

Jan. 26, 1954

A. E. WINSLOW ET AL

2,667,030

TWIST CONTROL MEANS FOR YARN WINDING MACHINES

Filed March 3, 1952

5 Sheets-Sheet 1

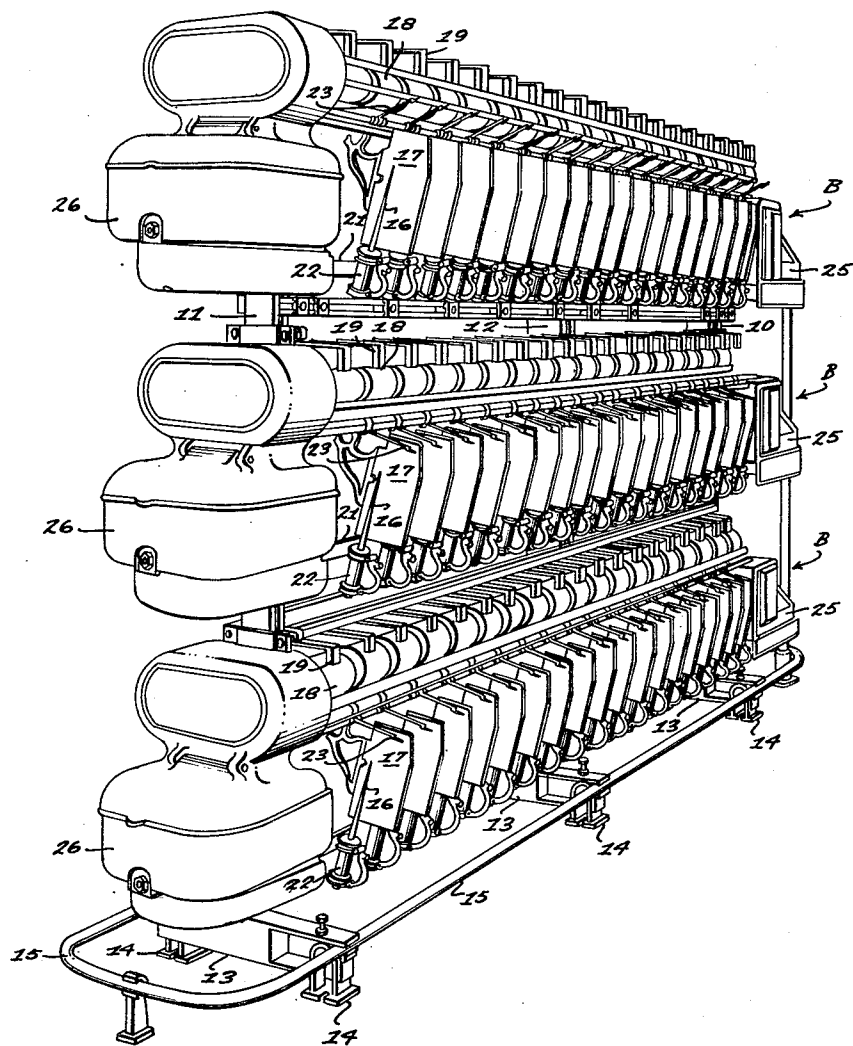


Fig. 1

INVENTORS

ALBERT E. WINSLOW &
JOHN A. BRADSHAW

BY

Parrott, Richards & Sims
ATTORNEYS

Jan. 26, 1954

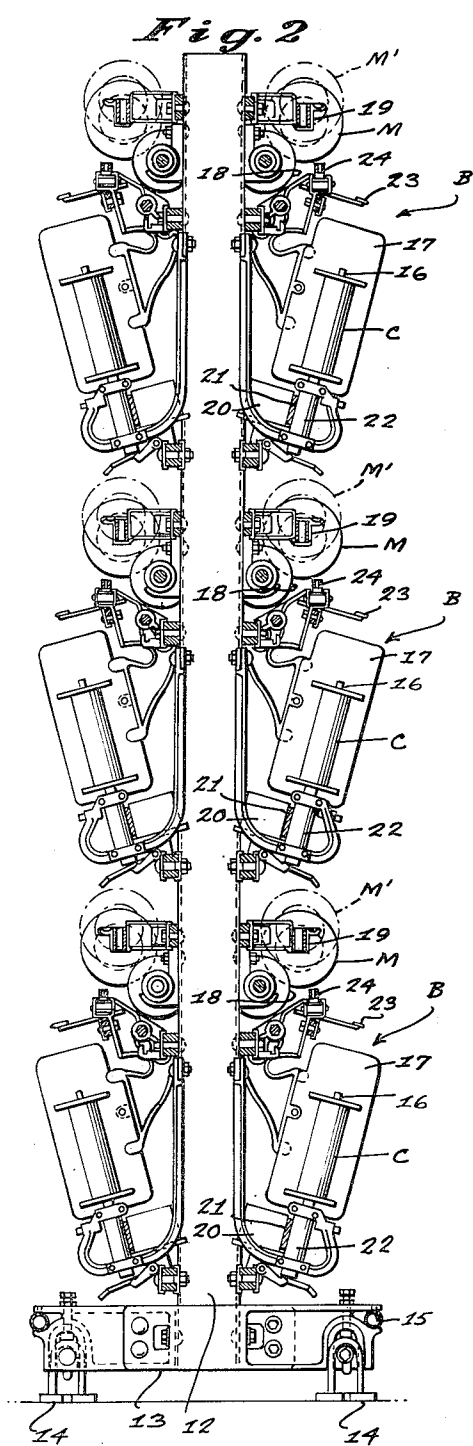
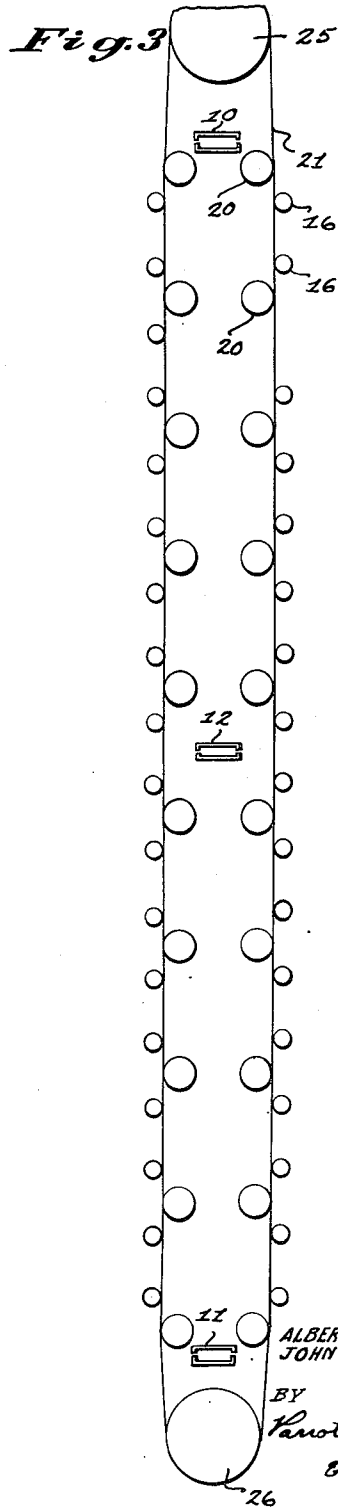
A. E. WINSLOW ET AL

2,667,030

TWIST CONTROL MEANS FOR YARN WINDING MACHINES

Filed March 3, 1952

5 Sheets-Sheet 2



INVENTORS
ALBERT E. WINSLOW &
JOHN A. BRADSHAW

BY
Parrott, Richard
& Sims
ATTORNEYS

Jan. 26, 1954

A. E. WINSLOW ET AL

2,667,030

TWIST CONTROL MEANS FOR YARN WINDING MACHINES

Filed March 3, 1952

5 Sheets-Sheet 3

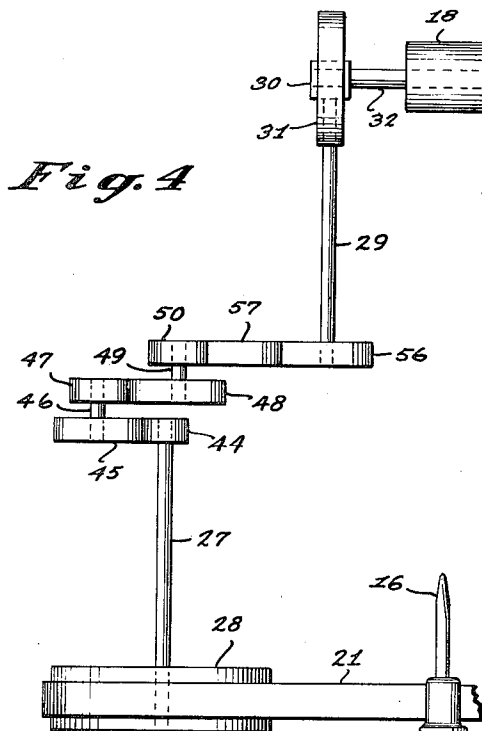


Fig. 4

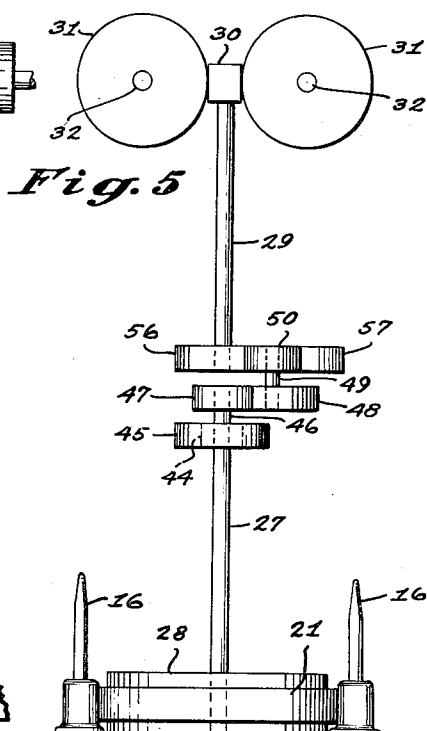


Fig. 5

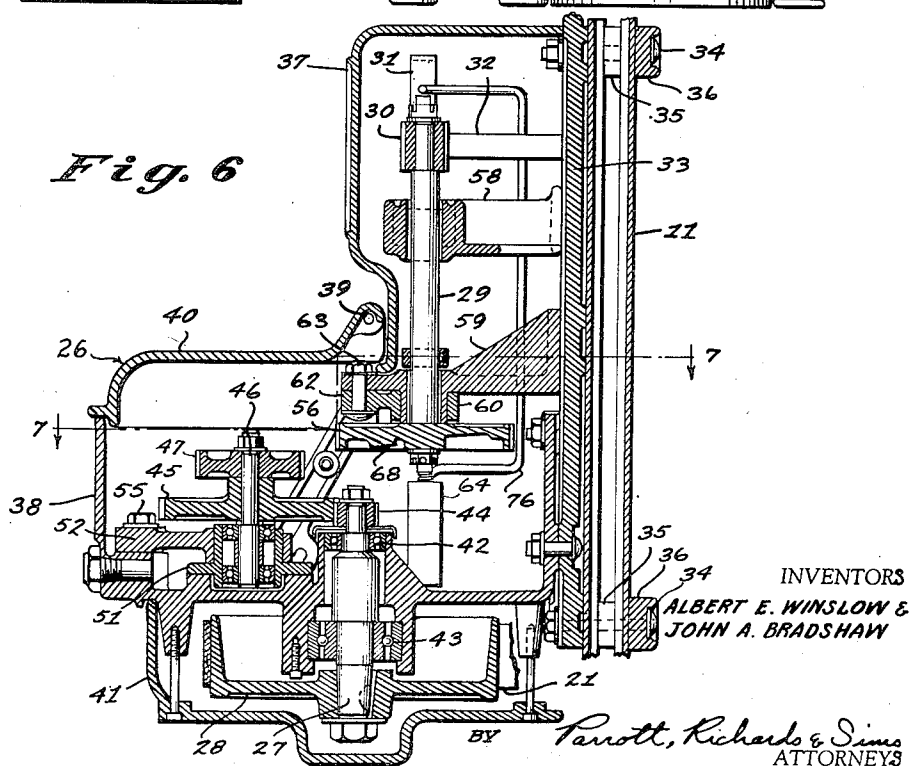


Fig. 6

INVENTORS

ALBERT E. WINSLOW &
JOHN A. BRADSHAW

BY Parrott, Richards & Sims
ATTORNEYS

Jan. 26, 1954

A. E. WINSLOW ET AL

2,667,030

TWIST CONTROL MEANS FOR YARN WINDING MACHINES

Filed March 3, 1952

5 Sheets-Sheet 4

Fig. 7

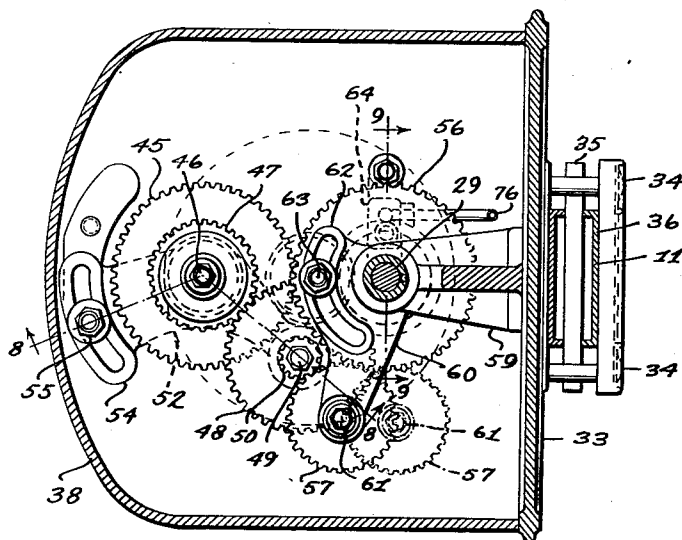


Fig. 8

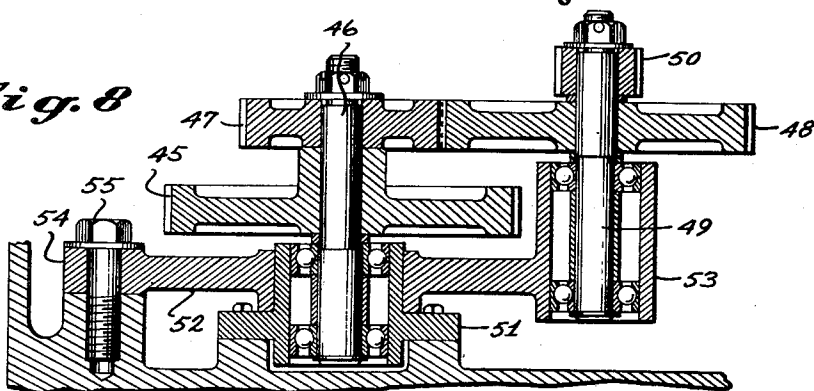
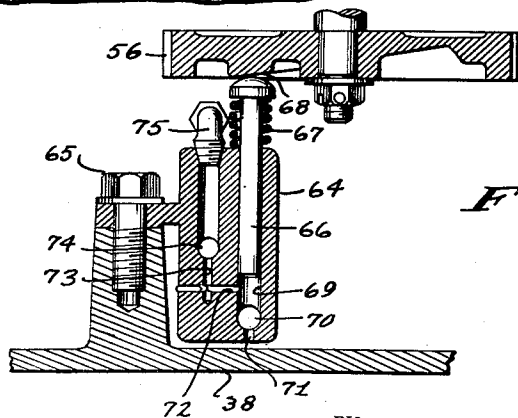


Fig. 9



INVENTORS
ALBERT E. WINSLOW &
JOHN A. BRADSHAW

BY

Parrott, Richards & Sims
ATTORNEYS

Jan. 26, 1954

A. E. WINSLOW ET AL

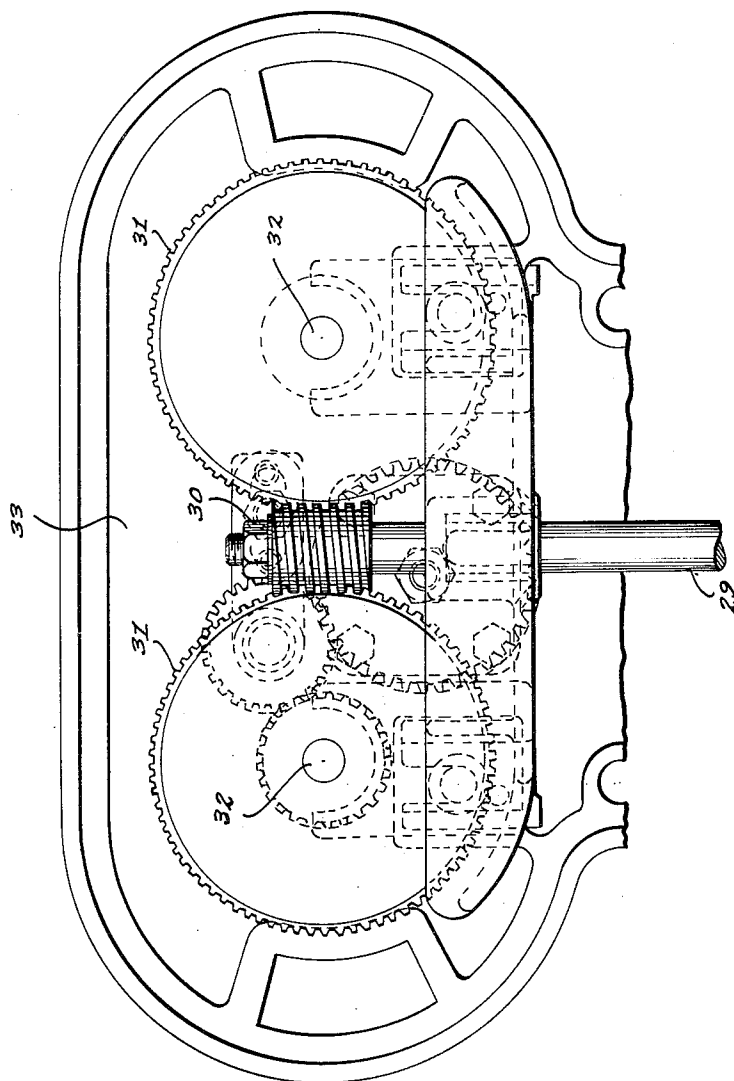
2,667,030

TWIST CONTROL MEANS FOR YARN WINDING MACHINES

Filed March 3, 1952

5 Sheets-Sheet 5

Fig. 10



INVENTORS

ALBERT E. WINSLOW &
JOHN A. BRADSHAW

BY

Parrott, Richards & Sims
ATTORNEYS

UNITED STATES PATENT OFFICE

2,667,030

TWIST CONTROL MEANS FOR YARN
WINDING MACHINESAlbert E. Winslow and John A. Bradshaw, Green-
ville, S. C., assignors to J. P. Stevens & Co.,
Inc., a corporation of Delaware

Application March 3, 1952, Serial No. 274,563

8 Claims. (Cl. 57—93)

1

This invention relates to yarn winding machines of the type commonly referred to as an "uptwister," and more particularly to an improved means for controlling the twist imparted to yarn as it is rewound by such machines.

As is well known, "uptwisters" are the machines used for the so-called "throwing" operation in which a desired degree of twist is placed in filament yarn by regulating the conditions under which the yarn is rewound from a rotating yarn delivery spindle to a yarn receiving member actuated by frictional contact with a take-up roll. The winding machines employed for this purpose are characteristically arranged with the yarn delivery spindles and yarn receiving members in a plurality of vertically spaced banks with common means for driving the spindles and for regulating actuation of the yarn receiving members in each bank so that the yarn is withdrawn from the rotating spindles at a rate that will impart a desired twist as the yarn is rewound by the take-up rolls.

As there is a very substantial range of variation in the twist that it may be desired to obtain in a throwing operation of this sort, it is necessary that the actuating means for the take-up rolls provide for a corresponding range of speed variation, and this requirement has heretofore rendered the take-up roll actuating means objectionably complicated. A related disadvantage of the take-up roll actuating means arrangements previously employed has been that their complex nature required extensive reassembly in order to change the twist ratio obtained.

According to the present invention, a twist control means is provided for actuating the take-up rolls that is arranged for bench assembly as a unit and requires only very simple rearrangement for changing over from one twist ratio to another. Also, this unit embodying the improved twist control means of the present invention is arranged for enclosure entirely by a housing in which means responsive to the operation of the unit is provided for continuous lubrication of the actuating means without attention during operation thereof, and in which housing the twist change elements of the actuating means are uniquely disposed in relation to an access opening for convenient rearrangement and adjustment with great facility.

These and other features of the twist control means of the present invention are described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a preferred embodiment of a yarn winding or "uptwister"

2

with which the twist control means of the present invention might be used;

Fig. 2 is a vertical section of the yarn winding machine shown in Fig. 2 taken adjacent the mid stand element;

Fig. 3 is a schematic plan view illustrating a lengthwise layout arrangement for the yarn winding machine shown in Fig. 1;

Figs. 4 and 5 are related schematic side and end elevations of a twist unit arranged in accordance with the present invention;

Fig. 6 is a vertical section of an actual twist unit constructed in accordance with the present invention;

Fig. 7 is a sectional detail in plan taken substantially on the line 7—7 in Fig. 6;

Fig. 8 is a sectional detail taken substantially on the line 8—8 in Fig. 7;

Fig. 9 is a sectional detail taken substantially on the line 9—9 in Fig. 7; and

Fig. 10 is a fragmentary detail showing in end elevation the geared driving connection provided between the twist unit and the take-up rolls according to the present invention.

Referring now in detail to the drawings, and more particularly at first to Fig. 1, there is illustrated in Fig. 1, as mentioned above, a preferred embodiment of an uptwister or yarn winding machine in which the twist control means of the present invention might be used. As shown, this yarn winding machine incorporates a frame structure comprising a plurality of horizontally spaced vertical stand elements arranged adjacent the ends of the machine as at 10 and 11 and intermediately thereof as at 12. Each of these stand elements 10, 11 and 12 is provided at their lower ends with lateral base members 13, which are fitted with leveling feet 14 at their extending ends, and which engage and support a guard rail 15 encircling the machine.

Mounted on the frame structure are the previously mentioned banks of yarn rewinding elements as indicated generally at B, and which are illustrated as comprising a plurality of yarn delivery spindles 16 spaced with interposed separators 17 and arranged in relation to a corresponding plurality of yarn take-up rolls 18 spaced above the spindles 16 and adapted for actuating yarn receiving members which may be disposed in finger brackets 19 for peripheral driving contact with these take-up rolls 18, the relative disposition of the yarn receiving members with respect to the take-up rolls 18 when empty being indicated in Fig. 2 at M, and the yarn receiving member position indicated in

broken lines at M' illustrating the vertical displacement provided for by the finger brackets 49 as yarn is rewound to fill the yarn receiving members.

Additionally, the banks B of operating elements include idler pulleys 20 for training an endless belt drive connection 21 past whorl portions 22 of the spindles 16, centering eyes 23 disposed above the spindles 16 for obtaining and controlling the ballooning effect of yarn delivered from bobbins or yarn carriers C mounted on the spindles 16, and traverse bars 24 for carrying yarn guides (not shown) to direct the rewinding traverse of the yarn on the yarn receiving members M.

Also mounted on the frame structure at the end stand element 10 are motor drive units 25 arranged according to the present invention for each bank B, and from which the endless belt drives 21 for the spindles 16 run and extend to transmission means or twist units 26 mounted on the other end stand element 11 for controlling the operation of the take-up rolls 18 in relation to the spindles 16, as previously mentioned (compare Fig. 3). Reference is made to copending application Serial No. 274,561, filed concurrently herewith, for a further detailed disclosure of the arrangement of the frame structure and disposition of the operating elements thereon in a yarn winding machine as described generally above, and to copending application Serial No. 274,562, also filed concurrently herewith, for a further detailed disclosure of the motor drive units 25. In addition, reference is also made to copending application Serial No. 274,536, likewise filed concurrently herewith, for a description of a traverse motion suitable for association with the twist units 26 to actuate the traverse bars 24 as mentioned above.

The arrangement and function of the twist control units 26 of the present invention is illustrated in detail in Figs. 4 to 10, inclusive, of the drawings. Figs. 4 and 5 illustrate the twist units 26 schematically as comprising a vertically disposed stub shaft 27 carrying an idler pulley 28 for the endless drive belt 21 and driven thereby for actuating through a gear train, to be described more in detail presently, a jack shaft 29 also disposed vertically and extending upwardly to drive, through a spiral pinion 30 and mating gears 31 (compare Fig. 10), the mounting shafts 32 for the previously mentioned take-up rolls 18, so that the take-up rolls 18 are driven at a speed related through the twist unit 26 to the speed at which the spindles 16 are rotated by the endless drive belt 21.

An actual embodiment of the twist unit 26 represented schematically in Figs. 4 and 5 is shown in Fig. 6 enclosed in a housing formed compositely of a back support plate 33 arranged for bolting as at 34 to the adjacent end stand 11 through spacers 35 and back clamping bars 36. This back housing plate 33 is also adapted for assembly with a top cover housing 37 and a bottom pan-like housing portion 38, the cover housing 37 being fitted through a pivoted connection at 39 with an access cover plate 40, and the lower face of the bottom housing portion 38 being adapted to carry to a cover housing 41 for the idler pulley 28.

The bottom housing portion 38 is also fitted with bearing supports as at 42 and 43 for the previously mentioned stub shaft 27 carrying the idler pulley 28. At its upper end this stub shaft 27 is arranged to carry a pinion 44 in mesh with a crown gear 45 mounted on a first intermediate

countershaft 46 which also carries a range gear 47 in mesh with a second range gear 48 carried on a second intermediate countershaft 49 together with a twist change gear 50 (compare Figs. 7 and 8). These intermediate countershafts 46 and 49 are positioned in the bottom housing portion 38 by supporting means consisting of a bearing housing 51 for the first countershaft 46 having its outer surface adapted to receive and serve as a pivot for a swing bracket 52 formed at one end with a bearing housing portion 53 for the second countershaft 49 and at its other end with a curved adjusting slot portion 54 arranged for engagement by a securing stud 55 fitted to the bottom housing portion 38 so that the swing bracket 52 may be pivotally positioned for proper running engagement of the twist change gear 50 with a gear 55 carried at the lower end of the previously mentioned jack shaft 29. This mounting arrangement of the twist change gear 50 on the swing bracket 52 makes adjustment easily possible for any size of twist gear 50 desired, and the disposition of the twist change gear 50 at the upper end of the intermediate countershaft 49 makes this change gear easily accessible through the access cover plate 40 for replacement by a gear of different size whenever it is desired to change the twist ratio.

Also, in order to provide for maintaining the drive for the take-up rolls 18 in the same direction upon reversal of the direction of rotation of the spindles 16 for reversing the twist, an idler gear 57 is associated with the jack shaft drive gear 56. The jack shaft 29 is carried in upper and lower bearing supports 58 and 59 extending from the back housing plate 33, and the lower bearing support 59 is adapted to carry a further swing bracket 60 for the idler gear 57. The idler gear 57 is mounted on the swing bracket 60 at 61 to run in mesh with the jack shaft drive gear 56, and the swing bracket 60 is pivoted on the lower bearing support 59 for movement concentrically about the axis of the jack shaft 29 so that the idler gear 57 always remains in mesh with the jack shaft drive gear 56. The swing bracket is also provided a curved adjusting slot portion 62 engaged by a bolt 63 for clamping the swing bracket 60 to the lower bearing support 59 at the operating position desired for the idler gear 57. Normally this idler gear 57 will be displaced from the twist change gear 50 to run freely, while the change gear 50 drives the jack shaft gear 56 directly, but upon reversal of the spindles 16 to reverse the twist the change gear 50 may be shifted from engagement with the jack shaft gear 56 and the idler gear 57 adjusted to an interposed position so that the direction of rotation of the jack shaft gear 56 is maintained in the same direction for proper operation of the take-up rolls 18. Here again it will be noted that the securing bolt 63 may be easily reached through the access cover plate 40 for adjustment of the idler gear 57 whenever desired.

It should also be noticed that the arrangement of the twist unit 26 in a fully closed housing is taken advantage of to provide a unique lubricating arrangement by means of a pumping system arranged for circulating lubricant through the housing continuously during operation. This lubricating system comprises a pumping means 64 bolted as at 65 to the bottom housing portion 38 (as shown best in Fig. 9) and comprising a working plunger 66 biased by a spring 67 for actuation from a cam surface as at 68 formed on the bottom face of the jack shaft

drive gear 56 to reciprocate in a cylindrical passageway 69 which reduces at its lower end to form a seat for a check ball 70 disposed in covering relation to a continuation in reduced diameter as at 71 of the cylindrical passageway through the bottom face of the body of the pumping means 64. As the pan-like bottom housing portion 38 is adapted for collecting a supply of lubricant within the twist unit housing, it will be seen that lubricant from such a supply will flow into the passageway 69 past the check ball 70 upon each upward stroke of the plunger 66, and at each downward plunger stroke the lubricant in the passageway 69 will be trapped by the check ball 70 and compressed. A lateral passageway 72 is provided in the pumping means 64 to connect with a parallel cylindrical passage 73 arranged to contain a second check ball 74 and running to a fitting at 75 for a distributing conduit 76 reaching to the top of the jack shaft 29 to discharge the pumped lubricant thereon and allow it to flow by gravity over the various operating elements of the twist unit 26 for recovery in the bottom housing portion 36 and recirculation.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this disclosure or otherwise except as defined in the appended claims.

We claim:

1. In a yarn winding machine, the combination with a plurality of yarn delivery spindles and a corresponding plurality of yarn take-up rolls for driving yarn receiving members, and means for rotating said spindles, of means for actuating said take-up rolls to impart a desired twist to yarn rewound from said rotating spindles to said yarn receiving members, said actuating means comprising a vertically disposed stub shaft driven by said spindle rotating means, a vertically disposed jack shaft for driving said take-up rolls, and a gear train connecting said stub shaft to drive said jack shaft, said gear train incorporating a changeable gear component for allowing regulation of the actuation of said take-up rolls to provide a desired degree of twist in said yarn, and all of the components of said gear train being disposed to rotate about vertical axes.

2. In a yarn winding machine, the combination defined in claim 1 and further characterized in that said changeable gear component is shiftably disposed for accommodating replacement by an alternative component of different size.

3. In a winding machine for imparting twist to yarn by rewinding the yarn from a rotating spindle to a yarn receiving member driven by a take-up roll, means for driving said take-up roll in relation to the rotation of said spindle comprising a stub shaft rotated with said spindle, a jack shaft for driving said take-up roll, and an interposed gear train connecting said stub shaft to drive said jack shaft, said gear train incorporating gear components leading from said stub shaft and terminating in a shiftably mounted gear component that is replaceable by alternative components of different size, and said gear train further incorporating a final gear component fixed on said jack shaft and an associated idler gear component that is shiftably mounted for interposing in mesh with said first mentioned shiftably mounted gear component to maintain

the drive for said jack shaft and said take-up roll in the same direction upon reversal of the direction of rotation of said spindle.

4. In a winding machine for imparting twist to yarn by rewinding the yarn from a rotating spindle to a yarn receiving member driven by a take-up roll, means for driving said take-up roll in a selected relation to the rotation of said spindle and thereby obtaining a desired degree of twist in said yarn, said means comprising a stub shaft rotated with said spindle, a jack shaft connected for driving said take-up roll, an interposed gear train leading from said stub shaft and incorporating an intermediate removable gear component rotating in the same direction as said stub shaft, mounting means shiftably in relation to the axis of said jack shaft for carrying said removable gear component with accommodation for replacement thereof with alternative gear components of different size, said gear train further incorporating a final gear component fixed to said jack shaft and an associated idler gear component, and mounting means shiftably in fixed circular relation about the axis of said jack shaft for carrying said idler gear component in mesh with said final gear component and interposable in mesh with said removable gear component to maintain the drive for said jack shaft and said take-up roll in the same direction upon reversal of the direction of rotation of said spindle.

5. In a yarn winding machine, the combination with a plurality of yarn delivery spindles and a corresponding plurality of yarn take-up rolls for driving yarn receiving members, and means incorporating an endless belt connection for rotating said spindles, of means for actuating said take-up rolls in relation to the rotation of said spindles, said actuating means comprising a stub shaft carrying an idler pulley for said endless belt connection, a gear train connecting said stub shaft to drive said take-up rolls, a housing entirely enclosing said gear train, and pumping means responsive to motion of said gear train for elevating oil in said housing to drain by gravity over said gear train continuously during operation thereof.

6. In a yarn winding machine, the combination with a plurality of yarn delivery spindles and a corresponding plurality of yarn take-up rolls for driving yarn receiving members, and means incorporating an endless belt connection for rotating said spindles, of means for actuating said take-up rolls in relation to the rotation of said spindles, said actuating means comprising a vertically disposed stub shaft carrying an idler pulley for said endless belt connection, and a housing providing a journal support for said stub shaft and entirely enclosing: a gear train leading from said stub shaft, a jack shaft driven by said gear train, a geared connection adapting said jack shaft to drive said take-up rolls, and pumping means operated from said gear train for elevating oil in said housing to the upper end of said jack shaft to drain by gravity over the elements of said actuating means continuously during operation thereof.

7. In a yarn winding machine, the combination defined in claim 1 and further characterized in that said spindle rotating means comprises an endless belt driving connection, said stub shaft is fitted with a pulley member driven by said endless belt connection, and said jack shaft is fitted with a spiral pinion for driving said take-up rolls.

8. In a yarn winding machine, in combination,

7

a frame structure, a plurality of yarn delivery spindles and a corresponding plurality of yarn take-up rolls disposed on said frame structure for driving yarn receiving members, drive means carried at one end of said frame structure, an endless belt connection reaching from a pulley at said drive means for rotating said spindles, and means for actuating said take-up rolls to impart a desired twist to yarn rewound from said rotating spindles to said yarn receiving members, said actuating means being arranged as a unit assembly carried at the other end of said frame structure and comprising a stub shaft, a pulley member carried on said stub shaft driven from said endless belt connection, a jack shaft connected for driving said take-up rolls, and a

8

gear train connecting said stub shaft to drive said jack shaft and incorporating a changeable gear component for allowing regulation of the actuation of said take-up rolls to provide a desired degree of twist in said yarn.

ALBERT E. WINSLOW.
JOHN A. BRADSHAW.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,654,376	Lambert -----	Dec. 27, 1927
1,799,915	Lewis -----	Apr. 7, 1931
1,963,135	Keyser -----	June 19, 1934
2,244,141	Camp -----	June 3, 1941