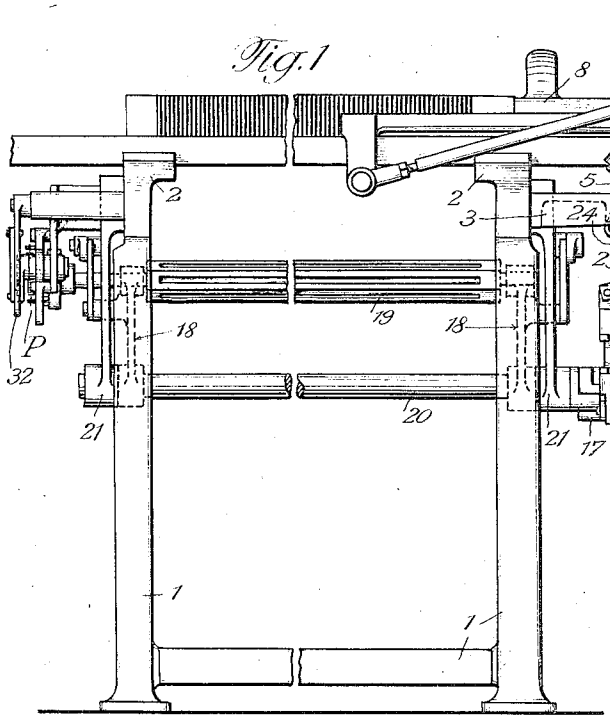
Dec. 24, 1935. H. DIEM 2,025,499

CRANK DRIVING ARRANGEMENT FOR JACQUARD CONTROLLED FLAT KNITTING MACHINES

Filed March 17, 1934

Fig. 1



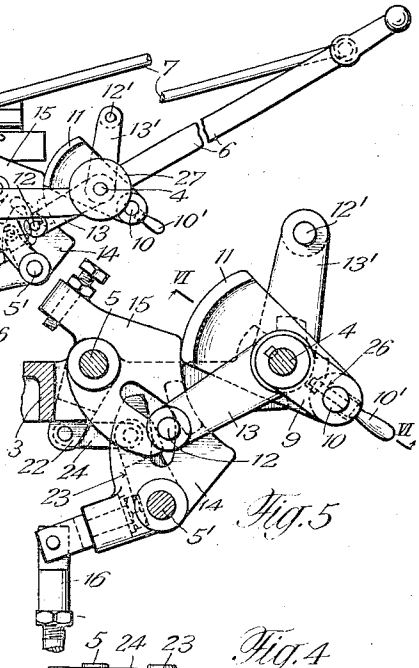


Fig. 5

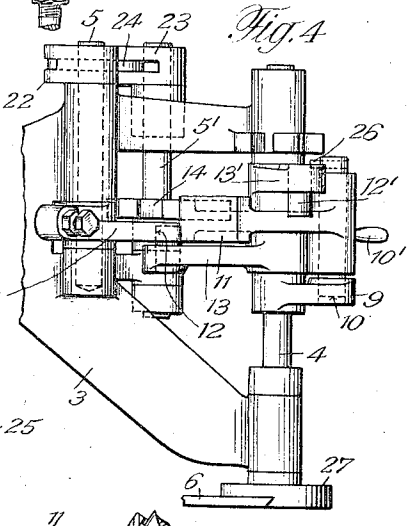


Fig. 4

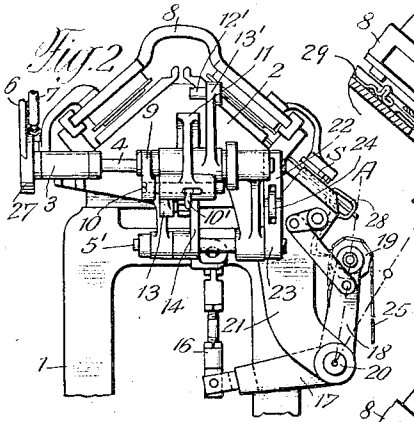


Fig. 2

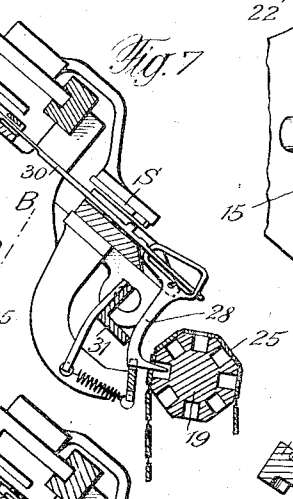


Fig. 7

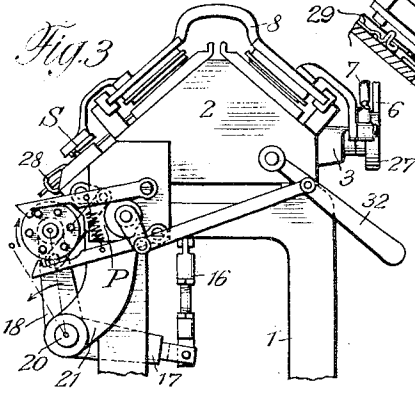


Fig. 3

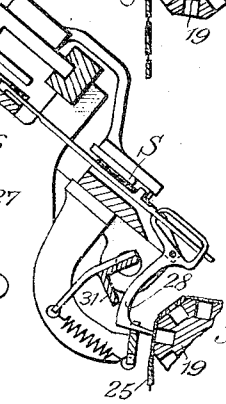


Fig. 8

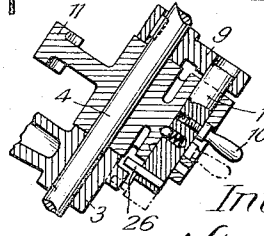


Fig. 6

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CRANK DRIVING ARRANGEMENT FOR JACQUARD CONTROLLED FLAT KNITTING MACHINES

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Application March 17, 1934, Serial No. 716,020
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4 Claims. (Cl. 66—64)

This invention relates to crank driving arrangements for jacquard controlled flat knitting machines including a jacquard drum. The drive of the hand operated jacquard controlled flat knitting machines is generally effected by means of a crank mounted on the frame of the knitting machine, the crank being connected with the cam slide of the machine through the intermediary of a tension bar, so that the slide is traversed in synchronism with the reciprocations of this bar.

With these arrangements, the rocking motions of the jacquard drum are effected by a cam member, a two armed lever provided with adjusting screws or some other suitable member being arranged on the shaft to which the hand crank is secured, said member being connected with the jacquard drum through the intermediary of a lever device, whereby the drum is lifted before the crank and consequently also the slides arrive, in their end positions and thus the pushers are advanced into working position.

Thereupon the jacquard drum drops back into initial position by action of its own weight or by spring tension. Or, as provided for in another known arrangement, the rocking motions of the jacquard drum may be effected by means of a gear wheel drive cooperating with a lever mechanism, the driving wheel of this drive being secured to the crank shaft.

The afore-described known arrangements have the drawback inherent thereto that, for effecting the rocking motions of the jacquard drum, a relatively large angle at the centre is required for the crank arm to move through, so that not only the normal overall length of the machine is increased, but also the efficiency of the same is detrimentally affected.

On the other hand, if high speed operation or a small angular range for the crank arm respectively is provided for, shocks are arising during the lifting of the jacquard drum and, moreover, danger exists for the drum being unintentionally displaced.

According to the present invention, the above-mentioned disadvantages are eliminated in the crank driving arrangement by providing rockable cam guide members for rocking the jacquard drum in the end positions of the cam slide which guide members are adapted to be slidingly engaged free from shocks in the manner of a Maltese cross control device and in which members rocking levers connected with the driving member of the arrangement engage during certain relatively small angular ranges of the crank, the jacquard drum being secured in position by a segmental arresting member during the traverse of the cam slide through the range of sinking the loops.

In the accompanying drawing a constructional form of the invention is illustrated by way of example only, in which

Fig. 1 shows a longitudinal elevation of a flat knitting machine as seen from the operator's stand,

Fig. 2 shows a partial elevation of the end of the machine at which the drive of the cam slide is arranged,

Fig. 3 shows a partial elevation of the end of the machine at which the actuating means of the jacquard drum are arranged,

Figs. 4 and 5 illustrate on a larger scale a top plan view and an elevation respectively of the feed device,

Fig. 6 shows a section on the line VI—VI in Fig. 5,

Figs. 7 and 8 each show a vertical section through the jacquard drum arrangement inclusive of the needle pushers, the former figure showing the relative positions of parts with the needles being inoperative and the latter figure showing these parts in their positions which correspond to the operative positions of the needles.

Referring to the drawing, 1 designates the frame of a jacquard controlled flat knitting machine as seen from the operator's stand, that is, that side of the machine at which the operator works. 2 refers to the bed portion of the knitting machine on which the two needle beds which are inclined to each other in the shape of an inverted V are arranged. To the needles 29 of the rear needle bed, pushers 30 are correlated which are actuated by the needle lock S during the passage of the cam slide 8, provided that these pushers have been moved into operative position by the jacquard sinkers 28. This operation is carried out, when the jacquard sinkers 28, which are normally urged on the pattern card 25 by an angular bar 31 which is acted upon by spring tension, confront a non-punctured point of the pattern card (Fig. 8) instead of meeting with an aperture in the card (Fig. 7). Thus the needle pushers 30 are raised to extend in the path of movement of the lock S.

The jacquard pattern cards 25 pass about the jacquard drum 19 which is rockably mounted in lever arms 18 collaterally of the bed portion of the machine and adapted to be rotationally displaced by steps corresponding to the pitch of the

pattern cards by an escapement mechanism P. This mechanism is actuated by means of a hand lever 32 in either direction of rotation depending whether the upper or the lower pawl of the mechanism is caused to engage with the jacquard drum 19, as evident from Fig. 3. This escapement mechanism is known per se and need therefore not be further described.

On the right end of the bed portion of the knitting machine a projecting mounting member 3 is secured in which shafts 4, 5 and 5' have their bearings. To the shaft 4, a hand crank 6 for controlling the drive of the cam slide is fixed by means of a connecting head 27 and coupled with the slide 8, which is displaceable longitudinally of the needle beds, in a known manner. The shaft 4 carries also a driving arm 9 which is adapted to be coupled to a segmental member 11 loosely mounted on the shaft 4 by a slidable locking bolt 10 (Fig. 6). This segmental member comprises two driving arms 13 and 13' which are provided with two pins 12 and 12' respectively and which alternately actuate two cam members 14 and 15 in dependency on the direction in which the hand crank 6 is rocked, said cam guide members being adapted to be slidingly engaged by the pins 12, 12' free of shocks in the manner of a Maltese cross control device.

The cam guide member 14 is secured to the shaft 5' and operatively connected to the jacquard drum 19 by means of a pivotal lever device 16, 17, 18 of a known construction. The levers 17 and 18 of this device are secured on an axle 20 which is mounted in bearings 21. The cam guide member 15 and a lever 22 are keyed to the shaft 5 and a lever 23 secured to the shaft 5' is connected to the lever 22 by means of a link 24.

The operation of the crank driving arrangement for jacquard controlled flat knitting machines is as follows:

It is assumed that the hand crank 6 has to be oscillated through 180° above a horizontal plane passing through shaft 4. This hand crank 6 is connected with the slide 8 through the intermediary of the tension bar 7, the slide being traversed from left to right and the drive of the jacquard drum arrangement actuated at the same time.

To this end, the segmental member 11 is coupled to the driving arm 9 and thus to the shaft 4 by means of the slidable locking bolt 10. Now, before the slide 8 arrives in its outermost position to the right of the machine (Fig. 1), i. e., shortly before the hand crank 6 arrives at its dead centre to the right of the shaft 4, the pin 12 of the driving arm 13 engages into the cam guide member 15, for operating this member. When the slide 8 arrives at the left of the machine, i. e. the hand crank 6 reaches its dead center to the left of the shaft 4, the pin 12' of the driving arm 13' engages the guide member 14 and actuates the latter and consequently the drum 19. In this way the jacquard drum 19 is lowered, that is, moved from A to B by means of the lever arrangement 22, 24, 23, 16 and 17.

After the hand crank 6 has passed the dead centre and thus the traversing movement of the slide is reversed from the direction to the right to that to the left, the pin 12 resets the cam member 15 back into initial position. Consequently, the jacquard drum 19 is raised from B to A by means of the said lever device.

During this operation, the drum 19 can be fed either forwardly or backwardly by a step corresponding to a pattern card through the intermediary of the known escapement mechanism P by rocking the hand lever 32, or else the drum can be left to remain in the same position. Furthermore, the feeding of the drum 19 by a step can be repeated any number of times by slightly raising and lowering the hand crank 6 away from the dead centre position during which operation the slide is correspondingly moved back and forth a small amount, while assuming a position beyond the needle bed. In this manner several pattern cards 25 are skipped before the jacquard drum reassumes its position A and the slide 8 cooperates again with the needles.

Similar operations can be carried out when the slide arrives in its left hand end position in the machine and thus the hand crank 6 into its dead centre position to the left of the shaft 4. In this case the cam guide member 14 is actuated by the pin 12' of the driving arm 13' and, consequently, the jacquard drum 19 by the lever device 16, 17, 18.

It will be observed that the two cam guide members 14 and 15 are at all times secured in position by the segmental member 11 except when the two pins 12 and 12' engage with the cam guide members 14 and 15 respectively or the locking bolt 10 is connected to the driving arm 9.

In the latter event, the locking bolt is set into the chain dotted position shown in Fig. 6 by means of the handle 10'. By this means the segmental member 11 is connected to the mounting member 3 by the locking bolt in conjunction with a stud 26. At the same time the jacquard drum 19 is locked in its respective position due to being connected with the thus blocked cam guide members 14 and 15, by lever means.

By shortening the arm of the hand crank 6 by correspondingly displacing the connecting head 27 the travel of the slide is reduced in a known manner, in order to restrict the effective needle bed area of the knitting machine. Even then the crank driving arrangement for the knitting machine operates in the same manner as previously described without requiring any rearrangement at all.

A further advantage of the crank driving arrangement according to the invention consists in the mutual cooperation of the hand crank with the cam guide members 14 and 15 respectively to the effect that the lowering and raising of the jacquard drum 19 is at all times effected free of shocks by an accelerating or decelerating movement respectively and thus the effort to be applied is considerably reduced.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed.

What I claim is:

1. In a crank driving arrangement for jacquard controlled flat knitting machines, in combination, a needle bed, a cam slide adapted for traversing said needle bed, a jacquard drum rockably arranged collaterally of said needle bed, a common rockable actuating means for said cam slide and said jacquard drum, driving members adapted to be coupled to said rockable actuating means, two cam guide members for rocking said jacquard drum provided one for each end position of said cam slide on said needle bed and adapted for slidingly guiding each one of said driving members during a relatively small angular range of the rocking movement of said actuating means in the respective direction, and a segmental arresting member adapted for securing said jac-

quard drum in position during the traverse of said cam slide through the range of sinking the loops.

2. In a crank driving arrangement for jacquard controlled flat knitting machines, in combination, a needle bed, a cam slide adapted for traversing said needle bed, a jacquard drum rockably arranged collaterally of said needle bed, a common rockable actuating crank for said cam slide and said jacquard drum, at least two driving arms adapted to be coupled to said rockable actuating crank, two rockable cam guide members, adapted for slidingly guiding one of said driving arms during a relatively small angular range of the rocking movement of said actuating crank by means of a cam slot, a linkage intercalated between said jacquard drum and said two rockable cam guide members for rocking said jacquard drum in its end positions on said needle bed by engagement of either of said cam guide members with the correlated driving arm, and a segmental arresting member adapted for securing said jacquard drum in position during the traverse of said cam slide through the range of sinking the loops.

3. In a crank driving arrangement for jacquard controlled flat knitting machines, in combination, a needle bed, a cam slide adapted for traversing said needle bed, a jacquard drum rockably arranged collaterally of said needle bed, a common rockable actuating crank for said cam slide and said jacquard drum, a driving shaft rigidly connected to said actuating crank, at least two driving arms adapted to be coupled to said driving shaft, two rockable cam guide members each adapted for slidingly guiding one of said driving arms during a relatively small angular range of the rocking movement of said actuating crank by means of a cam slot, a linkage intercalated between said jacquard drum and said two rockable cam guide members for rocking said jacquard drum in its end positions on said needle bed by engagement of either of said cam guide members with the correlated driving arm, and a segmental arresting member mounted on said driving shaft and adapted for securing said jacquard drum in position during the traverse of said cam slide through the range of sinking the loops while said driving arms are disengaged from said cam guide members.

4. In a crank driving arrangement for jacquard controlled flat knitting machines, in combination, a needle bed, a cam slide adapted for traversing said needle bed, a jacquard drum rockably arranged collaterally of said needle bed, a common rockable actuating means for said cam slide and said jacquard drum, driving members adapted to be coupled to said rockable actuating means, two cam guides for rocking said jacquard drum one for each end position of said cam slide, said cam guides being adapted to guide each of said driving members a relatively small angular range of the rocking movement of said actuating means in the respective direction, and means for securing said jacquard drum in position during the traverse of said cam slide through the range of sinking the loops.

HANS DIEM.