J. BOYD.

MECHANISM FOR GUIDING AND APPLYING TENSION TO SPINDLE DRIVING BANDS.

APPLICATION FILED MAY 14, 1909.

940,502. **Patented Nov. 16, 1909.**

3 SHEETS—SHEET 1.

Fig. 1.

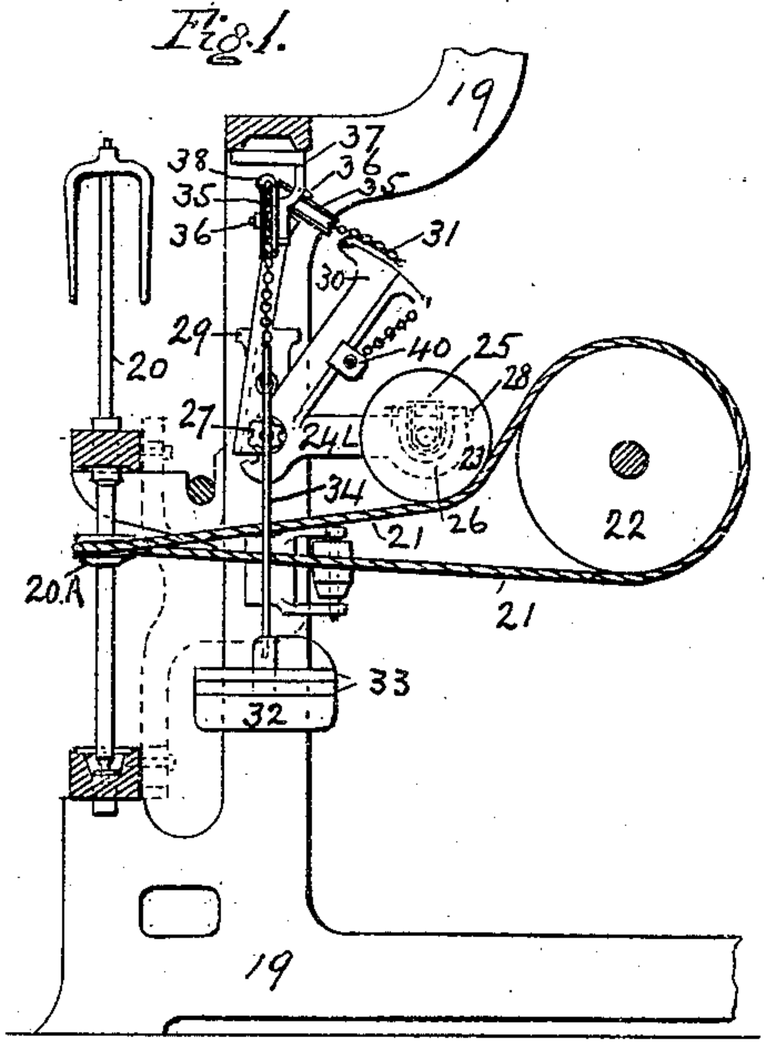


Fig. 2.

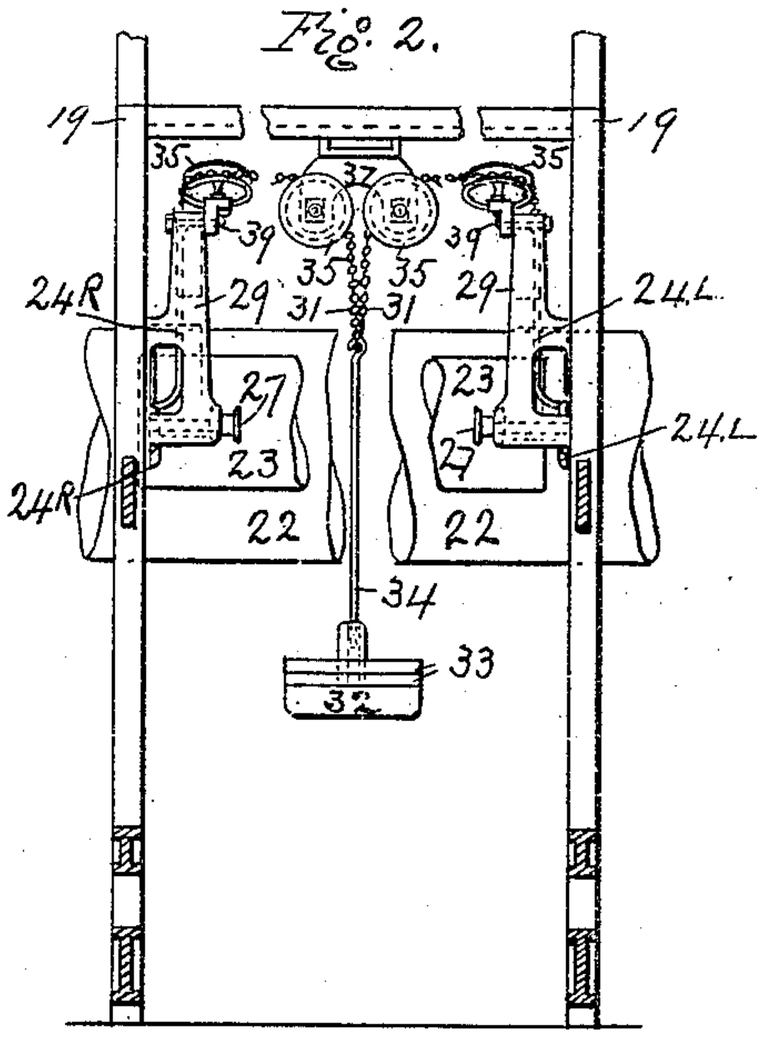
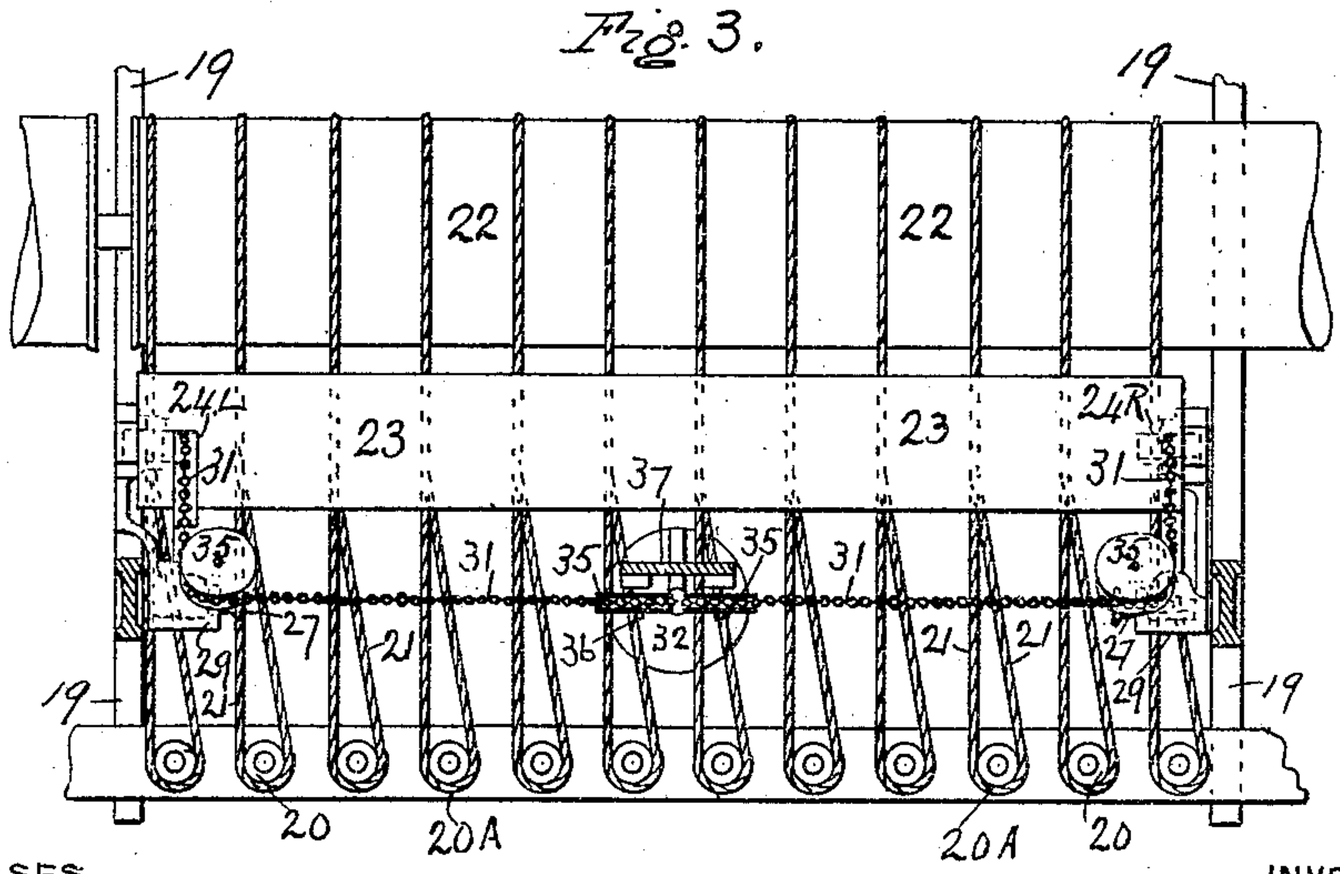


Fig. 3.



WITNESSES

L. H. Grote

M. E. Klein

INVENTOR

John Boyd

BY

Howson and Howson

his ATTORNEYS

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 4.

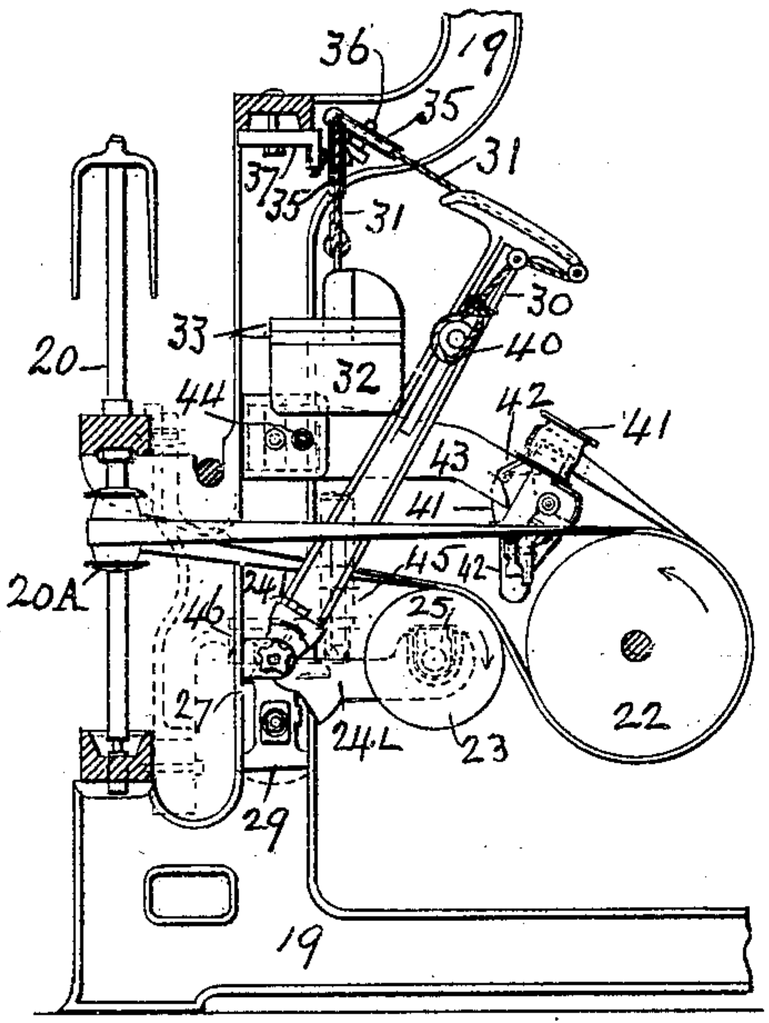


Fig. 5.

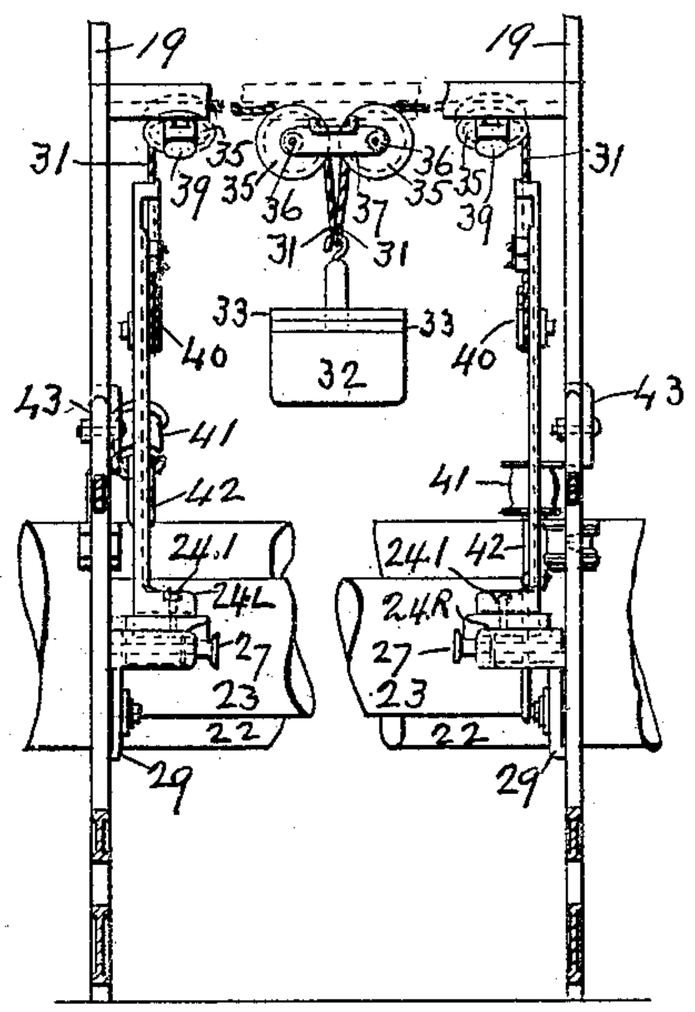
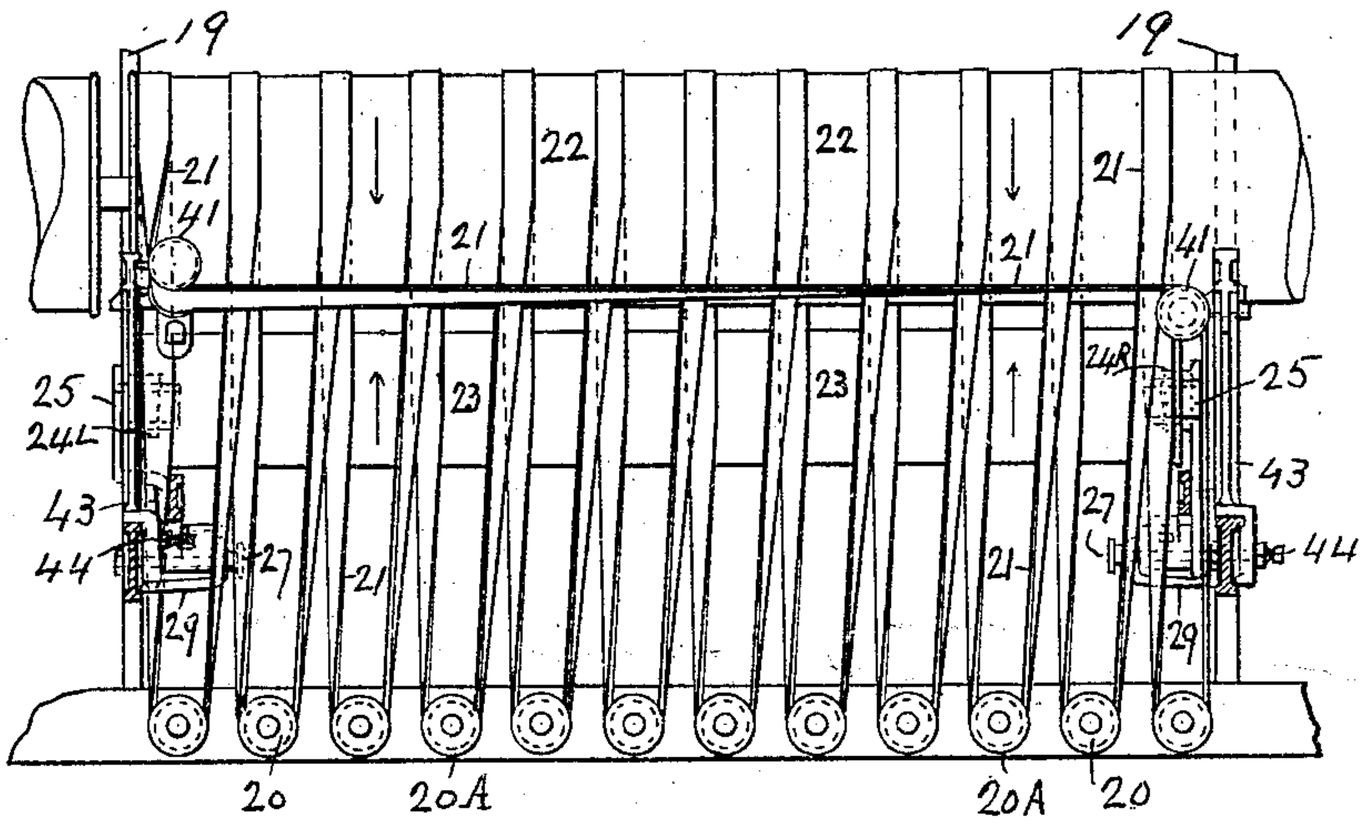


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

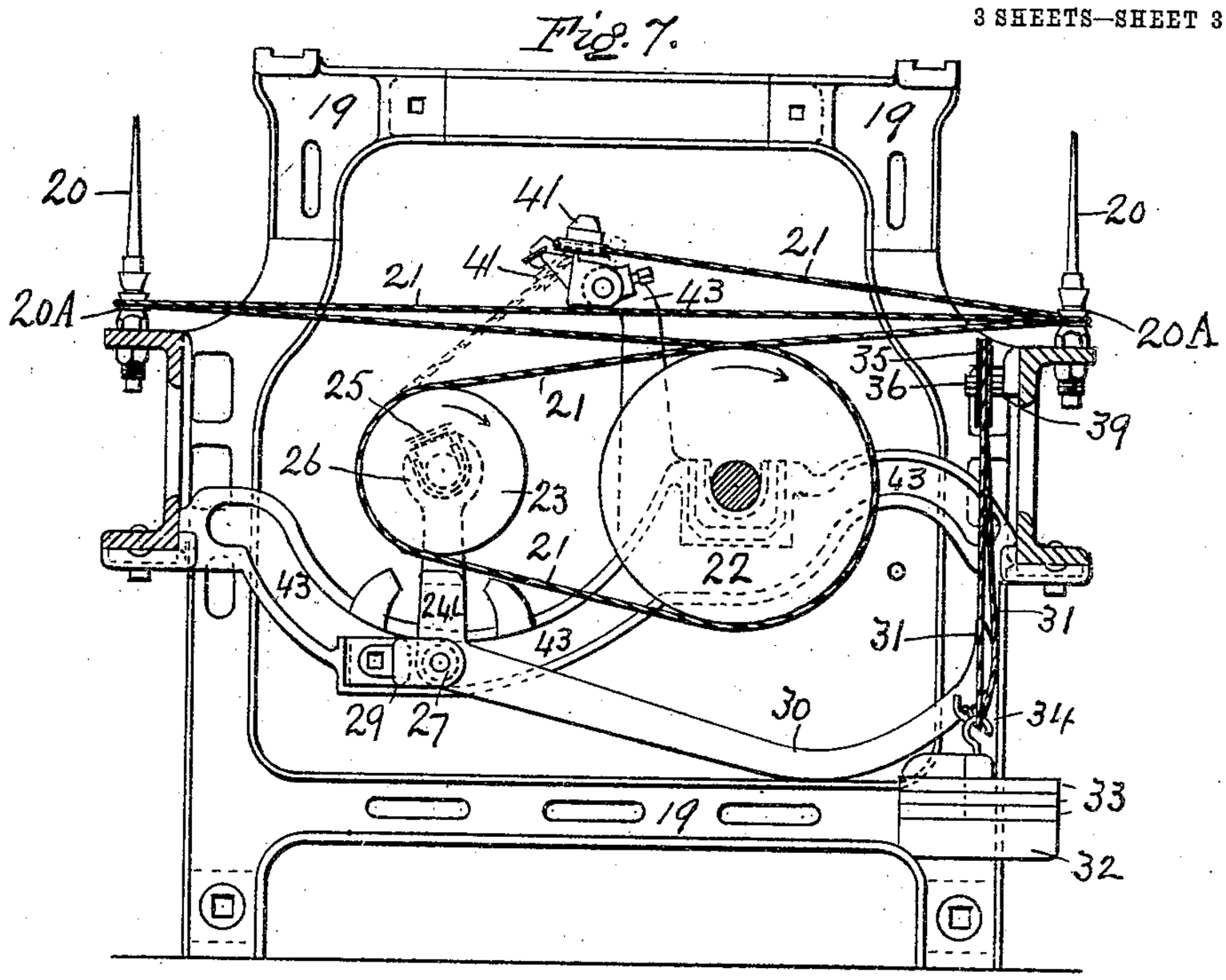
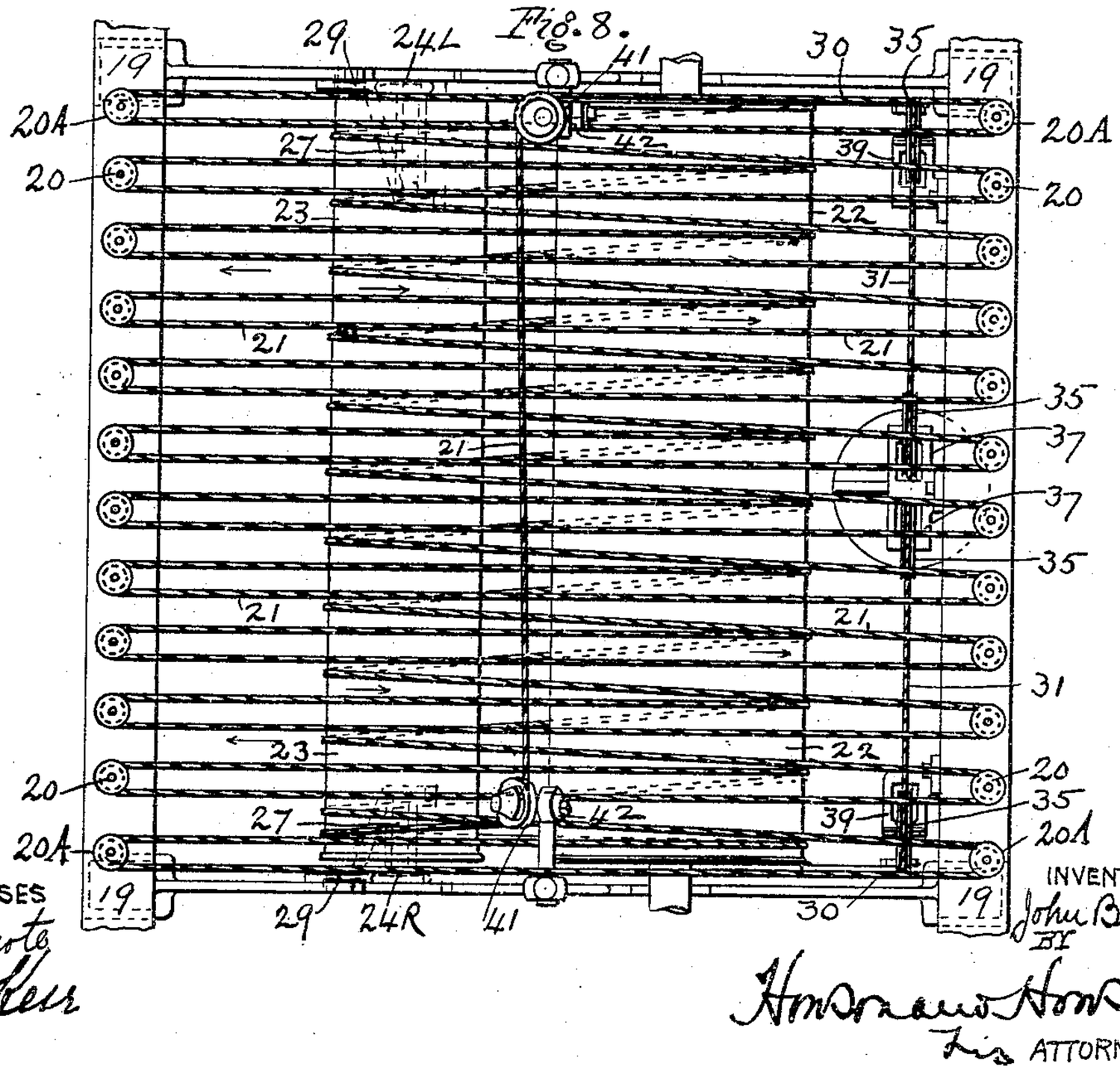


Fig. 8.



WITNESSES

L. H. Grote

M. E. Kerr

INVENTOR

John Boyd

BY

Howson & Howson

HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN BOYD, OF BOTHWELL, SCOTLAND, ASSIGNOR OF ONE-HALF TO DAVID PHILLIPS AND JAMES SCOTT & SONS, LIMITED, OF DUNDEE, SCOTLAND.

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

940,502. Specification of Letters Patent. **Patented Nov. 16, 1909.**

Application filed May 14, 1909. Serial No. 497,134.

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, 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 specification.

This invention comprises improvements designed for spinning, twisting, winding and similar machines for fibrous materials. It pertains to an improved mechanism of the kind described in the Phillips patent No. 908420 of 1908 for guiding and tensioning the banding of a number of contiguous spindles with one apparatus instead of using a separate guiding and tensioning apparatus for each band whereby a regular motion is imparted to the spinning spindles and a more uniform twist is imparted to the fibrous material which may be twisted thereby.

The invention consists mainly in combining the principal parts of existing mechanism, viz., (1) the pivoted tensioning cylinder lever, (2) its pivot frame bracket—and (3) its weighted arm, along with other improved details, hereafter referred to, in one compact apparatus adapted to work at each end of each tensioning cylinder, and instead of having as formerly a separate weight or set of weights for each pivoted lever—regulating the tension of each tensioning cylinder or two or more such tensioning cylinders by one weight or one set of weights—thereby entirely preventing the tilting of said tensioning cylinder or cylinders (a serious fault of the mechanism referred to), and not only making the mechanism much more convenient and effective for guiding and tensioning a number of contiguous single spindle driving bands, but also thereby when desirable and with a vastly better mechanism for the purpose making each set of the apparatus (with the addition of two guide pulleys) capable of guiding and tensioning all the individual coils of a long endless cord or flat tape band driving a number of contiguous spindles.

The invention is illustrated in the accompanying drawings.

Figures 1, 2 and 3 are a vertical section, a front and a plan view of so much of a dry spinning frame as is necessary to illustrate the application of the invention to a frame having spindles on one side only of a driving cylinder all driven by separate bands in which the tensioning cylinder is shown working above the spindle driving bands. Figs. 4, 5 and 6 are a vertical section, a front and a plan view of so much of a similar spinning frame as is necessary to illustrate the application of the invention to a frame having spindles on one side only of a driving cylinder all driven by one long endless tape band in which the tensioning cylinder is shown working under all the coils of the band. Figs. 7 and 8 are a vertical section and a plan view of as much of a cotton ring spinning frame as is necessary to illustrate the application of the invention to a frame having spindles on both sides of a main driving cylinder all driven by one long endless cord band when the top of the driving cylinder is slightly under the centers of the V spindle whirls.

In one embodiment of the invention, Figs. 1, 2 and 3, as applied to an ordinary spinning frame 19 having a number of spindles 20 on one side only of its main driving cylinder all driven by single bands 21 of equal length (and preferably by what are known as double looped cord bands) from the driving cylinder 22 the tensioning cylinder 23 being shown working above the bands 21. The bottom of the driving cylinder as shown in Fig. 1 is preferably on a plane about one inch lower than the center of the V spindle whirls 20^A. Each band 21 is passed around one of the V whirls to the bottom of and around over the top of the driving cylinder 22, then downward under the tensioning cylinder 23, and back toward the spindle whirl 20^A, where the two ends are secured. The tensioning cylinder 23 is placed in front of the driving cylinder 22 for the purpose of tensioning each band 21. Each tensioning cylinder 23 is carried preferably by two separate right and left pivoted swing levers 24^R and 24^L. In some cases, however, one pivoted swinging lever, instead of two, may be used to advantage to carry the gudgeons of two contiguous tensioning cylinders when they are working end to end. The end gudgeons of each tensioning cylinder are sustained by and run in oscillating bushes 25, 25, carried in open gabs 26, 26, formed

in the levers 24^R and 24^L. The pressure of the tensioning cylinder in this case being downward on the top of the bands, each lever gab has a cross pin 28, passed through the top part of its bush 25, to receive its upward pressure and so keep the bush in its place. The levers 24^R and 24^L. are pivoted on live spindles 27, 27, sustained by frame brackets secured to the framing 19. The centers of the live spindles 27, 27, and of the tensioning cylinder gudgeons are preferably on the same plane (and about one inch higher than the center of the main driving cylinder) when the levers 24^R and 24^L are at half-stroke and they are centered so that the tensioning cylinder can be made to take up a great amount of slackness in the spindle driving bands.

Instead of the levers 24^R and 24^L having as formerly a separate weight or set of weights for each quadrant lever 30, two chains 31, 31, as shown in Figs. 1, 2 and 3, or two cords as shown in Figs. 4, 5, 7 and 8 connected to a common central suspended weight 32 and adjustable weights 33. 33. by a hooked wire 34, are passed over right and left central vertical grooved pulleys 35, 35, revolving on studs 36 or spindles carried by a central rail bracket 37. The chains or cords 31, 31, are then passed through holes in the center gables of the frame 19, if any of these intervene, and around right and left angled grooved pulleys 35. 35. revolving on studs or spindles 36, 36, carried by brackets 39, 39, secured to the top of the frame brackets 29, 29, or by independent right and left rail brackets 39, 39. The chains or cords are then adjustably connected to the quadrants 30, of their right and left levers 24^R and 24^L by set screws and fixtures 40 by which the tensioning cylinder 23 can be conveniently set parallel to the driving cylinder 22 and kept thereby from being tilted or canted.

A single set of weights 32 and 33 for each tensioning cylinder acts equally well when as in Figs. 1, 2 and 3, the tensioning cylinder 23 rests on the top of and tensions a set of single bands 21, or when as in Figs. 4, 5 and 6, the tensioning cylinder is working under and tensioning all the coils of one long endless flat spindle driving band 21, common to a number of spindles 20, or when, as in Figs. 7 and 8, the tensioning cylinder is shown working on one side of the driving cylinder 22 and tensioning all the coils of one long endless cord band 21 common to a number of contiguous spindles 20 on both sides of the frame.

When as in Figs. 1, 2 and 3, the tensioning cylinder rests on top of the bands, it will be observed that the constant weight 32 is much lighter than when the cylinder is located below the bands and is pressed up against the same. In the latter case the weight 32 has not only to take up the weight of the cylinder but also to apply the tensioning pressure of the same against the band, whereas in the first mentioned arrangement, the cylinder itself together with its supporting lever arms constitutes the tensioning pressure, the weight of which is taken up in part only by the weight 32 and, if desirable, still further by the addition of the adjustable weights 33.

Though connecting the quadrants 30 of each pair of levers 24^R and 24^L with a common set of weights 32 and 33 by means of chains or cords 31 passing around grooved pulleys 35 is more sensitive and therefore preferable, the connecting of the quadrants 30 of the levers by chains or cords to pulleys on a suitably placed and carried rocking shaft counter-weighted by a suspended set of weights may serve the same purpose. One common set of suspended weights may also be made to regulate the tension of two or more tensioning cylinders 23 by one long rocking shaft having a number of chain pulleys secured to it and chains or cords connected to two or more levers or pairs of separate and independent levers 24^R and 24^L. One common set of suspended weights may also by means of one long chain or rod suitably connected to two or more levers or pairs of levers 24^R and 24^L be made to regulate the tension of two or more tensioning cylinders 23.

In the second embodiment of the invention Figs. 4, 5 and 6 as applied to a similar dry spinning frame 19 having a number of spindles 20 on one side only, driven by one long endless flat tape band 21 from the driving cylinder 22 in which the tensioning cylinder 23 is shown working below the coils of the band, the top of the driving cylinder is in its usual position in relation to the spindle whirls 20^A to suit the run of the band 21 as it goes from the cylinder to the spindles. Each tensioning cylinder 23 is carried by levers 24^R and 24^L pivoted on frame brackets 29, 29, provided with stoppers to limit their swing. The centers of their pivot spindles 27, 27 and the tensioning cylinder 23 are on the same plane when the levers are at half stroke. Each lever 24 is provided with an adjustable upwardly projecting quadrant lever 30, which can be set and secured by their set screws 24.1 to clear the coils of the band 21 between which the levers 30, 30, are placed. As in the first embodiment of the invention the regulating of the tension of each cylinder 23 and the keeping of the latter from tilting are accomplished by connecting the arms 30 of the pivoted levers 24^R and 24^L by chains or cords 31, 31, passed over grooved pulleys 35 to a common set of suspended weights 32, 33. Two guide pulleys 41, 41, and brackets 42, 42, to carry the same are provided for each tensioning cylinder to return the endless

tape to the other end of the tensioning cylinder. Beginning at the first spindle 20 at one end of the tensioning cylinder 23 from each whirl 20^A the flat tape 21 when running is carried direct over the top of the tensioning cylinder 23 around the under side of and over the top of the main driving cylinder 22 direct to and around each next spindle whirl 20^A to the end of the section—when the tape from the top of the cylinder 22 is passed around the angled guide pulley 41 and back over the top of the spindle banding, around the other slightly angled guide pulley 41 and back to the first spindle whirl 20^A which in order to suit the run of the long tape band 21 is fixed higher on its spindle 20 than the rest of the other whirls are. By this method of banding the spindles, every spindle 20 is driven direct by the tensioning cylinder 23 and the main driving cylinder 22. When necessary, guide pulleys and brackets 45 and 46 shown in hatched lines in Fig. 4 are used to keep the band 21 from coming in contact with the center gables of the frame 19. The guide pulleys 41, 41, have each live spindles running in oil cup sockets 42 adjustably secured to suitably formed frame brackets 43. The frame brackets 43 are adjustably secured to the framing 19 and are each provided with an adjustable set screw 44 for the purpose of setting the inner end of the bracket to right or left and fixing it in this position when in some cases without such an adjustment the tape 21 would not run clear of the right hand oil cup socket 42 as shown in Fig. 6.

Though the driving of a number of contiguous spindles 20 with one long tape 21 is shown only in the second embodiment, both of the embodiments of the invention shown in Figs. 1, 2, and 3 and in Figs. 4, 5 and 6 can be worked to advantage with either short single bands 21 or with a long endless band if the whirls 20^A are made suitable for same.

In a third embodiment of the invention, Figs. 7 and 8 as applied to a section of a cotton ring spinning frame 19 a number of spindles 20 on both sides of a frame are driven by one long endless cord band 21 from a central driving cylinder 22. The top of the cylinder 22 is slightly under the centers of the V spindle whirls 20^A of the spindles 20 on each side. Each tensioning cylinder 23 is carried by levers 24^R and 24^L pivoted on frame brackets 29, 29, provided with stoppers to limit their swing. The centers of their pivot spindles 27, 27, and the centers of the tensioning cylinder 23 are on the same vertical line when the levers are at half stroke. Each lever 24 has a long horizontal arm 30 and, as in the former embodiments of the invention, the regulating of the tension of each cylinder 23 and the keeping of the latter from tilting are accomplished by connecting the arm 30 of the pivoted levers 24^R and 24^L by chains or cords 31, 31, passing over grooved pulleys 35 to a common set of suspended weights 32, 33. Two guide pulleys 41, 41, running in oil cup sockets 42 carried by frame brackets 43 are provided for each set of the apparatus to return the cord to the other end of each tensioning cylinder. When banding the spindles 20 beginning at one end of the tensioning cylinder the band (as shown in Fig. 8) is passed from one of the guide pulleys 41 around two spindle whirls 20^A on opposite sides of the frame, then right around both cylinders 22 and 23 and direct to and alternately around each next two opposite spindle whirls 20^A and both cylinders to the end of the section. Finally the band from the top of the cylinder 23 is passed around the second angled pulley 41 and the two ends of the band are secured. The guide pulleys 41, 41, have each live spindles running in oil cup sockets 42 adjustably secured to suitably formed frame brackets 43. By this method of banding the spindles every two opposite spindles 20 are driven directly by the tensioning cylinder and the main cylinder.

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—

1. In mechanism of the character described, a frame, a tensioning cylinder, a bracket at each end of said cylinder, a lever pivoted on each of said brackets and supporting each end of the cylinder, in combination with a weight arm for each lever, a weight common to both levers and flexible means for connecting said arm of each lever to said common weight for the purpose described.

2. In mechanism of the character described, a frame, a tensioning cylinder, a bracket at each end of said cylinder, a lever pivoted on each of said brackets and supporting each end of the cylinder, in combination with a weight arm for each lever and a weight common to both levers and flexible means for connecting said arm of each of said levers to said common weight for the purpose described together with means for adapting said cylinder for tensioning the coils of a single band for driving a series of contiguous spindles.

3. In machines of the type described, a common horizontal driving cylinder, a plurality of spindles, band means for driving the same from said cylinder, a horizontal tensioning cylinder for tensioning said band means, independent levers one at each end of the tensioning cylinder to carry the same, in combination with a weight common to both levers for regulating the tension of the cylinder and keeping it from tilting, together

with cords or chains connected to both levers and to the common weight, and guide pulleys for said cords or chains.

4. In machines of the type described, a common horizontal driving cylinder, a plurality of spindles, a common horizontal tensioning cylinder, independent levers one at each end of the tensioning cylinder to carry same and means substantially as described for adapting said cylinders for tensioning the coils of a single band for driving a series of contiguous spindles, in combination with a weight or set of weights common to both levers for regulating the tension of the cylinder and keeping it from tilting together with cords or chains connected to both levers and to the common set of weights, and guide pulleys for said cords or chains.

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

JOHN BOYD.

Witnesses:
JAMES CUNNINGHAM,
R. EDWARD BOYD.