April 21, 1925 1,534,973

A. LEVITON ET AL

NEEDLE OPERATING MECHANISM

Filed March 13, 1925 2 Sheets-Sheet 1

Fig. 1.

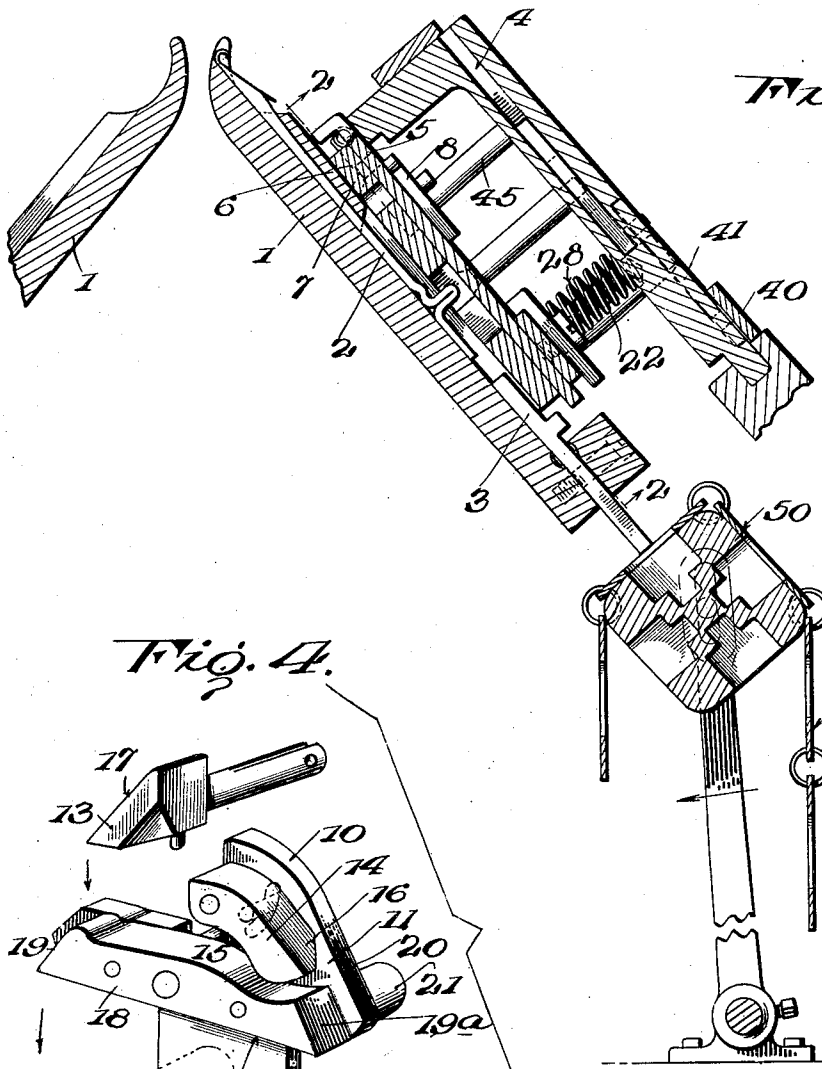
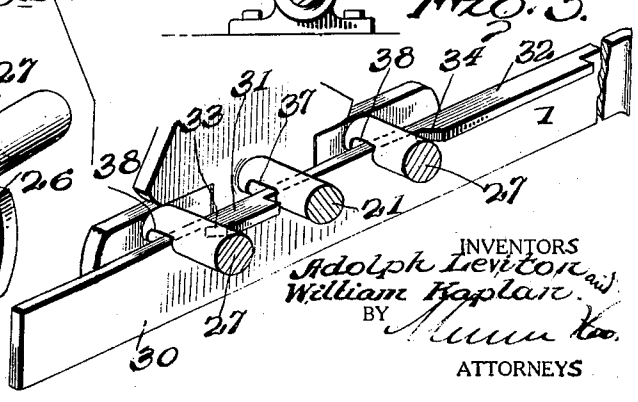


Fig. 4.

Fig. 5.



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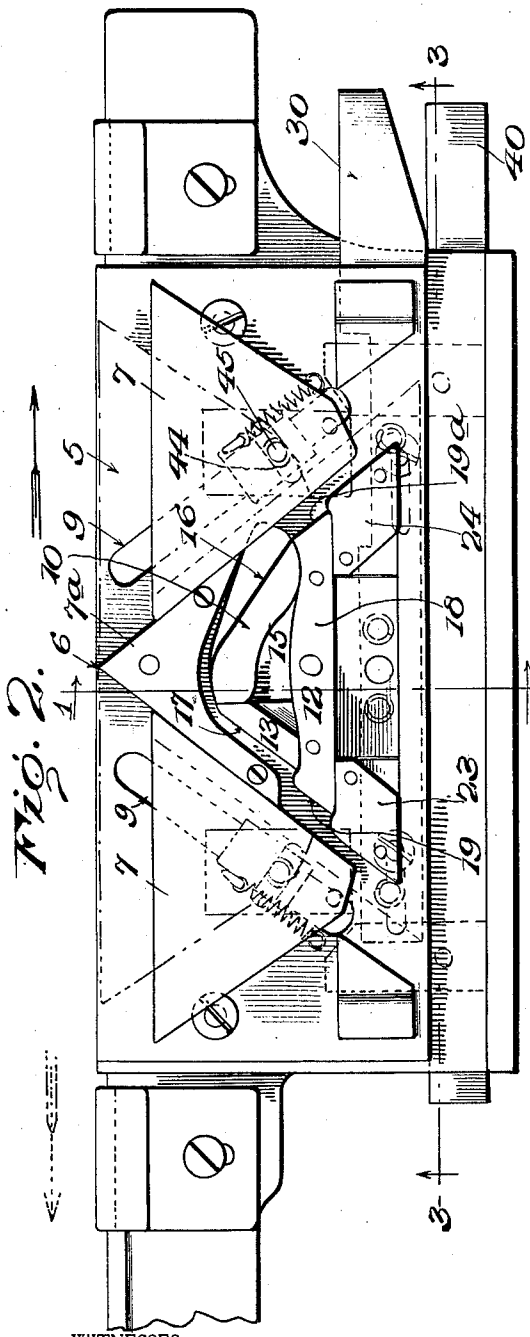


Fig. 2.

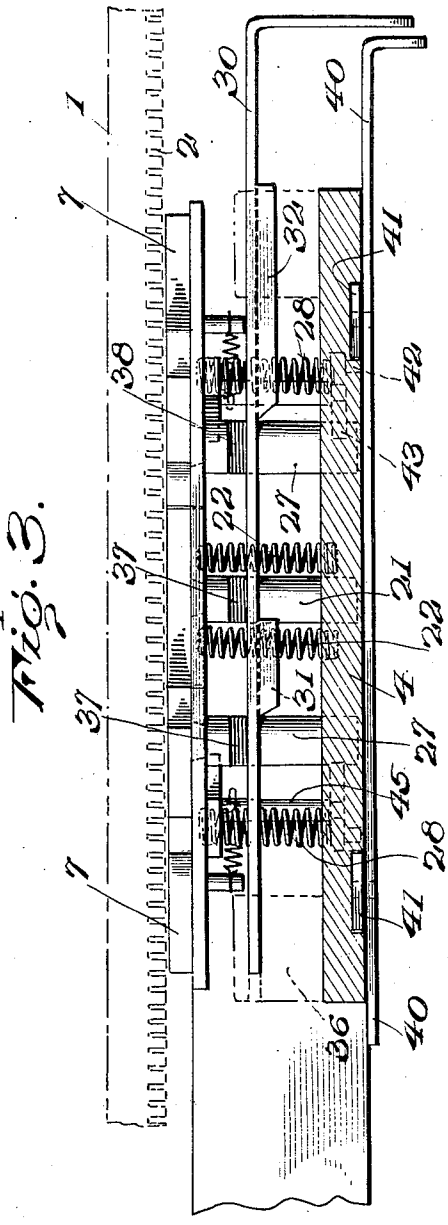


Fig. 3.

WITNESSES

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Patented Apr. 21, 1925. 1,534,973

UNITED STATES PATENT OFFICE.

ADOLPH LEVITON AND WILLIAM KAPLAN, OF BROOKLYN, NEW YORK.

NEEDLE-OPERATING MECHANISM.

Application filed March 13, 1925. Serial No. 15,372.

To all whom it may concern:

Be it known that we, ADOLPH LEVITON and WILLIAM KAPLAN, citizens of the United States, and residents of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Needle-Operating Mechanism, of which the following is a specification.

This invention relates to an improved needle operating mechanism especially adapted for use on the so-called flat knitting machines, and the present invention is a modification of the needle operating mechanism shown, described, and claimed in our co-pending application filed January 21, 1925, Serial No. 3848.

The present invention aims to provide a needle operating mechanism of the character described and which has all of the advantages and capacities of the invention forming the subject-matter of the application hereinabove referred to but which simplifies the construction and mode of operation of the mechanism so as to lessen the cost of the machine without impairing its efficiency or detracting from any of its advantages. More specifically, the present invention proposes to eliminate the jack lock or jack cam, the jacks when in use being elevated into the needle lock or cam by the action of the jacquard mechanism.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is a fragmentary view in section on the line 1—1 of Figure 2 and showing a portion of a flat knitting machine constructed in accordance with the present invention,

Figure 2 is a view in section on the line 2—2 of Figure 1,

Figure 3 is a view in section on the line 3—3 of Figure 2,

Figure 4 is a fragmentary perspective view of the parts of the needle lock or cam, and

Figure 5 is a fragmentary view in perspective showing one form of means for retracting and projecting the shiftable sections of the needle lock or cam.

It is to be understood that the present invention is constructed in substantially the same manner as the machine shown in our co-pending application filed Jan. 21, 1925, Serial No. 3848 except for the construction of the needle lock and for the action of the jacquard mechanism which will hereinafter be more fully described and reference is made to the application mentioned for a fuller understanding of the general structure and operation of the machine.

Referring to the drawings it will be seen that the invention forming the subject-matter of this application includes as in the previous instance needle beds 1 having grooves in which needles 2 and jacks 3 are slidably fitted. A carriage is indicated at 4 and on the carriage a supporting plate 5 is secured. A needle lock or cam, designated generally at 6, is mounted on the supporting plate 5.

The needle lock 6 includes a pair of shiftable down-throw cams 7 of triangular form having slides 8 pivoted in inclined slots 9 formed in the supporting plate 5. An up-throw cam, designated generally at 10, is provided and includes an upper section 11 and a lower section 12. The upper section 11 may be of any preferred form and is shown for the sake of illustration as including a cardigan 13 and a pivoted element 14. The cardigan and pivot element 13 and 14 are conventional in the art and are used for double stitching, the cardigan being retracted in the usual way when double stitching is effected to provide the usual way 15. Of course it is to be understood that the cardigan structure of the upper section 11 is not essential to the present invention and that this section 11 may be of any type provided it affords the up-throw camming surfaces. In the type of the upper section 11 shown the up-throw camming surfaces are provided by faces 16 and 17. All of the elements of the upper section 11 except the cardigan 13 are mounted on the carrier member 20. The carrier 20 has a rearwardly directed post 21 slidably mounted in an opening provided therefor in the carriage 4. Springs 22 are provided for holding the carrier up against the inner face of the supporting plate 5. It is understood at this point that the supporting plate 5 has openings which

permit the upper section 11 of the up-throw cam to project exteriorly of the plate. The lower section 12 of the up-throw cam includes a carrier member 22' and a top cam piece or part 18 mounted on the carrier 20 and having cam faces 19 and 19ª and lower or bottom cam pieces or parts 23 and 24 having camming surfaces 25 and 26, the cam faces 19, 19ª, 25 and 26 being complemental to the camming surfaces 16 and 17 when plain stitching is being effected Rearwardly directed posts 27 are provided on the carrier member 22 and are fitted in openings provided therefor in the carriage 4. Springs 28 are provided to yieldably hold the carrier member 22 against the inner face of the supporting plate 5 and it is to be noted that this supporting plate has openings permitting the cam pieces 23 and 24 to project exteriorly of the plate.

A single operating bar 30 is provided and has its lugs 31 and 32 formed with inclined surfaces 33 and 34. The bar 30 is slidably fitted in suitable bearings 36 provided therefor on the carriage and the lugs 31 and 32 of the bar co-act with inclined walls of notches 37 and 38 formed in the posts 21 and 27, respectively. With this arrangement when the bar 27 is moved for a certain distance in one direction its lugs 31 and 32 will co-act with the notches 38 only and will effect retraction of the carrier member 22 and the cam pieces 23 and 24. Upon further movement of the bar 30 the lugs 32 will co-act with the cam wall of the notch 37 of the post 21 and will effect retraction of this post 21 as well as retraction of the post 27.

The down-throw cams 37 are automatically operated from an operating bar 40, suitably mounted on the carriage 4 and having blocks 41 operating in slots provided therefor in the carriage and having inclined surfaces engageable with pins 42 rigidly formed with and projecting from plates 43. The plates 43 have inclined slots 44 therein and the slots 44 of the plates 43 have an inclination opposite with respect to the inclination of the slots 9. Posts 45 rigidly connected with the slides 8 of the down-throw cam 7 have their rear ends operatively fitted in the slots 44. The arrangement is such that when the bar 40 is shifted it will elevate one down-throw cam 7 and retract the other down-throw cam. The shifting of the bar 40 is accomplished automatically in any of the conventional ways widely practiced in the art.

Jacquard mechanism 50 is provided and has cards 51 co-operable with the jacks 3. The jacquard mechanism is given a throw of such a degree that the selected jacks which are actuated by the cards 51 are fully elevated by the action of the jacquard mechanism. In other words, the jacquard mechanism engages and elevates the jack so as to push the needles up to such an extent that they will be engaged by the surfaces 19 or 19ª of the lower section of the up-throw cam. With this arrangement no jack lock or cam is needed since the jacquard mechanism fully elevates the jacks and the needle lock carries the needles through the remainder of their operative movements.

In plain sitching both of the down-throw cams 7 are lowered as far as they may be in which position the slides 8 of the cams rest on the lower ends of the slots 9. If the cardigan is not used (and it rarely will be) the up-throw cam of the needle lock is constituted by the cam surfaces 26, 16, 17, 19ª, 19 and 25 and as the carriage reciprocates the up-throw and down-throw cams of the needle lock operates in the usual manner to reciprocate the needles. When fancy stitching is to be effected the bottom cam pieces 23 of the lower section 12 of the up-throw cam of the needle lock are retracted and this provides a clearance across the needle lock for the needles that are idle. At this time the jacquard mechanism is brought into play and the cards 51 thereof elevate the selected needles through the jacks 3 until the needles are engaged by the surfaces 19 or 19ª of the upper part of the lower section 12 of the up-throw cam. During the time that fancy stitching is being effected by the machine the down-throw cams 7 are automatically shifted at the end of each run of the carriage. The down-throw cam 7 which is disposed forwardly in respect of the direction of movement of the carriage being elevated and the down-throw cam 7, which is located rearwardly, being lowered. This shifting of the down-throw cams facilitates the elevation of the needles by the jacks to such an extent as to permit them to engage the cam surfaces 16 or 19. As the movement of the carriage changes the cam 7 must be shifted and this is accomplished from the bar 40, as hereinabove described.

It is to be understood that the shiftable down-throw cams 7 are provided in conjunction with the stationary down-throw cam 7ª which is ordinarily used.

The mechanism constituting the present invention may be employed on one side of the machine in conjunction with conventional needle operating mechanism on the other side of the machine, or both sides of the machine may be equipped with the needle operating mechanism and needle locks constituting this invention and hereinabove described.

We claim:—

1. In a needle operating mechanism for flat knitting machines, a set of needles, a needle lock including an up-throw cam having a lower section having a top or upper part and a retractible bottom part, the bottom part completing the needle lock to ef-

fect plain stitching, the bottom part being retracted to provide the clearance for the idle needles when fancy stitching is effected, a set of jacks cooperable with the needles, and jacquard mechanism for elevating the jacks to such an extent as to cause the needles to be operated upon by the top part of the lower section and by the upper section of the needle lock when fancy knitting is effected.

2. In a needle operating mechanism for flat knitting machines, a set of needles, a needle lock including shiftable down throw cams, an up-throw cam, having a lower section having a retractible bottom part, the bottom part completing the needle lock to effect plain stitching, the bottom part being retracted to provide the clearance for the idle needles when fancy stitching is effected, a set of jacks cooperable with the needles, and jacquard mechanism for elevating the jacks to such an extent as to cause the needles to be operated upon by the upper part of the lower section and by the upper section of the needle lock when fancy knitting is effected.

3. In a needle operating mechanism for flat knitting machines, a set of needles, a needle lock including an up-throw cam having a lower section having an upper part and a lower part, the lower part comprising a carrier member and spaced cam pieces fixed on said carrier member, the lower part completing the needle lock to effect plain stitching, the lower part being retracted to provide the clearance for the idle needles when fancy stitching is effected, a set of jacks cooperable with the needles, and jacquard mechanism for elevating the jacks to such an extent as to cause the needles to be operated upon by the upper part of the lower section and by the upper section of the needle lock when fancy knitting is effected.

4. In a needle operating mechanism for flat knitting machines, a set of needles, a needle lock including a supporting plate having slots, down-throw cams having slides shiftable in the slots, means for shifting the slides to shift the down-throw cams, an up-throw cam having a lower section provided with a retractible lower part, the lower section completing the needle lock to effect plain stitching, the lower part of the lower section being retracted to provide the clearance for idle needles when fancy stitching is effected, a set of jacks cooperable with the needles, and jacquard mechanism for elevating the jacks to such an extent as to cause the needles to be operated upon by the upper part of the lower section and by the upper section of the needle lock when fancy stitching is effected.

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