

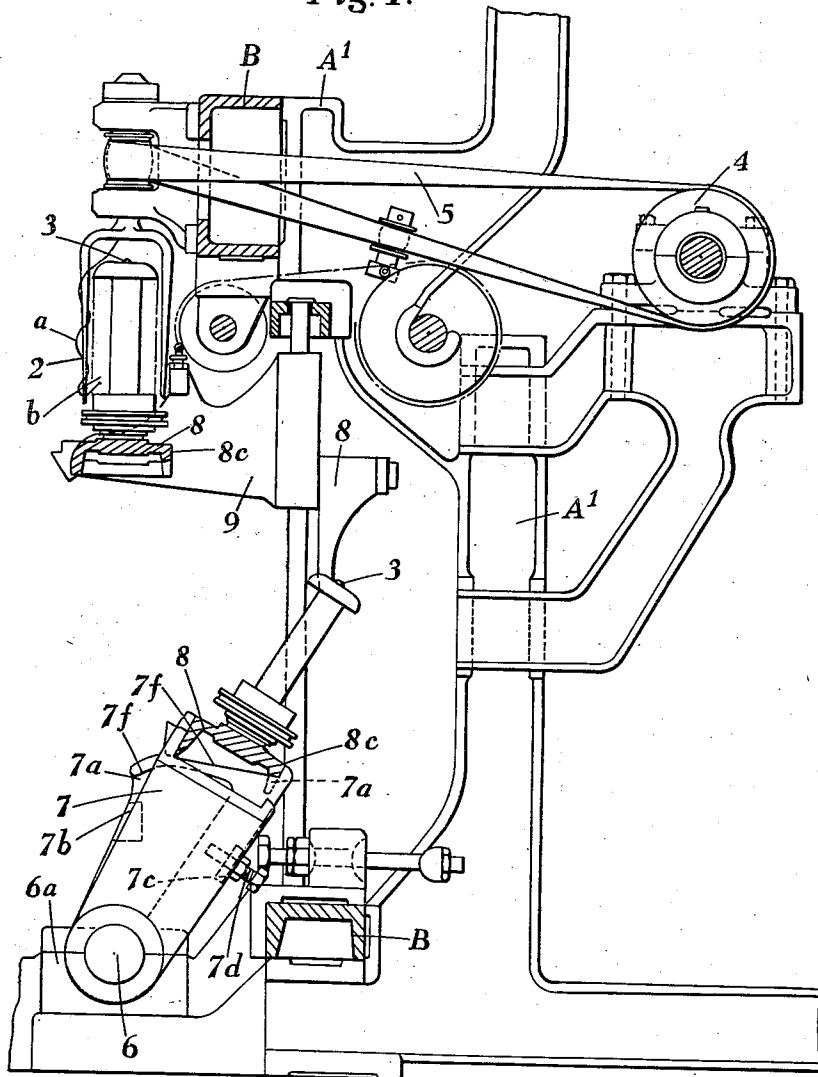
April 6, 1937.

J. K. ANDERSON
DOFFING MECHANISM FOR FLYER SPINNING,
DOUBLING, TWISTING, AND LIKE MACHINES
Filed Oct. 10, 1934 4

2,076,423

4 Sheets-Sheet 1

Fig. 1.



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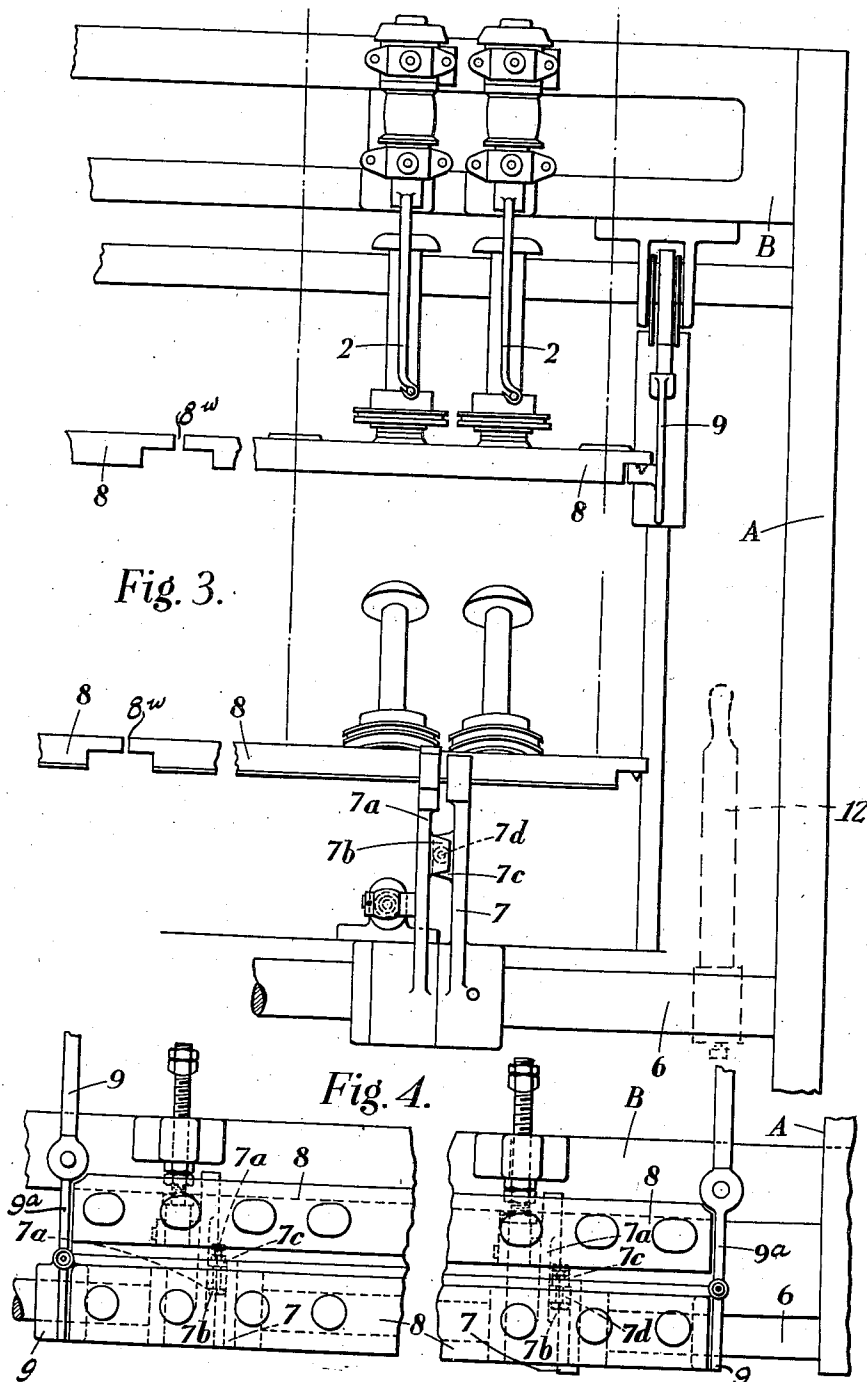
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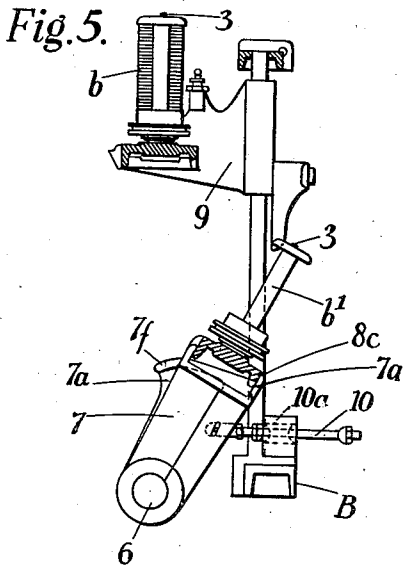
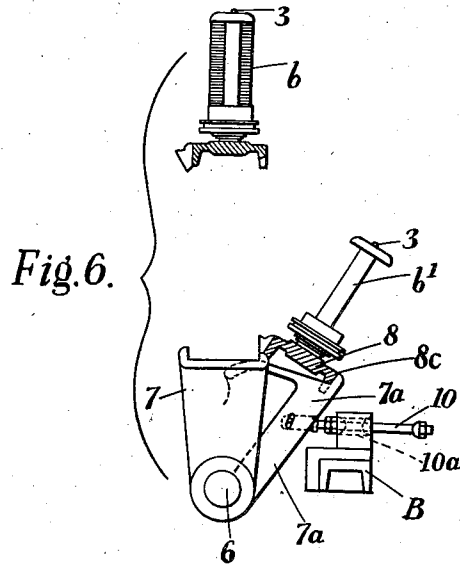
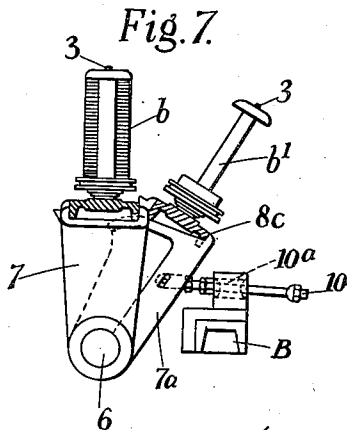
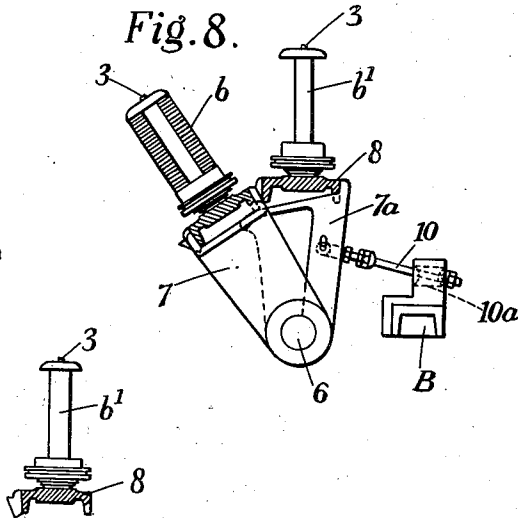
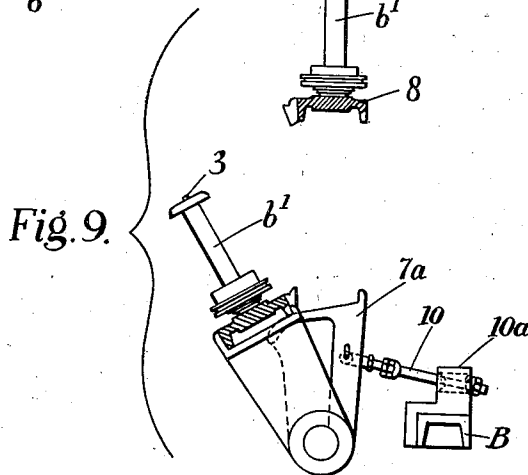
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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

James Keith Anderson, Wellington Foundry,
Leeds, EnglandApplication October 10, 1934, Serial No. 747,692
In Great Britain October 14, 1933

5 Claims. (Cl. 118—18)

This invention relates to apparatus known as doffing mechanism for flyer spinning, doubling, twisting and like machines used in the production of yarns or threads of fibrous substances and especially to that type of apparatus wherein interchangeable lifter rails carrying their respective bobbin-spindles are employed, and wherein the usual and well known type of lifter or traversing mechanism, (not shown), is made use of in connection with detachable lifter rails formed in sections. My present invention consists in the construction and arrangement of comparatively simple devices whereby the several functions are carried out with greater precision and less liability to disarrangements than have heretofore been encountered.

My said invention is characterized by the employment of two series of oscillating members both of which are mounted upon a single operating shaft, one series being used for moving the empty bobbins alone and placing them in their respective positions, while the other series move the full bobbins as well as the empty bobbins, as is hereinafter described. One series of the said oscillating members is fixed upon the operating shaft, while the other series of members is loosely mounted thereon but is arranged to be engaged with, so as to be operated by the fixed members carried by the shaft, and the curved or horizontal paths in which the fixed members move and are adjusted to receive their lifter rails and the load of full bobbins, are nearer the centre of the operating shaft than are the surfaces which receive the lifter rails and empty bobbins, so that while one series positively moves the lifter rails in one plane, the other series receives its lifter rails and raises them while moving them in another plane in the manner and for the purpose hereinafter fully explained.

In the accompanying sheets of drawings which are illustrative of my invention and which are hereinafter referred to:—

Fig. 1 is a sectional end elevation of sufficient of the framework of the machine and operating parts mounted thereon to show the application of my improved lifter plate interchanging devices and other parts arranged in accordance with my invention, and in the positions that they occupy during the spinning operations.

Fig. 2 is a similar view to Fig. 1 and shows the several parts in their respective positions at one period while the doffing operations are being performed.

Fig. 3 is a front elevation of the parts shown by Fig. 1.

Fig. 4 is a plan of certain of the parts shown by Fig. 2.

Fig. 5 is an end elevation showing the lifter rails' interchanging mechanisms in their respective positions when the full bobbins are about to be changed and empty bobbins supplied to take their place.

Fig. 6 is a similar view to Fig. 5 and shows the position of the oscillating members moved and adjusted for receiving the lifter rail and its full bobbins when same are caused to descend in the first stage of the "doffing actions".

Fig. 7 is a similar view to Fig. 6 but shows the full bobbins descended with their lifter rail to rest upon the series of oscillating members previously adjusted to receive same, while the lifter-rail-carrying-devices will continue to descend below said position.

Fig. 8 is a similar view to Fig. 7, but shows the oscillating member carrying the rail and its full bobbins as having moved to the extent of its front position and with the empty bobbins brought into the central position along with their lifter rails by the other series of oscillating members, so that same may be raised into action as is hereinafter explained.

Fig. 9 shows the lifter rail and the empty bobbin that it has raised into position for the spinning operations to recommence, while it has left the fixed series of oscillating members with their lifter rail from which the full bobbins have been removed, and another series of empty bobbins have been placed thereon ready for the attendant, after the spinning operations have commenced, to move same in a rearward direction in order to place the two oscillating members and their lifter rail in the position to the rear of the spindles and flyers which are carrying out the spinning operations, which position is shown by Fig. 5.

In Figs. 5 to 9 inclusive, all unnecessary framework is omitted, in order that the adjustments of the parts illustrated may be more clearly shown.

A and A¹ indicate the end frames and intermediate framework of the machine, and B the longitudinal rails which bind the end frames, and the intervening members between same, to each other.

The flyers 2 are mounted upon their spindles 3 and are arranged to be actuated or rotated by the driving cylinder 4 and belt 5 so that their rotary movements may twist and wind the threads of yarn *a* upon the bobbins in well known manner.

In carrying my invention into effect I provide a rock shaft 6 supported by bearings 6a at the front lower part of the machine, and upon this shaft 6 I fix a series of rail-supporting members 7 to oscillate with said shaft 6 as is hereinafter described, while adjoining each of said supporting members 7 is another member 7a which is loosely mounted upon the shaft 6. However, by the members 7a each having a lateral projection 7b (Figs. 3 and 4) extending from it, another lateral projection 7c from each of the members 7 may have an adjusting screw 7d fixed upon it, so that its outer end may come in contact with the projection 7b (Fig. 2), thus enabling the movements of the member 7 to effect the movements of the member 7a when a certain position is reached for the purpose hereinafter described.

The members 7 and 7a extend vertically from the shaft 6 so that their upper ends may receive the lifter rails 8 when same have descended from their operating positions shown by Fig. 1 to carry the full bobbins b sufficiently below the flyers 2 (as shown by Fig. 2) to allow their removal from the spindles 3 which support them in known manner. This extra lowering of the lifter brackets or traverse operating members 9 is permitted in well known manner for the purpose of enabling doffing to be effected, by having the rear parts 9a (Figure 1) of said brackets 9 of a sufficiently small breadth or thickness to pass between the spaces 8w (Figure 3), existing between the sets of lifter rails which are used in well known manner in all doffing apparatus, wherein said rails are formed in sections and do not extend continuously from one end of the machine to the other.

As is shown by Figs. 1 and 5 of the drawings, during the spinning operations of the machine and while the sliding lifter bracket 9, of well known construction and arrangement, is in about its highest position as shown by Fig. 1, the members 7 and 7a are conveniently adjusted in their rear positions with the empty bobbins b' out of the way of the attendant when in front of the machine, so that the lifter rails 8 are supported at the upper ends of the members 7a further from the centre of the shaft 6 than they would be supported by the upper end of the members 7, also as is shown by Fig. 1. By thus arranging the member 7a to support the lifter rails 8 beyond the supporting surfaces on the members 7, when the attendant operates the shaft 6 (to commence the process of doffing as is hereinafter explained), said shaft is moved to carry the members 7 forward to the position shown by Fig. 6, in order to adjust said members 7 in alignment with the full bobbins b on the rails 8 above.

The variable engagement of the members 7 by their adjusting screws 7d being brought by it into contact with the projections 7b on the members 7a, enables the last named movement of the members 7 to take place while leaving the members 7a stationary in their rearward positions of rest. This action is further permitted to take place by reason of the rails 8 when carried to their rear positions by the members 7 travelling with said members 7 until their rear edges 8c come into contact with the inclined upper surfaces of extending projections 7f formed on the front edges of the members 7a, since, when the edges 8c reach these inclines, by the members 7 still continuing their movements towards the rear of the machine, said rails are forced to slide up and over the inclined surfaces to occupy

the higher position on the upper surfaces of the members 7a.

After the attendant has adjusted the members 7 and allowed the members 7a to remain in their respective positions described and shown by Fig. 6, the lowering of the lifter brackets 9 then carries the rails 8 downwardly until they reach the members 7 placed to receive them, and when the rails 8 are thus arrested in their descent the brackets 9 will continue for a short distance further, in order to move to positions beneath the rails 8.

When the rails 8 have thus been deposited upon the members 7 to occupy the positions shown by Fig. 7, the attendant may then move the shaft 6 in order to oscillate the members 7 and 7a to carry same into the relative positions shown by Fig. 8. The moving of the members 7 and 7a into the position stated is effected by the members 7 being firmly secured to the shaft 6, while the operating screws 7d carried by the members 7 come into contact with a projection 7b carried by the members 7a in order to move these latter. Further, when the members 7 have moved the members 7a into the vertical positions stated, the further advancing of the members 7a in that direction is prevented by the adjustable pivoted connecting rods 10 which are connected at one end to the fixed members of the framework 10a and at the other end to the members 7a.

On the members 7a, with their empty bobbins, being adjusted in the positions shown by Fig. 8, the attendant will then cause the lifter brackets 9 to ascend so that said lifter brackets will raise the rails 8 into their spinning positions shown by Fig. 9, and at this position the spinning operations may be started to cause the flyers of the machine to wind a few coils around the bobbins on the raised lifter rails 8 as these extend from the full bobbins that have not been raised by the lifter brackets. The attendant may then sever or cut the connecting strings or threads between the full bobbins b and the empty bobbins b' and allow the spinning operations to continue. After the spinning has thus continued, the attendant may then remove the full bobbins from the lifter rails carried by the members 7, and substitute therefor empty bobbins b', as is shown by Fig. 9, in order that when the spinning operations have fully recommenced, the attendant may then operate the shaft 6 to move the members 7 rearwardly so that the lower edges of the rails thereon are brought by said members 7 into contact with the upper front edges of the members 7a as shown by Figure 9 (which at such time are in higher positions) thereby causing said members 7a to move simultaneously with the members 7 but not at any greater speed, since at such time the projections 7b on said members 7a are resting against the ends of the screws 7d fixed on the members 7 and remain in such relatively contacting positions until the members 7a reach their rearmost positions in which they are arrested while yet allowing the positively moved members 7 to continue their movements also to their rearmost positions. From this it will be observed that while the members 7 are operated positively with the shaft 6 upon which they are mounted, all the movements the members 7a are also positively affected, while the said members 7 are permitted to have their positive movements further carried out to permit them to perform their functions hereinbefore described and during the effective operations of the machine to occupy their folded or inactive positions.

By the movements of the two series of oscillating members 7 and 7a to carry the full and empty bobbins into the different positions above described, firstly by carrying the empty bobbins from the front of the machine where they occupy positions shown by Fig. 9, so that they are finally carried to their rearmost position shown by Fig. 5, said bobbins will have radiated in paths to a greater distance from the centre of the shaft 6 than they were when they were supported by the series of members 7, and this is for the purpose of permitting the adjustment of said empty bobbins, the rails that carry same, as well as the relieving of the series of members 7 to again receive the rails with the full bobbins, under conditions that are necessitated in order to simplify the doffing actions by bringing such actions into the sequential order, so as to reduce the number of movements.

To enable the attendant to manually operate the rock shaft 6, in order to move the parts connected with same as is hereinbefore described, any appropriate lever, toothed wheel or other gearing or mechanism of any of the types already made use of, may be employed. A lever 12 for this purpose is conventionally shown by dotted lines in Figure 3, said lever being fixed to the rock shaft.

As before stated, the usual well known type of lifter or traversing mechanism may be used in connection with detachable lifter rails formed in sections, hence a reference to such mechanism without a drawing thereof is deemed sufficient.

It has been previously proposed to employ two series of oscillating members, one series for empty bobbins and the other for full and empty bobbins, pivoted about separate shafts and operated so that full and empty bobbin rails are interchanged by suitably moving the members about their shafts, the arrangement being such that the members when in the spinning axis are approximately at the same height and parallel to each other, and when moved to the left or to the right of said position are at different heights so that the rails are supported by one or the other, and during such movements the interchanging of the rails is effected by gravity.

My invention is distinguished from such mechanism by the two sets of members mounted upon one and the same shaft, one set being fixed thereon while the other set is loosely mounted to be actuated by engaging members automatically operated by the other set, so that while one set is moved by the operating shaft throughout the whole of their paths of motion (approximately equally on both sides of the vertical plane in which their central shaft oscillates) the other set only moves from the extreme position at the rear to the central position and then returns to said extreme position.

The members which are fixed upon their operating shaft are alone made to carry the bobbin rails and their spindles with the empty and the full bobbins, while the other members (which are longer than those fixed upon their shaft and are higher than the others when in alignment with the spinning axis) are arranged only to carry the rails having empty bobbins. Moreover, in addition to said distinguishing features, the two sets of rails are at all times positively moved into their extreme positions from the position at the front of the machine to the position within the machine, and the moving of the rails and their bobbins is always positively effected to

avoid sudden movement by gravitational action so that they are deposited thereon and exchanged therefrom by the members alone, without in any way depending upon the actions of gravity to perform said motions.

Such being the nature and object of my invention, what I claim is:—

1. In doffing mechanism for flyer spinning, doubling, twisting and like machines, two series of oscillating members for receiving and interchanging the lifter rails, a rock shaft upon which one series of said oscillating members is fixed, another series of oscillating members being loosely mounted on said shaft, and having their outer extremities for receiving the lifter rails further from the center of the shaft than are the ends of the fixed members, an adjusting screw mounted upon each one of the fixed oscillating members in the series for adjusting the relative positions of the loosely mounted oscillating members on said shaft which have to be operated by it, adjustable means whereby the movements of the loose oscillating members are limited, means whereby the rock shaft may be manually operated and adjusted, and means whereby the lifter rails may be adjusted in position to place said lifter rails upon the oscillating members.

2. In doffing mechanism for flyer spinning, doubling, twisting and like machines, two series of oscillating members for receiving and interchanging the lifter rails, a rock shaft upon which one series of said oscillating members is fixed, the other series of oscillating members being loosely mounted on said shaft, and having their outer extremities for receiving the lifter rails further from the center of the shaft than are the ends of the fixed members, inclined surfaces on the outer ends of the loosely mounted oscillating members to receive their lifter rails thereon, and projections on the outer ends of the fixed oscillating members to engage the lifter rails and carry them over the inclined surfaces beyond the paths followed by the supporting surfaces on the fixed oscillating members.

3. In doffing mechanism for flyer spinning, doubling, twisting and like machines, a series of oscillating members, a shaft for supporting and operating said oscillating members which are fixed thereon, another series of oscillating members loosely mounted on said shaft and having their outer extremities for receiving the lifter rails further from the centre of the shaft than are the ends of the fixed members, the formation of the ends of the two series of oscillating members to enable the fixed members to be moved into and within the path in which the loose members carry their lifter rails, and means whereby the fixed members are permitted to move outwardly from their folded positions without moving the loose oscillating members.

4. In doffing mechanism for flyer spinning, doubling, twisting and like machines, a rock shaft, a series of lifter supporting oscillating members, fixed on said shaft, another series of lifter supporting oscillating members loosely mounted on said shaft, and having their outer extremities for receiving the lifter rails further from the center of the shaft than are the ends of the fixed members, means whereby the fixed series may be moved out of said rearmost position without moving the loose oscillating members, means whereby the fixed members, when moving to their most outward position, simultaneously move the loose oscillating members to

a central position, and means whereby the two series are held in their said adjusted positions.

5 In doffing mechanism for flyer spinning, doubling, twisting and like machines, two series of oscillating members, a rock shaft supporting
5 said members, the members of one series being fixed on said shaft, the members of the other said series being loosely mounted on said shaft, the loosely mounted members having their up-
10 per extremities further from the center of the

shaft than are the ends of the fixed members, means for operating said members to move one said series from a position for receiving a lifter rail with bobbins from spinning position to a po-
5 sition in which said bobbins are presented for exchange, and to move the other said series into a position for delivering a lifter rail with empty bobbins to be lifted into spinning position.

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