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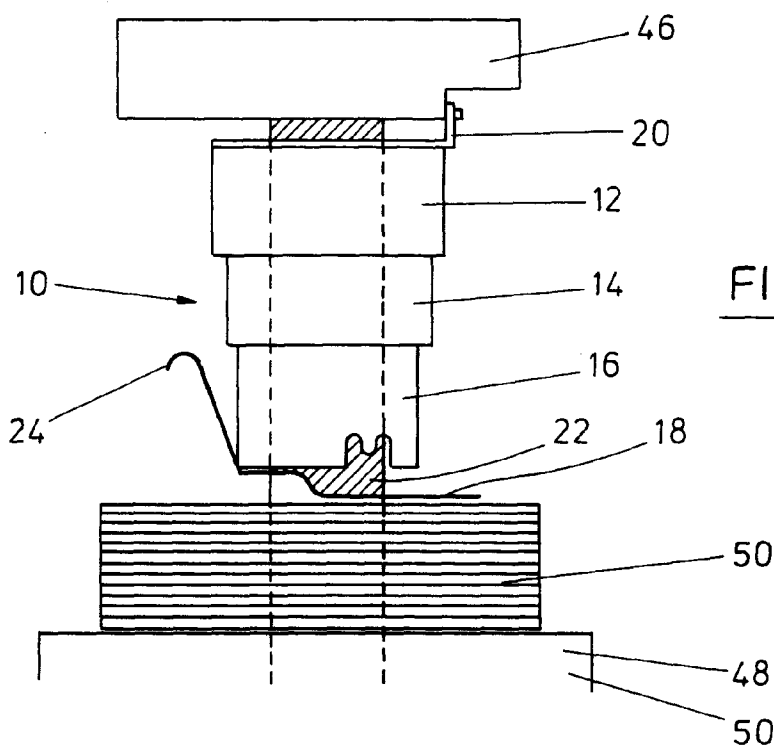
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**(54) Cutting machine blade guard**

(57) A band knife guard (10) comprises upper, middle and lower guard sections (12), (14) and (16). A wire shoe (18) extends forwardly and to the side from the lower end of the lower guard section (16). A band knife guard (10) has a mounting (20) extending from the upper guard section (12) and is arranged to be attached

to the body of a band knife machine (46), so that the upper, middle and lower guard sections surround the two main faces of a band knife blade (22). A wire lifting handle (24) extends upwardly from the base of the lower guard section (16) to facilitate lifting of the band knife guard (10).



**FIG. 5a**

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## Description

**[0001]** This invention relates to a guard for a cutting machine blade.

**[0002]** A band knife machine comprises a continuous blade which is run, typically in a vertical direction, in a loop which passes down through a cutting table. Material, such as fabric, for cutting is offered up to the blade then pushed against the blade. The material is cut as it is pushed passed the blade.

**[0003]** Band knife guards are used to cover a band knife blade in order to protect an operator from unintentional contact with the band knife blade.

**[0004]** A previous band knife guard has comprised a box section of metal which tapers towards an opening at a lower end thereof. The box section surrounds the band knife blade. Serious disadvantages arise with this type of band knife guard because a gap must be left beneath the guard in order to allow an operator to view the blade during cutting and obtain a desired accuracy of cut. The gap which must be left beneath the guard however leaves a portion of blade exposed from which the operator is unprotected. The taper of the box section is used to try and improve the visibility of the blade for the operator, but this type of guard still has very poor visibility. The consequence of this is that an operator will often not use the guard, thus leaving themselves completely unprotected from the band knife blade. Furthermore, this previous type of band knife guard is not adjustable and can only be set to one position. The result of this is that once a cutting operation has been completed and the material for cutting has been removed there is a large gap between the base of the band knife guard and the cutting table and an undesirably large portion of the blade is left open from which the operator is not protected.

**[0005]** It is an object of the present invention to address the above mentioned disadvantages.

**[0006]** According to a first aspect of the present invention, a guard for a blade of a cutting machine comprises a cover section and a foot section, in which the cover section has substantially parallel side portions forming a slot, and the foot section is located at a first end of the cover section at an angle to the length thereof and forms a peripheral barrier to impede an operator from touching a blade which the guard is arranged, in use, to protect.

**[0007]** The guard may, in use, prevent the operator from coming into contact with the blade.

**[0008]** The guard may be freely movable relative to a mounting portion, to allow the guard to drop to cover parts of the blade which are, in use, exposed above material to be cut.

**[0009]** The foot portion may be arranged to contact a top surface of material to be cut.

**[0010]** The guard portion may be arranged to drop to cover parts of the blade exposed when the blade exits material which has been cut.

**[0011]** At least one longitudinal edge of the cover sec-

tion may be at least partially closed. The foot section may be substantially perpendicular to the cover section. The slot may be elongate.

**[0012]** The guard may be a guard for a continuous blade cutting machine or for a circular blade cutting machine.

**[0013]** The guard may be positioned, in use, around the blade.

**[0014]** The side portions may have a spacing just greater than the thickness of a blade which the guard is arranged, in use, to protect.

**[0015]** Preferably the elongate slot has one edge substantially closed with the other edges being open.

**[0016]** The cover section may comprise a plurality of cover pieces which are movable relative to one another, each cover piece preferably having substantially parallel side portions. The substantially parallel side portions may be formed from a substantially flat piece of material folded into two, in which case the fold may form the at least partially closed longitudinal edge of the slot. The cover pieces are preferably movable between an extended configuration and a retracted configuration. In the extended configuration the cover pieces are preferably arranged substantially end to end. In the retracted configuration the cover pieces are preferably received one within the other, in a telescopic arrangement. Preferably, a lowermost of the cover pieces is the narrowest. The cover pieces may be freely movable relative to one another.

**[0017]** The first end of the cover section may have a recess therein to allow the blade to be guarded to be seen more easily. The recess may be located to allow the cutting edge of the blade to be seen. The recess may have a substantially central projection therein, to prevent access by a finger of an operator. The recess may be present in both side portions.

**[0018]** The cover section may have a mounting section arranged, in use, to secure the guard to a cutting machine. Preferably, the guard is arranged, in use to hang from the mounting section. The mounting section may be a bracket.

**[0019]** The foot section may be made from a thin section of material, such as wire.

**[0020]** The foot section may extend forwards of the at least partially closed edge of the slot, which is preferably forward, in use, of the cutting edge of the blade. Preferably, the foot section presents a smooth lower face beneath the first end of the cover section, to enable material being cut to slide smoothly beneath the guard. The foot section may have a rounded front end to allow material being cut to slide smoothly beneath the guard.

**[0021]** There may be a space between the first end of the cover section and the foot section which may be sized to prevent access by a finger of an operator.

**[0022]** The foot section may be secured to the cover section at a rear side of the first end thereof.

**[0023]** The guard may also include lifting means for lifting the guard. The lifting means may be powered and

may be operated by a foot of an operator. The lifting means may be a manually operated handle, which may be formed integrally with the foot section.

**[0024]** The slot may comprise translucent side portions, which may allow a user to view the blade to be guarded. The side portions may be secured to an upright portion of the cover section. Said upright portion may be integral with lifting means of the guard. The upright portion may be integral with the foot portion.

**[0025]** The foot portion may extend rearwardly of the cover portion. The foot portion may comprise twin projections, one of which may extend to one side of a blade to be guarded and the other to another side of said blade.

**[0026]** The guard may include adjustment means, which may be operable to hold the guard in a chosen position. The adjustment means may deter descent of the guard towards a blade protecting position. The adjustment means may bear against the guard to create friction. The adjustment means may be actuable to selectively release or restrain the guard.

**[0027]** According to a second aspect of the present invention, a method of protecting a blade of a cutting machine comprises placing a guard over said blade, the guard comprising a cover section and a foot section, in which the cover section has substantially parallel side portions forming a slot, and the foot section is located at a first end of the cover section at an angle to the length thereof and forms a peripheral barrier to impede an operator from touching the blade.

**[0028]** The method may include moving the guard up and down along the blade as material is cut with the cutting machine.

**[0029]** The guard may fall to a table of the cutting machine as soon as material, on which the guard is resting, is removed, thus covering the blade along the whole of its otherwise exposed length.

**[0030]** Preferably, in use, the foot is disposed above material to be cut and the material in turn rests on a table of the cutting machine through which the blade extends, material to be cut being arranged to be pulled toward the blade and passing under the foot section prior to being cut. Preferably, the foot section is shaped so as to ease passage of the material thereunder.

**[0031]** The invention extends to a cutting machine provided with a guard as described in the first aspect.

**[0032]** All of the above aspects can be combined with any of the features disclosed herein, in any combination.

**[0033]** Specific embodiments of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic side view of a band knife guard.

Figure 2 is a plan view of a foot portion of the guard shown in Figure 1;

Figures 3a and 3b are schematic side views of parts of the band knife guard shown in Figure 1;

Figures 4a to 4c are schematic rear views of parts of the band knife guard;

Figures 5a and 5b are partial views of the band knife guard in use;

Figure 6 is a side view of a circular blade guard in use; and

Figure 7 is a front view of the circular blade guard.

**[0034]** A band knife guard 10 comprises upper, middle and lower guard sections 12, 14 and 16. A wire shoe 18 extends forwardly and to the side from the lower end of the lower guard section 16. The band knife guard 10 has a mounting bracket 20 extending from the upper guard section 12 and is arranged to be attached to the body of a band knife machine 46 (see Figure 5a and 5b) so that the upper, middle and lower guard sections surround the two main faces of a band knife blade 22 (see Figure 5a and 5b). A wire lifting handle 24 extends upwardly from the base of the lower guard section 16 to facilitate lifting of the band knife guard 10.

**[0035]** The band knife guard 10 will now be described in greater detail.

**[0036]** The upper, middle and lower guard sections 12, 14 and 16 are arranged to be telescopically adjustable, with the upper guard section 12 receiving the middle guard section 14 therein and the middle guard section 14 receiving the lower guard section 16 therein. Each of the upper, middle and lower guard sections 12, 14 and 16 is formed from a flat section of metal which has been folded over to create two substantially parallel faces 26 joined by a fold 28.

**[0037]** The upper guard section 16 has a flange 29 (Figure 4b) which projects inwardly from a lower end of one of the parallel faces 26 and is arranged to communicate with flanges 30 (Figure 3b) at an upper end of the middle guard section 14 in order to retain the middle guard section 14 within the upper guard section 16. Flanges 32 (Figure 4c) are provided on the lower end of the middle guard section 14 to communicate with corresponding flanges 34 (Figure 3a) on an upper end of the lower guard section 12 in order to retain the lower guard section 12 within the middle guard section 14.

**[0038]** Each of the guard sections 12, 14 and 16 are suitably sized to allow for free movement of the guard sections relative to one another.

**[0039]** The lower end of the lower guard section 16 has front and rear cut-away sections 36 and 38 (Figure 1) respectively, which are provided to permit the band knife blade 22 to be viewed. A projection 40 is provided between the front and rear cut away sections 36 and 38 to prevent an operator of the band knife machine from touching the blade within the band knife 10. The role of

the wire shoe 18 in preventing the blade 22 from being touched is discussed below.

**[0040]** The configuration of the front and rear cut away sections 36 and 38 has been chosen to allow as much visibility of the blade as possible whilst retaining an open section of the guard 10 which does not allow the blade to be touched.

**[0041]** The wire shoe 18 is secured to the lower end of the lower guard section 16 as shown in Figure 1, and comprises a wire loop which extends laterally to either side of the lower guard section 16 and has a smoothly curving front section 42 forward of the front of the lower guard section 16. The wire shoe is formed in a loop to enable the guard to glide smoothly over material being cut. The shape of the shoe 18 is important because it must not dig into or catch the material being cut. The size of the shoe is also important because it must extend away from the lower end of the lower guard section 16 enough to allow an operator to view the band knife blade 22 but it must be close enough to the lower end of the lower guard section 16 to prevent an operator from touching the band knife blade 22.

**[0042]** The wire shoe 18 is secured to the lower guard section 16 by crimping or welding flanges 44 of the lower guard section 16 (see Figure 2).

**[0043]** The wire lifting handle 44 is formed of the same piece of wire as the wire shoe 18 and extends upwardly and to the rear of the lower guard section 16.

**[0044]** In use, the band knife guard 10 is secured to a band knife machine 46 (see Figure 4) by the mounting brackets 20. The lower and middle guard sections 16 and 14 fall by gravity towards a table 48 of the band knife machine 46 because of the free movement between the upper, middle and lower guard sections. The length of the band knife guard 10 is chosen so that when extended, the wire shoe 18 at the lower end of the lower guard section 16 contacts the table 48, thus protecting an operator from the whole length of the band knife blade 22, which would otherwise be exposed.

**[0045]** An operator would normally stand to the left hand side of the band knife machine 46 shown in Figure 4 and would thus be behind the band knife guard 10. A section of material 50, for example a stack of pieces for cutting, would then be moved to the front side of the knife guard, which is then raised using the lifting handle 24 and the wire shoe is then rested on top of the material 50. In this position the sharp front side of the blade 22 is covered either by the material 50 of the band knife guard 10, thus protecting the operator. The operator then pulls the material 50 towards himself. With the band knife guard 10 resting on top of the material, any variations in the thickness of the material result in the guard 10 moving upwardly or downwardly because of the free movement between the guard sections 12, 14 and 16.

**[0046]** In this way, the wire shoe 18 provides a smooth surface which does not dig into or catch the material 50 and permits the guard 10 to react to the thickness of the material 50 by moving upwards or downwards.

**[0047]** When the end of the material is reached the guard 10 falls to contact the table 48 once more, thus protecting the operator.

**[0048]** The knife guard 10 described above prevents an operator from touching the band knife blade 22 at all times throughout a cutting operation. This is achieved whilst retaining visibility of the point where the blade contacts the material, which is essential for effective use of the knife machine 46.

**[0049]** The form of the knife guard, in particular the lower guard section 16, which has only a very narrow gap between the parallel faces 26 allows for excellent visibility around the blade whilst still offering protection. The wire shoe 18 provides a smooth lower surface for easy gliding of the material 50 and also provides excellent visibility because of the thinness of the wire used.

**[0050]** An alternative embodiment would include only one guard section fixed rigidly to the band knife machine.

**[0051]** The guard may suitably be used in other fields, on band saws and fret saws for instance, both commercially and domestically.

**[0052]** A further embodiment of knife guard is shown in Figures 6 and 7. The knife guard 100 is suitable for use with a circular blade cutting knife 102, which comprises a motor body 104, handle 106 and blade 108.

**[0053]** The knife guard 100 comprises a sliding arm 110, the top of which is curled over to give a lifting handle 112. A lower end of the sliding arm 110 is curled rearwardly to form a foot portion 114.

**[0054]** Side portions 116 are secured at either side of the lower end of the sliding arm 110. The side portions 116 are made of perspex to allow visibility of the blade 108 which they protect. The side portions 116 are secured to the sliding arm 110 by means of a bracket 118.

**[0055]** The foot portion 114 comprises twin projections 120, which have a space therebetween to accommodate the blade 108.

**[0056]** The sliding arm 110 is slidably received in a guide 120, which is secured to the motor body 104.

**[0057]** A control trigger 122 is secured to the motor body 104 at point 124, about which point the control trigger 122 may pivot. The control trigger 122 is also supported on a bracket 126. The control trigger 122 is biased to bear against the sliding arm 110 with a spring (not shown), in order to hold the sliding arm in position.

**[0058]** When a handle 128 of the control trigger 122 is depressed, an end 130 of the control trigger 122 is caused to move to the left, as seen in Figure 7, which allows the sliding arm 110 to move up or down freely in the guide 120.

**[0059]** In use, the knife guard 100 would normally be in a raised position, when it is engaged with some material which is to be cut. When the cutting knife 102 is in position, pressure is exerted on the handle 128 of the control trigger 122, which allows the knife guard 100 to descend, so that the foot portion 114 contacts an upper surface of the material to be cut. This prevents a user

from inadvertently touching the blade 108. When the circular blade cutting knife 102 has passed through the material to be cut, then the knife guard 100 drops further to protect parts of the blade 108 which would otherwise be revealed when the knife 102 exits the material.

**[0060]** Also, if desired, the knife guard 100 can be left in position by leaving the control trigger 122 in contact with the sliding arm 110. In this way, the guard 100 can be maintained in the raised position.

**[0061]** The side of the sliding arm 100 may be profiled, so that the trigger arm 128 will only grip the sliding arm 100 when the sliding arm is in the raised position. When the sliding arm is not in the raised position, it will drop automatically by the force of gravity rendering full protection when the blade emerges from the material being cut.

**[0062]** The side portions 116 could alternatively be pieces of mesh mounted on a loop of wire or the like, which alternative would also have the function of preventing a user from touching the blade whilst maintaining visibility of the blade.

**[0063]** Many of the advantages of the first described embodiment are also obtained with the latter embodiment.

**[0064]** The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference. All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features. The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

## Claims

1. A guard for a blade of a cutting machine comprises a cover section (12, 14, 16) and a foot section (18), in which the cover section (12, 14, 16) has substantially parallel side portions forming a slot, and the foot section (18) is located at a first end of the cover

section at an angle to the length thereof and forms a peripheral barrier to impede an operator from touching a blade (22) which the guard is arranged, in use, to protect.

2. A guard for a blade of a cutting machine is claimed in claim 1, in which the guard (10) is freely movable relative to a mounting portion (46), to allow the guard (10) to drop to cover parts of the blade (22) which are, in use, exposed above material (50) to be cut.
3. A guard for a blade of a cutting machine as claimed in any preceding claim, in which the foot portion (18) is arranged to contact a top surface of material (50) to be cut.
4. A guard for a blade of a cutting machine as claimed in any preceding claim, in which the guard (10) is arranged to drop to cover parts of the blade (22) exposed when the blade exits material which has been cut.
5. A guard for a blade of a cutting machine as claimed in any preceding claim, in which the side portions have a spacing just greater than the thickness of a blade (22) which the guard is arranged, in use, to protect.
6. A guard for a blade of a cutting machine as claimed in any preceding claim, in which the slot is an elongate slot and has one edge substantially closed with the other edges being open.
7. A guard for a blade of a cutting machine as claimed in any preceding claim, in which the cover section comprises a plurality of cover (12, 14, 16) pieces which are movable relative to one another between an extended configuration and a retracted configuration.
8. A guard for a blade of a cutting machine as claimed in any one of claims 2 to 4, in which the side portions (116) are secured to an upright portion (110) of the cover section, which upright portion (110) is integral with the foot portion (120).
9. A guard for a blade of a cutting machine as claimed in any one of claims 1 to 4 or 8, in which the foot portion (120) comprises twin projections, one of which may extend to each side of the blade (108).
10. A guard for a blade of a cutting machine as claimed in any one of claims 1 to 4, 8 or 9, in which the guard includes adjustment means (122), which are operable to hold the guard (100) in a chosen position.
11. A method of protecting a blade (22) of a cutting machine

chine comprises placing a guard (10) over said blade (22), the guard comprising a cover section (12, 14, 16) and a foot section (18), in which the cover section (12, 14, 16) has substantially parallel side portions forming a slot, and the foot section (18) is located at a first end of the cover section at an angle to the length thereof and forms a peripheral barrier to impede an operator from touching the blade.

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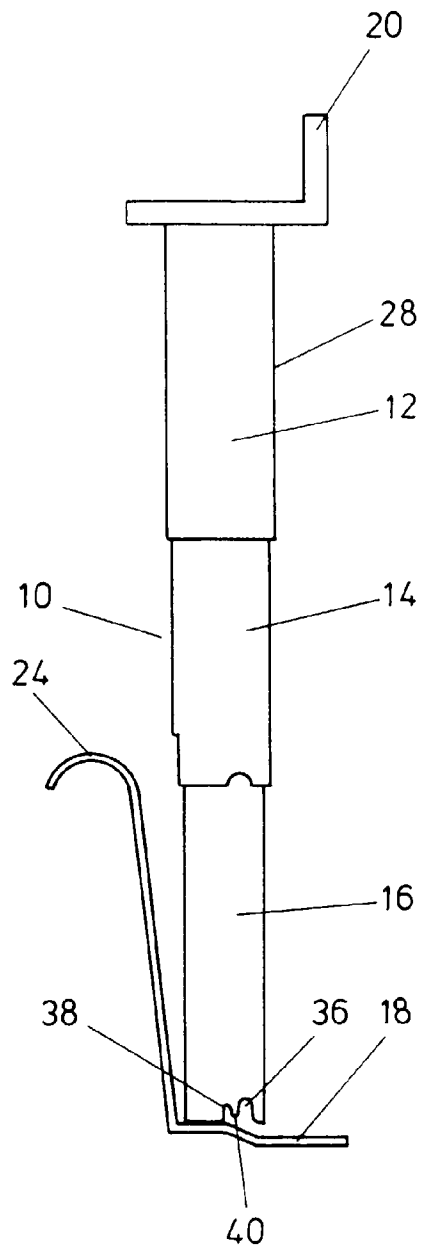


FIG. 1

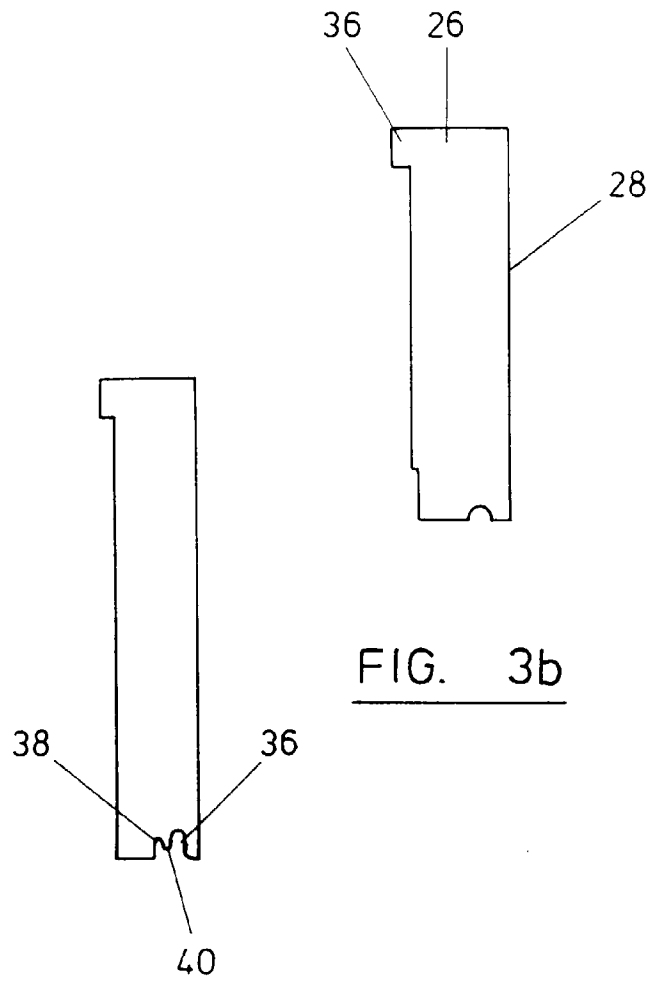


FIG. 3b

FIG. 3a

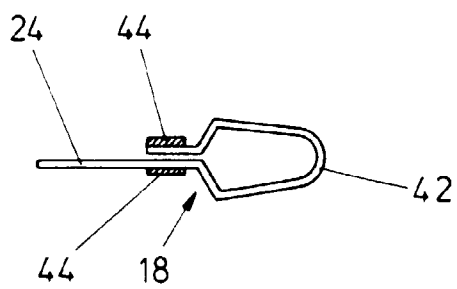


FIG. 2

FIG. 4b

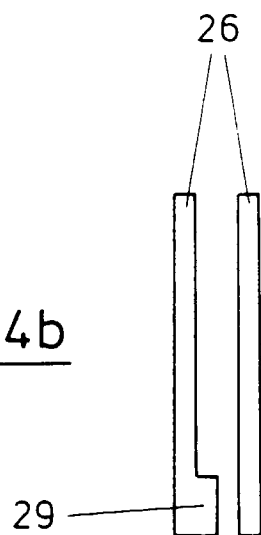


FIG. 4a

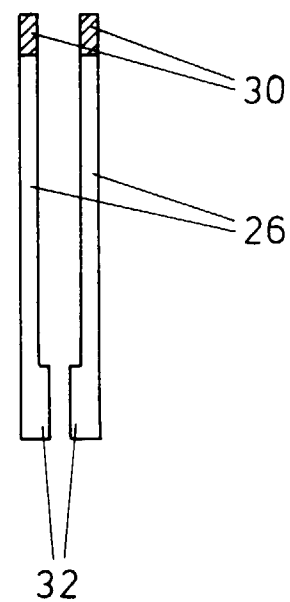
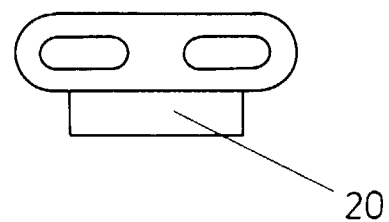
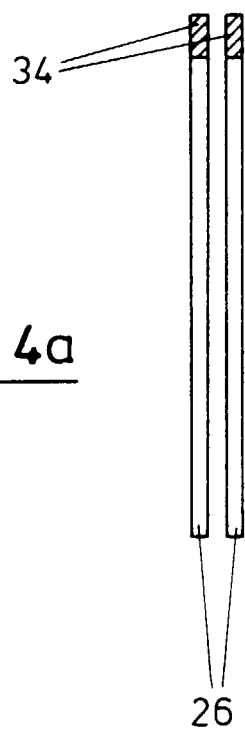
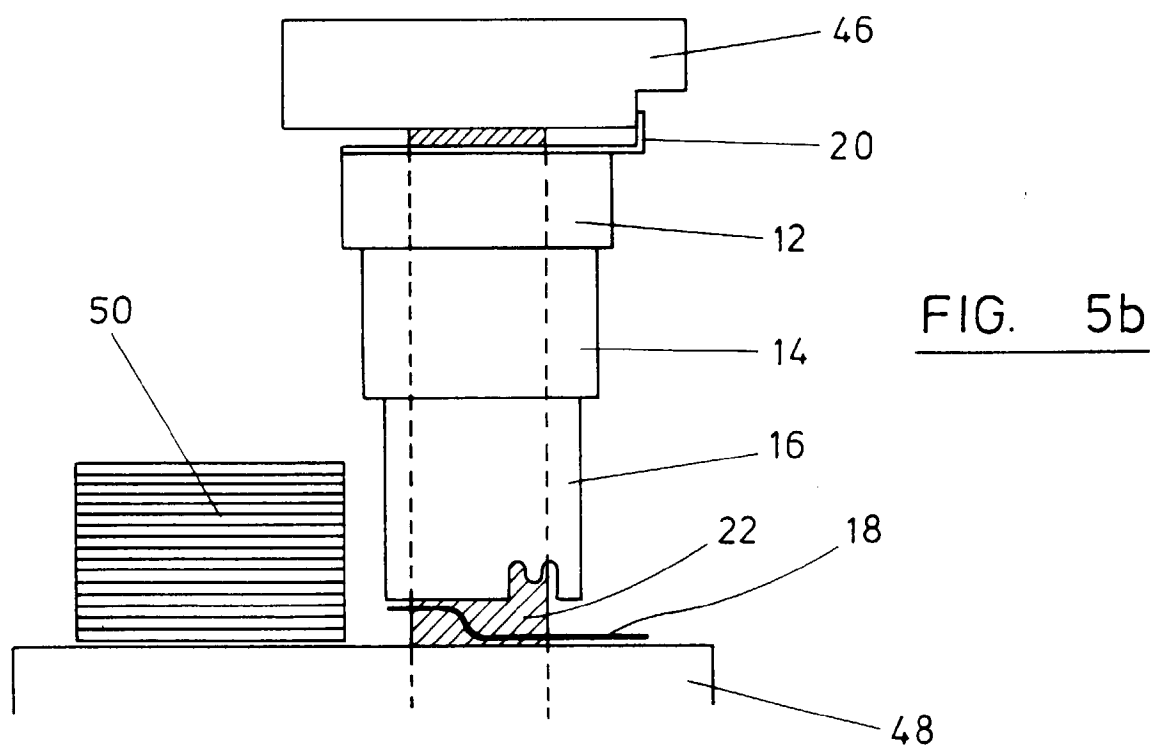
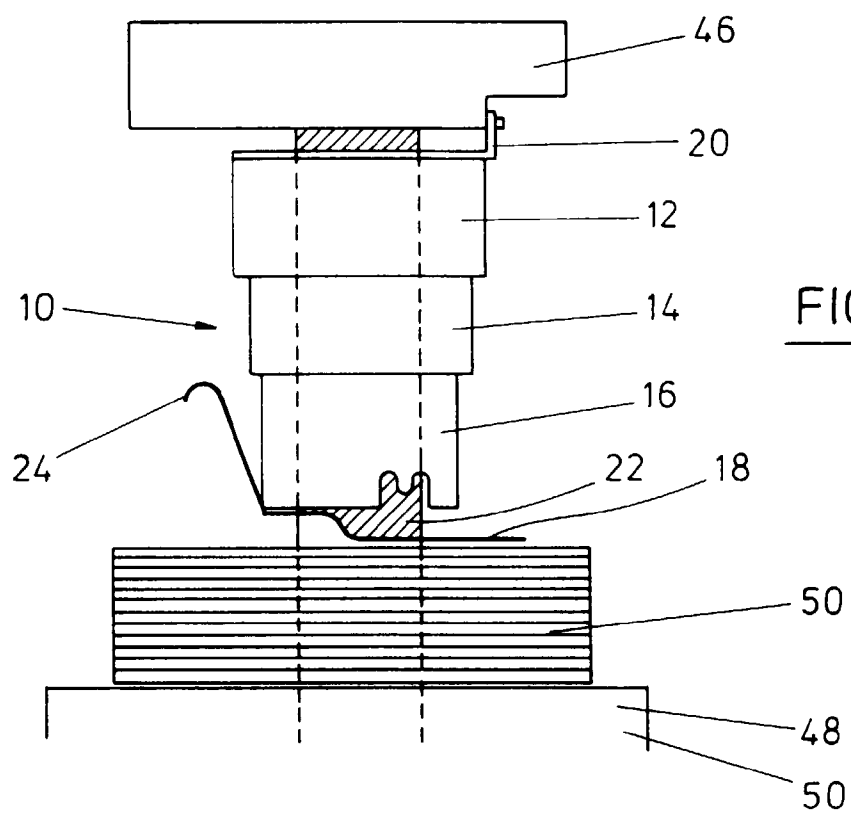
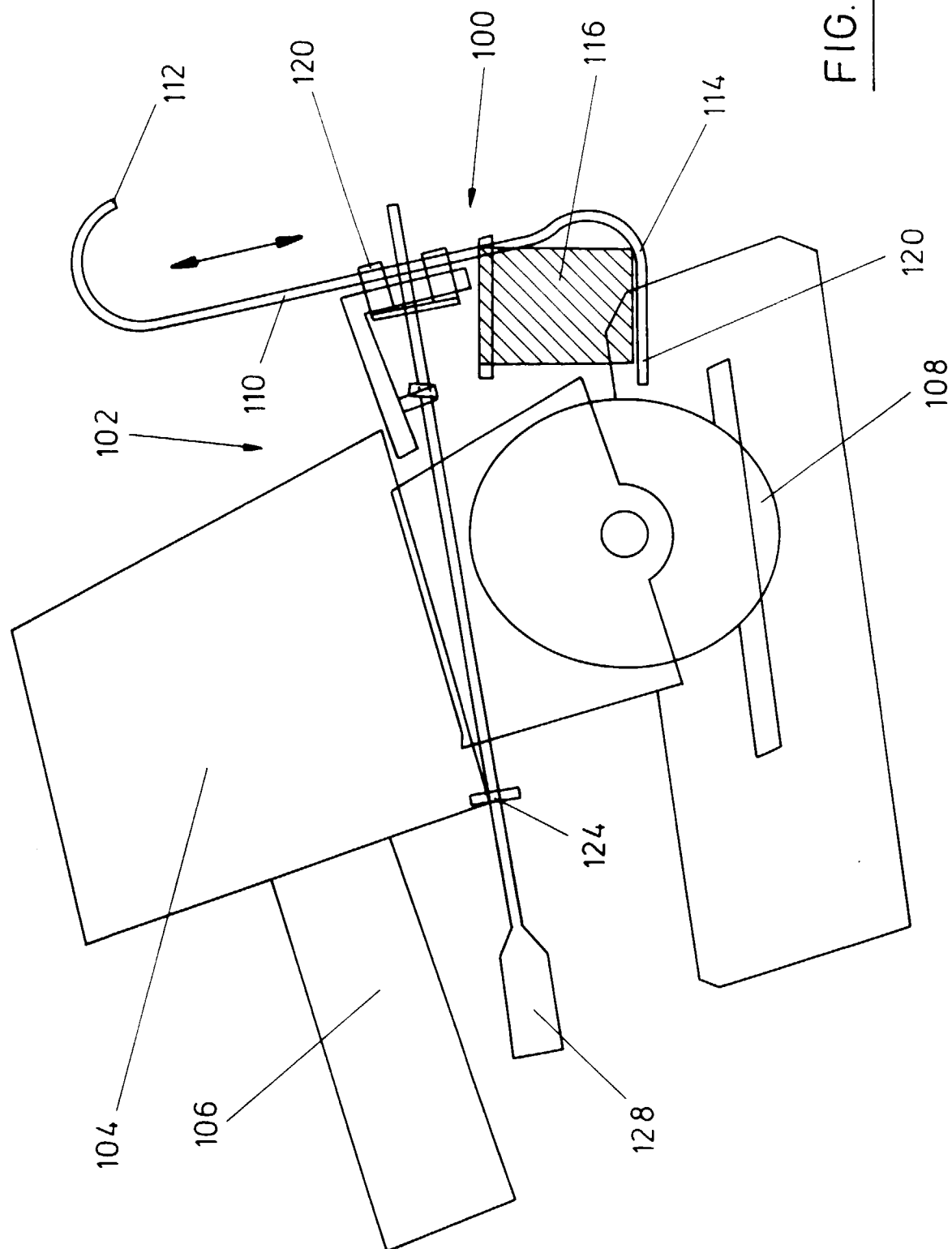


FIG. 4c







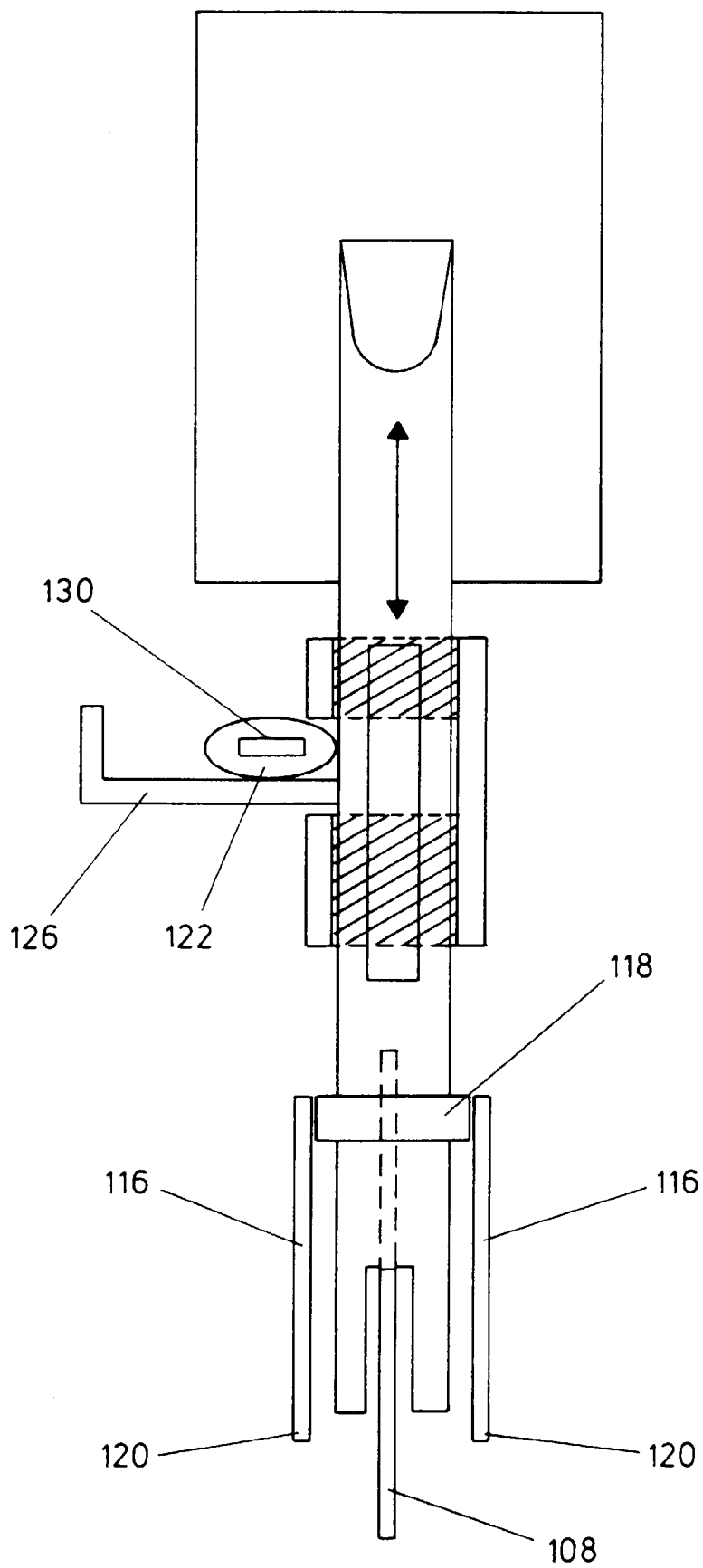


FIG. 7