July 24, 1934. G. KEYSER 1,967,714

MACHINE FOR UNITING KNIT FABRICS

Filed April 11, 1933 4 Sheets-Sheet 1

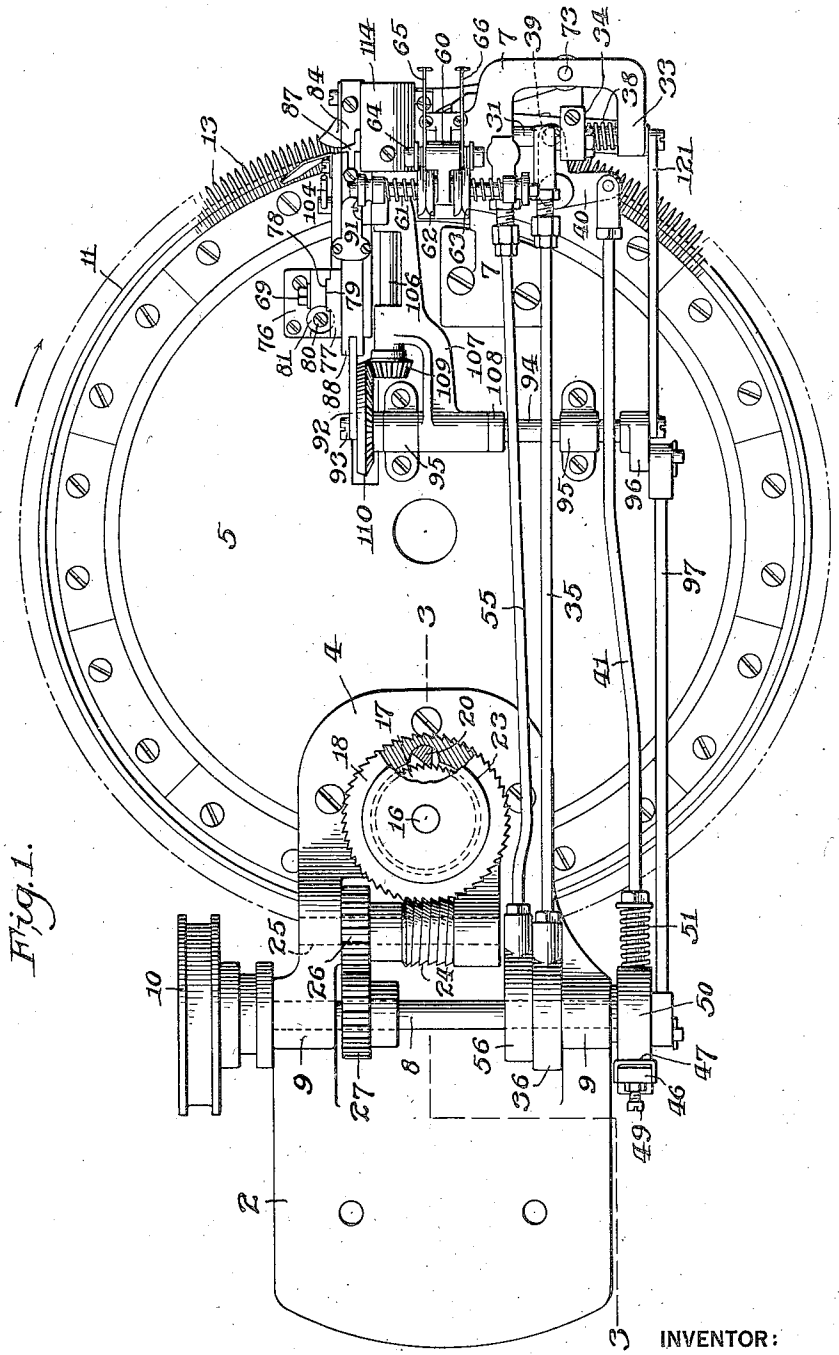


Fig. 1.

INVENTOR:
George Keyser
BY
ATTORNEY

July 24, 1934. G. KEYSER 1,967,714

MACHINE FOR UNITING KNIT FABRICS

Filed April 11, 1933 4 Sheets-Sheet 2

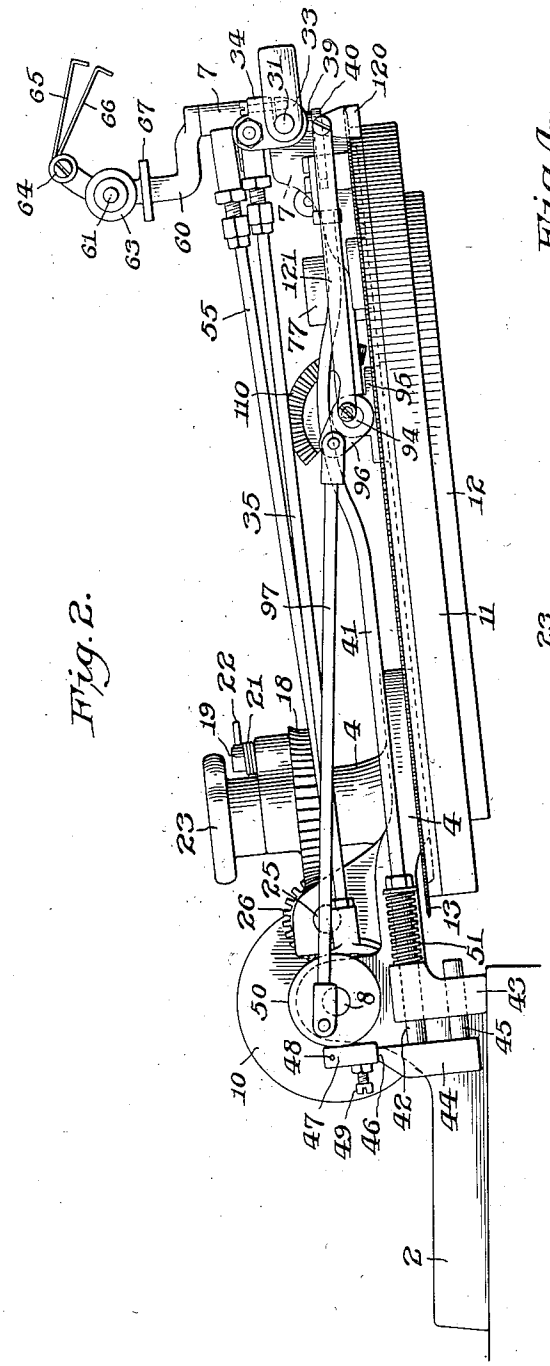


Fig. 2.

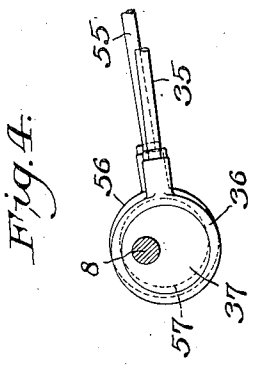


Fig. 4.

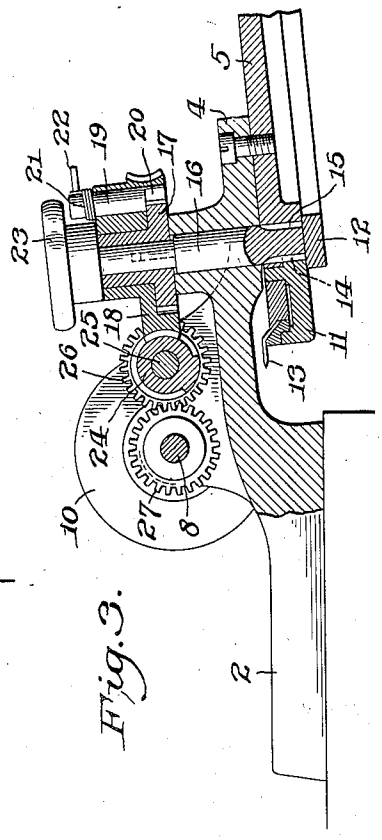


Fig. 3.

INVENTOR:
George Keyser
BY
A. K. Trautz
ATTORNEY

July 24, 1934. G. KEYSER 1,967,714

MACHINE FOR UNITING KNIT FABRICS

Filed April 11, 1933 4 Sheets-Sheet 3

Fig. 5.

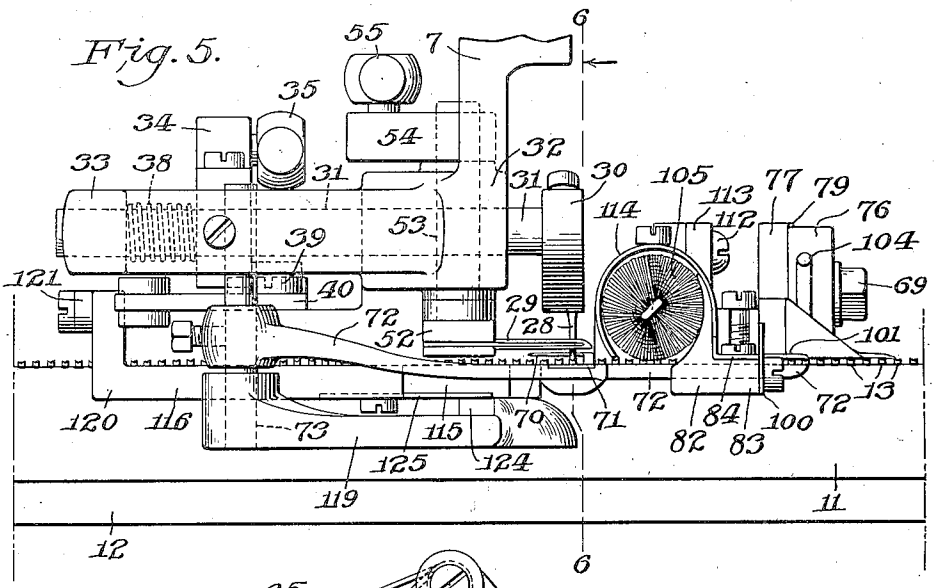
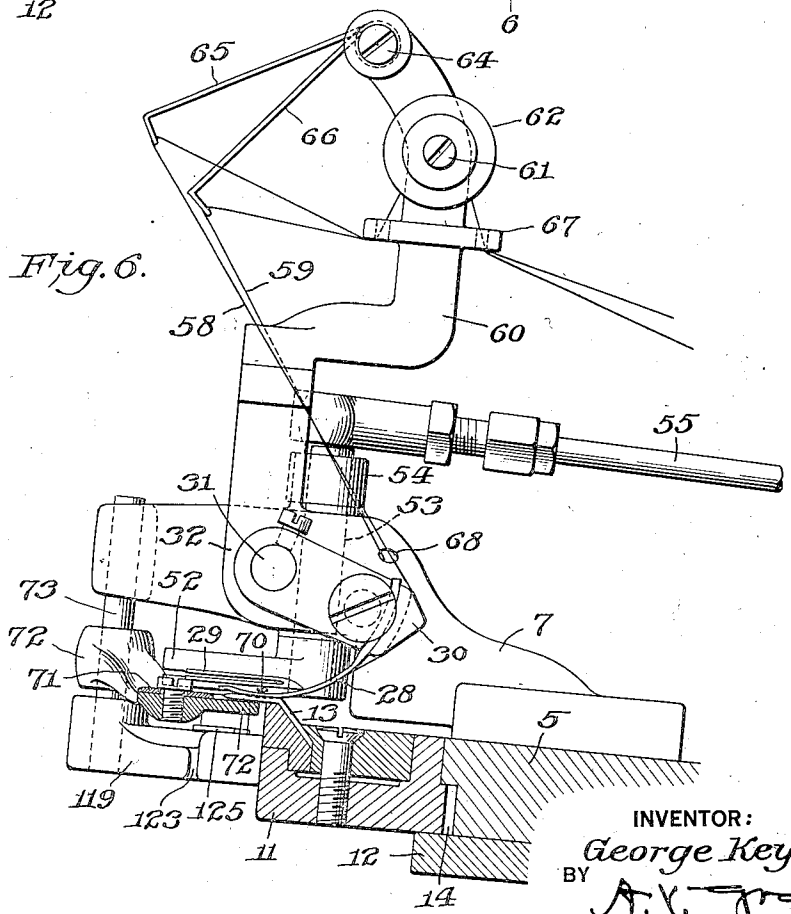


Fig. 6.

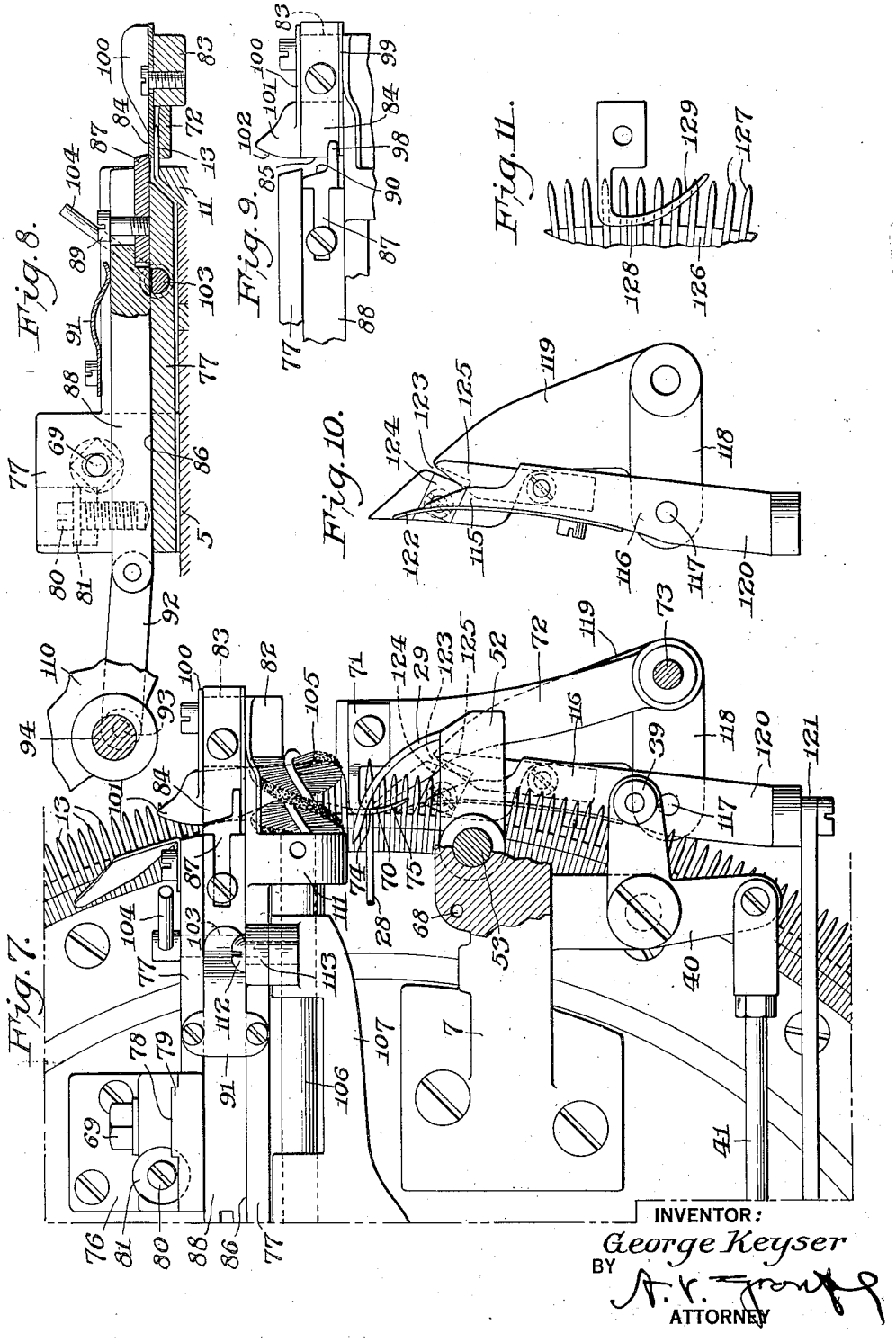


INVENTOR:
George Keyser
BY
A. Y. Grouse
ATTORNEY

July 24, 1934. G. KEYSER 1,967,714

MACHINE FOR UNITING KNIT FABRICS

Filed April 11, 1933 4 Sheets-Sheet 4



INVENTOR:
George Keyser
BY
A. V. Frost
ATTORNEY

Patented July 24, 1934 1,967,714

UNITED STATES PATENT OFFICE

1,967,714

MACHINES FOR UNITING KNIT FABRICS

George Keyser, Philadelphia, Pa.

Application April 11, 1933, Serial No. 665,523

21 Claims. (Cl. 112—25)

This invention relates to improvements in machines for uniting knit fabrics wherein the fabrics to be united are carried by a series of impaling pins and wherein a sewing mechanism is operated synchronously with the movement of the pins for the production of stitches for uniting the fabrics.

An object of the invention is to provide the machine with an improved stitch finger having a part around which the stitches are formed by the sewing mechanism and having an outwardly turned portion provided with a free end extending from the said part for the purpose of feeding the fabrics outwardly upon the impaling pins toward the free ends thereof following the production of the stitches which unite the fabrics.

Another object of the invention is to provide the machine with a novel means for discharging the sewed fabrics from the impaling pins, and, thereafter, severing chains of stitches which connect articles carried in spaced relation by the impaling pins, following the uniting of parts of the respective articles by the sewing mechanism and following the discharge of the articles successively from the impaling pins.

Another object is to provide the machine with a novel means to sever or cut from the fabrics to be sewed, waste portions thereof which extend above the impaling pins and the fabric loops impaled thereon, and to feed such waste portions outwardly from above the path of travel of the pins and discharge them from the machine.

Another object is to provide a novel means for operating the sewing needle.

A further object is to improve and simplify the construction, support arrangement and relationship of the moving parts of the machine, whereby the disc on which the ring of impaling pins is mounted may be supported by a supporting frame at one side of the disc, and whereby the sewing mechanism and the severing or cutting mechanism may be supported by the disc and advantageously spaced from the supporting frame and connected to and actuated by a driving shaft journaled in the supporting frame; and whereby the ring of impaling pins may be rotated by mechanism actuated by the driving shaft and carried by the arm which extends from the supporting frame and overhangs the ring and supports the disc.

With the foregoing and related objects in view, the invention resides in the elements and the combinations of them hereinafter described and claimed.

In the accompanying drawings, illustrating the invention,

Figure 1 is a top view, partly in section, of a machine for uniting knit fabrics embodying the invention.

Figure 2 is a side view of the machine.

Figure 3 is a section, on line 3—3 of Fig. 1, showing the mechanism for rotating the ring of impaling pins.

Figure 4 is a detail showing the eccentrics for actuating the needle and the looper.

Figure 5 is a front view of a portion of the ring of impaling pins, parts of the sewing mechanism and the cutting devices for the fabrics and the chains of stitches.

Figure 6 is a section, on line 6—6 of Fig. 5, showing parts of the sewing mechanism and adjuncts.

Figure 7 is a top view, partly in section showing the parts illustrated in Fig. 5.

Figure 8 is a sectional detail showing the cutting device for the knit fabrics and adjuncts.

Figure 9 is a top view of parts of the cutting device for the knit fabrics.

Figure 10 is a top view of the cutting device for severing the chains of stitches.

Figure 11 is a view showing a modified form of the stitch finger and its relation to the impaling pins.

Referring to the drawings, the frame or supporting means of the machine, as generally stated, comprises a bed plate 2, adapted to be secured upon a suitable table or support, an arm 4 extending from the bed plate, a supporting disc 5 supported by the arm 4, and a bracket 7 secured upon the disc 5.

The driving shaft 8 is journaled in bearings 9 rising from the bed plate 2, and the shaft 8 is provided with a pulley 10 by means of which it may be rotated from a suitable source of power.

Surrounding the disc 5, and rotatably fitted to the periphery thereof, is a ring 11 supported by an annular plate 12 which is secured to the bottom of the disc 5. The ring 11 is provided with a circular series of radially-projecting impaling pins 13 for receiving the loops of the fabrics to be united and carrying them to the sewing mechanism which will be hereinafter described.

The ring 11 is provided with internal gear teeth 14 in mesh with a pinion 15 arranged within an opening in one side of the disc 5. The pinion 15 is carried by the lower end of a

shaft 16 which extends upwardly therefrom and which is fitted to rotate in a bearing formed by the arm 4. The upper portion of the shaft 16 has a toothed wheel 17 keyed thereon; and, rotatably mounted on the wheel 17, is a worm wheel 18 which embraces and encloses the toothed wheel 17. The teeth of the wheel 17 correspond in number with the teeth of the worm wheel 18, and the worm wheel 18 has a vertical stem or pin 19 fitted to turn therein and provided on its lower portion with a projection 20 forming a pawl adapted to engage any one of the teeth of the wheel 17 to cause it to be turned by and with the worm wheel 18. The upper end portion of the stem 19 extends above the worm wheel 18 and is encircled by a spring 21, one end of which engages the worm wheel 18 and the other end of which engages a transverse pin 22 projecting from the stem and tends to turn the pawl into operative engagement with the teeth of the wheel 17. The pawl 20 may be disengaged from the wheel 17 to permit it to be turned independently of the worm wheel 18, for a purpose hereinafter explained, by turning the stem 19 by hand against the action of the spring 21. The shaft 16 extends upwardly above the wheels 17 and 18 and it is provided with a suitable hand wheel 23 by means of which the shaft 16 may be operated to turn the ring 11 by hand when the pawl 20 is disengaged from the wheel 17. The worm wheel 18 is in mesh with a worm 24 on a counter shaft 25 which parallels the driving shaft 8 and is fitted to turn in bearings on the arm 4. The counter shaft 25 is provided with a gear wheel 26 to mesh with a similar wheel 27 on the driving shaft 8, whereby, when the driving shaft is rotated, the ring 11 carrying the impaling pins 13 will be slowly and continuously rotated at a uniform speed in the direction of the arrow in Fig. 1.

If it be desired to turn the pin-carrying ring 11, in either direction independently of the worm wheel 18 and its connection with the driving shaft 8, the same may be done by moving the pin 22 to hold the pawl 20 disengaged from the wheel 17 and by turning the wheel 23 by hand.

The stitch forming devices of the sewing mechanism comprise a curved needle 28 and a curved looper 29.

The needle 28 is carried by an arm 30 which projects fixedly from a shaft 31 which is arranged parallel to the main shaft 8 and which is mounted to turn and to slide longitudinally in two spaced bearings 32 and 33, formed on the frame bracket 7. The needle 28 and shaft 31 are located with respect to the impaling pins 13 which pass beneath them to cause the pointed free end portion of the needle to be projected over the impaling pins and through the grooves therein and through the loops of the fabrics carried thereby and to be retracted therefrom, when the shaft 31 is rocked to oscillate the arm 30.

The shaft 31 is provided with an upwardly extending arm 34 fixed thereon, and the upper end portion of this arm 34 is connected by a ball-and-socket joint to one end of a rod 35. The other end of the rod 35 is connected to a ring or strap 36 which surrounds an eccentric 37 on the driving shaft 8, whereby, when the shaft 8 is rotated the needle arm 30 will be oscillated.

Encircling the shaft 31 is a spring 38, Fig. 5, one end of which engages the bearing 33 and the other end of which engages the arm 34 and urges the shaft 31 longitudinally in a direction to move the needle 28 laterally and reversely of the direction of movement of the impaling pins 13. The side of the arm 34 opposite to that engaged by the spring 38 is engaged by a roller 39 on one arm of a bell-crank lever 40 which is fulcrumed on the bracket 7. The other arm of this lever 40 is connected to one end portion of a rod 41 whose other end portion terminates in an enlarged part 42 which extends through and is slidable within a projection 43 on one side of the bed plate 2. The free end of the part 42 carries a block 44 whose lower end is provided with a guiding pin or rod 45 which extends parallel to the part 42 and is fitted to slide in an opening in the projection 43. The upper end of the block 44 has an arm 46 formed thereon which carries a bearing plate 47 having side flanges which embrace the arm 46 and which are pivoted thereto by a pin 48. The plate 47 rests against an adjusting screw 49 screwed into and through the arm 46, and the plate 47 engages a cam 50 on the driving shaft 8 and is held against the same by a spring 51 encircling the part 42 between the projection 43 and a head or nut on the part 42. The cam 50 is constructed to reciprocate the rod 41 when the driving shaft 8 is rotated and thereby cause the bell-crank lever 40 to move the shaft 31 longitudinally in opposition to the spring 38 thereon and thus cause the needle 28 to be moved laterally to cause it to follow the movement of the impaling pins 13 and the fabrics carried thereby when the needle is engaged therewith during the sewing operation.

The looper 29 is carried by an arm 52 projecting from the lower end of a vertical shaft 53 which is mounted to turn in a bearing formed by the bracket 7. The looper 29 is positioned to move over the loops of the fabrics carried by the impaling pins 13 and to be moved from side to side of the line of travel of the loops and to cooperate with the needle 28 to effect the sewing operation when the shaft 53 is rocked and the looper 29 is thereby oscillated. The upper end portion of the shaft 53 is provided with an arm 54, Fig. 5, which is connected by a ball-and-socket joint to one end of a rod 55 whose other end carries a ring or strap 56 which surrounds an eccentric 57 on the driving shaft 8, whereby, when the shaft 8 is rotated the shaft 53 and looper 29 carried thereby will be oscillated.

The bracket 7 carries tension, take-up and thread guiding means for the needle thread 58 and the looper thread 59, as follows: The bracket is provided with an upwardly extending arm 60 having a horizontal rod 61 extending therethrough and secured thereto. The rod 61 carries two pairs of spring pressed tension discs 62 and 63 of usual construction. The upper end of the arm 60 is provided with two outwardly extending screws 64 carrying two take-up arms 65 and 66, of usual construction, for the needle and looper threads 58 and 59, respectively; and the arm 60 is provided with a flange 67 having thread guiding eyes for guiding the threads 58 and 59 to and from the tension devices 62 and 63.

The needle and looper threads 58 and 59 are drawn from a suitable source of supply to and through eyes in the flange 67 thence through the tension devices 65 and 66, thence through other eyes in the flange 67 and thence through eyes in the take-up arms 65 and 66. From the take-up arm 65 the needle thread 58 passes to and through a groove in the free end of the needle

arm 30 and thence to and through a groove in the needle to the needle eye; and from the take-up arm 66 the looper thread 59 passes to and through a hole 68 in the bracket 7, thence to and through a groove in the free end of the looper arm 52 and thence to and through a groove in the looper to the looper eye.

The parts of the knit fabrics to be united are impaled upon the impaling pins 13, in the usual manner, and such parts are carried by the pins to and past the sewing devices by the continuous movement of the pin-carrying ring 11.

Each time the driving shaft 8 makes a complete revolution, the ring 11 is advanced a distance equal to the distance between the centers of two adjacent impaling pins 13, and, each time the shaft 8 makes a complete revolution, the needle 28 and the looper 29 are actuated to form a stitch. An impaling pin 13 is thus presented to the needle 28 for each stitch forming operation.

The needle 28 and the looper 29 cooperate to form the stitches substantially in the same manner as the needle and the looper, shown and described in my previous Patent No. 1,069,336, cooperate to form stitches; and, during each stitch forming operation, the needle 28 passes through the groove in the impaling pin 13 beneath it and through the loops of the fabrics impaled thereon, and the stitch unites the fabrics substantially as shown and described in said previous patent.

During the operation of the needle 28 to produce each stitch, the cam 50 moves the needle laterally, in opposition to the pressure of the spring 38, at the same speed and in the direction of movement of the impaling pin 13 passing beneath the same, while the needle is actually engaged with the pin and while it is being projected through and being withdrawn from the loops of the fabrics carried thereby; and, while the needle 28 is clear of the impaling pins, the cam 50 permits the spring 38 to move the needle laterally in the reverse direction to meet the next succeeding pin 13. It will thus be understood that the needle 28 will be moved forward and backward laterally to meet and move with the impaling pins successively as they pass beneath the needle.

Extending between and beyond the paths of movement of the needle 28 and the looper 29 is a stitch finger 70 which is formed by and projects from a bent plate 71 which is secured upon a supporting arm 72. The arm 72 is secured to a rod or shaft 73 which is secured to and extends downwardly from a part of the bracket 7. The stitch finger 70 is arranged above the fabrics to be united and it extends in the direction of the travel thereof and it has a part 74 which is located between the paths of movement of the needle 29 and the looper 30 and around which the stitches are formed to cause the needle and the looper to form loose or elastic stitches in uniting the fabrics and to cause them to form a chain of stitches when no fabrics are being sewed, so that the sewing of the fabrics will commence immediately upon the presentation thereof to the needle and looper. The stitch finger 70 has a portion 75 which extends from the part 74 in the direction of the travel of the impaling pins 13 and terminates in a free end and which is curved or turned outwardly toward the free ends of the pins, as shown in Fig. 7, for moving the sewed loops of the fabrics upon the pins 13 radially outward or toward the free ends thereof, for a purpose hereinafter explained, as the pins carrying the sewed fabrics move forwardly beneath the outwardly turned portion 75 of the stitch finger.

The parts of the fabrics to be united are impaled upon the pins 13 in the usual manner, so that the pins will extend through the undivided loops of a course of stitches of each of the two fabrics, and so that portions of the fabrics shall extend above the impaled loops thereof to be subsequently cut therefrom and discharged from the machine, as waste material, preceding the sewing operation, in accordance with the usual practice in this art, and I shall now describe my improved mechanism for severing this excess or waste material from the fabrics and for discharging such waste material from the machine.

Secured upon the disc 5 is an angle bracket 76 having a vertical channel 78 in one side thereof. This bracket 76 supports a bracket 77 which is vertically adjustable thereon and which is provided with a rib 79 slidably fitted to the walls of the channel 78 to permit such adjustment and the adjustment is effected by means of a screw 80 which is screwed into the bracket 76 and provided with an annular flange 81 fitted to turn within a slot in the bracket 77 and to raise or lower the same when the screw is turned. The bracket 77 is secured to the bracket 76 in different positions of adjustment by a screw 69 which extends through a slot and in the bracket 76 which is screwed into the bracket 77.

The bracket 77 has a part 82 which extends outwardly beyond the impaling pins 13, with sufficient clearance above the same, and then downwardly and has a lateral extension 83 upon which is secured a blade or cutting element 84 which extends back over the pins 13 in close proximity thereto and which is provided with a cutting edge 85 on its inner end adjacent to and outwardly of the path traversed by the upwardly projecting portions of the fabrics to be united as they are carried by the pins 13 toward the sewing mechanism.

Arranged within a longitudinal channel 86 in the bracket 77 is a blade or cutting element 87 whose bottom surface is in the same plane with the top surface of the element 84. The blade 87 is carried by a bar 88 which is fitted to slide longitudinally in the channel 86; and the blade 87 is secured to the bar 88 by a screw 89 which extends through a longitudinal slot in the bar and holds the blade in firm engagement with the bar within an offset in the bottom of the outer end portion thereof. The blade 87 is provided with a cutting edge 90 on its outer end which, when the bar 88 carrying the blade 87 is reciprocated, is adapted to cross the path traversed by the upwardly projecting portions of the fabrics to be united and to cooperate with the blade 84 to cut or sever such portions of the fabric as they are advanced by the impaling pins into the space between the cutting edges 85 and 90. The bar 88 is pressed downwardly within the channel 86, and the blade 87 is pressed into operative contact with the blade 84 by a spring 91 which is secured to the bracket 77 and which exerts a downward pressure upon the bar 88.

The inner end of the bar 88 is pivoted to one end of a link 92 whose other end is pivoted, at 93, eccentrically to one end of a rockable shaft 94 which is fitted to rock in bearings 95

secured upon the frame disc 5. The other end of the shaft 94 has an arm 96 fixed thereon and connected by a rod 97 to the outer side of the cam 50 away from the turning axis thereof, whereby, when the driving shaft 8 rotates the cam 50, the shaft 94 will be rocked to reciprocate the bar 88 for the operation of the fabric cutting device.

The side of the movable cutting blade 87 nearest to the sewing needle 28 has a finger 98 formed thereon which projects outwardly therefrom over the fixed cutting blade 84, to insure the proper cooperation of the cutting edges 85 and 90. This finger 98 and the end surface of the blade extending from the finger to the opposite side of the blade are adapted, during the reciprocations of the blade, to feed the severed portions of the fabrics outwardly over the top of the blade 84 and through a channel, formed by two plates or flanges 99 and 100 which rise from the respective sides of the blade 84, and thus discharge the severed or waste portions of the fabrics through the outer open end of the channel and from the machine. The plate 99 is formed on one side of the blade 84, and the plate 100 is secured to one side of the extension 83 of the bracket 77.

The plate 100 is provided with a part 101 which extends outwardly therefrom at an angle thereto and in a direction away from the sewing needle 28 and parallel with and in close proximity to the path of the impaling pins 13. The part 101 has an inwardly directed inner edge 102 which faces the path of the fabrics carried by the pins 13 and serves to direct the fabrics inwardly to a position adjacent to the periphery of the pin carrying ring 11 and into the space between the cutting edges 85 and 90. The free end portion of the arm 72 which carries the stitch finger 70 is shaped like the part 101 and located directly beneath the same and beneath and close to the path of the pins 13, and it assists the part 101 in directing the fabrics inwardly upon the pins 13 and into the proper position thereon to be acted upon by the fabric cutting device and the sewing mechanism.

Extending into the bracket 77 and beneath the bar 88 therein transversely thereof is a shaft 103 which is fitted to turn in the bracket. One end of the shaft 103 extends outwardly and is provided with a handle 104 by means of which it may be turned, and the portion of the shaft 103 which extends beneath the bar 88 has the upper portion thereof cut away providing a shoulder at one side thereof which is adapted to engage the bar 88 and raise it and the cutting blade 87 relatively to the blade 84, when the handle 104 is moved to turn the shaft, and thereby raise the cutting blade 87 to an inoperative position to prevent the blades 84 and 87 from accidentally cutting any parts of the fabrics or stitches uniting the same, carried by the pins 13, if, for any reason, the machine is turned backward or operated to reverse the direction of motion of the pin carrying ring 11.

Located between the fabric cutting or trimming device and the sewing needle 28, and arranged to act upon the top of the cut or trimmed fabrics, is spirally formed, rotary brush 105 constructed to brush from the impaling pins and the impaled loops of the fabric thereon loose ends or pieces of threads and other waste and undesired parts which may remain after the fabric trimming operation. This brush 105 projects axially from the outer end of a shaft 106 to which it is secured. The shaft 106 is fitted to turn in bearings formed on an arm or bracket 107 whose inner end is mounted loosely on the rockable shaft 94 between a collar 108 thereon and one of its bearings 95. The inner end of the shaft 106 has a small beveled gear wheel 109 fixed thereon in mesh with the beveled teeth of a sector 110 secured upon the shaft 94, whereby, when the shaft 94 is rocked, as hereinbefore described, the brush 105 will be rotated, first in one direction and then in the reverse direction, in alternate succession, to effect the brushing operation. The outer end portion of the shaft 106 extends loosely through a bearing 111 formed on one side of the bracket 77, and the outer end of the arm or bracket 107 is secured to the bracket 77 by means of a screw 112 which extends through a slot in a lug 113 on the bracket 77 and which is screwed into a lug formed on the bracket or arm 107. After the screw 112 has been loosened, relative up and down adjustments, within a limited extent, may be had between the brackets 77 and 107.

A suitable guard 114 for housing the brush 105 is provided, as shown in Figs. 1 and 5. This guard 114 has its inner end portion secured to the bearing 111, Fig. 7, and it extends outwardly from the bearing and embraces the brush 105, as clearly shown in Fig. 5.

In uniting parts of articles formed of knit fabric, such for example as parts of stockings, it is customary to impale such parts on the impaling pins 13 so that the articles will be carried by the pins successively and in spaced relation to one another. Therefore, between the completion of the sewing of the parts of each article and the beginning of the sewing of the parts of the next succeeding article, a chain of stitches will be formed which will connect the two articles.

I shall now describe my improved mechanism for discharging the sewed articles from the impaling pins and for severing the chain of stitches which connects each article with the next succeeding article.

As the parts of the articles being sewed pass the needle 28, they pass through a channel formed by a part of the arm 72 and the periphery of the impaling pin ring 11 below the pins 13, and such parts are thereby prevented from moving radially on the pins from beneath the part 74 of the stitch finger 70 around which the stitches are formed. However, as rapidly as the successive stitches are formed around the part 74 and through the loops of the knit fabrics impaled on the pins 13, the stitches are moved forwardly from the part 74 and along the outwardly turned portion 75 of the stitch finger by the forward movement of the impaling pins 13 carrying the fabrics and the stitches which unite them; and, as the sewed fabrics or parts are thus moved along the outwardly turned portion 75 of the stitch finger, such fabrics or parts are thereby moved radially outward with respect to the pins 13 and away from the periphery of the ring 11 which carries them. Immediately after the fabrics or parts have been moved outwardly by the portion 74 of the stitch finger, and after the stitches uniting the parts have been discharged from the free end of such portion, the fabrics or parts, depending from the pins 13, are acted upon by the free end portion of an arm 115 of a lever 116 which is located beneath and close to the pins 13, and which extends between the fabrics or parts and the periphery of the

ring 11. This lever 116 is fulcrumed, at 117, on a projection 118 on an arm 119 which is secured to and supported by the fixed rod or shaft 73 which is supported by the frame bracket 7, as hereinbefore described. The arm 120 of the lever 116 has an upwardly extending projection thereon which is pivotally connected to one end of a link or bar 121 whose other end is pivoted to one end of the rockable shaft 94 eccentrically with respect thereto, whereby, when the shaft 94 is rocked, as previously described, the lever 116 will be rocked on its fulcrum 117, and the free end portion of its arm 115 will be moved toward and from the ring carrying the impaling pins 13 substantially in radial directions with respect thereto. The lever arm 115 has a spring plate 122 secured to the inner side thereof and projecting beyond and forming, in effect, a continuation of the end of the arm 115. The free end of the spring plate 122 remains in contact with the periphery of the ring 11, with a light pressure, in all positions of the lever 116. The outer surface of the free end portion of the lever arm 115 and the continuing outer surface of the projecting end of the spring plate 122 extend tangentially or outwardly at an angle with respect to the periphery of the ring 11, as illustrated in Fig. 7, so that the in and out movements of the arm 115 and plate 122 will cause the outer surfaces thereof to engage fabric parts depending from the impaling pins 13 and gradually work or move them outwardly on the pins, beyond the position to which they were moved by the outwardly turned portion 74 of the stitch finger 70, and discharge such parts from the pins 13 after the parts have been advanced by the pins a short distance from the free end of the stitch finger.

As each sewed article is thus discharged from the impaling pins it is suspended from the pins by a chain of stitches which extends from the next succeeding article carried by the pins or from the free end of the stitch finger 70, in accordance with the nearness or remoteness of the next succeeding article; and, as each article discharged from the impaling pins 13 hangs therefrom suspended by its chain of stitches, the suspending chain above the article rests against the smooth and rounded outer surface of the arm 119. This surface extends tangentially outward from the periphery of the ring 11 and it is interrupted by a slot 123 formed in the arm 119, as shown in Figs. 7 and 10, and the chain, guided by the smooth surface of the arm 119, finds its way to the open end of the slot 123 under the influence of the pull of the article suspended thereby or under the influence of the forward movement of the impaling pins, or both. The chain of stitches then enters the slot 123 and moves toward the closed end thereof and between the cutting edge of a blade 124, fixed to the arm 119 on one side of the slot, and the cutting edge of a blade 125 carried by the lever arm 115 and secured to the bottom thereof. The cutting edge of the blade 125 is arranged to cooperate with the cutting edge of the blade 124 during the inward movements of the rocking lever arm 115 to sever the chains of stitches, and, after a chain has entered between the cutting edges of the blades, an inward movement of the blade will sever the chain and thus permit the article suspended thereby to drop into a suitable receptacle arranged beneath the machine to receive it. Thus, as rapidly as the successive articles carried by the pins 13 are sewed and discharged therefrom, the chains of stitches connecting them to the sewing devices or to the next succeeding article will enter the slot 123 and be severed by the blades 124 and 125, and the articles will drop into the receptacle provided to receive them.

The provision of the arm 119 with the slot 123 therein prevents any parts of the sewed articles from entering the space between the cutting edges of the blades 124 and 125 of the chain cutting device, while the slot permits the free entry of the chains into such space.

In fine gauge machines, where the loops of the fabrics to be united are small and the impaling pins are in close relationship and the stitches uniting the fabrics are correspondingly small, the size of the stitch finger 70 is necessarily small and has a limited amount of strength. Its strength, however, is sufficient to enable the outwardly turned portion 74 of the finger to move the fabrics carried by the pins 13 radially outward thereon to a limited extent, and not to a sufficient extent to discharge the fabrics from the pins. Therefore, it is necessary to employ the lever arm 115 to effect the discharge of the fabrics from the pins, following the initial outward movement of the fabrics by the stitch finger. The finger 70 forms a useful combination with lever arm 115, however, because, when the fabrics are acted upon by the sewing devices the fabrics are in close relationship with the pin-carrying ring 11 and, in the absence of the outwardly turned portion of the stitch finger, would be in danger of being carried forwardly between the lever arm 115 and the ring 11, but the operation of the finger provides an opening between the fabrics and the ring which insures the entrance of the lever arm 115 and its spring plate 122 into such opening.

When the gauge of the machine is sufficiently coarse to permit the use of a stitch finger of sufficient strength to have its outwardly turned portion to extend to or slightly beyond the free ends of the impaling pins and to move the fabrics on the pins to the free end of such outwardly turned portion, the same will operate to move the fabrics outwardly upon the pins and discharge them from the free ends thereof without the aid of any additional device, such as the lever arm 115 and its plate 122. In Fig. 11, I have illustrated a portion of a ring 126 carrying a series of impaling pins 127 of sufficient coarseness to permit the use of a stitch finger 128 which has an outwardly turned portion 129 of sufficient strength to extend to and slightly beyond the free ends of the pins 127 and to move the relatively coarse fabrics and stitches uniting them outwardly upon and to discharge them from the free ends of the pins.

I claim:

1. In a machine for uniting knit fabrics, the combination of a series of impaling pins for receiving and carrying loops of the fabrics, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics, and a stitch finger having a part supported adjacent to the path of travel of said loops and around which said mechanism forms its stitches, said finger having a portion provided with a free end and extending from said part in the direction of travel of said pins and turned outwardly toward the free ends thereof.

2. In a machine for uniting knit fabrics, the combination of a circular series of impaling pins

having radially projecting free end portions for receiving and carrying loops of the fabrics, means for supporting and rotating the series, sewing mechanism constructed to produce stitches for uniting the fabrics, and a stitch finger having a part supported adjacent to the path of travel of said loops and around which said mechanism forms its stitches, said finger having a portion provided with a free end and extending from said part in the direction of travel of said pins and turned radially outward with respect thereto.

3. In a machine for uniting knit fabrics, the combination of a series of impaling pins for receiving and carrying loops of the fabrics, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics, a stitch finger having a part supported adjacent to the path of travel of said loops and around which said mechanism forms its stitches, said finger having a portion provided with a free end and extending from said part in the direction of travel of said pins and turned outwardly toward the free ends thereof for moving said fabrics outwardly as they are advanced by said pins, and means for discharging said fabrics from said pins following the outward movement thereof by said finger.

4. In a machine for uniting knit fabrics, the combination of a series of impaling pins for receiving and carrying loops of the fabrics, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics, a stitch finger having a part supported adjacent to the path of travel of said loops and around which said mechanism forms its stitches, said finger having a portion provided with a free end and extending from said part in the direction of travel of said pins and turned outwardly toward the free ends thereof for moving said fabrics outwardly as they are advanced by said pins, a member supported below said pins for inward and outward movement with respect thereto to engage said fabrics and discharge them from said pins following the outward movement thereof by said finger, and means for operating said member.

5. In a machine for uniting knit fabrics, the combination of a series of impaling pins for receiving and carrying loops of the fabrics, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics, a stitch finger having a part supported adjacent to the path of travel of said loops and around which said mechanism forms its stitches, said finger having a portion provided with a free end and extending from said part in the direction of travel of said pins and turned outwardly toward the free ends thereof for moving said fabrics outwardly as they are advanced by said pins, a pivoted arm supported below said pins for inward and outward movement on its pivot with respect to the pins to engage said fabrics and discharge them from the pins following the outward movement of the fabrics by said finger, and means for operating said arm.

6. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, and a cutting device for severing the chains of stitches which suspend said articles.

7. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism, constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a cutting device for severing the chains of stitches which suspended said articles, and means for guiding the suspending chains into operative relation to said device.

8. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a part supported below said pins and having a slot therein for the reception of the chains of stitches which suspend said articles as the chains are advanced by said pins, and a cutting device for severing the suspending chains within said slot.

9. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a part supported below said pins and provided with a cutting device having a fixed cutting element and a movable cutting element between which and the fixed element the chains which suspend said articles are moved as the chains are advanced by said pins, and means for operating the movable element for severing the suspending chains.

10. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a part supported below said

pins and having a slot therein for the reception of the chains of stitches which suspend said articles as the chains are advanced by said pins, a cutting element fixed to said part adjacent to one side of said slot, a cutting element movable relatively to the fixed element and constructed to cooperate therewith to sever the chains of stitches which enter said slot, and means for operating the movable cutting element.

11. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, a part supported below said pins, a member on said part and movable outwardly and inwardly with respect to said pins to engage said articles and discharge them from the pins following the sewing operation whereby said articles will be suspended successively from said pins by said chains of stitches, means for operating said member, and a cutting device for severing the chains of stitches which suspend said articles.

12. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, a part supported below said pins, a member on said part and movable outwardly and inwardly with respect to said pins to engage said articles and discharge them from the pins following the sewing operation whereby said articles will be suspended successively from said pins by said chains of stitches, a cutting element fixed to said part, a cutting element carried by said member and movable therewith relatively to the fixed element for cooperation therewith for severing the chains of stitches which suspend said articles as the chains are advanced by said pins, and means for operating said member.

13. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, a part supported below said pins, an arm pivoted on said part and movable outwardly and inwardly with respect to said pins to engage said articles and discharge them from the pins following the sewing operation whereby said articles will be suspended successively from said pins by said chains of stitches, a cutting element fixed to said part, a cutting element carried by said arm and movable therewith relatively to the fixed element for cooperation therewith for severing the chains of stitches which suspend said articles as the chains are advanced by said pins, and means for operating said arm.

14. In a machine for uniting knit fabrics, the combination of a supporting disc, a ring rotatably carried by the disc and provided with a circular series of impaling pins for receiving and carrying loops of the fabrics, a supporting frame provided with an arm overhanging said ring and supporting said disc, a driving shaft journaled in said frame, a counter shaft journaled in said frame in parallel relation to the driving shaft, gearing between said shafts, means operated by the counter shaft for rotating said ring, and sewing mechanism operated by the driving shaft for uniting fabrics carried by said pins.

15. In a machine for uniting knit fabrics, the combination of a supporting disc, a ring rotatably carried by the disc and provided with a circular series of impaling pins for receiving and carrying loops of the fabrics, a supporting frame provided with an arm overhanging said ring and supporting said disc, a driving shaft journaled in said frame, a counter shaft journaled in said frame in parallel relation to the driving shaft, gearing between said shafts, a shaft journaled in said arm and provided with means for rotating said ring, gearing between the last named shaft and the counter shaft, and sewing mechanism operated by the driving shaft for uniting fabrics carried by said pins.

16. In a machine for uniting knit fabrics, the combination of a supporting disc, a ring rotatably carried by the disc and provided with a circular series of impaling pins for receiving and carrying loops of the fabrics, a supporting frame comprising a bed plate laterally of the disc and constructed to be secured upon a table and provided with an arm overhanging said ring and having a part secured to the top of said disc, a driving shaft journaled in said frame, means operated by said shaft for rotating said ring, a bracket secured to the top of said disc in spaced relation to said frame, stitch forming devices movably carried by said bracket for uniting fabrics carried by said pins, and means actuated by the driving shaft for operating said devices.

17. In a machine for uniting knit fabrics, the combination of supporting means, a rotatable ring provided with a circular series of radially projecting impaling pins for carrying the fabrics, means for rotating said ring, a cutting element fixed on said supporting means and located above said pins outwardly of the path of travel of said fabrics, a cutting element slidable on said supporting means to move a part thereof across said path and constructed to cooperate with the first named element to sever portions of said fabrics extending above said pins and to discharge said portions outwardly from the pins, means for reciprocating the slidable cutting element, and a finger carried by and projecting outwardly from the slidable cutting element for engaging the adjacent severed portions of the fabrics for feeding them radially outward with respect to the impaling pins.

18. In a machine for uniting knit fabrics, the combination of supporting means, a rotatable ring provided with a circular series of radially projecting impaling pins for carrying the fabrics, means for rotating said ring, a cutting element fixed on said supporting means and located above said pins outwardly of the path of travel of said fabrics, a cutting element slidable on said supporting means to move a part thereof across said path and constructed to cooperate with the first named element to sever portions of said fabrics extending above said pins and to discharge said portions outwardly from the

pins, means for reciprocating the slidable cutting element, and means operable to raise the slidable cutting element from cooperating relationship with the fixed cutting element.

19. In a machine for uniting knit fabrics, the combination of supporting means, a rotatable ring provided with a circular series of radially projecting impaling pins for carrying the fabrics, a driving shaft, means operated by the shaft for rotating said ring, a cutting element fixed on said supporting means and located above said pins outwardly of the path of travel of said fabrics, a cutting element slidable on said supporting means to move a part thereof across said path and constructed to cooperate with the first named element to sever portions of said fabrics extending above said pins and to discharge said portions outwardly from the pins, a rockable shaft, means operated by the driving shaft for operating the rockable shaft, and means operated by the rockable shaft for reciprocating the slidable cutting element.

20. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, a cutting device constructed to sever portions of said articles extending above said pins before said articles are acted upon by the sewing mechanism, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a cutting device for severing the chains of stitches which suspend said articles, a rockable shaft, means operated by said shaft for actuating the cutting devices, and means for rocking said shaft.

21. In a machine for uniting knit fabrics, the combination of a series of impaling pins constructed to receive loops of the fabrics of parts of articles carried by the series in spaced relation, means for supporting and advancing the series, sewing mechanism constructed to produce stitches for uniting the fabrics of the parts of said articles and to produce chains of stitches between them, a cutting device constructed to sever portions of said articles extending above said pins before said articles are acted upon by the sewing mechanism, a brush arranged to act upon said articles between said cutting device and the sewing mechanism, means to discharge said articles successively from said pins following the sewing thereof whereby said articles will be suspended successively from said pins by said chains of stitches, a cutting device for severing the chains of stitches which suspend said articles, a rockable shaft, means operated by said shaft for actuating said cutting devices and said brush, and means for rocking said shaft.

GEORGE KEYSER.