

United States Patent [19]

Andersson

[11] 3,857,315
[45] Dec. 31, 1974

[54] DEVICE FOR SETTING KNIFE HOLDERS,
PARTICULARLY AT A BAND CUTTING
MACHINE

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[22] Filed: Aug. 14, 1972

[21] Appl. No.: 280,302

[30] Foreign Application Priority Data

Aug. 20, 1971 Sweden..... 10584/71
Aug. 20, 1971 Sweden..... 10585/71

[52] U.S. Cl..... 83/504, 83/425.4, 83/508.3

[51] Int. Cl..... B26d 1/22

[58] Field of Search 83/499, 498, 500, 504,
83/508.3, 508.2, 425.4, 425.3, 491

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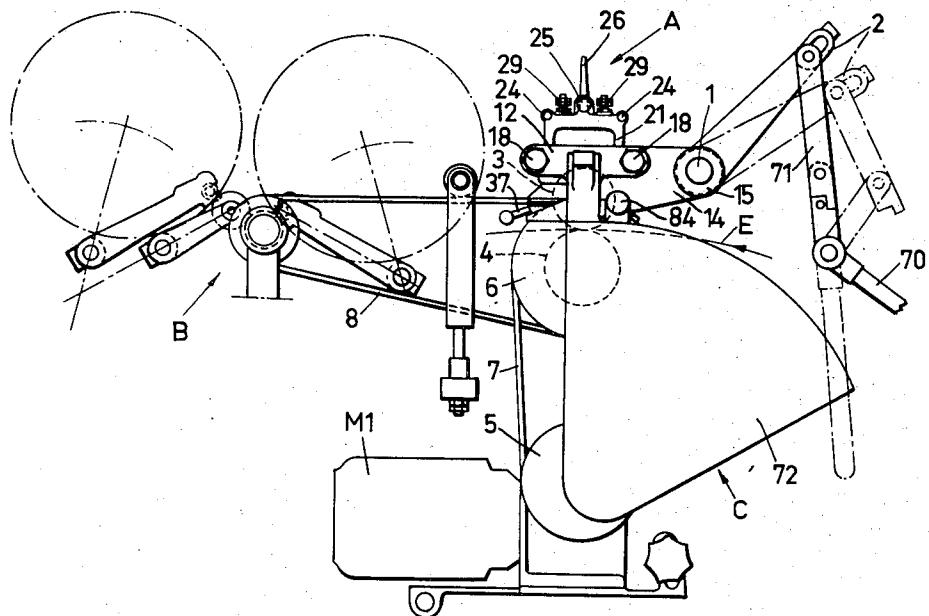
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[57]

ABSTRACT

A device for setting a plurality of knife holders which are mounted with equal spacing between the knives along at least one slide shaft and adapted to be moved along said slide shaft by means of the setting device for changing the distance of the holders relative each other while maintaining the equal spacing between the knives. The setting device renders possible a rapid correct and simple setting and is designed to allow individual adjustments of each knife holder and individual exchange of adjusting members for each knife holder without having to affect the setting device as a whole.

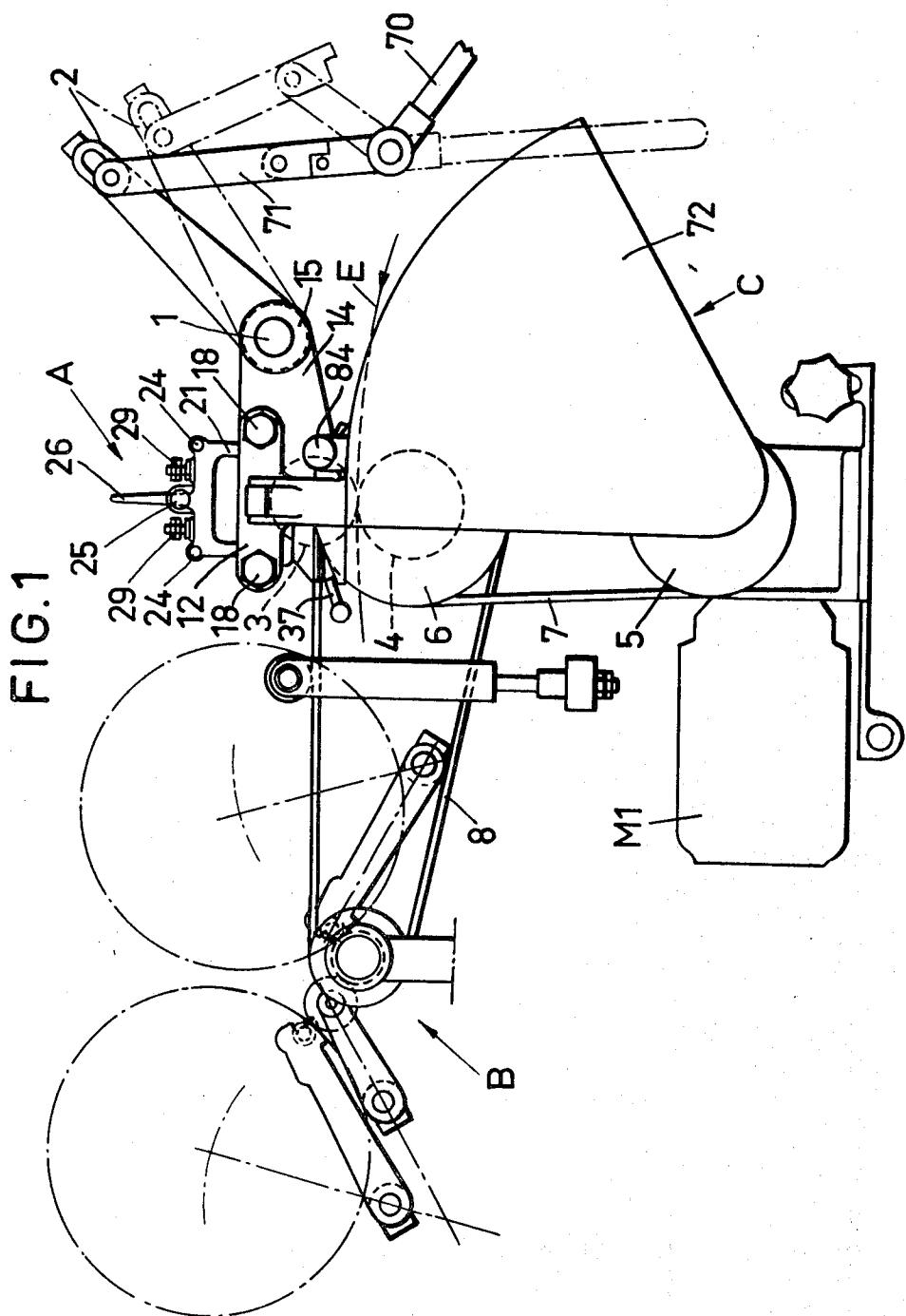
39 Claims, 11 Drawing Figures



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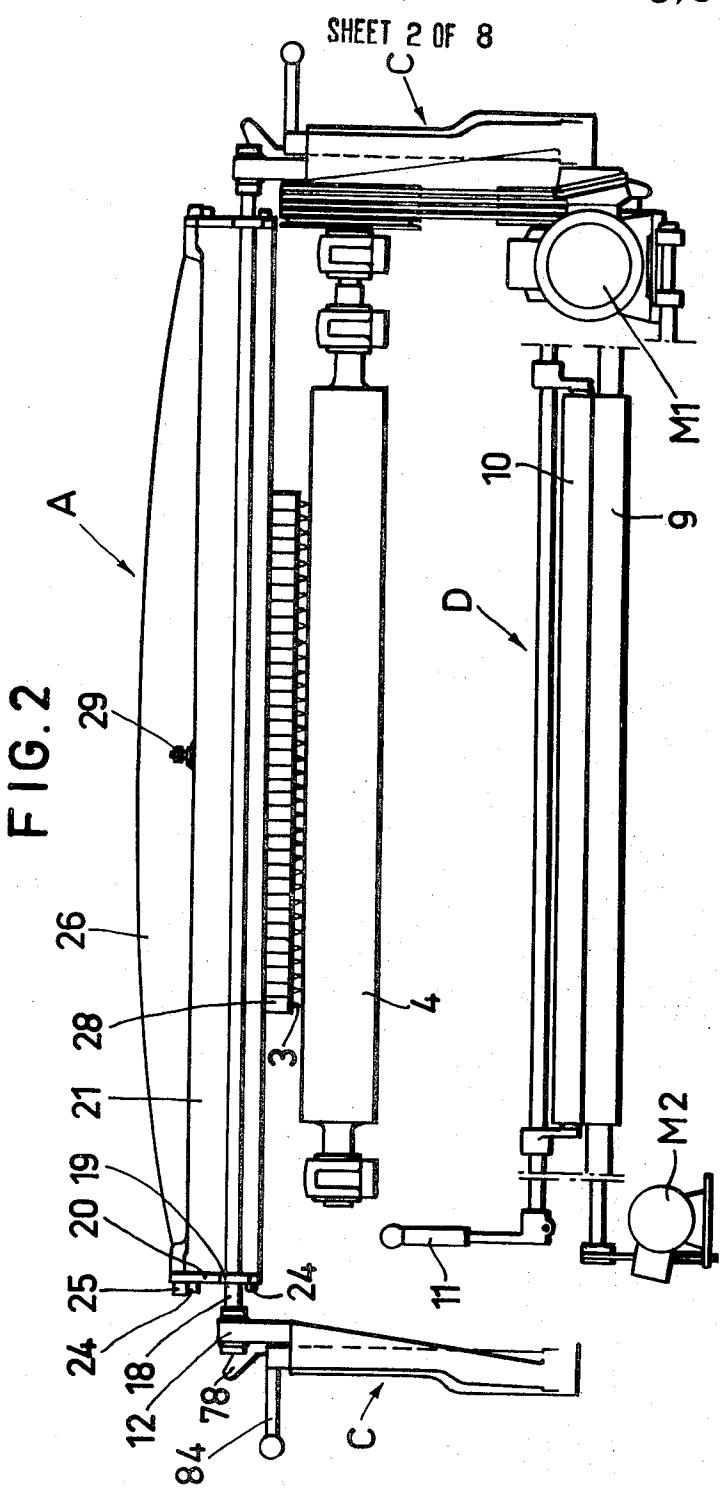
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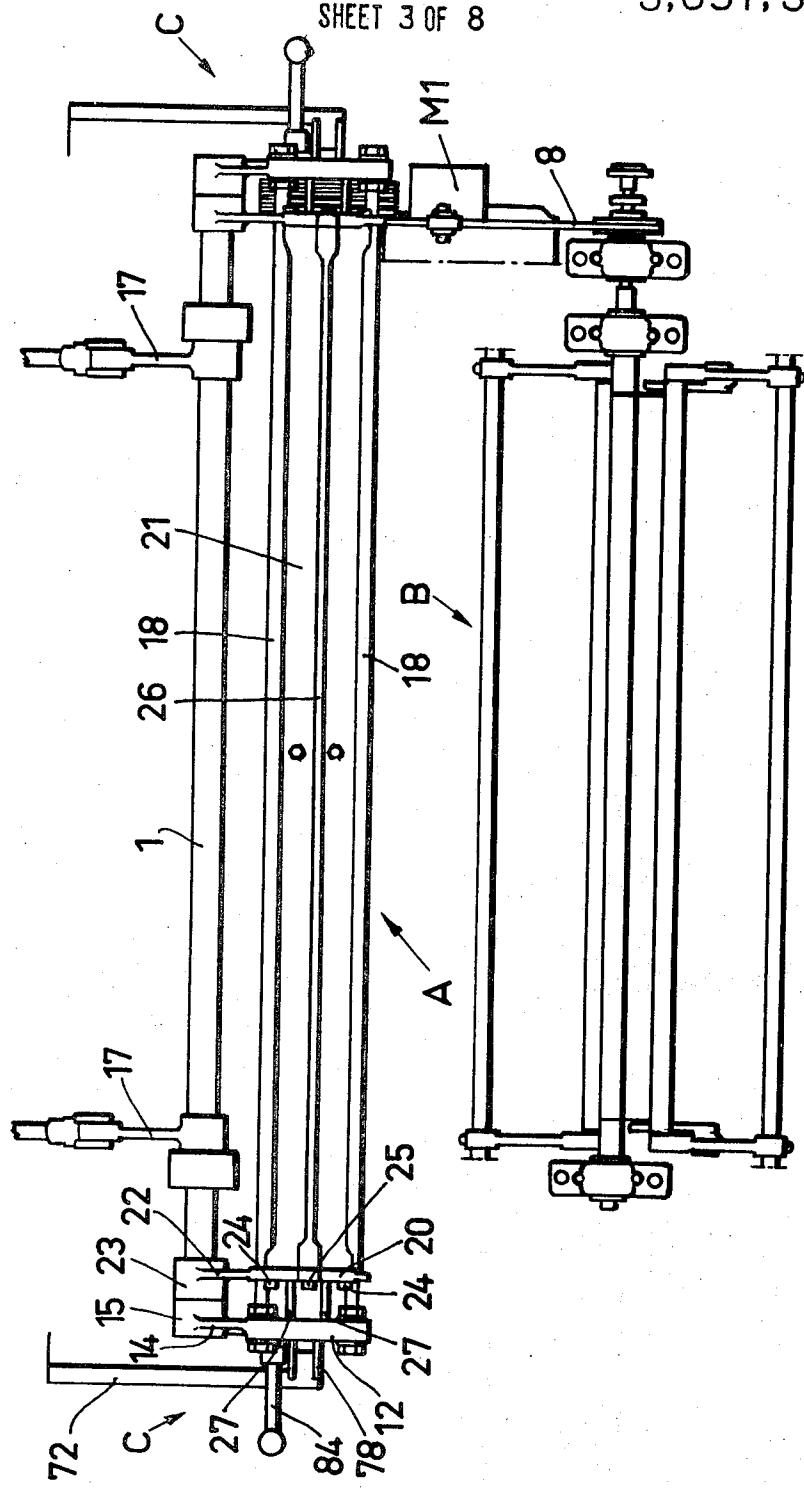
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FIG. 4

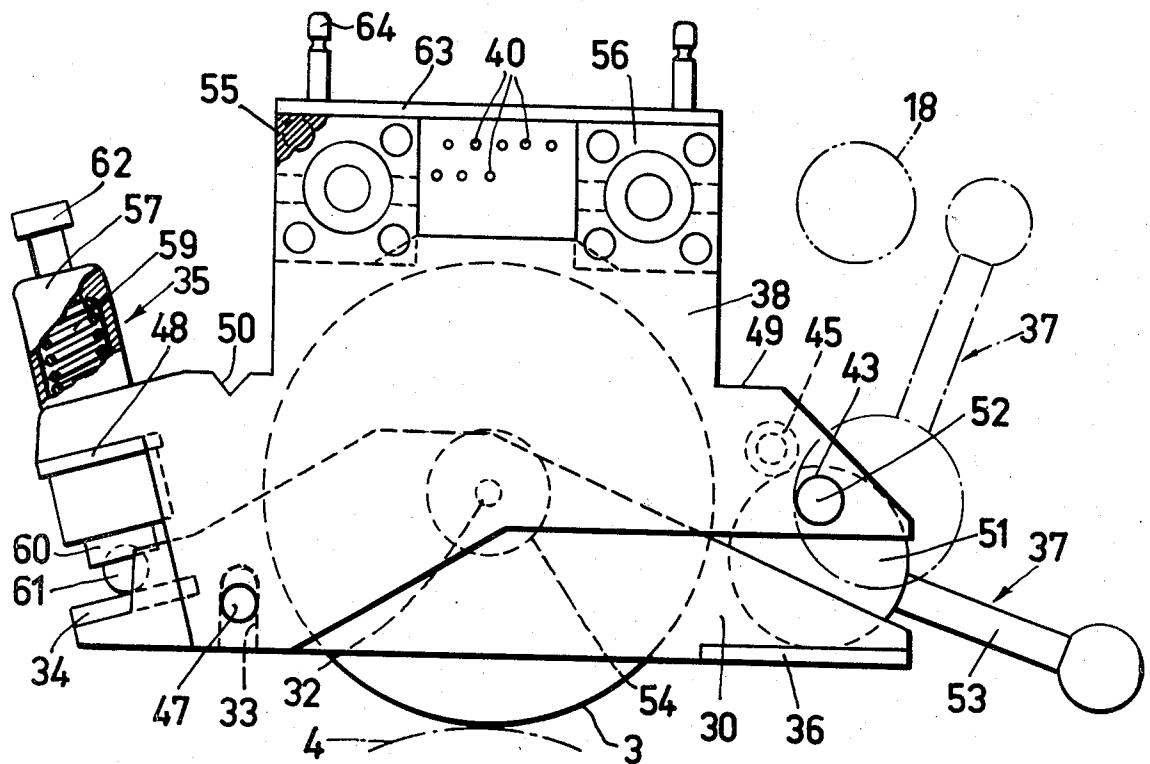


FIG. 5a

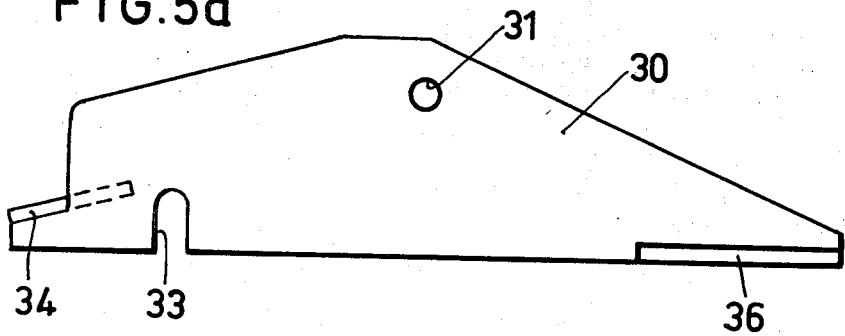
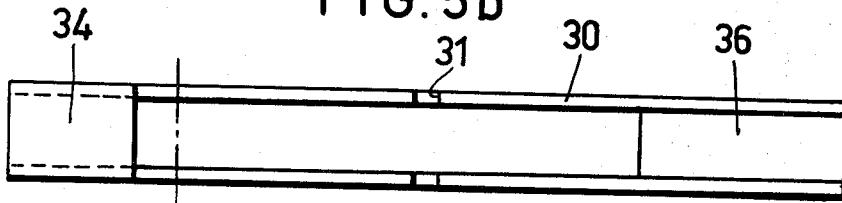


FIG. 5b



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FIG.6a

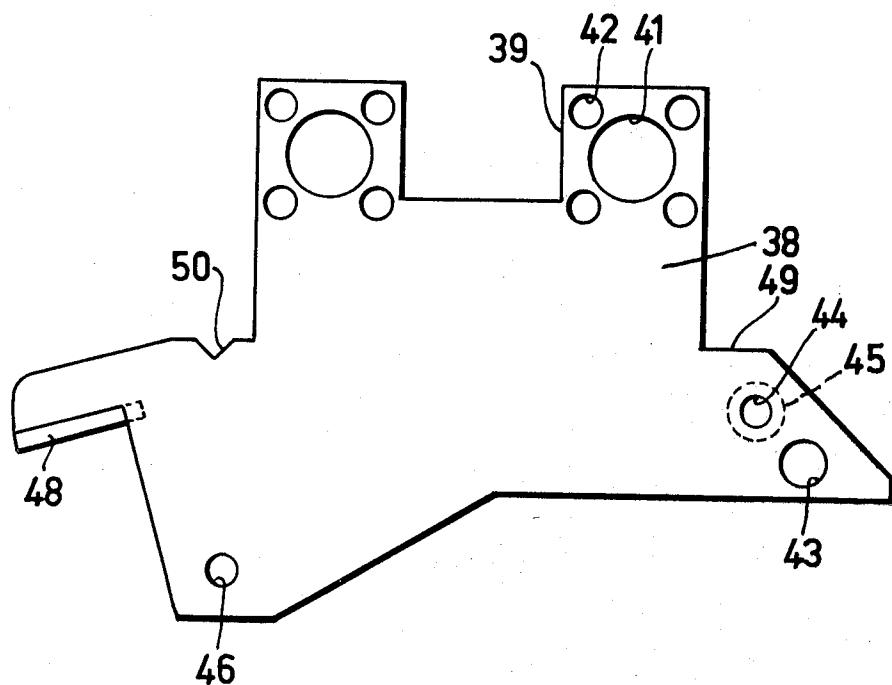
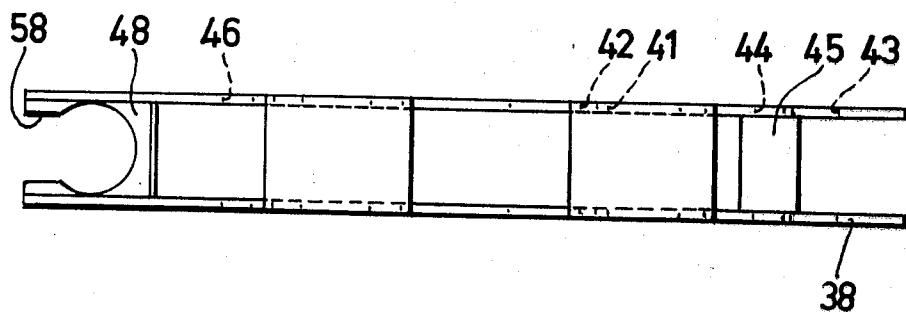


FIG.6b

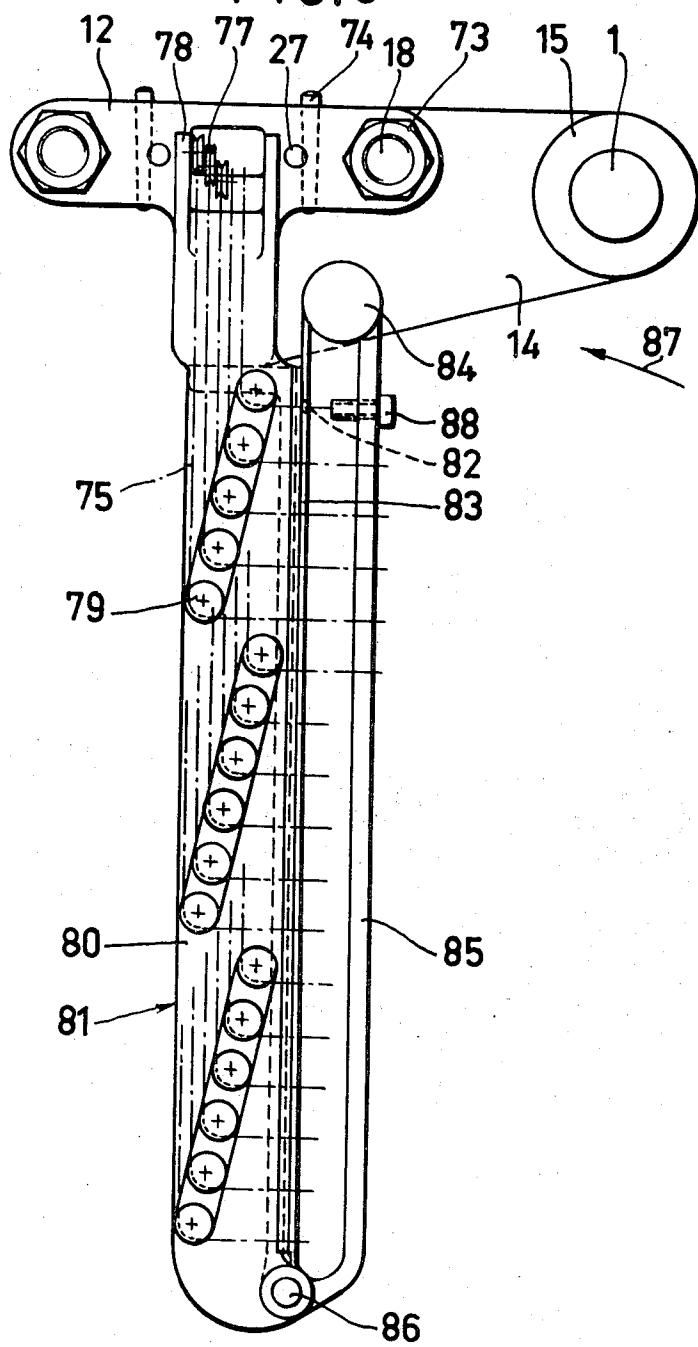


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FIG. 8

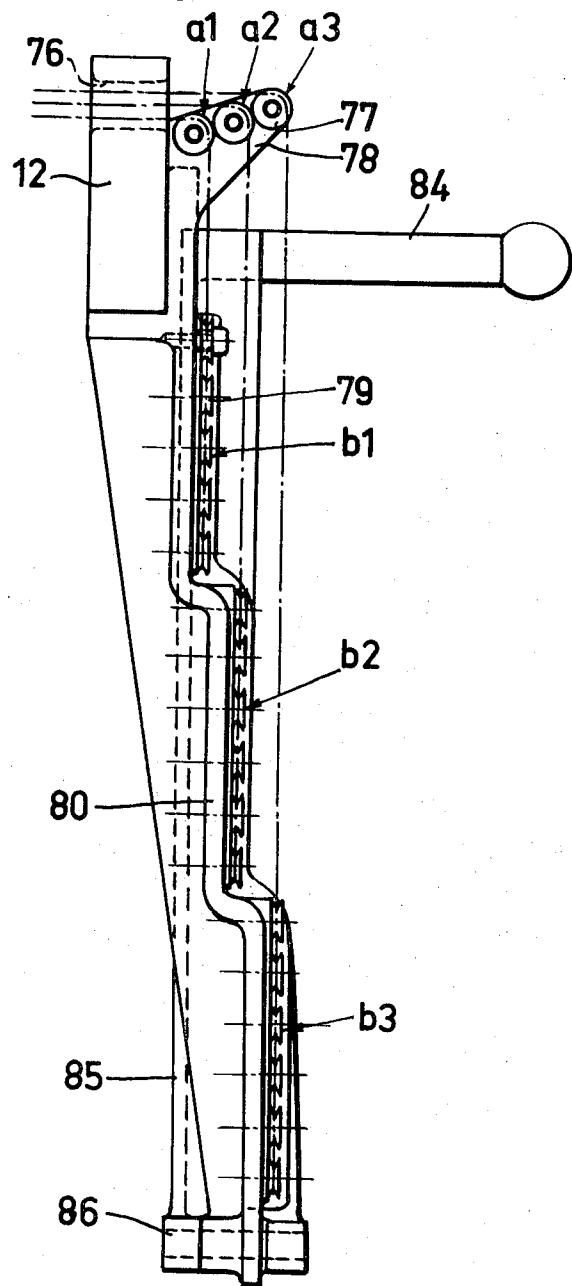


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FIG. 9

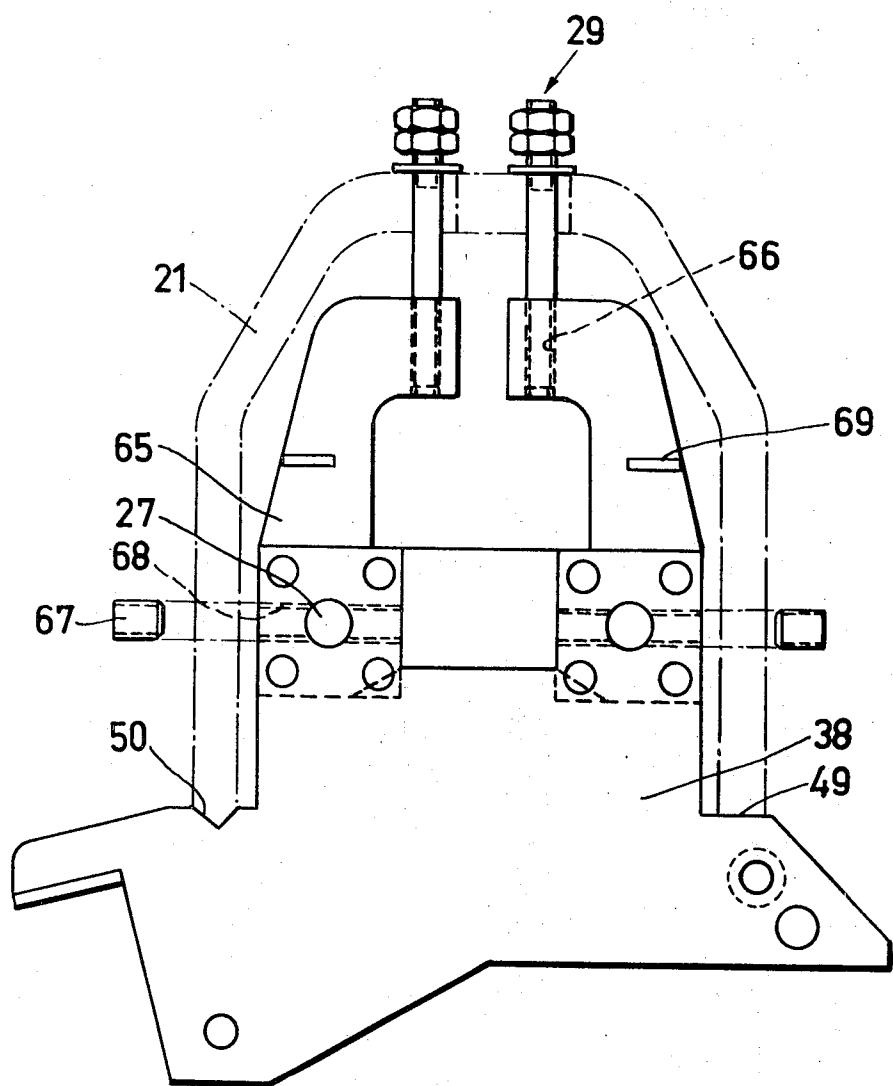


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FIG. 7



DEVICE FOR SETTING KNIFE HOLDERS, PARTICULARLY AT A BAND CUTTING MACHINE

The present invention has as its object to produce a setting device which renders possible a rapid and simple setting but nevertheless ensures that a correct setting is obtained. The setting device further is intended to allow individual adjustments of each knife holder and individual exchange of adjusting members for each knife holder without having to affect the setting device as a whole. The setting device further should not include parts which are movable relative each other, thereby rendering it possible to obtain a higher accuracy and maintain it for a long period.

The aforesaid objects and properties of the invention, and other objects and properties disclosed in the following description, have been achieved by the characterizing features of the invention defined in the following claims 1-17.

The invention further relates to a device at cutting machines, particularly band cutting machines for dividing a fabric of cloth or other material into bands, comprising at least one slide shaft extending transverse to the cutting direction, a plurality of knife holders for knives mounted on the slide shaft and adapted to slide along said shaft for setting different distances between the knives, at least one counter-cutting roll co-acting at the cutting operation with the knives, means for moving the knives into and out of contact with the counter-cutting roll, and means for holding the knives in their cutting position in a pressing abutment to the counter-cutting roll.

The object of this invention is to arrange the slide shaft or shafts for adjusting the knives in such a manner, that the shafts during the cutting operation with the knives in contact with the counter-cutting roll or rolls are held entirely relieved of the pressure developing during the cutting operation. This is important because the slide shaft or shafts, for reasons which will be explained later on in connection with the description of the embodiment of the invention shown in the accompanying drawing, must have a relatively small diameter for rendering possible a sliding movement of the knife holders along the shafts with a friction as low as possible and for rendering possible a correct setting. The slide shafts with a relatively small diameter, moreover, usually have a considerable length in order to cover a large setting range. This is another reason why the slide shafts have to be held relieved during the cutting operation.

A further object of the invention is to arrange the knife holders in such a way that in their positions set they cannot be moved along the slide shafts nor be turned relative thereto.

Still a further object is to arrange the knife holders in such a way that the knives individually and optionally can be moved out of contact with the counter-cutting roll, so that at an adjustment in question of the knives the distance between the same can be multiplied or changed in another way whilst maintaining the setting.

The aforesaid objects and properties of the invention, together with other objects and properties disclosed in the following description, have been achieved by the characterizing features of the invention defined in the following claims 18-39.

The invention is described in greater detail by way of an embodiment, with reference to the accompanying drawings, in which

FIG. 1 shows an end view of a band cutting machine according to the invention,

FIG. 2 shows a lateral view seen from the right-hand side in FIG. 1,

FIG. 3 shows a plane view of FIG. 2,

FIG. 4 shows a lateral view of a knife holder slidably arranged in the band cutting machine,

FIGS. 5a and 5b and 6a and 6b show lateral views and, respectively, plane views of details of the knife holder according to FIG. 4,

FIG. 7 shows a lateral view of a stationary knife holder comprised in the band cutting machine,

FIG. 8 shows an end view, corresponding to FIG. 1, of a device for adjusting the slidable knife holders,

FIG. 9 shows a view seen from the right-hand side in FIG. 8.

20 The band cutting machine shown comprises a knife holder device generally designated by A, which is pivotal about a shaft 1 by means of a lever mechanism 2 to move the knives 3 of the knife holder device A into and out of engagement with a counter-cutting roll 4

25 which is driven via pulleys 5, 6 and a belt 7 by a motor M1 mounted on the machine stand. The machine further comprises a winding means 3 for cut bands. The winding means may be of any conventional design and does not constitute a part of the present invention. It is, therefore, not described in detail in the following. In the embodiment shown the winding means B is driven by the motor M1 via the belt 7 and a belt 8. The band cutting machine further comprises a setting device C for setting the position of the knives 3 relative each other along the counter-cutting roll 4. The band cutting machine shown, finally, comprises a feeding means D for feeding from a supply (not shown), for example a reel, the fabric to be cut, as indicated by E in FIG. 1.

30 FIG. 2 shows of said feeding means D a rubber roller 9 and a pressure roller 10 between which the fabric is advanced. The pressure roller can be moved by a lever 11 into and out of engagement with the rubber roller which via belt transmission is driven by a motor M2. After the rollers preferably are arranged a weighing means and a stretching means for the fabric (both not shown). The feeding means with weighing means and stretching means are of a conventional design and do not constitute a part of the invention.

35 In the following, the novel knife holder device A and the novel knife setting device C are described in detail.

40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 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3245 3250 3255 3260 3265 3270 3275 3280 3285 3290 3295 3300 3305 3310 3315 3320 3325 3330 3335 3340 3345 3350 3355 3360 3365 3370 3375 3380 3385 3390 3395 3400 3405 3410 3415 3420 3425 3430 3435 3440 3445 3450 3455 3460 3465 3470 3475 3480 3485 3490 3495 3500 3505 3510 3515 3520 3525 3530 3535 3540 3545 3550 3555 3560 3565 3570 3575 3580 3585 3590 3595 3600 3605 3610 3615 3620 3625 3630 3635 3640 3645 3650 3655 3660 3665 3670 3675 3680 3685 3690 3695 3700 3705 3710 3715 3720 3725 3730 3735 3740 3745 3750 3755 3760 3765 3770 3775 3780 3785 3790 3795 3800 3805 3810 3815 3820 3825 3830 3835 3840 3845 3850 3855 3860 3865 3870 3875 3880 3885 3890 3895 3900 3905 3910 3915 3920 3925 3930 3935 3940 3945 3950 3955 3960 3965 3970 3975 3980 3985 3990 3995 4000 4005 4010 4015 4020 4025 4030 4035 4040 4045 4050 4055 4060 4065 4070 4075 4080 4085 4090 4095 4100 4105 4110 4115 4120 4125 4130 4135 4140 4145 4150 4155 4160 4165 4170 4175 4180 4185 4190 4195 4200 4205 4210 4215 4220 4225 4230 4235 4240 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6245 6250 6255 6260 6265 6270 6275 6280 6285 6290 6295 6300 6305 6310 6315 6320 6325 6330 6335 6340 6345 6350 6355 6360 6365 6370 6375 6380 6385 6390 6395 6400 6405 6410 6415 6420 6425 6430 6435 6440 6445 6450 6455 6460 6465 6470 6475 6480 6485 6490 6495 6500 6505 6510 6515 6520 6525 6530 6535 6540 6545 6550 6555 6560 6565 6570 6575 6580 6585 6590 6595 6600 6605 6610 6615 6620 6625 6630 6635 6640 6645 6650 6655 6660 6665 6670 6675 6680 6685 6690 6695 6700 6705 6710 6715 6720 6725 6730 6735 6740 6745 6750 6755 6760 6765 6770 6775 6780 6785 6790 6795 6800 6805 6810 6815 6820 6825 6830 6835 6840 6845 6850 6855 6860 6865 6870 6875 6880 6885 6890 6895 6900 6905 6910 6915 6920 6925 6930 6935 6940 6945 6950 6955 6960 6965 6970 6975 6980 6985 6990 6995 7000 7005 7010 7015 7020 7025 7030 7035 7040 7045 7050 7055 7060 7065 7070 7075 7080 7085 7090 7095 7100 7105 7110 7115 7120 7125 7130 7135 7140 7145 7150 7155 7160 7165 7170 7175 7180 7185 7190 7195 7200 7205 7210 7215 7220 7225 7230 7235 7240 7245 7250 7255 7260 7265 7270 7275 7280 7285 7290 7295 7300 7305 7310 7315 7320 7325 7330 7335 7340 7345 7350 7355 7360 7365 7370 7375 7380 7385 7390 7395 7400 7405 7410 7415 7420 7425 7430 7435 7440 7445 7450 7455 7460 7465 7470 7475 7480 7485 7490 7495 7500 7505 7510 7515 7520 7525 7530 7535 7540 7545 7550 7555 7560 7565 7570 7575 7580 7585 7590 7595 7600 7605 7610 7615 7620 7625 7630 7635 7640 7645 7650 7655 7660 7665 7670 7675 7680 7685 7690 7695 7700 7705 7710 7715 7720 7725 7730 7735 7740 7745 7750 7755 7760 7765 7770 7775 7780 7785 7790 7795 7800 7805 7810 7815 7820 7825 7830 7835 7840 7845 7850 7855 7860 7865 7870 7875 7880 7885 7890 7895 7900 7905 7910 7915 7920 7925 7930 7935 7940 7945 7950 7955 7960 7965 7970 7975 7980 7985 7990 7995 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8060 8065 8070 8075 8080 8085 8090 8095 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8160 8165 8170 8175 8180 8185 8190 8195 8200 8205 8210 8215 8220 8225 8230 8235 8240 8245 8250 8255 8260 8265 8270 8275 8280 8285 8290 8295 8300 8305 8310 8315 8320 8325 8330 8335 8340 8345 8350 8355 8360 8365 8370 8375 8380 8385 8390 8395 8400 8405 8410 8415 8420 8425 8430 8435 8440 8445 8450 8455 8460 8465 8470 8475 8480 8485 8490 8495 8500 8505 8510 8515 8520 8525 8530 8535 8540 8545 8550 8555 8560 8565 8570 8575 8580 8585 8590 8595 8600 8605 8610 8615 8620 8625 8630 8635 8640 8645 8650 8655 8660 8665 8670 8675 8680 8685 8690 8695 8700 8705 8710 8715 8720 8725 8730 8735 8740 8745 8750 8755 8760 8765 8770 8775 8780 8785 8790 8795 8800 8805 8810 8815 8820 8825 8830 8835 8840 8845 8850 8855 8860 8865 8870 8875 8880 8885 8890 8895 8900 8905 8910 8915 8920 8925 8930 8935 8940 8945 8950 8955 8960 8965 8970 8975 8980 8985 8990 8995 9000 9005 9010 9015 9020 9025 9030 9035 9040 9045 9050 9055 9060 9065 9070 9075 9080 9085 9090 9095 9100 9105 9110 9115 9120 9125 9130 9135 9140 9145 9150 9155 9160 9165 9170 9175 9180 9185 9190 9195 9200 9205 9210 9215 9220 9225 9230 9235 9240 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shaft 1 via arms 22 and bearings 23 by means of a keying or another fastening means, and they are secured on the casing by screws 24 in the corners of the end walls and by an upwardly located central screw 25. The casing further is stayed by a central stiffening spring 26 formed on the upper side of the end wall. In the brackets 12 also two parallel shafts 27 are mounted which constitute slide shafts for knife holders 28 for the cutters formed as circular slitting knives 3. Said slide shafts 27 extend through holes in the end walls, which holes like the holes 19 for the shafts 18 are somewhat greater than the respective shafts extending therethrough, for reasons which will be explained below.

As appears from FIG. 2, the embodiment shown comprises 35 knife holders 28. The central knife holder is stationary relative to the casing 21, and thereby relative to the slide shafts 27, by means of screwnut joints 29 fastened on the casing and on said knife holder. Two sets each comprising seventeen knife holders are arranged on both sides of the stationary knife holder and adapted to slide on the slide shafts 27 for guided setting each by its setting device C.

One of the slidable knife holders is shown in greater detail in FIGS. 4-6 (seen from the right-hand side in FIG. 2), of which FIG. 4 shows the knife holder in assembled state, FIGS. 5a and 5b show a lateral view and, respectively, a plane view of two inner parallel side plates 30 comprised in the knife holder, and FIGS. 6a and 6b show a lateral view and, respectively, a plane view of one of two outer parallel side plates comprised in the knife holder and, respectively, both of said outer side plates.

The inner side plates 30 are identically equal. Each side plate includes a hole 31 for a shaft 32 for the circular slitting knife 3 and a groove 33, the object of which is explained in the following. Between the side plates are arranged a lower pressure plate 34 for a compression spring means 35 (see FIG. 4) and a pressure plate 36 for an eccentric means 37 (see FIGS. 4 and 1).

The outer side plates 38 are identically equal as well, except for the forward side plate shown in FIG. 6 which includes a recess 39 while the rearward side plate does not include such a hole and in this portion is provided with a number of holes 40 (see FIG. 4) for a purpose which will be explained in the following. The side plates include holes 41 to be passed through by the slide shafts 27 and holes 42 for plug welds holding the side plates together. The side plates further include holes 43 for an eccentric lug comprised in the eccentric means 37 and holes 44 for a shaft for a pipe 45 arranged between the side plates and constituting a stop means for an eccentric disc comprised in the eccentric means. The side plates 38 further include holes 46 for a shaft 47 (see FIG. 4) which in assembled state of the knife holder is inserted in grooves 33 in the inner side plates 30. Between the side plates, furthermore, an upper pressure plate 48 for the compression spring means 35 is provided. The side plates, finally, include contact surfaces for the lower edges of the downwardly open casing 21 (see FIG. 7) in the form of a plane support surface 49 and a V-shaped support groove 50.

In the assembled state of the knife holder according to FIG. 4 the eccentric means 37, the compression spring means 35 and the circular slitting knife 3 are shown mounted in place. The circular slitting knife 3 is supported between the inner side plates 30 between ball bearings 54 about the shaft 32. The intermediate

pieces 55 are fastened between the outer side plates 38 by means of the plug welds in the holes 42. Ball bushings 56 for the support of the slide shafts 27 are inserted in the holes 41 in the side plates 38 and in corresponding holes in the intermediate pieces 55. The shaft 47 is inserted in the groove 33 and constitutes a holding shaft for the knife bearing unit, i.e., the inner side plates 30 with the pressure plates 34 and 36 and the support for the circular slitting knife 3. The eccentric means 37 comprises an eccentric disc 51 which is supported about an eccentric lug 52 provided in the holes 43 in the outer side plates 38. For its rotation, the eccentric disc is provided with a control lever 53. The position for the eccentric means shown by fully drawn lines in the Figure shows the circular slitting knife 3 in operative position against the counter-cutting roll 4, at which position the eccentric disc is held pressed against the pressure plate 36. As mentioned above, the eccentric disc abuts the pipe 45 located between the outer side plates 38. The compression spring means 35 comprises a spring housing 57 inserted in a bayonet groove 58 in the pressure plate 48. Within said spring housing a compression spring 59 is provided which downwardly presses against a piston 60, which in its turn presses against a ball 61 abutting the pressure plate 34. The spring housing comprises upwardly an adjusting screw 62 for a desired setting of the spring pressure.

FIG. 4 shows a further plate 63 which is fastened upwardly on the side plates 38 or intermediate pieces 55 and provided with uprights or spring mountings 64, the function of which will be described in detail below. The dash-dotted line indicates the position for one of the shafts 18, and the dash-dotted lines indicate the eccentric means 37 in a swung-up position.

Before describing the function of the knife holders 28 and their support in connection with the casing 21 and lever mechanism 2 first an embodiment of the central stationary knife holder 28 is described with reference to FIG. 7. For reasons of simplicity a lateral view only of those outer side plates 38 is shown which agree with the outer side plates 38 for the slidable knife holders. In FIG. 7 further is shown by dash-dotted lines the casing 21 which with the end edges abuts the support surface 49 and, respectively, the support groove 50. As appears more clearly from FIG. 7, the screw-nut joints 29, which also are shown in FIGS. 1 and 2, are mounted above the casing 21 and threaded into holes 66 in arms 65 extending upwards from the intermediate pieces 55 located between the side plates 38. The knife holder, besides, is fixed also by means of set screws 67 to be screwed into threaded holes 68 in the intermediate pieces 55 for engagement with the slide shafts 27. The arms 65 further show spring mountings 69 for one end of springs drawn between said mountings and each of the spring mountings 64 (see FIG. 4) on each slidable knife holder 28 as is described in detail below.

The function referred to in the preceding paragraph is as follows:

In the locked position for the lever mechanism 2 with the pair of toggle joints 17 shown by fully drawn lines in FIG. 1, the circular slitting knives 3 are held in operative position for cutting into bands the fabric E which is fed in between the circular slitting knives and the counter-cutting roll 4. In this operative position the knife holders 28 are in the position shown in FIG. 4. The lever mechanism 2 holds the casing 21 in a pressed-down position, and the casing in its turn holds

for each knife holder the outer side plates 38 in a position pressed down relative to the inner side plates 30, in such a way that, as shown in FIG. 4, the shafts 47 in the different knife holders are located some distance downward in the grooves 33. Hereby the working pressure exerted on the circular slitting knives is taken up only by the compression spring means 35 and the casing 21 which is effectively stayed and well-guided by the grooves 50. Due to the load being taken up in this way, the advantage is obtained that the slide shafts 27 for adjusting the knife holders 28 are relieved. This is very essential for several reasons. One reason is that the slide shafts, for render possible adjustment of the knife holders, can be stayed only at the ends outside the adjustment range and, therefore, must be made relatively long. The slide shafts, furthermore, must have a relatively small diameter in order to safely ensure a correct setting. This implies, that the shafts when being subjected to the working pressure would be bent and thereby give rise to a varying working pressure for the different circular slitting knives 3, which would jeopardize a correct cutting of the fabric. A further reason is that by abutment of the pressure absorbing casing 21 to the knife holders 28 in the V-shaped grooves 50 and to the plane surface 49 it is guaranteed that the knife holders 28 cannot be laterally moved out of the setting in question. Such a guaranty does not exist when the working pressure instead would have been taken up directly by the slide shafts 27, provided that such strong slide shafts could have been used at all. The V-shaped grooves 50 and the correspondingly shaped edge of the casing 21 are a further guaranty that the knife holders cannot be moved out of the correct perpendicular position and assume a skew position relative to the slide shafts 27. Furthermore, in order to obtain a correct setting when the knife holders 28 are being moved along the slide shafts 27, it is necessary that the movement is carried out with a friction as low as possible. At the embodiment shown this has been achieved by the ball bushings 56. These bushings, however, for operating satisfactorily, must have a relatively small dimension and thus have necessitated the use of slide shafts 27 with a relatively small diameter fitting the ball bushings. This is a further reason why the relatively weak slide shafts have to be relieved, as they for the above reasons cannot take up the large working pressure here concerned.

When the circular slitting knives 3 are to be released from the counter-cutting roll 4, for example for charging a new fabric or for adjusting the circular slitting knives to the cutting of other band widths, the procedure is as follows: The lower lever 70 (see FIG. 1) of the toggle joints 27 is moved downwards to the position shown in FIG. 1 by a dash-dotted line. Hereby the toggle lever 71 folds and the shaft 1 rotates. The compression spring means 35 are released so that the outer side plates 38 with connecting parts are lifted until in each knife holder 28 the shaft 47 abuts the bottom of the grooves 33 whilst the circular slitting knives 3 still abut the counter-cutting roll 4. The outer side plates 38 and the inner side plates 30 thus have resiliently moved apart so that the workpiece has been released. Upon rotation of the shaft 1, the bearings 23 which are rigidly connected with the shaft are actuated and via the arms 22 lift the end walls 20 which are rigidly connected with the casing 21. Hereby the lower edges of the casing 21 are disengaged from the V-shaped grooves 50

and support surfaces 49 of the knife holders. The clearance between the shafts 18 and the holes 19 of a greater size relative the shafts has now been utilized entirely and the shafts 18 rest against the lower edge of the holes 19. Upon continued rotation of the shaft 1 also the brackets 12 are lifted via the shafts 18. At the desired position such swung up that the circular slitting knives 3 are lifted up from the counter-cutting roll 4, the knife holders 28 are entirely relieved and only suspended on the slide shafts 27 whereafter the knife holders can be adjusted without friction.

When thereafter the circular slitting knives again are to be lowered into cutting position, the lever 70 is moved to the right in FIG. 1 so that contact is obtained 15 between the circular slitting knives 3 and the counter-cutting roll 4 as well as between the lower edges of the casing 21 and the V-shaped grooves 50 and support surfaces 49. When then the toggle lever 71 is pressed into the straight locking position, the shafts 47 are 20 pressed down into the grooves 33 to the position shown in FIG. 4 and the whole pressure is loaded on the circular slitting knives by the compression spring means 35 and the casing 21, but the slide shafts 27 are entirely relieved.

25 When at the setting in question of the knife holders 28 it is desired, for example, to cut bands twice as wide, i.e., when the distances between the circular slitting knives 3 are to be doubled, this can be effected by folding up every second circular slitting knife from the counter-cutting roll 4. In this connection the eccentric means 37 in every desired lifted knife holder 28 is pivoted into the position shown in FIG. 4 by dash-dotted lines. The compression spring means 35 hereby cause the inner side plates 30 with supported circular slitting 30 knife to pivot about the shaft 47 upwards from the contact with the counter-cutting roll 4. The compression spring means 35, thus, have two objects, viz., to hold the circular slitting knives pressed down in cutting position and to lift the circular slitting knives off the counter-cutting roll after said swinging movement of the eccentric means 37.

35 The exchange of a circular slitting knife 3 at the knife holder 28 shown is easy. By swinging upward the eccentric means 37 and thereafter pressing down the compression spring means 35 and swinging it to the left 40 in FIG. 4 out of the groove 58, the inner side plates 30 can be swung up out of engagement with the shaft 47 and be taken out to the right in FIG. 4 for exposing the bearing of the circular slitting knife.

45 FIGS. 7 and 8 show an arrangement which is particularly suitable for adjusting the knife holders 28. The arrangement is generally designated by C in FIGS. 1-3. By this arrangement the knife holders can easily be adjusted from a minimum distance between the circular slitting knives 3, at which the knife holders abut each other as shown in FIG. 2, to a maximum distance between the circular slitting knives, at which the circular slitting knives are distributed along the entire length of the counter-cutting roll 4 whilst in each setting position an equal spacing between the circular slitting knives is maintained. It is further possible, as already mentioned above, to multiply the distances between the circular slitting knives in a setting position in question or to change them in another way by folding up suitable circular slitting knives.

50 FIG. 8 shows the same end view as in FIG. 1, but with the plate 72 removed which in FIG. 1 conceals the ad-

justing device C proper, and with also other parts of the band cutting machine removed except for the bracket 12, the shafts 18 with their fastening nuts 73, the arm 14, the shaft 1 with its bearing 15 and the slide shafts 27. As regards said latter shafts, FIG. 8 also shows their locking at the bracket 12 by conical locking pins 74 which engage with grooves in the slide shafts. Said locking is to be preferred to the locking of the shafts by means of thread and nut, because the shafts for the reasons mentioned above have a relatively small diameter. The shafts can be chucked by tightening the nuts 73 whereby the pins 74 take along the shafts. FIG. 9 is a view seen from the left in FIG. 8 and is still more simplified with respect to the remaining parts of the band cutting machine by showing only the bracket 12.

From each knife holder 28 of the seventeen slidable knife holders in the embodiment shown which are associated with each setting device C, a steel wire 75 extends which is drawn from the respective knife holder in parallel with the slide shafts 27 out through a hole 76 in the bracket 12 and thereby extends through the holes 40 (see FIG. 4) in the knife holders located between the respective knife holder and the bracket. The number of necessary holes 40 in the rear outer side plate 38 of the respective knife holder, thus, depends on where in the row of knife holders the knife holder is located. The wires 75 thereafter run about pulleys 77 supported at the mounting 78 in the bracket 12. The wires are deflected over the pulleys 77 perpendicularly down to pulleys 79 which are supported at one angular leg 80 of an angular plate 81 fastened on the bracket 12. The wires are deflected about said lastmentioned pulleys 79 perpendicularly out through holes 82 (only the upper hole in FIG. 8 is shown) in the other angular leg 83 of the angular plate 81 and are fastened at a lever 85 which is provided with a handle 84 and supported about a lower joint 86 for swinging in the direction of the arrow 87.

For each mounting of the wires at the lever 85 a tightening means 88 is provided of which, however, only the uppermost one is shown in FIG. 8. The tightening means 88 are adapted to correctly adjust the length of the wires and thereby the position for the knife holders 28.

As appears from FIG. 9, the pulleys 77 are mounted in three rows a1, a2 and a3 at different heights and distances from the bracket 12. FIG. 8 shows for better clearness only the outer pulley in the now a3 located uppermost and farthest outward, the second pulley in the central row a2, and the third pulley in the lowermost row a1. The pulleys 79 as appearing from FIG. 8 are mounted in three oblique groups b1, b2 and b3 disposed at different distances in lateral direction in relation to the bracket 12. The wire from the knife holder located closest to the stationary knife holder is drawn about the said outermost pulley 77 in the row a3 and about the lowermost pulley 79 in the lowermost group b3. The wire from the second knife holder counted from the stationary knife holder is drawn about the second pulley 77 in the row a3 and about the second pulley 79 seen from below in the group b3, etc., so that finally the wire from the knife holder located closest to the bracket 12 is pulled about the rearmost pulley 77 in the row a1 and about the uppermost pulley 79 in the group b1. At the position of the lever 85 shown in FIG. 8 the knife holders 28 are located adjacent one another, as shown in FIG. 2, i.e., in this position there is

a minimum distance between the circular slitting knives 3. Upon swinging the lever 85 to the right in FIG. 8, i.e., the lever located to the left in FIG. 2, the lever pulls by the wires 75 the knife holders located to the left of the stationary knife holder to the left toward the bracket 12. The assembly of pulleys and wires hereby is so arranged that at each position for the lever there is always an equal spacing between the circular slitting knives 3.

10 For returning the knife holders 28 upon moving the lever 85 to the left in FIG. 8, in order to set a smaller distance between the circular slitting knives 3, return springs are provided from the stationary knife holder to each of the slidable knife holders. FIGS. 7 and 4 show 15 examples of spring mountings 69 and, respectively, 64 for such return springs. For making the return springs drawn to the different knife holders run free of each other, the spring mountings 64 are arranged at different distances from each other from the different knife 20 holders in lateral direction after the plates 63 and also on different levels above the plates 63.

The plate 72 shown in FIG. 1 may be provided along its curved upper edge with one or more scales from 25 which the distance between the circular slitting knives 25 can be read against the lever 85.

The setting device shown provides a very simple and rapid setting. It is reliable a.o. because wires are used instead of other transfer means which comprise movable parts. It renders possible individual adjustment to 30 correct position for each knife holder without affecting the position for the other knife holders, and it also renders possible individual exchange of the wires.

The band cutting machine shown by way of example 35 may, of course, be varied with respect to the means and details comprised in the machine, without changing the basic functions of the machine. It is possible, for example, to arrange only one set of slidable knife holders and to operate them from only one setting device instead of arranging as shown two identically equal sets 40 of slidable knife holders on both sides of the central stationary knife holder and to operate the sets from one setting device each. When using two sets of knife holders, the sets must not be identically equal, either. Furthermore, instead of the shown hinged lever in the setting device another movable or rotatable adjusting means may be used. The adjusting means further may be set and locked in a certain position and thereafter the position be finely adjusted by some suitable means. The knife holder arrangement and/or setting device 50 may also be utilized for knives other than circular slitting knives, and be used individually or in combination for cutting machines other than band machines.

What I claim is:

- 55 1. A device for use in cutting machines for cutting fabrics into bands, comprising:
 - a. at least one set of a plurality of knife holders,
 - b. at least one slide shaft along which the knife holders are arranged with an equal spacing between the knives,
 - c. at least one ball bushing on each knife holder and having a surrounding contact with said slide shaft,
 - d. at least one wire drawn from each knife holder, said wires from the different knife holders in each set of knife holders running substantially in parallel with each other and with said slide shaft to a position remote from said slide shaft, and

- e. a common setting means arranged at said position to which setting means all said wires of said set of knife holders are attached, said setting means and said wires being so arranged that upon actuation of said setting means all said knife holders are moved along said slide shaft in the same direction while permanently maintaining the equal spacing between the knives.
- f. at least one counter-cutting roll coacting with the knives during the cutting operation,
- g. means for moving the knives into and out of contact with said counter-cutting roll,
- h. means for holding the knives in their cutting position in pressing abutment to said counter-cutting roll, and
- i. means for entirely relieving said slide shaft from the pressure the knives are subjected to during the cutting operation, the entire pressure being taken up by said means for holding the knives in pressing abutment to said counter-cutting roll.

2. A device according to claim 1, characterized in that the knife holders comprise a first portion constituting the bearing for the knives, a second portion constituting the bearing for the slide shaft, and a guide means between said portions for a guided movement of said second portion relative to said first portion toward and away from the counter-cutting roll, and that said movable portion in the cutting position for the knives is held in a pressed-down position relative to the first portion by said members for pressing abutment of the knives to the counter-cutting roll.

3. A device according to claim 2, characterized in that said members for pressing abutment of the knives to the counter-cutting roll comprise for each knife holder a compression spring means located between said portions.

4. A device according to claim 3, characterized in that the pressure of the compression spring means can be adjusted individually.

5. A device according to claim 2, characterized in that said members for pressing abutment of the knives to the counter-cutting roll comprise a means which is common to all knife holders and with equal pressure down against the movable portions of the knife holders.

6. A device according to claim 5, characterized in that said means is formed so as guidedly to abut the movable portions of the knife holders.

7. A device according to claim 2, characterized in that the movable portion of the knife holders is movable relative to said first portion in the direction from the counter-cutting roll to a stop position between the portions, in which position the knives still abut the counter-cutting roll, but the members for the pressing abutment of the knives to the counter-cutting roll are at least substantially relieved, and that from this position the knife holders and said members can be moved in common to a position for the knives out of contact with the counter-cutting roll, in which last mentioned position the knife holders are supported on the slide shaft.

8. A device according to claim 7, characterized in that the knife holders and said members are pivotal about a common shaft by means of an actuating mechanism.

9. A device according to claim 2, characterized in that the guide means for the guided movement between

the portions of the knife holders comprises a shaft provided at the movable portion and a groove in said first portion.

10. A device according to claim 3, characterized in that said first portion of the knife holders comprises two parallel side plates which at the ends are provided with pressure plates, which are located transverse to and between the side plates and which in the area between the pressure plates are provided with a transverse shaft for supporting the knife, and that one pressure plate constitutes the lower support surface for the compression spring means and the second pressure plate constitutes the lower support surface for a rigid pressing member provided between said second pressure plate and a stop member at the movable portion.

11. A device according to claim 10, characterized in that the movable portion of the knife holders comprises two parallel side plates abutting outwardly the side plates of said first portion, which parallel side plates between themselves, at the pressure plate of the compression spring means on the first portion overlying one end, are provided with a pressure plate constituting the upper support surface for the compression spring means, and at the pressure plate for the rigid pressing member overlying the other end are provided with said stop member for the pressing member.

12. A device according to claim 11, characterized in that the guide means between the portions of the knife holders is located in the area between the bearing of the compression spring means and the knife.

13. A device according to claim 11, characterized in that the pressing member is an eccentric means with an eccentric disc which in operative position of the eccentric means is arranged between said second pressure plate of said first portion and the stop member of said movable portion.

14. A device according to claim 1, characterized in that each knife is individually movable from the cutting position.

15. A device according to claim 13, characterized in that the eccentric disc of the eccentric means is movable to a position not acting as pressing member, whereby the compression spring means swings the first portion of the knife holder about the shaft of the guide means and hereby swings up the knife from the counter-cutting roll.

16. A device according to claim 5, characterized in that the member pressing down in common the movable portions of the knife holders is a casing extending over the whole length of the counter-cutting roll and being open in the direction to said roll, the free longitudinal edges of said casing abutting the movable portions against guide surfaces located in relation to the bearing of the knives on both sides of the knives.

17. A device according to claim 16, characterized in that one of said guide surfaces is a V-shaped groove, and that the edge of the casing coacting with said grooves has a design corresponding to the grooves.

18. A device according to claim 1, characterized in that the slide shaft is supported at the ends in brackets located outside of end walls of the casing, and the brackets via arms are supported at the common shaft to be swung upon rotation of said shaft, and the slide shaft extends with clearance through holes in the end walls of the casing.

19. A device according to claim 18, characterized in that it comprises parallel support shafts extending between the brackets and mounted thereon, which shafts like the slide shaft extend with clearance through holes in the end walls of the casing.

20. A device according to claim 1, characterized in that it comprises two parallel slide shafts.

21. A device according to claim 1, characterized in that the knives are circular slitting knives and the counter-cutting roll is driven and drives the circular slitting knives.

22. A device according to claim 1, characterized in that it comprises a setting device for setting the knife holders along the slide shaft, which setting device comprises at least one wire drawn from each knife holder, that the wires from the different knife holders run substantially in parallel with each other and in the direction of motion of the knife holders to a position outside the setting range of the knife holders along the slide shaft, the wires being drawn from said position to a setting member and so adjusted relative to the setting member that upon actuation of the setting member the knife holders are moved along the slide shaft whilst permanently maintaining an equal spacing between the knives.

23. A device for use in cutting machines for cutting fabrics into bands, comprising:

- a. at least one set of a plurality of knife holders,
- b. at least one slide shaft along which the knife holders are arranged with an equal spacing between the knives,
- c. at least one ball bushing on each knife holder and having a surrounding contact with said slide shaft,
- d. at least one wire drawn from each knife holder, said wires from the different knife holders in each set of knife holders running substantially in parallel with each other and with said slide shaft to a position remote from said slide shaft, and
- e. a common setting means arranged at said position, to which setting means all said wires of said set of knife holders are attached,

said setting means and said wires being so arranged that upon actuation of said setting means all said knife holders are moved along said slide shaft in the same direction while permanently maintaining the equal spacing between the knives.

24. A device according to claim 23 characterized in that a wire from a knife holder which is located behind at least one knife holder, seen from said position outside the setting range of the knife holders, is drawn through holes in each said knife holder.

25. A device according to claim 23 characterized in that two parallel slide shafts are arranged and the wires are located in the area between the slide shafts.

26. A device according to claim 23 characterized in that the wires at said position outside the setting range of the knife holders are drawn over separate pulleys corresponding to the number of wires to the setting means.

27. A device according to claim 23 characterized in that the setting means comprises a lever pivotal about a joint, on which lever the wires are fastened at different distances from said joint.

28. A device according to claim 23 which includes at the fastening of each wire on the setting means a tightening member for adjusting the length of the wires.

29. A device according to claim 23 which includes return members acting in the direction against the movement of the knife holders to increase the distance between said holders.

30. A device according to claim 29 characterized in that the return members are arranged between a support stationary relative to the slide shaft and each of the knife holders.

31. A device according to claim 30 characterized in that said stationary support is a knife holder fixed on said slide shaft.

32. A device according to claim 31 characterized in that the knife holder fixed on the slide shaft is a central knife holder for two sets of knife holders.

33. A device according to claim 32 characterized in that the two sets of knife holders are individually adjustable each by one setting means.

34. A device according to claim 30 characterized in that the return members are springs.

35. A device according to claim 23 wherein the knives are arranged to be moved in common to and from an active cutting position with at least one counter-cutting roll.

36. A device according to claim 35 characterized in that the knives are arranged to be moved individually to and from the cutting position.

37. A device according to claim 35 characterized in that it includes means for entirely relieving the slide shaft from the pressure to which the knives are subjected during the cutting operation.

38. A device according to claim 35 characterized in that the counter-cutting roll is driven and the driving power for the knives is transferred to the knives via the counter-cutting roll.

39. A device according to claim 23 characterized in that the knives are circular slitting knives.

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