Aug. 25, 1931. J. A. KOOISTRA 1,820,310

SPINDLE DRIVING MECHANISM

Filed Feb. 6, 1931

Fig. 1.

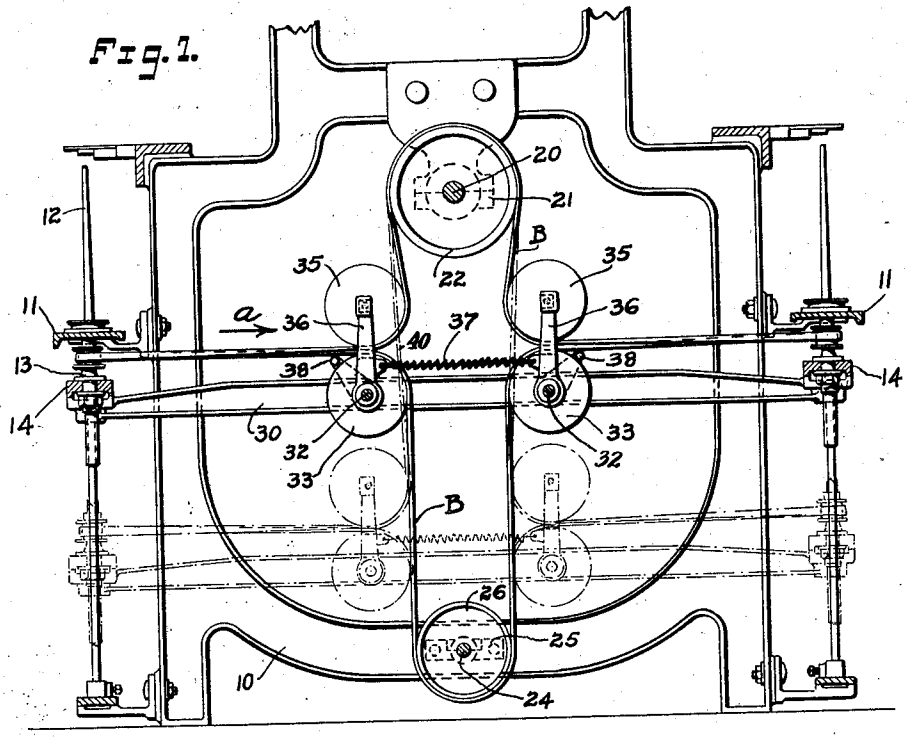
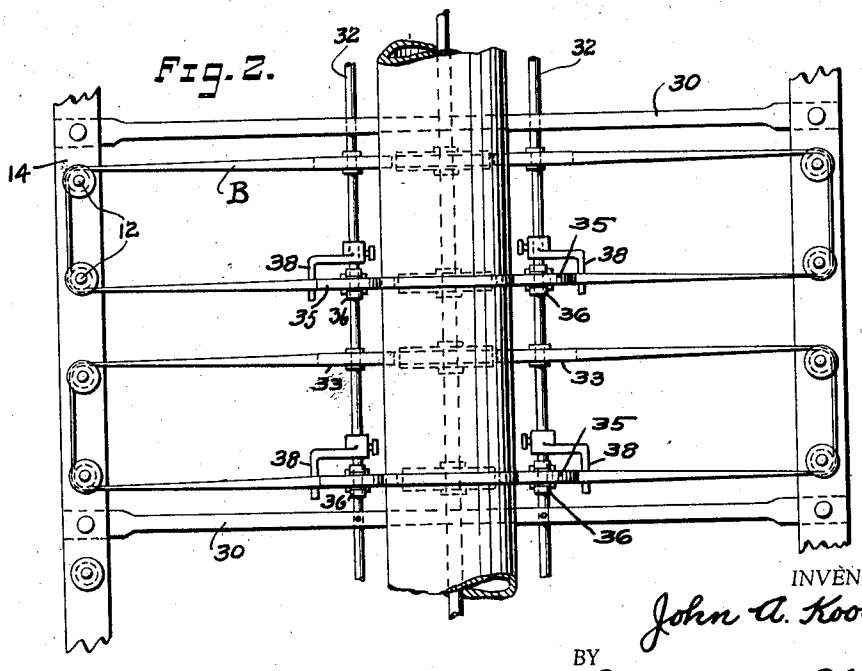


Fig. 2.



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Patented Aug. 25, 1931 1,820,310

UNITED STATES PATENT OFFICE

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SPINDLE DRIVING MECHANISM

Application filed February 6, 1931. Serial No. 513,983.

This invention relates to spinning or twisting machines in which the spindles and spindle rails are raised and lowered during the operation of the machine.

It is the general object of my invention to provide a spindle driving mechanism for use in such machines so designed that it is effective and satisfactory for driving the spindles in either direction, without substantial change in driving tension.

A further object is to provide a construction in which both the upper and lower shafts are mounted in fixed bearings, so that power may be conveniently applied through either or both of these shafts.

With these general objects in view, my invention relates to certain arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a sectional end elevation of a spinning or twisting machine embodying my improvements, and

Fig. 2 is a partial plan view thereof.

Referring to the drawings, I have shown parts of a spinning or twisting machine comprising an end frame 10 having ring-rails 11 fixed to the sides thereof and having spindles 12 mounted in bases 13 which are secured in vertically movable spindle rails 14. Any usual commercial mechanism may be used for raising and lowering the spindle rails 14 and the spindles 12 carried thereby.

An upper shaft 20 is mounted in fixed bearings 21 and supports a drum or a plurality of pulleys 22. A lower shaft 24 is mounted in fixed bearings 25 and supports a lower drum or a plurality of pulleys 26.

A cross frame member 30 extends from side to side of the spinning or twisting machine and is secured at its ou er ends to the under sides of the spindle rails 14, so that the spindle rails at the two opposite sides of the machine, together with the cross frame member 30, will all move upward or downward as a unit. In the preferred construction, a plurality of the cross frame members 30 are provided, spaced apart as indicated in Fig. 2.

Rods or shafts 32 extend through openings in the cross frame members 30 and are preferably fixed therein. The rods 32 rotatably support loosely mounted guide pulleys 33. Additional guide pulleys 35 are pivotally mounted at the upper ends of arms 36, which are themselves pivotally supported on the rods or shafts 32. Tension springs 37 connect each pair of opposite arms 36 and tend to draw the arms 36 and the upper guide pulleys 35 toward each other. Stop arms 38 (Fig. 2) are fixed on the rods 32 and limit outward swinging movement of the arms 36.

A continuous driving belt B is commonly provided for each group of four spindles 12, driving two spindles on each side of the machine, but each belt B may drive only one spindle at each side. The belt B passes over the upper drum or driving pulley 22, under a guide pulley 35 around a pair of spindles 12 at one side of the machine, over a guide pulley 33, under the lower pulley or drum 26, over a second guide pulley 33, around a pair of spindles at the opposite side of the machine from those first mentioned, and then under a second guide pulley 35 and back over the upper drum or pulley 22, all as clearly shown in Figs. 1 and 2.

The swinging guide pulleys 35 are yieldingly drawn against the belt B by the springs 37 and act to take up the slack in the driving belts.

Either the upper shaft 20 or the lower shaft 24 may be positively driven and when either shaft is driven, the other shaft may be left free to rotate. Preferably, however, the shafts 20 and 24 are connected by a chain 40 (Fig. 1) running over sprockets (not shown) proportionate to the diameters of the drums 22 and 26, so that the two drums will be rotated in unison and with the same peripheral speed, thus providing a double driving engagement with the belts B.

With the construction shown and described, it will be seen that the cross frame members 30, with their supported guide pulleys 33 and 35, may be moved upward or downward with the spindles 12 without changing the effective length of the belts B or

interfering in any way with the continued rotation of the spindles.

Furthermore, the direction of rotation may be changed without affecting the belt tension or the spindle speed. If the belt B is driven in the direction of the arrow *a* in Fig. 1, the left hand arm 36 will swing outward to a fixed position against its stop 38 and the right hand take-up pulley 35 will swing inward under the tension of the spring 37 to take up the slack in the belt.

If the belt B is driven in the opposite direction, the right hand arm 36 will move outward to fixed position against its stop 38 and the left hand pulley 35 will take up the slack. The conditions of operation are thus identical, regardless of the direction in which the belt is driven and in which the spindles are rotated.

In the claims, the word "pulley" will be understood to include a drum or cylinder, which is in effect a pulley of wider face.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. Spindle driving mechanism for axially movable belt-driven spindles comprising a machine frame, upper and lower shafts mounted in fixed bearings on said frame, pulleys on said shafts, a cross frame member mounted to move vertically with said spindles, guide pulleys rotatably mounted in fixed relation to said cross frame member, take-up pulleys mounted on arms pivoted on said cross frame member, means to apply yielding tension to said arms, and continuous belts each engaging pulleys on said upper and lower shafts, guide pulleys, take-up pulleys and a plurality of spindles.

2. Spindle driving mechanism for axially movable belt-driven spindles comprising a machine frame, upper and lower shafts mounted in fixed bearings on said frame, pulleys on said shafts, a cross frame member mounted to move vertically with said spindles, guide pulleys rotatably mounted in fixed relation to said cross frame member, take-up pulleys mounted on arms pivoted on said cross frame member, means to apply yielding tension to said arms, and continuous belts each engaging pulleys on said upper and lower shafts, a guide pulley, a take-up pulley and a plurality of spindles at one side of the machine and a guide pulley, a take-up pulley and a second plurality of spindles at the opposite side of the machine.

3. Spindle driving mechanism for axially movable belt-driven spindles comprising a cross frame member movable vertically with said spindles, guide pulleys mounted on said cross frame member, take-up pulleys yieldingly mounted on said cross frame member, vertically spaced pulleys rotatable about fixed axes above and below said cross frame member, one of said spaced pulleys being positively driven, and a single belt connecting said spaced pulleys, said guide and take-up pulleys, and a plurality of said spindles.

4. The combination in spindle driving mechanism as set forth in claim 3, in which fixed supports are provided for said spaced pulleys.

5. The combination in spindle driving mechanism as set forth in claim 3, in which means is provided for rotating said spaced pulleys in a predetermined speed relation.

6. Spindle driving mechanism for axially movable belt-driven spindles comprising a machine frame, upper and lower shafts mounted in fixed bearings on said frame, pulleys on said shafts, a cross frame member mounted to move vertically with said spindles, guide pulleys rotatably mounted in fixed relation to said cross frame member, take-up pulleys mounted on arms pivoted on said cross frame member, means to apply yielding tension to said arms, and stops to limit outward swinging movement of said arms.

In testimony whereof I have hereunto affixed my signature.

JOHN A. KOOISTRA.