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W. E. McCLEARY

CHECK FOR AXMINSTER LOOM NEEDLE MOTION

Filed Dec. 1, 1925

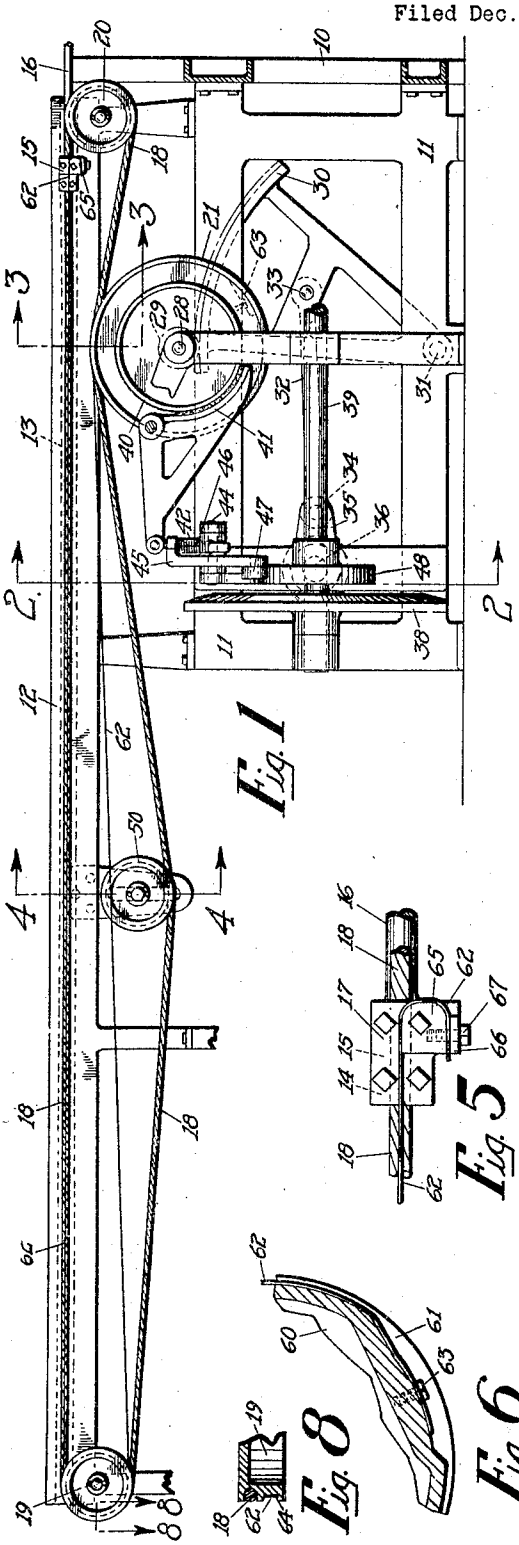


Fig. 1

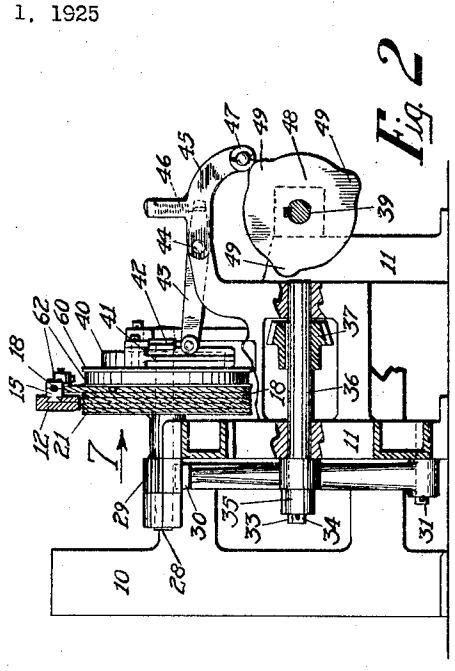


Fig. 2

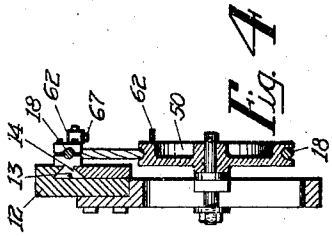


Fig. 4

Fig. 5

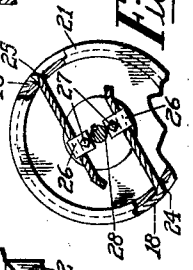


Fig. 7

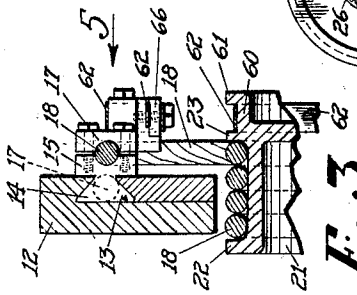


Fig. 3

Fig. 6

Fig. 8

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UNITED STATES PATENT OFFICE.

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CHECK FOR AXMINSTER-LOOM-NEEDLE MOTION.

Application filed December 1, 1925. Serial No. 72,583.

This invention relates to needle motions for Axminster looms and it is the general object of the invention to control the inner or weft laying stroke of the needle to the end that the needle may be accurately positioned with respect to the selvage shuttle located at the opposite end of the loom.

Axminster looms of the wide type usually employ a cotton cable or rope to move the needle into and out of the shed of the loom but it is found that this rope is subject to undesirable stretching which results in inaccurate positioning of the needle. Various substitutes for the cotton cable have been used from time to time but none have proved satisfactory. The needle is moved into the shed by one portion of the cable and is withdrawn from the shed by the other portion so that both ends of the cable stretch. The bottom of the advancing end of the needle is formed with a recess through which the selvage shuttle passes to interloop the filling of the needle and the selvage warp thread of the shuttle and this recess must lie in the path of the shuttle. Due to stretching of the withdrawing portion of the cable the needle is found to move beyond the proper position for registry with the shuttle, and it is a further object of my invention to prevent this objectionable excess movement of the needle beyond the selvage shuttle by supplying a flexible relatively inelastic member to follow the needle carrier and position the needle properly.

The motion of the needle is derived from a crank so that the needle is moving slower at the end of its stroke than it is at the middle portion of its movement and it is found where slackness has developed in the withdrawing portion of the cable that the needle will lead the inserting portion of the cable and it is a still further object of my invention to prevent improper movement of the needle by controlling the same through a flexible relatively inelastic member which moves at substantially the same rate of speed as the inserting portion of the cable.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein I have shown a convenient embodiment of my invention,

Fig. 1 is a rear elevation of the needle motion of a loom having my invention applied thereto,

Figs. 2, 3, and 4 are vertical sections on lines 2—2, 3—3, and 4—4, respectively, of Fig. 1,

Fig. 5 is an enlarged rear elevation of the needle carrier showing my auxiliary relatively inelastic flexible member attached thereto taken in the direction of arrow 5, Fig. 3,

Fig. 6 is an enlarged fragmentary section through the drum showing the method of attaching the auxiliary flexible member thereto,

Fig. 7 is a front elevation of the drum taken in the direction of arrow 7, Fig. 2, and

Fig. 8 is a detail section on line 8—8 of Fig. 1.

Referring to the drawings it will be seen that I have provided a loom frame 10 from which extends laterally a needle frame 11 having supported thereon a needle rail 12 provided with a groove 13 in which moves a shoe 14. Said shoe is formed as part of a needle carrier 15 to which is secured the outer end of a needle 16 and said carrier has a cap 17 by means of which a cable 18 is clamped to the carrier. The needle rail has pivotally mounted thereon outer and inner sheaves 19 and 20, respectively, around which the cable extends and the ends of said cable are secured to a cable drum 21 shown in Figs. 3 and 7. As shown in Fig. 3 said drum is formed with flanges 22 and 23 defining an area for the cable and said drum is further provided with a pair of openings 24 and 25, respectively, through which the ends of the cable extend. The ends as shown in Fig. 7 are held tightly in place by means of clamps 26 held in position by bolts 27.

The drum is keyed to a shaft 28 to which is secured a pinion 29 meshing with a segment 30 pivoted as at 31. A connector 32 is attached to the segment as at 33 and has connection as at 34 with a crank arm 35 secured to a shaft 36. Secured also to said shaft 36 is a bevel pinion 37 which meshes with an intermittent bevel gear 38 secured to a constantly moving shaft 39. As the gear 38 rotates the arm 35 is given a com-

plete revolution to oscillate the segment 30 and thus actuate the drum 21. Said drum is provided with a friction head 40 which cooperates with a brake 41 pivoted to the frame and having connection by means of link 42 to a lever 43 pivoted as at 44 to fixed structure. A second lever 45 pivoted at 44 is connected to lever 43 by means of a coiled tension spring 46 and said lever 45 is further provided with a roll 47 which cooperates with a cam 48 having three roller elevating surfaces 49. Said cam 48 is secured to the shaft 39 and the surfaces 49 are so placed as to apply the brake to the drum when the needle has reached the end of its inner or weft laying motion. Drum 50 is vertically adjustable on the needle rail to compensate for the stretching of the needle withdrawing portion of the cable which passes around the sheave 19. The matter thus far described is of well-known construction and similar to the motion shown in Patent No. 733,586 to G. F. Hutchins, but as previously stated the cable is found to stretch objectionably.

In carrying out my invention I provide drum 21 with an auxiliary drum 60 defined between flange 23 and flange 61. The substantially cylindrical surface between the flanges 23 and 61 receives a flexible metallic tape 62 one end of which is secured as at 63 to the drum 60. The free end of said tape is led around an annular groove 64 formed on sheave 19 and is secured to the needle carrier 15 as indicated in Fig. 5. In said figure it will be seen that the needle carrier is formed with a boss 65 around a portion of which the end of the tape 62 extends and to which said tape is secured by means of a block 66 held tightly against the boss by screw 67. Said tape is of such length that when the segment 30 has reached the end of its needle inserting stroke the needle carrier will be in proper position.

Under normal operation the continued rotation of shaft 39 results in periodic rotation of the drum 21 first in one direction and then in reverse direction so that the needle 16 will be pulled into the shed by means of that portion of the cable passing around sheave 20 and will then be withdrawn from the shed by that portion of the cable extending around sheave 19. Inasmuch as the tape 62 is relatively inelastic the carrier 16 cannot move to the right as shown in Fig. 1 any faster than the needle inserting portion of the cable is moving because of the fact that the tape is paid off the drum 60 at substantially the same rate of speed as the cable is wound upon drum 21. Any tendency of the needle to move ahead of the needle inserting portion of the cable will therefore be restrained and the tape will act to permit the carrier to move with a true crank motion irrespective of any slackness which may exist in that portion of the cable extending around sheave 19.

From the foregoing it will be seen that I have provided a simple but effective means operative throughout the whole stroke of the needle to prevent the latter from going beyond its proper stopping position. It will further be seen that I have provided a needle motion having two flexible elements one of which is subject to stretching due to its nature and the other of which is relatively inelastic and serves to arrest any undue motion of the needle which might be permitted by the stretching of the actuating cable. I am aware that it has been proposed heretofore to arrest the motion of the needle but previous devices have usually acted only at the end of the stroke so that any tendency of the needle to move in advance of the true crank motion is not corrected until the end of the stroke, whereas the device shown herein is operative throughout the whole motion of the needle to restrict the same to a proper motion.

Having thus described my invention it will be apparent that changes and modifications may be made therein without departing from the spirit and scope of the invention, and I do not wish to be limited to the details herein disclosed but—

What I claim is:

1. In a needle motion for Axminster looms, a needle having yarn inserting and withdrawing movements, a flexible actuating cable operatively connected to the needle, and a second auxiliary flexible member operatively connected to the needle throughout the yarn inserting movement of the latter to prevent said needle from having any irregular motion which would be permitted by slackness of the cable.

2. In a needle motion for Axminster looms, a needle having a yarn inserting and withdrawing movement, and a pair of flexible members operatively connected to the needle, one of said members serving to reciprocate the needle and the other of said members being relatively inelastic to restrain undue motion of the needle on its yarn inserting movement which might be permitted by slackness of the first named member.

3. In a needle motion for Axminster looms, a needle having yarn inserting and withdrawing movements, a cable operatively connected to the needle and having a portion to give the needle a yarn inserting movement and having a second portion to withdraw the needle, and an auxiliary flexible relatively inelastic member operatively connected to the needle and having a motion similar to the motion of the needle inserting portion of the cable to prevent undue motion of the needle permitted by slackness of the needle withdrawing portion of the cable.

4. In a needle motion for Axminster looms, a needle having yarn inserting and withdrawing movements, flexible means to

give the needle a yarn inserting movement and to withdraw the needle, and an auxiliary flexible device relatively inelastic and operatively connected to the needle to restrain undue advance movement of the needle throughout the whole yarn inserting movement of the needle.

5. In a needle motion for Axminster looms, a needle having yarn inserting and withdrawing movements, a flexible cable having a portion operative to give the needle a yarn inserting movement and having another portion operative to withdraw the needle, a flexible relatively inelastic member effective throughout the yarn inserting motion of the needle to restrain undue forward movement of the latter which might be permitted by slackness of the needle withdrawing portion of the cable, and means to take up slackness of the needle withdrawing portion of the cable, the member being effective to check the motion of the needle irrespective of the amount of slack taken up by said means.

6. In a needle motion for Axminster looms, a rotatable member, a needle, flexible connections between the member and the needle to give the latter a yarn inserting and withdrawing movement, and a flexible relatively inelastic element operatively connected to the needle and the rotatable member.

7. In a needle motion for Axminster looms, a needle having yarn inserting and withdrawing movements, and a pair of flexible members operatively connected to the needle, one of said members being subject to stretching during normal use and the other of said members being relatively inelastic and tending to resist undue movement of the needle rendered possible by slackness or stretching of the first member.

8. In a needle motion for Axminster looms, a needle, a flexible member connected to the needle and having a portion to give said needle a yarn inserting movement and having another portion to give said needle a withdrawing movement, a relatively inelastic flexible member operatively connected to the needle, and means to wind up and unwind said member, said means unwinding the relatively inelastic member at substantially the same rate of speed as the yarn inserting portion of the first named member is wound up.

In testimony whereof I have hereunto affixed my signature.

WILLIAM E. McCLEARY.