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2,723,636

ELASTIC METERING ATTACHMENT FOR SEWING MACHINES

Filed Feb. 19, 1953

4 Sheets-Sheet 1

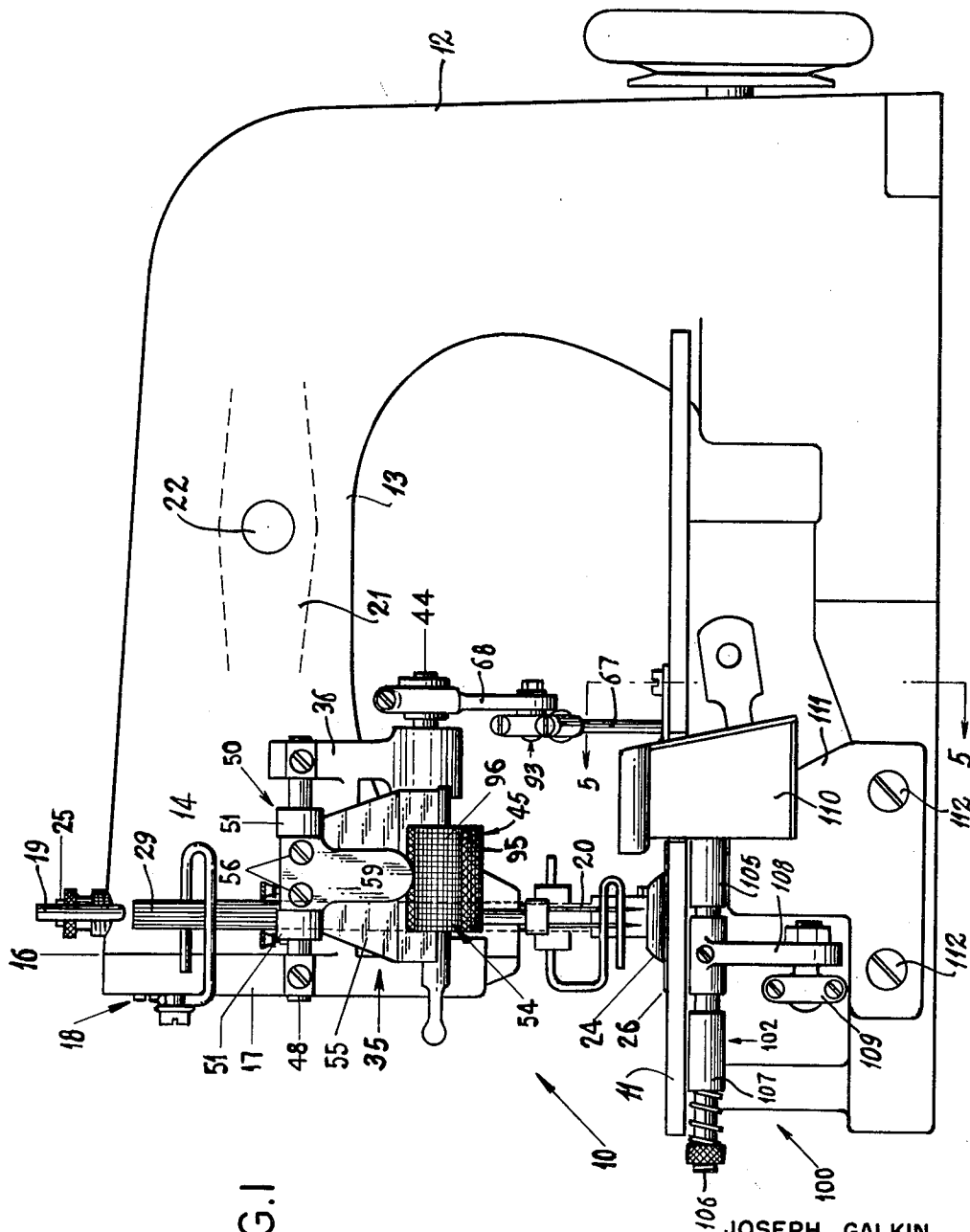


FIG. 1

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ELASTIC METERING ATTACHMENT FOR SEWING MACHINES

4 Sheets-Sheet 2



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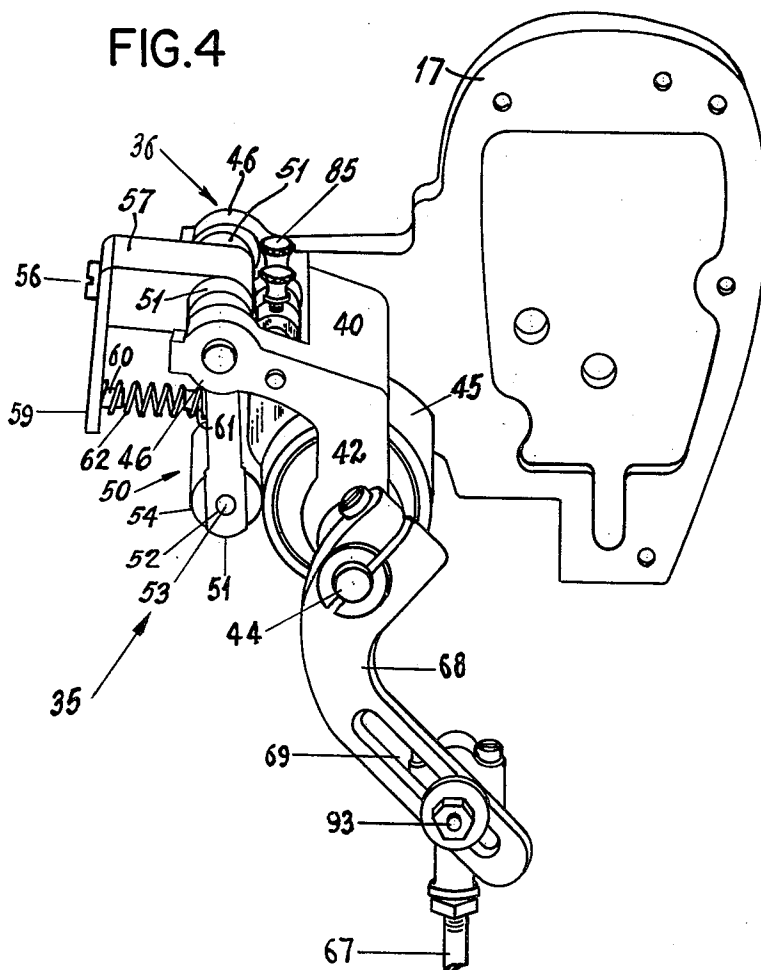
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ELASTIC METERING ATTACHMENT FOR SEWING MACHINES

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4 Sheets-Sheet 3



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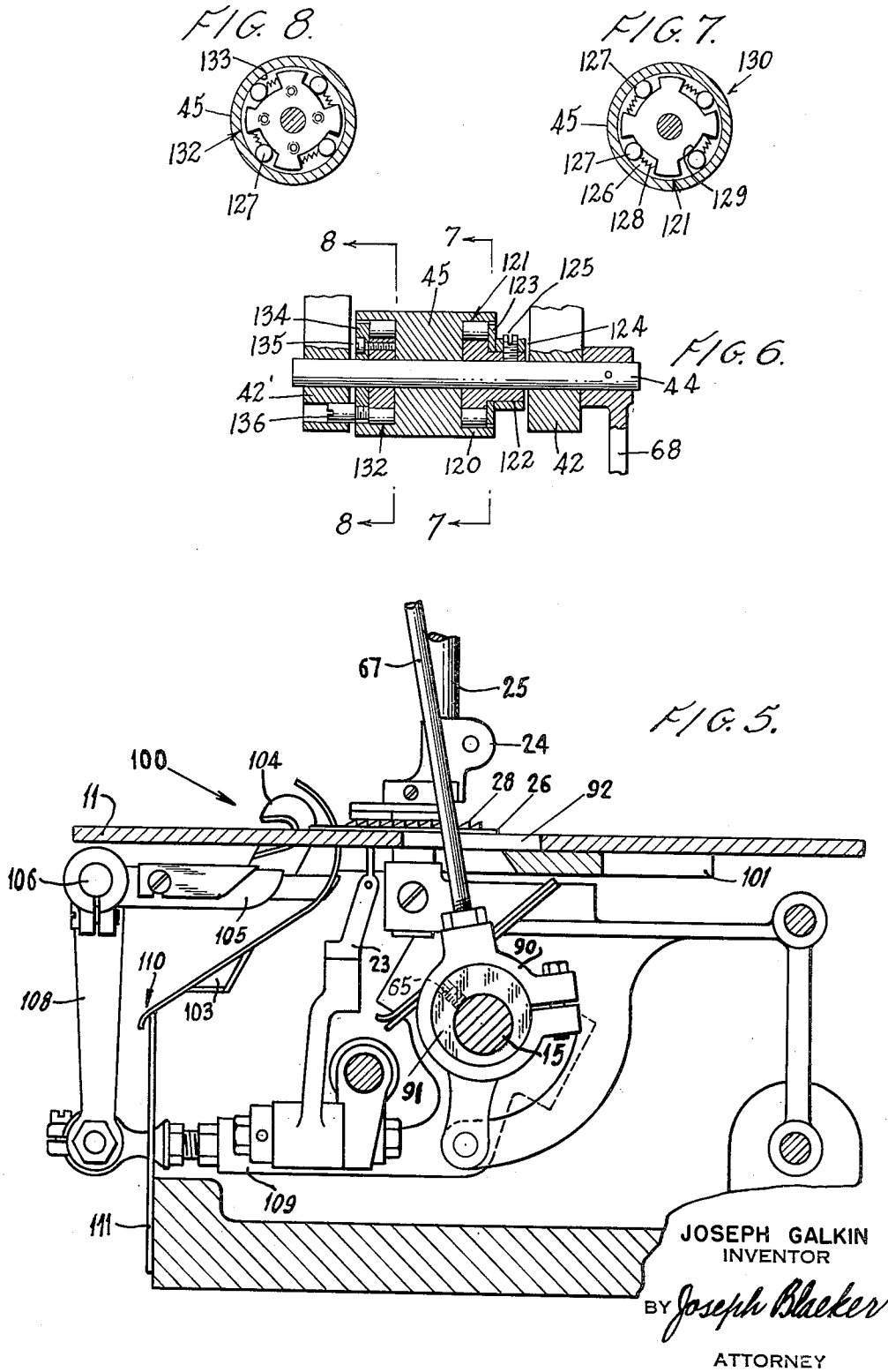
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ELASTIC METERING ATTACHMENT FOR SEWING MACHINES

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2,723,636

ELASTIC METERING ATTACHMENT FOR SEWING MACHINES

Joseph Galkin, New York, N. Y.

Application February 19, 1953, Serial No. 337,789

2 Claims. (Cl. 112—211)

This invention relates to sewing machines having superposed feed rollers to augment the feeding of the fabric by the feed-dog.

In prior practice, attempts have been made to drive puller feed rollers for sewing machines to make it possible to work on heavy fabric garments, such as overalls, by driving the rollers with a drive shaft extending the entire length of the machine. The elongated shaft developed a twist during sewing operations, causing irregular feeding and an overthrow.

In other prior designs of feed roller drives, clutch mechanisms, were mounted on the work supporting base of the sewing machine in a manner as to cover up or clutter up the base which made it difficult to operate.

In my prior application, Serial No. 300,582, now Patent No. 2,687,704 issued August 31, 1954, for upper main shaft drive for sewing machine feed, I have utilized a right-angular bracket fixed by bolts to the rear portion of the base and extending forwardly below the head to the front of the machine, where this bracket supported rotary feeding mechanism. In practice it is found that the bracket had to be made of such large size for strength, that it cluttered up a large portion of the base and interfered with sewing operations.

An object of this invention is to provide a mounting for auxiliary feeding rollers driven from the lower main drive shaft, directly and very close to the upper feed roller, whereby twisting of the drive shaft is eliminated, and whereby substantially the entire area above the work supporting base and between the head and the standard is clear for unencumbered sewing operations.

Another object of this invention is to provide a detachable mounting for auxiliary puller feed rollers for sewing machines, comprising an end plate attachable to the head of the sewing machine solely with the end plate screws and including an integral bracket extending forwardly to face the operator, and on which the auxiliary puller feed rollers are mounted.

Another object of this invention is to make the co-acting roller with diamond-shaped square cut knurls, and the clutch roller with diamond-shaped diagonally cut knurls, the square cut knurls, being out of alignment with the diagonally cut knurls, thereby preventing interengagement with the diagonally cut knurls, while permitting the square cut or upright directed knurls to interengage with the woven ribs positioned lengthwise of the elastic strip or tape being fed and to guide the tape.

With the above and other objects in view, the invention will be hereinafter more particularly described, and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of this specification.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a front elevation of a sewing machine, having my invention applied thereto.

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Figure 2 is a top plan view of a combined head plate and puller-feed attachment mounting.

Figure 3 is a front view of the combined head plate and puller-feed attachment mounting shown in Figure 2.

Figure 4 is a perspective rear view of the combined mounting shown in Figure 3.

Figure 5 is a cross-sectional view taken on line 5—5 in Figure 1.

Figure 6 is a cross-sectional view taken on line 6—6 in Figure 3.

Figure 7 is a cross-sectional view taken on line 7—7 in Figure 6.

Figure 8 is a cross-sectional view taken on line 8—8 in Figure 6.

In the illustrated embodiment of the invention, the numeral 10 indicates a sewing machine comprising a flat bed or work-supporting base 11 having an upright tubular standard 12 extending therefrom and having an upper overhanging horizontal arm 13 terminating in a hollow upright head 14. A drive shaft 15 is mounted horizontally in the base 11. The head 14 terminates in an upright end face 16 to which is attached a cover or head plate 17 by screws 18.

The sewing machine 10 has a sewing and feeding mechanism well known in the art. The main object of this invention is to provide a detachable mounting for auxiliary feeding rollers to assist the feed-dog feeding mechanism of the sewing machine in order to be able to operate and attach elastic strip material to garments. The gist of the invention resides in the fact that the entire area above the work-supporting base and the head 14 and between the standard 12 and a feed roller operating crank is clear for unencumbered sewing operation.

In the head 14 is journaled a needle-bar 19 carrying needles 20. The needle-bar 19 is reciprocated up and down by a needle lever 21 mounted on a pivot shaft 22. The needle lever 21 is connected to the needle-bar 19. A looptaker 23 is oscillated and cooperates with the needles to form stitching. The material worked upon is held down by a presser-foot 24 carried by a presser-bar 25.

The presser-bar rests on a cloth plate 26 secured to and above the work supporting base 11. The shaft 15 is suitably journaled in the base portion of the machine and from which the stitch forming and feeding elements are driven, as is well known in the art. The material is moved across the work support by a feed-dog 28 which is moved back and forth and up and down in the usual manner.

This invention is particularly directed to mechanism for guiding and feeding an elastic tape 29 to the presser foot 24 and to the feed-dog 28, also for stretching the elastic tape uniformly. In the preferred form of this invention the guiding and feeding mechanism is carried by the cover or head plate 17 as a combined unit with the plate.

The combined head plate and puller feed attachment mounting is identified by the numeral 35 and comprises feeding rollers and an integral bracket 36 forming an extension of the head plate 17. The bracket 36 has a downwardly extending arm 37 having an aperture 38. The bracket 36 also comprises a right-angular lateral extension 40 terminating in a downwardly extending arm 42 having an aperture 43. The apertures 38 and 43 are in axial alignment. A stub shaft 44 is rotatably mounted in the apertures 38 and 43. A knurled and hollow puller-feed roller 45 is rotatably mounted on the stub shaft 44.

The bracket 36 has two forwardly extending arms 46 having apertures 47 which are in axial alignment. A rod 48 mounted in the apertures 47 is secured to the arms 46 by screws 49. A roller carrier 50 having two apertured arms 51 is pivotally mounted on the rod 48. The arms 51 extend downwardly from the rod 48 and have

apertures 52 at their lower end portions. The apertures 52 are in axial alignment. A shaft 53 is mounted in the apertures 52, in substantially parallel relation with the shaft 44. A co-acting knurled feed roller 54 is freely rotatably mounted on the shaft 53.

As shown in Figure 1, the arms 51 are integral with a body portion 55. Fixed to the rod 48 by elongated screws 56, intermediate the arms 51, is a horizontally positioned dog 57 (Figure 4). An upright plate 59 is secured at its upper end to the dog 57 by the screws 56.

At the lower end of the plate 59 is a projecting guide pin 60, facing the roller carrier 50. A further guide pin 61 projects from the body portion 55 of the roller carrier 50 and faces the pin 60. The guide pins 60 and 61 are substantially in alignment. An open coil compression spring 62 is mounted on the guide pins 60 and 61 and is of sufficient length to react against the plate 59 and cause a pressure against the roller carrier 50. This causes pressure to be exerted by the feed roller 54 against the hollow puller-feed roller 45. The feed-roller 45 is positively driven in step-by-step rotation by the main drive shaft 15.

As shown in Figure 5, an eccentric 91 is mounted on the drive shaft 15 and is fixed thereto by a screw 65. A strap 90 at one end of a connecting rod 67 is mounted on the eccentric 91. The other end of the connecting rod 67 is pivotally connected to the lower end of a clutch arm 68.

The clutch arm 68 has a slot 69 to provide adjustability of the pivotal connection between the connecting rod 67 and the clutch arm 68 for increasing or decreasing the throw or step-by-step movement of the feed-roller 45 which forms the outer shell of the clutch mechanism 70. This pivotal connection constitutes means for adjusting the movement of the clutch mechanism independently of the movements of the feed-dog 28 of the sewing machine 10.

Figure 5 is a cross-sectional view taken on line 5—5 in Figure 1 and shows the clutch shaft 44 supported in bearings in the arms 37 and 42. The puller-feed roller 45 is freely rotatably mounted on the shaft 44 and shown in cross-section.

It is to be noted that the square cut or upright directed knurls of the coacting roller 54 interengage with woven ribs positioned in and lengthwise of the elastic tape 29 and prevent the elastic tape from running sideways out of alignment with the needles 20. This alignment feature is possible because the differently directed knurls of the two feed rollers prevent interengagement between the knurls of the rollers.

It is also to be noted that the disclosure herewith embodies a trimming mechanism having blades (later to be described) for trimming a side edge of fabric to which the elastic tape 29 is attached. This trimming mechanism is fully disclosed in my co-pending patent application, Serial No. 326,264 filed December 16, 1952, now Patent No. 2,667,850.

As best shown in Figures 2 and 3, I have provided two guide arms 78, 79, comprising upright side plates 80, 81, extending between the feed rollers 45 and 54. The lower edge 82 of each plate is of arcuate form designed to follow the outer periphery of the feed roller 45.

Each guide arm has an apertured collar 83 slidably mounted on a rod 84 which is secured in desired position in the bracket 36 by a screw 85. In operation, the guide arms 78, 79 are set on the rod 84 to contact with both sides of the tape 29 (Figure 1) and so that the tape is in alignment with the needles 20. Each guide arm is fixed to the rod 84 in adjusted position by a screw 85.

As shown in Figure 1, the clutch driven feed roller 45 has diamond shaped diagonally cut knurls 95. The co-acting feed roller 54 has diamond shaped square cut

knurls 96, that is, the knurls 96 are positioned in vertical planes.

It is to be noted that the diamond shaped square cut knurls cannot interengage with the diamond shaped diagonally cut knurls, they merely pass over each other. The result is that the feed roller 45 cannot exert any force tending to move the elastic tape sideways. The square cut knurls can thus freely engage the elastic tape 29 and guide it vertically without any hindrance from the feed roller 45.

The connecting rod 67 passes through the slot 92 and terminates at its upper end in a ball-shaped connection 93 which is adjustably secured in the slot 69 of the clutch arm 68.

Step-by-step rotation of the feed roller 45 in synchronism with the feed-dog of the sewing machine is effected by a friction clutch (not shown) but positioned inside the hollow puller-feed roller 45. The details of the clutch are fully disclosed in my co-pending patent application Serial No. 306,043, filed August 23, 1952, now Patent No. 2,706,457 issued April 19, 1955.

The sewing machine 10 shown in Figures 1 and 5 also includes an improved trimming mechanism 100 comprising a carrier plate 101 positioned below the work supporting base 11, and a shaft carrying bracket 102 which is adjustable with the carrier plate.

The trimming mechanism 100 also comprises a fixed cutting blade 103 and a cooperating movable cutting blade 104. The blade 104 is carried by a rocker arm or movable blade carrier 105 fixed to a shaft 106 rockably mounted in a bearing 107 extending from the bracket 102. The rocker arm 105 is oscillated through a link 108 fixed to the shaft 106 and through a strap arm 109 from an eccentric (not shown) on the drive shaft 15.

The trimming mechanism 100 also comprises a chip guard 110. A supplementary guard plate or cover plate 111 is fixed in upright position to the base by screws 112. The lowermost portion of the chip guard 110 extends outwardly beyond the base plate of the sewing machine and delivers the trimmed selvage clear of the sewing machine.

Figure 6 is a cross-sectional view taken on line 6—6 in Figure 3 and shows the shaft 44 rotatably supported in bearings 42, 42'. The puller-feed roller 45 is rotatably mounted on the shaft 44. The roller 45 has a bore 120 in which an oscillating clutching detent carrier 121 is rotatably mounted. The carrier 121 has a hub 122. Mounted on the hub 122 is a washer 123 and a collar 124. A screw 125 threaded in the collar 124 and the hub 122 secures the carrier 121 to the shaft 44 (Figure 6).

As shown in Figure 7, the carrier 121 has cavities 126 in each of which a roller detent 127 and a spring 128 is mounted in a manner to cause the detent to be wedged between a cam surface 129 in a cavity 126 and the peripheral surface defining the bore 120. The carrier 121 and the detents 127 and the springs 128 mounted inside the bore 120 constitute a roller friction clutch 130.

Step-by-step rotation of the roller 45 in synchronism with the feed-dog 28 is effected by the clutch 130 which is actuated by the crank 68, in engagement with the eccentric 91 on the shaft 15.

To prevent reverse movement of the roller 45, I provide a braking detent carrier 132 rotatably mounted within a bore 133 in the roller 45, as shown in Figure 8. The carrier 132 is secured to a disk 134 by a screw 135 and to one side of the bearing 42 by a screw 136.

The carrier 121 and the braking detent carrier 132 are mounted in the roller 45 to work in opposite directions and may be in the form shown and described in Patent No. 1,985,406, issued to Nathan B. Galkin.

The crank 68 has a slot 69 which permits slidable movement of the stud 93. It is thus possible to adjust

the stud 93 in the slot 69 and to increase or decrease the throw of the strap link 90 for varying the movements of the clutch 130 and the roller 45.

In accordance with the patent statutes I have described and illustrated the preferred embodiment of my invention, but it will be understood that various changes and modifications can be made therein without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. A combined head plate and auxiliary puller-feed attachment mounting unit for an elastic tape attaching sewing machine, said sewing machine having a work supporting base, an upright tubular standard extending from said base, an overhanging arm, a hollow head, a needle, a main shaft and a main feeding mechanism in said work supporting base; said mounting unit comprising a knurled hollow puller-feed roller having clutch and brake mechanism directly therein, said hollow roller having diamond-shaped diagonally cut knurls, a head plate attachable to the head of the sewing machine and including a bracket integral with said head plate and extending forwardly of said head, said bracket having a stub shaft rotatably supported thereby, said puller-feed roller being rotatably mounted on said stub shaft, said bracket having a rod mounted therein, a roller carrier pivotally mounted on said rod and having a carrier shaft rotatably supported thereby in substantially parallel relation with said puller-feed roller, a co-acting knurled feed roller rotatably mounted on said carrier shaft and spring-pressed against said puller-feed roller for feeding elastic tape therebetween, said co-acting roller having square cut vertically directed knurls, said diagonally cut knurls being out of alignment with said square cut knurls, for preventing interengagement of said knurls, thereby permitting said square cut knurls on said co-acting feed roller to guide said elastic tape vertically in alignment with said needle, said rollers being supported from said bracket clear of said overhanging arm, guide arms mounted on said bracket and extending downwardly between said rollers, said guide arms being spaced-apart to contact opposite edges of said elastic tape for guiding said tape to said feed-roller, and a crank fixed to said stub shaft directly adjacent an end face of said puller-feed roller and actuated by an eccentric on said main shaft in said base and adapted to operate said stub shaft and said auxiliary puller-feed mechanism, whereby the entire area between said base and said head and

between said crank and said standard is clear for unencumbered operations.

2. An auxiliary puller-feed attachment mounting unit for an elastic tape attaching sewing machine, said sewing machine having a work supporting base, an upright tubular standard extending from said base, an overhanging arm, a hollow head, a needle, a main shaft and a main feeding mechanism in said work supporting base; said mounting unit comprising a knurled hollow puller-feed roller having clutch and brake mechanism directly therein, said hollow roller having diagonally cut knurls, a head plate attachable to the head of the sewing machine and including a bracket integral with said head plate and extending forwardly of said head, said bracket having a stud shaft rotatably supported thereby, said puller-feed roller being rotatably mounted on said stud shaft, said bracket having a rod mounted therein, a roller carrier pivotally mounted on said rod and having a carrier shaft rotatably supported thereby in substantially parallel relation with said puller-feed roller, a co-acting knurled feed roller rotatably mounted on said carrier shaft and spring-pressed against said puller-feed roller for feeding elastic tape material therebetween, said co-acting roller having square cut knurls, said diagonally cut knurls being out of alignment with said square cut knurls, for preventing interengagement of said knurls, thereby permitting said square cut knurls on said co-acting feed roller to guide said elastic tape vertically in alignment with said needle, said rollers being supported from said bracket clear of said overhanging arm, guide arms mounted on said bracket and extending downwardly between said rollers, said guide arms being spaced-apart to contact opposite edges of said tape for guiding said tape to said feed-roller, a connecting rod passing through an aperture in said base, a crank fixed to said stub shaft directly adjacent an end face of said puller-feed roller and connected by said rod with an eccentric on said main shaft in said base and adapted to operate said auxiliary puller-feeding mechanism in timed relation with said main feeding mechanism.

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