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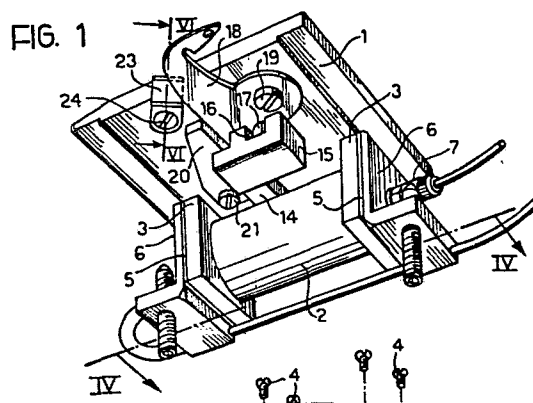
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54 Thread cutting device for sewing machines.

57 To control the oscillation of a hook-shaped cutter (18), the device uses a fluid pressure actuator fixed directly beneath the throat plate (1) and operating the hook by means of an arm (14) connected directly to the central part of a slidable plunger (8) within the cylinder (2). The cylinder is provided with flanges (3) to which are connected end plates (6) with the interposition of sealing sheets of elastomeric material (5) serving as shock absorbers. The hook-shaped cutter cooperates with a rectilinear counter-blade (23) which is lightened towards the point and can be made from hard metal such as metal carbides.



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"Thread cutting device for sewing machines".

The subject of the present invention is a thread cutting device for a sewing machine, comprising:

- a support plate serving as a throat plate
- 5 - an actuator supported below the support plate and constituted by a cylinder supplied with a fluid under pressure at its two ends, and a piston slidably mounted in the cylinder,
- a hook-shaped cutter pivoted to the support plate
- 10 and driven by the said piston to effect angular displacements in two directions,
- a guide plate for the cutter carried by the support plate,
- a resilient counter-blade fixed to the support plate
- 15 and cooperating with a hook-shaped cutter for cutting the thread gripped by the hook.

The device forming the subject of the present invention is principally characterised by the fact that the

20 cylinder of the actuator is fixed directly to the support plate and is provided with an aperture in its central part, and in that the piston is provided centrally with a transverse arm which passes through the said aperture in the cylinder

25 and drives, by means of a pin and groove coupling, the oscillations of the hook-shaped cutter.

By virtue of this characteristic, there is obtained

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a better sliding of the movable plunger and better resistance to stresses which occur during cutting, particularly in the case of thick threads.

5 Further characteristics and advantages of the present invention will become apparent from the description which follows, made with reference to the attached drawings, provided purely by way of non-limitative example, in which:

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Figure 1 is a perspective view from below of a thread cutting device according to the invention,

Figure 2 is an exploded view of Figure 1,

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Figure 3 is an exploded view of a detail of the actuator,

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Figure 4 is a longitudinal axial section of the actuator,

Figure 5 is a perspective view of the counter-blade, and

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Figure 6 is a sectional view illustrating the cooperation between the counter-blade and the hook-shaped cutter.

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A support plate adapted to be fixed to a sewing machine in place of the throat plate is indicated

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by the reference numeral 1. A cylinder forming part of a fluid pressure actuator (pneumatic or hydraulic) is indicated with the reference numeral 2. The cylinder 2 is provided with end flanges 3 having a square form. One of the edges of each of the two flanges 3 is provided with a pair of holes 3a for the direct fixing of the cylinder 2 to the underside of the support plate 1 by means of screws 4.

10

To each flange 3 there is fixed, with the interposition of a thin plate 5 of elastomeric material, an end plate 6 carrying a union 7 for the supply of fluid under pressure. A cylindrical plunger, comprising a piston which is mounted slidably within the cylinder 2, is indicated with the reference numeral 8. The plunger 8 is provided, near each of its ends, with a groove 9 in which is housed a toroidal sealing ring 10.

20

In the central part of each of the two ends of the plunger 8 there is screwed a screw 11 intended for the adjustment of the stroke of the plunger 8 within the cylinder 2, which is driven in two directions by fluid under pressure (air or oil) entering one or the other of the two ends of the cylinder through one of the unions 7.

In addition to the function of effecting a seal between the cylinder 2 and the end plates 6, the

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thin plates 5 also have the function of damping the shocks as the slidable plunger 8 strikes against the end plates themselves, thus significantly reducing the operating noise of the device. The direct
5 fixing of the cylinder 2 to the support plate 1 makes the device very compact and resistant to applied forces .

The plunger 8 is provided in its central part
10 with a groove 12 to which there is fixed, by means of a screw 13, an arm 14 which passes out from the cylinder 2 through a wide aperture 2a formed in the central part of the cylinder. The arm 14 is provided at its free end with a transverse projection
15 15 having a longitudinal groove 16. In the groove 16 engages a pin 17 carried by a hook-shaped cutter 18 pivoted below the plate 1 by means of a screw 19, such that the reciprocating axial displacement of the plunger produces a reciprocating angular
20 displacement of the hook-shaped cutter 18 about the screw 19.

A guide plate for the cutter, having an elongate form and directed orthogonally with respect to
25 the longitudinal axis of the cylinder 2, is indicated with the reference numeral 20. The plate 20 is fixed to the support plate 1 by means of a screw 21 and has a pin 22 which engages in a hole of the plate 1. A counter-blade intended to cooperate
30 with the hook-shaped cutter 18, to effect cutting

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of a thread gripped by this cutter, is indicated with the reference numeral 23. The counter-blade 23 has an attachment part 23a provided with a hole for fixing, by means of a screw 24, to the support plate 1, and a flat part 23b which is reduced in thickness and which ends with a cutting edge 23c shaped in the form of a transverse ridge and intended to cooperate with the hook-shaped cutter 18.

Due to this configuration, the counter-blade 23 can be made in a hard metal, such as a metal carbide. Moreover, the characteristic form of the counter-blade according to the invention makes it possible to use a hook-shaped cutter of greater thickness and therefore of greater strength than known cutters, as well as strengthening the transport member (not shown in the drawings) which has a slot for the passage of the hook and into which the counter-blade partly penetrates.

It will also be noted that the disposition and form of the guide plate 20 described above makes it possible to prevent pieces of cut thread from lodging between this guide plate and the support plate 1.

Naturally, the principle of the invention remaining the same, the details of construction and the embodiments of the device can be widely varied without by this departing from the scope of the present invention.

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CLAIMS:

1. A thread cutting device for a sewing machine, comprising:

- a support plate serving as a throat plate,
- 5 - an actuator supported beneath the support plate and constituted by a cylinder supplied with a fluid under pressure at its two ends, and a piston slidably mounted in the cylinder,
- a hook-shaped cutter pivoted to the support plate
- 10 and driven by the said piston to effect angular displacements in two directions,
- a guide plate for the cutter, carried by the support plate,
- a resilient counter-blade fixed to the support plate
- 15 and cooperating with the hook-shaped cutter for cutting the thread gripped by the hook,

characterised by the fact that the cylinder (2) of the actuator is fixed directly to the support plate (1) and is provided with an aperture (2a) in its central part, and in that the piston (8) is provided centrally with a transverse arm (14) which passes through the said aperture (2a) of the cylinder (2) and drives the oscillations of

20 the hook-shaped cutter (18) by means of a pin and groove coupling (17,18).

25

2. A thread cutting device according to Claim 1, characterised by the fact that the piston (8) is

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in the form of an elongate cylindrical body provided,
near each end, with a groove (9) housing an annular
seal (10) and, on each end, having a screw (11)
serving for the adjustment of the stroke of the
5 piston.

3. A thread cutting device according to Claim 1,
characterised by the fact that the cylinder (2)
of the actuator is provided at each end with a
10 flange (3), fixed by means of screws (4) to the
support plate (1), and in that against each flange
(3) there is fixed, with the interposition of a
sealing plate (5) of elastomeric material, an
end plate (6) carrying a pipe union (7) for the
15 supply of fluid under pressure.

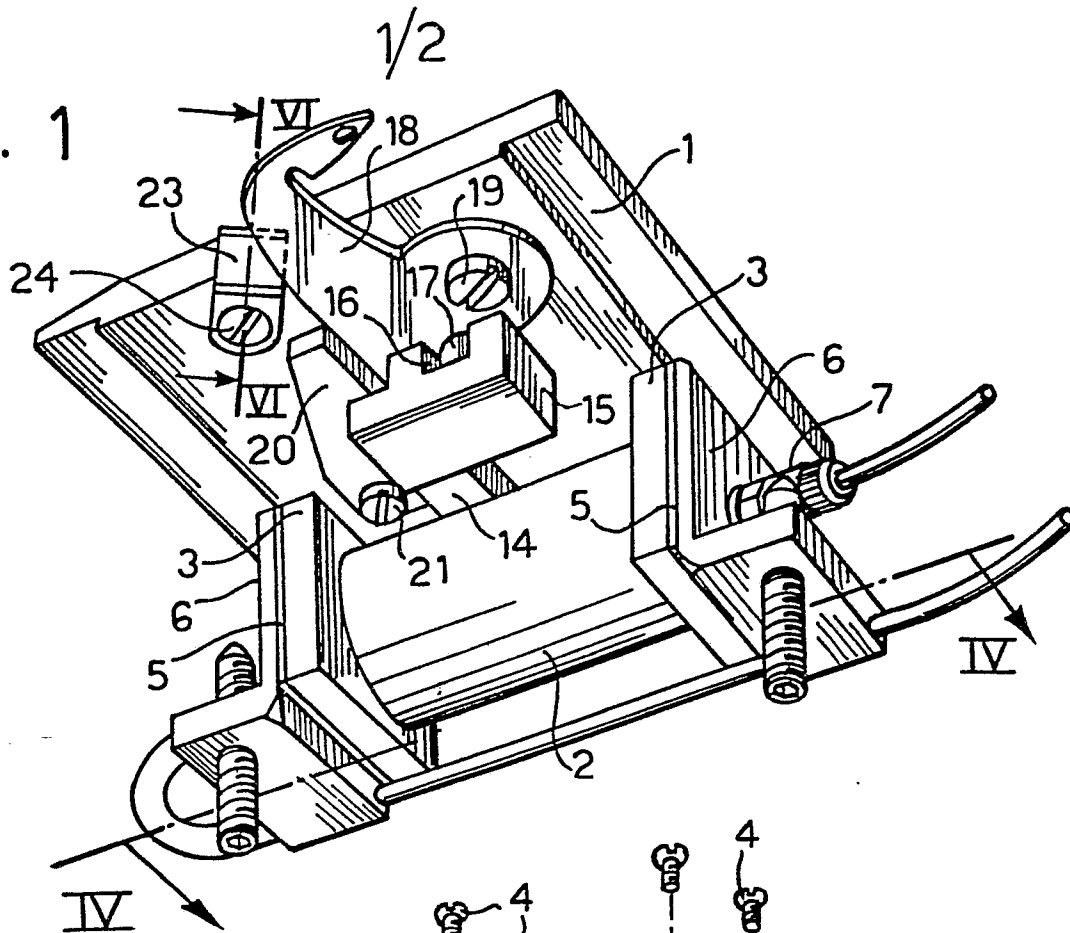
4. A thread cutting device according to Claim 1,
characterised by the fact that the guide plate
(20) of the hook-shaped cutter (18) is of elongate
20 form and extends in a transverse direction with
respect to the axis of the cylinder (2) of the
actuator.

5. A thread cutting device according to Claim 1,
25 characterised by the fact that the counter-blade
(23) is in the form of a flat plate of reduced
thickness having at one end a thickened attachment
region (23a) and at the opposite end a sharpened
edge (23c) in the form of a transverse ridge in-
30 tended to cooperate with a hook-shaped cutter (18).

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6. A thread cutting device according to Claim 5, characterised by the fact that the counter-blade is made of a hard metal, particularly metal carbides.

FIG. 1



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FIG. 3

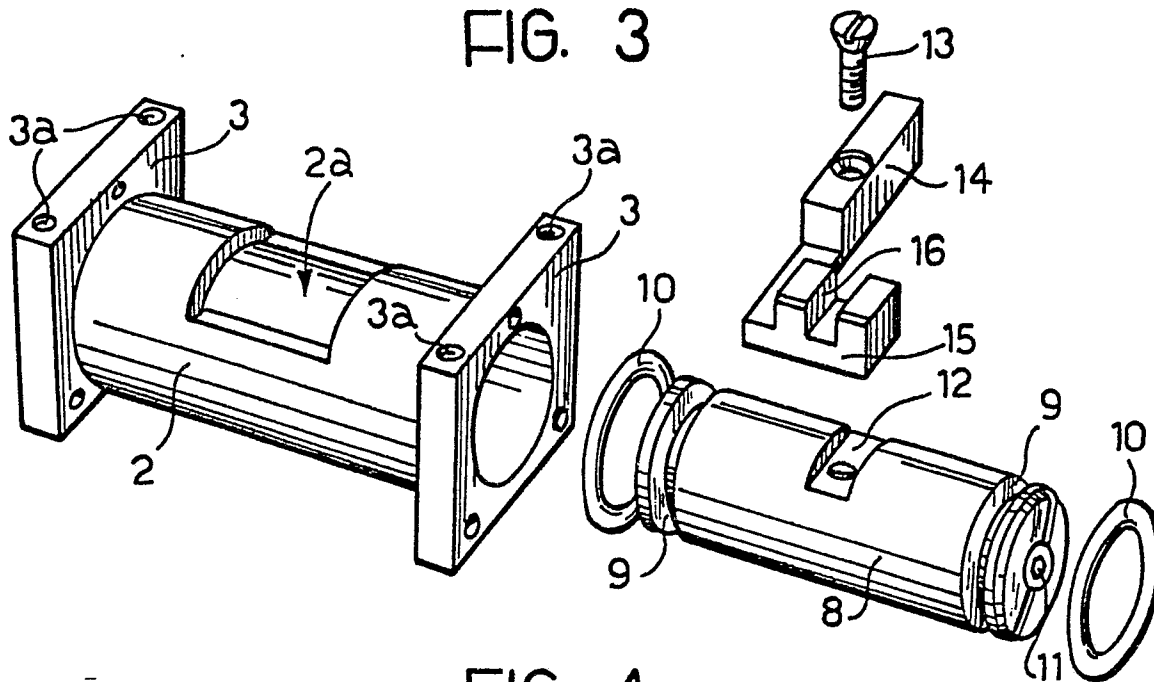


FIG. 4

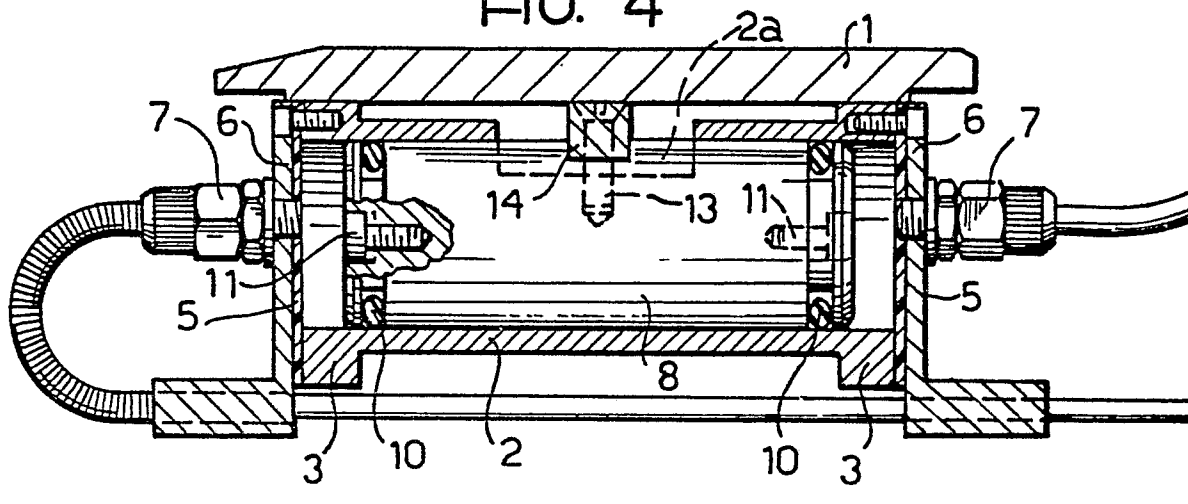


FIG. 5

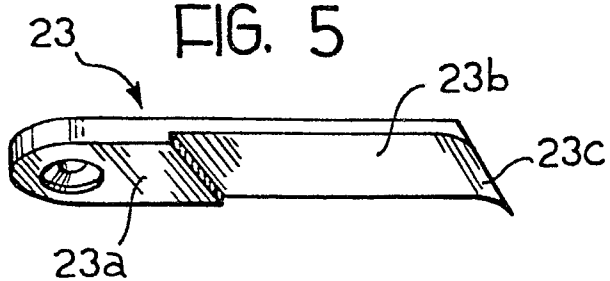
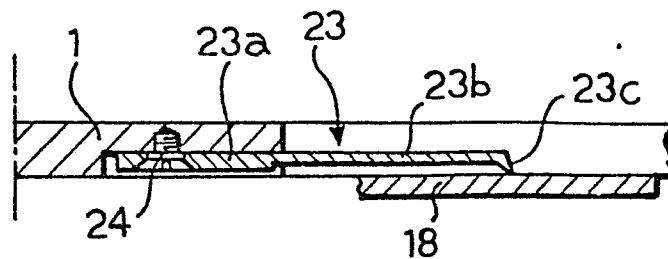


FIG. 6





DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>US - A - 4 202 286</u> (COSTAS) * Whole document *	1,2, 3,5	D 05 B 65/00
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	<u>AU - A - 16 660</u> (JURISIC) * Page 5, line 13 *	6	
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	<u>FR - A - 2 360 702</u> (UNION SPECIAL) * Page 3, line 10 *	3	TECHNICAL FIELDS SEARCHED (Int. Cl.)
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	<u>US - A - 3 369 509</u> (BURTON) * Column 2, lines 35-39 *	3	D 05 B
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	<u>US - A - 3 648 634</u> (HAZENDONK) * Whole document *	4,5	

			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search The Hague	Date of completion of the search 18-09-1981	Examiner VUILLEMIN	