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DOFFING ARRANGEMENT

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FIG. 1.

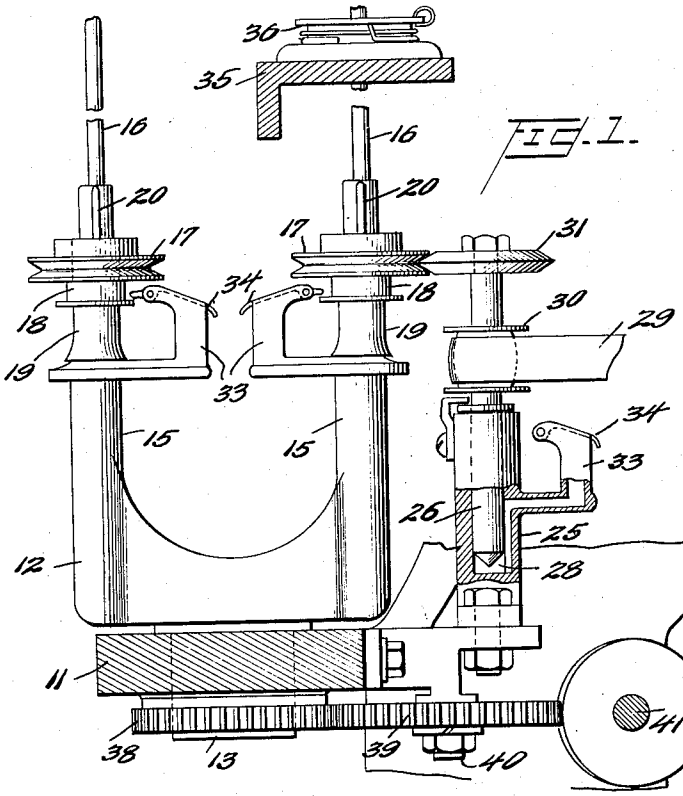
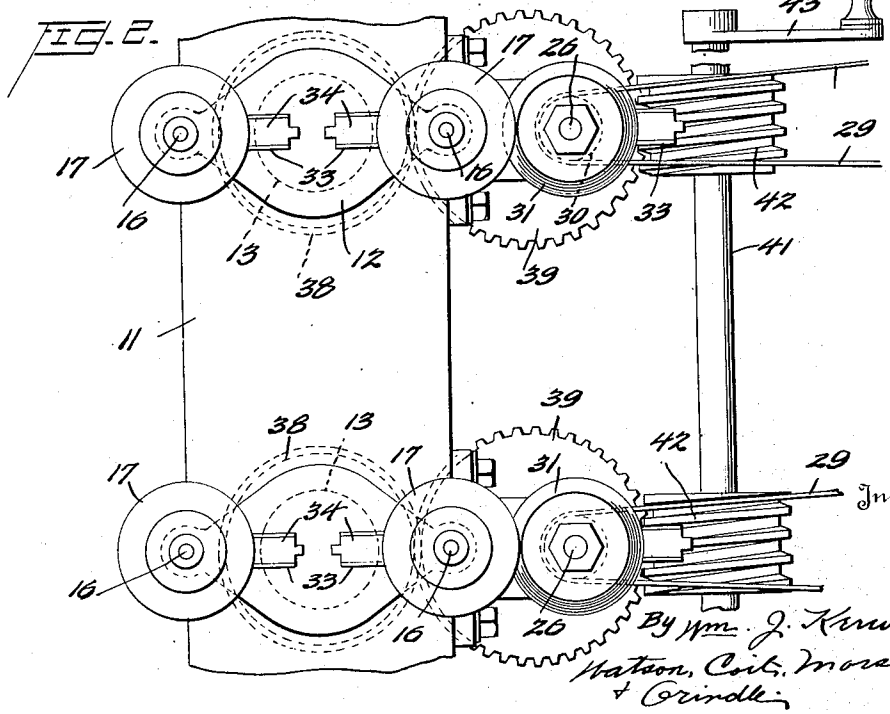


FIG. 2.



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DOFFING ARRANGEMENT.

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This invention relates to cap and ring spinning frames and especially relates to apparatus for doffing bobbins or spools of such frames. Although ring spinning frames will be described particularly in the following disclosure of the invention, it is to be understood that the invention is equally applicable to twisting frames, doublers, spoolers, slubbers, and other machines of like character.

In machines of the above specified character it is usual to have a plurality of bobbin spindles arranged on spindle rails at either side of the machine. These spindles are rotated by belts running on pulleys or wharves keyed to the spindles. They carry bobbins by means of spring retainers or the like in such fashion that the bobbins also will rotate to become filled with thread or yarn which they receive from drawing rolls by way of travelers, caps, or other devices for distributing the yarn to the bobbins. The bobbins, when filled, must be removed and in the usual types of spinning frames wherein no special arrangements are made for doffing, it is necessary to stop the operation of the frame and keep it idle while an operator removes the full bobbins and replaces them with empty ones. Even when the operator is highly skilled the frame must be stopped for a considerable period, the length of the idle time depending on the size of the yarn being handled. This, of course, increases the cost of the operation since the frame is non-productive for so much of the time.

Heretofore various devices have been produced or designed for doffing and donning the bobbins but all of such devices with which the present applicant is acquainted are so cumbrous and expensive that they have not proved entirely satisfactory in use.

According to the present invention, a frame is provided for carrying a plurality of spindles, which frame may be rotated to bring spindles with empty bobbins into position for the bobbins to be rotated and filled, and other spindles with full bobbins into position for the bobbins to be removed.

The object of this invention is to provide doffing apparatus of the above mentioned type which will be simple in all its parts, cheap to manufacture, easy to operate and keep in repair and constitute in the combination as well as details of its elements a general improvement in the art.

The invention will be disclosed by reference to the accompanying drawings wherein one embodiment of the invention is particularly illustrated, and in which:

Fig. 1 is a side elevation of one set of spindles showing one spindle in operative position and another in idle or doffing position; and

Fig. 2 is a plan view showing two adjacent spindle sets like that shown in Fig. 1

Referring more particularly to the drawings wherein like reference characters are applied to like parts throughout the several views, the numeral 10 denotes one of the standards or legs of a ring spinning frame. The spinning frame in its general assembly and operation is conventional and well-known and no further illustration of the same is deemed necessary than that which is given. The usual spindle rail 11 is carried by the standards 10. The rail is illustrated as a rectangular member but it is to be understood that it may assume other forms depending on the selected arrangement of the spindles thereon. Upon this rail 11 are mounted a plurality of spindle frames 12, each frame being provided with a journal 13 extending through a bearing on the rail so as to permit of rotation of the spindle frames. As illustrated, the journal 13 has its axis disposed vertically but it is to be understood that the invention is not limited to the use of vertically disposed journals.

A plurality (two as illustrated) of spindle brackets 15 are provided on the spindle frame 12 and spindles 16 are rotatably mounted in these brackets in a well known manner. Each of the spindles 16 carries a driving connection or disc 17, for causing rotation of the same. The spindle rests upon a collar 18 free to turn above a fixed hub 19 comprising part of the spindle bracket. Above the driving disc 17 the spindle is provided with a bobbin attaching device in the form of a spring bushing 20.

A driving shaft bracket 25 is secured to the rail 11 adjacent each spindle frame 12 so as to carry a driving shaft 26 in a parallel relation to the journal 15 and the spindles 16. The driving shaft operates with its lower end disposed in an oil well type of bearing 28 and is rotated by a belt or tape 29 passing over a wharve or pulley 30 keyed thereto. Adjacent its upper end the shaft 26 carries a driving connection or disc 31 adapted to cooperate with the driv-

ing discs 17 of the spindles 16 when the latter are turned into contact therewith. In Fig. 1 the disc 31 of the driving shaft and the disc 17 of one of the bobbin spindles are shown in mesh or contact. As illustrated, the driving discs 17 and 31 interengage directly through friction between their outer surfaces but it will be understood that toothed discs may be provided for the same purpose if desirable.

The spindles 16 in their bearings in the brackets 15 and the driving shaft 26 in its bearing in the bracket 25 are furnished with oil through oil cups 33 provided with covers 34.

In the preferred embodiment illustrated, the shaft 26 is not only parallel with the spindles 16 but is disposed outside their common orbit when they are turned with the spindle frame 12. By this arrangement the length of the tangential contact between the driving disc 17 of the spindles and the driving disc 31 of the power shaft is made as short as possible so that the disc will be disengaged after the spindle frame has been rotated only a short distance.

The spinning frame is provided with the usual ring rail 35 and travelers 36 carried thereon for distributing yarn to the bobbins in filling. The machine will also be provided with the usual means for operating the ring rail and for moving it out of the way when the bobbins have been filled so that they may be removed and replaced. In some types of machines, the ring rail is run down on the spindles but in the present instance it will be run up beyond the upper ends of the spindles in order that they may be turned.

A gear 38 is keyed to the lower end of the journal 13 and an idler gear 39 is rotatably mounted on a shaft 40 secured to the bracket 25. A lay shaft 41 is positioned longitudinally of the several spindle sets and carries worms 42 for meshing with the gears 39. By this construction the spindle frames 12 may be rotated and locked in any desired position by movement of the handle 43 keyed to the shaft 41.

In the position of parts shown in the figures the right-hand spindle 17 is being driven from the shaft 26 by the frictional contact of the discs 17 and 31. The ring rail 35 and traveler 36 are in operative position relative to the spindle. A bobbin is not shown in the figure but it will be understood that a bobbin is in place and being filled with yarn at this stage. When the bobbin is filled the operator disconnects the ring rail 35 from the operative parts of the machine and runs it up out of position. This may be done without stopping the movement of the remaining parts of the ring frame although obviously the operator may stop the entire machine if he deems it necessary to do so. When the ring rail 35 is raised the handle 43 is rotated to turn the shaft 41 carrying the worms 42, and thus through the action of gears 39 and 38 turn the spindle frame 12 to reverse the position of the spindles. The spindle shown on the left in the figures and which has been supplied with an empty bobbin will come into the position of the one shown on the right which now carries a full bobbin. The thread or yarn which has been wound on the full bobbin will extend from that bobbin to the traveler so as to lie closely adjacent the empty bobbin. At this time the operator may secure the thread in slits at the base of the full and empty bobbins and sever the same between them by the use of scissors or any other desired means. The thread passing between the base of the empty bobbin where it is attached and the ring rail or traveler will carry a certain amount of slack if the reels have run for a short period of time after the spindle frame was turned to throw the spindle out of driving connection. This will occur due to the inertia of the moving parts in case the operator stops the entire machine or through the continued operation of the parts through the short interval while the spindle frame is being turned in case the machine is left running. The operator may wind this slack about the empty spindles, and completes the turn of the frame 12 necessary to bring the discs 17 and 31 into driving relation. In case the machine is stopped the disc will be brought into close contact while the above described operations are taking place but if the machine is left running it will of course, be necessary to stop the spindle carrying the empty bobbin a slight distance away from its driving position with relation to the shaft 26 so that the thread will not become tangled or broken. After the thread is started on all the empty bobbins the ring rail and other machinery (if stopped) are brought into operation for filling the empty bobbins. The operator is then free to remove the full bobbins from the outer spindles and replace them at leisure while the new bobbins are being filled.

In the above described embodiment of the invention a single shaft 41 is arranged to cause simultaneous movement of all the spindle frames on the spindle rail because it is usual for all of the bobbins to be filled in about the same length of time but if desired individual rotating means may be provided for each spindle-head in order that they may be turned separately. When this is done the spindle frames may be arranged somewhat more closely along the rail than they are shown in Figure 2 since the turning may be done in such a manner that the spindles of adjacent spindle frames will not pass across the axis of the rail at the same time

as they do in the case in which all of the spindle frames are rotated together.

While one embodiment of this invention has been described somewhat in detail it is to be understood that various other embodiments are contemplated and it is desired that the invention be regarded as limited only by the prior art and the scope of the appended claims.

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

1. In a ring spinning frame, in combination, a spindle rail, a plurality of spindle frames mounted on said rail to have rotation about a vertical axis, a plurality of rotatable bobbin spindles mounted on each of said rotatable frames, means provided on said spindles for removably attaching a bobbin, a power shaft located outside the orbit of said spindles and having its axis parallel to the axes of the spindles, interengageable means to establish driving connections between said shaft and any one of said spindles, a lay shaft, and worm and pinion connections for rotating said spindle frames by movement of said lay shaft to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position, said worm and pinion connections also serving to lock the frame in any position into which it is turned.

2. In a ring spinning frame, in combination, a rotatable spindle frame, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft having its axis parallel to the axes of said spindles, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position, said last mentioned means also serving to lock the frame in any position into which it is turned.

3. In a ring spinning frame, in combination, a rotatable spindle frame, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft having its axis parallel to the axes of said spindles, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position.

4. In a ring spinning frame, in combination, a spindle frame rotatable about a vertical axis, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft located outside of the orbit of said spindles and having its axis parallel to the axes of the spindles, means to establish driving connections between said shaft and any one of said spindles and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position.

5. In a ring spinning frame, in combination, a rotatable spindle frame, a plurality of bobbin spindles rotatably mounted on said rotatale frame, a power shaft located outside of the orbit of said spindles and having its axis parallel to the axes of the spindles, and means to establish driving connections between said shaft and any one of said spindles.

6. In a ring spinning frame, in combination, a spindle frame rotatable about a vertical axis, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position, said last mentioned means also serving to lock the frame in any position into which it is turned.

7. In a ring spinning frame, in combination, a spindle frame rotatable about a vertical axis, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft having its axis parallel to the axes of said spindles, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position.

8. In a ring spinning frame, in combination, a spindle frame rotatable about a vertical axis, a plurality of bobbin spindles rotatably mounted on said rotatable frame, means provided on said spindles for removably attaching a bobbin, a power shaft, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position.

9. In a ring spinning frame, in combination, a spindle frame rotatable about a vertical axis, a plurality of bobbin spindles rotatably mounted on said rotatable frame, a power shaft, means to establish driving connections between said power shaft and any one of said spindles, and means to rotate said frame to place one of said spindles in driving relationship with said shaft while moving another of said spindles into idle position.

In testimony whereof I hereunto affix my signature.

WILLIAM J. KERWIN, JR.