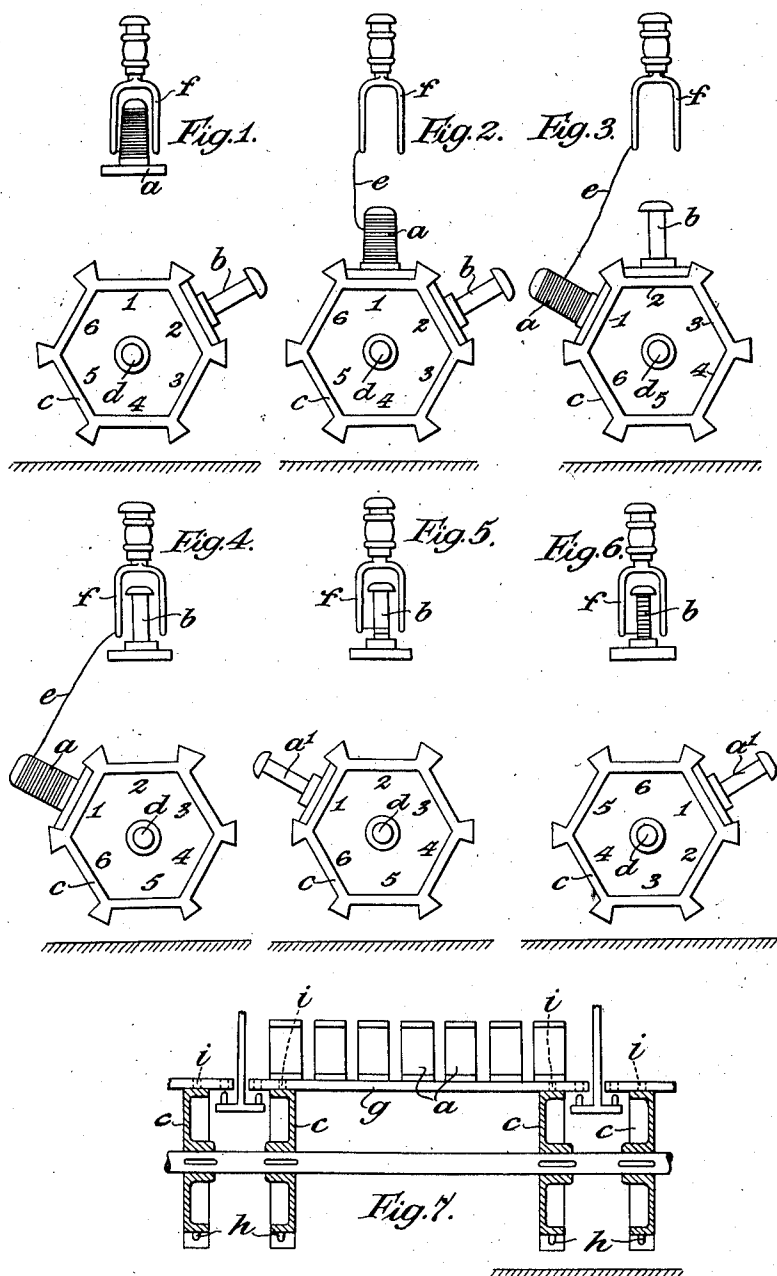


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DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
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DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING, TWISTING, AND LIKE MACHINES

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2 Claims. (Cl. 118—18)

The invention relates to doffing mechanisms for flyer spinning, doubling, twisting and the like machines, in which there are employed bobbin banks, having a number of spindles, on which the bobbins for spinning &c. are mounted. The bobbins must be removed from the working position after filling and replaced by empty bobbins, and these have to be brought into the position in which they can be filled.

Numerous devices have already been proposed or used for this purpose. In the apparatus it is important that the exchange of the bobbins shall be carried out quickly, accurately and simply.

For this purpose it is known for instance to use revolver banks, which are provided with several sets of spindles. The sets of spindles are in such a case secured on the revolver at an angle of 90°, 180° or other angle to one another. During the spinning operation the whole revolver is moved up and down. For changing the sets of bobbins the revolver bank is then rotated about a corresponding angle.

It is also known to use two bobbin banks, which can be moved independently. For the purpose of changing in such a case the bobbin banks are displaced on slides or the like.

The said revolver banks are heavy, and this constitutes a great drawback, because, as stated, during the spinning operation the whole revolver has to be moved up and down. Moreover the revolver banks obstruct the other constructional details of the machine and of the bank itself as bobbin bank with the accessory details.

In the previous revolver arrangements, in which the spindles are mounted directly on the revolver and the latter moves up and down during spinning, there is also a great difficulty in the fact that the position of the revolver has to be securely locked in each case, because the bobbin spindles have to be absolutely vertical and should not deviate from this position—for instance owing to inadequate securing of the revolver mechanism—at any point throughout the length of the machine.

However these difficulties are involved in all apparatus which are moved up and down as a whole during the spinning.

In the usual changing devices with two independently movable bobbin banks, the doffing operation consists in this that two sets of bobbin banks interchange their position. The bank with full bobbins in the spinning position is first of all brought forward for the exchange of the bobbins, while the bobbin bank with empty bobbins in the ready position is brought into the spinning axis

and the first-mentioned bank, after replacement of the full bobbins by empty ones, is later during spinning brought into the ready position at the back, i. e. behind and below the spinning position. At the end of the doffing operation, i. e. after one complete cycle of operation, the mechanism is again in its initial position.

With this type of doffing mechanisms, hitherto—except when the bobbin banks are driven directly in their movement from the front doffing position into the ready position—certain additional movements or means are required, for returning the mechanism after the change of bobbins into its ready position for the next bobbin change, and thus actually finish the doffing operation. In this respect the revolver again proves simpler.

The present invention aims therefore at an improved doffing mechanism with revolver, which however is free from the defects hitherto characteristic of this type of mechanism.

For this purpose according to the invention, a fixed revolver is used in combination with independently movable, exchangeable bobbin banks. The revolver serves in such a case to receive the bank with full bobbins and move the same from the spinning axis into the exchange position, in which case at the same time the bank provided with empty bobbins and resting on the revolver in the ready position is moved into the spinning axis from which it is raised into the working position; thereupon bringing the bank from the doffing position, after the full bobbins have been exchanged for empty into the rear ready position, from which in the next bobbin exchanging operation it is brought again into the spinning axis. During the succeeding exchange operations, the bobbin banks change their place on the revolver, so that the rotation imparted to the revolver really forms a retrogressive cyclic movement. The revolver is moved forward one step, in order to bring the filled bobbin bank from the spinning position into the doffing position, i. e. out of the spinning axis into a position, in which the full bobbins are replaced by empty ones, but two steps backward, in order to bring the bank provided with empty bobbins into the ready position, from which subsequently again with the forward step of the revolver it is brought into the spinning axis, while at the same time the bobbin bank which is then full is moved into the doffing position.

The revolver can for instance consist of discs or narrow drums, which are secured below the ends of the bobbin banks on a longitudinal shaft of the machine, the sides of the drums, which for

instance form a polygon, with their edges or by means of suitable abutments or pins serving to receive and hold the bobbin banks during the doffing movement and the return into the ready position.

Instead of one single revolver, use may also be made of several revolvers or revolver-like devices side by side.

The invention consists in bobbin doffing mechanism with exchangeable bobbin banks for flyer spinning, doubling, twisting and the like machines, characterized by a revolver rotatable about one or more fixed shafts, on which revolver the bobbin banks are deposited and entirely remain during the whole of the doffing process and by rotation of the revolver intermittently and unequally in opposite directions are moved into the positions required for the doffing and readiness of the bobbin banks.

The invention also consists in doffing mechanism for flyer spinning, doubling, twisting and like machines in which a revolver is used for the reception of banks of filled bobbins and for the movement of these bobbin banks for doffing purposes and the movement of bobbin banks with fresh bobbins for filling in which the bobbin banks of succeeding cycles remain on the revolver during the whole of the doffing process and are displaced with reference to the revolver so that the oscillatory movement applied to the revolver for the purposes referred to above is in fact cyclically retrogressive, the revolver moving forward one unit to bring bobbins lowered from the spinning position into the doffing position (that is to say from the spinning axis into a position where filled bobbins may be changed for empty bobbins) and backwards two units to bring fresh bobbins into the ready position from which position they are moved into the spinning axis when the revolver is rotated forward one position on the fixed cycle to bring the then filled bobbins from the spinning axis into the doffing position.

The invention also consists in an arrangement according to either of the preceding two paragraphs characterized by this that the movement of the bobbin banks is limited by suitable abutments.

The invention also consists in doffing mechanism for flyer spinning, doubling, twisting and like machines substantially as hereinafter described.

Referring to the accompanying diagrammatic drawing,

Figures 1 to 6 illustrate the doffing operation in a construction according to one form of the present invention;

Figure 7 illustrates one arrangement of revolver according to the present invention in longitudinal section.

In carrying the invention into effect in one form by way of example applied to the case where a single revolver (Figures 1 to 6) or a series of revolvers on a single shaft (Figure 7) or on shafts substantially in line is used, the apparatus in elementary form comprises, in association with two bobbin banks *a* and *b*, a revolver or revolvers *c* mounted on a fixed axis *d* and having six sides numbered 1 to 6 with depressions on each to receive a bobbin bank. The fixed axis *d* lies in the plane containing the axes of the bobbins being filled. The cycle of operations can be conveniently explained by reference to Figures 1 to 6 by visualizing the two bobbin banks *a* and *b* and noting that the sides

of the revolvers are numbered in clockwise direction with the bank *a* being raised in the spinning position and the bobbins thereon being filled, and the side of the revolver uppermost being called number 1. The position now is that the revolver is stationary, the bobbins on bank *a* are being filled, the side 1 of the revolver is ready to receive the bank of filled bobbins *a* in due course. Bank *b* stands in the ready position, namely, on side 2 of the revolver.

Next it is assumed that the bobbins on bank *a* have been filled and the bobbin bank lowered on the revolver side 1. The revolver is now rotated by hand one pace forward in a counter-clockwise direction. This brings bobbin bank *a* towards the front of the machine, the bobbins being presented to the operator with the centre line or axis of the bobbin at an angle of 30° to a horizontal line drawn through the axis of the revolver. The bobbin bank *b* on revolver side 2 having by the aforesaid movements been brought forward one pace, the bobbin bank 2 is now in the spinning axis. This bobbin bank with its empty bobbin is lifted into the spinning position by any suitable means. The threads *e* between the flyers *f* and filled bobbins of bank *a* are severed after a few layers have been wound on from the full to the empty bobbins, the spinning of the bobbins of bank *b* being then started in the usual way.

The filled bobbins of bank *a* are now removed by hand in accordance with usual practice and replaced by empty bobbins, this bobbin bank now being called *a'*. The position therefore is that as regards the revolver, the uppermost side is number 2, side number 1 has a bank of empty bobbins *a'* and the bank of bobbin *b* is being filled. The revolver is now rotated by hand two paces in a clockwise direction, that is backwards. This brings the side number 1 with the bank of empty bobbins *a'* into the ready position and leaves side number 6 at the top ready for the reception in due course of the bobbin bank *b* when the bobbins thereon have been filled. In comparison with the position first mentioned where bobbin bank *b* on side number 2 was in the ready position, there is now bobbin bank *a'* on side number 1 in the ready position so that the revolver through the doffing operation has revolved one step in a retrograde direction with respect to the front of the machine. When the bobbins of bank *b* are filled the position becomes similar to that from which the description of the operation started, that is to say, the bobbin bank *b* is lowered on to revolver side number 6 the revolver is moved forward one step, bobbin bank *a'* is lifted into the spinning position, bobbin bank *b* is doffed off these full bobbins and fresh empty bobbins substituted, the revolver is moved two steps in a clockwise direction and revolver side 6 with a bank of empty bobbins is in the ready position.

Such an arrangement as that just described is free from the difficulty of doffing arrangements where the mechanism is carried up and down during the spinning process because in the present case the bobbin banks only are carried up and down for instance by the usual carriers *g* indicated in Figure 7 and the revolving mechanism is a separate unity placed in a fixed position beneath and is employed only for changing the bobbin banks.

This general example can be applied in a number of different ways.

According to the example of construction shown in Figure 7 polygonal drums *c* of small width are placed near the ends of the bobbin banks. In the drawing four such drums are shown; two deal with the central bobbin bank *a* and the remaining drums carry the ends of other bobbin banks, parts of which are shown.

It is immaterial whether the machine has several banks or series of banks in parallel or not. The bobbin banks may be held to the sides of the revolver drums by means of edges or pins or both.

Figure 7 indicates pins *h* on the revolvers which enter holes *i* in the bobbin banks. Any suitable means may be employed to limit the forward and backward movement that is to fix the front and rear position of the bobbin banks. It is preferred however to provide stops for the front and back edges respectively of the bobbin banks. The revolvers may be formed with suitable holes formed by drilling or otherwise in place of grooves, these holes taking pins on projections screwed or bolted on the bobbin banks. These projections may be provided with transverse pins which co-

operate with a curved slot to locate the end positions of movement.

To limit the forward and backward movement during doffing processes it is preferred to provide stops as previously mentioned.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. Doffing mechanism for spinning, twisting and like machines comprising in combination a pair of interchangeable bobbin rails carrying bobbins, a shaft the axis of which is fixed in space, drums mounted on each end of the shaft, and means for supporting and maintaining said bobbin rails on the surface of said drums with the bobbin axes substantially normal to the aforesaid surface.

2. Doffing mechanism for spinning, twisting and like machines, comprising in combination a pair of interchangeable bobbin rails carrying bobbins, a shaft the axis of which is fixed in space, means mounted on said shaft for supporting said bobbin rails and for maintaining them with the bobbin axis substantially normal to the surface of said supporting means.

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