

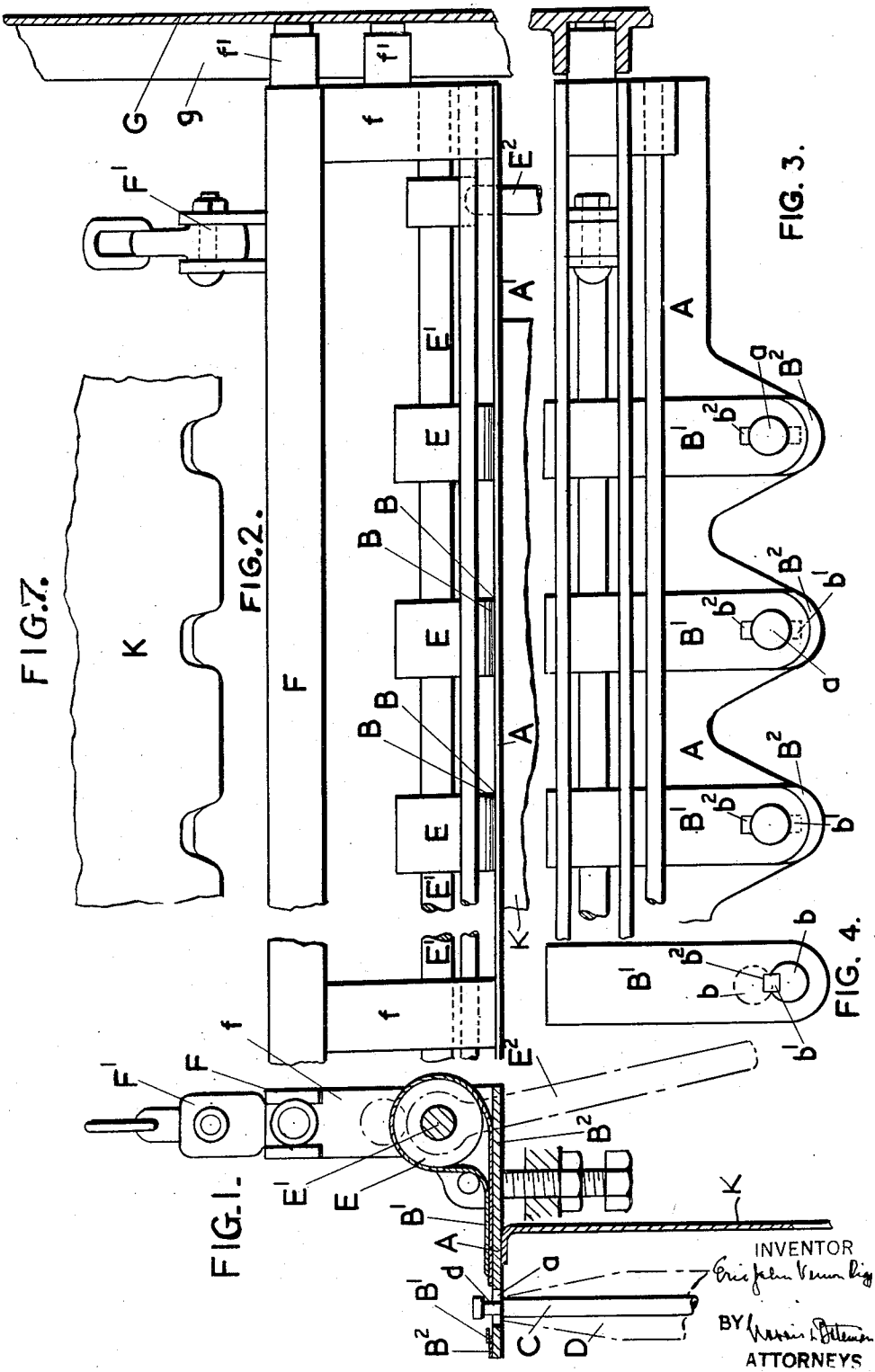
Aug. 14, 1951

E. J. V. RIGG  
AUTOMATIC DOFFING MOTION FOR SPINNING  
DOUBLING AND WINDING FRAMES

2,564,280

Filed July 5, 1949

3 Sheets-Sheet 1



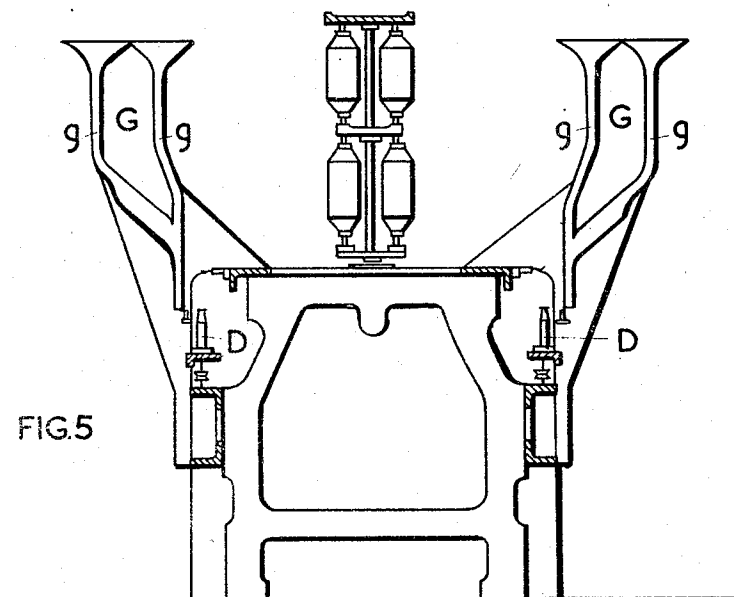
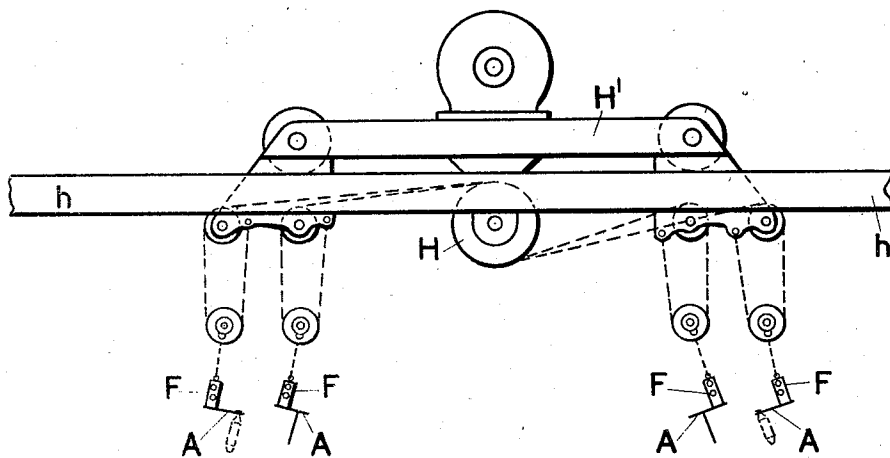
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3 Sheets-Sheet 2



INVENTOR  
Eric John Vernon Rigg  
BY *Harold P. Patterson*  
ATTORNEYS

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3 Sheets-Sheet 3

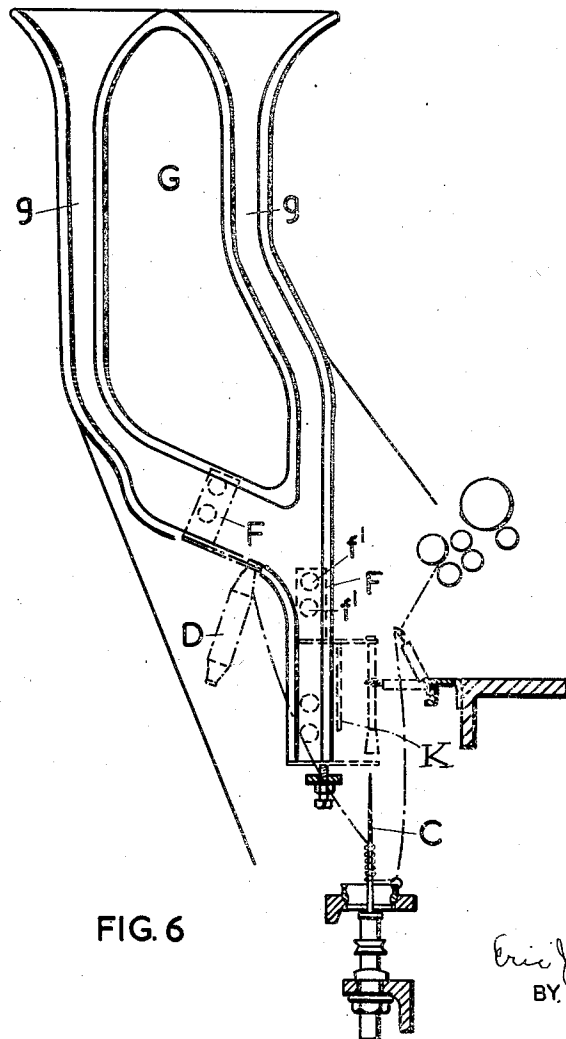
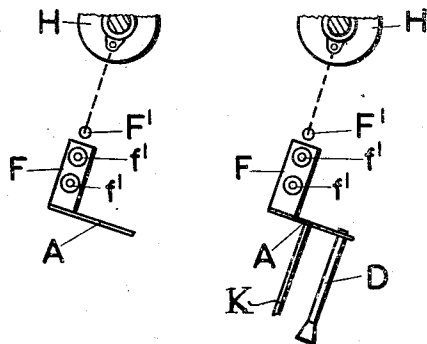


FIG. 6

INVENTOR.  
Eric John Vernon Rigg  
BY *Wm. L. Peterson*  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,564,280

## AUTOMATIC DOFFING MOTION FOR SPINNING DOUBLING AND WINDING FRAMES

Eric John Vernon Rigg, Manchester, England

Application July 5, 1949, Serial No. 103,024  
In Great Britain July 15, 1948

1 Claim. (Cl. 57—52)

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This invention relates to mechanism for doffing full bobbins from the spindles of spinning doubling and winding frames and for replacing them with empty bobbins.

The mechanism according to the invention consists of two plates for each side of the frame, arranged above the spindles and extending from end to end of the frame, each plate being formed with a series of circular apertures one for each spindle and concentric therewith so that when a plate is lowered the apertures pass over the ends of the bobbins on the spindles leaving the running threads from the lappets to the travellers free, a number of pairs of flat springs, carried on the upper surface of each plate corresponding to the number of apertures in the plate, the springs of each pair being arranged above the other and each spring having a hole of the same or substantially the same size as the aperture in the plate, the front of the hole in one spring and the rear of the hole in the other spring being extended in the form of a slot narrower than the hole, the width of the slot corresponding to the diameter of a groove formed in the end of each of the bobbins to be doffed and replaced on the spindles, and means for moving the springs of each pair relatively to one another so that when the plate and springs have been lowered so that the ends of the bobbins project through the holes therein the said ends can be gripped by moving the springs to cause the slots at the front and rear ends thereof to engage in the grooves in the bobbins whereby on lifting the plate all the bobbins will be removed from the spindles.

The invention is illustrated in and will be described with reference to the accompanying drawings in which:

Fig. 1 is a vertical transverse section through one plate, its associated flat springs and raising and lowering attachment, the plate being shown in position ready for lifting the bobbins from the spindles but before the springs have been moved to grip the bobbins.

Fig. 2 is a front elevation of a portion of the plate and springs.

Fig. 3 is a plan view thereof with the springs in the same relative positions as in Fig. 1.

Fig. 4 is a plan view of a pair of springs showing therein positions when moved to enter the groove in the top of a bobbin;

Fig. 5 is a transverse section through a frame showing the lifting mechanism for the plates;

Fig. 6 is a transverse section drawn to a larger scale showing a full bobbin being doffed.

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Fig. 7 is a fragmentary view in elevation of a portion of the thread severing cutter.

The full bobbin doffing plate A (or the empty bobbin replacing plate hereinafter called the donning plate) shown in Figs. 1 to 4 is arranged above the spindles and extends from end to end of the frame. It is provided with a row of apertures *a* one for each spindle and concentric therewith so that when the plate A is lowered the apertures pass over and surround the top of the bobbin D on the spindle C as shown in Fig. 1 in such a way that the running thread from the lappet guide to the travellers is kept clear of the mechanism.

The plate A carries on its surface a number of pairs of flat springs B<sup>1</sup> B<sup>2</sup> one pair for each aperture *a*, the springs of each pair being arranged one above the other. Each spring has a hole *b* in it of the same size as the aperture *a* in the plate A. The front edge of the aperture in the spring B<sup>1</sup> has a recess *b*<sup>1</sup> formed in it and the rear edge of the aperture in the spring B<sup>2</sup> has a corresponding recess *b*<sup>2</sup>.

The width of the recesses *b*<sup>1</sup> and *b*<sup>2</sup> are such that they embrace a groove *d* formed near the upper end of the bobbin D supported on the spindle.

The inner ends of each pair of springs B<sup>1</sup> and B<sup>2</sup> are secured to a boss E in such relative positions that when the boss is rotated in one direction the spring B<sup>1</sup> will slide outwards and the spring B<sup>2</sup> will slide inwards whilst if the boss is rotated in the opposite direction the spring B<sup>1</sup> will move outwards and the spring B<sup>2</sup> will move inwards.

The bosses E are secured on a rod E<sup>1</sup> extending from end to end of the frame and a handle E<sup>2</sup> is secured at one end of the rod E<sup>1</sup> by which it can be rotated to rotate the bosses E.

In the normal position of the bosses E and springs B<sup>1</sup> and B<sup>2</sup> the holes *b*<sup>1</sup> and *b*<sup>2</sup> therein coincide as shown in Figs. 1 and 3 but on rotation of the bosses the apertures move into the position shown in Fig. 4 so that the groove *d* in the top of the bobbin D is embraced by the recesses *b*<sup>1</sup> and *b*<sup>2</sup> to grip it firmly and consequently if the plate A is lifted (or lowered) the bobbin D will be carried with it.

The plate A is secured to a bar F extending the full length of the frame by the members *f* which also carry the bearings in which the rod E<sup>1</sup> rotates. The bar F is provided with hooks or shackles F<sup>1</sup> by which it can be lowered to bring the apertures *a* in the plate A over the spindles and when the bobbins have been gripped by the

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springs B<sup>1</sup> and B<sup>2</sup> it can be raised again to doff the full bobbins.

In order to guide the plate A in its downward and upward travel the ends of the bar F carry runners f<sup>1</sup> which engage in tracks g formed in upwardly projecting members G at each end of the frame. The tracks g are curved to guide the plate A in the required direction.

It is desirable to have two sets of tracks g as shown in Figs. 5 and 6 in each member G so that when a plate A with full bobbins has been raised from the spindles a second plate of identical construction to the first plate and carrying a complement of empty bobbins can be lowered on to the spindles and after the empty bobbins have been released the second plate can be raised and the whole removed to enable the full bobbins to be released and replaced by the fresh empty bobbins taken from a set of dummy spindles.

The plates A can be raised and lowered and taken away from the frame in different ways the means adopted depending on the layout of the spinning rooms and other considerations.

In the method shown in Fig. 5 the plates are raised and lowered by an overhead crane H operating from the carriage H<sup>1</sup> running on rails h and over the tops of all the frames.

The crane H is run to a position at the front of the frames where there is a device consisting of 2 rows of dummy spindles flanking an endless belt. This device corresponds in length and number of spindles to the spinning frames.

When the doffing is complete the crane is run to a position over the device where the full bobbins are dropped on to the endless belt and a fresh set of empty bobbins are collected from the dummy spindles. The operation can then be repeated.

The doffing process is briefly as follows:

The empty bobbins are first placed on the dummy spindles and the donning plate is lowered, collects them, and is then raised out of the way. The doffing plate is then lowered, collects the full bobbins, and is raised meanwhile the donning plate is lowered, the guides being so arranged that as the full bobbins are taken off the empty ones are lowered immediately on to the empty spindles thus nipping the thread on to the spindle and under the empty bobbin as in hand doffing. The thread is severed at the base of the empty bobbin as soon as it is in position by a cutter K attached to and descending with the donning plate, as will be seen from Fig. 6. The bobbins are then released all having been placed on the spindles at

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the same tension that is to say at the tension of the flat springs B<sup>1</sup> B<sup>2</sup>. The donning plate is then raised to its position over the creel and the doffing plate is lowered on to the dummy spindles the full bobbins are released and the rail is returned to its place above the creel. The frame is then started up and the bobbins are collected in a suitable manner as by hand.

I claim:

- 10 Mechanism for doffing full bobbins of the type having annular grooves near their tops from the spindles of spinning and doubling frames and replacing them by empty bobbins consisting of two plates for each side of the frame, arranged
- 15 above the spindles and extending from end to end of the frame, each plate being formed with a series of circular apertures one for each spindle and concentric therewith so that when a plate is lowered the apertures pass over the ends of the
- 20 bobbins on the spindles leaving the running threads from the lappets to the travellers free, a number of pairs of flat springs carried on the upper surface of each plate, corresponding to the number of apertures in the plate, the springs of
- 25 each pair being arranged one above the other and each spring having a hole of the same or substantially the same size as the aperture in the plate, the front of the hole in one spring and the rear of the hole in the other spring being ex-
- 30 tended in the form of a slot narrower than the hole, the width of the slot corresponding to the diameter of the groove near the top of each of the bobbins to be doffed and replaced on the
- 35 spindles, and means for moving the springs of each pair relatively to one another so that when the plate and springs have been lowered so that the ends of the bobbins project through the
- 40 holes therein the said ends can be gripped by moving the springs to cause the slots at the front and rear ends thereof to engage in the grooves in the bobbins whereby on lifting the plate all the bobbins will be removed from the spindles.

ERIC JOHN VERNON RIGG.

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