. By simple adjustment, it may be used for the final spinning draft of fiber stocks such as cotton, having maximum fiber lengths of approximately 7/8" to 1 3/4", or fiber stocks containing wool, mohair, or other fibers of lengths commonly processed on worsted type machinery.

Fiber drafting is essentially a problem of reducing a strand or strands without damage to the fibers and under controlled conditions which insure the production of commercially uniform yarns. The textile industry has devoted considerable time, money, and effort to this problem, and the patent and other literature reporting its findings is voluminous.

As a result of these prior efforts, standard and modern drafting machines such as spinning frames are built for a limited range of fiber lengths. These several type machines are often identified according to their usual use such as cotton frames and worsted frames. The conventional worsted frames are not used for drafting cotton and similar short fibers because of improper and insufficient fiber control, and a cotton frame cannot draft long fibers of wool, mohair, and other fibers conventionally drafted on a typical worsted frame.

According to the present improvements, there is provided a universal spinning frame capable of producing yarns which are in every way comparable with yarns spun on any of the several type frames currently used in the processing of yarn. The result is that the present requirements for a number of specialized frames to process different type yarns may be dispensed with, the flexibility of operations greatly increased, and with a considerable reduction in invested capital for plant and equipment.

These results are obtained in a preferred embodiment of our invention by providing a single apron type drafting frame and arranging therein a series of positively driven and individually adjustable rolls in contact with the apron in such a way that any one of them may constitute a back roll of a draft stage. A top roll with an independent weighting means is adjustably mounted over the selected driven roll so that both rolls contact the apron on opposite sides.

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The driven rolls have a dual function in that they may be set in any desired position with the adjustable top roll and in that those driven rolls not being used to determine the proper ratch setting will or may be used as carrier rolls for fiber control and at any desired selected position. They can be moved to perform either function in the most effective manner for the particular stock being run.

An object of our invention is to provide a final spinning frame for reducing different rovings of considerable maximum fiber length variation.

Another object is to provide a fiber drafting device in which either short fibers or long fibers may be processed by resort to simple adjustment.

Another object is to provide a single apron type spinning frame in which a relatively short tension apron may be used for the processing of either short or long textile fibers.

Another object is to provide a drafting mechanism such as may be used in the final spinning process in which an unusually long ratch setting adjustment may be provided, and wherein rolls have the alternate functions of being draft stage rollers or carrier rollers which are adjustable relatively to a selected draft stage roll.

Another object is to provide a gear type drive which is readily adjustable for the entire range of draft settings provided by the improved frame.

These and other objects of invention will be manifest from a consideration of the following description, claim and drawings, in which:

Fig. 1 is a side elevational view, partly in section, of a preferred embodiment of the spinning frame.

Fig. 2 is a partly exploded isometric detail assembly view of the gear drive, driven rollers, and a portion of the weighting mechanism of Fig. 1.

Fig. 3 is a detail of the plate for the change gear train shown in Fig. 2.

Fig. 4 is a diagrammatic view of a modification of the improved frame in which a short apron is nip driven by two rollers positioned below the path of stock travel.

Referring to the drawings, Fig. 1 shows a frame 10 on which is mounted a front driven roller 11. A top pressure roller 12 is spring pressed against the roller 11 by means of spring 13 pressing on slidable saddle 14. The hook member 15 on which the saddle slides is threaded as at 16 to receive cap 17 by which pressure is applied through the spring to the saddle 14. A retaining bracket 18 is the anchoring means for the hook member 15. Clearer rolls 19 and 20 cooperate with rolls 11 and 12 respectively. A

weight 21 pivoted at 22 presses the clearer roll 19 against roll 11. When the roller 12 is adjustably fixed against movement longitudinally of the frame, pressure may be applied as desired.

Rearwardly of the front rolls is mounted a removable nose bar 23, a like bar 24, and driven rolls 25, 26, and 27. The driven roller 27 may be fixedly mounted or adjustable. The rolls 25 and 26 are individually adjustable with reference to the rolls 11 and 27. The apron 28 is looped about the nose bar 23 and passed over bar 24, the driven rollers 25, 26, and 27 and the tensioning roll 29 which is pivoted to the frame 10 by means of member 30 loose on stud 31. As more fully explained, it is frequently unnecessary that the apron pass over all the back driven rolls 25, 26 and 27.

The nose bar 23, bar 24, and rollers 25, 26 and 27 are suitably weighted by control rollers 32, 33, 34, 35, and top pressure roll 36. Vertically grooved journal blocks of known type 37, 38, 39 and 40 and another not shown are mounted for adjustment along arm 42 which is pivoted at 43 on frame 10, and secured into position forwardly in any convenient manner. As will be understood, the grooves in these journals are to facilitate change or removal of weight control rollers and to permit them to ride the stock. The use of vertically grooved journal blocks per se is common practice. The journal blocks of the weighting control rollers of the illustrated embodiments permit the same close adjustment as provided for the series of driven rolls 25, 26, and 27. A fiber condenser or guide 44 is fixed relatively to the support for the back driven roll 27.

Adjustable journal blocks (not shown) similar to 40 positions top pressure roller 36 for effective action within the entire ratch area. Pressure is applied by means of spring 46, saddle 47, hook 48, cap 49, notched bracket 50, member 51, and pad 52. The member 51 extends laterally on both sides of the point of pressure to substantially cover the driven rollers of two or more drafting units in the frame. The notched bracket 50 is positioned on fixed members 53, 54 and runs longitudinally of the frame between two drafting units. The front roll 11 and back driven rollers 25, 26, and 27 are driven by a gear drive (Fig. 2). The parts are shown somewhat exploded and with certain parts removed to facilitate description and understanding of the function of the frame and drive.

The front roll 11 is connected to a source of power. A gear 58 and pivotable bracket 59 are mounted on the shaft 66 for roll 11. The bracket is pivotable on the roll 11 to provide for the use of change gears to vary the draft or to vary the ratch for different stock runs. Gear 58 engages gear 60 and through gears 61, 62, 63, and 64 of a gear train drives gear 65 on the shaft of back roll 27. The bracket 59 is perforated at 68 and 69 to receive the gear shafts 70 and 72. The perforation 67 receives bottom roll shaft 66 about which bracket 59 pivots when adjusted. Slots 73 and 74 provide for adjustment of the bracket and shaft 71.

A second gear 75 on the shaft of back roll 27 is the start or driving gear for a second train of gears which drive the intermediate individually adjustable rolls 25, 26. As will be seen, a bracket 80 is slotted as at 81 for pivotal and adjustable cooperation with arm 82, on which is mounted idler gear 83. Gear 83 engages gear 84 on the shaft of roller 26 in any of its adjusted positions. A wide idler gear 85 positioned below the path of travel of the stock is driven by gear 84 and it in turn drives gear 86 which is offset from gear 84 as shown. The gear 85 is mounted on an eccentric stud 87 which, together with slotted bracket 88, permits both horizontal and vertical adjustment of gear 85 so that it may always be positioned in engagement with both gears 84 and 86 in any of their adjusted positions. The stud 87 is shown in exploded rather than actual relationship to bracket 88.

The journal blocks 90, 91, and 92 are constructed so that close adjustment up to approximate contact of the driven back and intermediate rolls is provided. The dimensions of the journal blocks permitting this close adjustment will be referred to hereinafter as their width. This close adjustment of rolls enables accurate positioning of control rollers and permits the two intermediate rollers to form an apron driving nip for short aprons. Slotted supports 93 and 94 are removably secured, and engage the bar 24 and/or 23. Bracket 95 limits the forward movement of the slotted supports.

Fig. 4 shows a modification in which a pressure nip for a short apron is formed. In this modification it is shown that the direction of rotation of an intermediate roller (outside the apron) may be changed as by the use of two idler gears between it and the back roll, also that gears on the two intermediate roller shafts will drive the roller looped by the apron in the proper direction. A separate drive for the apron looped roller may of course be used in which case the outside roller may be positively driven at the same speed or frictionally rotated through the apron. When a separate drive is used the speed of the intermediate rollers need not be the same as the speed of the back roll 27'.

In Fig. 4, nose bar 23' and driven roller 25' determine the length of the apron stock support and the front rolls 11' and 12' and roll 27' determine the length of ratch. Tensioning roll 29' being yieldably mounted permits adjustment of apron 28'. Idler gears 100 and 101 driven from a gear on the shaft of back roll 27' reverse the direction of roll 26'. Rolls 25' and 26' form a driving nip for the apron 28. Weight rollers 32', 33', 34' and top pressure roll 36' are similar to those described in the other embodiments.

While the present invention contemplates the processing of long wool or mohair up to approximately 12'', the great bulk of processed fibers are of shorter length. A spinning frame, according to this invention, with a ratch length from about 1 inch up to 8 to 9 inches will provide all the versatility desired by most producers, and the smaller frame is accordingly preferred in such cases. Likewise, cotton fibers when properly weighted may be spun with approximately a 3'' ratch, and hence there is no practical reason for building the frame for long wool and short cotton fibers with a ratch range outside these limits. A shorter ratch may be desirable for a few special runs and a shorter ratch is contemplated as within the scope of the present improvements. To this end it will be noted that the bar 24 is removably positioned in slotted support 93 and that the support 93 may be removed bodily. Similarly, the weight roller journal blocks may slide off the end of their guide 42 when such special runs are to be made. As indicated above, ordinarily this removal of parts need not be resorted to.

It may also be noted that the dimensions of

some conventional type parts are preferably modified. For example, the front rolls 11 and 12 are greater in diameter than front rolls used on conventional single apron frames such as are currently used for cotton and other short fibers. As examples of the size of parts in Fig. 1 roll 11 is $1\frac{15}{16}$'' in diameter, rolls 25, 26, and 27 approximately 1'', and the weight rollers of various sizes and weights depending on stock requirements.

While the present improvements have been described in preferred embodiments, they are not limited thereto. The driven rollers may be smooth or rough, or the intermediate driven roller when used as an outside nip roller may be smooth and the other driven back rollers knurled or otherwise roughened.

Having described our invention according to preferred embodiments, and wishing to claim all the inventive features thereof, we claim:

In a single apron type drafting frame for strands of textile fibers, a front drawing off means comprising a driven front roll and associated top roll forming a nip for fibrous strands, fiber control means positioned rearwardly of said drawing off means and comprising an apron support mounted close behind said nip, a plurality of driven rolls comprising a rearward driven roll located rearwardly of said apron support and a plurality of driven rolls intermediate said rearward roll and said apron support, said rearward roll and said intermediate rolls being individually adjustable toward and away from said apron support, and toward and away from each other, an apron looped about the apron support and said rearward driven roll, means including a rear top pressure roll located exterior of the apron loop forming a nip with the rearward driven roll, additional fiber control means including a rotatable, non-ratch forming, slip draft roll superposed to the apron rearwardly of said apron support and forwardly of said rear top pressure roll for contacting and controlling fibers of strands being drafted without excessive loading of the apron, means for guiding said rear top pressure roll, weighting means having a portion extending lengthwise of the frame so that pressure may be applied to said rear top pressure roll for a ratch forming position of less than three inches to a ratch forming position in excess of five inches, means for driving said driven rolls in any of their adjusted positions, separate weighting means for said front top pressure roll and said rear top pressure roll and means for adjusting the position of said rear weighting means independently of said front weighting means, said adjusting means including a notched bracket extending lengthwise of the frame and positioned below the center lines of the driven rolls and a hook element in operative engagement with said notched bracket and with said rear pressure roll weighting means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,649,322	Perutz	Nov. 15, 1927
1,783,301	Morton	Dec. 2, 1930
1,804,968	Blake	May 12, 1931
1,827,385	Cornibert	Oct. 13, 1931
1,942,329	Gegauff	Jan. 2, 1934
2,177,929	Lambert	Oct. 31, 1939
2,271,191	Gossett et al.	Jan. 27, 1942
2,357,982	Thomas et al.	Sept. 12, 1944
2,426,425	Zalkind	Aug. 26, 1947

FOREIGN PATENTS

Number	Country	Date
9,692	Great Britain	of 1915