No. 752,647. PATENTED FEB. 23, 1904.

J. BOYD.

MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE DRIVING BANDS.

APPLICATION FILED APR. 19, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

FIG. 1.

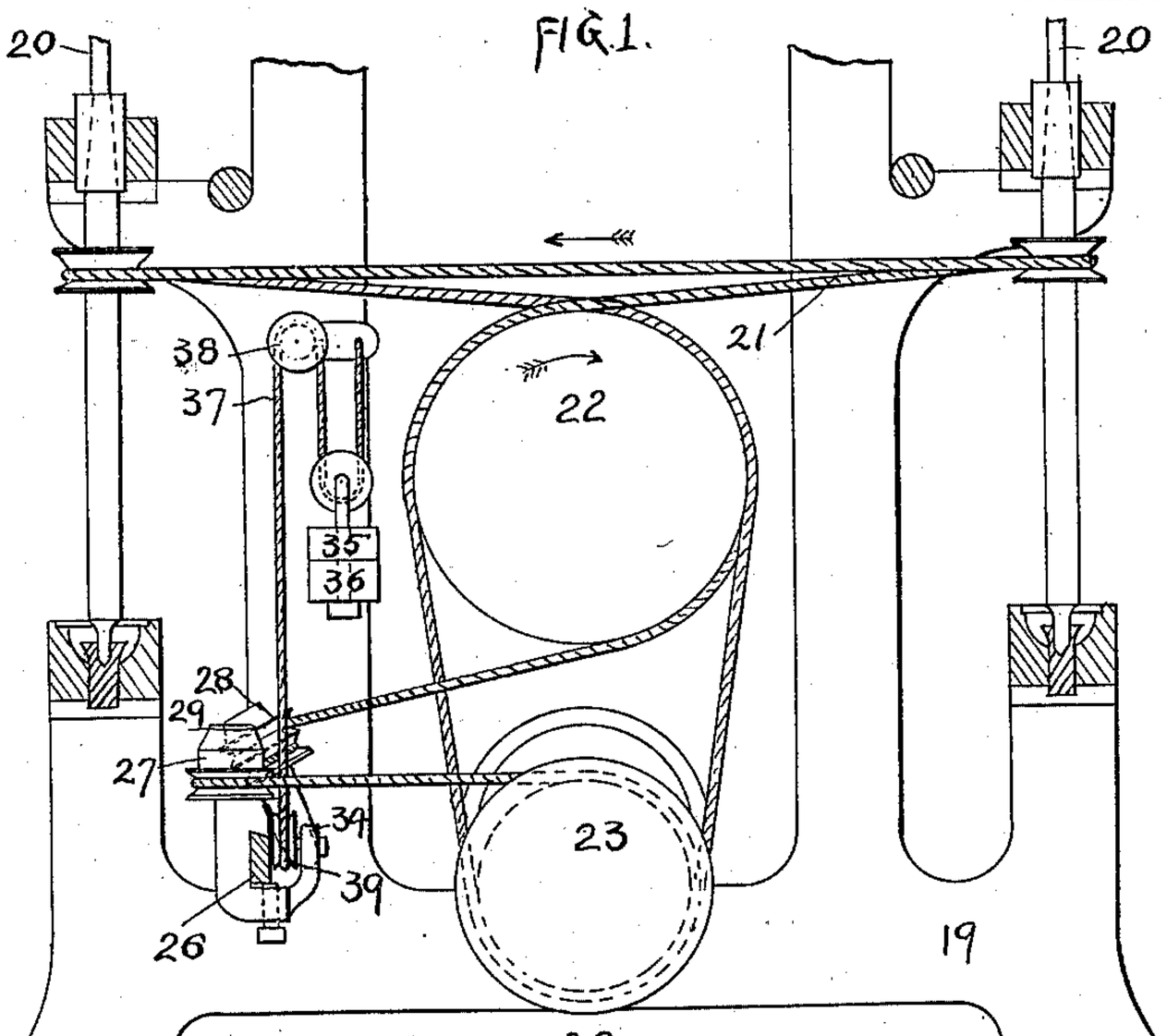
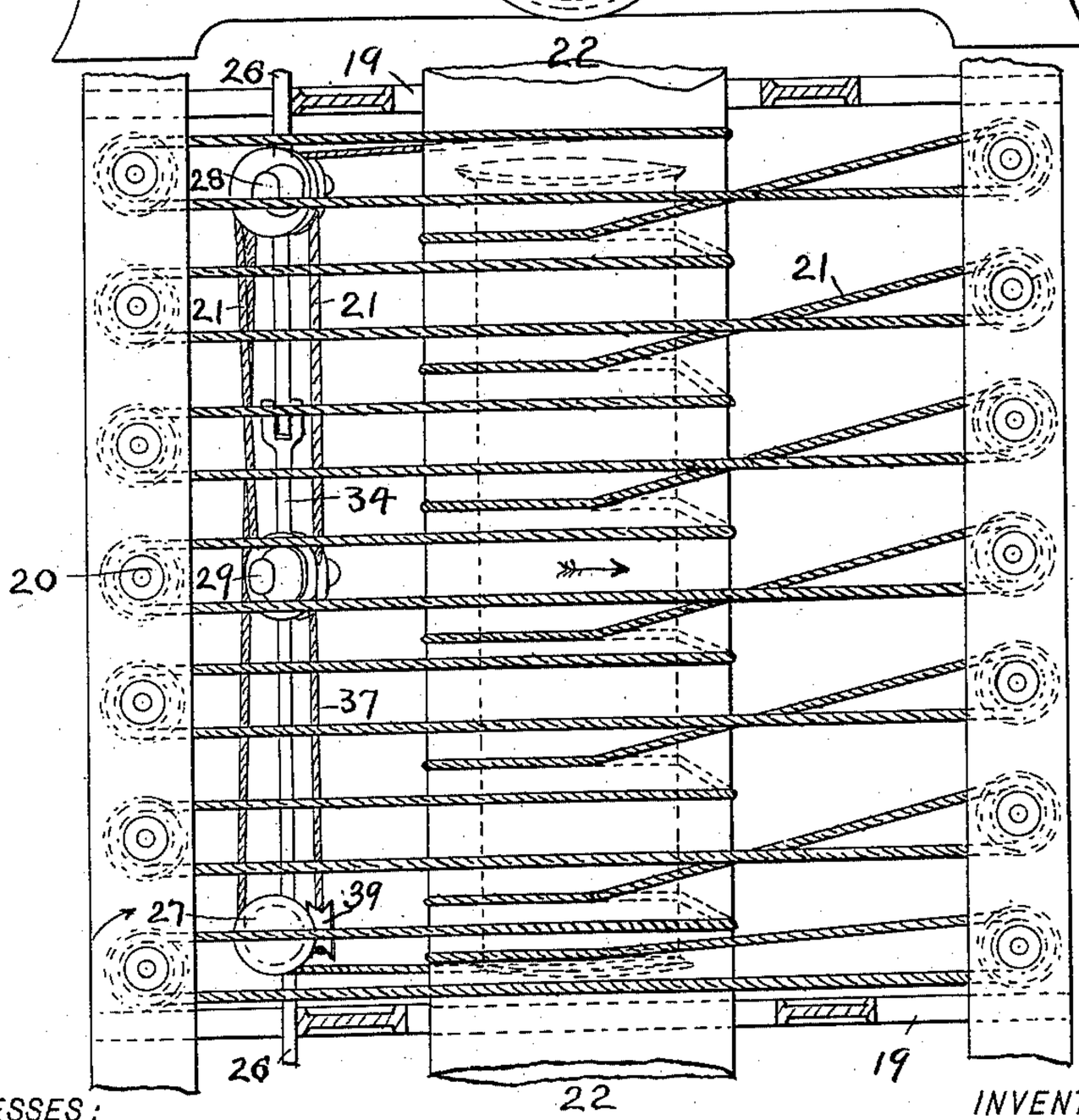


FIG. 3.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.

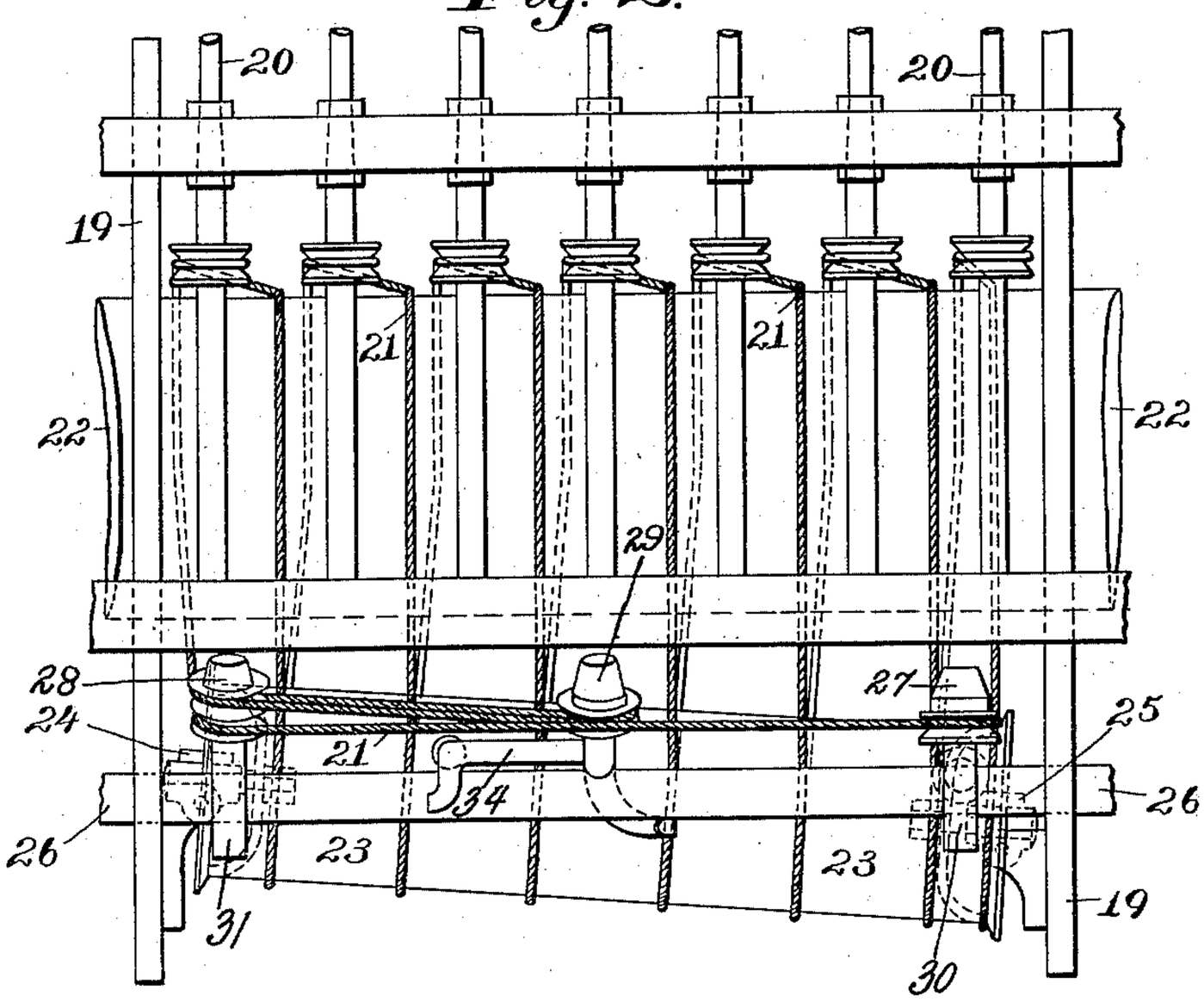


Fig. 4.

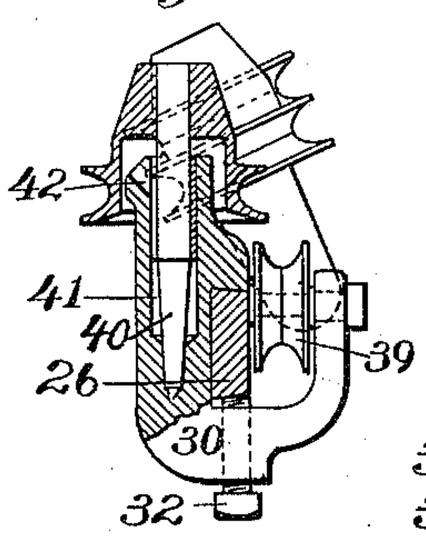


Fig. 7

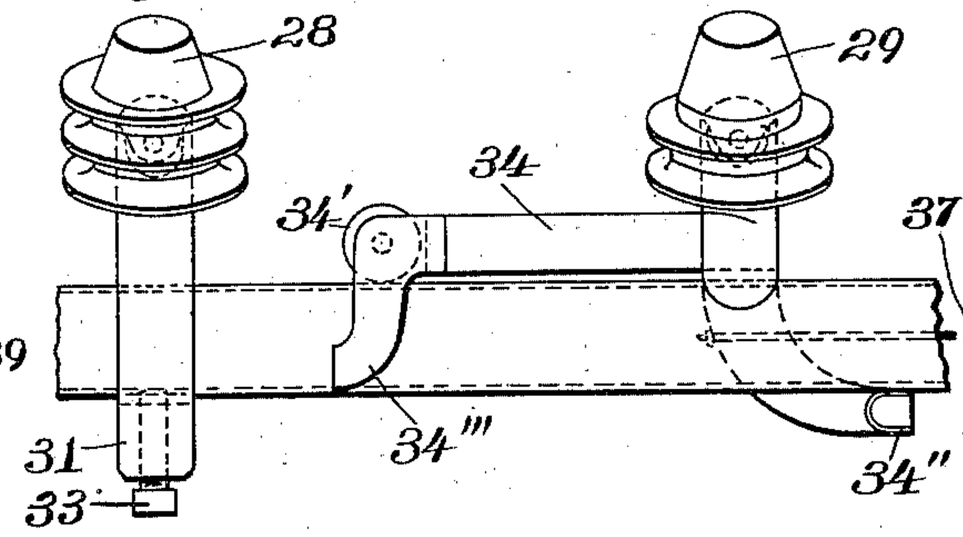


Fig. 9.

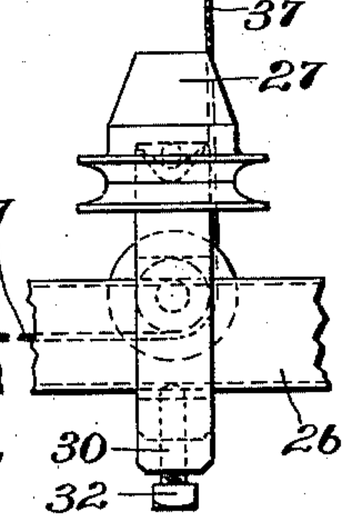


Fig. 5.

Fig. 11.

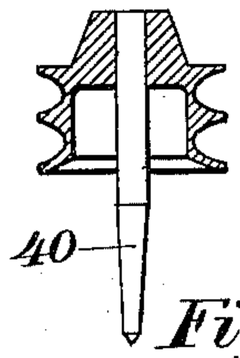


Fig. 8.

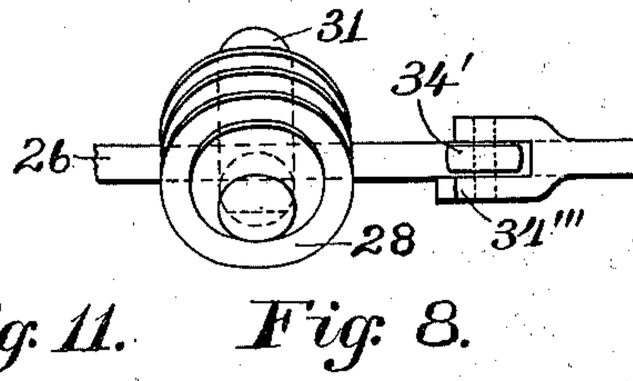


Fig. 10.

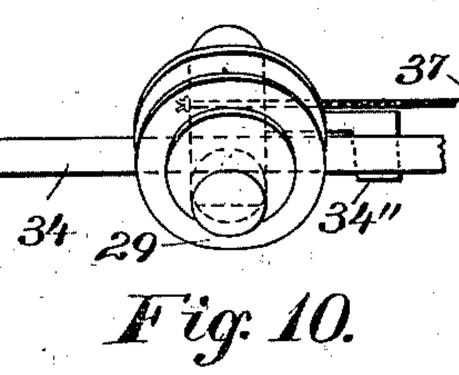
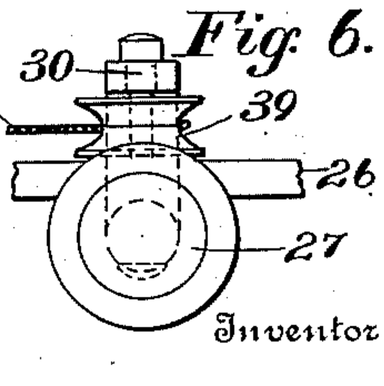


Fig. 6.



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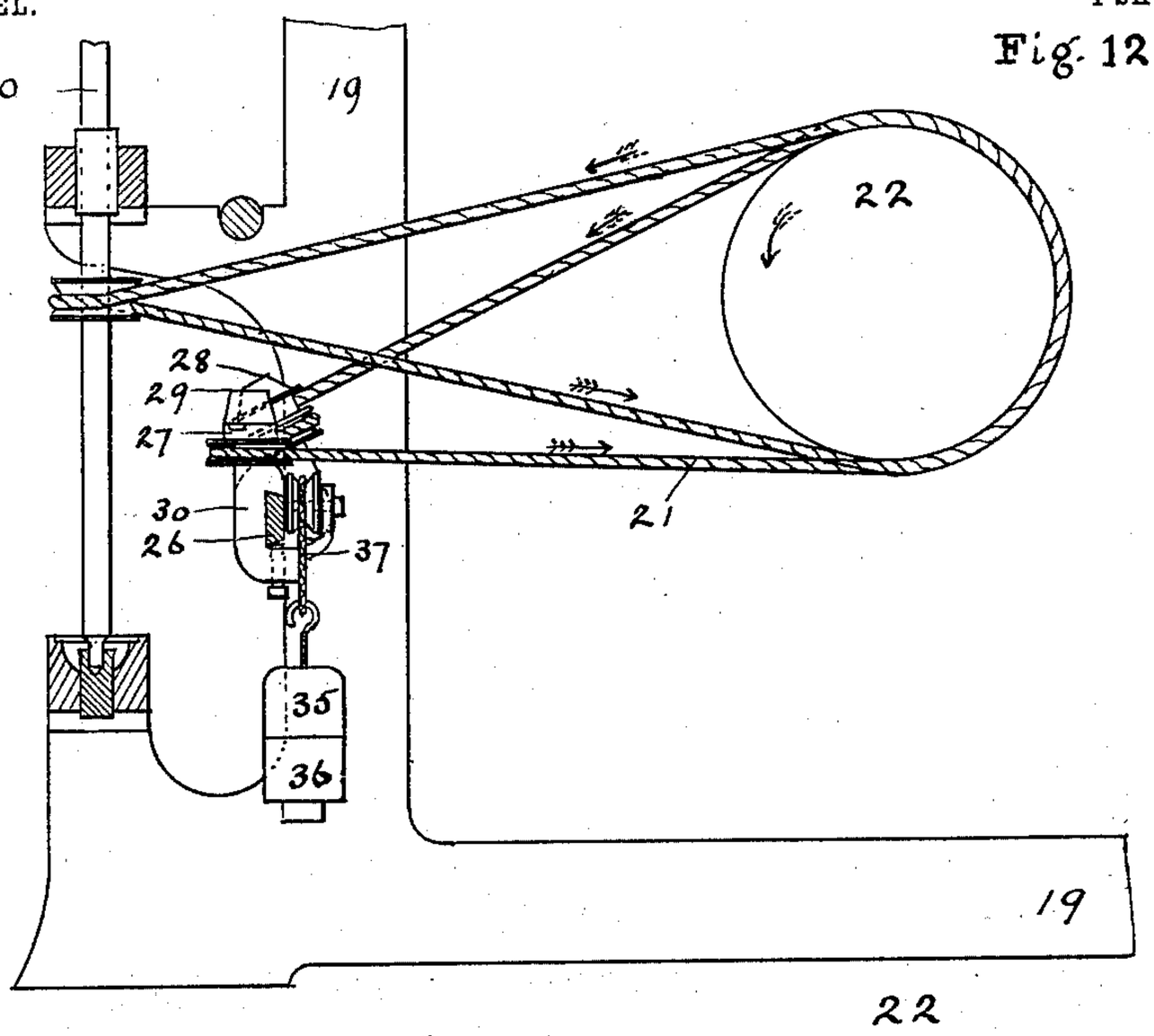
NO MODEL. 4 SHEETS—SHEET 3.

Fig. 12



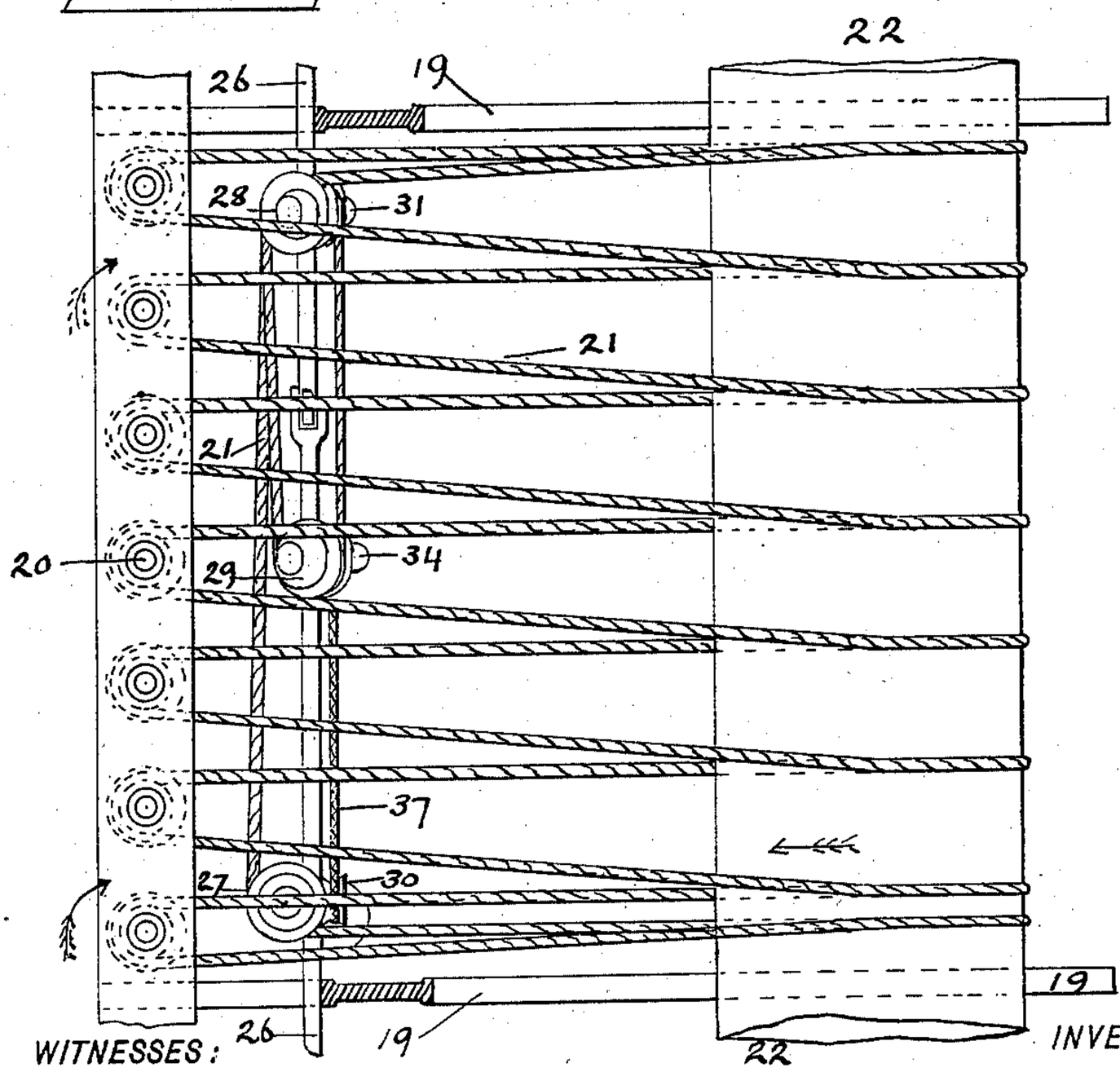


Fig. 13

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NO MODEL. 4 SHEETS—SHEET 4.

FIG. 14.

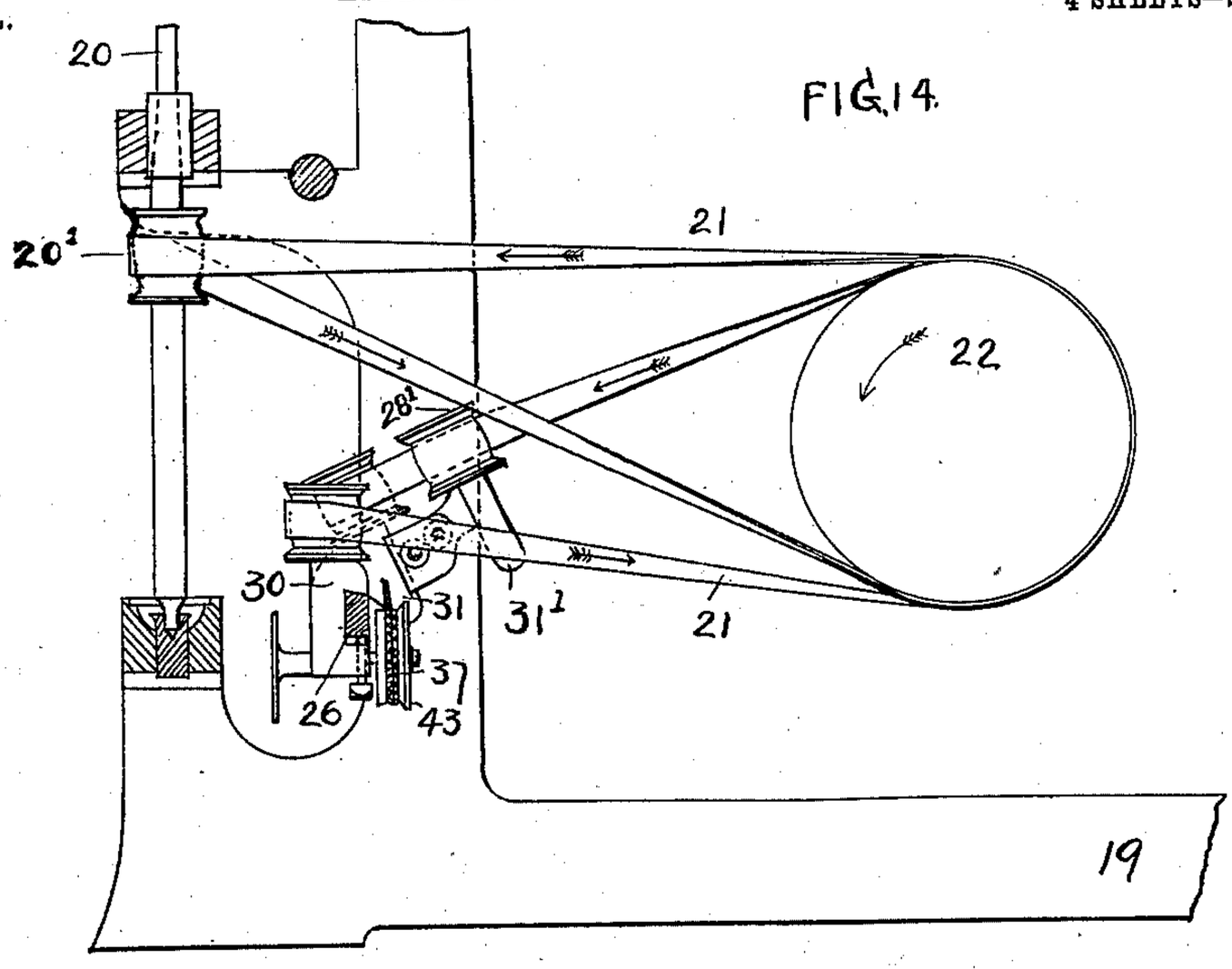
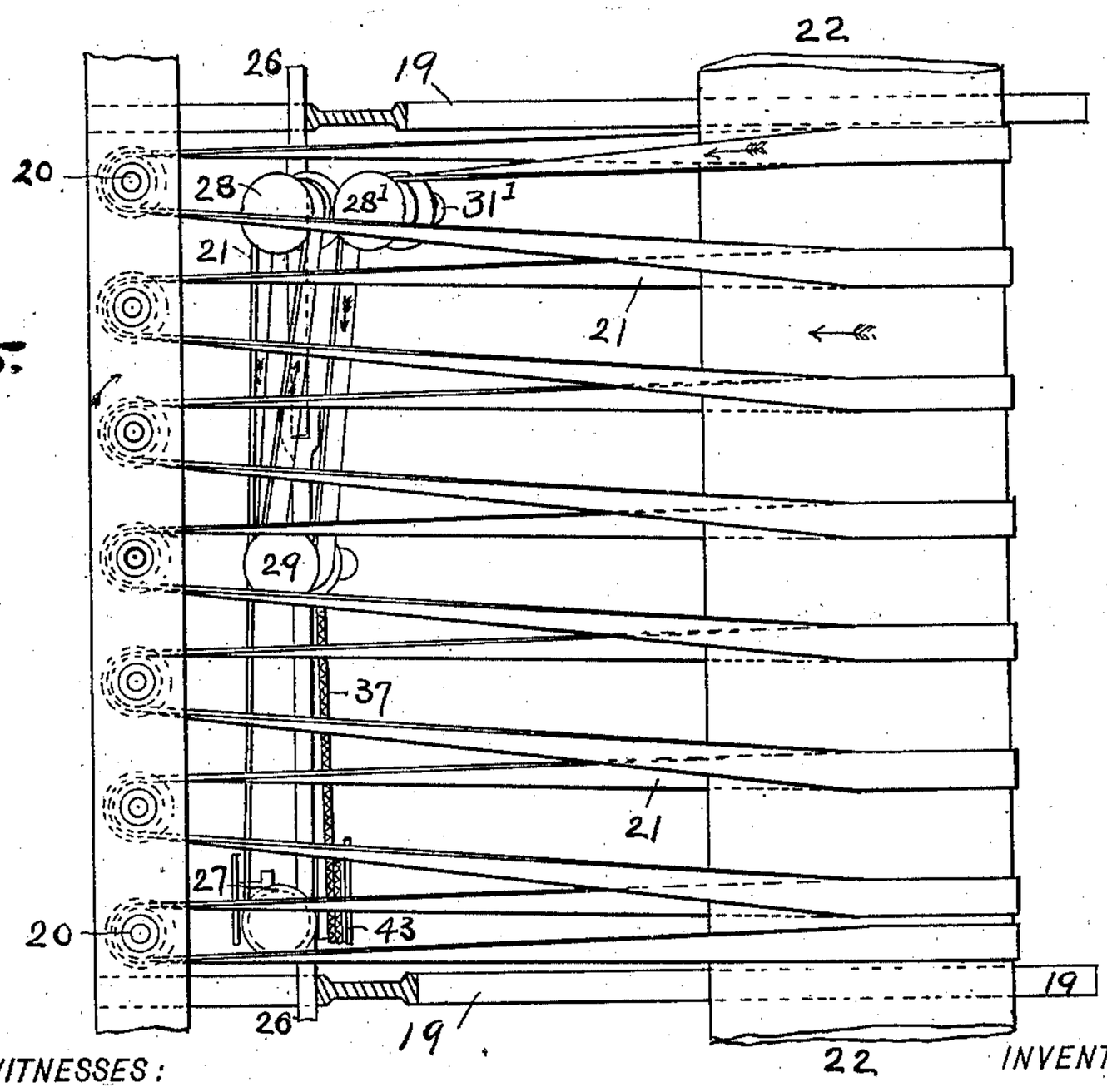


FIG. 15.



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No. 752,647. Patented February 23, 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. 752,647, dated February 23, 1904.

Application filed April 19, 1902. Serial No. 103,691. (No model.)

To all whom it may concern:

Be it known that I, JOHN BOYD, a subject of the King of Great Britain and Ireland, residing in Bothwell, county of Lanark, Scotland, have invented Improvements in Mechanism for Guiding and Applying Tension to Spindle-Driving Bands of Spinning, Twisting, Winding, and Like Machines, of which the following is a specification.

This invention comprises improvements designed for spinning, twisting, winding, and similar machines for fibrous materials, and pertains particularly to improved devices for guiding and tensioning spindle-driving bands of said machinery when all the spindles in a frame or in sections thereof are driven by one long endless band actuated by a driving-cylinder or its equivalent, whereby a more uniform speed and driving power are imparted to all the spindles, (or in case of dead-spindles to tubes or flyers which work thereon,) the wear and tear of bands are reduced, extra expenditure of power due to overtight bands is prevented, and a uniform twist is imparted to any fibrous material which may be spun or twisted thereby.

The invention consists, mainly, in the combination with each spindle-driving band and the driving-cylinder actuating the same, two or more stationary guide-pulleys, and one movable tension-pulley peculiarly made, arranged, and carried for the purpose of guiding and tensioning said bands in an improved manner, the carriage being pulled or strained by the action of adjustable weights or by an adjustable clock-spring device.

Figure 1 of the accompanying drawings is a vertical section of so much of a spinning-frame as is necessary to illustrate the application of my invention to a frame having spindles on both sides of its driving-cylinder all driven by one long endless cord band. Fig. 2 is a front elevation, and Fig. 3 is a plan, of the same. Figs. 4 to 11, inclusive, are separate views, on a larger scale, of the main parts of my improved spindle-band guiding and tensioning apparatus, as shown in Figs. 1, 2, and 3. Figs. 12 and 13 are a vertical section and a plan view of so much of a spinning-frame as is necessary to illustrate the application of my invention as applied to a frame having spindles on one side only of a driving-cylinder all driven by one long endless cord band; and Figs. 14 and 15 are a vertical section and a plan view of parts of a similar frame, showing my invention as applied to a frame of the same kind when all the spindles are driven by one long endless flat tape band.

In the construction illustrated in Figs. 1, 2, and 3 I have shown my improved mechanism as applied to a section of an ordinary spinning-frame 19, having seven spindles 20 on each side, all driven by one long endless cord spindle-driving band 21, actuated by a central horizontal driving-cylinder 22, the top of the latter being sufficiently under the level of the center of the pulleys of the spindles 20 on each side to prevent the coils of the band passing around the cylinder 22 from lapping, or in combination with the above and immediately under the driving-cylinder 22 an auxiliary angled cylinder 23 may be provided for each band 21, having live-spindles 24 and 25 at each end and stationary swiveled and angled bearings for the same, so as to guide and keep the coils of the band 21 well clear of one another, and thus more effectually keep them from lapping. The band when the auxiliary cylinder 23 is used is passed around both cylinders, as explained in the specification of United States Patent No. 617,276, of 1899, and shown in Figs. 1, 2, and 3 in drawings of the same; but in this case the auxiliary cylinder 23 being used only for guiding the band works on stationary bearings.

A longitudinal horizontal bar 26, a main part of my improved tension device slightly beveled on its top and under edges (as may be seen best in section in Fig. 4) and extending in one or more lengths the whole length of the frame 19, is fixed in the latter in any convenient way and in a suitable place for the purpose of carrying stationary guide-pulleys 27 and 28 (see Figs. 5 and 6 and Figs. 7 and 8) and a movable tension-pulley 29, provided for each band 21. (See Figs. 9 and 10.) The stationary guide-pulleys 27 and 28 are carried by brackets 30 and 31, adjustably secured to the bar 26 by projections of the brackets and by set-screws 32 and 33 or otherwise and so catch-

ing the top and under beveled surfaces of the bar wherever they are fixed. The tension-pulley 29 is mounted on a sliding or wheeled carriage-bracket 34, which when working moves backward and forward along the bar 26 between the stationary guide-brackets—in this case against the pull of the spindle-band 21—by the action of adjustable weights 35 and 36. These weights are suspended to or on a loop of a chain or cord 37, passed around a top pulley 38 and a pulley 39, carried by one of the fixed guide-pulley brackets 30 or otherwise. The other end of the cord 37 is connected to the carriage 34 for the purpose of acting on two or more coils of the band 21, which is carried around one of the fixed pulleys 28 and the tension-pulley 29, and thereby is made capable of automatically tensioning and taking up a great amount of slackness in the band 21 with a limited travel of the carriage 34 and its tension-pulley 29. The carriage 34 has an antifriction-roller 34′ at its top front end to bear on top of the bar 26 and a tail and projecting part 34″ to bear on the under side of the bar, which also serves to stop its travel in one direction, as the projecting snug 34‴ limits its travel in the other direction. Both the guide-pulleys 27 and 28 and the tension-pulley 29 are made with live footstep-spindles 40, working in oil-cup sockets 41, fixed to or as shown in the drawings, (see Figs. 4 and 11,) forming part of the stationary brackets 30 and 31 and of the carriage-bracket 34. Oiling holes or spouts 42 may also be made in latter for convenience of oiling the footstep-spindles 40 without entirely withdrawing the spindles. One of the stationary guide-pulleys 27 is made with one band-groove and is carried in its bracket 30 in a position and at an angle to suit the run of the band 21 as it goes or returns to the bottom of the cylinder 22 or, as shown in the drawings, to the top of the auxiliary cylinder 23 when the latter is used. The other stationary guide-pulley 28 and the tension-pulley 29 are formed with a proper number of grooves to suit the number of coils of the band which are required to pass round the same, and both these pulleys 28 and 29 are carried in their brackets 31 and 34 at an angle to suit the run of the band 21 as it goes from or returns to the top of the cylinder 22 or, as shown in drawings, when an auxiliary cylinder 23 is used to the bottom of the driving-cylinder 22.

When banding the spindles 20, beginning at one end and at the top of the cylinder 22, the band 21 is taken alternately round the latter and round the auxiliary angled cylinder 23 and round the **V**-grooved pulley of one spindle 20 on each side till the last two spindles of the section are banded, it being important that each two spindles, one on each side, should be driven direct from the cylinder 22, after which the band is taken once more round the two cylinders and over the top of the auxiliary cylinder 23 at one end, then round the two stationary pulleys 27 and 28 into a different groove each time and with one or more coils tight round latter and the tension-pulley 29 till it, with its carriage 34, is pulled close to the second stationary pulley 28, from which it is taken back round the bottom side and to the starting-point at the top of the cylinder 22, when the two ends are fastened together.

The directions of revolution and movements of parts are indicated by arrows. The tension-pulley 29 being pulled away from the second stationary pulley 28 by the weighted cord 37 and it sadjustable weights 35 and 36 thereby very equally tensions and takes up the slack of all the loops of the spindle-band 21, which pass round the cylinders 22 and 23 and spindles 20 on each side, the driving-band giving at the same time a regular rotary motion to all the spindles it drives.

In the construction illustrated in Figs. 12 and 13 I have shown my improved mechanism as applied to a section of a spinning-frame 19, having seven spindles 20 on one side only, all driven by one endless spindle-driving cord band 21, actuated by a horizontal driving-cylinder 22. My improved tension device, consisting of the horizontal bar 26, the stationary guide-pulleys 27 and 28, carried in their brackets 30 and 31, the movable tension-pulley 29, carried in its carriage 34, and the weighted cord 37 and its adjustable weights 35 and 36 are all placed in a similar position, as in the first construction, between the spindles 20 and the cylinder 22 for the purpose of guiding and tensioning the band, but a little higher, so as to suit the run of the band 21, and from the bottom of cylinder 22 at one end and to the top of the latter at the other end. The **V**-grooved pulleys of spindles 20 are, as in mules, in line or nearly in line with the center of the cylinder 22.

In banding the spindles 20, beginning at the top of the cylinder, the band is taken from the beginning to the end of the section alternately round the cylinder and round the successive **V**-grooved pulleys of spindles 20 and, lastly, from the under side of the cylinder 22 round one of the stationary guide-pulleys 27 and once or twice round the other stationary guide-pulleys 28 and the tension-pulley 29 and back to the starting-point at the top of the cylinder 22, when the band is tightened and the two ends fastened together.

In the construction illustrated in Figs. 14 and 15 I have shown my improved mechanism as applied to a section of a spinning-frame 19 of the same kind as shown in Figs. 12 and 13, having seven spindles 20 on one side only, all driven by one long endless and comparatively broad flat tape band 21, actuated by a horizontal cylinder 22. My improved tension device is the same in all its parts, except that in this case the guide and tension pulleys 27, 28,

and 29 are similar in form, being all made with top and bottom flanges and curved or bellied surfaces like the spindle-pulley 20′ commonly used for such bands, and an extra and similar stationary guide-pulley 28′ is provided, the socket part of which, 31′, is adjustably fixed to the stationary bracket 31 by screws, so as to adjust its angle to the run of the tape band 21 as it comes from the top of the cylinder 22, as shown in the drawings. Also in this construction instead of using a weighted cord 37 the weights are dispensed with, and the cord 37 is connected to and receives its necessary pull from the barrel 43 of an adjustable clock-spring device, which is carried on the bar 26 and may be made part of the guide-pulley bracket 30. In many cases this clock-spring device is better for acting on the tension-carriage 34 than adjustable weights shown in the first and second constructions.

Instead of the guide and tension pulley brackets of my improved mechanism being carried on a longitudinal bar the latter may be in some cases dispensed with, and the guide-pulley brackets may be fixed to some convenient part of the frame and the tension-carriage made to move on a longitudinal rail of the frame or on a longitudinal bracket fixed to the same.

When very heavy round cord bands are used for driving very large flier-spindles, grooved pulleys fixed on driving-shafts may be used to advantage instead of a driving-cylinder.

Flat tape bands, as well as round cord bands, if not too broad, can be used with the grooved guide and tension pulleys shown in Figs. 1 to 13.

By extending any of the constructions illustrating my improved mechanism a much larger number of spindles can be driven by one belt or band than it is possible to show in the drawings referring to the same.

Any necessary number of sets of my improved mechanism may be used on one frame and all carried on the longitudinal bar 26, according to its length and according to the number and pitch of the spindles in the same. As a rule one set of my improved mechanism is used to each section in the length of a frame.

In the claims the term "band" is intended to cover either the cord band or flat band or belt shown in the drawings and hereinbefore described or other suitable form of spindle-driving band.

I claim as my invention—

1. In spinning, twisting, winding and similar machines, in combination with a horizontal driving-cylinder, a driving-band, and a number of spindles driven by the band from the cylinder, two or more guide-pulleys having live footstep-spindles 40, oil-cup sockets 41 in which these spindles work, stationary brackets 30 and 31, of which said sockets form part, the sockets being at angles to suit the rim of the band as it goes to or returns from the driving-cylinder, a tension-pulley 29 having a live footstep-spindle 40, and an oil-cup socket 41 in which this last-named spindle works, a tension-pulley carriage 34, of which said last-named socket forms part, and the socket being at an angle to suit the run of the driving-band as it passes around said tension-pulley 29, all substantially as described.

2. In spinning, twisting, winding and similar machines, the combination of a horizontal driving-cylinder, a number of spindles and an endless band passing around the driving-cylinder and each of the spindles, with two stationary brackets 30 and 31, and guide-pulleys therein for the band, one of said brackets carrying more than one pulley, live footstep-spindles for said guide-pulleys, oil-cup-socket bearings for said pulleys at angles to suit the run of the band from and to the driving-cylinder, and a tension-pulley also having a live footstep-spindle and an oil-cup-socket bearing for the latter, substantially as described.

3. In spinning, twisting, winding and similar machines, in combination with a horizontal driving-cylinder, a driving-band and a number of spindles driven by the band from the cylinder, a horizontal bar 26, two or more stationary guide-pulleys mounted on said bar and having live footstep-spindles, oil-cup sockets in which these spindles work, stationary brackets 30 and 31 carrying these sockets, a tension-pulley 29 having a live footstep-spindle 40, an oil-cup socket 41 for this spindle, a tension-pulley carriage 34 carrying this last-named socket and mounted to traverse upon the bar 26 automatically between the guide-pulley brackets, the guide-pulleys being adapted to bring the endless band 21 back to the position from which it starts and the tension-pulley having means to tension the band, all substantially 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.