March 10, 1953 A. J. CAPRARA ET AL 2,630,773

APPARATUS FOR ATTACHING ELASTIC BANDS TO GARMENTS

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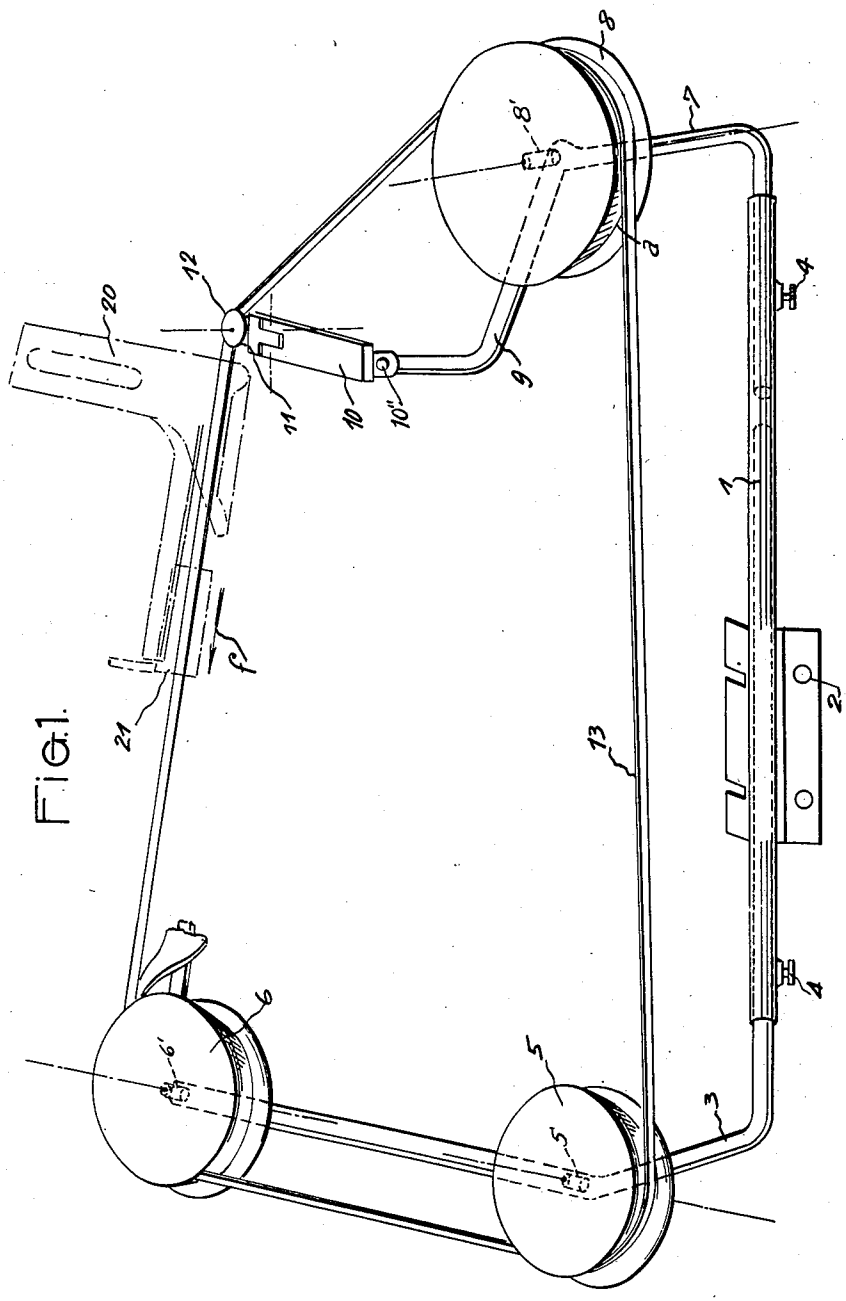


Fig. 1.

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Fig.2.

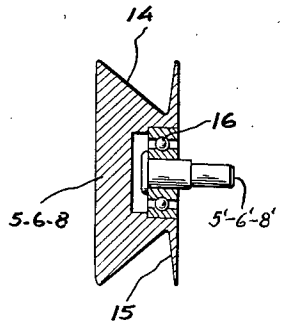


Fig.3.

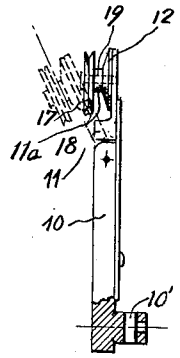


Fig.5.

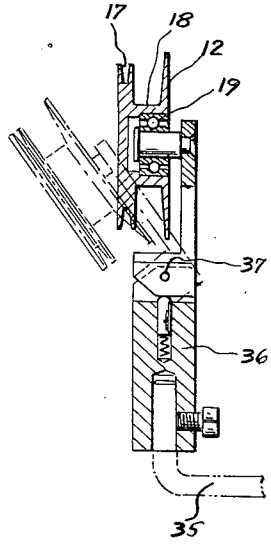
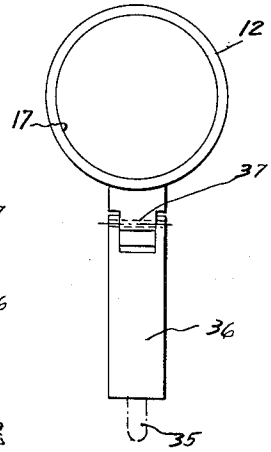


Fig.6.



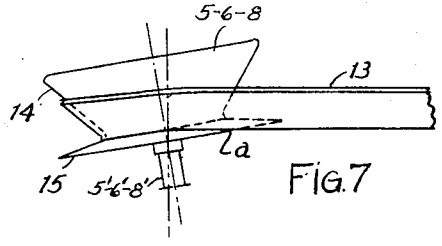


Fig.7

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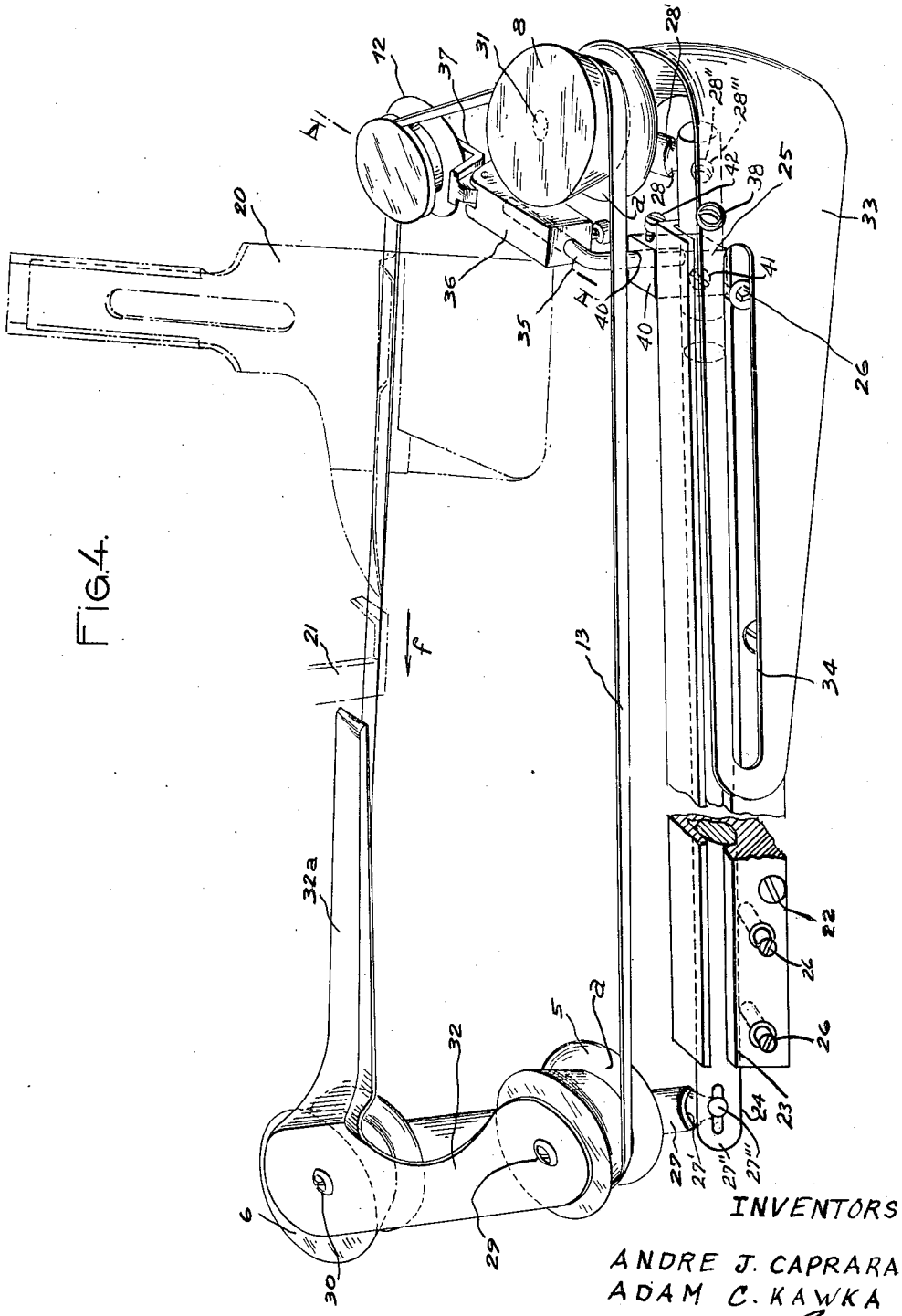


Fig. 4.

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Patented Mar. 10, 1953

2,630,773

UNITED STATES PATENT OFFICE

2,630,773

APPARATUS FOR ATTACHING ELASTIC BANDS TO GARMENTS

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Paris, France

Application February 12, 1951, Serial No. 210,462
In France February 10, 1950

5 Claims. (Cl. 112—2)

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Until now, elastic ribbons, especially made of rubber and placed in the hems of fashioned articles, such as drawers, slips and the like, were introduced continuously inside the hem being formed on the sewing machine, then cut at the end of said hem, the two ends of the elastic ribbon being attached together. It was thus necessary to use ribbons, the elastic material of which, such as rubber, was coated with a textile material, such as cotton, to make it possible to sew the ends together; said elastic ribbons, coated with cotton has only a limited elasticity (of the order of 150%). In addition, they were soon damaged and destroyed by the products used for washing clothes. Their application required complicated operations which increased considerably the cost of the articles.

The present invention obviates these drawbacks by creating a device, applicable to a sewing machine, allowing the introduction of a ribbon of a very elastic material, such as latex (which may have an elongation coefficient of 700%), manufactured in the shape of an endless band, directly inside the marginal hem of a clothing article or the like, at the time of the formation of said hem by the curling device on the sewing machine.

According to the invention, the device is characterized by four pulleys rotating about upright axles, attached to orientable supports, themselves associated with the table of a sewing machine, the endless rubber ribbon being made to pass under tension around said pulleys, one of which is placed before the guide for the hem formation preceding the presser foot of the sewing machine. This pulley has two grooves, a small upper groove for reversing the elastic ribbon to offer it substantially horizontally to the hemming guide and another lower groove being used for guiding the fabric which enters the curling guide.

According to other features, the device comprises a supporting frame for the four pulleys, making it possible to orient each one of them in a position ensuring a perfect guiding of the endless elastic ribbon. Three of the pulleys consist of a slightly trunco-conical lower flange and a trunco-conical upper flange which causes the ribbon to move down into the bottom of the groove formed by the assembly of two trunco-conical flanges. These pulleys are mounted on very soft operating bearings, particularly ball bearings, on the upright axles supported by the frame. The frame consists of a part, for attachment to the sewing machine, which includes a plurality of round bars supported in such a manner as to be able to rotate individually about their own axle and to be locked in a set position, thus giving a great facility of orientation for the pulleys. The fourth pulley, with two grooves, is to be placed in front of the hem stitcher on the sewing machine to lead thereto the edge of the fabric of the article and the elastic ribbon is presented flat above the edge of the fabric. The fourth pulley is supported by an articulated bracket allowing the easy raising and lowering of this pulley and a guide, placed on two of the pulleys causes the hem formed to deviate to prevent it from coming in contact with the pulleys. An apron attached on the support also prevents the fashioned article to be caught by certain parts of the device.

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Two types of embodiment of the device according to the invention are shown, by way of examples, in the appended drawings.

Figure 1 is a perspective view of a first type of embodiment.

Figure 2 is a transverse section of one pulley.

Figure 3 is a side elevation of the articulated support of a pulley.

Figure 4 is a perspective view of a second type of embodiment.

Figure 5 is a section along line V—V of Figure 4.

Figure 6 is a plane view corresponding to Figure 5.

Figure 7 is a side elevation of a pulley showing the inclination of the pulley with respect to the perpendicular.

According to Figure 1, 1 is a sleeve attached to the frame of a sewing machine (not shown), by an attachment plate 2.

A bent round bar 3 is introduced in the sleeve 1 and is locked therein by a set screw 4. Grooved pulleys 5, 6 are mounted on axles 5' and 6' respectively (Fig. 2) which are fixed to the bent bar 3; a second bent bar 7 is introduced at the other end of the sleeve 1 and carries a grooved pulley 8, similar to pulleys 5 and 6. The pulley 8 being mounted on axle 8' (Fig. 2) which is fixed to bar 7 in the same manner as axles 5' and 6' are fixed to bar 3. Sockets may also be provided in the bars 3 and 7 at right angles to each other to receive the axles 5', 6' and 8'. The sockets having their axis so positioned with relation to the axis of the bars that the axles may be positioned in a horizontal or vertical plane, thus permitting angular adjustment of the pulleys 5, 6 and 8 with relation to the axis of the bars 3 and 7.

An arm 9, integral with and on one end of the bar 7 is shaped in a suitable manner and

carries at its free end a sliding support 10, which is longitudinally adjustable along the arm 9. The support 10 carries a hinge 11 on which is mounted a grooved pulley 12. The adjustment of support 10 being accomplished by means of a bore 10' which receives the end of the arm 9 (Fig. 3), a set screw 10'' engaging the end of the arm 9 to retain the support 10 in adjusted relation to the arm 9.

The grooved pulleys 5, 6, 8 and 12 form the angles of a frame on which a rubber, latex or the like ribbon 13 is placed.

As shown in Figure 2, the pulleys 5, 6 and 8 comprise a trunco-conical working face 14 and a flange 15, also trunco-conical, the apex angle of which is opposite that of the trunco-conical working face 14. These pulleys are mounted on bearings 16, for instance ball bearings, and are inclined respectively on the bent bar 3 and the bent bar 7 with respect to the perpendicular by an angle substantially equal to the angle of cone 15 of the lower flange of the pulleys (Fig. 7). The axles 5', 6' and 8' on which the pulleys 5, 6 and 8 rotate are inclined on bars 3 and 7 so that the conical part 15 of each pulley will be substantially in line at their inner portion (*a*—Figs. 1, 4 and 7). In this position the pulleys will maintain the side of the ribbon 13 in contact with the lower portion of the trunco conical working face 14 and the edge of the ribbon 13 in contact with the cone 15. This angle is important for if the axles 5', 6' and 8' were in perpendicular relation to the bars 3 and 7 the ribbon 13 would run off of the pulleys.

The pulley 12, mounted on the hinge 11 of the sliding support 10 comprises a narrow upper groove 17 which reverses the ribbon 13 to offer it substantially horizontally to the hemming guide 20; and a wider lower groove 18 which is used to guide the fabric which enters the curling guide. The second groove 18 is also used to form the marginal hem inside of which the ribbon is placed when it is brought into engagement with the hemming guide 20. For the formation of this marginal hem by the pulley, the operator maintains the edge of the fabric against the inner wall of the pulley so that as the pulley rotates the edge of the ribbon, which is received in groove 17, will be turned over to bring the turned over edge into overlapping relationship with the side of the ribbon. It is mounted on bearings 19 similar to the bearings 16 of the pulleys 5, 6 and 8.

The ribbon of rubber or of other elastic material 13 is compelled to move on its edge at the base of the working surface of each one of the pulleys 5, 6 and 8 due to the inclination of the latter with respect to the horizontal and it is compelled to move on its edge in the narrow groove 17 of the pulley 12, so that it is presented substantially flat after the latter, considering a direction of rotation along the arrow *f*.

A hemming guide 20 keeps the rubber ribbon 13 horizontally and on edge up to the presser foot 21 of the sewing machine.

To place the elastic holding ribbon for an under-garment such as drawers, slips or the like, the position of the bent bars 3 and 7 in the sleeve 1 is adjusted by means of the screw 4 so as to obtain a frame, the perimeter of which is substantially larger than that of the elastic ribbon used for a given size of undergarment, so that said ribbon be slightly stretched on the frame; to facilitate this operation, the hinge 11 is pivoted in the position 11*a* shown in dotted lines in Figure 3; the rubber ribbon being arranged on the pulleys, the hinge 11 is brought back to its initial position, which automatically places the elastic ribbon 13 under tension in the hemming guide 20, then the presser foot 21 of the sewing machine is lowered and the machine is put in operation until all the elastic ribbon 13 is enclosed inside the hem stitched by the machine.

According to the modification of Figure 4, the sleeve 1 is replaced by a support 22 in which a groove with a partially cylindrical section 23 is formed. Two axles, 24 and 25 can slide inside the groove 23 and be locked by conical screws 26 or any other suitable device.

The axles 27 and 28 are provided with conical ends 27' and 28' respectively, which are inserted into similarly shaped openings 27'' and 28'' respectively in the axles 24 and 25. The axles 27 and 28 may be rotated by such mounting to adjust the angular relation of the axles 5', 6' and 8' with respect to the perpendicular. Set screws 27''' and 28''' respectively, when screwed into the ends 27' and 28' respectively of the axles 27 and 28 will retain the axles at any adjusted or set position. Thus the pulleys 5, 6 and 8 will be inclined with respect to the vertical plane passing through the longitudinal axis of the axles 27 and 28 which may also be adjusted with respect to the horizontal plane passing through the longitudinal axis of axles 24 and 25. The axles 24 and 25 may also be rotated and locked in set position by means of screws 26.

The pulleys 5, 6 are mounted on axles 29, 30, perpendicularly to the axle 27.

The pulley 8 is mounted in the same manner on an axle 31 perpendicular on the axle 28. A guide 32, consisting of a metal plate or the like, suitably shaped, is attached above the two pulleys 5 and 6 and comprises a finger 32*a* parallel with the direction of the elastic ribbon 13.

An apron 33 is attached on the axle 25 of support 22 beneath the pulley 8 by a screw 38, so as to protect the fabric against any asperities which may exist on said support.

A slot 34 allows an access to the locking screws 26.

The arm 9 is replaced by a bent axle 35 which is mounted in a bearing 40 attached to the support 22 and on which a support 36 can slide and be locked at the set position; this support at its free end, comprises a hinge 37 on which the pulley 12 is mounted. The opposite end of the bent axle 35 is inserted into the opening 40' in the bearing 40 which is secured to the support 22 by means of a screw 41 and a set screw 42 in the bearing 40 will engage and retain the end of the axle 35 in the bearing 40 in any adjusted or set position.

The operation of the device is identical with that described above in connection with Figure 1.

We claim:

1. A device for passing an endless elastic ribbon inside a marginal hem being formed in a fashioned article, comprising a main support, means for attaching said main support to the table of a sewing machine, a frame arm connected to each end of said support, a plurality of vertically disposed axles fixed to said frame arms in spaced relation to each other, a horizontally disposed trunco-conical grooved pulley journalled on each of said axles in the same plane, a second support pivoted on one end of one of said frame arms, a vertically disposed axle fixed to said second support, a pulley journalled on said last axle in the same plane as said first pulleys,

said last pulley having two grooves therein, a lower groove for guiding the fabric, and a smaller upper groove for guiding the elastic ribbon flat over the fabric, said last pulley adapted to be arranged ahead of a hem stitcher on a sewing machine preceding the presser foot of the machine.

2. A device for passing an endless elastic ribbon inside a marginal hem being formed in a fashioned article, comprising a main support, means for attaching said main support to the table of a sewing machine, said main support provided with a longitudinally extending groove having a partially circular section therein, a round bar stub positioned in said groove at each end of the main support and extending outwardly of said main support, said stubs adapted to be rotated about their axes and means for retaining said stubs in selected adjusted positions, an arm attached to each free end of each stub and extending at right angles thereto in the same plane and direction, said arms adapted to be rotated about their axes and means for retaining said arms in selected adjusted positions, a pair of vertically disposed axles secured to one of said arms, a pulley journalled on each of said axles, a vertically disposed axle secured to the other of said arms, a pulley journalled on said last said axle, a bearing member attached to one end of said main support, a right angularly disposed bar journalled in said bearing member, means for retaining said right angularly disposed bar in selected adjusted positions, an auxiliary support mounted for rotation on said right angularly disposed bar, means for retaining said auxiliary support in selected adjusted positions, said auxiliary support having a forked end and a transversely disposed axle secured in said forked end, a bracket pivotally journalled on said last said axle, a vertically disposed axle secured to said bracket and a pulley journalled on said last said axle.

3. The device as in claim 2 wherein the first and second of said pulleys have a slightly trunco-conical lower flange and a trunco-conical upper flange for guiding the elastic ribbon and the last of said pulleys is provided with two superposed grooves with the upper groove being narrower than the lower groove.

4. The device as in claim 2 wherein a guide is provided for covering the first said pulleys and a finger extends from said guide for deflecting the hemmed edge of the article.

5. The device as in claim 2 wherein a protecting apron is secured to said support.

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