Dec. 22, 1936. E. KINSELLA ET AL 2,064,924

LIFTER MOTION OF SPINNING APPARATUS

Filed Aug. 20, 1935

FIG. 1

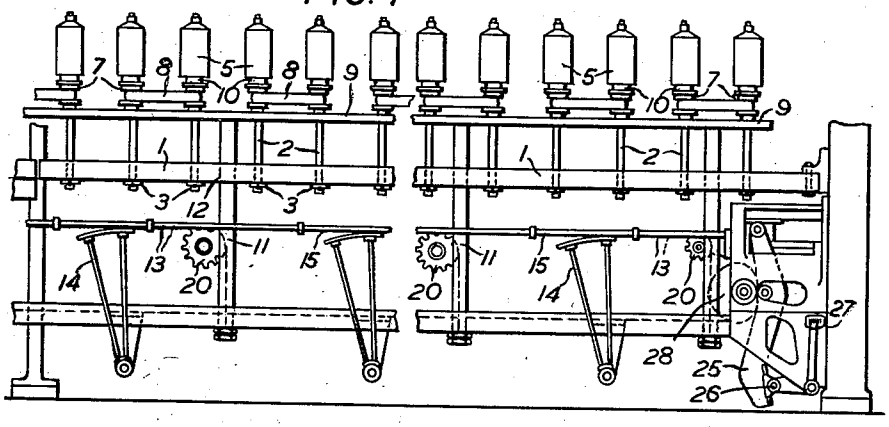


FIG. 2

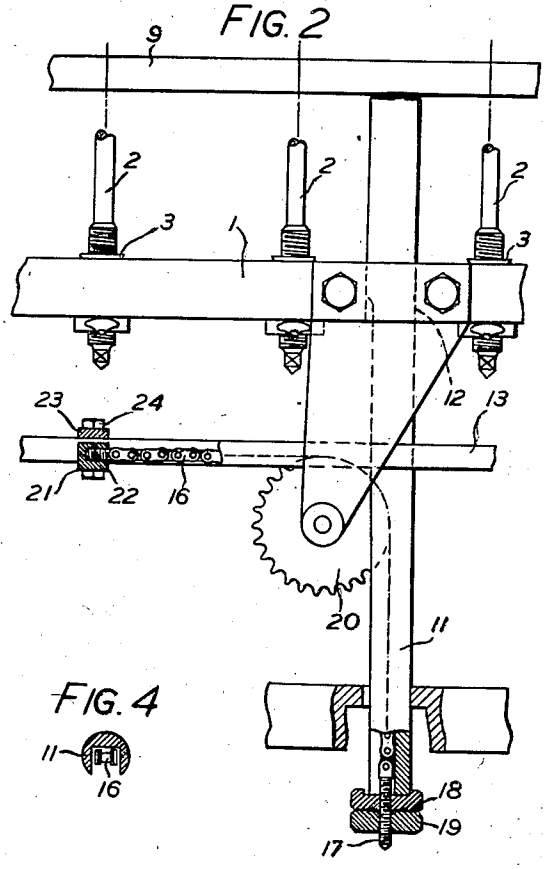


FIG. 3

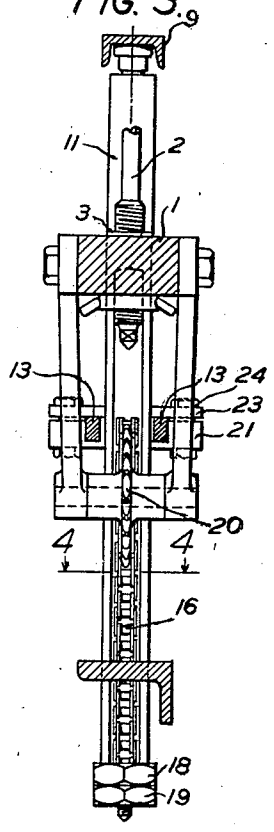


FIG. 4

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Patented Dec. 22, 1936

2,064,924

UNITED STATES PATENT OFFICE

2,064,924

LIFTER MOTION OF SPINNING APPARATUS

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Application August 20, 1935, Serial No. 36,956
In Great Britain September 17, 1934

5 Claims. (Cl. 118—41)

This invention relates to the lifter motion of spinning machines such as are used for the twisting or doubling of yarn, such as ring-spinning, flyer-spinning and cap-spinning machines.

In machines of the above type, the spindles are generally arranged substantially vertically and the traversing of the yarn being spun upon the bobbins or other yarn packages is effected by the vertical movements of a lifter rail which carries either the bobbins on which the yarn is being wound or guide means for conducting such yarn to the bobbins. These vertical movements are effected by means of vertical lifter rods each actuated by a chain attached to the lower end of the rod, the chain passing over flanged wheels or chain sprockets and being secured to a horizontally reciprocating traverse rod. Each lifting chain is secured to one side of the lower end of its lifter rod, and through the chains is transmitted the whole of the force necessary to raise the lifter rail and the various elements mounted thereon. On account of the lateral connection between the chains and the lifter rods, the rods are submitted also to a bending moment which is liable to cause deflection of the rods and to give rise to faulty spinning, especially in machines adapted to operate at a high speed. It is an object of the present invention to provide an improved spinning machine which is free from the disadvantage outlined above.

According to the present invention, lifter rod members are employed which are of such section that each lifting chain may run up the axis of the lifter rod member to which it is attached. By the term axis is meant the line joining the centres of area of successive cross-sections of the lifter rod member. In one convenient form, a circular rod is employed which is deeply grooved longitudinally so as to receive the chain. Since the pull of each chain is along the axis of the lifter rod member (hereafter referred to as "lifter rod") to which it is attached and the rod is submitted to a compressive force only, the bending force arising from a lateral attachment of chain to rod is avoided.

In addition to the avoidance of bending forces in the lifter rod, such forces may also be avoided or counteracted in other parts of the lifter motion of the spinning apparatus. Thus, for example, the chain sprockets over which the lifting chains run may be arranged so that their shafts are supported on both sides of the sprockets instead of on one side only, as is usual in such machines. Similarly, bending moments in the horizontally reciprocated traverse rods may be overcome by the provision of two traverse rods connected together at suitable intervals by yokes to which the ends of the chains are attached between the rods. Thus the lifter rods, lifting chains and sprockets therefor are mounted between the two traverse rods, and any bending force which might be applied to the traverse rods is taken by the yokes which transmit to the traverse rods a purely tensile or compressive force.

The invention is of particular advantage in connection with the method of mounting the traverse rods described in U. S. application S. No. 36,954 filed August 20, 1935, corresponding to British application No. 26,638/34 filed 17th September, 1934, and with the method of actuating the traverse rods described in U. S. application S. No. 36,955 filed August 20, 1935, corresponding to British application No. 26,639/34 filed 17th September, 1934. While the invention is applicable to twisting or doubling machines generally in which traversing of the yarn is effected by means of a vertically operated lifter rail, it is of particular advantage in connection with cap-spinning machines in which the lifter rail carries hollow spindles and driving means therefor, together with the bobbins on which the yarn being spun is wound.

By way of example, a form of apparatus according to the present invention will now be described in greater detail with reference to the accompanying drawing in which Fig. 1 is a front elevation of a cap-spinning machine provided with means according to the invention and Figs. 2 and 3 are a front elevation and a sectional side elevation of the lifter rods according to the invention, and Fig. 4 is a detail of Figs. 2 and 3.

A cap-spinning machine according to the invention comprises a fixed horizontal spindle rail 1. Stationary spindles 2 are secured to the spindle rail at suitably spaced intervals by means of an attachment 3 as described in U. S. specification S. No. 36,953 filed August 20, 1935, corresponding to British application No. 26,635/34 filed 17th September, 1934. The spindle rail is constructed in sections secured to the frames 4 of the machine. At the upper ends of the spindles 2 are the caps 5 of the machine, and surrounding each of the spindles 2 is a driving wharl 7 driven by a band 8 and mounted in suitable bearings in a horizontal lifter rail 9. The wharls 7 drive the bobbins 10 provided for the reception of the yarn to be spun.

The weight of the lifter rail 9 and of the bobbins 10 and associated parts mounted thereon is taken by a number of vertical lifter rods 11 which

descend from the lifter rail and pass through suitable borings 12 in the spindle rail. The lifter rods 11 pass between two horizontal traverse rods 13 situated below the spindle rail 1 and mounted, as described in U. S. application S. No. 36,954 filed August 20, 1935, corresponding to British application No. 26,638/34 filed 17th September, 1934, upon rocking quadrants 14 to which they are secured by metal tapes 15. The lower end of each lifter rod 11 is deeply grooved longitudinally, as shown in section in Fig. 4, for the reception of a chain 16 which is secured to the bottom of the rod 11 by means of a screw 17 fitting into a nut 18 which is of greater diameter than the rod, and is recessed on its upper side to receive the end of the rod 11. An additional nut 19 is provided beneath each nut 18 to serve as a locking means.

The lifting chains 16 pass centrally up the rods 11 and over sprockets 20 disposed between and a little below the traverse rods 13, their upper ends being secured to yokes 21 by means of which the two traverse rods 13 are connected together at intervals.

A screw 22 connects the chain 16 to the yoke 21, which is secured to the rods 13 by a clamping piece 23 and nuts and bolts 24.

The traverse rods 13 are reciprocated horizontally by means of suitable lever and cam arrangements, such for example as described in U. S. application S. No. 36,955 filed August 20, 1935, corresponding to British application No. 26,639/34 filed 17th September, 1934. One such arrangement is shown on the right hand side of Fig. 1 in which a lever 25 rocks about an adjustable pivot 26 provided with a vernier scale 27 to facilitate adjustment of the length of traverse. The lever 25 is actuated by a cam 28, and its upper end is connected to the traverse rods 13. The lever 25 alternately pulls the chains 16 so as to raise the lifter rail 9 through the medium of the lifter rods 11 and allows the chain 16 to return so that the lifter rail 9 descends again. In order to counter-balance wholly or in part the weight carried by the lifter rail 9, counter-balance weights may be employed, or, with advantage, compressed air cylinders may be provided at the ends of the traverse rods 13 as described in U. S. application S.No. 36,955 filed August 20, 1935, corresponding to British application No. 26,636/34 filed 17th September, 1934. The cylinders are connected to a suitable reservoir of compressed air and assist the operating cams 28 in forcing the traverse rods 13 in one direction so as to lift the lifter rail 9. In the other direction of traverse the weight of the lifter rail 9, the elements 17 and the bobbins 10 carried thereby maintain the traverse rods 13 in engagement with the cam 28, and recompress the air in the cylinder. Alternatively, the cam 28 may be made to operate in the other direction so that it acts with the weight of the lifter rail 9 to compress the air in the cylinder, the cylinder alone effecting the raising of the lifter rail 9.

What we claim and desire to secure by Letters Patent is:—

1. In a spinning machine comprising vertically reciprocating parts, and horizontally reciprocating actuating members therefor, a connection between said reciprocating parts and actuating members comprising vertical rods connected to said parts, flexible members connected to said rods and said actuating members, and pulleys over which said flexible members pass, each of said vertical rods having a longitudinal recess and each flexible member lying in the recess so as to pass up the axis of the rod.

2. In a spinning machine comprising vertically reciprocating parts, and a pair of horizontally reciprocating traverse rods for actuating said parts, a connection between said reciprocating parts and said traverse rods comprising vertical rods connected to said parts, flexible members connected to said vertical rods and said traverse rods, and pulleys over which said flexible members pass, said vertical rods, flexible members and pulleys being disposed between said two traverse rods, and each of said vertical rods having a longitudinal recess and each flexible member lying in the recess so as to pass up the axis of the rod.

3. In a spinning machine comprising vertically reciprocating parts, and a pair of horizontally reciprocating traverse rods for actuating said parts, a connection between said reciprocating parts and said traverse rods comprising vertical rods conected to said parts, flexible members connected to said vertical rods and said traverse rods, pulleys over which said flexible members pass, brackets, adapted to support said pulleys on both sides thereof, said vertical rods, flexible members and pulleys being disposed between said two traverse rods, and each of said vertical rods having a longitudinal recess and each flexible member lying in the recess so as to pass up the axis of the rod.

4. In a spinning machine comprising vertically reciprocating parts, and horizontally reciprocating actuating members therefor, a connection between said reciprocating parts and actuating members comprising vertical rods connected to said parts, chains connected to said rods and said actuating members, and sprockets over which said chains pass, each of said vertical rods having a longitudinal recess and each chain lying in the recess so as to pass up the axis of the rod.

5. In a cap spinning machine comprising a vertically reciprocating traverse rail with rotating tubes and driving wheels mounted thereon for the reception of bobbins and horizontally reciprocating members for actuating said traverse rail, a connection between said members and said traverse rail comprising vertical rods connected to said traverse rail, flexible members connected to said rods and said actuating members, and pulleys over which said flexible members pass, each of said vertical rods having a longitudinal recess and each flexible member lying in the recess so as to pass up the axis of the rod.

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CERTIFICATE OF CORRECTION.

Patent No. 2,064,924.

December 22, 193

EDWARD KINSELLA, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 42, for the word "chain" read chains; line 49, for the serial number "36,955" read 36,952; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of March, A. D. 1937.

Seal)

Henry Van Arsdale
Acting Commissioner of Patents.