

United States Patent [19]

Lee

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[54] APPARATUS FOR EDGE FINISHING BODY
OPENING IN GARMENTS

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[52] U.S. Cl. 112/121.12

[51] Int. Cl. D05b 21/00

[58] Field of Search 112/2, 3, 18, 121,
112/121.11, 121.12, 121.14, 121.15, 121.2

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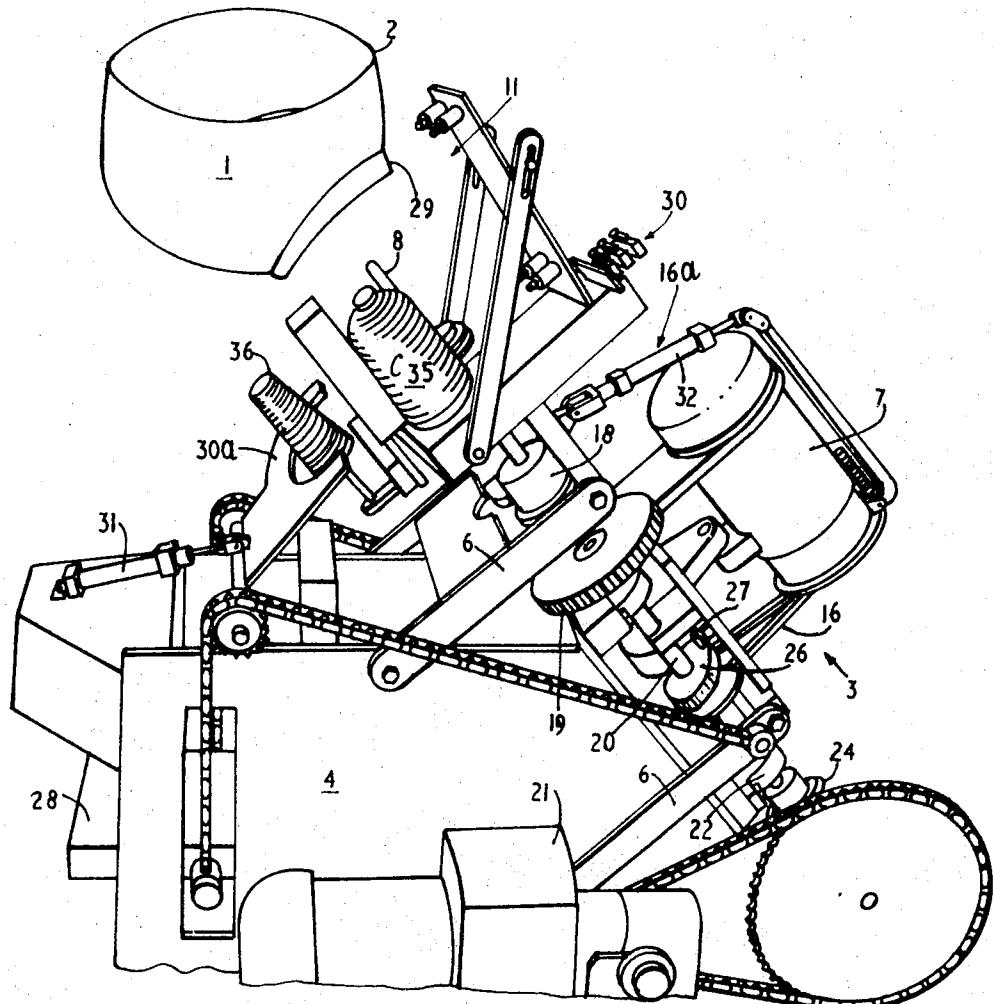
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Primary Examiner—Werner H. Schroeder
Attorney—McDougall, Hersh, Scott

[57] ABSTRACT

An edge finishing machine for an opening in a garment, the machine comprising a table movable on a frame by cam means, a sewing machine mounted on a shaft rotatably supported on the table. The cam means and the rotational movement of the sewing machine causing the sewing machine needle to traverse a path which is a duplicate of the profile of the garment opening and a garment support located adjacent the machine.

6 Claims, 3 Drawing Figures

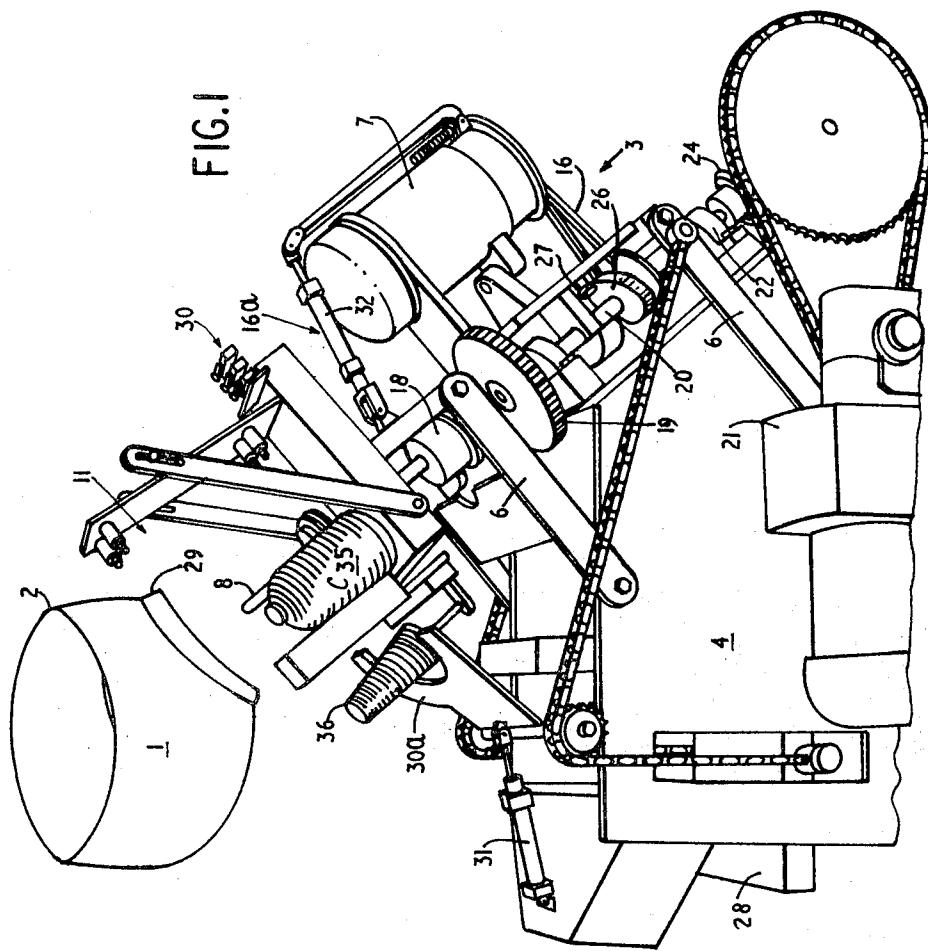


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FIG. 1

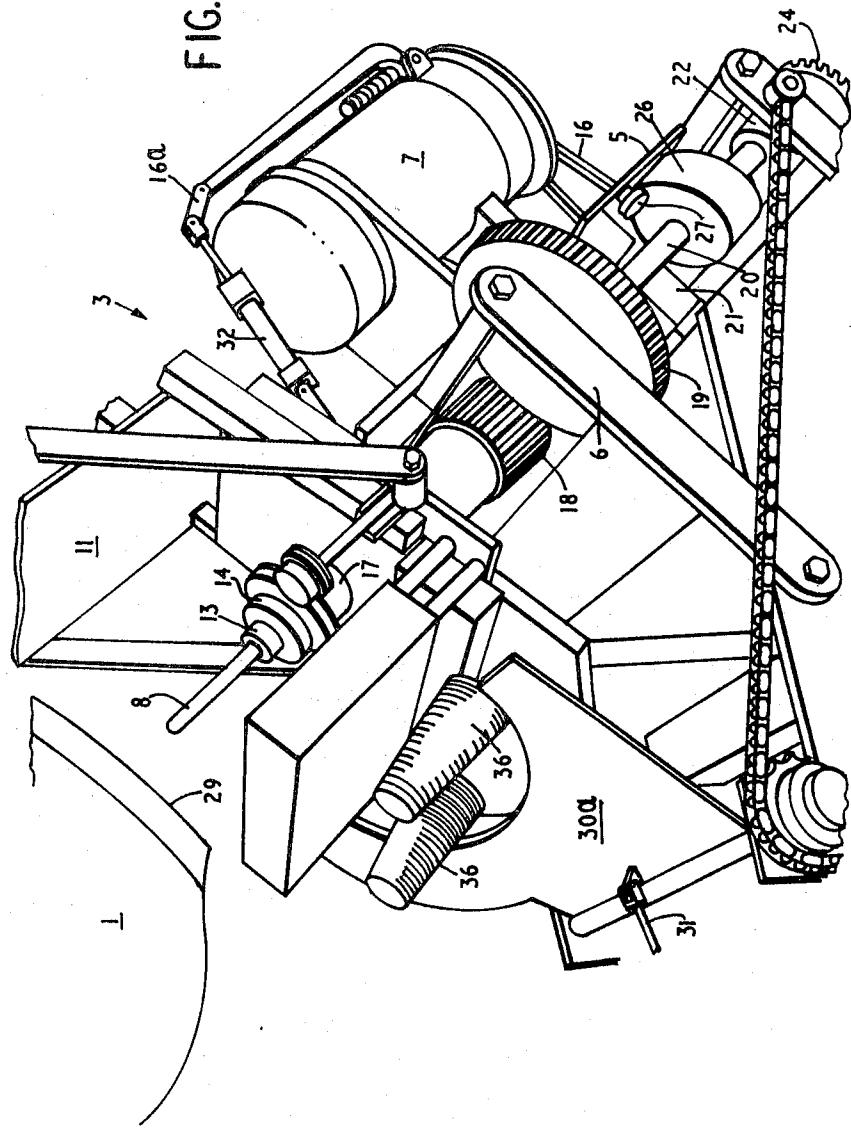


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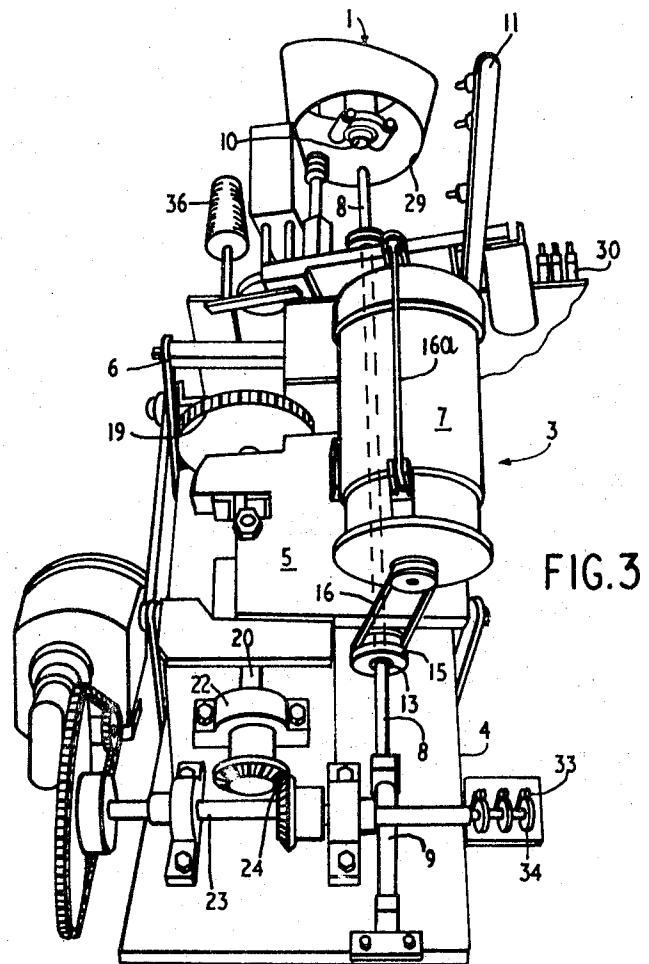
FIG. 2



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APPARATUS FOR EDGE FINISHING BODY OPENING IN GARMENTS

In the manufacture of garments the raw edge of openings therein e.g. leg or head openings require overlocking or hemming to prevent fraying of the garment material and to present an edge finish of acceptable appearance.

This is particularly so in the manufacture of garments such as underpants for men and briefs for females. In the latter it is also desirable to have the leg openings elasticated.

The present invention has been devised primarily to provide a machine which will edge finish and if desired simultaneously elasticise the leg openings of female briefs.

Accordingly the invention provides an edge finishing machine for an opening in a garment; said machine comprising in combination with a body form on which a semi-finished garment can be mounted with the opening to be finished in juxtaposition to said machine, said opening being circular with respect to an axis; a main frame, a table mounted on the main frame and movable to and fro, a work shaft rotatably mounted on the table co-axial with said axis, a sewing machine support fixed to the work shaft, cam means on a drive shaft rotatably mounted on the frame to engage and move the table to and fro in a path which represents the profile of the garment edge to be finished in a plane at right angles to said axis, power transfer means coupling the work shaft and the drive shaft to effect rotation of the former, a sewing machine drive comprising a lay shaft mounted rotatably on the table co-axial with the work shaft and adapted to transfer a drive from a sewing machine motor when mounted on said table to a sewing machine when mounted on said sewing machine support and control means for energising said sewing machine motor and controlling the sewing machine functions as a result of the rotation of said drive shaft, the arrangement being such that rotation of the drive shaft effects rotation of the sewing machine support and movement of the table to cause the sewing mechanism of a sewing machine to trace a path which is circular relative to said axis and follows the profile of the garment opening edge in a plane at right angles to said axis.

The drawings illustrative of the invention in one form and now described are

FIG. 1 is a perspective side view of the machine.

FIG. 2 is an enlarged view of part of FIG. 1 and

FIG. 3 is an end view.

Briefs, preformed to the point of requiring leg opening finishing are mounted on a body form support 1 shaped like the waist 2 to leg part of the body torso which is juxtaposed a finishing machine 3. The machine comprises a main frame 4 on which is mounted a movable table 5. Two pairs of arms 6 connect the table 5 to the frame 4 and on the upper surface of the table 5 there is secured a drive motor 7. Rotatably supported in bearings on the underface of the table 5 is the outer of a pair of concentric tubes and through the centre of the inner tube there is a shaft 8. The shaft 8 is slidably mounted in the inner tube and is connected by a cylinder 9 whereby the shaft 8 may be moved into and out of an aligning socket 10 in the body form.

The support 1 would in a production situation be ideally mounted on a rotatable work head so as to be indexed between various positions where the garment

would be (a) loaded (b) sewn (c) removed. With such an arrangement, in order to accurately position the support 1 in the garment finishing position, a combination of the shaft 8 and the socket 10 would be essential.

The table 5 is moved to and fro so as to bring a sewing machine (not shown in the interest of clarity) mounted on a carrier indicated generally 11, into sewing vicinity with the leg opening of the body form. The sewing machine could be a standard Singer sewing machine Type No. 246 K43 as commonly used in the garment industry or a similar machine.

The inner tube indicated 13 has a pulley 14 fixed to it, the pulley 14 drives the sewing machine through a belt. The drive for the tube 13 is by means of the pulley 15 and belt 16 coupling pulley 15 to motor 7. The motor 7 has an air cylinder operated clutch, the control cylinder and operating lever therefore are indicated generally by the numeral 16a.

The sewing machine carrier 11 is rotatably mounted relative to the table 5 and is secured to the outer tube 17 of the concentric tubes. Also secured to the outer tube 17 is a wide spur gear 18. This spur gear 18 is driven by a gear 19 fixed to a shaft 20 rotatably mounted in bearings 21 and 22 on the frame 4. The shafts 20 is driven from a main drive shaft 23 through a pair of bevelled gears 24. From the foregoing it will be seen that rotation of the shaft 23 causes the shaft 20 to rotate thereby driving gear 18 through gear 19 with the result that the sewing machine carrier 11 rotates with the sewing machine needle concentric with the concentric tubes and the shaft 8 and hence the leg opening of the body form. The gear 18 is made sufficiently wide so that as the table 5 is moved to and fro under the influence of cam means the gears 18 and 19 will remain in driving engagement. The cam means comprises a rotating cam 26 fixed to the shaft 20 and a co-operating cam roller 27 mounted on the underface of the table 5. The load on the cam and roller 26, 27 is lightened by means of a chain supported counter balance weight 28. The to and fro movement of the table 5 can be modified as required to accommodate the shape of an edge to be hemmed. For example, the leg opening in the body form, when looked at in the direction of the shaft 8, is circular in cross section but the edge 29 of the opening when viewed at right angles to the axis of the shaft 8 is not in the one plane.

The wavy profile of the leg opening edge is followed by the sewing machine needle by reason of the cam and follower 26 and 27.

Certain operations of the machine, as referred to earlier, are controlled by air cylinders. For example the shaft 8 is advanced and retracted as required by air cylinder 9, also the sewing machine clutch arrangement 16a includes an air cylinder which must be operated at an appropriate time. The sewing machine carrier 11 carries three air cylinder control valves indicated generally 30. These air control valves are operated from cams (not shown) on plate 30a. The valves 30 provide for normal sewing machine functions for example the operation of a thread cutter (in known manner) and the blowing away of threads and fluff. The sewing machine may be of the known type which trims the edge of the garment just prior to hemming thereby requiring the trimmings also to be blown away. The cam carrying plate 30a is moved into and out of alignment with valves 30 by an air cylinder 31 which with cylinder 32

of the assembly 16a and cylinder 9 are operated by valves 33 and cams 34 on the shaft 23.

In order to deliver air to the valves 30 a gland of known type is mounted around tube 17, so that air can pass into an air take-off manifold on the tube 17 and from there to the valves 30 by piping.

Because of the larger inertia of the rotating sewing machine and its carrier 11 it is rotated continuously.

The spool indicated 35 indicates elastic thread which may be sewn simultaneously around the leg opening of the garment with an overlocking stitch using cotton indicated 36.

I claim:

1. In an edge finishing machine for an opening in a garment, said machine being used with a body form on which a semi-finished garment can be mounted with the opening to be finished located adjacent said machine, said opening being circular when viewed along its axis and the garment edge having an uneven profile when viewed perpendicular to the axis, said machine including a main frame, and a support on the main frame for supporting a sewing machine to be used for performing the finishing operation, the improvement comprising a table mounted on said main frame and movable to and fro relative to the main frame, a work shaft rotatably mounted on the table co-axially with said axis, a main drive shaft rotatably mounted on the frame, cam means mounted on the drive shaft, a cam follower connected to said table and engaged with said cam means whereby rotation of the drive shaft moves said cam follower to impart said to and fro movement to the table, said cam means defining a configuration such that the movement of the table corresponds with said uneven profile of the edge of the garment, power transfer means coupling said work shaft and said drive

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shaft to effect rotation of the work shaft as the drive shaft is rotated, means connecting said work shaft to said sewing machine support for rotation of the sewing machine support, separate drive means for said sewing machine comprising a shaft mounted rotatably on said table co-axially with said work shaft, a sewing machine motor mounted on said table, and a drive means coupling the sewing machine motor to the sewing machine drive shaft, and including a second coupling means connected to the sewing machine drive shaft, said second coupling means being positioned adjacent the sewing machine on said support for operation of sewing machine mechanisms.

2. The machine as claimed in claim 1 including first and second control means, said first and second control means being operated upon rotation of the main drive shaft to energize said sewing machine motor and to control other sewing machine operations.

3. The machine as claimed in claim 2, wherein the control means comprises a plurality of air cylinders, air valves and cams, said valves and cams being brought into operative engagement as a result of the rotation of said work shaft.

4. The machine claimed in claim 3 wherein the locating bar is axially moved by an air cylinder operated by one of said cam-valve combinations.

5. The machine claimed in claim 1 including counterweights to facilitate the movement of the table.

6. The machine as claimed in claim 1, including a locating bar comprising an axially movable shaft which is co-axial with the work shaft and mounted on said table, moving means to axially move said locating bar, and a socket opening in the body form in line with said axis and dimensioned to slidably receive the locating bar.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,759,199 Dated September 18, 1973

Inventor(s) Harold Barry Lee

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

column 1, line 63, after "connected" change "by"
to --- to ---;

column 4, line 23, cancel "work" and substitute ---
main drive ---

Signed and sealed this 9th day of April 1974.

(SEAL)

Attest:

EDWARD M.FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents