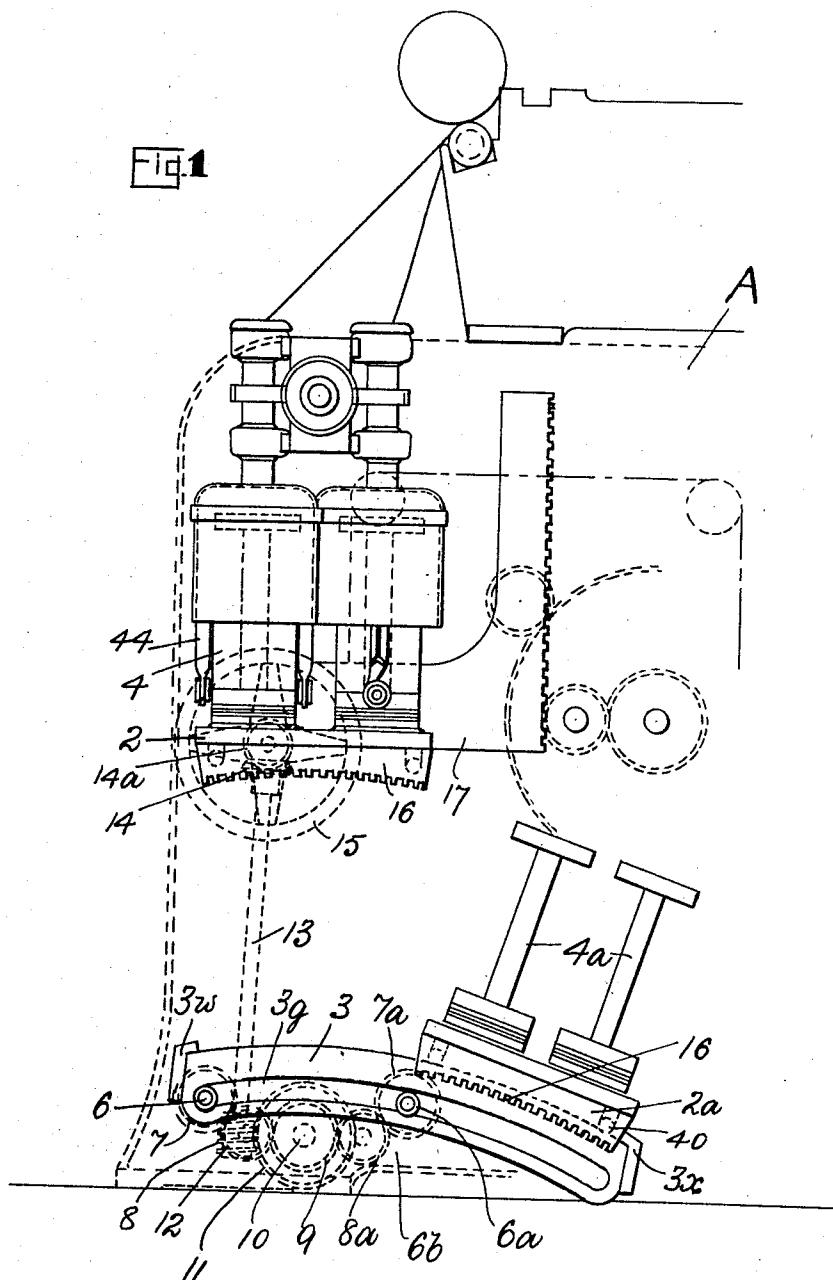


Sept. 15, 1931.

J. A. PORTER
DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
Filed May 22, 1929

1,823,374

5 Sheets-Sheet 1



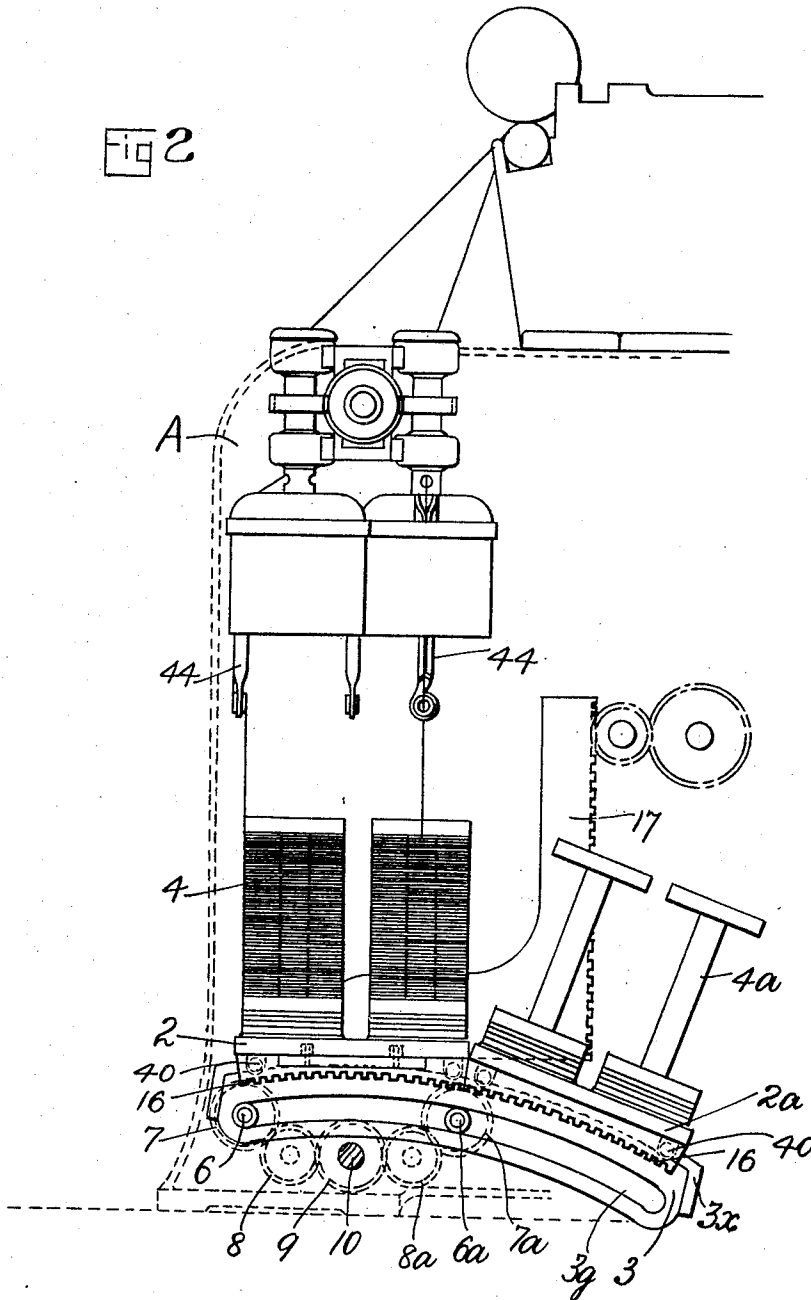
INVENTOR:
Joseph Alfred Porter
BY *Wrightson & Lundy*
ATTYS.

Sept. 15, 1931.

J. A. PORTER
DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
Filed May 22, 1929

1,823,374

5 Sheets-Sheet 2



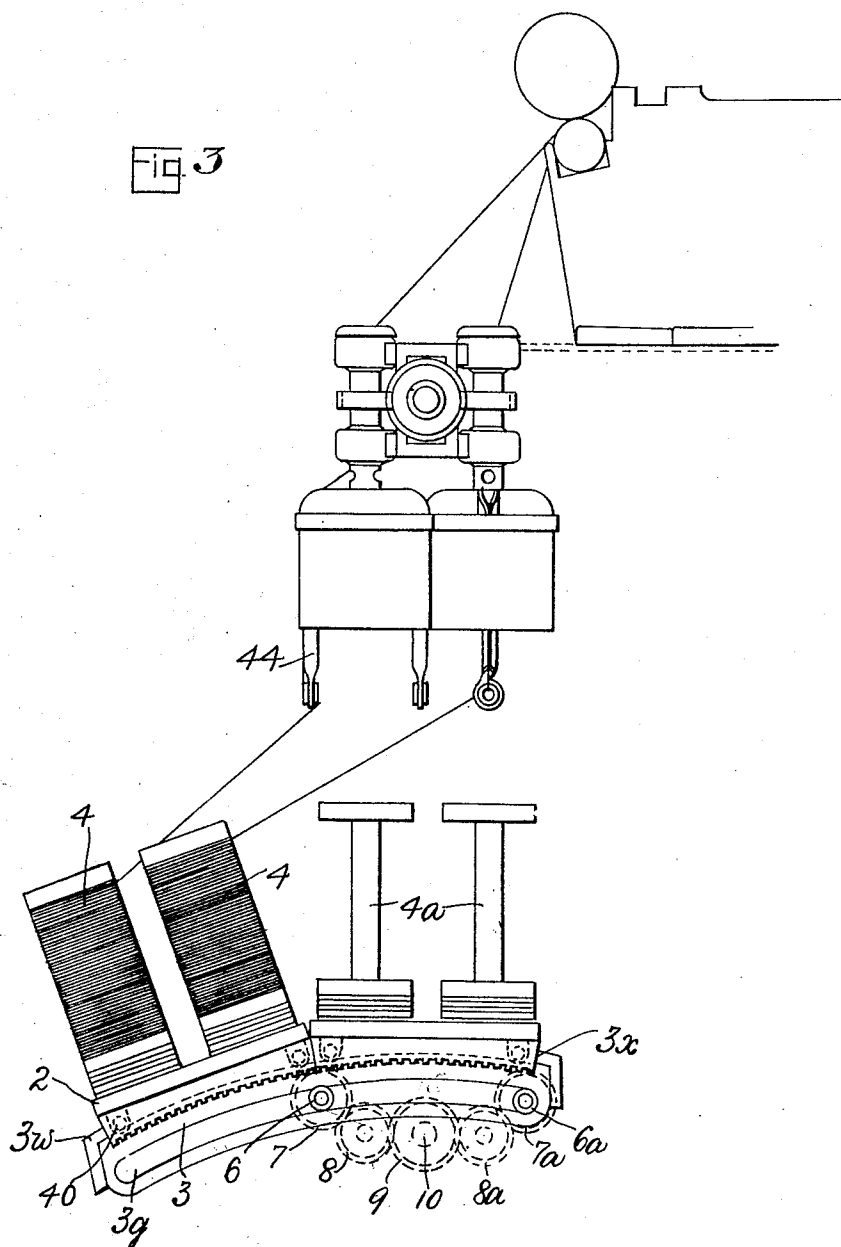
INVENTOR:
Joseph Alfred Porter
BY *Wm. L. Mumby*
ATTYS.

Sept. 15, 1931.

J. A. PORTER
DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
Filed May 22, 1929

1,823,374

5 Sheets-Sheet 3



INVENTOR:

Joseph Alfred Porter

BY *Wright Brown Lumbly May*

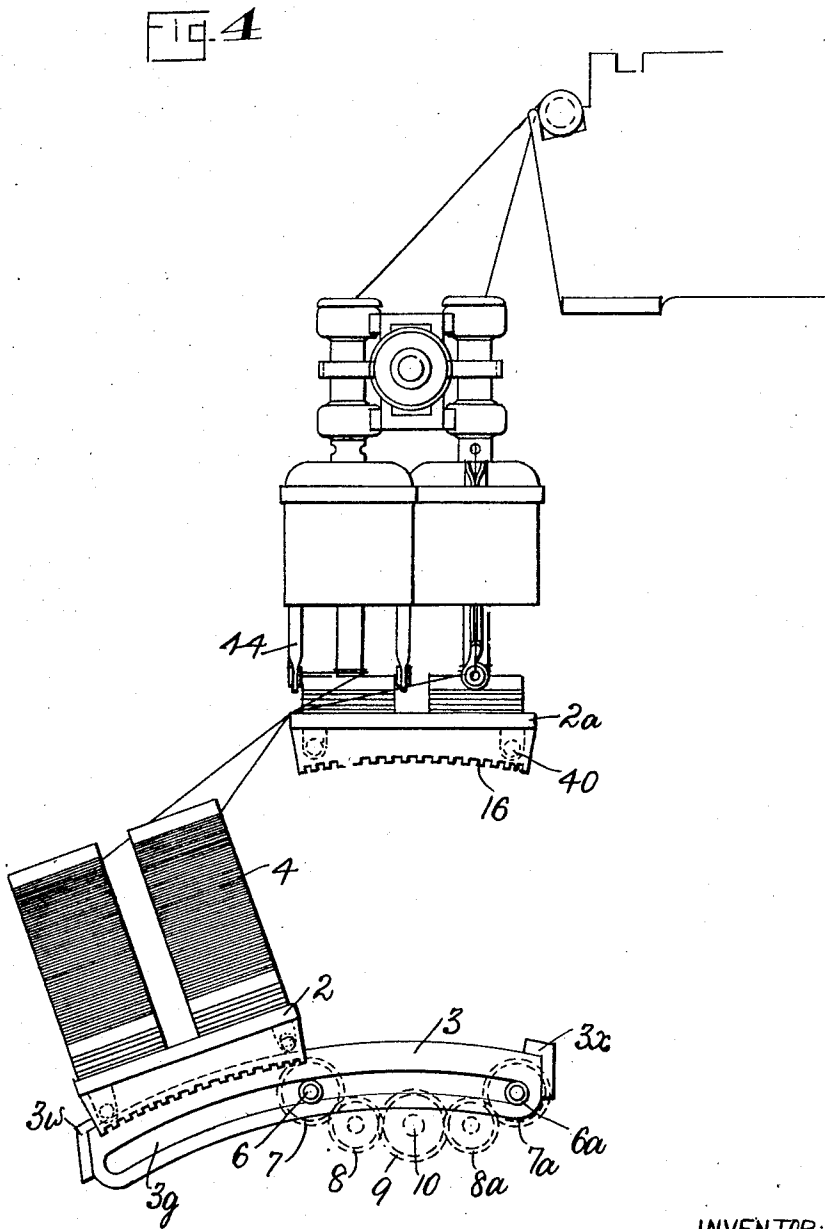
ATTYS.

Sept. 15, 1931.

1. J. A. PORTER
DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
Filed May 22, 1929 5 Sheet

1,823,374

5 Sheets-Sheet 4



INVENTOR:
Joseph Alfred Porter
BY Wright & Brown - Quincy May
ATTYS.

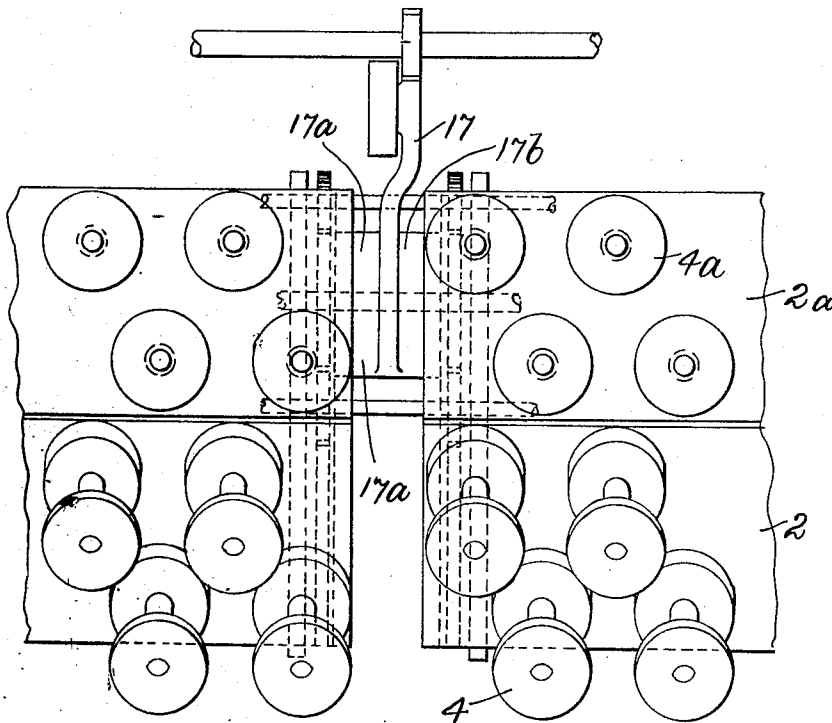
Sept. 15, 1931.

J. A. PORTER
DOFFING MECHANISM FOR FLYER SPINNING, DOUBLING,
TWISTING, AND LIKE MACHINES
Filed May 22, 1929

1,823,374

5 Sheets-Sheet 5

Fig. 5



INVENTOR:
Joseph Alfred Porter
BY *Night Broom Limby May*
ATTYS.

UNITED STATES PATENT OFFICE

JOSEPH ALFRED PORTER, OF HOPE FOUNDRY, LEEDS, ENGLAND, ASSIGNOR TO FAIRBAIRN LAWSON COMBE BARBOUR LIMITED, OF HOPE FOUNDRY, LEEDS, ENGLAND

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

Application filed May 22, 1929, Serial No. 364,964, and in Great Britain May 31, 1928.

In connection with mechanical doffing apparatus for flyer spinning, doubling, twisting and like machines, in most arrangements it is necessary (in order to afford space for the interchanging of the full and empty bobbins) to cause the lifter plate to descend for a space rather more than double the length of the bobbins. To provide for this comparatively excessive motion the framework of the machine and the positions of the spinning spindles have to be so high that the work of the attendant has to be carried out under disadvantages well known. My present invention consists in the production, arrangement and construction of devices whereby the lifter plate with its full or empty bobbins during the doffing process need not be brought down very much below the lower ends of the legs of the flyers when the spindles upon which the bobbins are mounted are fixed to said lifter plate. By these means I am enabled to reduce the height of the operating parts so as to render the work of the attendant more easy to carry out while to the said devices I am enabled to add others whereby I may secure the readjustments of the detached plate and a second supply of empty bobbins without the necessity of arresting the motions of the machine after same has once been started into its spinning operations. In this manner the output of the machine is increased without increasing the duties of the attendant.

In order to clearly describe my invention I have hereunto appended sheets of drawings illustrative thereof to which by figures and letters reference is made in the following description:—

Fig. 1 is an end elevation of portions of a spinning, doubling, twisting or like machine showing an embodiment of my improved mechanism for actuating the lifter plates hereinafter described and the relative positions of said lifter plates with the flyer mechanism in the machine when the bobbins are nearly full and are in their highest positions.

Fig. 2 illustrates the positions into which the full bobbins are moved during the first step of the doffing process.

Fig. 3 shows the positions of the full bobbins and the empty bobbins when the attendant has moved them through the next step of the doffing operation.

Fig. 4 illustrates the position of the parts with the empty bobbins in position for the spinning operations to re-commence.

Fig. 5 is a plan of the parts shown by Figs. 1, 2, 3 and 4.

In the drawings,

A indicates the end frame of the machine.

To attain the object of my invention I make use of the usual interchangeable plates 2 and 2a with their respective series of spindles fixed to them to receive the two series of bobbins 4 and 4a as heretofore employed, however in connection with these we now employ transporting or carrying members 3, for said lifter plates, so that I may mount said members 3 at the proper distance below the lowest position of the lifter plates 2 and 2a when working under ordinary conditions to traverse the bobbins 4 during the building of the coils of yarn thereon.

These transporting members 3 are situated at the extreme ends of the lifter plates 2 and 2a so that by dividing said lifter plates into two series of sections I can mount the lifter rack mechanism to operate between the two ends of each pair of sections as well as at the outer ends of same, by which arrangement the actuating of the said series of lifter plates 2 and 2a is carried out with greater precision. The position of one of the lifter arms 17 is shown by Fig. 5 between the ends of the two sections of plates forming part of the series of plates 2a.

Each lifter plate in the series of lifter plates 2 and 2a is supplied with a transporting member 3 at each end of it, so that the lateral extensions 17a and 17b from the lifter rack 17 will pass beneath or below the ends of the lifter plates 2 and 2a in each series as is shown by Fig. 5.

It will be observed that the transporting members 3 have only two positions, one where they retain the inoperative bobbins at the front of the machine while the operative bobbins, or those about to be put into operation, are in alignment with the flyers and the

other position where the bobbins which are inoperative are to the rear of those which are in alignment with the same flyers, thus when carrying out the process of doffing in order to move the lifter plate (which has been left at the front of the flyers and has been supplied with empty bobbins after the other bobbins have been placed in position upon the other lifter plate for the winding operations to recommence) so that said newly supplied empty bobbins on said lifter plate may be brought from the front of the flyers in a position to the rear of said flyers it is essential that a separate movement should be given to said lifter plate in addition to its ordinary movement by the transporting members 3.

Said transporting members 3 have curved slots 3g arranged to take over runners 6 and 6a which are carried by the brackets 6b.

Upon the studs carrying said runners are loosely mounted pinions 7 and 7a and these pinions as shown by Figs. 1, 2, 3 and 4, are made to gear with intermediate pinions 8 and 8a which derive their motion from a central toothed wheel 9.

This wheel 9 is fixed upon a shaft 10 so that by said shaft 10 having a worm wheel 11 also fixed upon it, this wheel 11 may be actuated by a worm 12 mounted upon a vertical shaft 13 which derives its motion through the bevel gears 14, 14a by means of a hand wheel 15.

By these means when the attendant actuates the hand wheel 15 in order to rotate the shaft 10 the wheels 9, 8 and 8a and 7 and 7a will also be rotated either in one direction or the other as is hereinafter explained.

The shaft 10 extends lengthwise the spinning frame and is arranged to actuate other sets of wheels 9, 8, 8a and 7, 7a that are mounted to engage with racks upon the lifter plates 2 and 2a.

The transporting members 3 have a longitudinal slot 3g which spans the runners 6 and 6a so that said members 3 are retained in positions as desired, and by said slot 3g being curved as shown by the drawings, the bobbins 4 when moved to the front of the machine are made to occupy inclined positions as is shown by Figs. 3 and 4 of the drawings, thus facilitating the handling of said bobbins by the attendant as well as retaining them in positions clear of the flyers.

Each lifter plate 2 and 2a is provided on each of its outer extremities or ends with racks 16, said racks being fixed to the lower surfaces of said plates 2 and 2a as is shown by the drawings.

The supporting and transporting members 3 have their curved upper surfaces smooth to receive the runners 40 mounted upon the lifter plates adjacent to the racks 16 which are upon the ends of the plates 2 and 2a.

These lifter plates 2 and 2a when brought into position with the edge of one against the edge of the other (as shown by Figs. 11

and 12) will snugly fit between the projections 3w and 3x on the ends of the transporting members 3. By thus abutting against said extensions 3w and 3x when the teeth of the rack 16 are in engagement with one or other of the wheels of the pinions 7 or 7a said pinions are enabled to move so that said plates will carry with them the transporting members 3. These will slide over the antifriction runners 6 and 6a from the positions shown in Figs. 1 and 2 to the positions shown in Figs. 3 and 4.

To carry out the additional movement of the lifter rail when same is required to be transferred from the front of the flyers to the rear of said flyers, after the empty bobbins have been placed upon their spindles as shown by Fig. 4 and after the full bobbins have been replaced by empty bobbins while the plate 2 is in the position shown by Figure 4, the attendant will then actuate the hand wheel mechanism whereby the pinions 7 and 7a are caused to actuate the lifter plate 2 so that said lifter plate is moved from its position on the carrier 3 to its rear position over said carrier 3 so that its edge will abut against the projection 3x. When reaching this central position the attendant will still continue the actions of the hand wheel so that the pinions 7, 7a will then carry the plate 2 and its transporting member 3 back to the position shown by Fig. 2 where it is ready for the next process of doffing to be recommenced and the carriers 3 are in their rearmost position as is shown by Fig. 2.

The operations of the foregoing parts are as follows:—

When the bobbins 4 have completed the winding operations so that they are ready for doffing, the attendant arrests the motion of the machines and actuates the lifter rack 17 (which supports said lifter plates and reciprocates same vertically during the winding operations) in order to lower the bobbins from the position shown in Fig. 1 to their lowest position shown by Fig. 2 in which position the lifter plates 2 will be received by and will rest upon the transporting members 3 as is shown by Fig. 2 while the lifter rack 17 will have descended slightly below the plate 2 in order to leave same with its rack 16 engaging with the pinions 7 and 7a.

The attendant will then actuate the hand wheel 15 and thereby commence to revolve the shaft 10 so that by the gearing described the pinions 7, 7a will commence to revolve and at such time the teeth of the rack 16 will have been brought into gear with the pinion 7 as shown by Fig. 2 and also into gear with the pinion 7a. The attendant will then continue the rotations of the hand wheel 15 until the carrier 3 is moved from the position shown by Figs. 1 and 2 into the position shown by Figs. 3 and 4 where the full bobbins will have been brought to the front of the machine and

the empty bobbins 4a will have been brought from the rear of the machine to be in alignment with the axis of their respective flyers 44.

5 The attendant will then actuate the lifter mechanism 17 in the opposite direction and will cause the lifter mechanism to raise the plate 2a from its position shown in Fig. 3 into its working positions shown by Fig. 4 where the spinning operations may then com-
10 mence to wind a few coils around the bobbins 4, 4a on which the machine may be again arrested and the threads w may be then severed as is well understood.

15 The spinning operations of the machine may be then started into action and after thus starting into action the attendant may remove the full bobbins 4 from their spindles on the plate 2 and replace same by empty bobbins
20 on the same plate, after which the attendant may then actuate the hand wheel 15 so as to return the transporting members 3 to their rear positions shown by Figs. 1 and 2 where the empty bobbins remain out of the way
25 of the attendant until the next doffing process has to be carried out.

Such being the nature of my said invention what I claim is:—

1. Doffing mechanism for spinning machines and the like comprising a plurality
30 of detachable and interchangeable lifter plates, a pair of arcuate supporting members for said plates having curved slots, a pair of parallel spaced runners extending
35 into said slots, studs carrying said runners, the spacing of said runners being less than the length of the slots, whereby the supporting members are movable on said runners, and means mounted on said studs and
40 operatively engaging a lifter plate on said members to move said plates forwardly from a horizontal position to a forwardly and downwardly sloping position.

2. Doffing mechanism for spinning machines and the like, comprising a pair of
45 forwardly extending supporting rails mounted for limited forward and rearward movement and adapted to carry a pair of removable lifter plates one in front of the other, stops on said rails to limit the forward and rearward motion of lifter plates
50 thereon, and driving connections adapted to operatively engage lifter plates on said rails to move said plates forwardly and
55 rearwardly and to move said rails by engagement of said plates against said stops.

3. Doffing mechanism for spinning machines and the like, comprising a pair of
60 parallel runners spaced in a substantially horizontal plane, studs carrying said runners, a pair of arcuate supporting members having arcuate slots receiving said runners, said slots being approximately twice as long
65 as the spacing between said runners, whereby said members are capable of limited forward

ward and rearward movement on said runners, a pair of lifter plates removably resting on said members, stops on said members engageable by said plates to limit forward and rearward movement of said plates on
70 said members, driving means mounted on said studs to operatively engage a lifter plate resting on said members and to move said plate forwardly and rearwardly from an intermediate horizontal position above
75 said shafts, said members being also movable forwardly and rearwardly on said runners by engagement of said plates against said stops.

4. In a spinning machine or the like having a plurality of flyers, doffing mechanism comprising a pair of parallel runners horizontally spaced beneath said flyers, studs carrying said runners, a pair of arcuate supporting members having arcuate slots to receive said runners, said slots being about
80 twice as long as the spacing between said runners, a pair of removable lifter plates resting on said members, each plate being movable forwardly and rearwardly on said members when the other plate is removed
85 therefrom, stops on said members to limit the movement of said plates thereon, a gear pinion loosely mounted on each said stud, and a gear rack mounted on each said plate
90 to engage one or the other of said pinions when the plate is on said support members, whereby rotation of said pinions may move a plate from a horizontal position beneath
95 said flyers to a sloping delivery position in front of the machine and from said delivery position to a position rearward of said flyers.

JOSEPH ALFRED PORTER.

105

110

115

120

125

130