R. G. WOODWARD.

SEWING MACHINE.

APPLICATION FILED FEB. 18, 1908.

1,145,644.

Patented July 6, 1915.

3 SHEETS—SHEET 1.

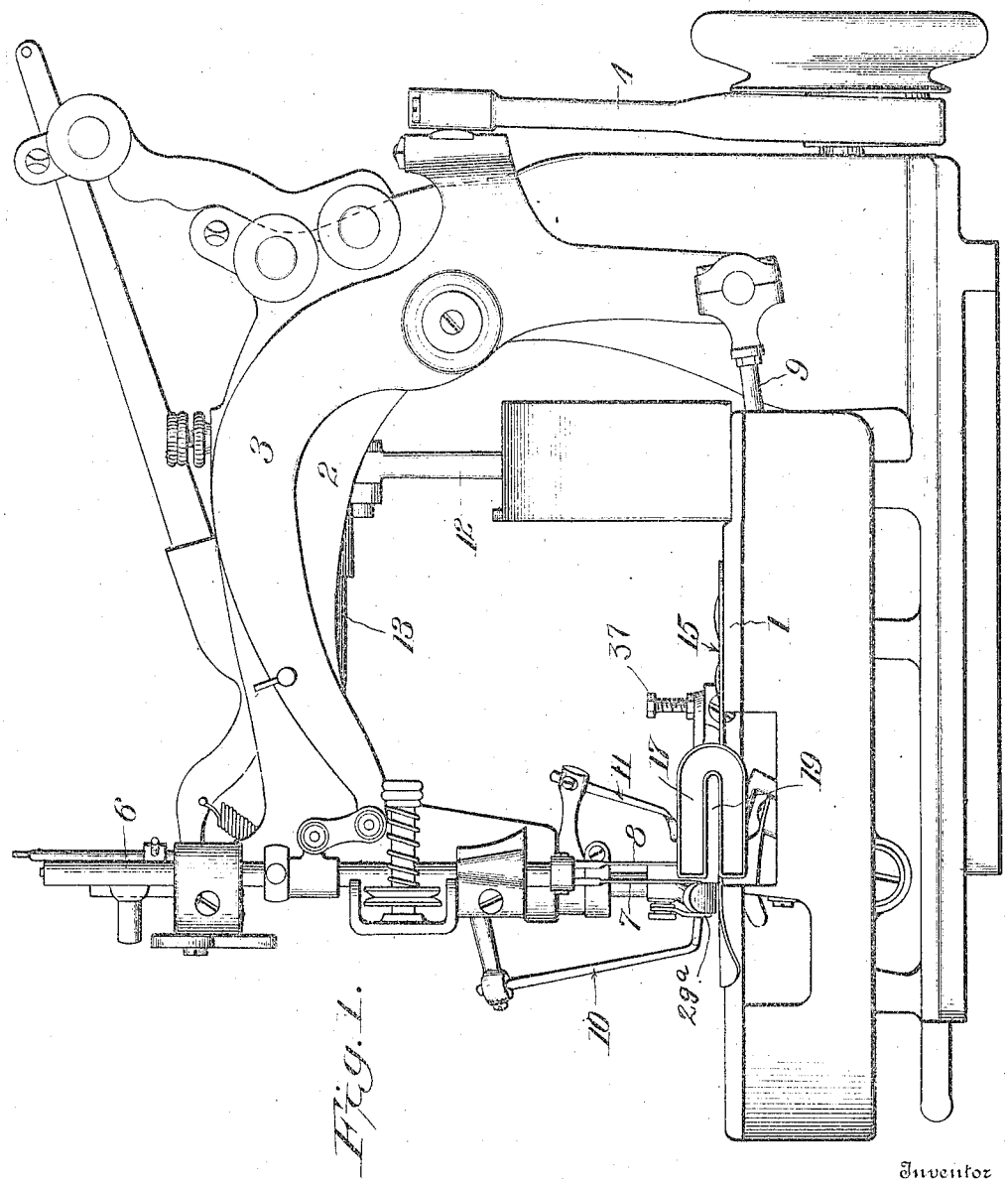

Fig. 1.

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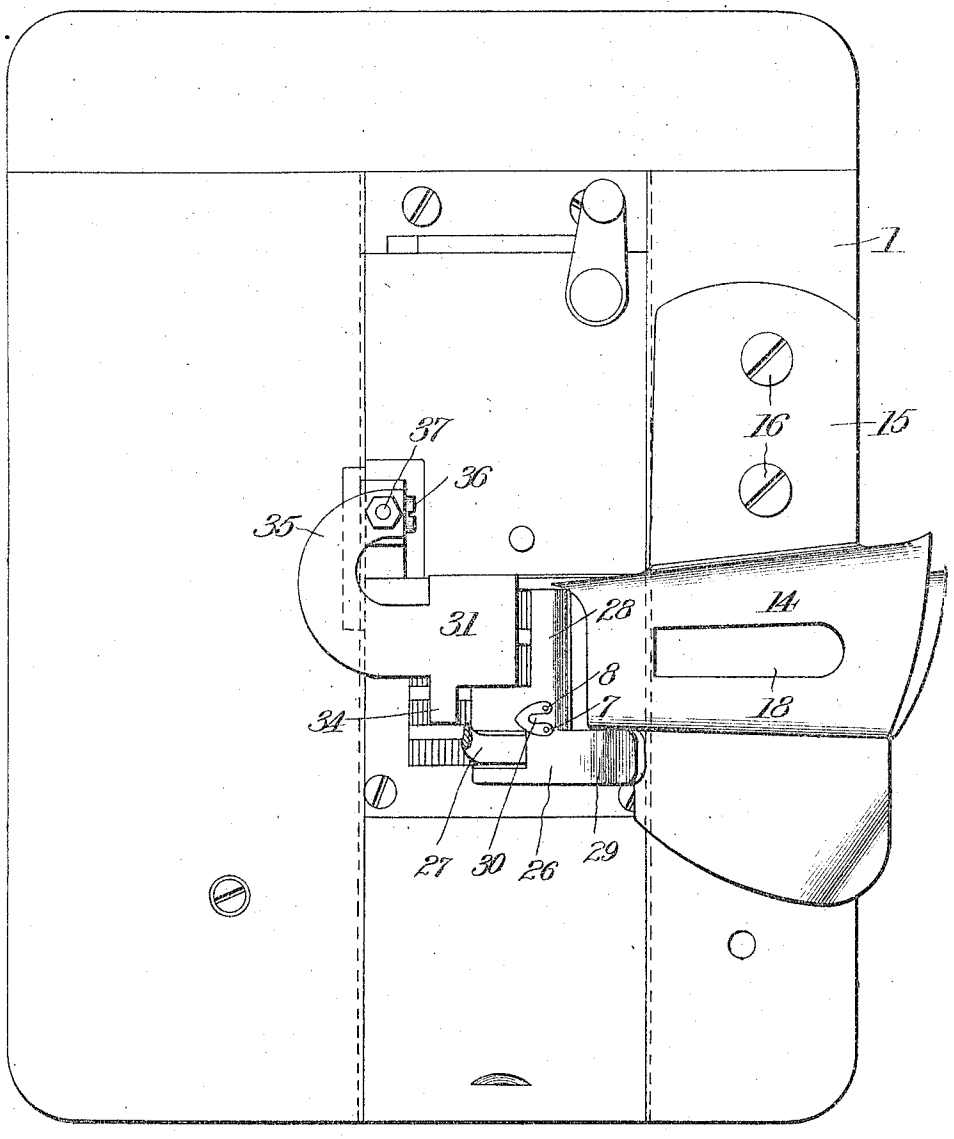
3 SHEETS—SHEET 2.

Fig. 2.



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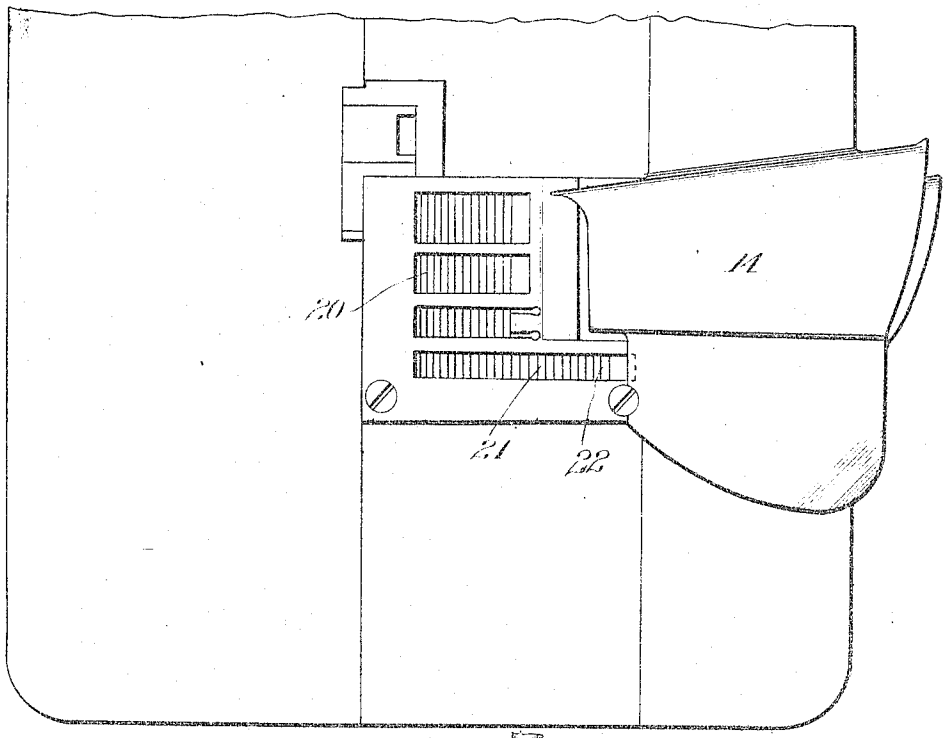

Fig. 3.

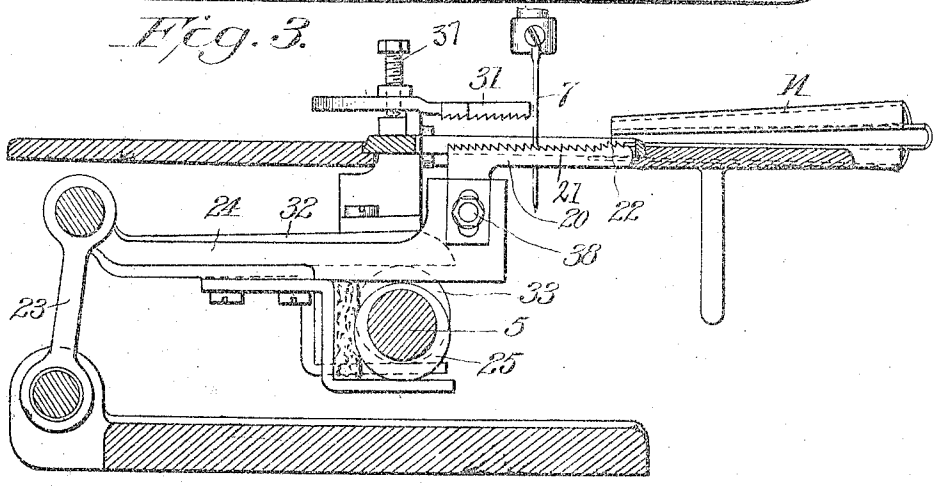

Fig. 4.

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UNITED STATES PATENT OFFICE.

RUSSEL GREEN WOODWARD, OF WAUKEGAN, ILLINOIS, ASSIGNOR TO UNION SPECIAL MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SEWING-MACHINE.

1,145,644. Specification of Letters Patent. Patented July 6, 1915.

Application filed February 18, 1908. Serial No. 416,496.

To all whom it may concern:

Be it known that I, RUSSEL G. WOODWARD, a citizen of the United States, residing at Waukegan, in the county of Lake, State of Illinois, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a description, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

My invention relates to sewing machines and more especially to that type of sewing machine which is adapted to operate upon knit goods or loosely woven fabric.

The object of my invention is to provide a combined feeding and binding mechanism which shall operate to place a knit binding strip upon a loosely woven fabric and feed the woven fabric, so that the binding will be evenly and smoothly stitched thereto.

A further object of my invention is to provide a feeding mechanism with a feed dog, all the parts thereof moving in the same timing and which shall operate to feed a fabric to the stitching mechanism slightly faster than said fabric is carried away from the stitching mechanism, so that said fabric will be slightly gathered or led evenly and smoothly, relative to another fabric or a binding strip.

Further objects of my invention will in part be obvious and will in part be hereinafter more fully described.

In the drawings which show by way of illustration one embodiment of my invention: Figure 1 is a front elevation of a sewing machine having my improvements attached thereto. Fig. 2 is a top plan view of the work support, also showing the presser foot with the presser bar sectioned and with the spring for the presser-foot removed. Fig. 3 is a top plan view of the work support, with the upper feed removed. Fig. 4 is a sectional view showing the feed operating mechanism.

In the present illustrated embodiment of my invention, I have shown a sewing machine having a work support 1, an overhanging arm 2, to which is pivoted a needle lever 3, oscillated by a link 4 from a suitable cam on the driving shaft 5. The needle bar 6 reciprocates in suitable bearings in the forward end of the overhanging arm and receives its movement from the needle lever 3. In the present illustration of my invention, I have shown the needle bar as provided with two needles 7 and 8. Coöperating with the needles 7 and 8, is a thread carrying looper operated by a link 9 from the needle lever 3. Coöperating with said needles above the work, are two thread carriers 10 and 11, which are mounted on the overhanging arm and are oscillated back and forth by a suitable cam on the driving shaft, through a link 12 and a rock shaft 13, mounted in bearings at the rear side of the overhanging arm.

The stitch forming mechanism above described is referred to merely by way of illustration and it is obvious that any other stitch forming mechanism may be substituted therefor, without departing from the spirit of my invention. A single needle for example, may be used without any coöperating thread fingers above the work support.

In the present illustration of my invention, I have shown the sewing machine as provided with a binder 14, which is mounted on the shank 15 secured to the work support 1, by suitable screws 16. The binder is of the usual form and comprises guiding members forming a U-shaped space 17 through which the binding is led. The upper member of the binder is provided with an opening 18 to assist in placing the binding strip in the binder. The binder is also provided with a space 19 for the body fabric which is to be bound. The bed plate as shown in Fig. 1 is cut away so that when the binder is in place, the space 19 for the body fabric has its lower wall in substantially the same plane as the bed plate of the machine, so that the body fabric may extend directly into the space therefor, without being bent up or down. The binder as shown in Figs. 2 and 3, is preferably so located when used with a stitching mechanism comprising two needles, that the inner edge of the binding is in a line substantially parallel with the line of feed and passing between said needles, so that as the binding strip passes from the binder, one of said needles enters the binding strip and body fabric, while the other needle enters the body fabric only at a point close to the binding strip. The

thread fingers 10 and 11 as they pass threads from one needle to the other, will cover therefore, the upper edge of the binding strip, while the looper locking its thread in the needle loops, will cover the edge of the binding strip beneath the material. If a single needle is used, of course, said binder will be so located that a line of stitching will be deposited in the binding strip adjacent the edge thereof.

As a means for feeding the binding strip, I have shown in the present embodiment of my invention a feeding mechanism comprising an upper and a lower feeding member. The lower feeding member 20 as shown in Fig. 3, is provided with a feeding surface or feeding surfaces which extend from one side of the line of feed to the other, so that said feeding member 20 when operating to feed a binding strip and a body of fabric, will operate upon both the binding strip and body fabric, to carry the same away from the stitching mechanism after it has been stitched. Said feeding member 20 is also provided with a forwardly extending portion 21, which extends along one side of the needle and in front thereof. Said feeding member 21 is provided with a raised portion 22 at the forward end thereof. The feeding member 20, receives its backward and forward movement from a feed rocker 23, which is operated in the usual manner. The feed bar 24 carrying the feed member 20 receives an up and down movement to bring the feed member into engagement with the fabric from an eccentric 25 on the main shaft 5.

Coöperating with the lower feed member 20, is a presser foot 26 which is preferably pivotally secured to a presser bar 27. The presser foot 26, has a laterally extending member 28 which extends preferably across the front end of the binder. Said presser foot is provided with a forwardly extending portion 29, which coöperates with the raised portion 22 of the feeding member 20. A spring 29^a presses the portion 29 downward. The presser foot in the present embodiment of my invention, is shown as provided with a tongue 30 over which the cross threads are led by the thread guides 10 and 11.

The upper feeding member 31 is carried by a feed bar 32 which is also pivoted to the feed rocker 23, so that the two feeding members 20 and 31 move back and forth, together to feed the fabric. The feed bar 32 receives its rising and falling movements from an eccentric 33 on the main shaft 5. The eccentrics 25 and 33 are preferably so disposed on the main shaft that the feeding members are brought together to clamp the material and feed the same, and are then moved in opposite directions to release the material so that the feed dogs may be moved again, to their forward position. The feed member 31 is preferably so disposed as to operate entirely upon the binding strip. Said feed member 31 is also provided with a lateral extension 34 which extends in rear of the stitching point. The presser foot 26 is preferably cut away so as to allow the feeding member 31 to engage the upper side of the fabric. The feeding member 31 is provided with an outwardly and downwardly extending shank portion 35 which is secured to the feed bar 32 by a suitable screw 36. The screw 37 passes through said shank 35 and engages the feed bar and serves as a means for adjusting the position of the feed member 31, relative to its feed bar.

It will be observed that my feeding mechanism comprises two members which are operated in the same timing. Said feed members are brought together to clamp the material and then move laterally to feed the same. The lower feed member is also provided with a forward extension having a raised portion, which will be brought into engagement with the fabric at an earlier period of time than the main portion of the lower feeding member. This feeding member 20 is preferably so timed that a slight feeding movement is given thereto as soon as the raised portion thereof engages the fabric and before the main portion of the feed engages the fabric with sufficient force to move the same. The result of this timing of the parts, is that the fabric engaged by the forward raised extension of the feed dog or feeding member will be moved forward slightly faster than the fabric is fed away from the stitching point so that said fabric will be crowded in ahead of the stitching point or slightly gathered. In placing a binding strip of elastic or non-elastic material upon a knit fabric, it is found that the knit fabric is very apt to be stretched by the feeding action of the machine so that said fabric when attached to a binding strip or another fabric, is stretched from its normal condition. Where however, the feed dog is provided with means for feeding in the knit fabric faster than it is carried away from the stitching point, the feeding in action may be so regulated as to compensate for the usual stretching of the knit fabric and thereby said knit fabric will be stitched smoothly and evenly to a binding strip or to another fabric. The feed member 20 as shown in the drawings is secured to the feed bar 24 by a screw and slot connection 38. It will be seen therefore, that the feed member 20 may be adjusted vertically on the feed bar and by adjusting said feed member on said feed bar the period at which the raised portion of the feed member is brought into engagement with the fabric to feed the same, may be varied to

that the amount of gathering in by this forward extension of the feed member may be adjusted. It has also been found that when working upon a binding strip made of knit goods or other loosely woven fabric that the upper edge of the binding strip is liable to lag, so as not to be fed evenly with the under side of the binding strip. When, however, an upper feeding member is used such as shown in the drawing, the upper side of the binding strip which is clamped between the two feeding members will be fed with the same speed as the lower side of the binding strip and the binding strip will therefore, be attached even, and smoothly to the body fabric.

It is obvious that from certain aspects of my invention, the binder may be omitted and two fabrics united edge to edge. When uniting an elastic and a nonelastic fabric edge to edge, the same trouble of stretching the elastic fabric is often experienced but with my feed dog which has the raised portion operating upon the elastic goods, this objection may be overcome and the two pieces of fabric evenly and smoothly united. The two fabrics to be united edge to edge would of course be fed to the stitching mechanism so that one needle would engage each fabric. Where my machine is operated to stitch two fabrics edge to edge as above noted, the upper feed may be omitted if desired as the essential function of the upper feed is to feed the binding strip both on the upper and lower surfaces even.

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

1. The combination with a needle, of a feeding mechanism including a feed dog having an integral forwardly projecting portion located entirely at one side of the needle, said feed dog extending from a point in rear to a point in front of the needle, said feed dog having a horizontal feeding surface in rear of the needle extending to a point well in advance of the needle, and a raised fabric engaging surface at the front end of said forwardly projecting portion, and devices coöperating with said feed dog whereby said raised feeding surface secures a differential feeding effect on the material.

2. The combination with a needle, of a feeding mechanism including a feed dog having an integral forwardly projecting portion located entirely at one side of the needle, said feed dog extending from a point in rear to a point in front of the needle, said feed dog having a horizontal feeding surface in rear of the needle extending to a point well in advance of the needle, and a raised fabric engaging surface at the front end of said forwardly projecting portion, devices coöperating with said feed dog whereby said raised feeding surface secures a differential feeding effect on the material, and means whereby said feed dog may be adjusted vertically for varying the differential feeding action thereof.

3. The combination with stitch-forming mechanism including a needle, feeding mechanism including a feed dog having a portion thereof engaging the material in the rear of the needle and a forwardly extending portion located at one side of and in front of the needle, said portion in rear of the needle having a horizontal feed engaging surface, said forwardly extending portion moving in the same timing with the portion of the feed dog in rear of the needle, and having a portion thereof located entirely in front of the needle and at one side thereof raised above the remaining feed surface of the feed dog, devices coöperating with said feed dog for securing a differential feeding effect upon the material, and a second feeding member located above said first named feeding member and coöperating therewith to feed the fabric.

4. The combination with stitch-forming mechanism including a needle, feeding mechanism including a feed dog having a portion thereof engaging the material in the rear of the needle and a forwardly extending portion located at one side of and in front of the needle, said portion in rear of the needle having a horizontal feed engaging surface, said forwardly extending portion moving in the same timing with the portion of the feed dog in rear of the needle, and having a portion thereof located entirely in front of the needle and at one side thereof raised above the remaining feed surface of the feed dog, devices coöperating with said feed dog, for securing a differential feeding effect upon the material, and a binder located relative to the feeding mechanism so that the forwardly extending portion engages the body fabric only.

5. The combination with stitch-forming mechanism including a needle, of feeding mechanism including a feed dog having a portion thereof engaging the material in the rear of the needle, and a portion thereof engaging the material at one side of and in front of the needle, said forwardly extending portion moving in the same timing with the portion of the feed dog in rear of the needle, and having a portion thereof raised above the remaining feed surface of the feed dog for securing a differential feeding effect upon the material, a second feeding member located above said first named feeding member and coöperating therewith to feed the fabric, and a binder located relative to said feeding mechanism so that the forwardly extending portion of the feed dog engages the body fabric only.

6. The combination with a needle and a work support, of feeding mechanism includ-

ing a feed dog having a portion thereof located in rear of the needle and a forwardly extending integral portion for engaging the fabric at one side of and in front of said needle, said forwardly extending portion having means for giving said fabric a differential feeding movement and means whereby the position of said feed dog relative to the work support may be varied, and a second feeding member located above and coöperating with said first named feeding member.

7. The combination with a needle and a work support, of feeding mechanism including a feed dog having a portion thereof located in rear of the needle and a forwardly extending integral portion for engaging the fabric at one side of and in front of said needle, said forwardly extending portion having means for giving said fabric a differential feeding movement, means whereby the position of said feed dog relative to the work support may be varied, a second feeding member located above and coöperating with said first named feeding member, and a binder so located relative to said feeding member that the forwardly extending portion engages the body fabric only.

8. The combination with a needle and a work support, of feeding mechanism including a feed dog, having a portion thereof located in rear of the needle and a forwardly extending integral portion for engaging the fabric at one side of and in front of said needle, said forwardly extending portion having means for giving said fabric a differential feeding movement, means whereby the position of said feed dog relative to the work support, may be varied, a second feeding member located above and coöperating with said first named feeding member, a binder so located relative to said feeding member that the forwardly extending portion engages the body fabric only, and a presser foot coöperating with said feeding mechanism.

9. The combination with two needles, of feeding mechanism including a feed dog having a portion located in the rear of said needle and a forwardly extending portion located in advance of and at one side of said needles, said forwardly extending portion having means located at one side of said needles for securing a differential feeding effect upon the material, and a binder so located relative to said needles, as to direct the edge of the binding between said needles and means for laying a thread from one needle to the other so that the edge of the binding is covered.

10. The combination with two needles, of feeding mechanism including a feed dog having a portion located in rear of said needles and a forwardly extending portion located at one side of and in advance of said needles, said forwardly extending portion having a raised feed engaging surface, an upper feeding member coöperating with said first named feeding member and a binder so located relative to said needle as to direct the edge of the binding strip between said needles, and means for laying a thread back and forth between said needles.

11. The combination with a needle of feeding mechanism including a feed dog, having a portion thereof in rear of said needle and an integral portion located at one side of and in advance of said needle, said portion in rear of the needle having a horizontal feed engaging surface, said integral portion having a raised feed engaging surface located entirely in front of the needle and at one side thereof, a presser foot cooperating with said feed member and having a portion thereof at one side of the needle cut away, an upper feeding member cooperating with said lower feeding member and operating in said cut away portion of the presser foot.

12. The combination with a needle, of feeding mechanism including a feed dog having a portion thereof in the rear of said needle and an integral portion located at one side of and in advance of said needle, said integral portion having a raised feed engaging surface located entirely in front of the needle and at one side thereof, a presser foot coöperating with said feed member and having a portion thereof at one side of the needle cut away, an upper feeding member coöperating with said lower feeding member, and operating in said cut away portion of the presser foot, said upper feeding member having a lateral extension extending in rear of said needle.

13. The combination with a needle, of feeding mechanism including a feed dog having a portion thereof in the rear of said needle and an integral portion located at one side of and in advance of said needle, said integral portion having a raised feed engaging surface, a presser foot coöperating with said feed member and having a portion thereof at one side of the needle cut away, an upper feeding member coöperating with said lower feeding member and operating in said cut away portion of the presser foot, and a binder located in front of said needle and so positioned that the forwardly extending portion of the feed member engages the body fabric only.

14. The combination with a needle, of the feeding mechanism including a feed dog having a feeding portion in the rear thereof and an integral feeding part located in advance of said needle, said portion in rear of the needle having a horizontal feed engaging surface, said integral part having a relatively raised feed-engaging surface located entirely in front of the needle and at

one side thereof, a hinged presser foot co-operating with said feed member having its front portion pressed down by a spring whereby said integral portion with certainty comes in contact with said presser foot.

In testimony whereof I affix my signature, in presence of two witnesses.

RUSSEL GREEN WOODWARD.

Witnesses:

CHESTER MCNEIL,

WARD WRIGHT.