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(54) **Tile cutter.**

(57) A tile cutter comprising a base plate (1), a straight ridge (16) extending on the upper side of the base plate (1), and resilient supports (17A) mounted on both sides of the ridge (16) on the base plate (1). A guide rail (3) is mounted on the base plate (1) along and above the ridge (16), a slide (5) is supported by the rail (3), and a lever (4) is supported by the slide (5) and pivotal on an axis (4c) parallel to the base plate (1). An arm (9) is supported pivotally by the lever (4) on an axis (9A) parallel to the base plate (1), and press members (7) are mounted on the lever (4) over the resilient supports (17A), whereby pivotal movement of the lever (4) moves the arm (9) and the press members (7) relative to the upper surfaces of the supports. A cutting blade (6) is supported by the arm (9) so that pivotal movement of the arm (9) moves the blade (6) relative to the upper surfaces of the supports. A cam (10) is supported by the lever (4) and adapted to be manually operated, and a spring (12) mounted on the lever (4) urges the arm (9) against the cam (10) and biases the blade (6) away from the support surfaces.

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This invention relates to a cutter for tiles, particularly for mosaic tiles, made of ceramics or chinaware for use as building materials.

Conventionally, tiles have been cut to desired sizes by initially making a straight score line or cut in the upper surface of the tile and then pressing on both sides of the cut while supporting the tile under and along the cut. Tile cutters of this type are exemplified in Japanese patent provisional publication (S)57-170706, utility model publications (S)-55-53383 and (S)55-56008 and utility model provisional publications (S)56-156613 and (S)57-177709.

Figs. 1 and 2 of the accompanying drawings show a prior art tile cutter which corresponds to that shown in publication (S)56-156613, which is designed for common tiles other than mosaic tiles.

With reference to Fig. 1, a tile T is held by one hand on the rubber sheets RS and across the metal ridge MR, and the lever L is moved forwardly along the rails R so that the circular cutting wheel or blade CB makes a cut C in the upper surface of the tile above and along the ridge MR.

As shown in Fig. 2, at the forward end position, the lever is lowered so that the press member PM presses the tile on both sides of the ridge in order to break the tile along the cut and the ridge, as the rubber sheets contract. At this stage, the blade enters the groove G (Fig. 1) in the scale or gauge member S abutting the tile, because the blade is located lower than the press member.

The foregoing prior art cutter is not able to cut all mosaic tiles of the type wherein a plurality of small parts are assembled in a pattern and fixed to a net with spaces or intervals between adjacent parts (Fig. 9), the intervals being narrower than the blade diameter, for the following reason. When the second or rearward tile, for example, should be pressed by the press member (imaginary lines in Fig. 9), the blade would initially contact the tile surface of the adjacent tile and prevent the press member from lowering.

In addition, when the press member presses the tile, the rubber sheets tend to contract locally under the press member, so that the tile may not be cut exactly along the cut C.

It is a general object of this invention to provide a tile cutter adapted for mosaic tiles as well as larger single piece tiles by providing an adjustment for the position of the blade.

It is another object of the invention to provide such a cutter which cuts tiles exactly along a straight line.

A tile cutter according to the present invention comprises a base plate, a straight ridge extending on the upper side of the base plate, resilient supports mounted on both sides of the ridge on the base plate, a guide rail mounted on the base plate along and above the ridge, a slide supported by

the rail, a lever supported by the slide and pivotally mounted on an axis parallel to the base plate, an arm supported pivotally by the lever on an axis parallel to the base plate, press members mounted on the lever over the resilient supports, so that the pivotal movement of the lever moves the arm and the press members relative to the upper surfaces of the supports, a cutting blade supported by the arm so that the pivotal movement of the arm moves the blade relative to the support surfaces, a cam supported by the lever and adapted to be manually operated to adjust the position of the cutting blade, and a spring mounted on the lever to urge the arm against the cam and bias the blade away from the support surfaces.

A preferred embodiment of the invention is shown in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a prior art tile cutter;

Fig. 2 is an enlarged perspective view of part of the cutter of Fig. 1;

Fig. 3 is a perspective view of a tile cutter according to this invention;

Fig. 4 is an enlarged view partially cut away of part of the cutter shown in Fig. 3;

Fig. 5 is an enlarged perspective view partially cut away of part of the cutter shown in Fig. 3;

Fig. 6 is a sectional view of the part shown in Fig. 5;

Fig. 7 is an enlarged perspective view of another part of the cutter shown in Fig. 3;

Figs. 8a-8d are views similar to Fig. 4, but showing different positions of the cutting blade of the invention; and

Figs. 9 and 10 are schematic views illustrating the operation of the cutter according to the invention.

With reference to Fig. 3, the tile cutter of this invention includes a horizontal, generally rectangular base plate 1, to which both end blocks 2 are fixed. Two parallel guide rails 3 extend between the blocks 2 and above the upper surface of the plate 1.

A slide block 5 is supported slidably by the rails 3. A lever 4 is pivotally supported at its front end on the slide 5 by a horizontal pin 4c, which is perpendicular to the rails 3. The lever 4 has a grip 4A at its rear end.

As shown in Fig. 4, the lever 4 has formed therein a front end cavity 4D. An L-shaped arm 9 is located in the cavity 4D and has a corner 9a supported pivotally on the lever 4 by a pin 9A, which is parallel to the lever pin 4c, so that part of arm 9 can move in the cavity 4D. The arm 9 carries, at its lower end, a rotatable cutting wheel or blade 6, and has an upper side 9c adjacent the upper end.

A generally rectangular cam 10 has four sides

I-IV for engagement with the side 9c and is supported eccentrically on the lever 4 by a pin 10A. The four sides I to IV have different distances from the axis of the pin 10A, and the pin with the cam 10 are rotatable on the lever 4. The pin 10A has one end fixed to the cam 10 and its other fixed to a knob 8 which is outside the cavity 4D and is manually accessible.

The side 9c of the arm 9 is urged against the cam 10 by a compression spring 12 connected to a pin 11 on the arm 9 and to a screw 13 on the lever 4. The cam 10 functions as a stopper to limit the rotation of arm 9 in the counterclockwise direction as seen in Fig. 4.

A press member 7 is pivotably supported on the lower end of lever 4 at the back of blade 6 by a screw hinge 7A. As better shown in Fig. 10, the press 7 has feet 7b and a central bottom recess 7c between them. Each foot 7b has a soft bottom pad 7a to protect the tile T.

As shown in Fig. 3, a cross gauge member 15 is fixed to the front end of base 1 to measure the cutting size of the tile. The gauge 15 has scales 15A on both sides of a groove 15D formed in it at the middle between the rails 3. The gauge 15 also has a groove 15a extending perpendicularly to the rails 3.

An L-shaped slide 15B for positioning the tile includes a first member in parallel with the rails 3 and a cross member fixed to the first member. The cross member is slidable in the groove 15a and can be fixed to the base 1 by a wing or butterfly nut 15c.

Between the gauge 15 and rear block 2 extends a straight rigid ridge 16, which is fixed to the base 1, in alignment with the groove 15D and in parallel with the rails 3, so that the blade 6 moves right over and parallel with the ridge 16.

On each side of ridge 16, a bed 17 is supported on the base 1 by resilient means 17A at the four corners and two center points of the bed. The bed 17 is made of steel plate of suitable rigidity, and the upper surface of each bed 17 is covered with a protective rubber sheet 17a.

As shown in Figs. 5 and 6, each resilient means 17A includes a flush bolt 18 extending through a hole 17b in the bed 17 and a hole 21 in the base 1. A collar 19 surrounds a substantial portion of the bolt 18 and has a diameter larger than the upper hole 17b. The collar 19 extends loosely through the lower hole 21 and is surrounded by a conical compression spring 20 between the bed 17 and base 1. The lower end of bolt 18 is screwed into a nut 23 with a washer 22 interposed between the base 1 and nut 23, in order to fix the bed 17, bolt 18 and collar 19 together.

The normal distance between the bed 17 and base 1 may be increased by loosening the nut 23,

in order to adjust the lowering amount of bed 17 when it is pressed. This may adjust the pressure required to cut the tile.

As best shown in Fig. 7, an angle-shaped tile holder 25 has a lower horizontal side lined with a protective rubber sheet 26. The holder 25 extends along the rails 3, and its front end is supported on the gauge 15 by a butterfly nut 27, resiliently through a coil spring (not shown). The holder 25 has a slot 29 adjacent the rear end, and a vertical pin 31 is fixed to the base 1 and extends loosely through the slot 29. A compression spring 33 surrounds the pin 31 and resiliently supports the rear end of the holder 25.

An L-shaped bracket 35 (Fig. 7) is fixed to the base 1 adjacent the pin 31 and supports a lever 37, which can pivot on a horizontal pin 39 fixed to the bracket 35 in parallel to the lever pin 4c (Fig. 1). The lever 37 has a rectangular end, one corner of which is supported by the pin 39 so that one of two sides 37a and 37b of this end compressively engages the holder 25. The two sides 37a and 37b of the lever 37 have different distances from the pin 39, and therefore pivotal movement of lever 37 moves the rear end of holder 25 up or down.

Figs. 8c and 8d show the selective positions of blade 6 for making cuts in tiles of two different thicknesses, and Figs. 8a and 8b illustrate the step of pressing these tiles for the positions 8a and 8b, respectively.

In operation, the lever 4 is raised and the holder lever 37 is turned to the upright position shown by imaginary lines in Fig. 7 to raise the rear end of holder 25. Mosaic tiles T (Fig. 9) fixed to a net N at intervals are placed on the beds 17 and over the ridge 16. The lever 37 is then turned to the horizontal position so that the holder 25 holds the tiles in place.

The knob 8 on the lever 4 is turned to select one of the lower positions of blade 6 shown in Figs. 8c or 8d, depending on the thickness of the tile. The lever 4 is moved to the rear position shown by imaginary lines in Fig. 3. Then, while the lever 4 is pressed down and the blade engages the tiles, it is moved to the front position to form a cut C (Fig. 10) in the tiles along the ridge 16 (the size of the cut is exaggerated in Fig. 10).

At this front position, as shown by solid lines in Fig. 9, the lever 4 is further lowered, so that the blade 6 enters the groove 15D of gauge 15 while the feet 7 press the tile against the ridge 16 and beds 17. This breaks the tile along the ridge 16 as the beds 17 are lowered against the forces of springs 20, as shown by imaginary lines in Fig. 10.

The knob 8 is then turned to select the higher blade position shown in Fig. 8a or 8b, and the lever 4 is raised and moved back to the position shown by imaginary lines in Fig. 9. The lever 4 is then

lowered so that the feet 7 press the second tile without the blade 6 contacting any tiles. The succeeding tiles can be cut in the same manner.

Because the rigid beds 17 are lowered as a whole, the tiles can be broken exactly along the cut C. 5

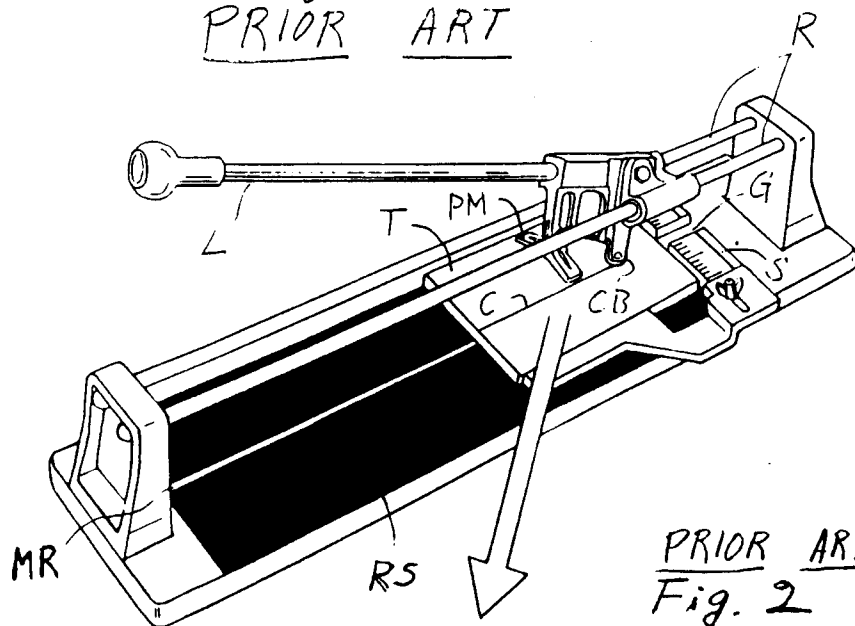
## Claims

1. A tile cutter comprising a base plate, a straight ridge extending on the upper side of said base plate, resilient supports mounted on both sides of said ridge on said base plate, a guide rail mounted on said base plate along and above said ridge, a slide supported by said rail, a lever supported by said slide and pivotal on an axis parallel to said base plate, an arm supported pivotally by said lever on an axis parallel to said base plate, press members mounted on said lever over said resilient supports, whereby pivotal movement of said lever moves said arm and said press members relative to the upper surfaces of said supports, a cutting blade supported by said arm so that pivotal movement of said arm moves said blade relative to said upper surfaces of said supports, a cam supported by said lever and adapted to be manually operated, and a spring mounted on said lever to urge said arm against said cam and bias said blade away from the support surfaces. 10 15 20 25 30
2. A tile cutter according to Claim 1, wherein said resilient supports each comprise a rigid plate and resilient means supporting said rigid plate on said base plate. 35
3. A tile cutter comprising a base plate for supporting a tile to be cut, guide means above said plate, a slide movably mounted on said guide means, tile cutting means pivotally mounted on said guide means, and cam means mounted on said guide means and engageable with said tile cutting means for adjusting the position of said tile cutting means relative to said base plate. 40 45

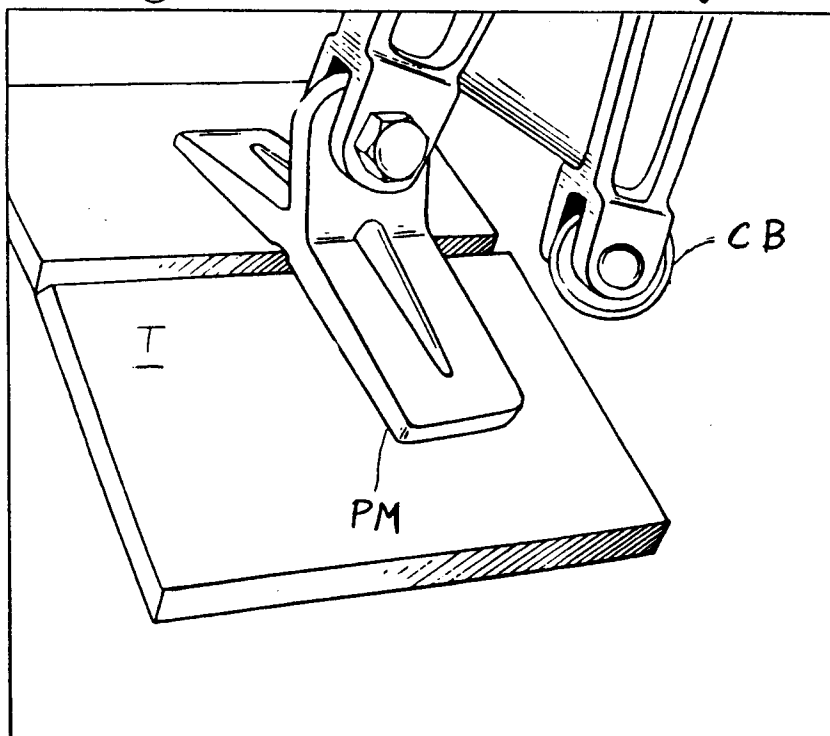
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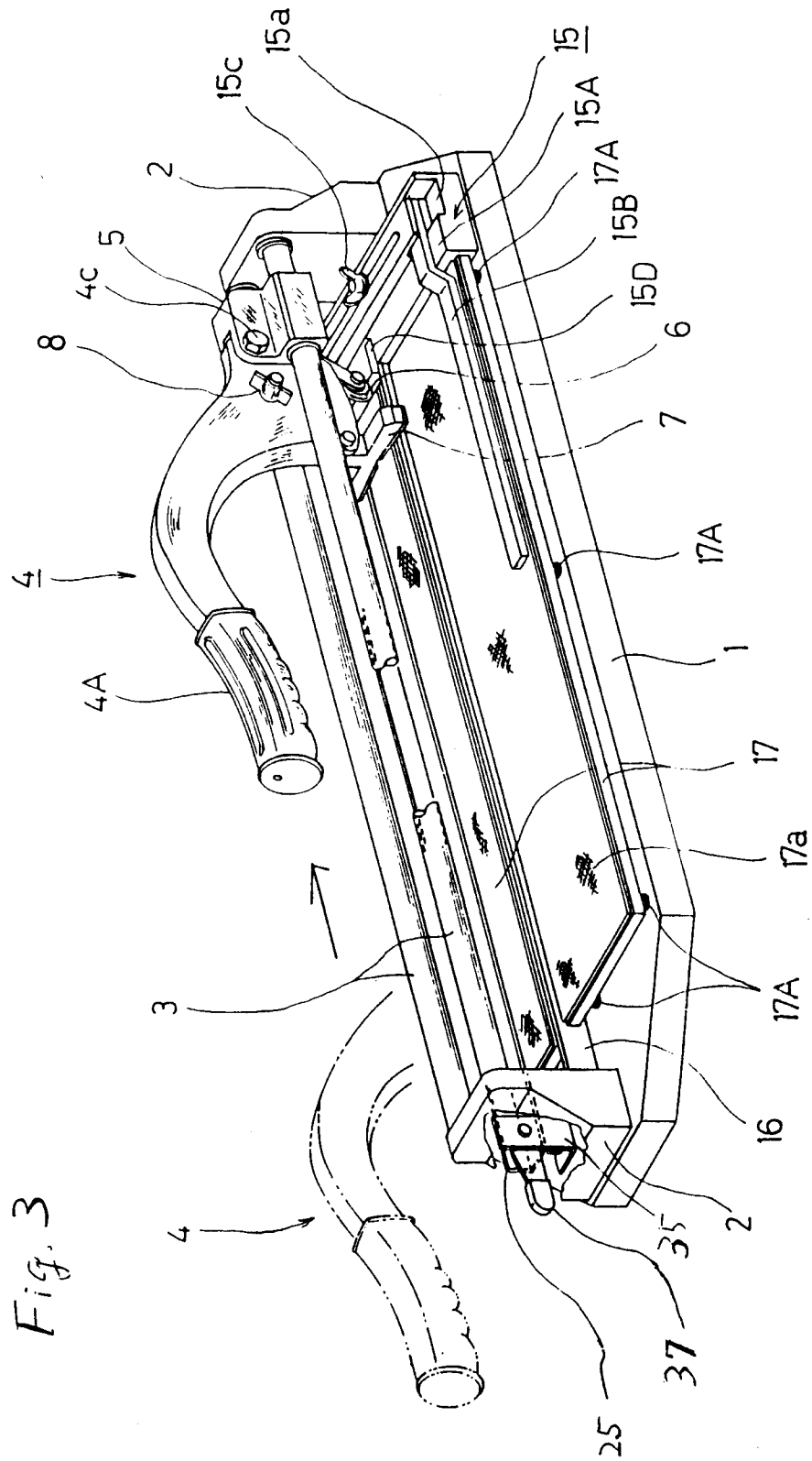
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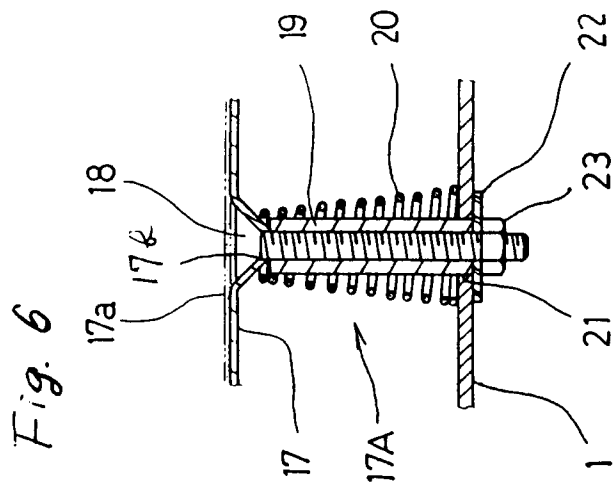
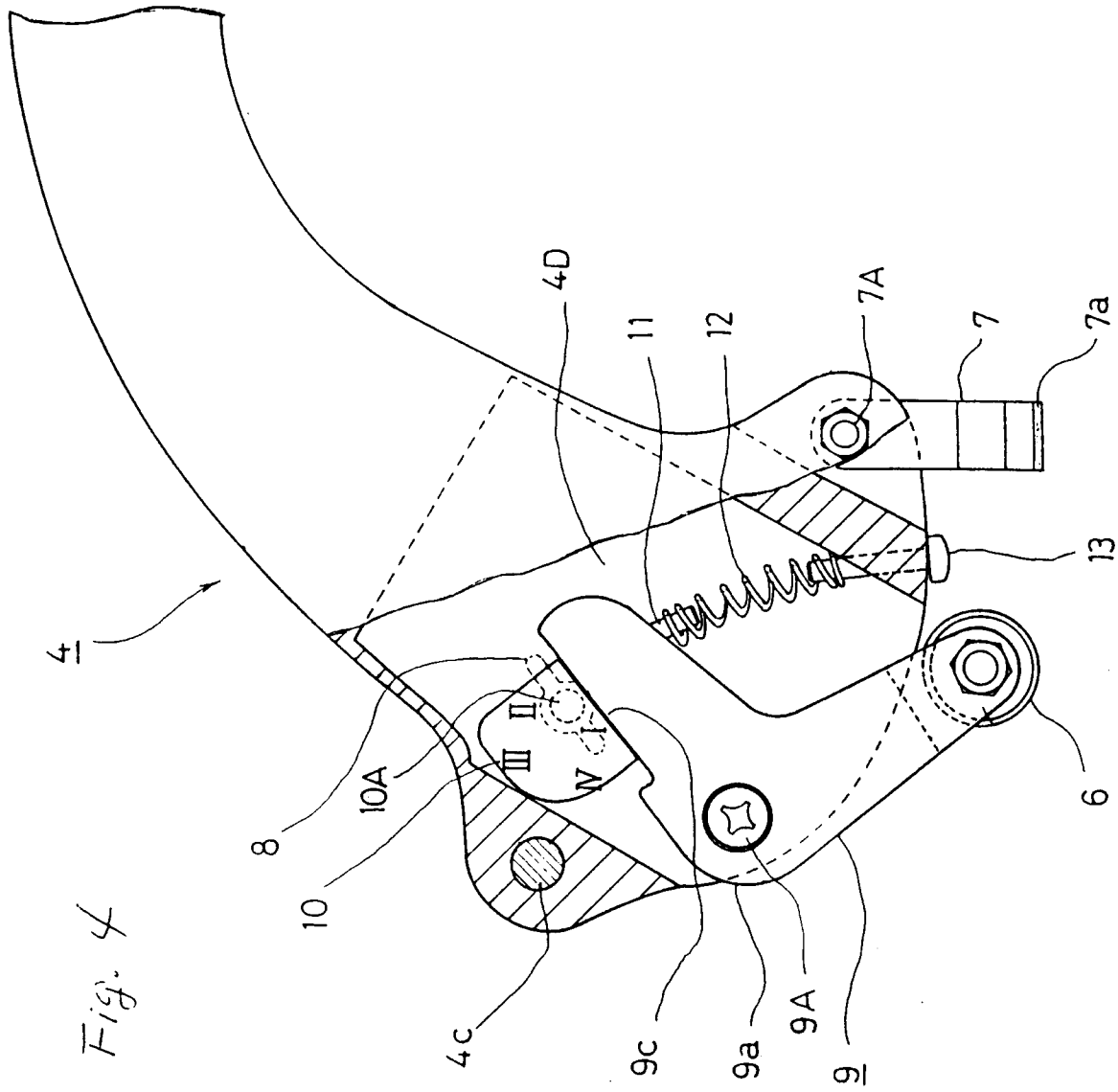
Fig. 1  
PRIOR ART



PRIOR ART  
Fig. 2







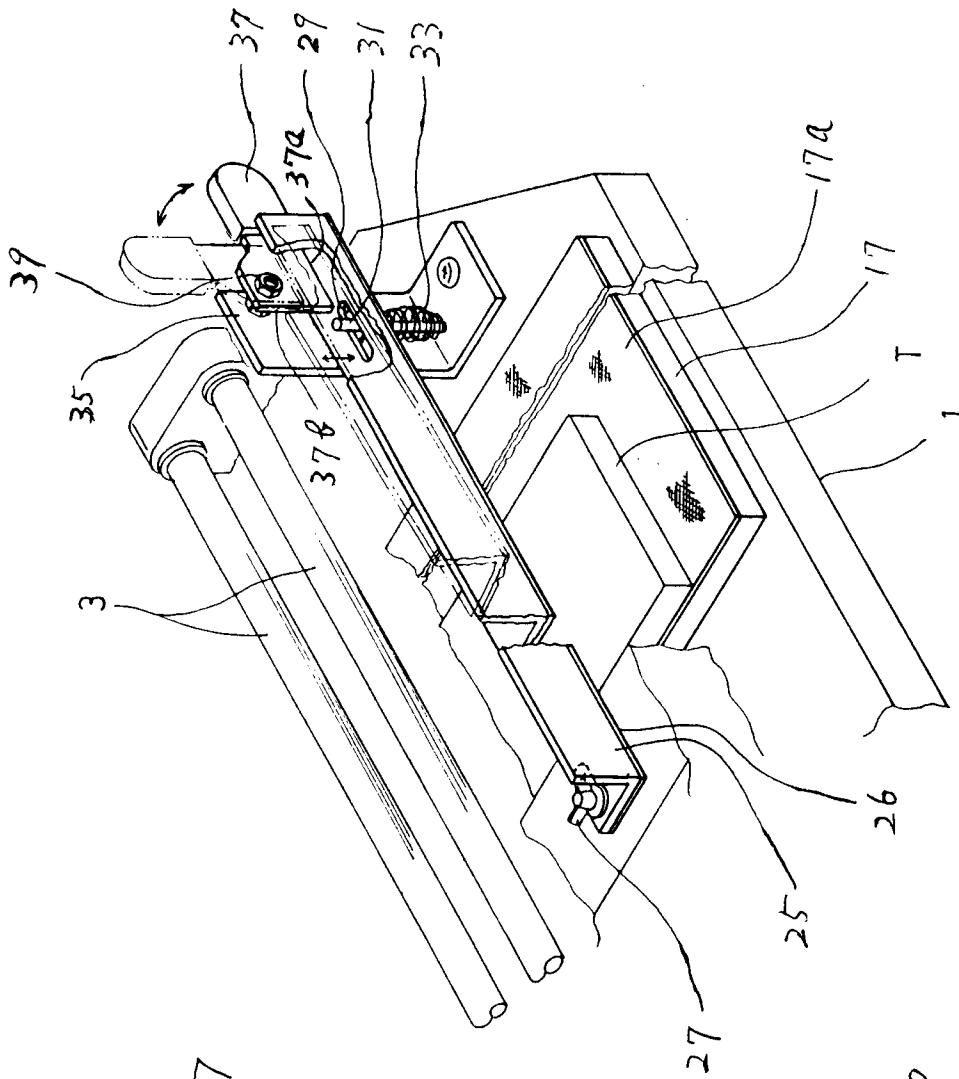


Fig. 7

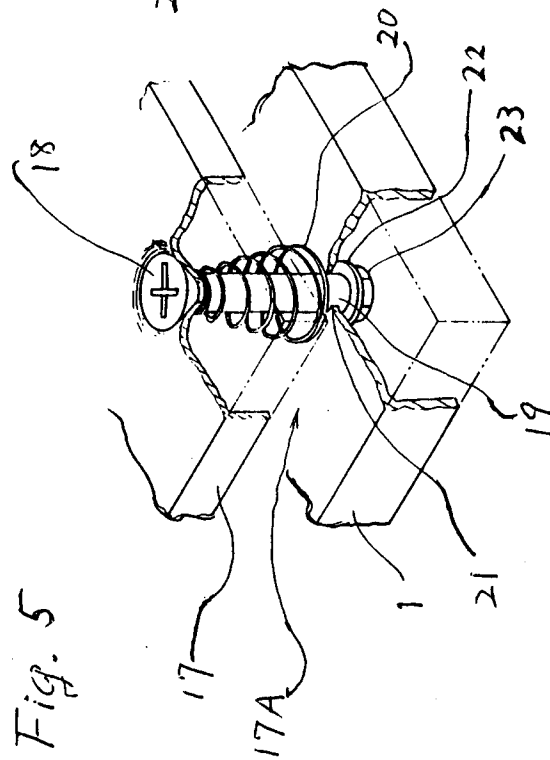


Fig. 5

Fig. 8a

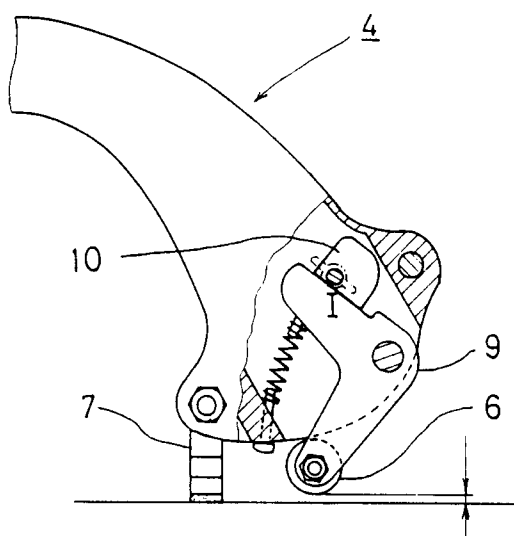


Fig. 8b

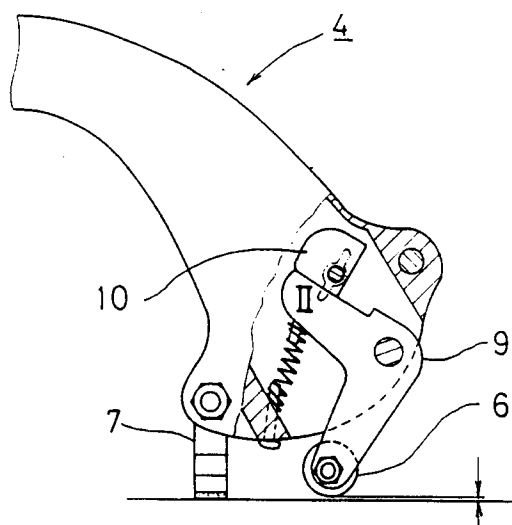


Fig. 8c

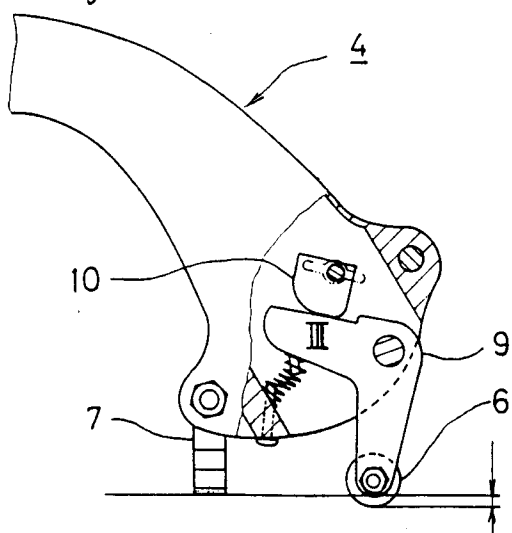


Fig. 8d

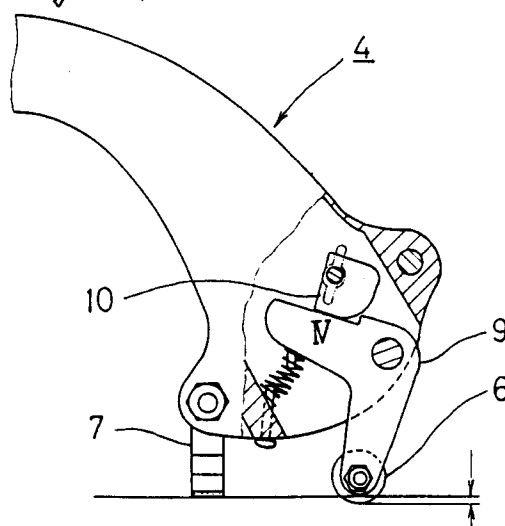
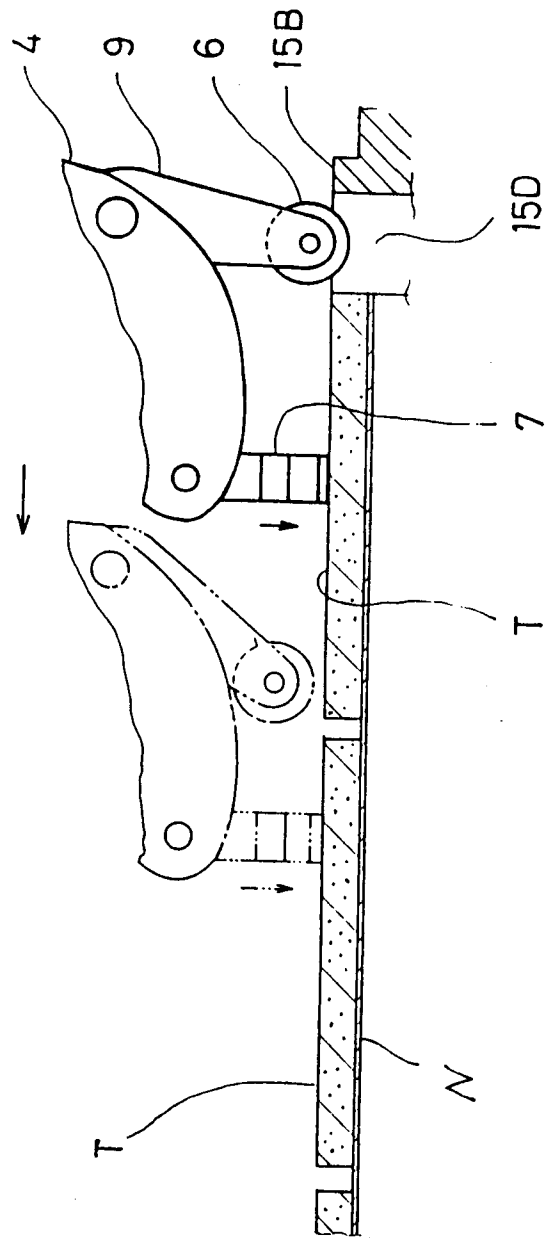
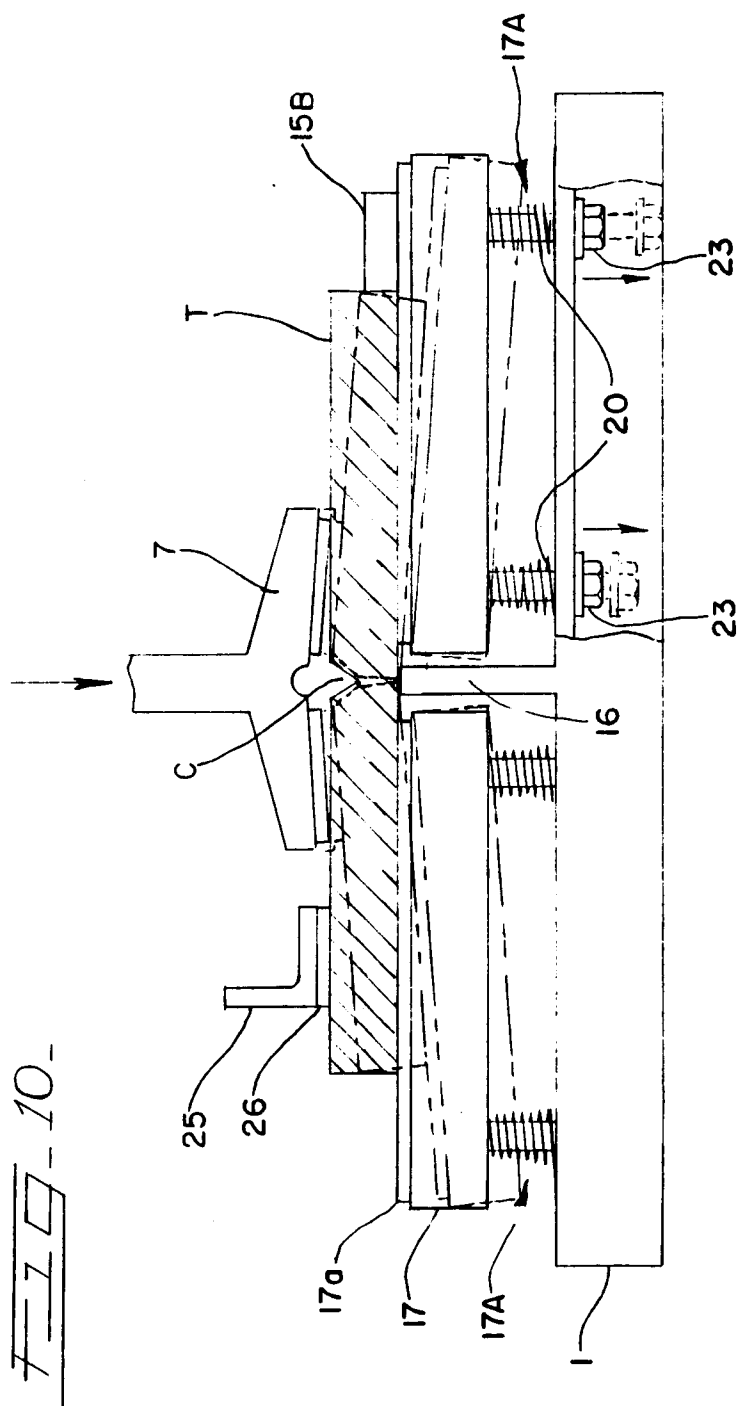


Fig. 9







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## EUROPEAN SEARCH REPORT

Application Number

EP 91 30 1597

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE-A-2 855 649 (M. YASUGA) * page 5, line 11 - page 7, line 27 * * figures 1-5 * & FR-A-2 444 547 & IT-A-1 114 306 ---	1-3	B28D1/22
Y	DE-A-3 015 385 (E. JÖCKER) * page 6, line 14 - page 8, line 11 * * figures 1-3 * ---	1-3	
A	FR-A-1 356 714 (OFFICINA MECCANICA MONTOLI VINCENZO) * page 2, left column, line 15 - line 26 * * figures 1,4 * ---	2	
A	FR-A-2 490 541 (WARIN ET FILS) * claim 8; figures 1,2 * ---	2	
A	FR-A-1 363 392 (C.L.E. BRUNET) ---		
A	FR-A-1 392 157 (L. ROUXEL) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B28D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 OCTOBER 1991	Examiner MOET H. J. K.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	