Aug. 22, 1950 J. A. KOOISTRA 2,519,769

SPINDLE DRIVING MECHANISM FOR SPINNING FRAMES

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Fig. 1.

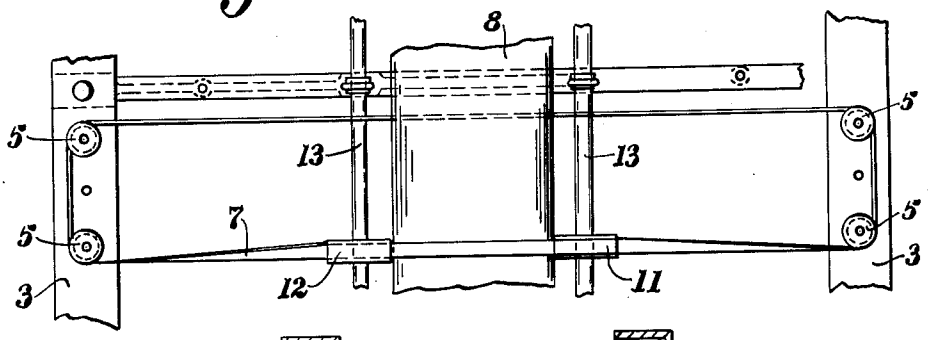


Fig. 2.

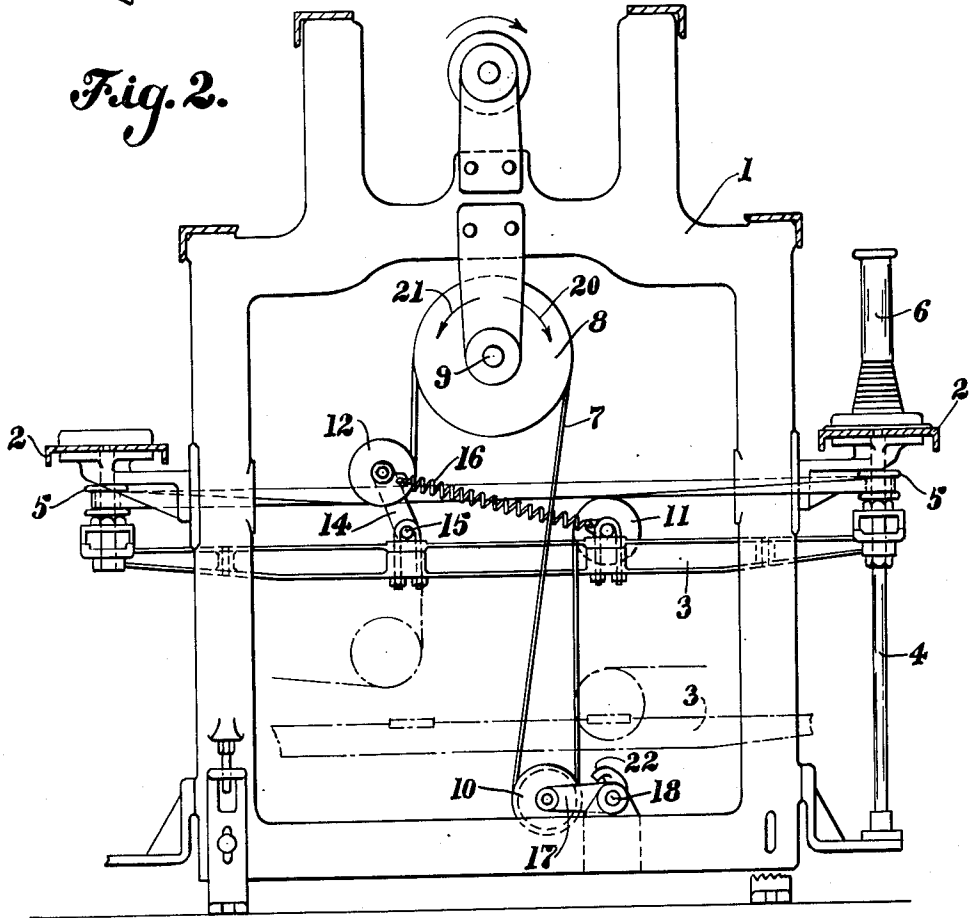
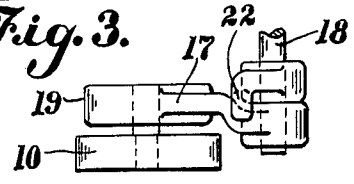


Fig. 3.



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SPINDLE DRIVING MECHANISM FOR SPINNING FRAMES

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2 Claims. (Cl. 57—105)

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This invention relates to the means for driving or rotating the spindles of a spinning or twisting frame of that type in which the spindles are carried by a spindle frame which rises and falls during the operation of the frame to effect the proper winding of the yarn upon the bobbins or yarn receivers.

In this type of apparatus the spindles are located in rows, one row at each side of the moving spindle frame, and a plurality of belts are employed each of which drives a group of spindles located at both sides, usually a group of four with two at each side, and these belts are driven by a suitably driven cylinder mounted on the main frame above the spindle frame. Such a type of spinning frame is well known in the art and an example is disclosed in Patent No. 1,820,310 granted August 25, 1931.

The object of the present invention is to secure uniformity in the operation and control of the series of these driving belts so that the spinning operation shall be uniform throughout, and further to maintain this uniformity of operation and control regardless of the direction in which the belts are driven, it being understood that the belts are driven in one direction to secure a right hand twist of the yarn and in the opposite direction to secure a left hand twist.

The object of the invention is further so to simplify the construction that a minimum number of guiding pulleys are carried by the rising and falling spindle frame, thus to maintain the load on that movable frame as low as possible.

The object of the invention is further to provide for equalization of the various belts by providing a single or common driving element for all of the belts above the spindle frame and a freely rotating individual pulley for each belt below the spindle frame.

The object of the invention is further to provide means by which the several independent pulleys below the spindle frame shall independently exert yielding pressure against the several belts.

The object of the invention is further to provide for an efficient and proper slack control of each belt, due to the pushing of the belt toward one of the pulleys in whichever direction the belt is driven, by making use, in the case of each belt, of a single yielding pulley on the movable spindle frame and one of the yielding pulleys on the main frame below the spindle frame.

The nature and objects of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

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The drawings illustrate so much of a familiar type of spinning frame as is necessary to a disclosure of the invention together with a preferred form of the invention embodied therein. It will be understood that the spinning frame is a long machine and that the spinning elements are repeated throughout its length so that it is only necessary to illustrate one of such elements and a small portion of the frame.

In the drawings:

Fig. 1 is a top plan view of a section of the frame illustrating the arrangement of the drive for one group of spindles;

Fig. 2 is an end elevation of a portion of the spinning frame; and,

Fig. 3 is a top plan view of a detail.

The spinning frame comprises end frames, one of which 1 is illustrated. In the type shown at each side of the main frame and supported therefrom are the fixed rails 2 on which rings are mounted. The spindle frame 3 extends transversely and is guided in its up and down, or rising and falling movement, between the positions shown in full lines and in dotted lines by the vertical guides 4. On this spindle frame at each side are rotarily mounted the spindles each of which is provided with a whirl 5 and each of which carries a suitable bobbin or yarn receiver 6. These spindles, which are arranged in two rows one at each side of the spindle frame extending the length of the entire frame, are driven by a plurality of belts with each belt driving a group of spindles located at both sides. With the ordinary arrangement illustrated each group, as shown in Fig. 1, comprises four spindles, two located at each side and driven by the single belt 7. A cylinder 8 is journaled at 9 on the main frame above the spindle frame and is driven by suitable means. This driving cylinder acts to drive the entire series of belts and the arrangement is the same for each belt, so that it is sufficient to describe this arrangement for but one belt.

With this invention but three pulleys are required for each belt and but two of these three are carried by the rising and falling spindle frame and by means of these three perfect equalization and control of the several belts is secured during the rising and falling movement of the spindle frame and the entire spinning operation and this regardless of the direction in which the belts are driven to effect either form of twist.

One pulley 10 is mounted on the main frame below the spindle frame, the second pulley 11 is fixedly journaled on the spindle frame toward one side, and the third pulley 12 is mounted on the spindle frame toward the other side. For complete utilization of the invention the pulleys 10 and 12 are mounted so as yieldingly to press against the belt.

The pulley 11 is conveniently mounted on a rod 13 which extends lengthwise of the frame and thus supports the series of pulleys for the belts at this position. The pulley 12 is journaled on an arm 14 and this arm is journaled on another rod 15 mounted on the spindle frame and extending lengthwise of the frame so as to support the other pulleys of the series. The pulley 12 is yieldingly pressed against the belt by suitable means, such as the spring 16 connecting the arm 14 to a fixed point on the spindle frame. The pulley 10, see Fig. 3, is journaled on an arm 17 pivoted on a shaft 18 which also extends lengthwise of the frame as a journal for the other pulleys of the series. This pulley 10 is yieldingly pressed against the belt by suitable means and for that purpose a suitable weight 19 is attached to the arm 17.

The belt, as shown, passes from the whirl of the spindle shown at the right of Fig. 2, over the fixed pulley 11, thence around under the yielding pulley 10, thence up and around the driving cylinder 8, thence down and under the pulley 12, thence to the spindle shown at the left of Fig. 2, and thence back and around the other two spindles as shown in Fig. 1.

The two yielding pulleys, 12 carried by the movable spindle frame and 10 mounted on the main frame below the spindle frame, respectively act to take up any slack in the belt when the driving drum is driving the belt toward them. For example, when the belt is running in the direction of the arrow 20 the run of the belt extending from the driving drum down to the pulley 10 will be pushing down and the weight 19 will act to press against the belt, while the run extending from the pulley 12 up to the driving drum will be pulling up on the pulley 12 and the limit of upward movement of this pulley will be fixed by the straightening out of the arm 14. When the driving drum is running in the direction of the arrow 21 the run of the pulley extending from the drum down to the pulley 12 will be pushing downward and the spring 16 will act to cause the pulley 12 to take up the slack. Also the run extending from the pulley 10 up to the driving drum will be pulling and the yielding pulley 10 will move up until the arm 17 contacts with a fixed stop 22. Thus it will be seen that a very simple and efficient construction is provided by this invention. Only three pulleys are required for each belt and only two of these are carried by the moving spindle frame. Each belt driven by the common driving cylinder passes at the bottom of the frame over its own individual, freely rotatable, pulley and thus the control of each belt at the bottom of the spinning frame is independent of the others. Furthermore, by providing for a yielding action of the freely rotating pulley at the bottom of the spindle frame it is necessary only to provide for the yielding action of a single pulley on the movable spinning frame in order to provide for taking up that slack in the belt caused by the driving drum driving the belt in one direction or the other.

It will thus be seen that in its preferred form the invention provides a very simple and efficient construction employing a minimum number of elements and particularly of those carried upon the movable spindle frame. There is but a single driving element for all of the belts in the form of a cylinder or drum and for each belt but three idler pulleys are necessary, one on the main frame below the spindle frame and two mounted upon and carried by the spindle frame, and in order to secure complete slack control and tension and secure uniformity of operation it is only necessary to provide for the yielding action of but two of these pulleys, one on the spindle frame and one below the spindle frame.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In a spinning frame having a main frame, a rising and falling spindle frame, a plurality of spindles rotarily mounted on each side of the spindle frame, a plurality of belts each driving a group of spindles located at both sides, and a driving cylinder for engaging and driving all the belts, the driving combination in which there are three idler pulleys for each belt, one on the main frame below the spindle frame yieldingly pressed against the belt, a second fixedly journaled on one side of the spindle frame, and a third mounted on the other side of the spindle frame and yieldingly pressed against the belt and in which the belt passes from a spindle at the one side over the second pulley, thence around the first, thence around the cylinder and thence under the third to the spindle at the opposite side.

2. In a spinning frame having a main frame, a rising and falling spindle frame, a plurality of spindles rotarily mounted on each side of the spindle frame, a plurality of belts each driving a group of spindles located on both sides, and a driving cylinder mounted on the main frame longitudinally of the spindle frame for engaging and driving all the belts, the combination of a series of freely and independently rotatable pulleys one for each belt opposite the driving cylinder, means acting to press each pulley independently and yieldingly against its belt, a second series of pulleys one for each belt mounted on the spindle frame and yieldingly pressed against the runs of the respective belts extending opposite the runs between the driving cylinder and the first series of pulleys, each pulley of both series acting when the driving cylinder is driving the belt toward it to take up slack in the belt.

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