May 23, 1950 J. L. BUCHANAN 2,509,032

KNITTING MACHINE

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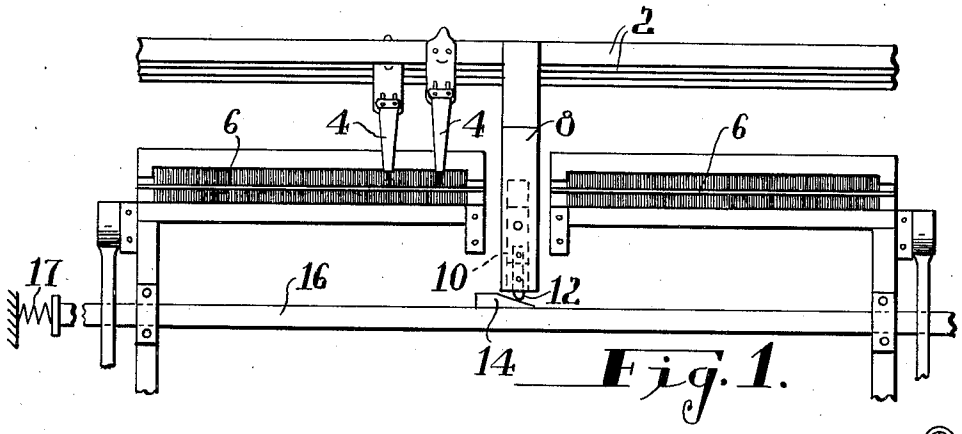


Fig. 1.

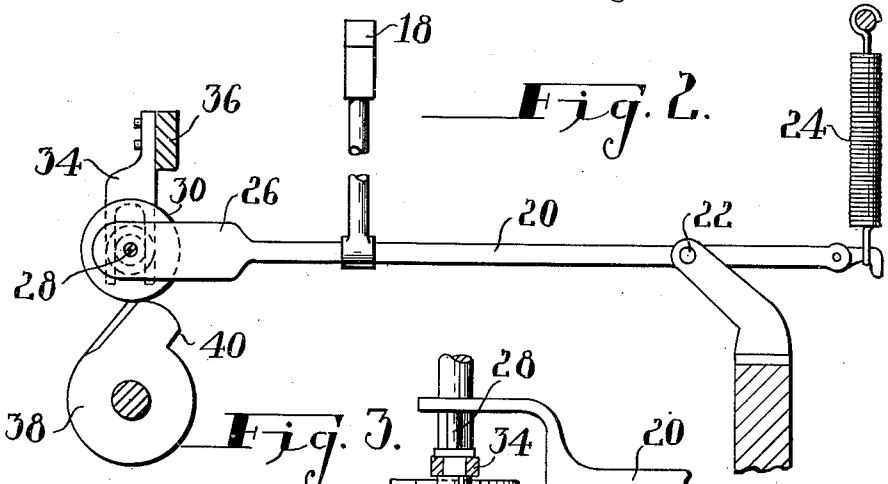


Fig. 2.

Fig. 3.

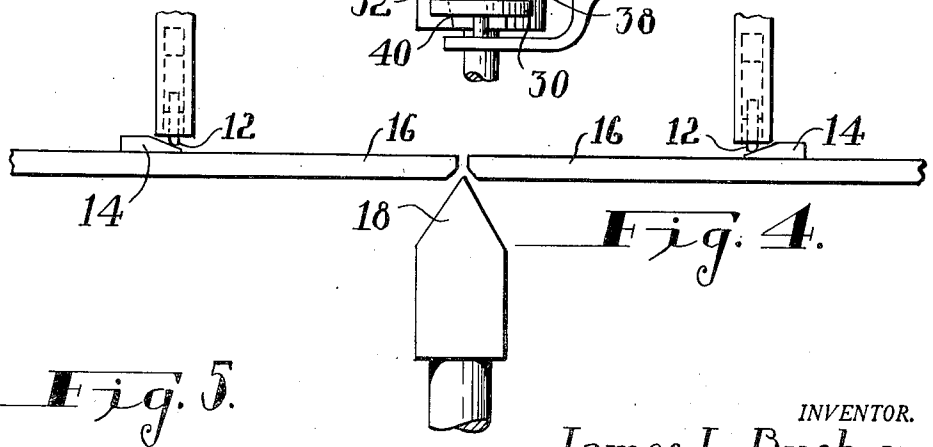
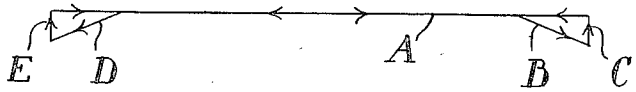


Fig. 4.

Fig. 5.



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KNITTING MACHINE

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5 Claims. (Cl. 66—126)

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This invention relates to knitting machines and has particular reference to the control of yarn carriers on full-fashioned knitting machines for the purpose of preventing breakage of sinkers in the event of improper action of a catchbar.

In full-fashioned machines a catchbar, which controls both forward and rearward movements of dividers, controls only the rearward movements of the sinkers which are moved out independently of the catchbar. The engagement of the sinkers for rearward movement is effected by downward movement of the catchbar to engage their butts when they are in outward position. There is always the danger that for some reason the catchbar may not drop downwardly, being prevented from doing so, for example, by improper position of a sinker so that it may engage the top of a sinker butt, with the result that the sinkers will not be withdrawn at the proper time. In order to produce proper selvages, the carriers are ordinarily caused to move at a level below the level of the tops of the sinkers which are projected in a wave following the movements of the carriers. If the sinkers are not properly withdrawn, a carrier may engage them causing breakage which may require the replacement of the entire series of sinkers.

In order to avoid this difficulty, flexible carriers are commonly used which will normally present the yarn at a proper level for the formation of selvages but which may yield in the event of an occurrence such as that just mentioned to prevent serious danger. Such spring carriers, however, are not particularly satisfactory because of the poor selvage which they sometimes produce due to their being pulled sidewise by the tension of the yarn. Rigid carriers may be depended upon for the consistent production of proper selvages but have the disadvantage indicated above.

In accordance with the present invention, the carriers are controlled in their movements so as to avoid damage but at the same time produce proper selvages. In accordance with the invention, rigid carriers are caused to travel through most of their movements at a height above the sinkers, leading the sinker wave, for example, by about one inch. About one-half inch from the end of each stroke the carriers are permitted to drop downwardly to a proper height to form a good selvage. At the beginning of the return stroke they are abruptly raised to clear sinkers which might accidentally remain outwardly. It may be noted that the position of the carriers below the level of the tops of the sinkers is not

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necessary during the presentation of yarns to the needles through the intermediate portions of the carrier strokes; they are only required to be in lower position for selvage formation. Hence operation in accordance with the invention does not interfere with the normal knitting operation.

The general object of the invention is as just indicated. This object, together with other objects relating to details of construction and operation, will become apparent from the following description, read in conjunction with the accompanying drawing, in which:

Figure 1 is a diagrammatic elevation illustrating only so much of a full-fashioned knitting machine as is necessary for the understanding of the invention;

Figure 2 is a fragmentary elevation, partly in section, showing certain control devices;

Figure 3 is a fragmentary plan view of the same, partly in section;

Figure 4 is a fragmentary elevation illustrating the control of certain cams for the purpose of giving vertical movements to the carriers; and

Figure 5 is a diagram illustrative of the paths taken by the carriers in accordance with the invention.

There are illustrated at 2 the stacked carrier rods which support, in conventional fashion, the yarn carriers 4 arranged to move adjacent to the sinkers and needles generally indicated at 6. Ordinarily the carrier rods 2 are supported by fixed brackets or carrier trees secured to the machine frame so that the carriers have only horizontal movements. In the present instance, however, the carrier trees 8 are arranged, through a dovetail slide connection, to have vertical movements relative to the frame of the machine, the slide mounting being indicated at 10. Each of the carrier trees 8 is provided with an adjustable cam follower 12 arranged to be acted upon by a corresponding cam 14 secured to one of a pair of slides 16 extending lengthwise of the machine and urged toward the center of the machine by an individual compression spring 17. As indicated in Figure 4, these slides may be moved outwardly by the action of a wedge cam 18 which may be located adjacent to the center of the machine. This cam 18 is carried by a lever 20 pivoted at 22 and urged in a direction to move the wedge cam 18 downwardly by a tension spring 24.

The lever 20 is bifurcated at its forward end and carried a fixed rod 28 on which there may turn and slide a cam following roller 30 provided with a hub 32 having an annular groove in which

engages a fork 34 secured to a rod 36 extending lengthwise of the machine and controlled in its movements by one of the conventional nuts adapted to be moved lengthwise by one of the usual screws rotated to control narrowing. Accordingly, as narrowing progresses the position of the cam follower roller is displaced lengthwise of the machine. The roller 30 is arranged to be acted upon by a cam 38 carried by the usual main shaft of the machine which makes one revolution for each stroke of the carriers, i. e., one revolution for each half of a complete reciprocation of the carriers. The cam 38 has a high portion indicated at 40 which, as indicated in the drawing, is tapered in circumferential extent so as to change the timing of operation of the follower 30 depending upon the longitudinal position of the follower in accordance with its control by the bar 36.

Assuming a constant longitudinal position of the follower 30, the carriers have, by reason of the mechanism illustrated, movements in accordance with Figure 5. Starting with movement of a carrier to the right along the path A, at which time its yarn feeding end will move slightly above the level of the tops of the sinkers in advance of the outward sinker wave, the action of the cam 38 will produce near the end of the carrier stroke a gradual upward movement of the wedge cam 18 causing the cams 14 to move in such directions as to permit the carrier trees to move downwardly with the result that the carrier follows the path B dropping below the level of the tops of the sinkers. The selvage is thus produced with the carrier in a lower position proper for selvage formation. Just prior to the reverse movement of the carrier the cam rise 40 clears the follower roller 30 permitting a sudden drop of the wedge cam 18 whereupon the springs 17 move the bars 16 to cause the cams 14 to raise the carrier trees moving the active carrier upwardly as indicated at C. At the next stroke the carrier, accordingly, moves at an upper level to the left along the path A. It is thus in position to clear any sinkers which might possibly remain projected across its path. At the end of this new stroke the carrier is similarly moved downwardly along the path D and then suddenly upwardly along the path E in preparation for the next stroke.

The paths indicated in Figure 5 are modified when narrowing occurs by reason of the movement of the follower roller 30 in the direction of wider portions of the cam rise 40. The lowering of the carriers takes place correspondingly earlier so as to maintain proper selvage formation in the narrowing operation so that, in effect, Figure 5 is properly contracted to maintain the proper selvage formation.

It will be evident from the foregoing that despite the use of rigid carriers the possibility of engagement of a carrier with an improperly located sinker is prevented consistently with good selvage formation. It will be evident that the desired motions of the carriers may be accomplished in various fashions, and, consequently, the mechanism illustrated is to be considered merely an example of the fashion in which the desired carrier paths may be attained.

What I claim and desire to protect by Letters Patent is:

1. In a full-fashioned knitting machine having a reciprocating yarn carrier and sinkers, means controlling said yarn carrier to move it above the level of the tops of the sinkers throughout the major portion of its strokes and to depress it below the level of the tops of the sinkers at the ends of its strokes to position it for selvage formation.

2. In a full-fashioned knitting machine having a reciprocating yarn carrier and sinkers, means controlling said yarn carrier to move it above the level of the tops of the sinkers throughout the major portion of its strokes and to depress it below the level of the tops of the sinkers at the ends of its strokes to position it for selvage formation, and means for advancing the timing of said depression during narrowing.

3. In a full-fashioned knitting machine having a reciprocating yarn carrier and sinkers, a yarn carrier rod, vertically slidable supporting means for said yarn carrier rod, and means controlling said supporting means to impart vertical movements to the yarn carrier, the last means being timed to impart downward movements to the yarn carrier at the ends of each stroke and upward movements thereafter prior to beginning of its next stroke.

4. In a full-fashioned knitting machine having a reciprocating yarn carrier and sinkers, means controlling said yarn carrier to move it above the level of the tops of the sinkers throughout the major portion of its strokes, to depress it below the level of the tops of the sinkers at the ends of its strokes to position it for selvage formation, and to move it above the level of the tops of the sinkers prior to the beginning of its next stroke.

5. In a full-fashioned knitting machine having a reciprocating yarn carrier and sinkers, a yarn carrier rod, substantially vertically slidable supporting means for said yarn carrier rod, and means controlling said supporting means to impart substantially vertical movements to the yarn carrier, the last means being timed to impart downward movements to the yarn carrier at the ends of each stroke and upward movements thereafter prior to beginning of its next stroke.

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