May 1, 1951 W. T. GENSHEIMER 2,551,261

SPIRAL STITCHING MACHINE

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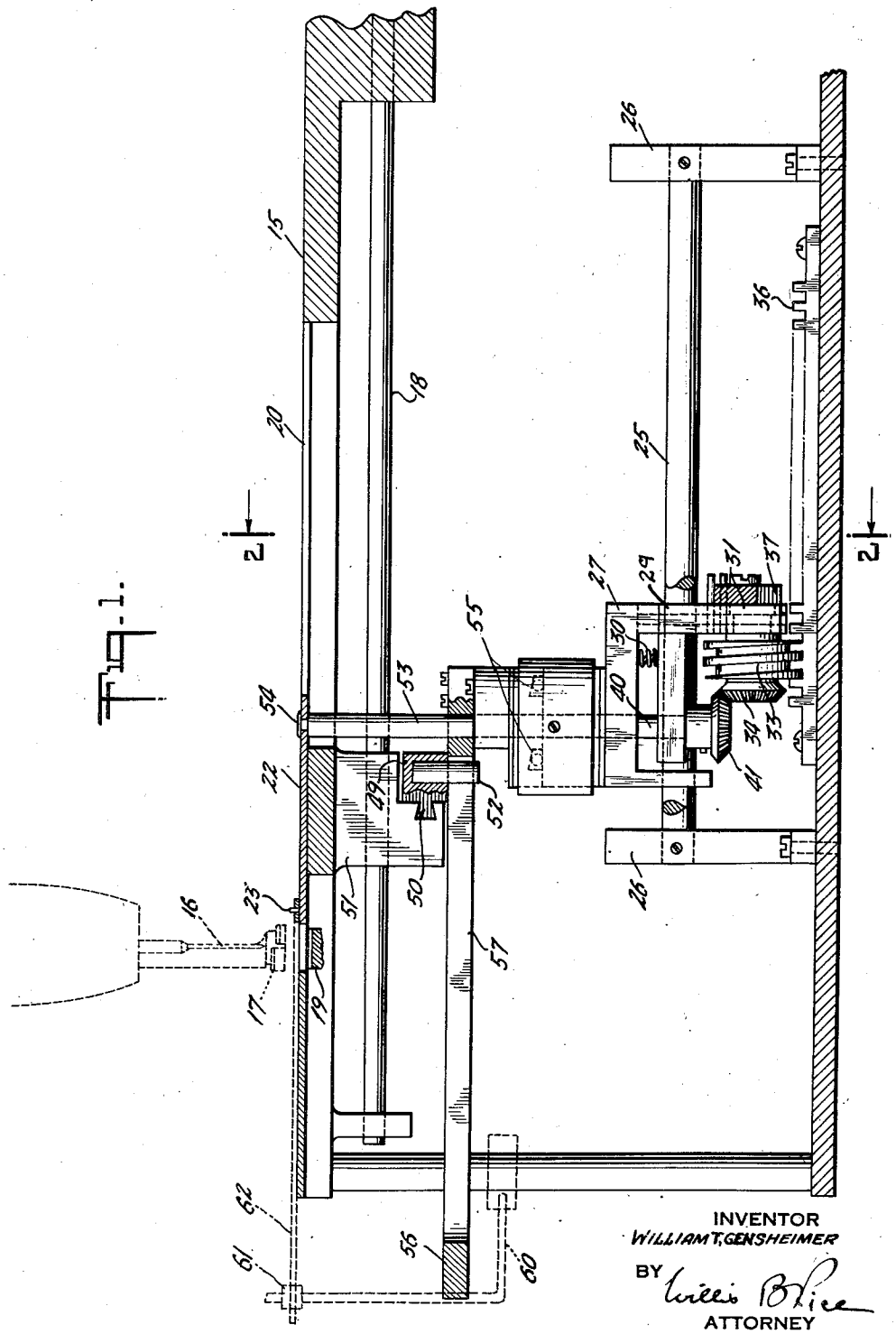


Fig. 1.

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Fig. 1.

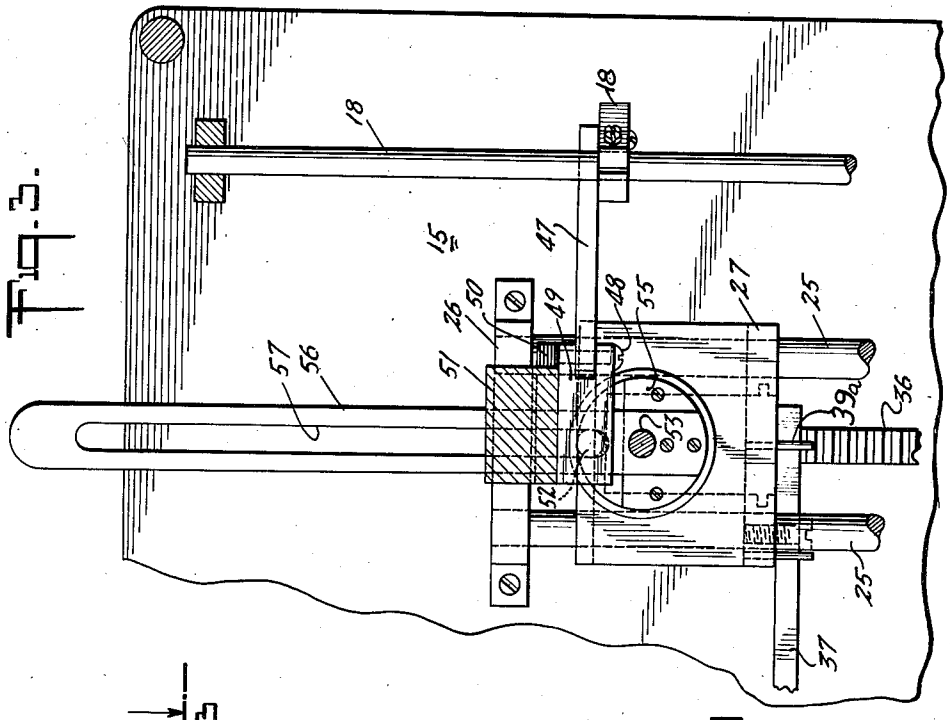
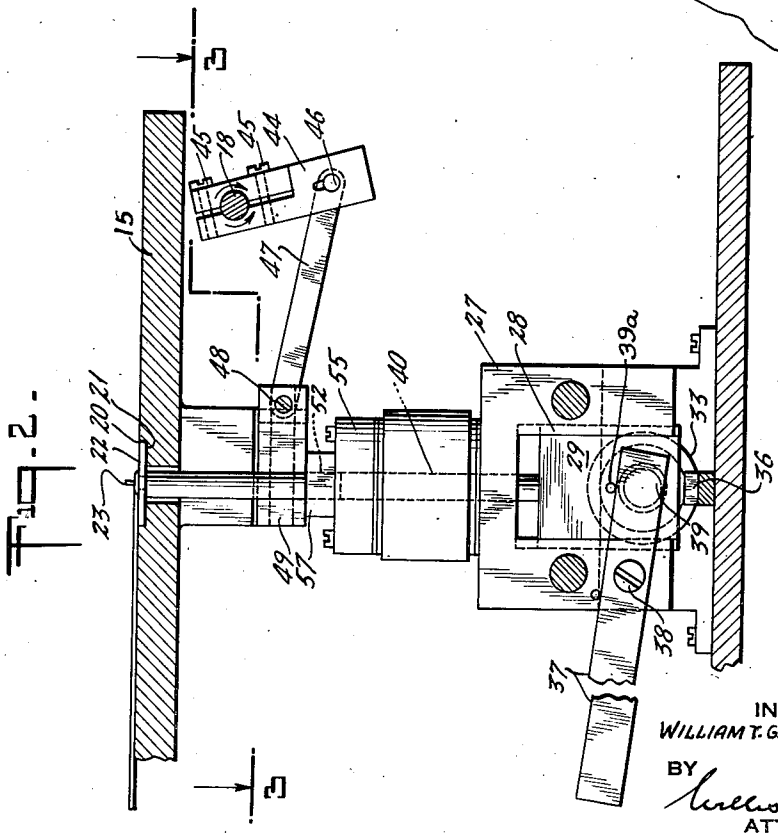


Fig. 2.



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FIG. 4.

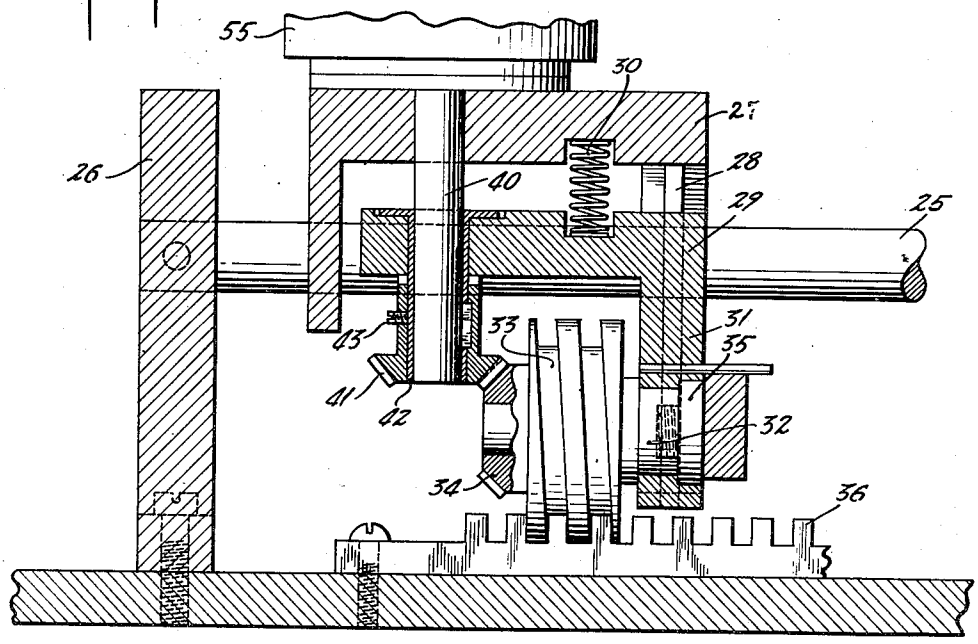


FIG. 5.

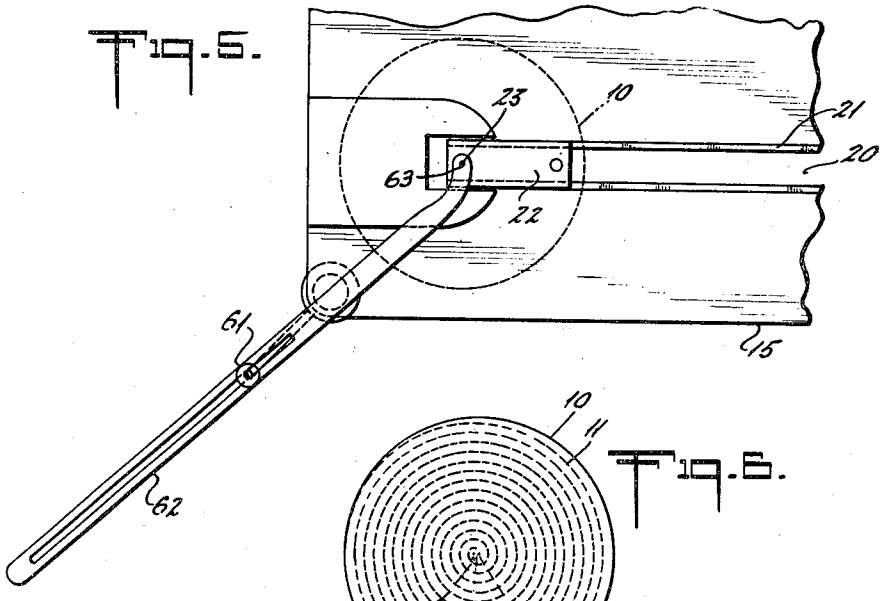


FIG. 6.

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SPIRAL STITCHING MACHINE

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Application October 2, 1947, Serial No. 777,408

3 Claims. (Cl. 112—2)

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This invention relates to a sewing machine attachment for making a new and novel brassière element and to the brassière element made in accordance therewith.

In the making of brassières of the breast forming type it is desirable to provide a breast cup which will at the same time be soft in texture and yet stiff enough to be self-sustaining so as to hold the tissue in the form desired. This result can be achieved by forming the breast pocket of a plurality of layers of a textile, intimately sewn together with or without a filling material between them.

It is the object of this invention to provide a new and practical brassière element from which garments of this kind can be manufactured in quantity production and at low cost. In accordance with one phase of this invention, therefore, the breast pocket material is assembled and given a circular shape and the parts thoroughly sewn together by spiral stitching, and thereafter a sector is cut from the circular element so formed to permit it to be given its cone shaped form.

This invention accordingly comprises a machine and an article of manufacture possessing the features, properties and the relation of elements which will be exemplified in the machine and article of manufacture hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation partly in section of the bed of a sewing machine, disclosing the machine attachment and part of this invention which is designed to form the brassière element above referred to. Fig. 2 is a section on the line 2—2 of Fig. 1 of the same machine. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 is an enlarged detail from the same position as Fig. 1, but showing certain of the parts in cross section. Fig. 5 is a top plan view of a portion of the construction shown in Fig. 1, and Fig. 6 is the brassière element above referred to.

Referring first to Fig. 6, the brassière element

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is shown to comprise a plurality of layers of suitable material 10 having a row of machine stitching 11 starting at the center and moving spirally outward to the periphery. Such an element may be used to form a brassière by cutting out a sector shown at the line 12—12 and sewing the ends together. Such an element may be constructed with great rapidity and sewn into the brassière with ease.

The machine of the invention referred to in Fig. 1 comprises a commercial sewing machine having a bed 15, a needle 16 and a foot 17. The operating mechanism is omitted from the drawing except for the oscillating shaft 18 for driving the feed mechanism in the usual manner. Any conventional operating mechanism may be used, the construction being such that the operating mechanism raises and lowers the needle 16, a shaft 18 oscillates to drive the feed mechanism 19 in timed relation thereto. Longitudinally from the bed 15 of the machine there is cut a slot 20 having a shoulder 21 to support a slide 22, carrying a vertical pin 23. The direction and position of the slot and the position of the pin are such that the line through the path of movement of the pin 23 intersects the needle 16 as the slide 22 is slid back and forth in the slot 20. For reasons which will be clear, the length of the slot is such that the pin 23 can come very close to the needle 16 or can be moved to a distance therefrom by the sliding of the slide.

A shaft 25 is mounted in supports 26 parallel to the shaft 18 and to the slot 20, and a head 27 slides upon this shaft 25. Vertically slidable in guides 28 upon the head is a block 29 which is spring pressed downward by a spring 30. This block 29 has a downward extending arm 31 carrying a stud shaft 32 on which is journalled a wormwheel 33 integral with a bevel gear 34. This shaft 32 may be held in place by a screw 35. This wormwheel 33 meshes with a rack 36 extending parallel to the shaft 25, so that on rotation of the wormwheel 33, the block 29 and the head 27 will be moved along the shaft 25. An arm 37 is pivoted at 38 to the head 27 and is also connected to the block 29, so that by depressing the arm 37 the wormwheel 33 may be moved out of mesh with the rack 36 against the pressure of the spring 30 thereby permitting the head 27 to slide along the shaft 25, but whenever

the lever 37 is released the wormwheel 33 reengages the rack.

In the particular embodiment shown in the drawings the pivot 38 comprises a screw passing through a lever 37 and screwed into block 27, and the pivotal connection comprises a pin 39a carried by the block 29 in the path of the lever 37 in position such that when the lever is moved the block 29 will be raised.

Journalled vertically in the head 27 is a shaft 40 and at the lower end of this shaft there is splined a bevel gear 41 in position to mesh with the bevel gear 34, so that as the shaft 40 is driven the wormwheel 33 is also driven. The gear 41 is directly carried by a sleeve 42 attached to the block 29 by a set screw 43, so that as the wormwheel 33 is raised and lowered by the lever 37 the gears will stay in mesh, the gear 41 sliding upon its drive shaft.

Mounted upon the feed-mechanism-driving shaft 18 is a block 44 fastened upon the shaft by screws 45 and this block 44 carries a pin 46 by which it is pivoted to a link 47. The other end of the link 47 (see Fig. 3) is pivoted at 48 to a block 49 transversely slidable in a guide 50 upon a support 51 upon the underside of the bed. This block 49 carries a downwardly extending pin 52. A shaft 53 is vertically journalled in head 27 in alignment with shaft 40. This shaft 53 is journalled also to slide 22 at its top at 54 and is ratchet connected to shaft 40 by a ratchet 55. Upon shaft 53 is a lever 56 having a longitudinal slot 57 embracing the pin 52 so that the front and back movement of the pin 52 caused by the oscillation of the shaft 18 will cause the oscillation of the lever 56 about the shaft 53. By reason of the fact that the pin 52 cannot move in the direction of the extension of the shaft 25 the leverage between pin 52 and shaft 53 is constantly changed as the head slides on the shaft 25 and this fact is utilized, as will be described, to keep the distance between the successive turns of the spiral 11 equal.

A bracket 60 carries the block 61 which holds in place the slotted rod 62 having at one end the opening 63 which can be inserted over the top of the pin 23 to hold the element in place. By reason of the slot in the rod 62 this rod 62 can slide as the slide 22 slides.

The operation of the device is as follows. The shaft 18 operates with each stitch to move pin 52 a fixed amount. This movement oscillates lever 56 through an angle inversely proportional to the distance between the axis of shaft 53 and pin 52 (ignoring the difference between the tangent of the angle and the angle). This distance is converted into a proportional movement of wormwheel 33 and hence of slide 22 and pin 23, because of ratchet 55.

Now the pin 23 serves as a center about which the brassière element must revolve, but the center moves constantly away from the needle at a rate inversely proportional to its distance. This exactly compensates for the fact that the length of each revolution of the spiral increases in proportion to its distance and hence the number of stitches per revolution likewise increases.

A more or less circular swatch of material comprising for example two or three superimposed layers of a suitable cloth has its center inserted over the pin 23 and its periphery inserted beneath the foot 17.

The machine can be made to start the sewing either at the center of the spiral or at the outside edge. The machine shown here is designed

to start at the center. To this end, therefore, the connections are made such that the movement of the machine will cause the block 27 to move away from the needle. The operator will, therefore, depress the lever 37 and move the head 27 to the position shown in Fig. 1. After the swatch has been impaled upon the pin 23, guide 62 is placed over the pin 23 to hold the swatch in place whereupon the machine will start operation.

As the spiral is sewn it will be clear that the further away it gets from the center the more stitches will be required for each revolution if the distance between successive turns is to be kept constant. This is accomplished in accordance with the present machine since the decrease in leverage of the pin 52 automatically decreases the motion of the slide 22 in exact proportions to the distance between pin 23 and the needle.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

I claim:

1. A device for spiral sewing adapted for use with a sewing machine having a frame, a needle and an automatic feed, said device comprising a work guide slidable in a slot on said frame toward and from said needle, a pair of relatively movable elements, one of which is mounted on said frame and the other connected to said work guide, a drive member connected to effect relative motion between said elements, said elements being constructed and arranged to move said work guide in said slot by their relative motion, a lever and ratchet connected to said drive member, a block slidable in fixed guides upon said frame, for motion transverse to said lever, carrying a pin for engaging said lever, and means operated by said feed for reciprocating said pin.

2. A device for spiral sewing adapted for use with a sewing machine which has a frame, a base, a needle and an automatic feed, comprising in combination a work guide mounted to slide laterally in said bed toward and away from said needle, a rack mounted on said frame parallel to said slot, a worm wheel journalled on said work guide engageable with said worm, a driving means for said worm wheel including a lever pivoted on said work guide and extending parallel to said slot, means mounted on said machine and connected to said automatic feed to be oscillated thereby and carrying a member slidably connected with said lever, whereby the operation of the feed will operate the worm wheel at a rate corresponding to the position of the work guide.

3. A device for spiral sewing adapted for use with a sewing machine which has a bed, a needle, an automatic feed mechanism, comprising in combination a work guide adapted to be mounted on said head for lateral movement toward and from the needle, a pin carried by said work guide, a ratchet and gear train mounted on said work guide in position to cooperate with a worm on

said bed, a lever pivotally mounted on said work guide connected to said ratchet to drive the same, and having an arm parallel to the axis of the worm and means adapted to be connected to the automatic feed of the machine in position to be oscillated thereby, carrying a member slidably connected with said lever to slide on said lever as the work guide slides on the bed.

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