March 6, 1962 F. C. WIESINGER ET AL 3,023,595

CONTROLLER FOR KNITTING MACHINES

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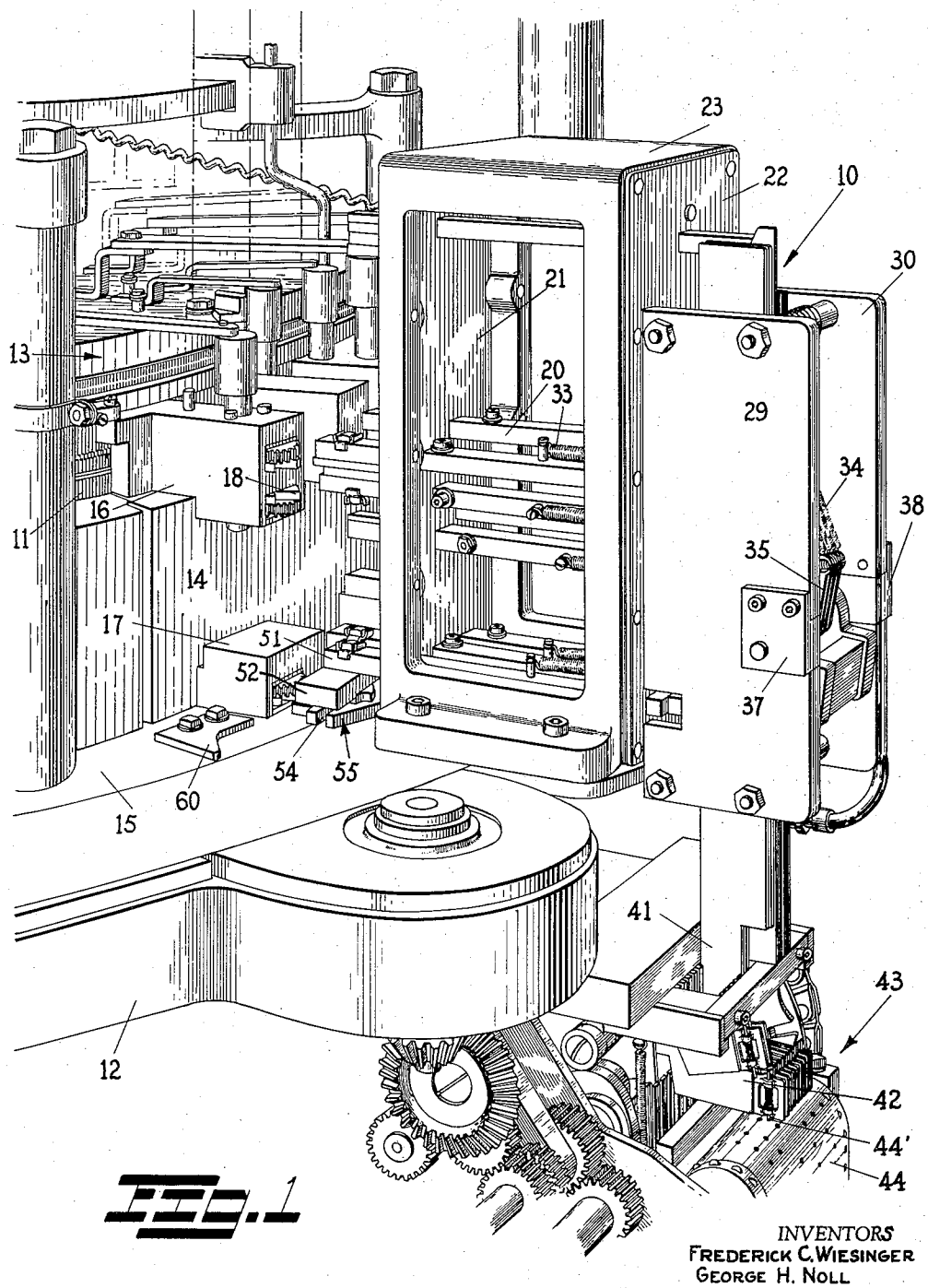


FIG. 1

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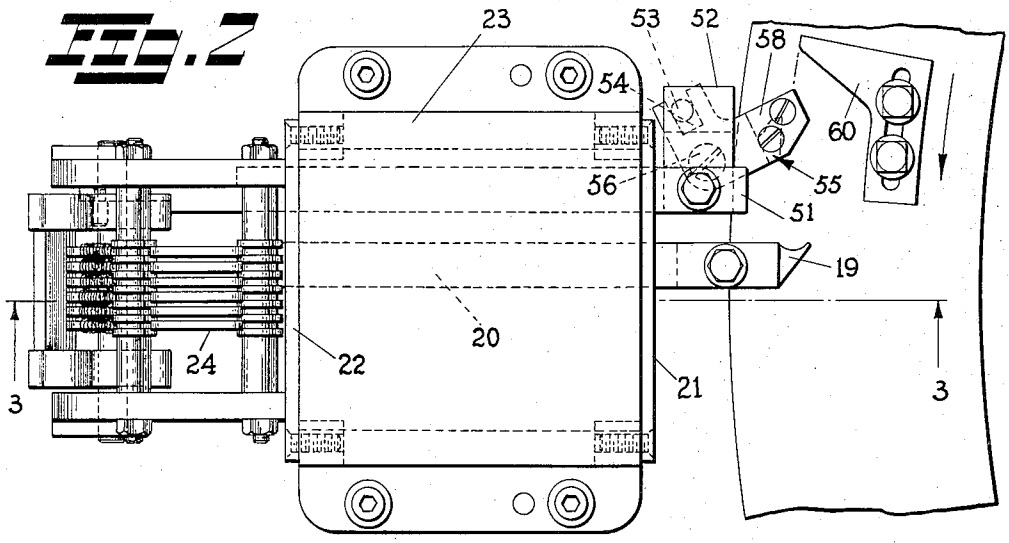
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Fig. 2



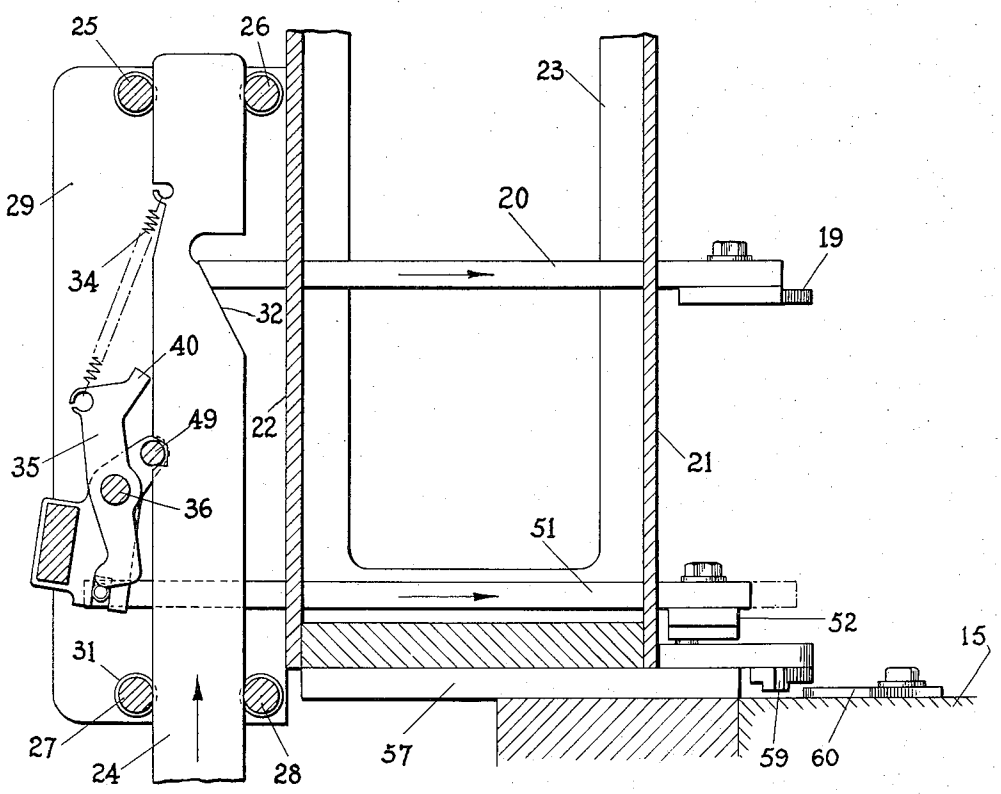


Fig. 3

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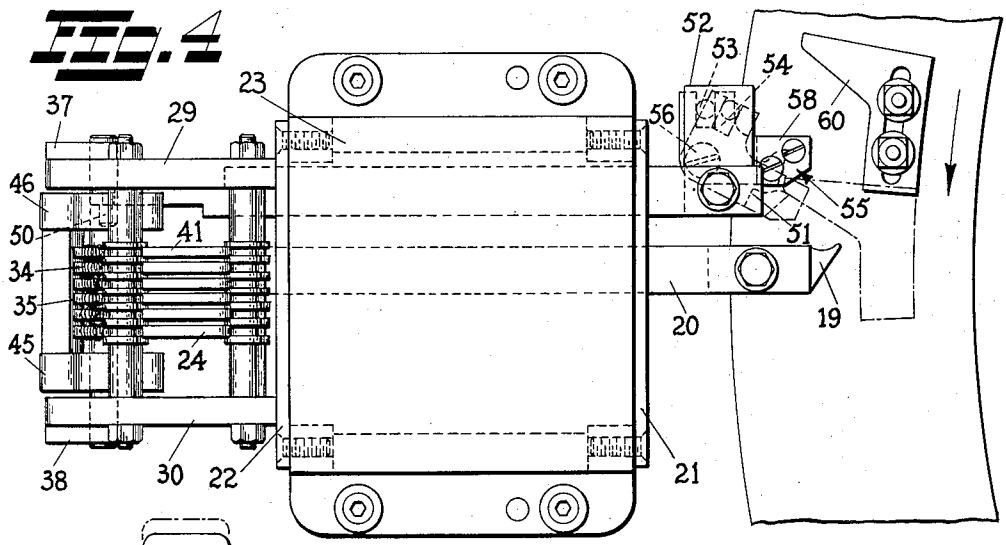
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FIG. 4



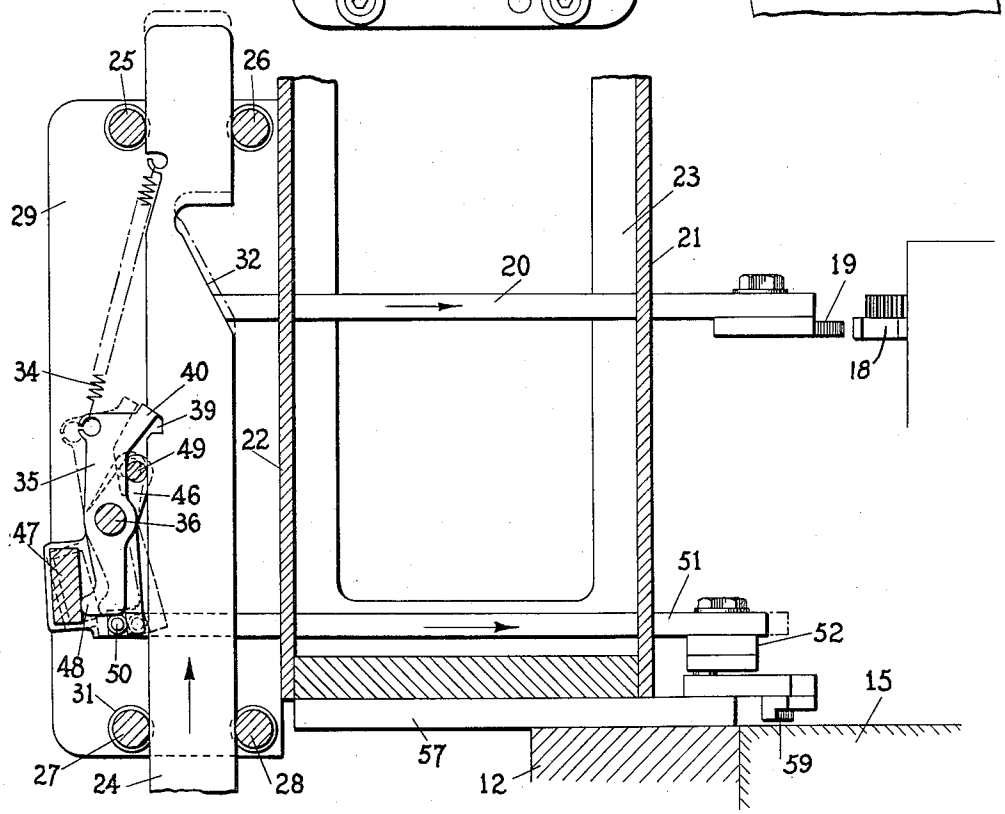


FIG. 5

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3,023,595

CONTROLLER FOR KNITTING MACHINES

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7 Claims. (Cl. 66—50)

This invention pertains to controller means, preferably for use in circular, multifeed, independent needle knitting machines.

It is a general object of the invention to improve the controller unit of a machine of the type described so that it shall be more adapted to use in a machine having a great number of feeds.

A more specific object is that of so devising such a unit that it may perform its intended task with fewer motions or changes of position for the parts and with less noise and wear incidental to its functioning.

It is a further object of the invention to effect a selective change of the controller parts and, while proceeding with a following selecting cycle, holding the position of those selector members which act to govern the turning cams, star wheels or the like at the machine until such following selection has progressed to a point where a next following change of said members (which may include releasing some or all of those first selected and then moving others to a selected relationship while retaining some of those previously in such position) is initiated.

Other objects will become apparent from the following more detailed description.

In multifeed knitting machines adapted to knit goods in the form of blanks it is necessary to effect certain changes cyclically, e.g., in sweater blanks or the like, changes in the position of certain cams or other parts are effected by a pattern governed means. In one example, the machines manufactured and sold under the mark "Circular Jacquard" by Wildman Jacquard Co., these changes are effected through a controller unit one example of which is to be found in United States Patent No. 2,082,127. Until recently these machines have been built with a moderate number of feeds and, as in this patent, the controller elements, eventually effective upon turning cams, star wheels or the like, have had their position changed at each feed according to a pattern, that is, at times when the unit is functioning. All such selectively positioned elements have been released after passing a feed. They are therefore selectively set and released once for each feed so that for a twelve feed machine, an equivalent number of selecting cycles must be completed at each revolution.

Much work done on these machines is of such nature that actually, all selecting or action at the controller involves the same settings of the controller parts for at least a revolution.

According to the instant invention, a controller unit has been so modified that it may be given one primary selecting movement at each revolution (and accordingly released once per revolution) and those settings will be retained or "held over" for the revolution despite the fact that the underlying pattern means is advancing and actually moving on to initiate a selecting movement incidental to the next following revolution. Those members which are reselected at a following revolution are not returned to inactive position but are merely latched in active position a second time and thus a member may be held over for carrying through its selecting function for any desired number of revolutions.

The invention will be described in detail by reference to a specific embodiment thereof as illustrated in the accompanying figures of drawings, wherein:

FIG. 1 is a perspective view showing a controller unit applied to a knitting machine and embodying the invention.

FIG. 2 is a top view of the controller unit.

FIG. 3 is a section taken at line 3—3, FIG. 2, and showing a slide bar, etc., in non-selected position.

FIG. 4 is a top view similar to FIG. 2, but showing parts in slide bar releasing position.

FIG. 5 is a section similar to that of FIG. 3, but showing a slide bar and attendant parts in active or selected position.

Now referring to FIG. 1, a controller unit generally indicated by numeral **10** bears the usual relationship to a multifeed knitting machine of which it forms a part. Such machines may have a cylinder **11** mounted in a base **12**, a dial **13** and, of course, the usual needles in both cylinder and dial. Cams (not shown) are carried in sections such, for example, as section **14**, several of which are fixed to a rotatable cam ring **15**, the dial sections being likewise rotatable. Cams in these sections are movable, their positions being altered by turning cams and more or less conventional means carried in brackets such as those at **16** and **17**. For purposes of this disclosure it is only necessary to say that movement is imparted to the cams whenever a star wheel **18**, for example, engages a trip **19**, FIGS. 2 and 3. Through gears and other known means this rotation of the star wheel is imparted to a cam individual to that wheel and the result may be evident in cam control to cause needles at that station to knit, tuck, welt or transfer, as desired. Each knitting feed or station is thus governed and while this particular example relates to a machine in which the needle cylinder and dial are stationary while the cam sections rotate past them, it is to be understood that such movement is only a relative matter and the complementary parts may be desired to rotate or remain stationary as desired.

As shown in United States Patent No. 2,082,127 a controller unit is fixed at the periphery of the machine base in position to support a number of horizontally disposed plungers **20** to the end of each of which is adjustably attached one of the trip members **19**. These plungers are slidably mounted in inner and outer plates **21** and **22** of an open sided box-like stand **23** bolted to the base of the machine. As shown in FIG. 1, there are a number of these plungers and they are disposed at different heights depending upon the position of star wheels they are to govern. They are staggered circumferentially so as to be controlled by a particular one of an equivalent number of slide bars **24**. The trip members are offset to bring at least some of them into vertical alignment to compensate for the offsetting of plungers **20** and, of course, their effective position depends on the time at which they should act.

These slide bars **24** are preferably vertically disposed and are slidable in spaced relationship as they are mounted between upper and lower rods **25**, **26** and **27**, **28**, in turn held in side plates **29** and **30**. Spacing rollers with shrouds **31** on these rods maintain the slide bars in proper lateral relationship.

Each slide bar has a notch with an inclined surface **32** which bears against a correspondingly angled surface at the adjacent end of its plunger **20**. Each plunger is pulled outwardly by a spring **33**, FIG. 1, while each slide bar is biased downwardly by a spring **34** attached to a hook at the upper part of the slide bar and to a similar hook on a latch or detent **35** pivoted at a shaft **36** extending between bearings in blocks **37** and **38** attached to plates **29** and **30**, respectively.

Each slide bar has a smaller notch **39** the upper part of which is inclined to facilitate entry and withdrawal of an end **40** of each latch which engages in this notch as shown in FIG. 5 to hold its respective slide bar in a raised posi-

tion and that bar, in turn, then holds its plunger **20** pressed inwardly so that it may trip its turning cam or perform such other function as intended. Spring **34** serves a dual purpose in that it maintains its latch tip **40** inwardly against the slide bar and returns the latter to an inactive position when that slide bar is released.

These slide bars extend downwardly to terminate in an end **41** of reduced size which aligns with and bears upon a selecting and lifting lever **42** at the selecting means generally denoted by numeral **43**. A pattern strip **44** is periodically advanced in known manner and pins **44'** in levers **42** drop into a hole in the strip which in cooperation with a drum, carries each selected lever inwardly to be engaged by known lifting means which then raises that lever and also the slide bar individual to it. This pattern means is now well known in the art being a part of all Circular Jacquard machines and also described and shown in United States Patents Nos. 1,986,295 and 2,082,127 so that a detailed description is not necessary here.

Each time a selection is effected certain slide bars may be raised and while heretofore, they had to be held up by the selecting means, they are now latched in raised position by detents **35**. Previously, these selecting functions occurred at each feeding station and were then cancelled and a following selection again made prior to knitting at the next station. This gave rise to a great deal of noise and, of course, subjected the parts to much more wear than needed since, during the knitting of many fabrics, the cycle was such that each of these changes, so-called, effected no more than a duplication of a previously existing condition. That could be done in a machine having few feeds fairly widely spaced, but is entirely impractical in machines having a relatively great number of feeding stations. According to the instant invention, each selection is effected at a blank feed or space between feeds wide enough for the purpose and the slide bars raised and latched are held over for any desired period, for example, one revolution of the machine or for, say, thirty feeds if that happens to be the number of feeds employed.

After a selecting and slide bar raising action, the lifting levers are dropped and return to an outer, non-selected position. They are then ready to be reselected and that action is in process and need not be accomplished with great rapidity so long as lifting levers are positioned in accordance with the pattern at strip **44** in readiness to raise slide bars just after the last of the knitting feeds has been passed, that is, continuing with or according to the example above mentioned.

To cancel a setting, means is provided for withdrawing the latching detents. That includes levers **45** and **46** and a presser plate **47**, this latter bearing against the lower ends **48** of the detents. A rod **49** extends across between the upper parts of the levers **45**, **46** and, when all levers are down, it rests in their notches **39**.

A pin **50** fixed in the outer end of plunger **51** engages in a notch at the lower end of lever **46**. This plunger **51** is slidable in apertures in plates **21**, **22** as are the plungers **20** and as the levers **45**, **46** are swung in or out, plunger **51** will be moved likewise. At its inner end, FIGS. 2–5, this plunger is provided with a lateral extension **52** from which a pin **53** depends to engage in a notch **54** in a bell crank **55**, in turn pivoted at **56** to a base plate **57** of the unit. This bell crank has at the inner end of arm **58** thereof a cam striker piece **59** which is aligned at an elevation to be contacted by a releasing cam **60** carried by the rotary cam ring **15**. This cam **60** is circumferentially adjustable as shown for timing purposes.

If all slide bars are down, the rod **49** rests in the notches **39** in the bars, but as soon as any slide bar is raised, a latch end **40** enters the notch to hold the bar in elevated position and that notch also cams the rod outwardly to swing arms **45** and **46** to an intermediate position, FIG. 5. There plate **47** practically touches the ends **48** of detents **35** and also, movement of the arms presses plunger **51** inwardly to an intermediate position in which striker piece **59** is interposed in the pathway of cam **60**.

When that cam does contact the piece **59** it swings the bell crank **55** as shown in FIG. 4, pulling the plunger **51** still farther inwardly and along with it, the arm **46** so that the plate **47** presses the detents to a position, FIG. 5, in which they release their slide bars. At that time all bars tend to drop under the influence of gravity and springs **34** and, of course, the plungers are retracted by their springs **33**. That is, they drop if permitted to do so. However, in many instances a next following selection will have caused some lifter levers **42** to elevate their bars so that, when released, those bars will not drop; in fact, they will have been raised slightly above the normal selected level as shown in dot-and-dash lines, FIG. 5, and before they can drop when the lifter levers are next lowered, the detents **35** will have been released to be in position to prevent those slide bars from falling or in other words, they will be held over from one selecting cycle to the next. Of course, that results in the plunger **20** at that slide bar being held in too and thus the whole selecting function controlled by that particular bar is held over.

To review the operation, a cycle may be considered to start with a selecting action in which pins of some lifting levers engage in apertures in the pattern whereupon their levers are carried inwardly and are then raised lifting their respective slide bars. Plungers are cammed inwardly and as each feeding station or section passes the controller, its cams or other elements will be positioned by contact of star wheels **18**, etc., with such members **19** as may be in their pathway. This action occurs just before cam **60** reaches the striker piece **59**.

Of course, as soon as any slide bar is raised its notch cams rod **49** outwardly and also receives its detent as the bar reaches the end of its travel upwardly. That sets the plunger **51** inwardly and piece **59** in position to be tripped by cam **60**. That cam then strikes the said piece **59** and swings the bell crank pulling plunger **51** and plate **47** inwardly to withdraw the detents. This withdrawal involves only a brief interval, but one long enough for all non-selected bars to drop. Since the selecting means **43** functions just prior to tripping of the plunger **51** by cam **60**, those selected overtravel slightly, but are held up long enough by their lifting levers for the detents to return to latching position. All newly selected and reselected (held over) bars are thus latched and remain in that position during a revolution or other cycle.

This action all takes place between two adjacent feeding stations which must be spaced far enough apart to permit the mechanism to function, however, the action is one very rapidly accomplished and, by way of example, in a thirty-inch machine having provision for thirty-two feeders or knitting stations, it may easily be accomplished in the space of two feeds which may be blanked out or omitted in any convenient manner.

It can be seen that the space required for altering the pattern control need be only sufficient to permit advancing the plungers. Whereas heretofore the plungers had to be advanced before a station was passed, then the selection made at a station whereupon the plungers dropped back and a next selection was made prior to reaching a following knitting station. Thus two functions really occurred between each feeding or knitting station with a great deal of noise and wear of parts which can now be avoided. The spacing between those feeding stations at which the selection is altered is cut down and all other spacing need not provide for any selection at all.

Thus, a controller unit of the type involved has been improved greatly from the point of view of its simplicity of design and function, but also the characteristics of the machine of which the controller is a part are now much less dependent upon or circumscribed by that unit than has been the case heretofore.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept

may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

We claim:

1. In a circular, independent needle, multifeed knitting machine having members subject to selection for varying the cycle and character of knitting, a controller means having vertically movable slide bars, means for selectively so moving said slide bars and means movable in response to change of position of said slide bars for transmitting said selective movements through to said members subject to selection, latch means for each slide bar engageable with a notch in the bar for holding it in a selected position and means responsive to periodic actuation by a member rotatable as a part of said knitting machine for withdrawing said latching means after said slide bars have again been subjected to a selecting movement.

2. In a circular, independent needle, multifeed knitting machine having a plurality of cam stations, members associated with said stations effective upon actuation thereof to vary the character of knitting at said stations, a controller means having vertically movable slide bars, pattern controlled means for selectively so moving said slide bars, means horizontally movable in response to change of position of said slide bars for transmitting said selective movements through to said members, said members being relatively rotatable with respect to said horizontally movable means, latch means for each slide bar and engageable therewith, and means responsive to periodic actuation by a member rotatable as a part of said knitting machine for releasing said latch means.

3. The mechanism of claim 2 wherein said latch releasing means is effective to free all of said slide bars after a succeeding selecting movement has elevated bars including some of those previously selected to a position above that at which they are held by said latching means, so that some of said slide bars previously selected may be held over to function with others later selected.

4. The mechanism of claim 2 wherein said slidable members are latched in position and are released once during each revolution of said knitting machine.

5. The mechanism of claim 2 wherein each slidable member controls a plunger radially movable for affecting cam control means at the knitting machine and other means is provided for actuation by any one of said slidable members as it is latched in a selected position for setting said release means.

6. The mechanism of claim 2 wherein said cam stations and members are rotatably mounted and wherein said horizontally movable bars are relatively stationary with respect thereto.

7. The mechanism of claim 2 wherein said latch releasing means is effective simultaneously upon all said slide bars.

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