Oct. 29, 1957 D. A. WILKINSON 2,810,939

SLUBBING APPARATUS

Filed July 11, 1955 4 Sheets-Sheet 1

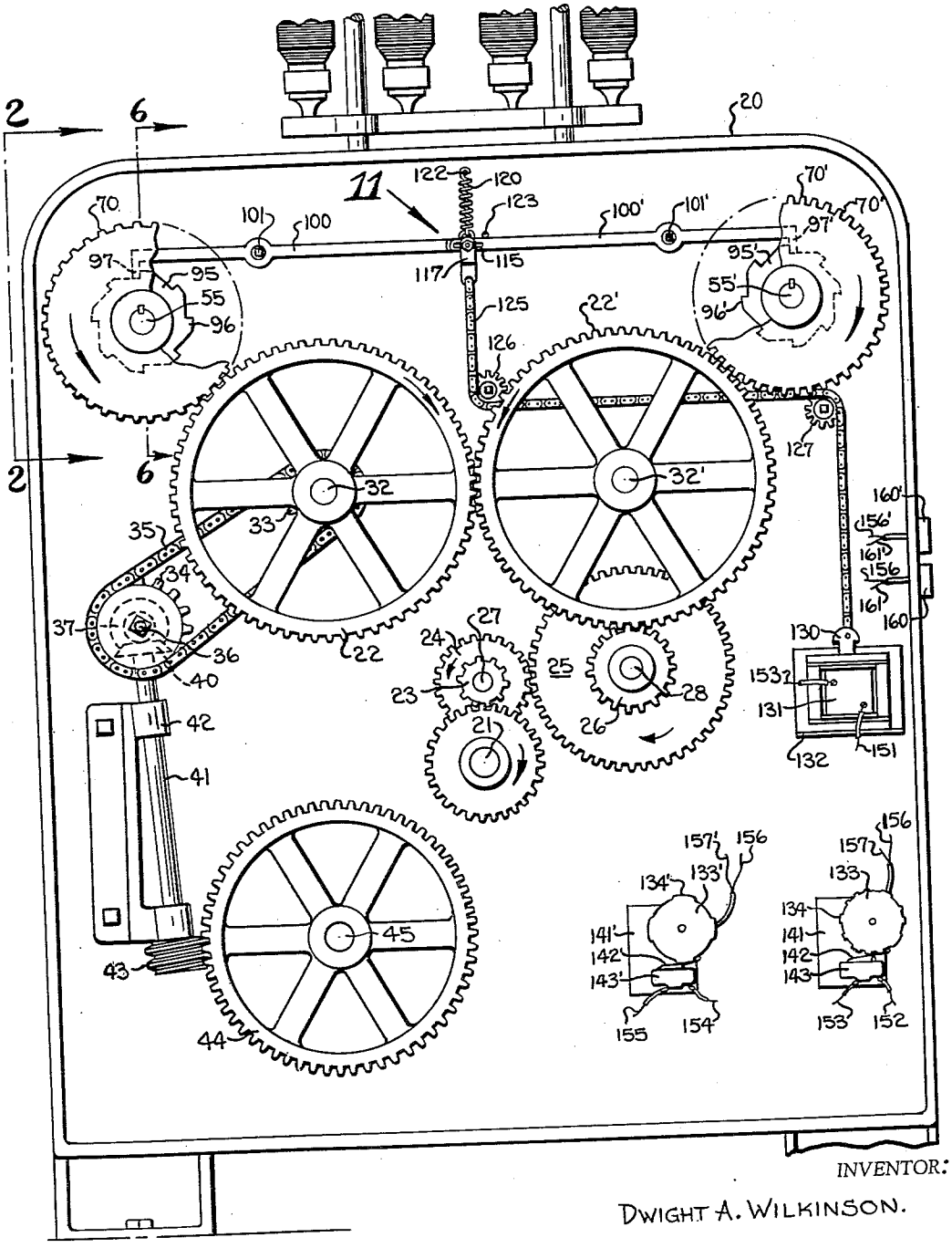


Fig-1

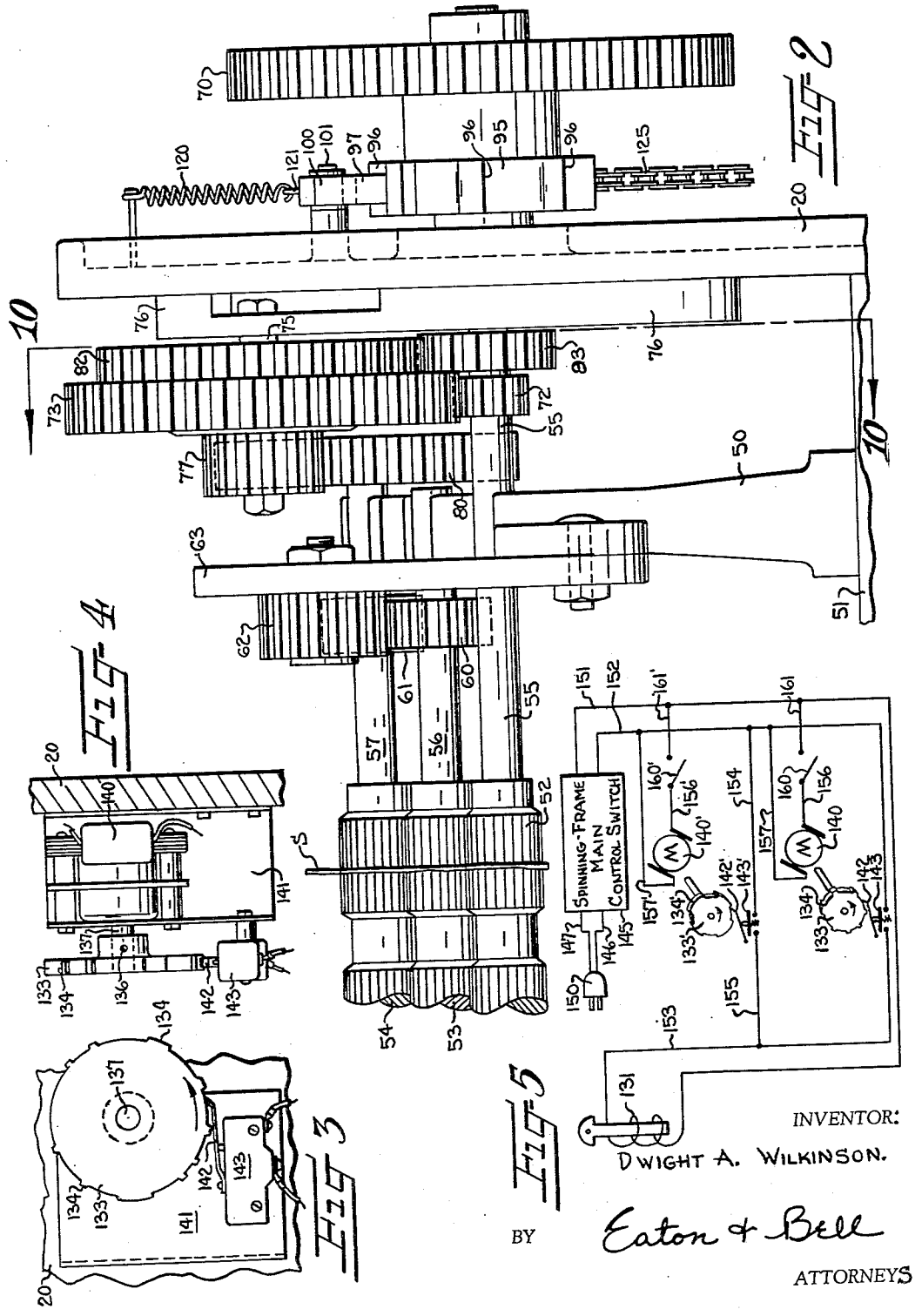
INVENTOR:
DWIGHT A. WILKINSON.

BY Eaton & Bell
ATTORNEYS

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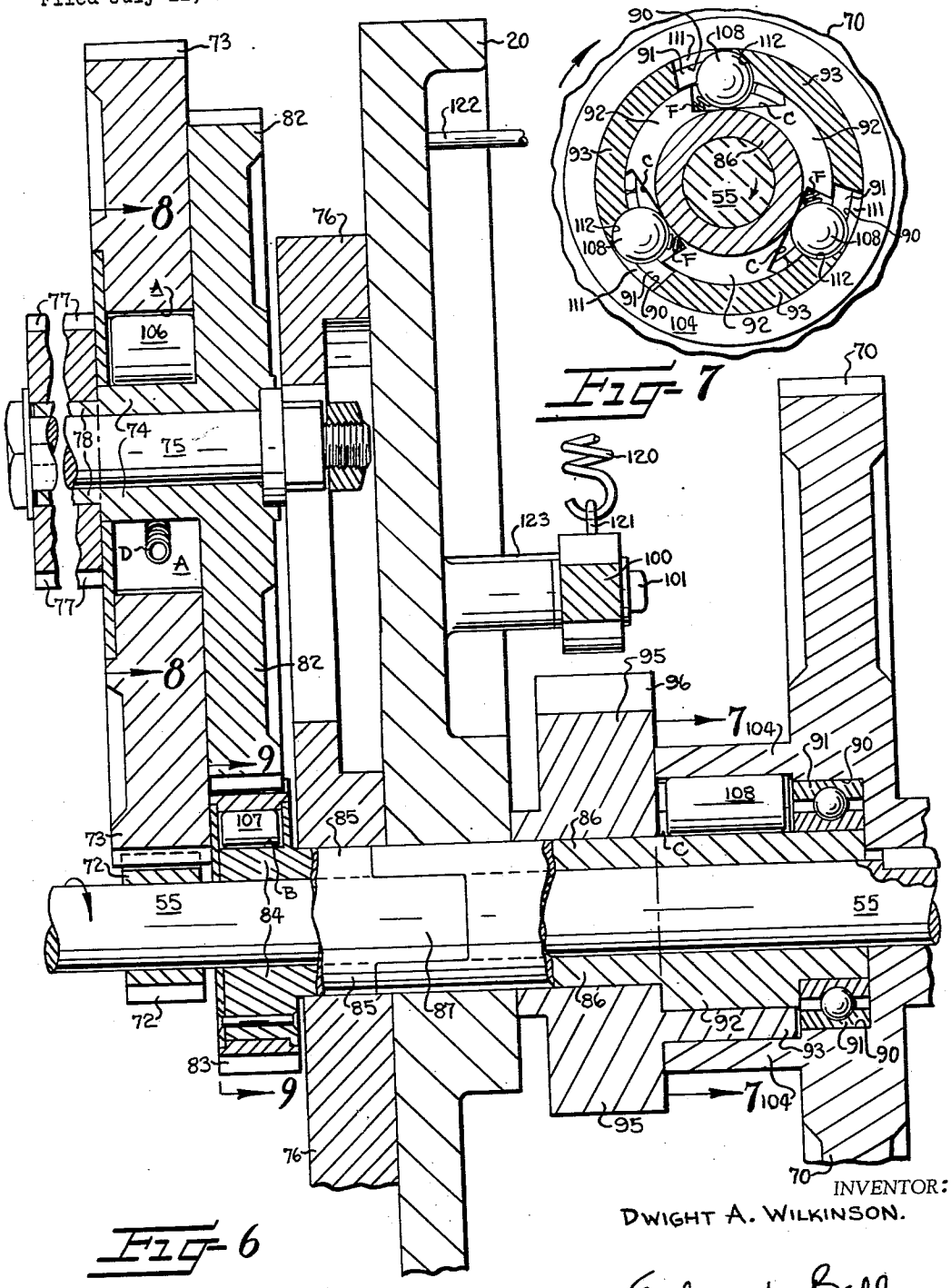


Fig- 6

Fig- 7

INVENTOR:
DWIGHT A. WILKINSON.

BY Eaton & Bell

ATTORNEYS

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SLUBBING APPARATUS

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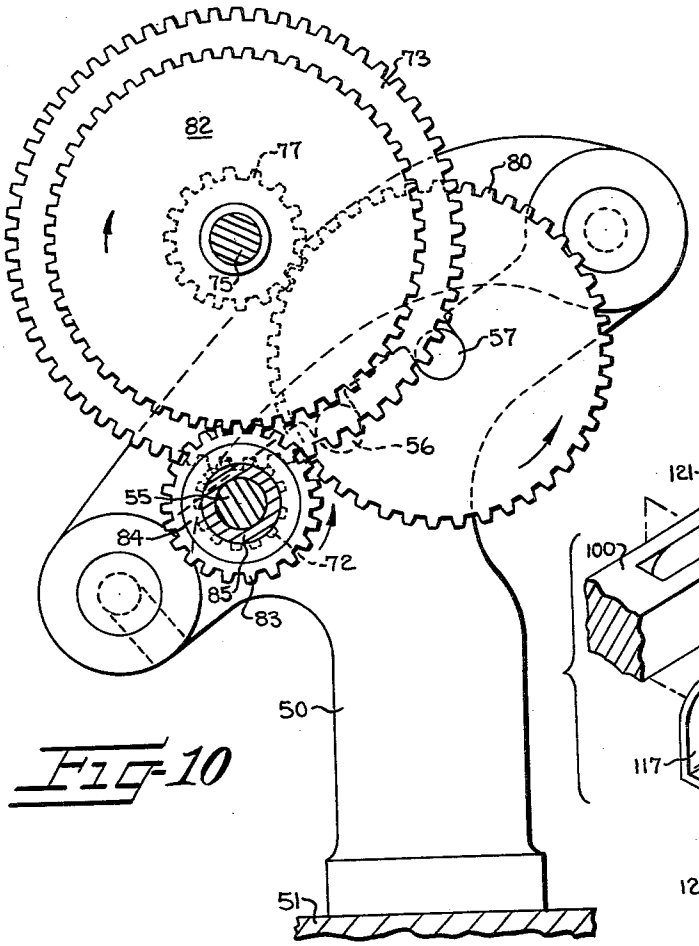


Fig-10

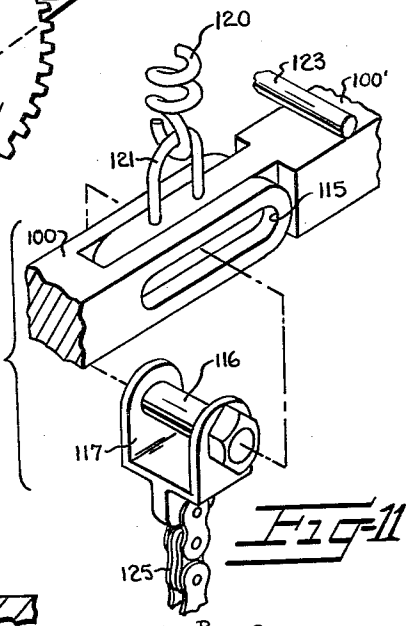


Fig-11

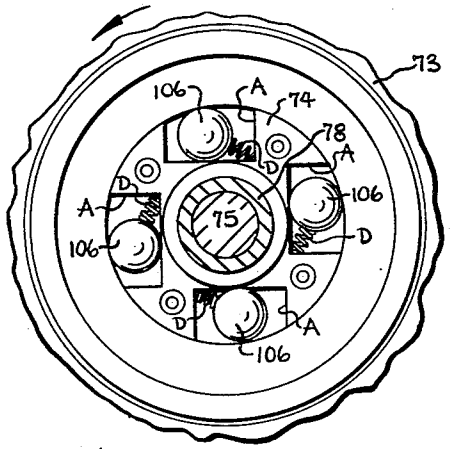


Fig-8

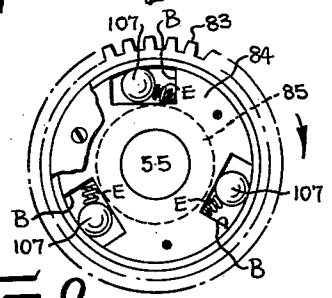


Fig-9

INVENTOR:
DWIGHT A. WILKINSON

BY Eaton & Bell

ATTORNEYS

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SLUBBING APPARATUS

Dwight A. Wilkinson, Charlotte, N. C.

Application July 11, 1955, Serial No. 520,994

7 Claims. (Cl. 19—143.5)

This invention relates to textile drafting machines and, more especially, to an improved slubbing apparatus or attachment for spinning frames, roving frames and similar machines for forming extended and enlarged portions of varying lengths, and at variously spaced intervals, in textile strands or yarn according to a predetermined pattern for producing Himalaya yarn, slub yarn, and flake filling.

It is an object of this invention to provide apparatus of the character described which is so constructed as to be economically manufactured and maintained and which is simple in its operation.

It is another object of this invention to provide apparatus of the character described utilizing a clutch mechanism for alternately effecting normal and relatively slow rotation of drafting rolls of a spinning frame, roving frame and the like, which clutch mechanism is activated and deactivated by electrical means under the control of a pattern wheel or wheels.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

Figure 1 is an end view of a spinning frame with parts broken away, omitting a portion of the creel and showing the invention applied thereto;

Figure 2 is an elevation showing the arrangement of the gear train for driving the bottom rolls of a spinning frame looking substantially along the line 2—2 of Figure 1 and omitting the top rolls for purpose of clarity;

Figure 3 is an enlarged detail of one of the pattern mechanisms shown in the right-hand lower portion of Figure 1;

Figure 4 is a view looking at the right-hand side of Figure 3;

Figure 5 is a schematic diagram showing an electrical circuit controlled by the pattern mechanism;

Figure 6 is an enlarged vertical sectional view taken substantially along the line 6—6 in Figure 1;

Figure 7 is a fragmentary detail, partially in section, taken along line 7—7 in Figure 6;

Figure 8 is a fragmentary detail, partly in section, looking substantially along line 8—8 in Figure 6, but omitting the cover plate from the gear;

Figure 9 is a view similar to Figure 8, but looking substantially along the line 9—9 in Figure 6;

Figure 10 is an elevation, partially in section, taken looking substantially along line 10—10 in Figure 2;

Figure 11 is an enlarged partially exploded isometric view showing how the pliable element or chain is connected to the proximal ends of the levers and looking in the general direction of the arrow indicated at 11 in Figure 1.

Referring more specifically to the drawings, the invention is shown in association with a spinning frame, although it is to be distinctly understood that the invention may be used with other types of drafting machines. The spinning frame includes an end support or head-end

frame member 20 which has a driven cylinder shaft 21 (Figure 1) journaled therein and which imparts rotation to a pair of main intermediate gears 22, 22' through a gear train including gears 23, 24, 25 and 26. Gears 23, 24 and 25, 26 are mounted on respective stub shafts 27, 28 carried by the end support 20.

The left-hand and right-hand intermediate gears 22, 22' are fixed on respective conventional shafts 32, 32' rotatably mounted in the end support 20. A sprocket wheel 33 fixed on shaft 32 drives a sprocket wheel 34 by means of a sprocket chain 35. Sprocket wheel 34 is mounted on a stub shaft 36 and has a bevel gear 37 fixed thereto which meshes with a bevel gear 40 fixed on the upper end of a substantially vertically disposed shaft 41 journaled in a bracket 42. The stub shaft 36 and the bracket 42 are suitably secured to the end support or head-end frame member 20.

The lower end of shaft 41 has a worm 43 fixed thereon which meshes with a worm gear 44 fixed on a shaft 45 journaled in the head-end frame member and which shaft 45 drives the conventional builder motion which is a usual part of spinning frames of this type.

Referring to Figures 2 and 10, each side of the machine includes a set of drawing rolls, each set of drawing rolls being rotatably mounted on a plurality of spaced roll stands 50, only one of which is shown in Figures 2 and 10. The roll stands 50 at each side of the machine are mounted on a roll stand support or girt 51, the end thereof shown in Figure 2 being suitably supported by the end-support or head-end frame member 20. The set of drawing rolls usually comprises top and bottom rolls, the conventional top rolls being omitted in this instance and the numbers 52, 53, 54 indicating front, intermediate and back or rear bottom rolls, respectively.

The bottom rolls 52, 53, 54 are connected to respective shafts 55, 56, 57 whose corresponding end portions are journaled on the roll stand 50 shown in Figures 2 and 10. Textile strands, such as roving, are fed between the top and bottom rolls in the usual manner to be attenuated thereby, one of such strands being indicated at S in Figure 2. The shafts 56, 57 of the intermediate and back rolls 53, 54 have respective pinions or gears 60, 61 fixed thereon which do not mesh with each other, but which mesh with a common intermediate idler gear 62 rotatably mounted on a swing arm 63. The front and rear drawing bottom roll shafts 55, 57 are driven by means to be later described and it is apparent that rotation of the shaft 57 with its gear 61 imparts rotation to the shaft 56 and the intermediate bottom roll 53 by means of the intervening gears 62 and 60. As is conventional, the rear, intermediate and front rolls rotate at progressively increasing rates of speed. The parts heretofore described are usual parts of a spinning or roving mechanism and it is with such or similar parts that the present invention is adapted to be associated.

Referring again to Figure 1, the intermediate gears 22, 22' mesh with other gears 70, 70', respectively, which are fixedly mounted on the outer ends of the respective shafts 55, 55' to which the front bottom rolls at opposite sides of the machine are connected. The parts associated with the gear 70' are identical to corresponding parts associated with the gear 70 and will therefore bear the same reference characters with the prime notation added.

It is apparent that, since the gear 70 is fixed on the shaft 55, rotation is imparted to the front bottom roll 52 (Figure 5) at a constant speed at all times during which the machine is operating. Referring to Figures 2, 6 and 10, the shaft 55 is journaled in the head-end frame member or end support 20, in a manner to be later described, and has a low speed driving pinion or gear 72 fixed thereon which is spaced inwardly of the end

support 20 and meshes with a relatively large low speed or primary transmission gear 73 loosely mounted on a hub 74 (Figures 6 and 8). The hub 74 is a part of an overriding clutch mechanism and is rotatably mounted on a stub shaft 75 adjustably secured to a bracket 76 carried by the end support 20.

The end of the hub 74 remote from the bracket 76 and end support 20, and adjacent the swing arm 63, has a reduced portion 78 thereon on which a relatively small gear or pinion 77 is secured. The pinion 77 meshes with a relatively large gear 80 fixed on the outer end of the shaft 57. Thus, since the gear 70 is fixed on the outer end of the shaft 55 to which the front bottom roll is connected, it is apparent that rotation at a normal rate of speed is imparted to the intermediate and back rolls 53, 54 from gear or pinion 72 through the gear 73, hub 74, gear or pinion 77 and gear 80 which drives the shaft 57 to which the back bottom roll 54 is connected. Of course, as heretofore stated, the shaft 57 imparts rotation to shaft 56 and its intermediate bottom roll 53 through the intervening gears 61, 62, 60.

Now, in order to increase the speed of the back and intermediate bottom rolls 54, 53 at predetermined irregular intervals of varying duration according to a predetermined pattern, it will be noted that hub 74 in Figures 6 and 8 is a part of an overriding clutch mechanism and is formed integral with or fixed to a high speed or secondary transmission gear 82 of lesser diameter than the low speed gear 73 and the high speed gear 82 meshes with a high speed driving gear 83 which is of substantially greater diameter than the slow speed driving gear or pinion 72, the high speed driving gear 83 being axially alined with gear 72, but being loosely mounted on a hub 84 which also forms a part of an overriding clutch mechanism as best shown in Figures 6 and 9.

The hub 84 is loose on the shaft 55 and has a reduced portion 85 which is journaled in the bracket 76. The reduced portion 85 of the hub 84 is coupled to a tubular shaft 86 of substantially the same external and internal diameters as the reduced portion 85 of the hub 84. As a matter of fact, the tubular shaft 86 may be formed integral with the reduced portion 85 of hub 84, but is removably coupled to the reduced portion 85 of the hub 84 to facilitate assembling and dis-assembling the apparatus. The reduced hub portion 85 is shown in Figure 6 as being coupled to the tubular shaft 86 by means of a dog clutch arrangement indicated at 87. It will be noted that the tubular shaft 86 is partially journaled in the bracket 76 and is also journaled in the head-end frame member or support 20.

The outermost end of the tubular shaft 86 (Figure 6) extends into a recess or circular cavity 90 formed in the inner surface of the gear 70 and an annular bearing 91, preferably an anti-friction bearing, is positioned in the recess 90 and its inner portion engages the periphery of the tubular shaft 86. In this instance the outer race of the anti-friction bearing 91 is fixed, as by a pressed fit, in the recess 90 and the inner race thereof is fixed on the outer end of the tubular shaft 86. The tubular shaft 86 has an enlarged hub portion 92 positioned closely adjacent its outer end and this hub portion 92 also forms a part of an overriding clutch mechanism. An annular hub portion 93 of a clutch latching or restraining wheel 95 is loosely mounted on the hub 92 of the tubular shaft 86.

The clutch latching wheel 95 is similar in shape to a ratchet wheel (Figure 1) in that it has a plurality of cogs or teeth 96 on the periphery thereof any one of which is adapted to be engaged, at times, by a clutch dog or latch 97 on one end of a lever 100. The lever 100 is pivoted intermediate its ends, as at 101, on the head-end frame member or end support 20.

Referring again to Figure 6, it will be noted that the ratchet wheel or clutch restraining wheel 95 is journaled

on the tubular shaft 86 immediately adjacent the end support 20 and its outer surface is engaged by an annular or tubular hub portion 104 forming a clutch housing projecting inwardly from the gear 70. The inner surface of the annular hub portion 104 is loosely mounted on the tubular hub portion 93 of the clutch restraining wheel 95.

Referring to Figures 7, 8 and 9, it will be observed that the hubs 74, 84, 92 have respective circular series of spaced slots or grooves A, B, C formed in the periphery thereof and whose surfaces nearest the respective shafts 75, 55 are disposed at an angle with respect to a line drawn from the center of the corresponding shaft and bisecting each of the slots A, B, C. A ball or roller is disposed in each of the cavities or slots A, B, C, the rollers in the slots A, B, C being respectively designated at 106, 107, 108. It will be noted that the rollers 108 (Figures 7 and 6) are of substantially greater diameter than the deepest portions of the slots C and the annular hub portion 93 of the clutch restraining wheel 95 is provided with a plurality of circular spaced slots 111 therein, there being one of the slots 111 for each of the rollers 108 and through which the rollers extend.

It will be noted that corresponding walls or sides of the slots 111 are tapered, beveled or rounded, as at 112, for purposes to be later described, adjacent the small ends of the slots C. The deepest portions of the slots A, B, C in the respective hubs 74, 84, 92 have respective compression springs D, E, F therein which urge the respective rollers 106, 107, 108 against the internal surfaces of the gears 73, 83 and the annular hub portion 104 of the gear 70, respectively, and also against the surfaces nearest the shaft 75, 55 at the narrow ends of the respective slots A, B, C.

It is apparent, by referring to Figures 8 and 9, that the gears 73, 83 may rotate freely in a clockwise direction relative to the respective hubs 74, 84, and on the other hand, that the hubs 74, 84 may rotate freely in a counterclockwise direction relative to the respective gears 73, 83. Also, by referring to Figure 7, it is apparent that, when the clutch restraining wheel 95 is released from the clutch dog or latch 97, the clutch restraining wheel 95 and its hub 93 are free to rotate. Thus, due to frictional contact between the hub 104 of gear 70 and the annular hub 93 of wheel 95, the gear 70 drives wheel 95, moving surfaces 112 in a clockwise direction in Figure 7, i. e., away from rollers 108 so the straight walls of the slots 111, opposite from the respective surfaces 112, may engage and move the rollers 108 therewith toward the small ends of the slots C. This imparts rotation to the hub 92 and the tubular shaft 86 in unison with gear 70. It is apparent that said straight walls of the slots 111 need not necessarily engage the rollers 108, since, once the surfaces 112 move away from the rollers 108, the moving inner surface of the hub 104 of gear 70 contacts the rollers 108 and, with the assistance of springs F, moves the rollers 108 toward the small ends of the slots C to thereby drive the hub 92 and shaft 86.

On the other hand, when dog 97 engages any one of the teeth 96 in the clutch restraining wheel 95, the constantly rotating gear 70 momentarily moves the hub 92 and rollers 108 therewith relative to the annular hub 93 of the clutch restraining wheel 95 so the rollers 108 are moved into engagement with the cam surfaces or beveled surfaces 112. The shape of these surfaces 112 is such that they will tend to move the rollers 108 inwardly away from the inner surface of the hub 104 of gear 70 as the small ends of the notches C move away from the rollers 108. It is apparent that this breaks the fixed connection between gear 70 and hub 92 so the hub 92 and tubular shaft 86 cannot rotate whenever the clutch restraining wheel 95 is prevented from rotating

by one of its teeth 96 being engaged by the latch or dog 97.

Upon the dog 97 subsequently moving out of engagement with the clutch restraining wheel 95, the pressure of the springs F against the rollers 108 combined with the frictional contact of the rotating hub 104 of the gear 70 with the outer periphery of the annular hub portion 93 of the clutch restraining wheel 95 cooperate to again tend to move the rollers 108 toward the small ends of slots C so that rotation is again imparted to the tubular shaft 86 by the gear 70.

Now, in order to control the length of the intervals during which the clutch dog 97 is in engagement with and out of engagement with the clutch restraining wheel 95 and to also control the length of the intervening intervals, it will be observed in Figures 1 and 11 that the levers 100, 100' are slotted longitudinally thereof at their proximal ends, as at 115, and these slots are penetrated by a common clevis pin 116 mounted in the upper end of a link or clevis 117. The proximal ends of the levers 100, 100' are urged upwardly, to thereby urge the clutch dogs 97, 97' downwardly to operative position, by a tension spring 120 whose lower end is connected to the inner end of lever 100', as at 121, and whose upper end is connected to a spring anchor 122 projecting outwardly from the frame member or end support 20. Upward movement of the proximal ends of the levers 100, 100' is limited by means of a stop pin or abutment 123 projecting outwardly from the end support 20 and overlying the inner end of the lever 100'.

Now, the clevis 117 serves as a means to connect a pliable element 125 to the proximal ends of the levers 100, 100', said pliable element being shown in the form of a sprocket chain in Figures 1, 2 and 11. The sprocket chain 125 extends downwardly and passes beneath a sprocket wheel 126 and then outwardly and over another sprocket wheel 127, the sprocket wheels 126, 127 being suitably rotatably supported on the end support 20. The chain 125 extends downwardly from sprocket wheel 127 and is connected to the upper end of a solenoid plunger 130 surrounded by a solenoid coil 131. The solenoid coil 131 is mounted on a bracket 132 suitably secured to the end support 20 (Figures 1 and 5).

It is apparent that, whenever the solenoid coil 131 is energized, the plunger 130 is pulled downwardly to impart like movement to the proximal ends of levers 100, 100' and to thereby move the clutch dogs 97, 97' out of engagement with the teeth 96, 96' of the respective clutch restraining wheels 95, 95'. The energization and de-energization of the solenoid coil 131 is controlled by either one or both of a pair of cam wheels or pattern wheels 133, 133' which have respective series of switch closing elements, lobes or projections 134, 134' thereon. The pattern wheel 133, when used independently of the pattern wheel 133', is used for forming slub yarn wherein successive slubs are of varying relatively short lengths and are spaced varying relatively short distances apart from each other. The projections or switch engaging elements 134' on the cam wheel 133' are of substantially uniform length and are substantially uniformly spaced for controlling the apparatus to form so-called Himalaya yarn.

The parts associated with the pattern wheel 133' are substantially identical to the parts associated with the pattern wheel 133 and will therefore bear the same reference characters with the prime notation added.

The structure associated with the pattern wheel 133 is best shown in detail in Figures 3 and 4 wherein it will be noted that the pattern wheel 133 is adjustably secured, as by a set screw 136, to the shaft 137 of an electric motor 140. The electric motor 140 is preferably of a type such as is used in electric clocks and imparts one revolution per minute to the shaft 137 and pattern wheel 133.

The motor 140 is suitably supported on the outer flange of a channel-shaped bracket 141 whose inner flange is suitably secured to the end support 20. The periphery of the pattern wheel 133 is engaged by a leaf spring switch arm 142 of a switch 143 suitably supported on the outer flange of the channel-shaped bracket 141. In this instance, the switch 143 is of the normally open type.

Referring to Figures 1 and 5, it will be observed that the motors 140, 140', the switches 143, 143' and the solenoid coil 131 are arranged in series with the main operating circuit of the spinning frame, which main operating circuit in Figure 5 is indicated as a spinning frame main control switch designated at 145. One side of the main control switch has a pair of lead wires or conductors 146, 147 extending therefrom to a plug 150 adapted to be connected to a source of electrical energy, not shown. The other side of the main control switch 145 has wires or conductors 151, 152 leading therefrom, the other end of conductor 151 being connected to one end of the solenoid coil 131 and the other end of conductor 152 being connected to one side of the switch 143.

A wire or conductor 153 leads from the other end of the solenoid coil 131 to the side of the switch 143 opposite from the conductor 152. Corresponding ends of wires or conductors 154, 155 are connected to opposite sides of switch 143' and the other ends of these wires are connected to the respective conductors 152, 153. The motors 140, 140' have respective pairs of wires or conductors 156, 157, and 156', 157' connected thereto. The ends of conductors 157, 157' remote from the respective motors 140, 140' are connected to medial portions of conductor 152, and the ends of conductors 156, 156' remote from the respective motors 140, 140' are connected to corresponding sides of respective manually operable switches 160, 160'. The switches 160, 160' may be conveniently located and are shown in Figure 1 as being mounted on one side of the end support 20. Conductors or wires 161, 161' lead from the sides of the switches 160, 160' remote from the respective wires 156, 156' to medial portions of the wire or conductor 151.

It is thus seen that, when the main control switch 145 is closed, the switches 160, 160' may be either closed or open independently of each other, as desired, to energize or deenergize the respective electric motors 140, 140'. With rotation of the pattern wheels 133, 133', it is apparent that whenever one of the projections or lobes 134, 134' engages its feeler 142 or 142' on the corresponding switch 143 or 143', the circuit is closed to the solenoid coil 131 to thereby release the clutch restraining wheels 95, 95' from the respective clutch dogs 97, 97' (Figure 1).

Method of operation

It has already been stated how the power is transmitted from the intermediate gear 22 for driving the intermediate and back rolls 53, 54 at normal or relatively slow speed. However, it is necessary that the clutch restraining wheel 95 is engaged by the clutch dog or latch 97 and thereby restrained from rotation during rotation of the intermediate and back bottom drawing rolls 53, 54 at normal speed and it is apparent, therefore, that both of the switches 143, 143' are then open and the free ends of the feeler fingers 142, 142' are then disposed between adjacent lobes 134, 134' of the respective pattern wheels 133, 133'.

It has already been stated how the gear 70 (Figures 6 and 7) rotates in a clockwise direction independently of the annular hub portion 93 of the clutch restraining wheel 95 and the hub 92 of the tubular gear 86, thus driving the slow speed drive gear 72 independently of the high speed drive gear 83. Since the slow speed transmission gear 73 is then driven in a counterclockwise direction in Figure 8, it is apparent that the rollers 106 tend to move toward the small ends of notches A so that both of the gears 73, 82 rotate in unison to drive the small gear or pinion 77 and impart rotation to the inter-

mediate and back bottom rolls 53, 54 at normal or relatively slow speed.

Since the high speed transmission gear 82 is of lesser diameter than the slow speed transmission gear 73, it is apparent that the gear 82 imparts rotation to the gear 83 in a clockwise direction in Figure 10 at a relatively slower speed or number of revolutions per minute than that of the shaft 55 and the gear 72. By referring to Figure 9, it will be observed that clockwise rotation of the gear 83 relative to the shaft 55 tends to move the rollers 107 toward the large ends of the slots B so the gear 83 rotates independently of the hub 84 and the tubular shaft 86.

Now, when any one of the lobes 134, 134' on the respective pattern wheels 133, 133' engages either finger or feeler 142, 142' to close the corresponding switch 143 or 143', the solenoid coil 131 is energized to move the latches or clutch dogs 97, 97' out of engagement with the respective clutch restraining wheels 95, 95'. This causes operation of both of the mechanisms at each side of the machine in substantially the same manner and only the operation of the apparatus at the left-hand side of the machine in Figure 1 will be described.

When the clutch restraining wheel 95 is released from the clutch dog or latch 97, the gear 70 imparts like rotation to the hub 92, tubular shaft 86 and the hub 84 in the manner heretofore described. Since the load on the gear 82 is then greater than that on the gear 73, as will be apparent as the description proceeds, the gear 83 then becomes the driving gear and the hub 84 tends to rotate, momentarily at a faster rate of speed than the gear 83 (Figure 9), thus tending to move the small ends of the slots B toward the rollers 107 so the rollers 107 then cause the gear 83 to rotate at the same speed as and to be driven by the hub 84.

Due to the fact that the diameters of the gears 72, 73 are smaller and larger, respectively, than the respective gears 83, 82, it is apparent that the gear 83 will then impart rotation to the gear 82 at a faster number of revolutions per minute than the gear 73. In other words, the hub 74 (Figure 8) tends to rotate in a counterclockwise direction fasten than the gear 73 so the rollers 106 can be moved toward the large ends of the slots A and so the gear 82 and its hub 74 may rotate independently of the gear 73. Since the gear 82 is driven at a faster rate of speed than the gear 73, it is apparent that the intermediate and back bottom rolls 53, 54 (Figure 2) are caused to rotate at a relatively high speed, through intervening connections, whenever either or both of the switches 143, 143' are closed.

Referring to the right-hand lower portion of Figure 1 and to Figure 5, it is apparent that when motor 140 is energized independently of motor 140' the irregularly spaced and relatively short irregular length projections or lobes 134 on the cam 133 will cause the formation of irregularly spaced and relatively short slubs of varying length to be formed in the strands S to produce slub yarns. On the other hand, when motor 140' is energized independently of motor 140, and relatively long and substantially uniformly spaced lobes 134' on the pattern wheel 133' will produce relatively long substantially equally spaced slub portions in the strand S thereby to produce so-called Himalaya yarn.

Both of the motors 140, 140' are energized when it is desired to produce substantially elongated slub portions in the strand at spaced intervals between which relatively short, closely spaced slubs are interspersed, as will be apparent by a comparison of the lobes 134, 134' on the respective pattern wheels 133, 133'. In order that the cams 133, 133' may be properly synchronized each with the other when used simultaneously, either motor 140 or 140' may be energized independently of the other to properly position lobes on the corresponding cam relative to lobes on the other cam. The main control switch 145 should be closed momentarily for this purpose and subsequently opened. Thereafter, both switches 160, 160' are closed and then the main control switch is closed so both motors 140, 140' start simultaneously. This is seldom necessary, since many manufacturers prefer a random pattern. Varying pattern effects may be produced in the strands S, as desired, by interchanging the pattern wheels 133, 133' with other pattern wheels having differently spaced and different lengths of lobes 134, 134' thereon.

It is thus seen that I have provided a novel apparatus for producing slub and Himalaya yarn utilizing pattern wheels and clutch and gear arrangements which are much more simple and which may be much more economically produced and more easily maintained than slub producing devices heretofore employed.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation the scope of the invention being defined in the claims.

I claim:

1. In a yarn drawing mechanism comprising drawing rolls, a driven shaft and means connected with the shaft for driving said rolls; means for accelerating the speed of rotation of at least some of said rolls comprising a tubular member loose on the shaft, first and second overriding clutches on the tubular member, means connected with the first clutch for transmitting rotation from the tubular member to said some of the rolls, said second clutch comprising a plurality of circularly spaced clutch elements, said tubular member having a plurality of off-set notches in its periphery each for loosely receiving one of said clutch elements, an annular clutch restraining member loose on said tubular member and having radial slots therein through which the clutch elements extend, a circular member fixed on the driven shaft and loosely encircling the annular clutch restraining member, means normally preventing rotation of the clutch restraining member whereby the circular member and the driven shaft rotate relative to the tubular member and the annular clutch restraining member, and pattern controlled means for releasing said annular clutch restraining member from the means preventing its rotation at predetermined intervals of predetermined duration whereby the clutch elements lock the circular member to the tubular shaft to accelerate the speed of said some of the rolls.

2. In a structure according to claim 1, said means preventing rotation of the clutch restraining member comprising a latch, a circular series of teeth on said clutch restraining member and disposed exteriorly of said circular member, said latch normally engaging one of said teeth, said pattern controlled means comprising a driven pattern member, a solenoid plunger, means connecting the plunger to the latch, a coil encircling the plunger, a switch interposed in an electrical circuit to said coil, and spaced means on the pattern member for actuating said switch to energize the coil and release the latch from the clutch restraining member.

3. A structure according to claim 2 having a second pattern member, a second switch arranged in parallel with the first-named switch, and spaced means on the second pattern member for actuating the second switch, the latter means varying as to location and length relative to the location and length of the spaced means on the first-named pattern member with respect to their respective switches.

4. In a mechanism for producing slubs in textile strand material, said mechanism comprising drawing rolls and means for rotating said drawing rolls and including a driven shaft; means for accelerating the speed of rotation of certain of said rolls at predetermined intervals comprising a tubular member loose on said shaft, a second member fixed to rotate with said shaft and having a portion encircling one end of said tubular member, a normally

inactive overrunning means between said portion and the tubular member, a rotatable element loose on said tubular member and adapted to be driven by said overrunning means, a restraining means normally engaging said element for restraining said element from rotation, means operable automatically upon said element being released from said restraining means for actuating said overrunning means whereby said shaft transmits rotation to said tubular member, said tubular member being adapted to accelerate the speed of rotation of said certain rolls when rotation is transmitted to the tubular member, and pattern mechanism for intermittently moving the restraining means into and out of engagement with said element at predetermined intervals of predetermined duration.

5. In a variable speed drive for drafting rolls of a textile machine having a driven shaft, a slow speed driving gear fixed on the shaft, a tubular member loosely mounted on the shaft, a high speed driving gear mounted on the tubular member, slow speed and high speed transmission gears meshing with the respective slow speed and high speed driving gears, a first overriding clutch means interposed between the slow speed and high speed transmission gears, and gear means connecting the high speed transmission gear with certain of said rolls; the combination of a second overriding clutch means interposed between the tubular member and the high speed driving gear, a tubular housing fixed on the shaft and encircling one end of said tubular member, a third overriding clutch means interposed between the housing and the tubular member and arranged so the shaft and tubular member may rotate in synchronism whereby the tubular member drives the high speed driving gear and the high speed transmission gear and whereby the slow speed transmission gear idles relative to the high speed transmission gear, a restraining member loose on said tubular member and operatively connected with the third clutch means, latch means to normally prevent rotation of the restraining member, said restraining member, when prevented from rotation, being operable to prevent said third means from transmitting rotation from the housing to the tubular member whereby the slow speed driving gear drives the transmission gears and the high speed driving gear idles relative to the slow speed driving gear, and means to release the restraining member from the latch means at predeterminedly spaced intervals of predetermined duration.

6. In a spinning frame having drawing rolls, means for rotating certain of said rolls including a driven first shaft, a first series of gears driven by said shaft for driving the rolls at normal speed, a second series of gears driven by said shaft for driving said rolls at relatively high speed, and first overriding means interconnecting said first and second series of gears; the combination of a tubular shaft loosely mounted on the first shaft and interposed between the first-named shaft and the second series of gears, means to effect a driving connection between the first shaft and the tubular shaft at predetermined intervals comprising a second overriding means including a first hub on said tubular shaft, said first hub having a circular series of off-set slots in its periphery, a roller in each slot of substantially greater diameter than the deepest portion of each slot, a second annular hub loosely mounted on the first hub and having a plurality of slots therein through which said rollers extend, a third annular hub loosely mounted on and encircling the second annular hub, means securing the third annular hub to the driven first shaft, means to normally restrain said second annular hub from rotation whereby the second annular hub prevents rotation of the first hub and tubular shaft, said rollers and slots being so arranged that the third annular hub then rotates with the first shaft independently of the first hub and the second annular hub, pattern controlled means for releasing the second hub from its restraining means at predetermined intervals, and said rollers and slots being so arranged that the third annular hub then imparts rotation to the second annular hub and the first hub and thus to the tubular shaft and the second series of gears for driving said drawing rolls at relatively high speed.

7. In a structure according to claim 6, a clutch restraining wheel journaled on said tubular shaft and integral with said second annular hub, the periphery of said clutch restraining wheel having a plurality of teeth thereon, said pattern controlled means comprising a clutch dog, means normally urging the clutch dog into engagement with the teeth in the clutch restraining wheel, electrically operable means for moving said clutch dog out of engagement with said clutch restraining wheel, at least one switch interposed in an electrical circuit to said electrically operable means, a driven rotatable pattern member, and spaced means on said pattern member for closing said switch at predetermined intervals for correspondingly actuating said electrically operable means.

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