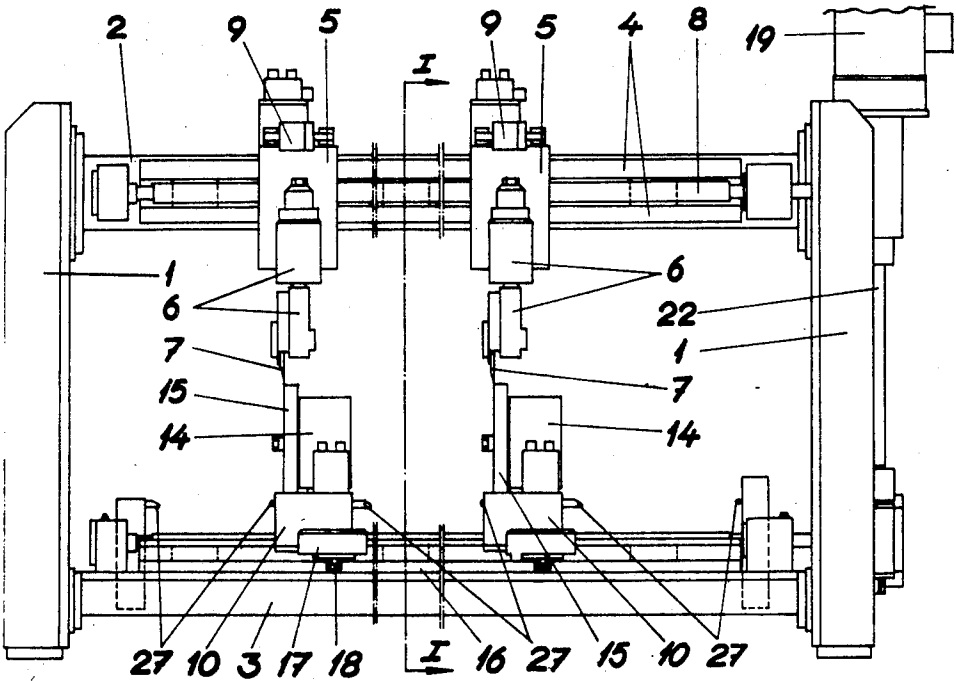


[72] Inventor **Veli Sauli Koskela**
Jyvaskyla, Finland
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[73] Assignee **Valmet Oy Punanotkonkatu**
Helsinki, Finland
a corporation of Finland

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Primary Examiner—James M. Meister			
Attorney—Richards & Geier			

[54] **LONGITUDINAL SHEET CUTTER**
1 Claim, 3 Drawing Figs.
[52] U.S. Cl..... **83/499,**
83/522, 83/560
[51] Int. Cl..... **B26d 1/24,**
B23d 19/06
[50] Field of Search..... **82/34.1; 83/498,**
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ABSTRACT: The upper and lower blade slides of a longitudinal sheet cutter are mechanically coupled with each other, so that the displacement mechanism for adjusting the blades to the desired cutting width operates only upon one of the slides, while the other slide follows automatically.



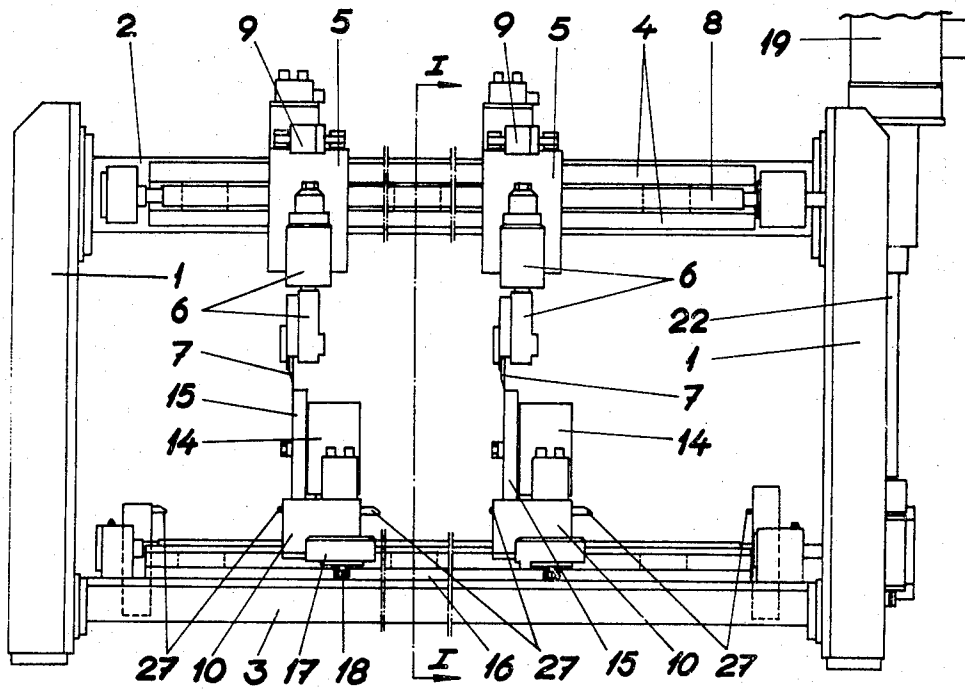


FIG. 1

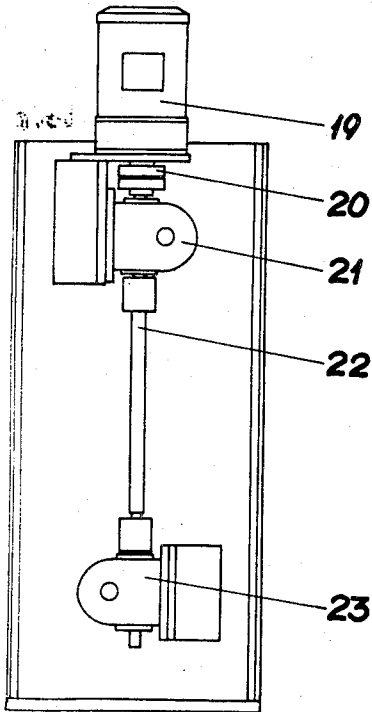


FIG. 2

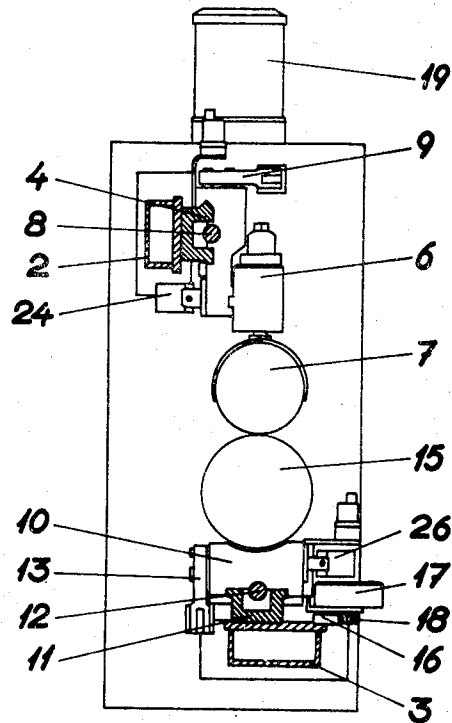


FIG. 3

INVENTOR:

V. S. Koskela

BY

Richard & Geier

ATTORNEYS

LONGITUDINAL SHEET CUTTER

The present invention concerns a longitudinal sheet cutter, having lower and upper blade slides and their displacement mechanism for the adjustment of the blades to give desired cutting widths.

Adjustment of the blades in a longitudinal sheet cutter is nowadays usually carried out in that the rotary upper and lower blades required for each point of cut are adjusted to their proper position by hand. This may be accomplished, e.g., in that at first the lower blades are individually correctly positioned in accordance with the desired cutting widths by displacing the lower blade slides along their guides by hand. After the lower blades have been correctly positioned, the upper blade corresponding to each lower blade is appropriately positioned with reference to the lower blade. Displacement of the upper blades, too, is usually accomplished by displacing the upper blade slides by hand along their guides.

The procedure of blade adjustment outlined above is rather slow and it causes the capacity of the sheet cutter to be considerably reduced if frequent changes of the cutting widths are necessary. This situation is encountered when different fairly small orders are run on one paper machine. In order to make the blade adjustment less time consuming, attempts have been made to automatize the displacement of the blades. In the most extensively automatized blade adjusting method in present use, the displacement of blades has been arranged so that there is an individual actuating motor for each lower and upper blade slide, which under digital control adjusts each lower and upper blade to its correct position.

This previously known method has the drawback that two digital control units are required for each pair of lower and upper blades, which implies high costs.

The object of the present invention is to eliminate these drawbacks. Accordingly, the invention is characterized in that the upper blade slides have been mechanically coupled to the respective lower blade slides so that control is required only for one of the two blade slides, while the other slide moves into its proper position by virtue of mechanical coupling. Since in a longitudinal sheet cutter according to the invention the upper blade slides are mechanically coupled with the respective lower blade slides, only one digital control unit is required for each pair of blade slides, as a result, the device controlling the blade slides will be less complex, less expensive and more reliable in operation than before. An advantage is also derived from the fact that one actuating motor is sufficient. For the purpose of coupling the upper blade slides mechanically to the respective lower blade slides, the lead screws moving the upper and lower blade slides along their guides have been coupled to a shaft driven by the motor in such manner that conformity of the rotations of said lead screws is ensured. The said lead screws may obtain their drive from a shaft driven by the motor by means of worm gear transmissions placed on this shaft. Of the pairs of blade slides preferably only the lower blade slide is connected to a digital control unit.

In the following specification the invention is described in greater detail in terms of one possible embodiment, with reference to the attached drawings.

In the drawings:

FIG. 1 shows the principle design of the blade adjustment system of a longitudinal sheet cutter as viewed from the front; FIG. 2 shows the same, viewed from the right-hand end; and FIG. 3 shows the same, viewed from the left and in section along the line I-I of FIG. 1.

In FIG. 1 can be seen the bed sections 1, which are connected by the upper blade beam 2 and the lower blade beam 3. On the upper blade beam there is a guide 4 for the upper blade slide 5. Attached to the slide 5 are the upper blade holder 6 and the upper blade 7 mounted in the latter. The upper blade slide 5 is moved along its guide 4 by the lead screw 8, with which the slide is engaged for the duration of displacement and from which it is disengaged after the slide has arrived in its proper position, this engagement and disengagement taking place by means of the engaging device 9. The locking of the

slide to the guide in desired position is accomplished with the aid of the locking device 24. The lower blade slide 10, too, moves along its own guide 11, actuated by the lead screw 12, with which the slide 10 may be engaged for the duration of displacement and from which it can be disengaged after the slide has reached its proper position, such engaging and disengaging being accomplished with the aid of the engaging device 13. The slide is locked to the guide by means of the locking device 26. Attached to the slide 10 are the lower blade driving motor 14 and the lower blade 15 proper.

The lower blade beam 3 carries a tooth rack 16 in engagement with which there rotates, when the slide is being moved, the gear wheel 18 of the pulse transmitter 17, which is mounted on the slide.

The driving unit consists of an electromotor 19, which over a coupling 20 drives the vertical shaft 22. This shaft carries the worm gear transmissions 21 and 23, transmission 21 being connected to the lead screw 8 moving the upper blade slides and transmission 23 being connected to the lead screw 12 moving the lower blade slides, in order to actuate said lead screws in such manner that they rotate at identical speeds. As a result of this arrangement, one digital control unit suffices for each pair of blade slides.

On the blade slides limit switches 27 have been provided, which serve the purpose of stopping the motor 19 and, obviously, at the same time stopping the lead screws in case the lower blade slides arrive at the end of their guide or if they collide. In this manner there can be no damage even if it should occur that improper blade setting data are supplied to the control unit or their control is otherwise improper.

Adjustment of the blades in the device may be accomplished, for instance, as follows. The initial situation is that both pairs of blades have been run to be at one end of the guides. In some suitable manner (e.g., by punch card) information concerning the desired position of both pairs of blades is supplied to the electrical control unit (not shown). The starting switch is then actuated, and the motor 19 starts, at which time both pairs of blades start under action of the lead screws, because the engaging devices 9 and 13 are engaged, and the slide locking devices 24 and 26 are, correspondingly, unlocked. When the pulse counter 17 notes that the lower blade which trails behind the other has arrived at the desired position, the control unit stops the motor 19, operates the locking devices of the trailing lower and upper blade slides and disengages their engaging devices 9 and 13, by which the slides in question are freed from the lead screws. The control unit then starts the motor 19 once more, and the leading pair of blades recommences its travel under action of the lead screws.

When the pulse counter notes that this lower blade has reached the prescribed position, the control unit stops the motor 19, actuates the locking devices of the lower and upper blade slides and disengages their engaging devices 9 and 13, so that these slides too are freed from the lead screws. Both lower blades have thus been directed to assume the desired positions and they have been locked in place. Since the movements of the lower and upper blade slides are mechanically completely coupled with each other, the upper blades corresponding to each lower blade will also have reached their proper positions.

The blade adjustment may also be accomplished in that the blades are not initially run to the end of the guides; instead, the information if supplied to the control unit by what amount and in which direction each pair of blades should be displaced. Then, when the starter is actuated, the blades will be moved accordingly. This procedure consumes less time than that described above.

The invention is not restricted to the embodiment described in the foregoing; it may be modified in various ways without transgressing the protective range of the invention. For instance, it is usual for a longitudinal sheet cutter to have a considerably greater number of pairs of blades than has been shown in the attached drawing.

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I claim:

1. A longitudinal sheet cutter, comprising at least one pair of blade slides which consists of an upper slide and a lower slide, guide carrying said slides, lead screws engaging and moving said slides along their guides, worm gear transmissions 5

connected to said lead screws, a motor driven shaft carrying said worm gear transmissions, whereby said slides are mechanically coupled, and a single digital control unit connected solely to the lower slide.

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