

The invention relates to a device of the type described in the concept of claim 1.

A device of the initially described type is known, for example from the FR-A-2 097 352 and the DE-A-21 32 853. It comprises a cutting elements which is pivotable around an axis and which has an electrically heated cutting part arranged at a slant in the direction of movement of the length of material. The cutting element is connected to an arm which co-acts with an electromagnet serving as a detent mechanism. Due to the slanted arrangement of the cutting part, the length of material moves, in the event of increased cutting resistance at the cutting part, upwards into portions of higher temperature. If the cutting force thereat is no longer sufficient, then the load applied by the length of material onto the cutting part, and thus on the cutting element, increases to exceed that of the detent resistance of the electromagnets, so that the arm is freed from the electromagnet and pivots the cutting part to the bottom side of the length of material. The up- and down-movements of the length of material at the cutting part results in an unsteady cutting process which may result in irregular, and thus untidy cuts. Furthermore, this device is not suitable for lengths of material under high tension which cannot move upwards on the cutting part. Finally, the relatively complicated device does not provide for a displacement of the cultured transversely to the length of material, which is also not possible because of the stationary arrangement of the electromagnets of the detent mechanism.

The FR-A-2 368 427 and the DE-A-26 59 716 also describe a device for thermal cutting of a length of material, comprising an electrically heated cutting part which is pretensioned against a stop on a cutting arm by means of a tensioning spring. The stop serves the removal of heat. If the cutting resistance exceeds the pretensioning load, then the cutting part is lifted off the stop, thereby discontinuing the removal of heat, resulting in increased temperature and thus increased cutting output of the cutting part. Only when this cutting output of the cutting part is no longer sufficient, will the cutting part be moved on by the length of material, thus moving the pivot arm against a stop switch which terminates the transport of the length of material. The pendulum movement, and with it the alternating cutting output of the cutting part, also produce undesirable irregular cuts on the length of material. The relatively complicated device does not address a displacement of the cutterhead transversely to the length of material.

The DE-A-34 22 570 describes a knifeholder for a scissor-cut knife on a cutting-wheel machine, having a cutterhead guided along a support by means of a dovetail guide. This specification does not reveal any reference to a detent mechanism which secures the cutting wheel in the event of overloading.

It is an object of the invention to improve a device of the initially described type.

The object is achieved according to the invention by the characterising features of the claim. The virtually perpendicular alignment and rigid arrangement of the cutting part ensures an even cut of the length of material. And yet, the detent mechanism further ensures good reliability relative to interference whilst offering a simple structure of the cutterhead which can also

be moved transversely to the direction of movement of the length of material. The detent mechanism is integrated directly into the longitudinal guide of the cutter, thus serving not only the reliability but also the engagement and displacement of the cutting part on the support for maintenance and setting-up procedures.

Advantageous arrangements of the device are described in claims 2 to 7.

It is particularly advantageous if the detention force according to claim 2 is adjustable, so that the cutterhead or the cutting part can be adjusted to lengths of material of different cutting characteristics. Claim 3 describes a particularly simple advantageous embodiment of the detent mechanism. An arrangement as in claim 4 is also feasible. Claim 5 describes an advantageous further development.

It is basically feasible that the cutterhead is separated from the support during the release of the detent mechanism. However, more advantageous is an arrangement as in claim 5.

An arrangement of the device according to claim 6 prevents further damage to the length of material, as the current supply to the cutting part is immediately cut on separation, so that damage to the length of material by heat radiation of the cutting part is also prevented.

The embodiment of the device as in claim 7 makes it possible to set the position of the cutterhead and thus of the cutting element very subtly to the desired position on the length of material.

In principle, the device is suitable for cutting of widely varied lengths of materials, such as foils and the like. However, it preferably serves the cutting of

a length of textile material, in particular a length of weave.

Exemplary embodiments of the inventive device will now be described based on the drawings. Shown are, in

Fig. 1: a first cutting device, in a sideview across the direction of movement of a length of material;

Fig. 2: a second device, in a sideview across the direction of movement of a length of material;

Fig. 3: a third device, in a sideview across the direction of movement of a length of material.

Fig. 1 illustrates a device for thermal cutting of a length of material 2, for example a length of a weave, which is moved in the direction of movement 4. A cutterhead 8, which is arranged on a carrier 6 which extends over the width of the material, comprises a mounting foot 10 which is mounted on the carrier 6 so as to be displaceable in its longitudinal direction by means of a dovetail guide. A detent mechanism 14 is arranged on the side of the mounting foot 10 facing towards the length of material 2. It comprises a leaf spring 16 which co-acts with an edge 18 of the dovetail profile 20 on the carrier 6. The leaf spring comprises a run-up element 22 which makes it easier to place the cutterhead 8 on the carrier 6.

On the carrier 6 at the side facing towards the mounting foot 10 is arranged a toothed rack 24 which meshes a toothed wheel 26 which is mounted in the mounting foot 10. The toothed wheel 26 has at its upper free side means 28 for engaging a tool, for example a slot for engaging a screwdriver. The cutterhead 8 can

be displaced along the carrier 6 and set to the desired cutting position by means of the toothed wheel 26.

Furthermore, the cutterhead 8 comprises a cutting element 30 mounted in the mounting foot 10, comprising two arms 32 and 34 which extend into the transport path of the length of material 2 and at their free end an electrically heated cutting part 36, for example a resistance wire or a resistance lamella which is heated to the required cutting temperature when under a current. Both arms 32 and 34 are at their top end connected to a current source 38, 40.

The arrangement of the device is such that the detent mechanism 14 has a detention force in the direction of movement 4 of the length of material 2 which essentially corresponds with the force of the intended cutting resistance of the cutting part 36 on the length of material. If the cutting resistance of the cutting element 30 or the cutting part 36 exceeds the normal cutting resistance, for example due to a power failure or a material fault in the length of material, then the detent mechanism 14 is triggered and the cutterhead 8 pivots over the top edge 42 of the dovetail profile 20 of the carrier 6 so far out of the length of material 2 until the cutting element 30 is disengaged from the length of material 2. The cutting element 30 preferably has on its lower arm 34 a shoe 44 by means of which it is seated on the now uncut length of material 2.

The device of Fig. 2 corresponds essentially with that of Fig. 1, so that identical parts are given the same reference marks, and reference is made to the statements relative to Fig. 1. In addition to the device of Fig. 1, the detent mechanism 14a of Fig. 2 is adjustable relative to the detent force. For this purpose, a setting screw 46 is provided, by means of which the pretensioning load of the leaf spring 16 is set.

Furthermore, the current supply to the cutting element 30 or the cutter part 36 is ducted via a switch 48 to which a power source 38a is connected. The switch 48 includes a contact element 50 which is pretensioned towards the carrier 6 by means of a spring 52 and which disconnects the current supply 54 to the arm 32a when the cutterhead 8a is released, so that the cutting element 36 is without current when the cutterhead 8a is released.

The exemplary embodiment of Fig. 3 corresponds essentially with the exemplary embodiment of the device of Fig. 1, so that identical parts are again given the same reference marks, and reference is made to the above statements. The embodiment of Fig. 3 has a modified guide for the mounting foot 10a on the carrier 6a and a modified detent mechanism 14b. The profile track 56 extending along the carrier 6a has at the top side a ledge 58 which comprises cross-sectionally an essentially spherical head section 60 which is connected to the remaining part of the profile track 56 via a web element 62. The mounting foot 10a is engaged on this ledge 58 by means of a foot element 64 having a partially spherical cut-out 66, so that the mounting foot 10a can pivot around the ledge 58. Furthermore, the mounting foot 10a has a lower foot element 68 which reaches under the profile track 56 and which supports the detent mechanism 14b. The latter comprises a ball-like detent element 70 which is pretensioned by means of a spring 72 against a groove 74 in the profile track 56. The pretension can be adjusted by means of a set screw 76. This permits setting the detention force of the detent mechanism 14b to a desired measure and thus to the respective characteristics of a length of material to be cut.

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Patent Claims

- 1: Device for thermal cutting of a continuous length of material (2), preferable a textile, of thermoplastic material, comprising a cutterhead (8, 8a, 8b), which is arranged on a carrier (6, 6a) and has a heated cutting element (36), which is held in its operating position by means of a detent mechanism (14, 14a, 14b), the detention force of which in the running direction (4) of the length of material (2) corresponds substantially with the force of the intended cutting resistance of the cutting means (36) on the length of material (2) in such a manner that the cutting means (36) is disengaged in the event of unintended cutting resistance on the length of material (2), **characterised in that** the cutting means (36) is aligned virtually perpendicularly to the plain of the length of material (2), and the cutterhead (8, 8a, 8b) is mounted by means of a mounting foot (10, 10a) so as to be displaceable on one side, which is facing towards the running direction (4) of the length of material (2), of the dovetail-like profile track (20, 56), which is arranged across the length of material (2), and that a top foot section (64) of the mounting foot (10, 10a) is pivotable around a top profile portion (42, 58) of the profile track (20, 56), and the bottom foot section (68) accommodates the detent mechanism (14, 14a, 14b) which co-acts with the bottom profile portion of the profile track (20, 56).



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- 2: Device according to claim 1, **characterised in that** the detention force of the detent mechanism (14a, 14b) is adjustable.
- 3: Device according to claim 1 and 2, **characterised in that** the detent mechanism (14a) comprises a leaf spring, preferably one which is adjustable by means of an adjustment screw (46), which abuts the lower profile section (18) of the profile track (20).
- 4: Device according to claim 1 and 2, **characterised in that** the detent mechanism (14b) comprises a detent element (70), which is pretensioned by means of a spring (72) against the lower profile portion (74) of the profile track (56) and the spring force of which is preferably adjustable by means of an adjustment screw (76).
- 5: Device according to one of claims 1 to 4, **characterised in that** the mounting foot (10, 10a) in its released state glides on the length of material (2) by means of a shoe (44) which is attached to the cutting element (30) which supports the cutting means (36).
- 6: Device according to one of claims 1 to 5, **characterised in that** the cutterhead (8a) comprises an electrical switch (48) for an electrically heated cutting means (36), which disconnects the power supply (38a) when the detent mechanism is in its released state.



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- 7: Device according to one of claims 1 to 6, **characterised in that** on the carrier (6, 6a) is arranged in the displacement direction of the cutterhead (8) a toothed rack (24), which meshes a hand-operated toothed wheel (26) which is arranged in the mounting foot (10).

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