Aug. 12, 1941. E. ST. PIERRE 2,252,214

FEEDING MEANS FOR KNITTING MACHINES

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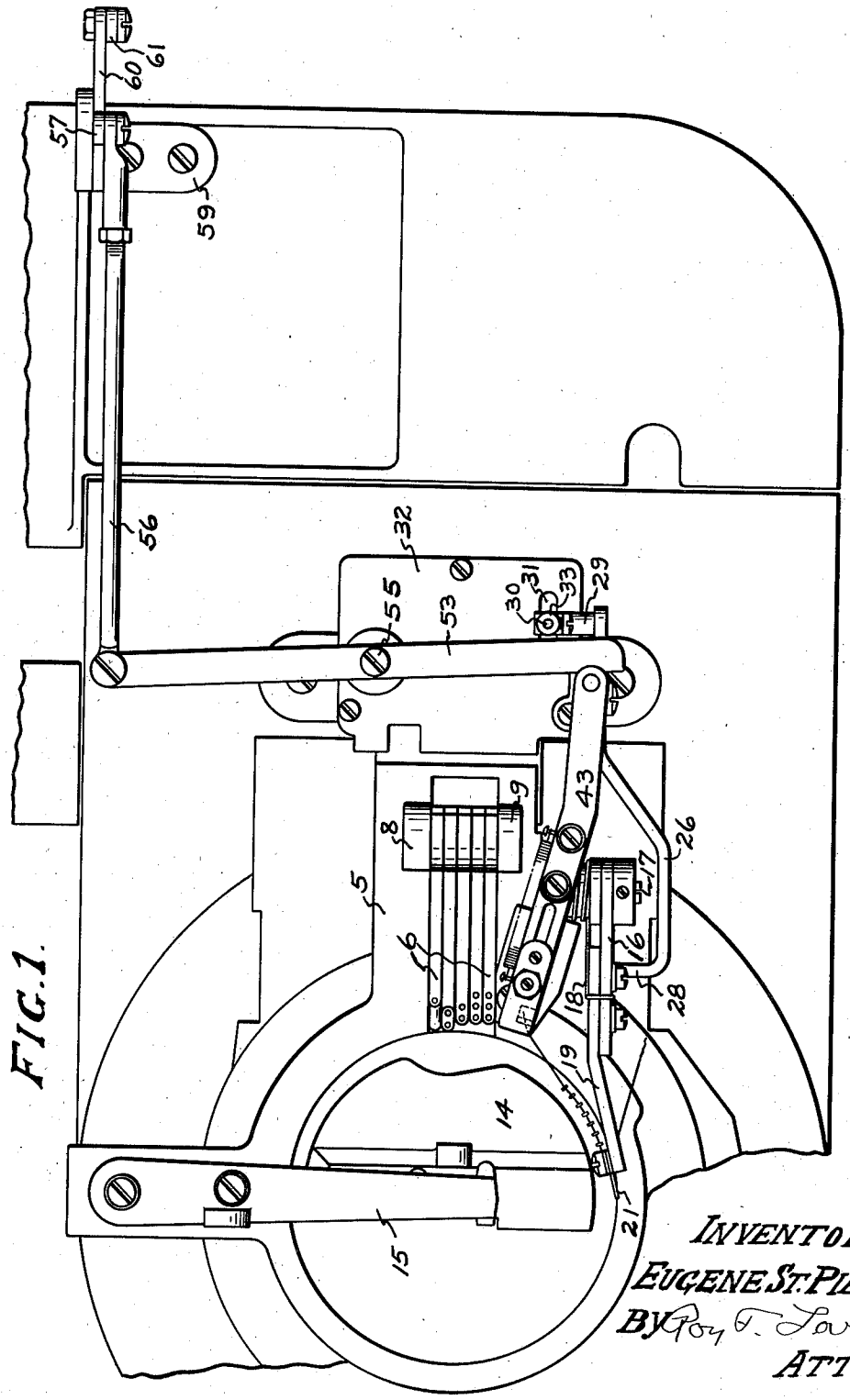


FIG. 1.

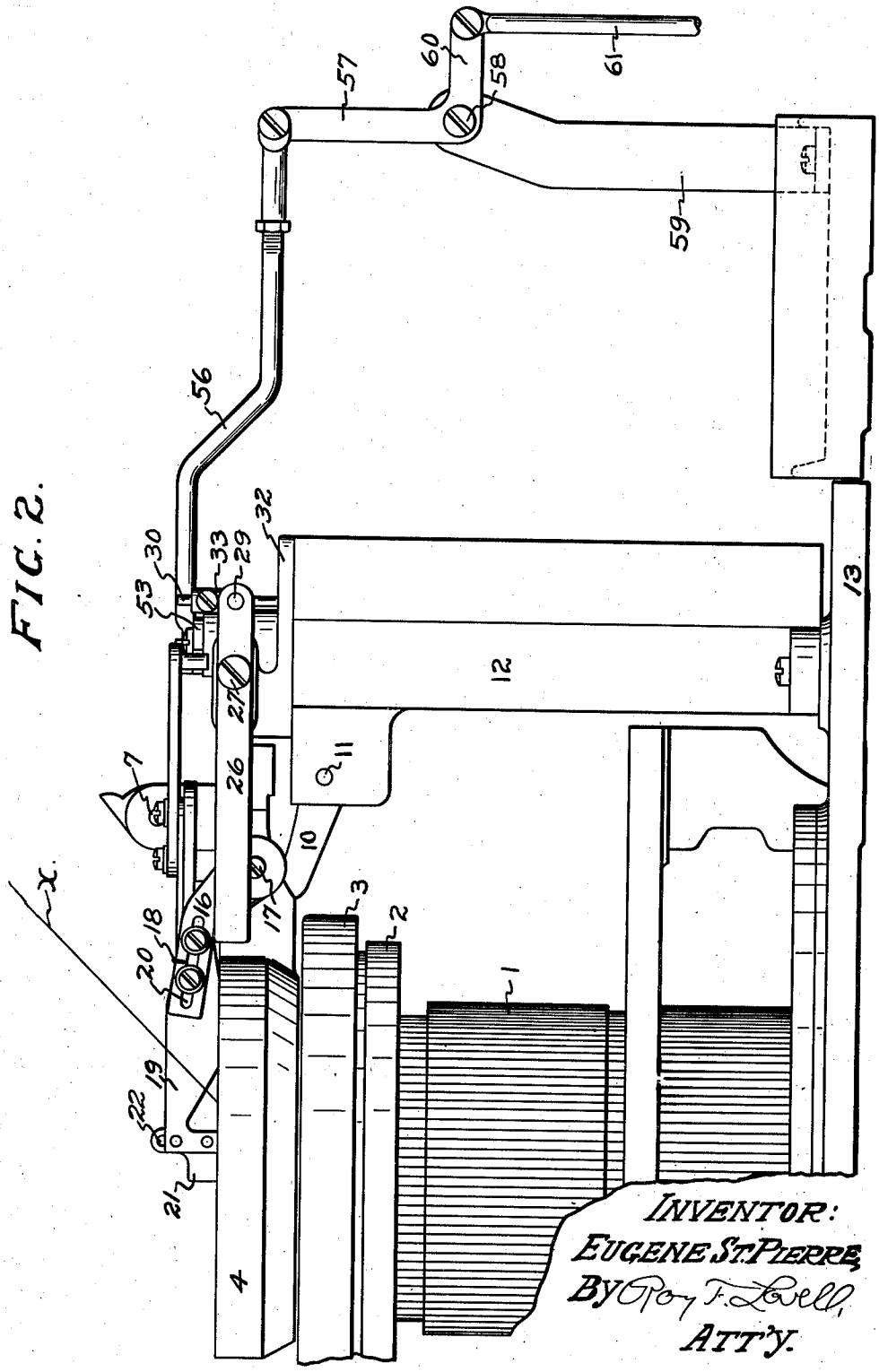
INVENTOR:
EUGENE ST. PIERRE,
BY Roy T. Lovell,
ATT'Y.

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FEEDING MEANS FOR KNITTING MACHINES

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FIG. 2.



INVENTOR:
EUGENE ST. PIERRE,
BY Roy F. Lowell,
ATT'Y.

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FIG. 4.

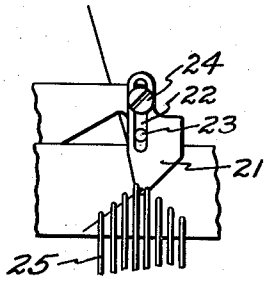


FIG. 3.

FIG. 5.

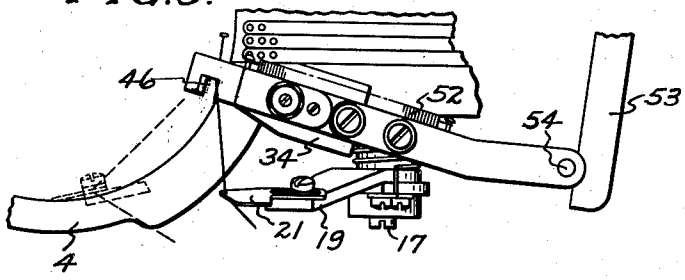


FIG. 7.

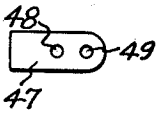


FIG. 8.

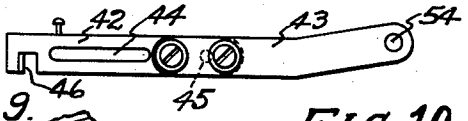


FIG. 6.

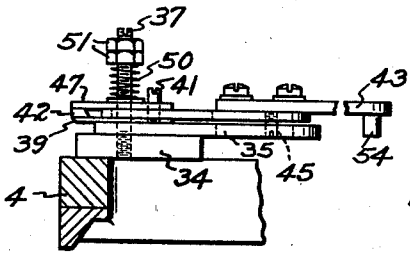


FIG. 9.

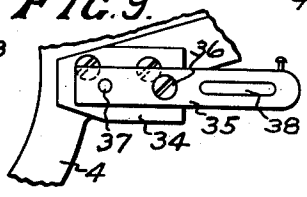
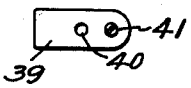


FIG. 10.



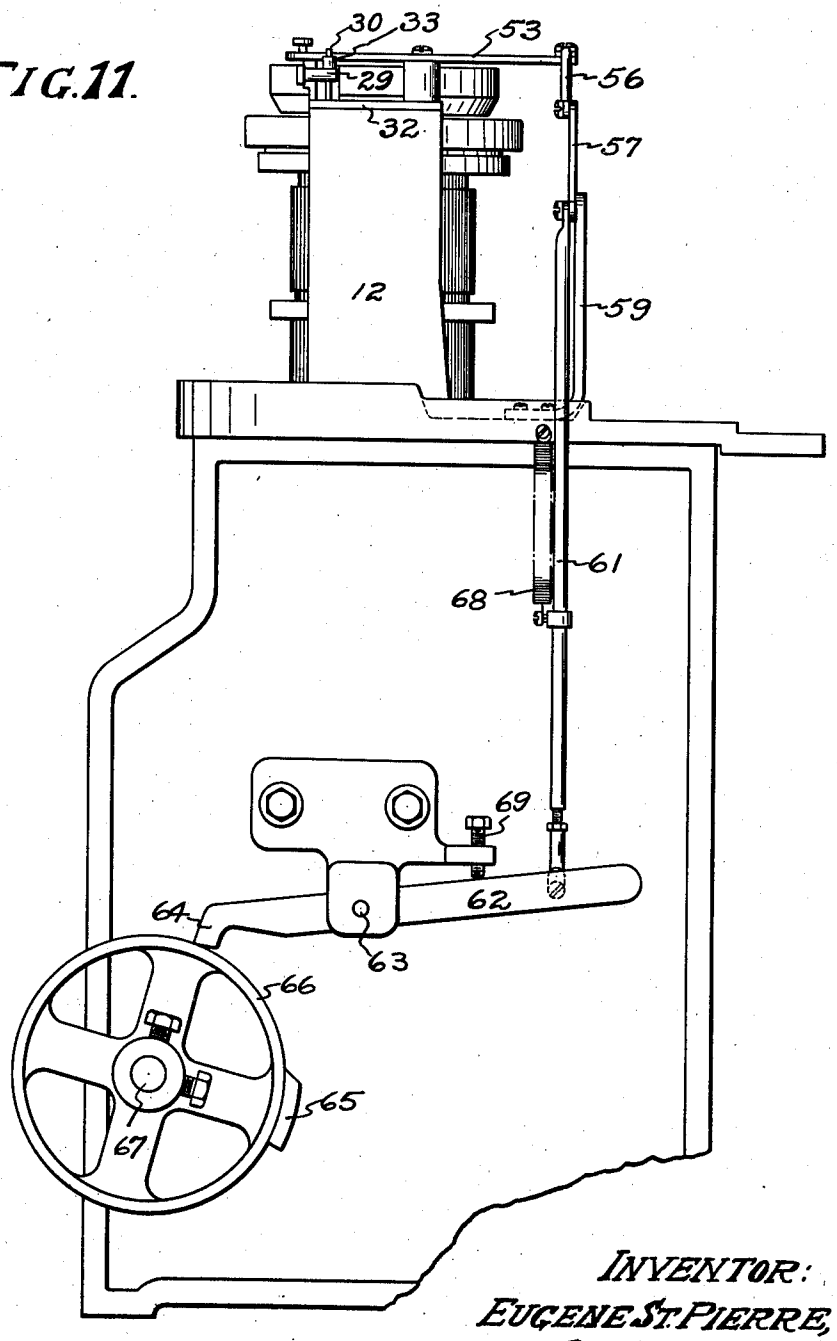
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EUGENE ST. PIERRE,
By Roy F. Lovell,
ATT'Y.

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FEEDING MEANS FOR KNITTING MACHINES

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FIG. 11.



INVENTOR:
EUGENE ST. PIERRE,
By Roy F. Lovell
ATT'Y.

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UNITED STATES PATENT OFFICE

2,252,214

FEEDING MEANS FOR KNITTING MACHINES

Eugene St. Pierre, Pawtucket, R. I., assignor to Hemphill Company, Central Falls, R. I., a corporation of Massachusetts

Application May 24, 1939, Serial No. 275,493

3 Claims. (Cl. 66—134)

This case concerns mechanism for application to knitting machines such, for example, as hosiery machines, and for feeding and controlling elastic yarn to those machines.

In the figures of drawings:

Fig. 1 is a plan showing parts of a conventional hosiery machine to which the yarn feeding and controlling means have been applied;

Fig. 2 is an elevation showing such parts of the machine as seen from the front thereof;

Fig. 3 is an elevation showing parts as illustrated at the top of Fig. 2, but wherein the yarn feeding means is in a different position;

Fig. 4 is a detail of part of the elastic yarn feeding means;

Fig. 5 is a plan showing most of the parts of Fig. 3 and having corresponding positions for those parts;

Fig. 6 is a section through the carrier ring of the machine illustrating the yarn binder and cutter as mounted thereon;

Figs. 7, 8, 9 and 10 are views showing in detail the separate parts of the binder and cutter; and

Fig. 11 is an elevation of a typical hosiery machine showing control for the binder and cutter and appropriate cam means for actuating the same.

The mechanism herein shown and claimed is particularly applicable to hosiery machines, although not necessarily limited to those machines and has exceptional utility for feeding and controlling elastic yarn in such machines. In these machines it is desirable to feed an elastic yarn at times at a position somewhat in advance of the regular mouthpiece and to be able to insert and withdraw that yarn to and from the needles clamping the same in a binder and cutting it independently of other yarns being fed at said regular mouthpiece, which yarns would preferably be held in the usual or regular yarn binder. In the mechanism herein concerned an elastic yarn is fed to be taken by needles at a position somewhat advanced with respect to the usual mouthpiece and, upon withdrawing said yarn from needles taking it, the yarn feeding means is so positioned with respect to a cooperating binder and cutter that the elastic yarn will automatically be taken within the binder to be cut and held preparatory to its being reintroduced to the needles at a subsequent time.

In the figures as much of a typical hosiery machine has been illustrated as is necessary to show properly the application and mode of operation of those parts which constitute the invention. The needle cylinder 1 is to be rotated relatively to certain cams (not shown) said cylinder having operable therein the usual needles which cooperate with sinkers (not shown) in drawing stitches, but which would be mounted and would function in a sinker head 2 as influenced by the more or less conventional sinker cams in a cap 3. A carrier ring 4 would be mounted in the usual way and would have in an extension 5 a series of yarn levers 6 which would pivot on a pin 7 passing through the upstanding ears 8 and 9. These levers 6 are for the purpose of feeding the ordinary knitting yarns such as yarns for the leg, heel and toe, reinforcing in the sole and others. They are controlled by a series of levers 10 pivoted at 11 at the front of a yarn lever control box 12 which is suitably attached to the circular base 13. From these levers 10 a series of connections lead down to appropriate means at a cam drum on the main cam shaft of the machine so that at the correct time in the knitting of a stocking yarns will be introduced to the needles or withdrawn. A disclosure of such mechanism and function is available in United States Patent #933,443. The cutter and binder (not shown completely) would be associated with a plate 14 attached to arm 15. This cutter and binder are conventional on Banner machines and no further disclosure or showing need be given here.

At the front of the machine a lever 16 is to be pivoted at 17 on a stud projecting from part of the extension 5. This stud has thereon suitable retaining and spacing collars which allow the said lever to be freely movable on the stud except as controlled by mechanism presently to be described. A spring 18 is wound about part of the stud and contacts the top of the lever normally to urge the same downwardly until stopped by contact of an extending part of that lever indicated by numeral 19 with the carrier ring. This extension 19 is attached to the first mentioned lever 16 by screws which pass through a slot 20 and are threaded into the extension 19. This slot allows for a certain amount of adjustment of the extension with respect to the lever so as to vary the position at which an elastic thread x is to be fed. The elastic thread is actually guided through an eyelet or opening at the lower end of a thin plate 21 which is vertically adjustable at the end of the extension 19. The plate has a slot 22 which is guided by a pin 23 and screw 24, the latter being for the purpose of clamping the plate in a properly adjusted position. This plate may be adjusted vertically so as to feed the elastic to hooks of needles in proper relationship thereto, or alternately, may be so positioned

as to feed below needle latches. Obviously the plate may be adjusted to feed at any desired position with respect to the needle hooks or latches and once set to a desired position, will assume the same position each time the elastic yarn is to be fed since the extension 19 acts as a stop as it bears upon the top of the carrier ring 4 as shown in Fig. 2. The elastic yarn is shown feeding to hooks of needles 25 in Fig. 4.

This elastic yarn feeding means is controlled by a second lever or arm 26 pivoted at 27 and having an angularly bent, inwardly projecting end 28 engaging beneath the lever 16. At the opposite end the arm 26 has an extending stud 29, Figs. 1, 2 and 11, through which projects a wire rod 30 to extend down through an opening 31 in plate 32 which is fixed at the top of the yarn lever control box 12. The wire rod has a collar 33 by means of which an adjustment may be effected so as properly to engage and raise the elastic feeding means. At the lower end this rod connects to the usual means (not shown) to be controlled by the cam drum at the main cam shaft. The cams on the drum are suitably arranged so as to drop the feeding means to the position of Figs. 1 and 2 whenever yarn is to be taken at the needles, and to raise that feeding means to the position of Figs. 3 and 5 as yarn is to be withdrawn. Obviously, according to arrangement of such cams the elastic may be fed at desired times and throughout desired intervals.

A binder and cutter are positioned slightly in advance of the regular mouthpiece and are mounted on a plate 34 which is in turn fixed to the carrier ring at the relative position shown in Figs. 1, 5, 6 and 9. The cutter and binder comprise certain parts as illustrated in these Figs. 6, 7, 8, 9 and 10. To the plate 34 there is attached a strip 35 which is connected to the plate 34 by a screw 36 as shown in Fig. 9 and also when the assembly is completed, by an elongated stud 37 which serves to prevent the strip 35 from relative movement with respect to plate 34. Strip 35 has a slot 38, the purpose of which will be made clear in due course.

The lower cutter element 39, Fig. 10, has an opening 40 which fits freely over stud 37, said cutter element being sharpened at the end as shown in Fig. 6. This cutter element also has threaded to its opposite end a pin 41. The movable cutting and clamping element generally designated by numeral 42, Fig. 8, has connected thereto an extension 43 by means of which it is to be operated. The part 42 has a slot 44 which engages about the stud 37 and also about the pin 41. A second pin 45 is threaded to project from the lower side of the element 42 and as shown in Fig. 6 extends down into slot 38 when the parts are assembled. These slots 38 and 44 allow the movable parts of the binder and cutter to slide with relative freedom, but prevent them from movement in other directions. The pin 41 in the cutter element 39 also prevents that piece from swinging about the stud 37. The movable cutter element 42 has a notch 46 into which the yarn is guided as shown in Fig. 5 when the cutter is opened preparatory to receiving that yarn. The front side of the notch is bevelled and sharpened to cooperate with the front edge of element 39 in cutting the yarn.

Another plate 47, Fig. 7, has an opening 48 therein so that it may freely slide over the stud 37. Plate 47 has another hole 49 through which pin 41 projects after the plate has been dropped down over stud 37 and said pin. When in the position shown in Fig. 6 the movable cutter element 42 will slide between the plate 47 and lower cutter 39. Yarn will be cut by the cooperating sharp edges at the front of notch 46 and element 39, but will merely be bound as it is squeezed between the top of the movable element 42 and plate 47. The latter is spring pressed by means of a spring 50 which bears upon a washer on plate 47 and is adjustable as to tension by means of nuts 51.

The said movable element in the binder and cutter is normally held in the position shown in Fig. 6 by a tension spring 52, Fig. 5, which connects to certain appropriate projections on parts 42 and 35 and has enough strength to impart the binding and cutting movement to said movable element 42. At such times as an elastic yarn is to be taken in the notch 46, the movable element is pushed outwardly to the position of Fig. 5 by means of a lever 53 which engages a downwardly projecting pin 54 at the outer end of extension 43, Figs. 1, 2 and 5. This lever 53 is pivoted at 55 and at its other end is connected by a link 56 to one arm 57 of a bell crank lever. Said bell crank lever as more clearly shown in Figs. 1, 2 and 11, swings about pivot 58 on a bracket 59 projecting upwardly from an extension to the circular base. The other arm 60 of this lever connects to a depending link 61 which in turn connects to a lever 62 pivoted at 63 and having a cam engaging toe 64. That toe is adapted to be engaged by a cam 65 on drum 66 fixed to one end of the main cam shaft 67, Fig. 11. A spring 68 connects to part of the frame and a collar on the link 61 and normally tends to maintain toe 64 downwardly against drum 66 except as raised by the cam. A stop screw 69 serves to limit movement of the parts in that direction, it being only necessary for the lever 62, upon toe 64 dropping from cam 65, to bring about such movement as would allow the binder and cutter element 42 to move to about the position shown in Fig. 6.

The position of the binder and cutter is such that when the cutter is opened as in Fig. 5 prior to receiving the elastic yarn, the last needle taking the same will draw the yarn around beneath the cutter so that upon upward movement of the feeding means which is properly timed, the yarn will move into the notch 46. The upward movement of the feeding means will be substantially complete when the last needle taking the yarn has moved to about the position shown in that Fig. 5 at which time the toe 64 of lever 62 will drop from the cam 65, Fig. 11, whereupon the cutter will close and will cut and bind the yarn as shown in Fig. 3. Upon reintroducing the yarn to the needles as in Fig. 1, the yarn feeding means is merely moved down to the position of Figs. 1, 2 and 4 whereupon the elastic yarn will extend from the binder to the eyelet in the plate 21 and will be in a position to be taken by needles such as are designed to take it, for example, every other needle, every fourth needle or any other combination of needles which is desired. After the said yarn has been taken by a leading needle and a few other needles and as those needles pass the binder the end will be pulled therefrom and knitting of the elastic yarn may continue as long as desired. While cam 65 as herein shown merely contemplates one opening movement of the binder for a knitted article, it is quite possible that the binder and cutter may be used more than once during the knitting of

each individual article, in fact, it being merely a matter of control to withdraw the yarn and insert it for single courses in which instance the binder and cutter would open and close to receive the yarn once for each course when elastic was knitted.

The invention has been described with respect to its application to a hosiery machine which may be of any of the usual types and may be provided with any of the existing mechanisms for patterning such as reverse plating or wrap striping. The feeding means is particularly adapted to be employed with elastic yarn such as covered elastic or would be equally applied to knitting in which uncovered or so-called raw elastic is employed. The invention is not to be limited other than by the scope of the appended claims.

I claim:

1. In a knitting machine the combination of a series of needles movable with respect to a mouthpiece, feeding means for yarns in said mouthpiece, an elastic yarn feeding means in advance of said mouthpiece, said elastic yarn feeding means being vertically movable to withdraw yarn from the needles when raised, a binder and cutter operable in a horizontal plane having a movable cutting and binding element with a notch therein for engagement of the yarn, said movable element being so positioned with respect to the vertically movable feeding means that when said feeding means is raised to inactive position, the elastic yarn will be so positioned as to be engaged within the notch in the movable element whereupon it may be cut and bound.

2. In a knitting machine the combination of a vertically swinging yarn feeding means and a horizontally movable binder and cutter, said vertically movable yarn feeding means being positioned to feed a yarn in advance of said binder and cutter and the binder and cutter having a movable element therein having a notch directed horizontally and toward the feeding means to receive a yarn, said binder and cutter being so positioned with respect to the feeding means that upon withdrawal of feeding yarn the yarn will be raised by the feeding means and will extend from said feeding means to the last needle having taken the yarn and in such a position as to be drawn into the notch in the movable cutting element whereupon it may be cut and bound.

3. In a knitting machine the combination of a vertically swinging yarn feeding finger and a horizontally movable binder and cutter, said vertically movable yarn feeding finger being so positioned as to feed a yarn in advance of said binder and cutter, the binder and cutter being located entirely without the needle circle and having a movable yarn receiving and cutting means projectable within the needle circle and having a notch horizontally directed toward the feeding means for receiving the yarn, said binder and cutter being so positioned and operated with respect to the feeding means that upon withdrawal of a yarn it will extend from a last needle knitting it to the feeding means and in the pathway of the binder and cutter so as to be caught in the horizontally disposed notch whereupon it may be bound and cut.

EUGENE ST. PIERRE.