No. 778,737. PATENTED DEC. 27, 1904.

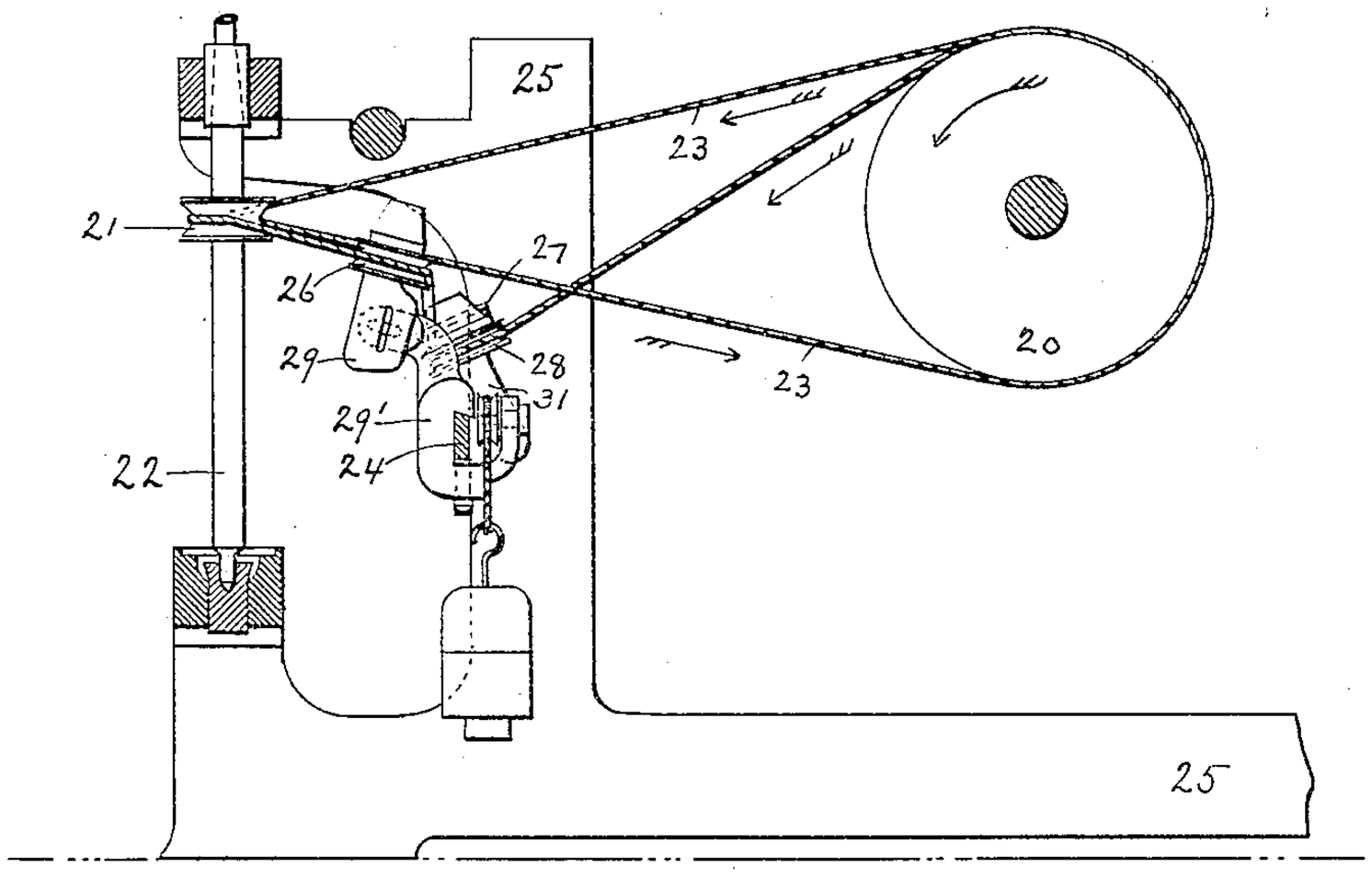
J. BOYD.

# MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE DRIVING BANDS.

APPLICATION FILED NOV. 25, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



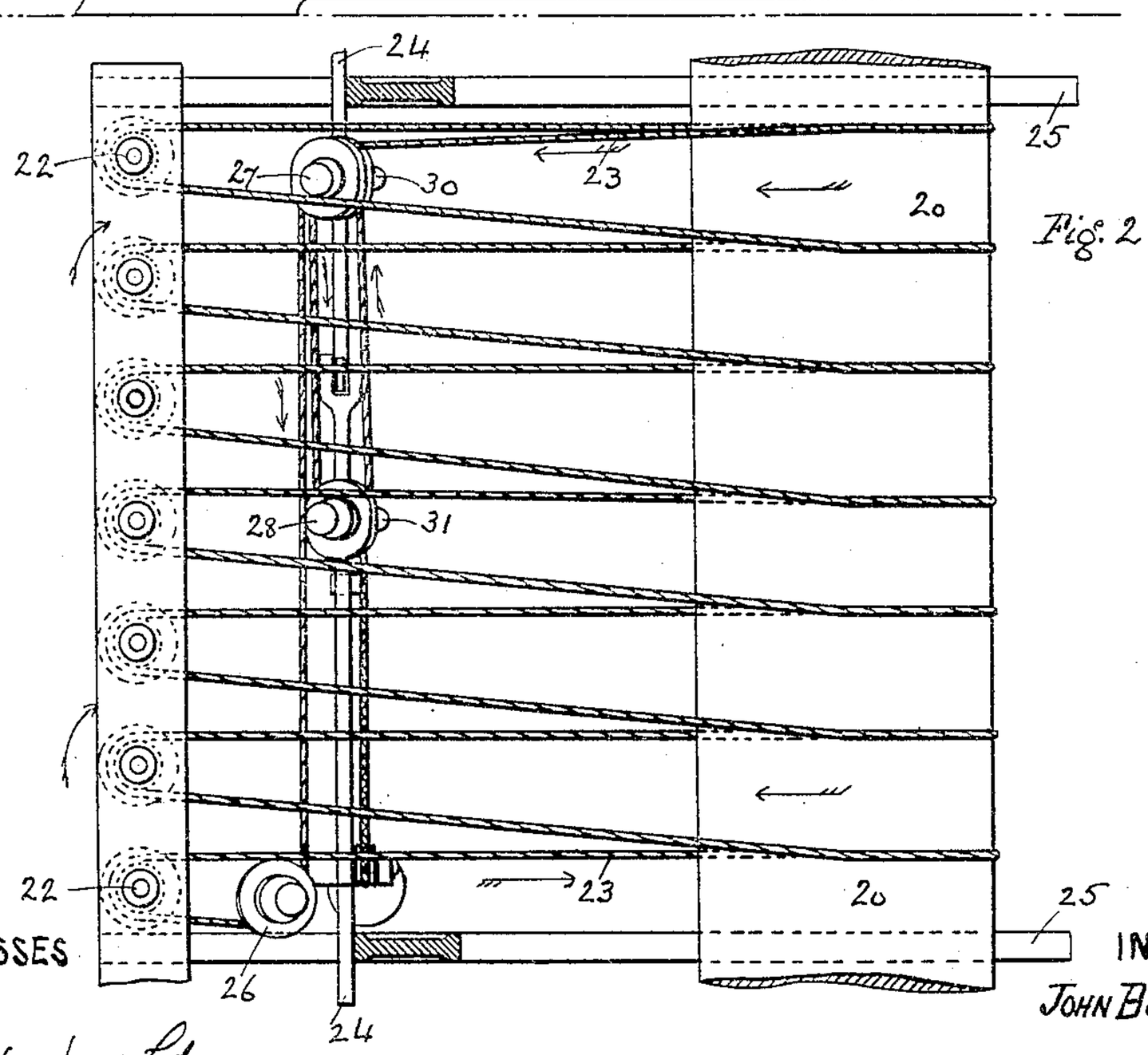




Fig. 2

WITNESSES

F. W. Wright.

Walter Abbe

INVENTOR

JOHN BOYD

BY Howson and Howson

ATTORNEYS

No. 778,737. PATENTED DEC. 27, 1904.

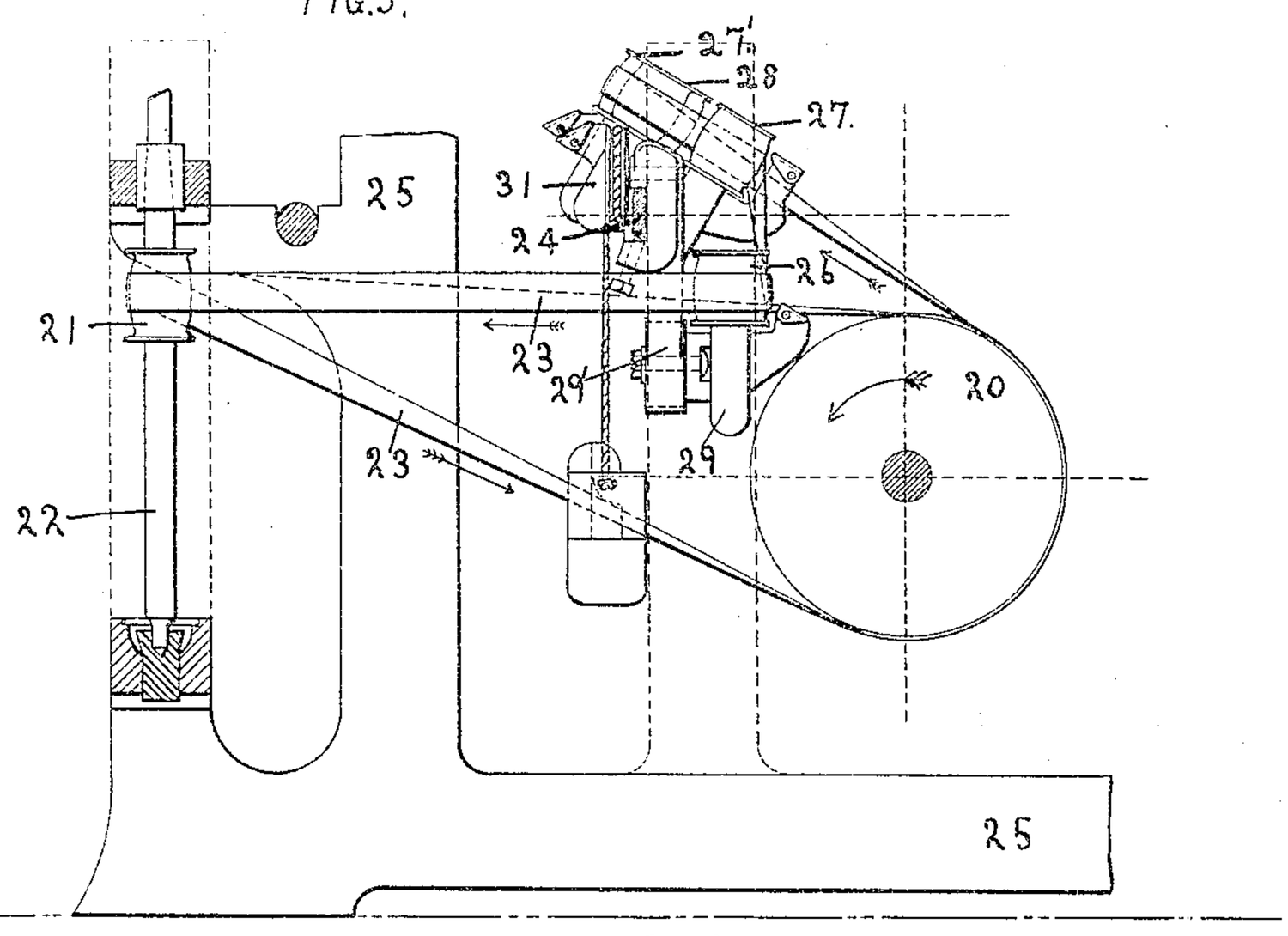
J. BOYD.

# MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE DRIVING BANDS.

APPLICATION FILED NOV. 25, 1903.

3 SHEETS—SHEET 2.

FIG. 3.



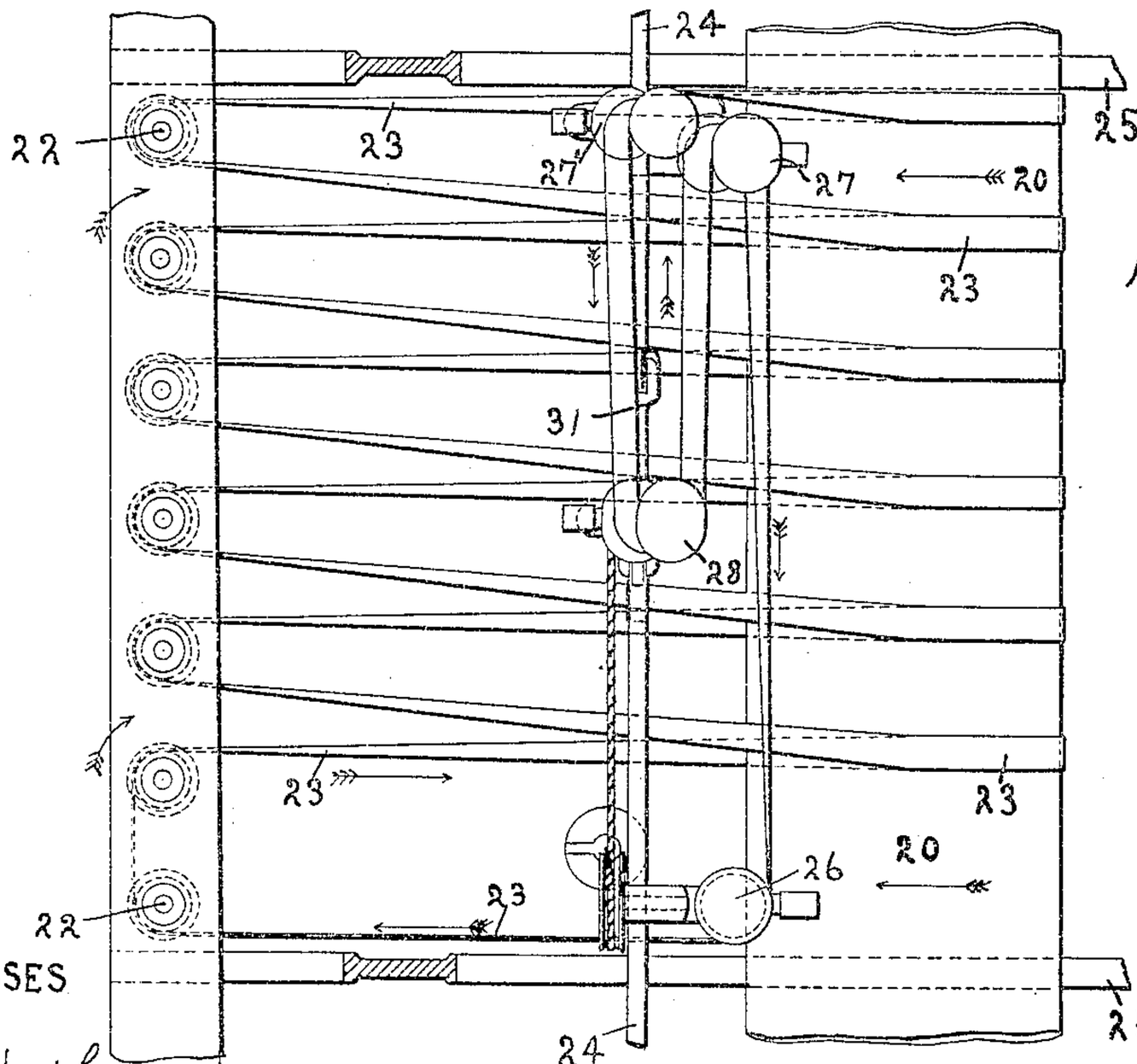




FIG. 4.

WITNESSES

F. W. Wright

Alfred P. Abbe.

INVENTOR

JOHN BOYD

BY

Howson and Howson

ATTORNEYS

No. 778,737. PATENTED DEC. 27, 1904.

J. BOYD.

# MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE DRIVING BANDS.

APPLICATION FILED NOV. 25, 1903.

3 SHEETS—SHEET 3.

Fig. 5.

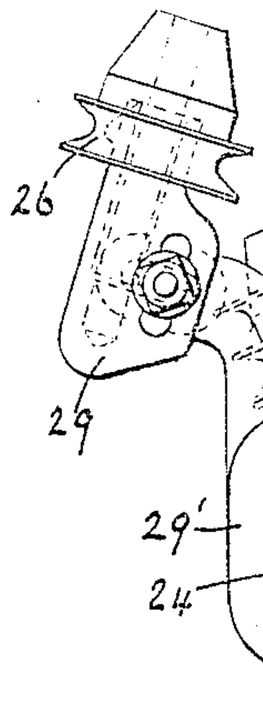



Fig. 6.

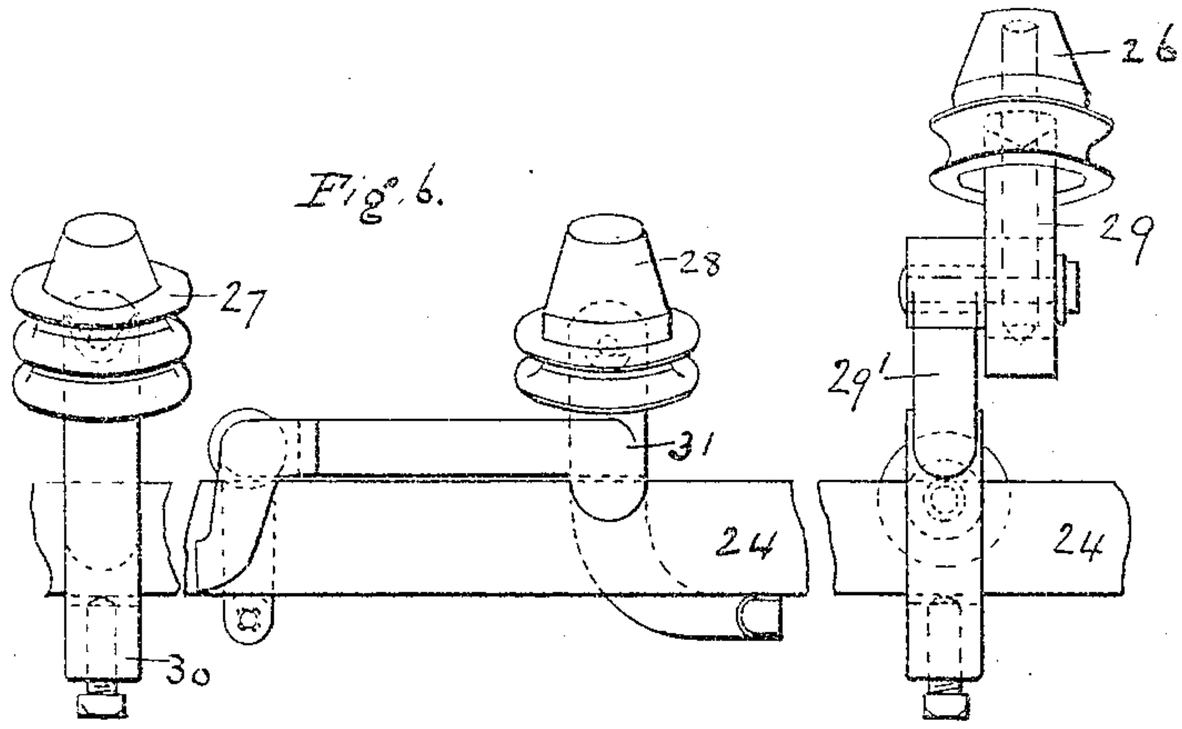



Fig. 7.

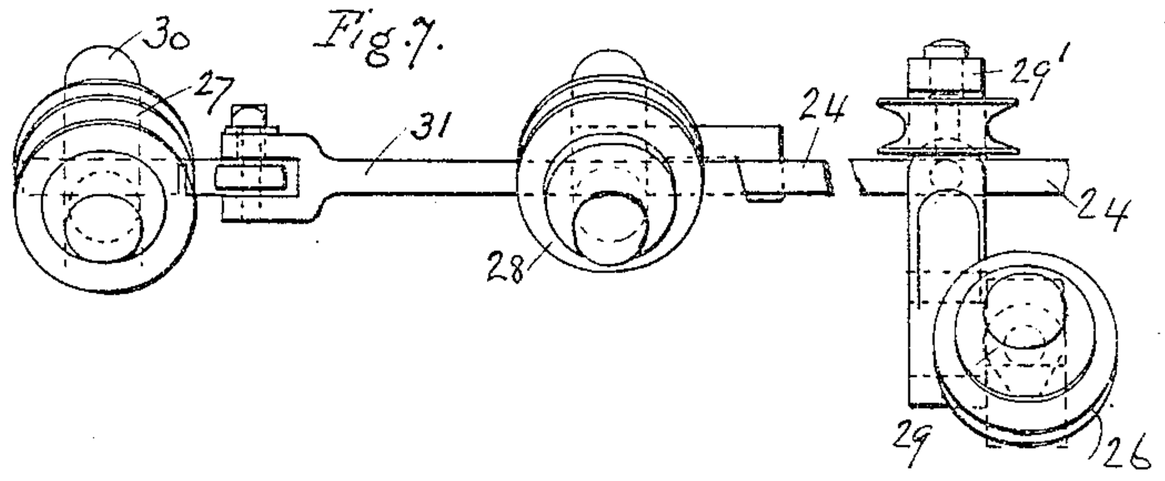



Fig. 8.

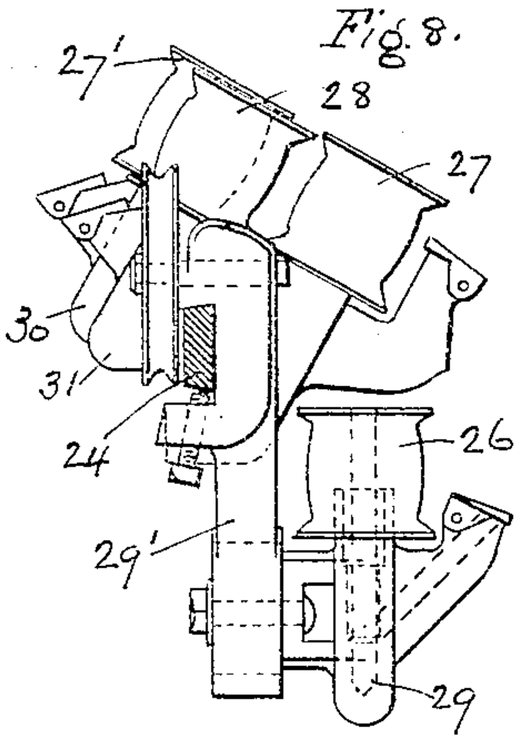



Fig. 9.

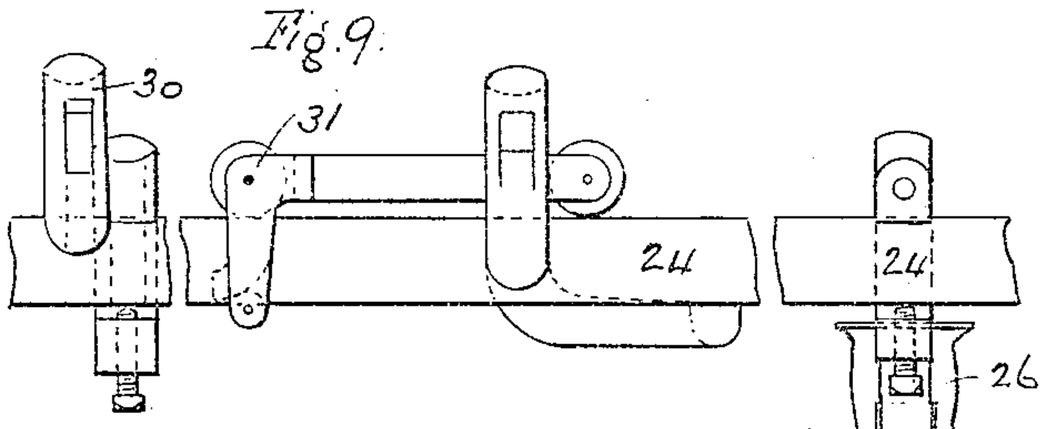
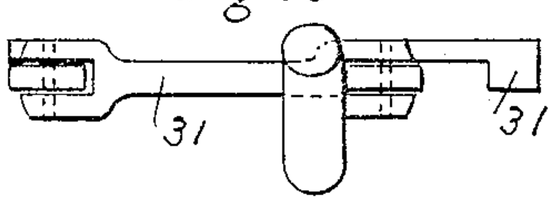



Fig. 10




WITNESSES

F. W. Wright.

Walter Abbe

INVENTOR
JOHN BOYD

BY Howson and Howson
ATTORNEYS

No. 778,737. Patented December 27, 1904.

# UNITED STATES PATENT OFFICE.

JOHN BOYD, OF BOTHWELL, SCOTLAND.

## MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE-DRIVING BANDS.

SPECIFICATION forming part of Letters Patent No. 778,737, dated December 27, 1904.

Application filed November 25, 1903. Serial No. 182,675.

*To all whom it may concern:*

Be it known that I, JOHN BOYD, a subject of the King of Great Britain and Ireland, residing at Bothwell, in the county of Lanark, Scotland, have invented certain new and useful Improvements in Mechanism for Guiding and Applying Tension to Spindle-Driving Bands, of which the following is a description.

This invention relates to further improvements in the spindle-band driving-gear of spinning, twisting, winding, and similar textile machines of the kind described in the United States Patent No. 752,647, dated February 23, 1904, in which one long endless band actuated by a driving-cylinder is used to drive all the spindles on one side of a frame (or in sections thereof) in combination with a band guiding and tensioning device comprising two or more guide-pulleys all carried by preference on a stationary bar, and one movable tension-pulley carried by a movable carriage mounted and sliding on said bar, and means for drawing the carriage along the bar for the purpose of tensioning said band.

According to the present invention one of the guide-pulleys is arranged in combination with the other parts of the tensioning device to effect the tensioning of the band in an improved manner, so that with less strain on the tension-pulley carriage a more uniform and a more powerful tension is applied throughout the length of the driving-band, whereby unnecessary expenditure of power is prevented, a more uniform speed is given to all the spindles, and a more uniform twist is imparted to any fibrous material which may be twisted thereby.

In order more fully to describe my improvements and to show how they can be carried into effect, I will describe their application as shown in three accompanying sheets of drawings.

On Sheet 1, Figure 1 shows a modification in which the improved cord-band-tensioning device is applied to a cross-sectional part of a flier spinning-frame having spindles only on one side of its driving-cylinder, all the spindles being driven with one long endless round cord band; and Fig. 2 is a plan thereof. The tensioning apparatus is shown placed below the spindle-driving band. On Sheet 2, Fig. 3 shows another similar modification in which the improved broad flat band-tensioning device is applied to a cross-sectional part of a flier-spindle spinning-frame having spindles only on one side of its driving-cylinder, all driven by one long endless flat band; and Fig. 4 is a plan thereof. The tensioning apparatus is shown placed above the spindle-driving band. On Sheet 3, Figs. 5, 6, and 7 show an end elevation and detached views to a larger scale of parts of apparatus shown in Figs. 1 and 2, Sheet 1; and Figs. 8, 9, and 10 show an end elevation and detached views of parts of apparatus shown in Figs. 3 and 4, Sheet 2.

In all the drawings the same reference-numerals are used to mark the same or like parts wherever they are repeated.

As shown in Figs. 1 and 2 of Sheet 1 and in Figs. 5, 6, and 7, Sheet 3, the center of the cylinder 20 is in line with or nearly in line with the wharve 21 of the spindles 22, and the spindle-band guiding and tensioning apparatus is placed between the spindles 22 and the cylinder 20 and below the band 23. A longitudinal bar 24, slightly beveled on its top and under edges, extends the whole length of the frame 25, to which it is applied for the purpose of carrying stationary single and double grooved guide-pulleys 26 and 27 and a single-grooved movable tension-pulley 28, provided for each band 23. The stationary guide-pulleys 26 and 27 are carried by their oil-cup-socket brackets 29 and 30, secured to the bar 24 by set-screws and the tension-pulley 28 in the oil-cup socket of its movable carriage 31, which when working moves along the bar 24 between the stationary brackets 29 and 30; but according to the present improved arrangement the running-band 23 after it goes from the last spindle 22 of the section passes round the cylinder 20, the double-grooved stationary pulley 27, the carriage tension-pulley 28, and once more round the double-grooved pulley 27 and round the guide-pulley 26 at the other end of the section instead of being carried round the cylinder 20 before it goes to the first spindle 22. The band 23 is carried direct from the guide-pulley 26 round the first spindle 22 of the section and

round latter back to the driving-cylinder 20, and so on alternately round each spindle 22 and round the cylinder 20 till the other end of the section is reached, so that every spindle (or every two spindles, as the case may be) is driven by the band going direct to the cylinder 20. For this purpose the guide-pulley 26, made as formerly with a live-spindle and run in an oil-cup socket of an adjustable or fixed bracket 29, in combination with another bracket 29′, secured to the bar 24, is carried by latter in a position in relation to the double-grooved guide-pulley 27 in front of and above the bar 24 so that the band 23 may run freely from the double-grooved pulley 27 at one end of the section round the guide-pulley 26 to the first spindle 22 at the other end of the section, as indicated, and thereby have the band guiding and tensioning device acting on the band 23 directly without the intervention of the cylinder 20. For the same purpose when the band guiding and tensioning apparatus is placed between the spindle and the cylinder and above the spindle-driving band the guide-pulley at the opposite end of the section from the double-grooved pulley is placed in front of and below the bar, so that the band may run freely, as in the former case, from the double-grooved guide-pulley at one end and round the other guide-pulley to the first spindle at the other end of the section.

The right direction of the running-band 23 and of the revolution of all the parts is indicated by arrows; but when the spindles 22 require to be driven in an opposite direction the double-grooved guide-pulley and the single-grooved guide-pulley brackets 29 and 30 ought to be transposed and the spindles 22 banded in the opposite way, so that the band may always run from the spindles to the bottom of the cylinder 20. Otherwise the tension device will not act properly.

The first modification referred to and shown in Figs. 1 and 2, Sheet 1, and in Figs. 5, 6, and 7, Sheet 3, is best adapted for driving the spindles of mules, as there is generally more room for the spindle-band guiding and tensioning device under the band 23 than above latter in mule-carriages. The tensioning device may also be arranged to work in front of the cylinder 20 between the coils of the band 23 as it goes and returns between the cylinder 20 and the spindles 22. In another similar modification the broad flat band guiding and tensioning device, as shown in Figs. 3 and 4, Sheet 2, and in Figs. 8, 9, and 10, Sheet 3, is similar in all its parts, except that in this case the guide and tension pulleys 26, 27, 27′, and 28 are all exactly of the same shape, all of them being made with top and bottom flanges and convex surfaces and the guide-pulley 27′ being mounted so as to adjust its angle to the run of the band 23 as it comes from the top of the cylinder 20; but according to the present improved arrangement, as in the former modification, the running-band 23 after it leaves the tension-pulley 28 and passes round its guide-pulley 27 at one end of the section goes round the guide-pulley 26 at the other end of the section and direct from it round one spindle 22 or, as shown in the drawings, round two spindles 22 to the bottom side of the cylinder, and for this purpose the spindle-band guiding and tensioning device is placed in a position between the spindles 22 and the cylinder 20 above the band 23 as it runs from the top of the cylinder to the spindles, and the guide-pulley 26,(made as formerly with a live-spindle,) from which the flat band runs direct to the spindle 22, is placed behind and lower than the bar 24 and is provided with an oil-cup-socket bracket 29, having, in combination with another bracket, 29′, secured to the bar 24, a lateral, a vertical, and also a swivel adjustment, so that the band 23 may be guided properly to the wharve of the spindle or spindles 22, which it drives. The vertical and swivel adjustments are secured in this case by the bolt 32 (with its securing-nut) on the bracket 29, passing freely through the vertical slot 33 in the bracket 29′. The direction of drive is indicated by arrows, and, as in the former case, to change the direction of drive the guide-pulleys 26, 27, and 27′ and their brackets at each end of the section must be transposed and the spindles banded in the opposite direction.

All the spindles in each section by the present improvement are driven with a uniform strain by the band and are equally easy to stop by the hand of the operator, except the first spindle 22, to which the band 23 comes after it leaves the guide-pulley 26, and this is corrected when necessary by passing the band 23 round two spindles 22 at that end of the section, as shown in Fig. 4.

Instead of the guide and tension pulley brackets of the improved spindle-band-tensioning device being carried on a longitudinal bar the latter might in some cases be dispensed with and the guide-pulley brackets might be fixed to some convenient part of the frame and the tension-carriage made to move between them on a longitudinal rail of the frame or on longitudinal brackets fixed to same.

The improved tensioning device can be worked in almost any convenient position above or below or on either side of the actuating-cylinder if the guide and tension pulleys are set at suitable angles to suit the run of the band and if the oil-cup sockets in which the live-spindles of the pulleys work are held in a position to retain the latter and also hold sufficient oil for the proper lubrication thereof.

Any necessary number of sets of the improved apparatus may be used on one frame and all carried on one longitudinal bar, ac-

cording to its length and according to the number and pitch of the spindles in same. As a rule, one set of the improved apparatus is used to each single section or to each double section in the length of a frame.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

In spindle-band guiding and tensioning devices of the kind referred to, the combination of a frame, a driving-cylinder 20, band-guiding pulleys 27, and a series of spindles 22 to be driven from the cylinder, with a guide-bar 24, a tensioning apparatus for the latter, a guide-pulley 26 arranged as described with relation to the band-guiding pulleys 27 and the guide-bar 24, and a driving-band running from the driving-cylinder 20 to the tensioning apparatus after it has passed around the band-guide and tension-pulleys at one end or section of the frame and running freely from the latter round said guide-pulley 26 to the first spindle or pairs of spindles 22 and the other end or section, whereby the tensioning device is caused to act on the driving-band without the intervention of the driving-cylinder, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN BOYD.

Witnesses:
JAMES CUNNINGHAM,
ANDREW RANKIN.