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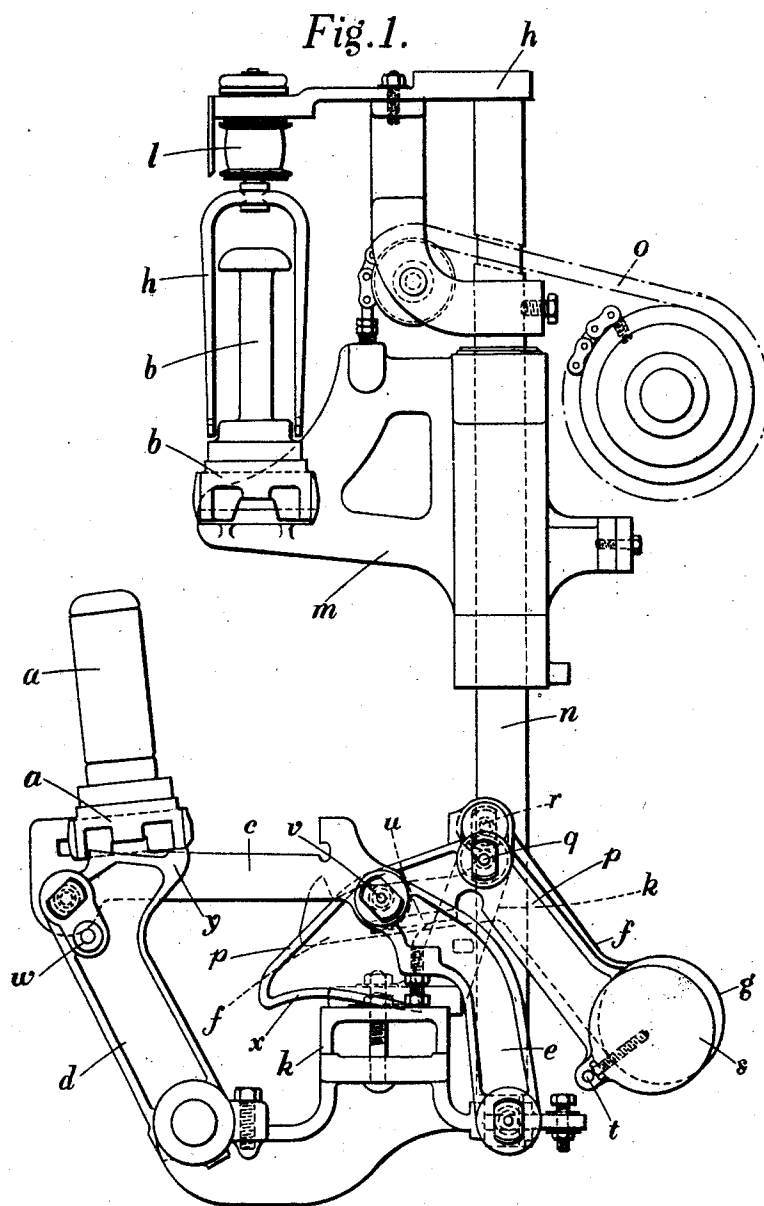
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1,752,678

DOFFING MECHANISM FOR SPINNING, TWISTING, AND LIKE MACHINES

Filed Aug. 29, 1928

3 Sheets-Sheet 1



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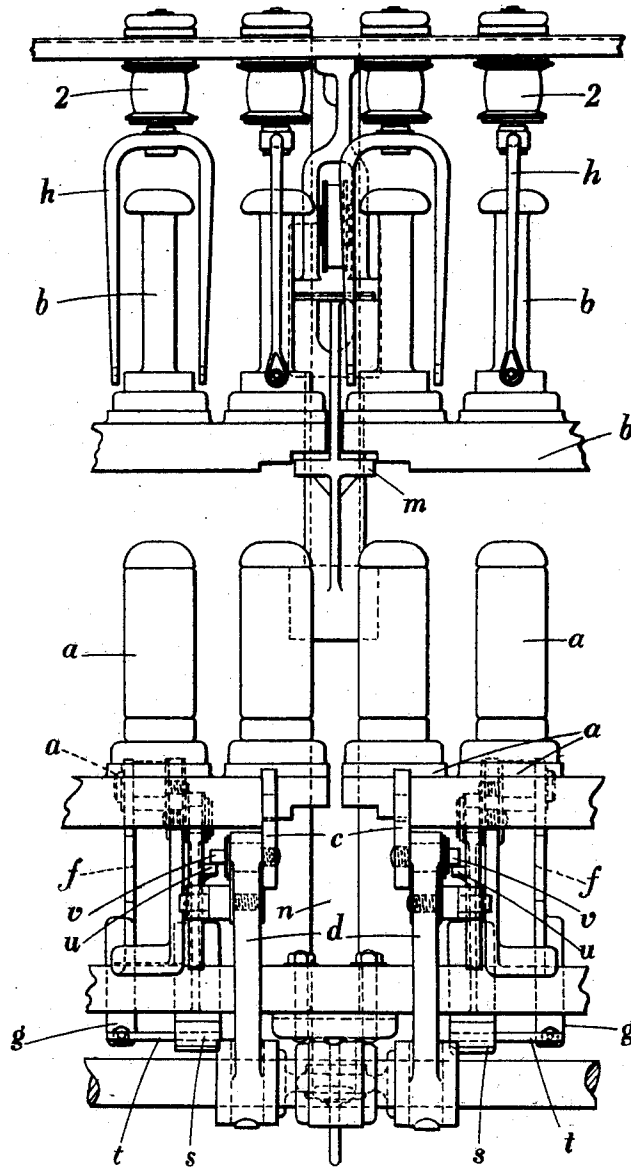
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3 Sheets-Sheet 2

Fig. 2.



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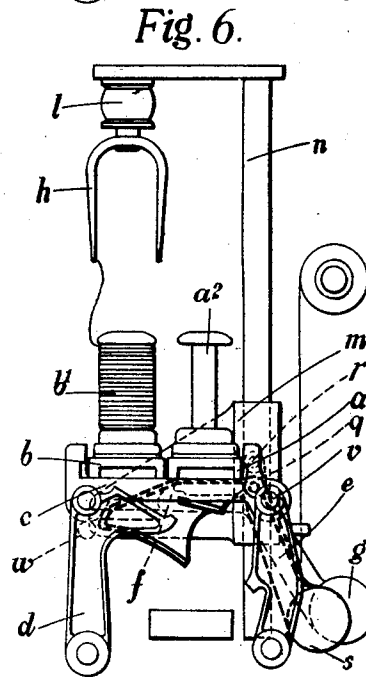
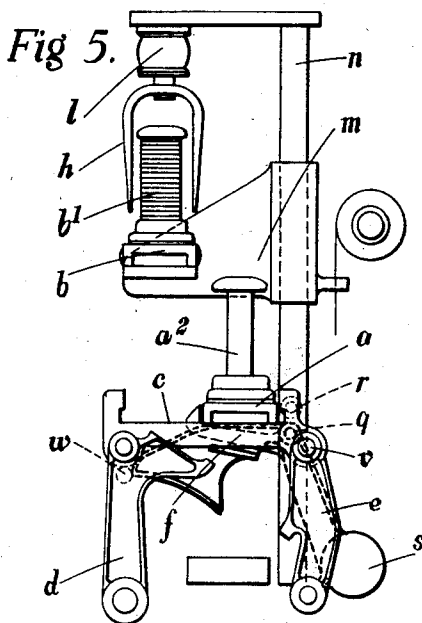
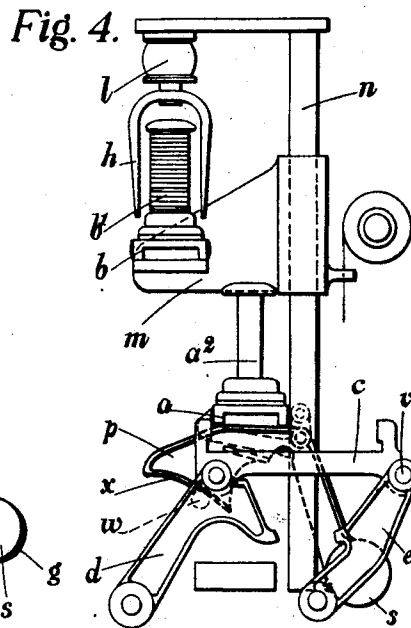
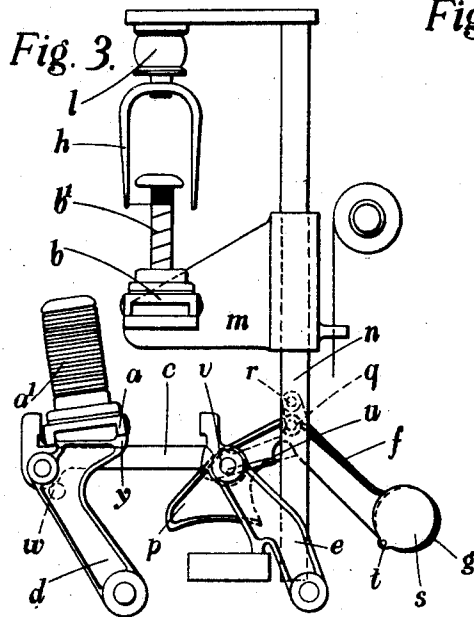
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3 Sheets-Sheet 3



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DOFFING MECHANISM FOR SPINNING, TWISTING, AND LIKE MACHINES

Application filed August 29, 1928, Serial No. 302,808, and in Great Britain November 10, 1927.

This invention relates to doffing motions for spinning, twisting and like machines, and in fact is an improvement in or modification of the invention set forth in the specification of United States patent application Serial No. 187,945 filed 30th April, 1927, which has eventuated into Patent No. 1,695,659. More particularly the present invention is concerned with mechanism of the class in which bobbins are supported on spindles projecting upwards from interchangeable bobbin rails which are arranged to be moved so as to bring a series of empty bobbins into their spinning positions within the flyers, and when the bobbins have been filled are moved to carry these bobbins to a position in which doffing is facilitated and in which a bobbin rail carrying empty bobbins can be brought into a convenient position to enable them to replace those in the flyers with as little delay as possible when those in the flyers have been filled.

The invention set forth in the specification of United States patent application Serial No. 187,945 filed 30th April, 1927, consisted in the provision of a rocking or swinging frame arranged to support the bobbin rails and comprising arms mounted to swing about the axes of shafts, one or both of which was actuated by suitable mechanism for swinging the frame into the various positions required during the transfer and doffing operations. It was preferred to cause the bobbin rails to move in a circular arc which is convex upward with the result that at the extreme forward and rearward positions the bobbin rails would take up a lower position than the intermediate or mid-position.

In the case of heavy rails, considerable effort is required when starting the movement of the rocking frame from the rearmost position owing to the need of lifting and sliding the heavy bobbin rails filled with bobbins. The main object of the present invention is to overcome this difficulty, and with that object in view, according to the present invention two or more supporting plates for the bobbin rails are provided pivoted in the framework and arranged to co-operate with the rocking frame itself so that the plates receive the bobbin rails as the latter move to their rearmost

position, and in fact retain them raised approximately at the level they attain in the intermediate position which is preferably that below the spinning position.

An example of a doffing motion for a spinning frame dealing with heavy bobbin rails and constructed in accordance with the invention will now be described with reference to the accompanying drawings, wherein:—

Figure 1 is a side elevation of the part of the motion which comes into question;

Figure 2 is a front elevation of a part of the machine showing the members of two adjacent swinging frames; while

Figures 3 to 6 are views corresponding to Figure 1 but shown to a smaller scale and somewhat diagrammatically to illustrate successive positions of the parts in operation.

It will be seen first of all that the motion has practically all the parts as in the motion described in the specification of United States patent application Serial No. 187,945 filed 30th April, 1927. *a, b* indicate the two sets of interchangeable bobbin rails, and as before the swinging frame consists of a pair of horizontal bars *c*, one at each end of a bobbin rail and each pivoted to the upper ends of two swinging arms *d, e*. The method of turning the frame is not shown, but may be, for example, similar to that shown in Figure 2 of the drawings with the specification of United States patent application Serial No. 187,945 filed 30th April, 1927. In this case also the bobbin rails *a, b* are retained in the rear position by a pivoted hook *f* counter-weighted at *g*. As before also the flyers *h* are supported on the flyer rail *h*¹, which is fixed to the main framework of the spinning machine, and are driven by a hand engaging with pulleys *i*. The lifting mechanism comprises brackets *m* guided on the standards *n* of the machine and are given an up-and-down motion for effecting the building operation, which motions are transmitted to it through the chain *o*. As before, the brackets *m* are also capable of a separate movement for lifting the bobbin rails *a, b* from the bars *c* into the spinning position.

In accordance with the present invention, each of the swinging frames has associated

with it a pair of supporting plates p of peculiar outline which are pivoted on brackets k at the points g immediately below the pivots r of the weighted hooks f . The brackets k are fitted on to the rail k^1 which extends along the full length of the machine. The pivoted supporting plates p each also has a counter-weight s at its tail end, and each of the plates p has at its tail end a transverse pin t engaging below the counter-weight g of the adjacent pivoted hook f . The effect of the supporting plates p is that when the rocking frame swings rearwardly from the position shown in Figure 1, it allows the pivoted plates p to rise into such a position that the bobbin rail a is transferred from its position on the bars c on to the upper edges of the plates p , which thus maintain the bobbin rails when they are in the rearmost position at a level above that of the upper surface of the bars c when the latter are in their rearmost position. The result is that on commencing to move the rocking frame from its rearmost position, no great effort is required because it moves practically to its middle or intermediate position before its upper bars c come into contact with the bobbin rail carrying a set of bobbins. This, however, will be explained more fully below in dealing with the cycle of operations with reference to Figures 3 to 6.

The pivoted plates p are each formed with a straight projecting ledge u on one side, and when the swinging frame is in the forward position as shown in Figure 1, the pivots v between the rear arms e of the frames and the top bars c engage these ledges to hold down the front parts of the plates p in the depressed position. The swinging frames are also provided with projecting runners w , and the purpose of these is to engage below the curved under surface x of the plates p to hold the latter positively in the upward position in the rearmost position of the rocking frame, as will be described more particularly with reference to Figure 4.

The invention can now be best described by considering the cycle of operations. It is convenient to start from the position when the rocking frame c, d, e is swung forwards, as shown in Figure 1. This condition of affairs is also illustrated somewhat more diagrammatically in Figure 3. The rail a with the filled bobbins a^1 is in this position tilted forward somewhat due to off-set portions y of the front arms d of the swinging frame, so that the filled bobbins a^1 are in a convenient position to be doffed by the operator. Moreover, by swinging the frame forwardly into the position shown, the rail b supporting the empty bobbins b^1 has been brought into the position below the flyers h and has then been lifted by the bracket m , so that the bobbins b^1 have reached the spinning positions.

The filled bobbins a^1 are then rapidly doffed, replaced by empty bobbins, and the

rocking frame is swung into the rearmost position as illustrated in Figure 4. It will be noticed by reference to Figures 1 and 3, that the pivots v of the rocking frame engaging above the ledges u positively hold the supporting plates p with their forward portions depressed and with their tail ends and counterweights s lifted. Incidentally, the pins t acting below the hooks f cause the forward ends of these hooks to be depressed also. When the rocking frame, however, is swung backwards into the position shown in Figure 4, the pivots v have left the ledges u and the counter-weights s cause the forward parts of the supporting plates p to rise. As a matter of fact, when the rocking frame is swung fully backwards as shown in Figure 4, the laterally projecting runner w has now engaged below the curved under edge x of the supporting plates p and positively maintains these supporting plates with the rear parts of their upper edges horizontal. Incidentally, in this position they have received the rail a carrying the empty bobbins a^2 recently placed upon this rail after doffing the full bobbins a^1 , for the rail a has been pushed on to the upper edge of the supporting plates p during the rearward movement of the rocking frame. Thus it is the runners w which hold the supporting plates p rigidly in the required position and not the counterweights s . The result is that the bobbins a^2 are kept substantially at the height which they attain in the middle or intermediate position of the rocking frame indicated in Figure 5, and the latter, as already described, is relieved of the weight of the rail a and the bobbins a^2 when the latter are in their rearmost position.

As already mentioned, the purpose of the pins t projecting from the tail end of the supporting plates p and engaging below the tail ends of the pivoted hooks f is to ensure that the latter shall have their rear ends raised and their forward ends depressed, as shown in Figure 3, when the rocking frame is moved to the forward position and when therefore the forward ends of the supporting plates p are depressed. The result of this is that the tail ends of the supporting plates are positively lifted and the pins t lift the tail ends of the pivoted hooks or catches f . When, however, the supporting plates p are allowed to return to the position shown in Figure 4, the counter-weights s have fallen, moving the pins t from below the tail ends of the hooks f so that the counter-weights g cause the forward ends of the hooks f to rise and are free to engage in front of the bobbin rail a when it is in the rearmost position as shown in Figure 4.

The next movement, therefore, is to swing the rocking frame half forwards in the intermediate position shown in Figure 5, and for the reason already explained, no special

effort is required for this movement because during this time the weight of the bobbin rail a and the bobbins a^2 does not have to be lifted; in fact, when the upper bars c of the rocking frame come into contact with the under surface of the bobbin rail a at the instant illustrated in Figure 5, the rail a is received in the rearward position on the bars c , leaving the vacant space at the forward parts of the bars c to receive the filled bobbins b^1 when these are lowered on to the bars c by the bracket m , as shown in Figure 6. During this time, of course, the forward ends of the pivoted hooks f have retained the rearmost bobbin rail a and prevented it from moving forward. The descent of the rail b with the bobbins b^1 depresses the forward ends of the pivoted hooks f , leaving both rails of bobbins and the swinging frame free to move forward during the next movement, which completes the forward movement, into the position shown in Figures 1 and 3. The cycle is now completed, the full bobbins b^1 being in the forward position ready for doffing and the empty bobbins a^2 being below the spinning position ready to be raised by the bracket m .

The invention is not limited to the precise construction shown in the drawings, which is merely taken as an example, but the shape of the supporting plates p can, for example, be somewhat modified, and furthermore, the invention can be applied to forms of rocking frame which are pivoted above the upper bars c , as set forth in the specification of United States patent application Serial No. 187,945, filed 30th April 1927.

I claim:—

1. A doffing motion for spinning, twisting and like machines, comprising in combination, a pair of interchangeable bobbin rails, a support for same comprising a rocking frame pivotally mounted on the machine framework, mechanism for swinging said rocking frame so as to carry said rails between the forward or doffing position and the rear position, and a pair of pivoted supporting members operatively related to said rocking frame so as to receive said bobbin rails in their rear position and to retain same at their highest position, clear of said rocking frame when the latter is in its rear position.

2. A doffing motion for spinning, twisting and like machines, comprising in combination, a pair of interchangeable bobbin rails, a support for same comprising a rocking frame pivotally mounted on the machine framework, mechanism for swinging said rocking frame so as to carry said rails between the forward or doffing position and the rear position, and a pair of supporting plates pivoted in the machine framework and operatively related to said rocking frame so as to receive said bobbin rails in their rear position and to retain same at their highest position,

said plates being formed with lateral projections which, when said rocking frame is rocked forward, are engaged by parts of said frame to depress said supporting plates.

3. A doffing motion for spinning, twisting and like machines, comprising in combination, a pair of interchangeable bobbin rails, a support for same comprising a rocking frame pivotally mounted on the machine framework, mechanism for swinging said rocking frame so as to carry said rails between the forward or doffing position and the rear position, and a pair of supporting plates pivoted in the machine framework and supported by parts of said rocking frame in the rear position of the latter so as to receive said bobbin rails and retain them at their highest position, clear of said rocking frame when the latter is in its rear position.

4. A doffing motion for spinning, twisting and like machines, comprising in combination, a pair of interchangeable bobbin rails, a supporting frame for said rails consisting of arms pivotally mounted upon the machine framework and a substantially horizontal platform secured to said arms, mechanism for swinging one of said arms about its pivotal axis, and a pair of pivoted supporting members operatively related to said supporting frame so as to receive said bobbin rails in their rear position and to retain same at their highest position, clear of said rocking frame when the latter is in its rear position.

5. A doffing motion for spinning, twisting and like machines, comprising in combination, a pair of interchangeable bobbin rails, a support for same comprising a rocking frame pivotally mounted on the machine framework, mechanism for swinging said rocking frame so as to carry said rails between the forward or doffing position and the rear position, a pair of pivoted supporting plates operatively related to said rocking frame so as to receive said bobbin rails in their rear position and to retain same at their highest position, and a pair of pivoted hooks shaped to retain a bobbin rail in its rearmost position and having a one-way connection with said supporting plates so as to be depressed by said supporting plates when the latter are depressed but to be allowed to recover when said supporting plates rise.

6. A spinning, twisting or like machine, comprising in combination, a stationary framework, a set of flyers journaled therein, driving means for said flyers, a rocking frame pivotally mounted on said framework, a pair of interchangeable bobbin rails supported on said rocking frame, mechanism for swinging said rocking frame so as to move said rails between the forward or doffing position and the rear position, lifter brackets for raising said rails into the spinning position, a builder motion for reciprocating either of said rails and the bobbins carried thereby during the

spinning operation, and a pair of pivoted supporting members operatively related to said rocking frame so as to receive said bobbin rails in their rear position and to retain same at their highest position, clear of said rocking frame when the latter is in its rear position.

In witness whereof I hereunto subscribe my name this 17th day of August, 1928.

JACK P. MACKIE.

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