Feb. 5, 1935. J. STEINHART 1,990,440

REGULATING ATTACHMENT FOR KNITTING MACHINES

Filed Sept. 26, 1932 3 Sheets-Sheet 1

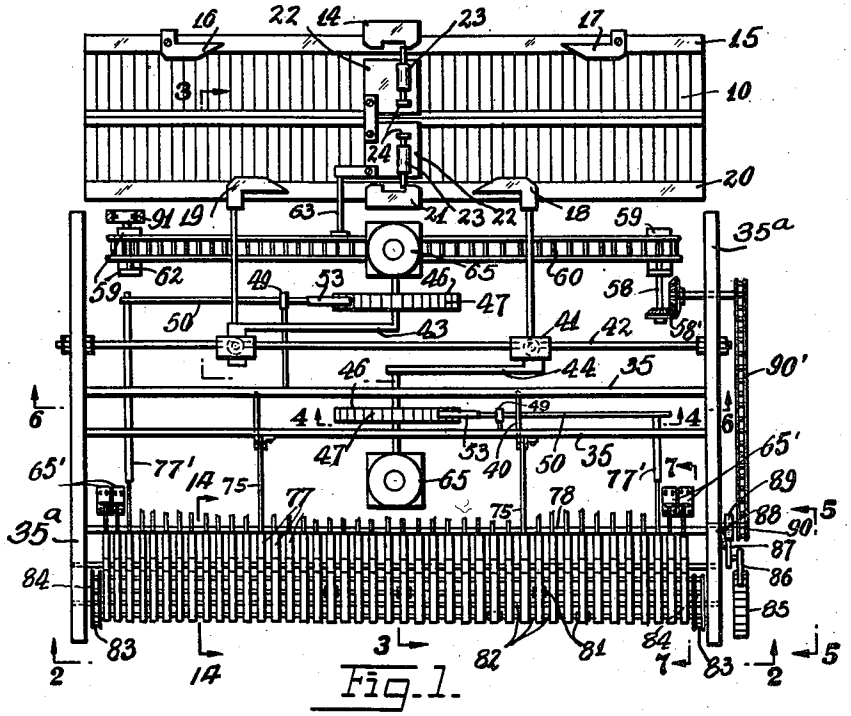


Fig. 1.

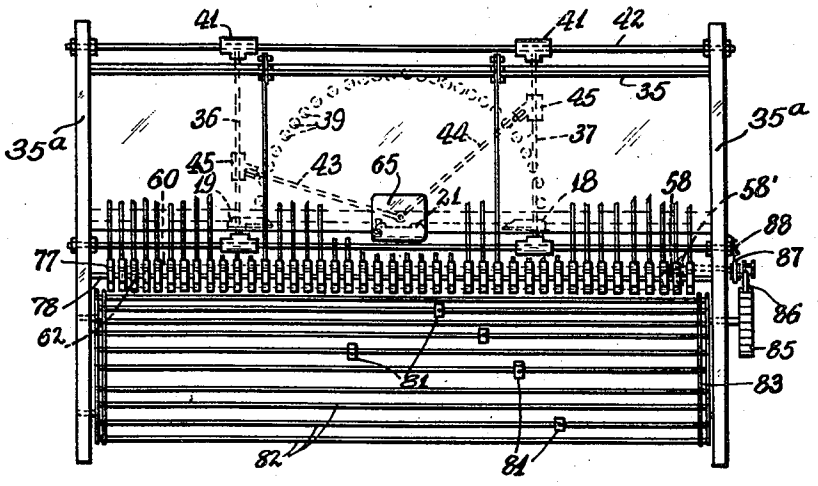


Fig. 2.

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REGULATING ATTACHMENT FOR KNITTING MACHINES

Filed Sept. 26, 1932 3 Sheets-Sheet 2

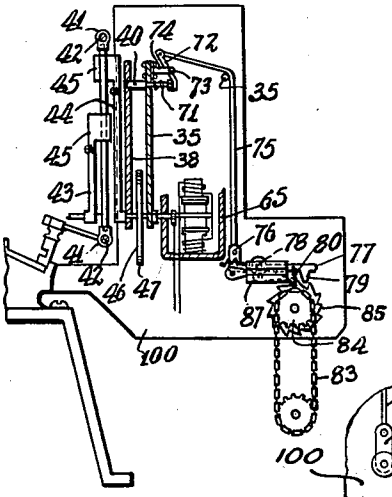


Fig. 3.

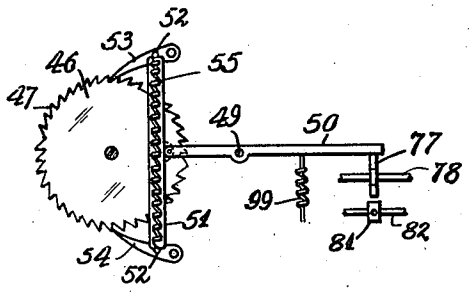


Fig. 4.

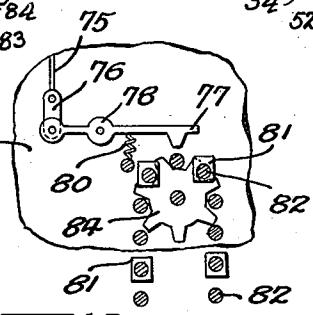


Fig. 10.

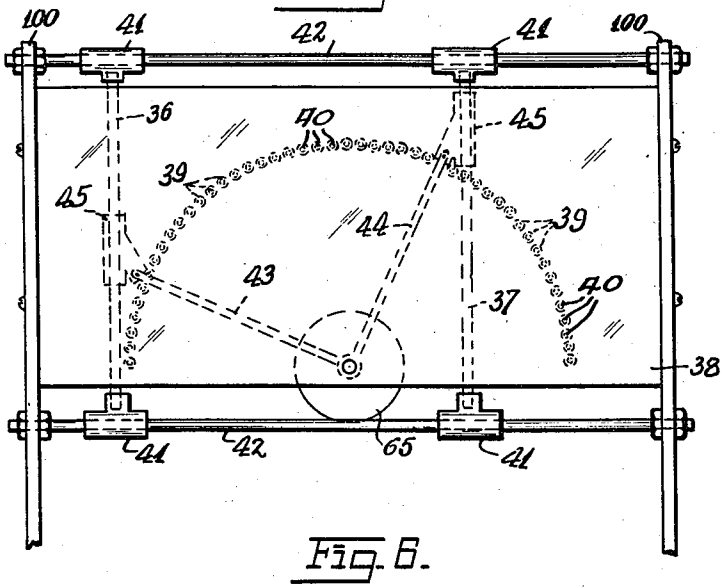


Fig. 6.

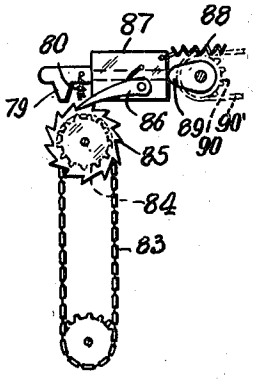


Fig. 5.

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REGULATING ATTACHMENT FOR KNITTING MACHINES

Filed Sept. 26, 1932 3 Sheets-Sheet 3

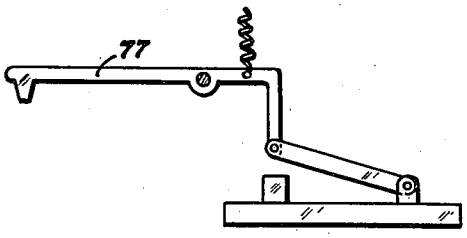


Fig. 7.

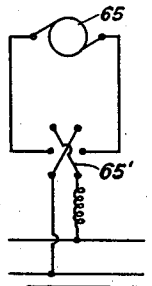


Fig. 8.

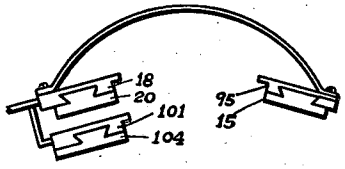
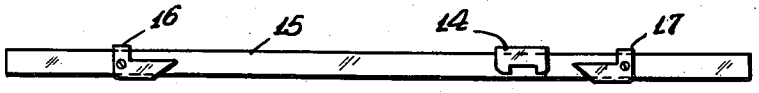


Fig. 13.



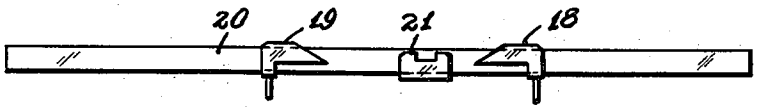


Fig. 9.

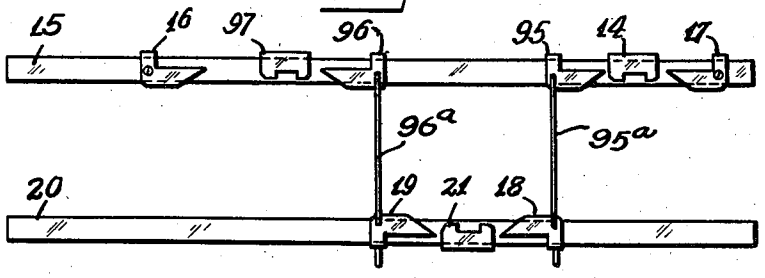


Fig. 11.

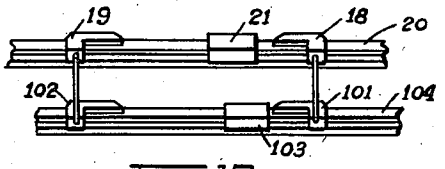


Fig. 12.

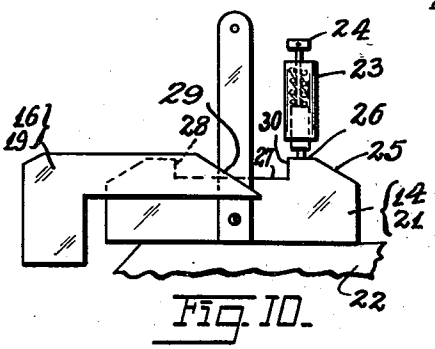


Fig. 10.

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Patented Feb. 5, 1935

1,990,440

UNITED STATES PATENT OFFICE

1,990,440

REGULATING ATTACHMENT FOR KNITTING MACHINES

Joseph Steinhart, New York, N. Y.

Application September 26, 1932, Serial No. 634,823

14 Claims. (Cl. 66—128)

This invention relates to new and useful improvements in a design regulating attachment for knitting machines.

The invention has particular reference to the conventional type of flat machines, having linear needle beds, a reciprocating carriage, and flat bars with stoppers. The "Lamb" knitting machine described in the Encyclopedia Britannica is a typical example of this type. Further, the carriage has the usual plug arrangement for engaging the yarn carriers of the machine at a stopper located at one end of a bar to take it along until the carriers are stopped by a stopper at the other end of the bar. This mechanism is hereinafter described.

Up to the present time designs with shifting stoppers have only been made on hand machines, and this invention proposes to enable power driven machines to shift stoppers to desired positions, depending upon the design wanted, by an automatic stud arrangement.

This invention still further proposes the construction of a device as mentioned which is durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a plan view of a portion of a knitting machine equipped with a design regulating attachment according to this invention.

Fig. 2 is an elevation view of Fig. 1 looking in the direction of the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary elevational view looking in the direction of the line 5—5 of Fig. 1.

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 1.

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 1.

Fig. 8 is a schematic wiring diagram of a portion of the device.

Fig. 9 is a schematic showing of the relation of the stoppers and the carriers according to this invention.

Fig. 10 is a fragmentary detailed view showing a stopper and its carrier.

Fig. 11 is another schematic view similar to Fig. 9 but showing a modified form of the invention.

Fig. 12 is a view similar to a front view of Fig. 9 but showing another modified form of the invention.

Fig. 13 is a view similar to an end view of Fig. 11 but showing a modified arrangement of the invention.

Fig. 14 is a fragmentary view taken along the line 14—14 of Fig. 1.

The invention is used in conjunction with the conventional type of flat knitting machine having a linear needle bed 10, a reciprocating carriage 22, and movable stoppers 18 and 19. The details of the knitting machine will not be given here since the machine may readily be recognized from the portion shown on the drawings and a mention of its operation. When one color of knitting is required only one carrier 14, see Fig. 9, is moving on the bar 15 having two fixed end stoppers 16 and 17 according to present day construction. The stoppers serve to limit the distance through which the carriers may move along the bars. The studs in this invention hereinafter described are placed so as to set the stoppers 18 and 19 upon the bar 20 very close to each other for the one color knitting. When it is desirable to knit two colors then two carriers move simultaneously on the bars 15 and 20. If the motion is from right to left then the carrier 14 on the bar 15 moves first from the stopper 17 until the carriage reaches the stopper 18 on the bar 20. There the carriage will engage (in the general manner) the carrier 21 upon the bar 20 and the carriage moves both carriers 14 and 21 until the carrier reaches the stopper 19 leaving the carrier 21 at the position of the stopper 19. The carriage continues and moves the carrier 14 to the final fixed stopper 16.

If the carrier 14 is knitting white and the carrier 21 is knitting black, then the design from the stopper 17 to the stopper 18 will be white, and from the stopper 18 to the stopper 19, it will be plated black and white, and from stopper 19 to stopper 16 white again. Thus by shifting the stoppers an unlimited number of patterns may be made.

To produce designs on the knitted material the stoppers 18 and 19 are moved to desired positions according to this invention at each motion (direction) of the carriage. This invention controls the movement of the two stoppers 18 and 19 on the single bar 20 in either direction, but it is possible to provide more than one pair of these

stopper or additional bars (a pair on each bar). Then the mechanism hereinafter further described for controlling the positions of the stoppers must be multiplied in a suitable manner, or the same device may be repeated on the same machine to obtain more color knitting.

It is thought advisable to give a little detail here, on the general method for the engaging and disengaging of the carriers 14 and 21 on present day knitting machines. The moving carriage has a number of plugs corresponding to the number of carriers which engage or disengage the carriage according to the usual manner at the desired time which is as follows: A carriage 22 moves with the plugs 23 which are either placed up or down by the present arrangements on the machine. When the plunger 24 of the plug 23 is up the corresponding carrier is not moved, therefore it does not knit. When the plunger 24 is down and moves with the carriage over the surfaces 25, 26 and 27, it will engage surface 28 and move the carriers 14 or 21 (depending on the setting and position), to a distance until the carrier 14 or 21 reaches the corresponding stopper 16 or 19 where the plunger will be carried up by the inclined edge 29 and leave the carrier 14 or 21 at that position.

On the return motion of the carriage and plunger 24, the latter engages the edge 30 and moves the carriage 14 or 21 in the opposite direction until the plug 23 is carried up again by the stopper at the other side.

From the brief description above given of the present type of knitting machine it is thought that the machine will be sufficiently understood by those skilled in the art to now understand the action of the attachment according to this invention which is as follows:

The attachment comprises a frame 35 including a pair of vertical slidably mounted rods 36 and 37 in connection to move stoppers 18 and 19 and these rods are adjacent a plate 38 formed with a plurality of apertures 39 spaced from each other for directing a plurality of pegs 40 adapted to be extended into the path of motion of the arms 43 and 44. The vertical rods 36 and 37 are slidably mounted by reason of their connection with collars 41 slidable upon horizontal rods 42 included in said frame. The support plates 35a are attached upon the frame of the knitting machine in any suitable manner.

A means is provided for moving the rods 36 and 37 in either direction, depending on the design desired, thereby taking stoppers 18 and 19 to new positions. This means comprises radial arms 43 and 44 respectively, rotatively mounted in the frame 35 and each engaged with collars 45 slidable upon the rods 36 and 37. Each of the radial arms 43 and 44 is also fixed coaxially with discs 46. Particular attention is now called to Fig. 3 where it should be noticed that the frame 100 is shown broken and only one complete set of mechanism is shown for operating the stopper 18.

Once the stopper reaches its position, it is held firmly in place until the carriage knits off, making it ready for the next shift. The stopper 19 moves forward, that is, it moves from right to left, until one of the pegs 40 which is projecting through the plate 38 engages the radial arm 43, thus preventing any further forward motion and the pawl 53 acting against the ratchet 47 stops any backward motion. Should the stopper 19 be moving backwards that is, from left to right, its further backward motion is checked by one of the pegs 40, while pawl 54 acting against the ratchet teeth prevents any forward motion. The pawls 53 and 54 are put into operation by studs 81 on the transverse rods 82 which are attached on the endless chains 83. A detailed description of the operation of the ratchet will be hereinafter given.

The electric motors 65 have their armatures connected to the radial arms 43 and 44, and supply the twisting torque in either direction, depending on the setting of the switches. Each motor has a double-throw switch 65' placed side by side rather than in the usual way. One section of the switch supplies current to the armature in one direction, while the other half supplies the current in the reverse direction, thereby reversing the direction of rotation of the motor. Each section of the switch is operated by a lever 77 using one lever for each section. The switches are closed and opened by the studs 81. When the stud 81 is omitted under the lever 77 a spring keeps the switch sections open, while a stud 81 will cause the lever 77 (Fig. 7) to rotate, thus closing the switch. The proper operation of the switch will depend upon the direction the stopper is required to move.

As previously stated a peg 40 is provided in line with each of the apertures 39. Each of these pegs is slidably mounted in a portion of the frame 35 and is provided with a spring 71 normally urging it into a retracted position. A means is provided for selectively moving the pegs 40 to engage through the openings 39 and stop the rod 37 in accordance with a predetermined sequence. In detail fingers 72 are pivotally mounted intermediately at 73 upon brackets 74 fixed upon the frame 35. One end of each of the fingers 72 engages against the rear end of a peg 40. The other ends of the fingers 72 connect with cables 75 guided and connected with the ends 76 of a plurality of levers 77 intermediately pivoted at 78. Each of these levers are urged with their headed ends 79 downwards into a neutral position. This urging is accomplished by a spring 80 connected with each of the levers and with the frame 35.

The heads 79 are adapted to be engaged selectively by studs 81 adjustably upon a plurality of transverse rods 82 forming an endless member. These rods 82 are fixed upon endless chains 83 extended over sprockets 84. The arrangement is such that as the endless chains 83 are caused to move the studs 81 will engage against the ends 79 in a predetermined sequence and thus cause the ejection of the pegs 40 in a corresponding sequence. A mechanism to operate the endless member is synchronized with the operation of the carriage 21 and comprises a ratchet 85 fixed coaxially upon one of the pinions 84 and engaged by a pawl 86 mounted upon a slide 87 slidably engaged on the frame 35. This slide 87 is normally urged into a retracted position by a spring 83 acting between the slide and the frame 35. A cam 89 is adapted to engage against the slide 87 to move the slide forward so that the pawl 86 causes the ratchet wheel 85 to advance one tooth. The cam 89 is fixed coaxially with a sprocket wheel 90 driven by chain 90' which receives its motion from driving chain 60 through shaft 58 and bevel gears 58'. A belt 91 is shown connected for driving the shaft 62.

Extensions 77' project from two of the levers 77 and engage under one of the ends of levers 50 pivotally mounted intermediate of their ends on the frame 35 by means of pins 49. Springs 55 connected between pins 52 urge pawls 53 and 54

into engagement with the ratchet wheels 47. Slides 51 attached upon the other ends of the levers 50 are capable of pushing either of the pawls 53 and 54 out of engagement with the ratchet wheels 47. Whenever there are studs 81 under the levers 77 the extensions 77' are in downward positions and springs 99 rotate the levers 50 about the pins 49, thereby moving the ends which are fixed to the slides 51 in an upward direction causing the slides 51 to engage the pins 52, thereby bringing the pawls 35 out of engagement with the ratchet wheels 47 and at the same time placing the pawls 54 into engagement with the wheels 47. On the other hand wherever there are no studs 81 under the levers 77 the extensions 77' are in upward positions, forcing the levers 50 to move the slides 51 in a downward direction causing the slides 51 to engage the pins 52, and thereby bring the pawls 54 out of engagement with the ratchet wheels 47 and at the same time placing the pawls 53 into engagement with the wheels 47.

The operation of the device may be traced by assuming the chain 60 moving in one direction and moving the carriage 21 correspondingly. As the chain 60 rotates the shafts 58 and 62 will also rotate. Rotations from the shaft 58 serve to advance the endless chain 83 the correct amount so as to cause one of the studs 81 to engage one of the levers 77 causing the lever 77 to pivot. The pivoting of one of the levers 77 causes the drawing of one of the cables 75 which in turn causes pivoting of one of the levers 72 which ejects one of the pegs 40 through one of the openings 39. This projected peg 40 will limit the motion of the rod 37 and correspondingly, the stopper 18. Thus the stopper 18 will be set into a new position. At the end of the stroke of the carriage 21, the endless chain will advance again, bringing forward a new set of studs, which will place the stopper in a new position. Suppose it is desired to bring the stopper 18 from a position at the right end of the machine to a position in the center of the machine, then a stud 81 is placed on a rod 82 under a proper lever 77 which will limit the motion of the rod 37. On the same rod 82 is also placed a stud to close the proper switch, besides the stud to operate the proper pawl 54. Should the design require the stopper to be moved in the opposite direction at the next movement of the carriage, then a proper stud is placed on the next rod to throw out the proper peg 40, and the reversing section of the switch is then made to operate by another stud on the same rod. To enable this backward motion the pawl 54 which previously operated will have to be lifted by a stud placed on the same rod, or by a removal of a stud, depending on the motion.

The function of the motion of the stopper 18 and carriage 21 has been previously described at the beginning of this specification. As will be readily understood by this time the main feature of this invention is the design regulating ability of the attachment by reason of the automatic setting of the stoppers 18 and 19. As previously stated various alterations as to the number of pairs of stoppers and duplication or arrangement of the mechanism may be provided so as to increase the effect of design changes.

When it is desired to move one of the stops 18, 19 studs are placed at proper location on the rod 82 so that when the rod goes into its operative position (as shown in Fig. 14) the proper switch will be closed in order to start one of the motors 65 and at the same time project the desired peg 40. When the arm 43 or 44 reaches the projecting peg 40 it will stop and hold the armature of the motor from rotating farther since the motor switch is still closed and the motor tends to run. The holding of the armature will cause no damage since the motors 65 are of small size drawing a small quantity of current, because their work is comparatively light, namely the moving of the stops 18 and 19. The tendency of the motor to run will cease when the motor switch is open as previously described by subsequent motion of the endless chain.

In Fig. 11 a modified form of the invention has been shown for causing the machine to knit three different solid colors during one stroke of the carriage. For this purpose bridged stoppers 95 and 96 may be used. The stoppers function in relation to the knitting machine instrumentalities by limiting the motion of the carriers. These bridge stoppers are arranged on the bar 15 and are bridged or connected with the stoppers 18 and 19 by links 95^a and 96^a. With this arrangement the machine knits for example, white from stopper 17 and 95 on bar 15. Just before leaving the carrier 14 at 95 one of the plungers 24 engages the carrier 21 at the position of the stopper 18 and then it knits black only (without plating) until the carrier 21 reaches the stopper 19 of the bar 20. Before leaving the carrier 21 at 19 another plunger 24 engages an additional carrier 97 upon the bar 15 at the stopper 95 and knits white or any new color only again up to the stopper 16. By shifting stoppers 18 and 19, there will also be a shifting of the stopper on the opposite bar, and designs may be made accordingly.

Should it be desired to knit a design of a few colors, the arrangements shown in Figs. 12 and 13 may be used. The arrangement in Fig. 12 will knit plated designing of a few colors (by adding more bars) interchanged at desired intervals, while the arrangement in Fig. 13 will knit multi-colored designs of solid colors.

In the first arrangement, stoppers 18 and 19 are joined with stoppers 101 and 102, respectively. Stoppers 18 and 19 being capable of being shifted to any desired position, according to this invention, which in turn will place stoppers 101 and 102 in the same respective positions, on bar 104. Thus, the carrier 103 may be made to work together with carrier 14 instead of the carrier 21, by lifting or lowering the plugs 23 (see Figs. 12 and 13). The means for lifting these plugs is provided for, on present-day built machines. As it can be seen, the position of stoppers 18 and 101 will always be the same, while the position of stopper 102 will always be that of the stopper 19, and by changing carriers, a few tone-effects may be obtained.

For a few tone-effects the stoppers may be bridged as shown in Fig. 13, in conjunction with the arrangement shown in Fig. 11. In the same manner, by engaging or changing carriers on bars 20 and 104 the multi-tone effect may be obtained.

The drawings show only two bars, but any desired number of bars may be added.

While I have shown and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:—

1. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers.

2. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of slidably mounted rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers.

3. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers.

4. In combination with a flat knitting machine having linear knitting beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers, said rods being mounted adjacent a plate provided with a plurality of apertures, and said means for selectively stopping said rods including pegs, movable through said apertures into the path of motion of said rods.

5. In combination with a flat knitting machine having linear knitting beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers, said means for moving one of said rods including an electric motor adapted to rotate in one or the other direction, a radial arm connected upon the shaft of said motor and connected with a collar slidably engaging said rod, a reversing switch connected with said motor, and means for automatically reversing said switch according to the motion desired.

6. In combination with a flat knitting machine having linear knitting beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers, said means for moving one of said rods including an electric motor adapted to rotate in one or the other direction, a radial arm connected upon the shaft of said motor and connected with a collar slidably engaging said rod, a reversing switch connected with said motor, and means for automatically reversing said switch by means of two levers operated by the studs on the endless chain.

7. In combination with a flat knitting machine having linear knitting beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stoppers, means for moving said rods, and means for selectively stopping the sliding of said rods in accordance to a predetermined sequence so as to correspondingly adjust said stoppers, said means for moving one of said rods including an electric motor adapted to rotate in one or the other direction, a radial arm connected upon the shaft of said motor and connected with a collar slidably engaging said rod, a reversing switch connected with said motor, and means for automatically reversing said switch by means of two levers operated by studs on the endless chain, said carriage being moved by an endless chain extended between sprockets, and said controlling cam being arranged upon the shaft of a sprocket engaging said endless chain.

8. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop rod in accordance with a predetermined sequence.

9. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop said rod in accordance with a predetermined sequence, comprising fingers intermediately pivotally mounted and having one of their ends engaging the rear ends of said pegs, means for retracting said pegs, and means for pivoting said fingers in the desired sequence.

10. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and

movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop said rod in accordance with a predetermined sequence, comprising fingers intermediately pivotally mounted and having one of their ends engaging the rear ends of said pegs, means for retracting said pegs, and means for pivoting said fingers in the desired sequence, comprising cables connected with the other ends of said fingers, levers pivotally mounted and connected at one of their ends with said cables, resilient means urging said levers into engagement with studs, and an endless member having removable said studs for engagement by said levers.

11. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop said rod in accordance with a predetermined sequence, comprising fingers intermediately pivotally mounted and having one of their ends engaging the rear ends of said pegs, means for retracting said pegs, and means for pivoting said fingers in the desired sequence, comprising cables connected with the other ends of said fingers, levers pivotally mounted and connected at one of their ends with said cables, resilient means urging said levers into engagement with studs, and an endless member having removable said studs for engagement by said levers, said removable studs being engaged upon transverse rods extended between endless chains.

12. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop said rod in accordance with a predetermined sequence, a ratchet gear being fixed for motion with one of said endless chains, and means synchronized with the action of said carriage for advancing said ratchet wheel.

13. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection for moving said stoppers and adjacent a plate provided with a plurality of apertures, means for moving said rods, a peg in line with each of said openings, and means for selectively moving said pegs to engage through said openings and stop said rod in accordance with a predetermined sequence, a ratchet gear being fixed for motion with one of said endless chains, and means synchronized with the action of said carriage for advancing said ratchet wheel, comprising a pawl engaging said ratchet wheel, a slide carrying said pawl, and a cam engageable against said slide and in connection for moving the slide upon each stroke of reciprocation of said carriage.

14. In combination with a flat knitting machine having linear needle beds, a reciprocating carriage, carriers movable with the carriage and movable stoppers for limiting the motion of the carrier, a frame for attachment on said knitting machine and including a pair of horizontally slidably mounted vertical rods in operative connection to move said stopper, means for moving said rods and means for selectively stopping the sliding of said rods in accordance with a predetermined sequence so as to correspondingly adjust said stoppers, said means for moving said rods including radial arms slidably connected with said rods and pivotally mounted, means for arresting back turning of said radial arms synchronized with the direction of motion of said radial arms, motors for turning said radial arms, reversing switches for controlling the direction of rotation of said motors, and mechanism for automatically operating said reversing switches.

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