

This invention relates to a device for cutting stacked sheet material, with a table area which has a field of action above which a cutting knife and a crosshead of a press are located, an input field behind it for receiving the material to be cut and an output field in front of it for receiving the cut material, with a forward feed device for the material to be cut, which forward feed device has teeth which in its frontmost position engage in slots in the crosshead of the press, and with a lateral stop for aligning the material to be cut by means of a contact pressure slide which can move in the region of the field of action in the direction of the cutting line.

A device of this type is known from EP 0 242 763 A2. In this device an automatically movable contact pressure slide is provided for pressing the material to be cut against the lateral stop, the effective width of the forward feed device being less than the distance between the lateral stop and the contact pressure slide. Since the effective width of the forward feed device is reduced in relation to the normal machine width, the contact pressure slide can remain in position without colliding with the forward feed device. The operating travel and the duration of operation of the contact pressure slide are correspondingly short. Since the contact pressure slide is operated automatically, the time interval to the following cut can also be kept short. This form of construction results overall in a transverse alignment with a minimum time requirement, and furthermore does not result in any difficulties when effecting the alignment before each cut. This document also discloses that the contact pressure slide is disposed above the field of action behind the operating plane of the crosshead of the press. It is also proposed that when the crosshead of the press is raised the contact pressure slide can first be moved under the latter and then in the contact pressure direction, so that the contact pressure slide can be brought up as close as possible to the cutting line.

A disadvantage of this known device is that in order to adapt to different widths of the material to be cut the forward feed device has to be reset or replaced each time. This is caused by the requisite low effective width of the forward feed device in relation to the distance between the lateral stop and the contact pressure slide. This device can therefore

only be used economically when constant stack formats are to be cut into large numbers of pieces.

When cutting stacked sheet material, particularly when this material is present in strip form, aligning the material accurately on the lateral stop when the forward feed device is almost in its frontmost position is considered in practice to be particularly problematical. Even if the forward feed device is provided with teeth and the crosshead of the press is provided with corresponding slots and these parts partially penetrate each other, there remains a region adjacent to the cutting plane underneath the crosshead of the press in which a contact pressure slide can only be used by employing a design which involves considerable cost. In particular, this is because in customary devices of the aforementioned type the crosshead of the press is moved via connecting rods at the side of the table, which make it difficult to obtain access to the table area disposed underneath this region of the crosshead of the press.

The object of the present invention is to further develop a device of the aforementioned type so that alignment of the material to be cut is ensured in the immediate vicinity of the cutting plane, whilst maintaining a simple form of construction of the device in the region of the forward feed device, crosshead of the press, lateral stop and contact pressure slide.

This object is achieved in that the forward feed device extends substantially over the entire width of the table area and the contact pressure slide acts exclusively in the region of the field of action formed between the cutting plane and the frontmost position of the forward feed device. This form of the device according to the invention first of all makes it possible to cut any stack format without changing or replacing the forward feed device. On account of this, the device can be of general purpose form in the region of the forward feed device, and can have the spindle-operated forward feed brackets which are customary for guillotine type cutters, for example. In contrast to the prior art, the contact pressure slide is effective solely in the region of the field of action which cannot be reached by the forward feed device. This results in the contact pressure slide being of relatively narrow construction. Due to the arrangement of the contact pressure slide in the immediate vicinity of the cutting plane, sheets which are as narrow as desired can be aligned accurately at the lateral stop, irrespective of whether they are sheets which extend over the entire width of the table or

sheets in the form strip blocks. So that sheets of any format can be aligned, the contact pressure slide should be movable substantially over the entire table width, i.e. at least as far as the vicinity of the lateral stop.

One particular embodiment of the invention provides for the contact pressure slide to be attached to a slide rod which is disposed above the table area and which can be moved parallel to the cutting plane in the direction of the cutting line by a means of power. The slide rod may be formed by the piston rod of an adjusting cylinder, particularly a pneumatically operable adjusting cylinder, which is disposed outside the field of action. The adjusting cylinder is advantageously attached at the side of the table or to a frame of the device on which the cutter and the crosshead of the press are mounted. The possibility also exists of constructing the slide rod as a toothed rack which cooperates with a toothed wheel of a means of power, for example an electric servomotor, which is disposed outside the field of action.

The contact pressure slide may for example be disposed parallel to the lateral stop and rigidly attached to the end of the slide rod facing the lateral stop. Since, in order to perform its function, the contact pressure slide is situated at the top above the stack to be cut, this rigid arrangement of the contact pressure slide means that it has to be moved out of the working zone of the crosshead of the press before the latter descends. Another advantageous embodiment provides for the slide rod to be disposed directly adjacent to the table area and for the contact pressure slide to be attached, so that it can swivel about a horizontal axis, to the end of the slide rod facing the lateral stop. By this means the contact pressure slide is removed in a simple manner from the working zone of the crosshead of the press by being swung underneath the upper boundary surface of the stack to be cut after the latter has been aligned, whereupon it can remain in the immediate vicinity of the stack to be cut. In this embodiment an adjusting means is provided for swinging the contact pressure slide in particular between its vertical operating position and a substantially horizontal inoperative position. The adjusting means is advantageously be constructed as a rod which can be operated by a means of power and which acts on the contact pressure slide at a distance from the swivelling axis of the latter. In order to ensure a defined position of the contact pressure

slide in its operating position, it is considered advantageous if it is supported in its operating position via a bearing area on a corresponding bearing area of the slide rod.

The height of the contact pressure slide should be oriented towards the maximum height of the stack of sheet material in the device. In this context provision is made for the contact pressure slide to extend, in its operating position, substantially from the table surface to slightly below the raised crosshead of the press.

The slide rod is advantageously disposed between the cutting plane and a connecting rod for the crosshead of the press. Despite the restricted space between the cutting plane, namely the cutting knife and the forward feed device, and the mechanism for operating the crosshead of the press, sufficient space thereby remains for the defined movement of the contact pressure slide.

Other features of the invention are illustrated in the description of the Figures and in the subsidiary claims. In this respect it should be remarked that all individual features and all combinations of individual features are essential parts of the invention.

The invention is illustrated by way of example with reference to a fundamental embodiment with two partial variants, without being restricted to this embodiment, and where:

- Figure 1 is an extremely simplified illustration, in plan view, of a first partial variant of a guillotine type cutter for cutting paper, cardboard or the like, with the contact pressure slide situated outside the field of action;
- Figure 2 is an illustration corresponding to that of Figure 1, with the contact pressure slide in operation;
- Figure 3 is an end view A corresponding to Figure 2, shown without the forward feed device;

Figure 4 is a view corresponding to that of Figure 3, and represents a second partial view of the contact pressure slide, which is shown in its operating position;

Figure 5 is an illustration corresponding to Figure 4, showing the contact pressure slide slightly removed from the material to be cut, in order to clarify the swinging position of the contact pressure slide; and

Figure 6 is a detailed illustration B corresponding to Figure 5, to clarify the cooperation of the slide rod, the contact pressure slide, and the rod for operating the contact pressure slide.

Figure 1 first of all shows a table 1 for the guillotine type machine, which has a table area 2 subdivided into an input field 2a, a field of action 2b and an output field 2c. The input field 2a serves to receive the material to be cut. A crosshead 3 of the press, which is mounted on a frame of the cutting machine which is not shown, and a cutting knife 4, which is indicated merely as a dash-dotted line, are disposed above the field of action 2b. Reference numeral 4a denotes the cutting plane of the cutting knife 4. The output field 2c serves to receive the cut material. A forward feed device 5 in the form of a forward feed bracket is movably mounted in the input field 2a. The width of the forward feed bracket 5 is only insignificantly less than that of the narrow edge 6 of the table 1 which defines the width of the table 1. As seen in plan view, the forward feed bracket is constructed in the manner of a comb on its side facing the crosshead of the press, and thus has a multiplicity of uniformly spaced teeth (see Figure 2 also). The crosshead 3 of the press is correspondingly provided, on its side facing the forward feed bracket 5, with slots 8 in which the teeth 7 can engage. Figure 1 shows the maximum position of advance of the forward feed bracket 5, namely the nearest position to the cutting plane 4a which the forward feed bracket 5 can assume. In this position the teeth 7 of the forward feed bracket 5 completely engage in the slots 8 of the crosshead 3 of the press, so that a free space remains underneath the slot-free region 3a of the crosshead 3 of the press.

In order that material 9 to be cut which is situated in this free space can be aligned at a lateral guide 14, a contact pressure slide 10 is provided. This contact pressure slide can be

moved towards the material 9 to be cut in the direction of the cutting line, which is likewise denoted by reference numeral 4a in the plan view illustrated in Figures 1 and 2. As shown in Figures 1 to 5, the contact pressure slide 10 is attached to a slide rod 11, which is disposed above the table area 2 and which can also be moved parallel to the cutting plane 4a in the direction of the cutting line. The slide rod is constructed as a toothed rack which cooperates with a toothed wheel, which is not shown, of a servomotor 12 disposed outside the field of action 2b. The servomotor, and thus the slide rod 11 also, are disposed between one of the two connecting rods 13 for pulling down the crosshead 3 of the press and the cutting plane 4a.

For the first partial variant, the slide rod 11 is rigidly attached to the plate-shaped contact pressure slide 10 in the region of the middle of the latter, as shown in Figures 1 to 3. The contact pressure slide 10, which is disposed parallel to the lateral stop 14, extends substantially from the table surface 2 to slightly below the raised crosshead 3 of the press, and thereby, on account of the region of the contact pressure slide 10 which projects at the top above the material 9 to be cut, makes it possible to align any stack which can be processed by means of the device.

Figures 2 and 3 illustrate the conditions for the last cut being made in the immediate vicinity of the cutting knife 4 of five strip blocks 9a to 9e. The strip blocks are advanced towards the cutting plane 4a by means of the forward feed bracket 5, with the contact pressure slide 10 moved out of the field of action 2b. This is followed, as shown in Figure 2, by the advance of the slide rod 11 with the contact pressure slide 10 until the latter is seated against the outside of the strip block 9a and the material 9 to be cut is pressed completely against the lateral guide 14 and is thereby laterally aligned. This position is also shown in the front view illustrated in Figure 3. After the alignment operation, the contact pressure slide 10 is moved back out of the region below the crosshead 3 of the press into the position shown by the dash-dotted lines; the lateral stop 14 is then lowered in the direction of the arrow, and the crosshead of the press is pressed down in the direction of the arrow on to the material to be cut by the action of the connecting rods 13. Finally, the cut is made by means of the cutting knife 4.

Figures 4 to 6 illustrate an alternative arrangement of the contact pressure slide 10 on the slide rod 11. The operating means for the crosshead 3 of the press is not shown in these Figures. As can be seen from these Figures, the slide rod 11 in this arrangement is disposed directly adjacent to the table area 2, and the contact pressure slide 10 is attached, so that it can swivel about a horizontal axis 15, to the end of the slide rod 11 facing the lateral stop 14. As shown in the illustration of Figure 6, an additional rod 16 is guided near the slide rod 11. By means of this additional rod the contact pressure slide can be swung anticlockwise by a maximum of 90° - and thus into a horizontal position. For this purpose the rod 16 acts on a projection 17 on the contact pressure slide 10 at a distance from the swivelling axis 15 of the latter. The contact pressure slide is provided at its lower end with a 45° bevel 18a, which comes into contact with a corresponding 45° bevel on the slide rod 11 in the vertical position of the contact pressure slide 10 and thereby fixes the latter in a defined manner. The means for moving the rod 16 are not shown. The rod may be moved by a pneumatic cylinder, for example, with the rod 16 constituting the piston rod of the latter. A significant advantage of the variant shown in Figures 4 to 6 is that the contact pressure slide 10 does not have to be moved back completely before the crosshead 3 of the press is pushed down, but it is sufficient instead to retract the contact pressure slide 10 after it has moved slightly from the stack of cut material.

List of reference numerals

1	Table
2	Table area
2a	Input field
2b	Field of action
2c	Output field
3	Crosshead of the press
4	Cutting knife
4a	Cutting plane
5	Forward feed bracket
6	Narrow edge
7	Tooth
8	Slot
9	Material to be cut
9a to 9e	Strip blocks
10	Contact pressure slide
11	Slide rod
12	Servomotor
13	Connecting rod
14	Lateral stop
15	Axis
16	Rod
17	Projection
18a	Bevel
18b	Bevel

Claims:

1. A device for cutting stacked sheet material (9), with a table area (2) which has a field of action (2b) above which a cutting knife (4) and a crosshead (3) of a press are located, an input field (2a) behind it for receiving the material to be cut (9) and an output field (2c) in front of it for receiving the cut material, with a forward feed device (5) for the material to be cut (9), which forward feed device has teeth (7) which in its frontmost position engage in slots (8) in the crosshead (3) of the press, and with a lateral stop (14) for aligning the material to be cut (9) by means of a contact pressure slide (10) which can move in the region of the field of action (2b) in the direction of the cutting line, characterised in that the forward feed device (5) extends substantially over the entire width of the table area (2) and the contact pressure slide (10) acts exclusively in the region of the field of action (2b) formed between the cutting plane (4a) and the frontmost position of the forward feed device (5).
2. A device according to claim 1, characterised in that the contact pressure slide (10) is movable over substantially the entire width of the table.
3. A device according to claim 1 or 2, characterised in that the contact pressure slide (10) is attached to a slide rod (11) which is disposed above the table area (2) and which can be moved parallel to the cutting plane (4a) in the direction of the cutting line by a means of power.
4. A device according to claim 3, characterised in that the slide rod (11) is formed by the piston rod of an adjusting cylinder, particularly a pneumatically operable adjusting cylinder, which is disposed outside the field of action (2b).



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5. A device according to claim 3, characterised in that the slide rod (11) is formed as a toothed rack with which a toothed wheel of a means of power (12) disposed outside the field of action (2b) cooperates.
6. A device according to any one of claims 3 to 5, characterised in that the contact pressure slide (10) is disposed parallel to the lateral stop (14) and is rigidly attached to the end of the slide rod (11) facing the lateral stop (14).
7. A device according to any one of claims 3 to 6, characterised in that the slide rod (11) is disposed directly adjacent to the table area (2) and the contact pressure slide (10) is attached, so that it can swivel about a horizontal axis (15), to the end of the slide rod (11) facing the lateral stop (14).
8. A device according to claim 7, characterised in that an adjusting means (16) is provided for swinging the contact pressure slide (10) between its vertical operating position and a substantially horizontal inoperative position.
9. A device according to claim 8, characterised in that the adjusting means (16) is constructed as a rod which can be operated by a means of power and which acts on the contact pressure slide (10) at a distance from the swivelling axis (15) of the latter.
10. A device according to any one of claims 7 to 9, characterised in that the contact pressure slide (10) is supported in its operating position via a bearing area (18a) on a corresponding bearing area (18b) of the slide rod (11).
11. A device according to any one of claims 1 to 10, characterised in that in its operating position the contact pressure slide (10) extends substantially from the table surface (2) to slightly below the raised crosshead (3) of the press.
12. A device according to any one of claims 3 to 11, characterised in that the slide rod (11) is disposed between the cutting plane (4a) and a connecting rod (13) for the crosshead (3) of the press.



13. A device according to any one of claims 1 to 12, characterised in that the lateral stop (14) can be moved, and in particular can be tilted downwards, out of the path of movement of the crosshead (3) of the press.

