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(54) **A rotary die cutting apparatus.**

(57) Rotary die cutting apparatus comprising a driven rotary cylinder (10) on which is circumferentially mounted a removable forme (11) having knives (14) projecting radially therefrom. The forme (11) is magnetically retained on the surface of said cylinder (10) by a plurality of longitudinally extending steel bars (15, 16, 17) which locate within grooves (19) in the surface of the cylinder (10), each groove (19) coin-

ciding with a plurality of longitudinally spaced magnets (20) which retain the forme (11) during rotation of the cylinder (10). The magnets (20) may be electro-magnets such that the forme (11) is removed by switching off the current to said magnets, or alternatively permanent magnets such that a tool will be required to release the steel bars from the grooves (19).

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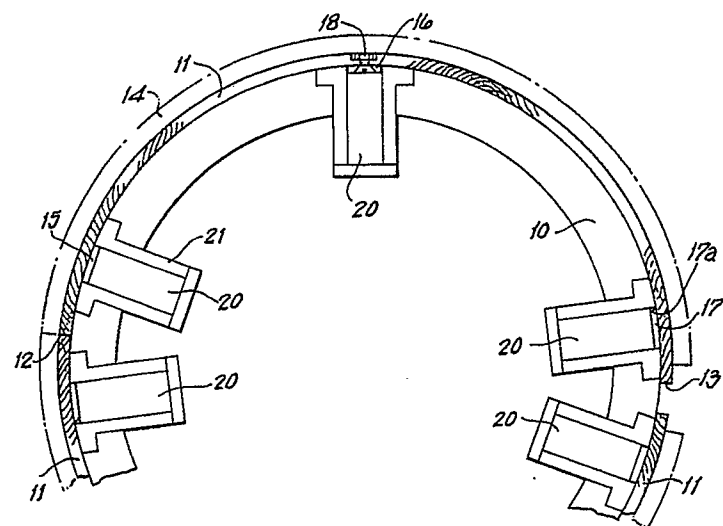


FIG.1

THIS INVENTION concerns rotary die cutting apparatus of the kind comprising a cylinder driven in rotation and carrying on its surface a removable forme having knives projecting radially therefrom. In operation, flat board is transported tangentially past the cylinder so that the knives perform a predetermined cut on the board.

Conventionally, the forme which is usually made from timber and preformed, is attached to the surface of the cylinder by screws which must be aligned with threaded apertures in the cylinder. When it is required to change or replace the forme a lengthy procedure is required to remove and replace a considerable number of screws.

In an alternative arrangement the forme may be mechanically clamped onto the cylinder wall using cumbersome clamping arrangements so that the cylinder requires careful balancing.

An object of the present invention is to provide, in rotary die cutting apparatus, a means for removably mounting a forme such that it may be easily and rapidly removed from the cylinder for replacement.

According to the present invention there is provided rotary die cutting apparatus comprising a driven rotary cylinder on which is circumferentially mounted a removable forme having knives projecting radially therefrom, characterised in that the forme is magnetically retained on the surface of said cylinder.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a partial transverse section of a rotary die cutting cylinder and forme, made in accordance with the invention;

Fig. 2 is a side elevation thereof with parts cut away for the purpose of illustration;

Referring now to the drawings, in rotary die cutting apparatus there is provided a rotatable cylinder 10 which is driven in rotation by conventional means (not shown) and on which is circumferentially mounted a wooden forme 11 constituted, in this example, by a pair of separately mounted substantially semi-circular sections which are in edge-to-edge abutting relationship at one side as illustrated at 12 with a gap 13 at the other side. Each forme section carries, in accordance with a predetermined cutting pattern, an arrangement of radially projecting knives 14.

Extending longitudinally of each forme section on the inner surface thereof are a plurality of spaced steel bars 15, 16 and 17. These may be attached to the forme by countersunk machine screws as illustrated at 18.

The steel bars 15, 16 and 17 are so positioned as to be received within complementary longitudinal grooves 19 in the outer surface of the cylinder

10. Coinciding with the grooves 19 at longitudinally spaced positions along the cylinder are a plurality of permanent electric holding magnets 20 retained within housings 21 and arranged to be energised by power means (not shown) external to the cylinder. Such magnets are energised to change their polarity, but may be an operative or inoperative mode with the power turned off.

The steel bar 17 has one edge chamfered as illustrated at 17a such that the forme may be mounted on the cylinder by initially locating bars 15 and 16 in their respective grooves 19, and, by virtue of the flexibility of the forme 11 and the assistance of the chamfered edge 17a, finally locating bar 17 in its respective groove.

In operation of the apparatus, the magnets 20 retain the steel bars 15, 16 and 17 in their respective slots 19 to overcome the centrifugal force which would otherwise tend to free the formes from the cylinder 10. Once the magnets are de-energised the forme may be readily removed by initially removing bars 17 from their slots and subsequently the bars 16 and 15.

The forme may consist of one or several sections according to the required length of cut and may be removed from its associated cylinder in a matter of seconds and replaced so that machine down-time is considerably reduced when compared with the conventional techniques of bolting or clamping formes in place.

In certain applications the magnets 20 may be by permanent magnets thus avoiding the need for a power supply. In this case however a special tool may be required to release at least an initial one of the steel bars before the forme may be removed by hand.

## Claims

1. Rotary die cutting apparatus comprising a driven rotary cylinder on which is circumferentially mounted a removable forme having knives projecting radially therefrom, characterised in that the forme is magnetically retained on the surface of said cylinder.
2. Rotary die cutting apparatus according to Claim 1, wherein the forme carries a plurality of inwardly facing spaced steel bars each extending longitudinally of the forme parallel to the axis of rotation of the cylinder.
3. Rotary die cutting apparatus according to Claim 2, wherein said steel bars are adapted to be received within complementary longitudinal grooves in the outer surface of the cylinder.
4. Rotary die cutting apparatus according to

Claim 3, wherein coinciding with said grooves at longitudinally spaced positions therealong are a plurality of magnets retained within housings and effective to hold said steel bars within said grooves.

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5. Rotary die cutting apparatus according to Claim 4, wherein said magnets are permanent electric holding magnets adapted to be powered by means external to the cylinder.

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6. Rotary die cutting apparatus according to any one of Claims 3-5, wherein at least one of said steel bars has at least one chamfered longitudinal edge to assist in engagement and disengagement of said bar within and from its associated groove.

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7. Rotary die cutting apparatus according to any preceding claim, wherein said removable forme is divided into a plurality of part-cylindrical forme sections according to the required length of cut to be performed by said knives.

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8. Rotary die cutting apparatus according to Claim 4, wherein said magnets are permanent magnets.

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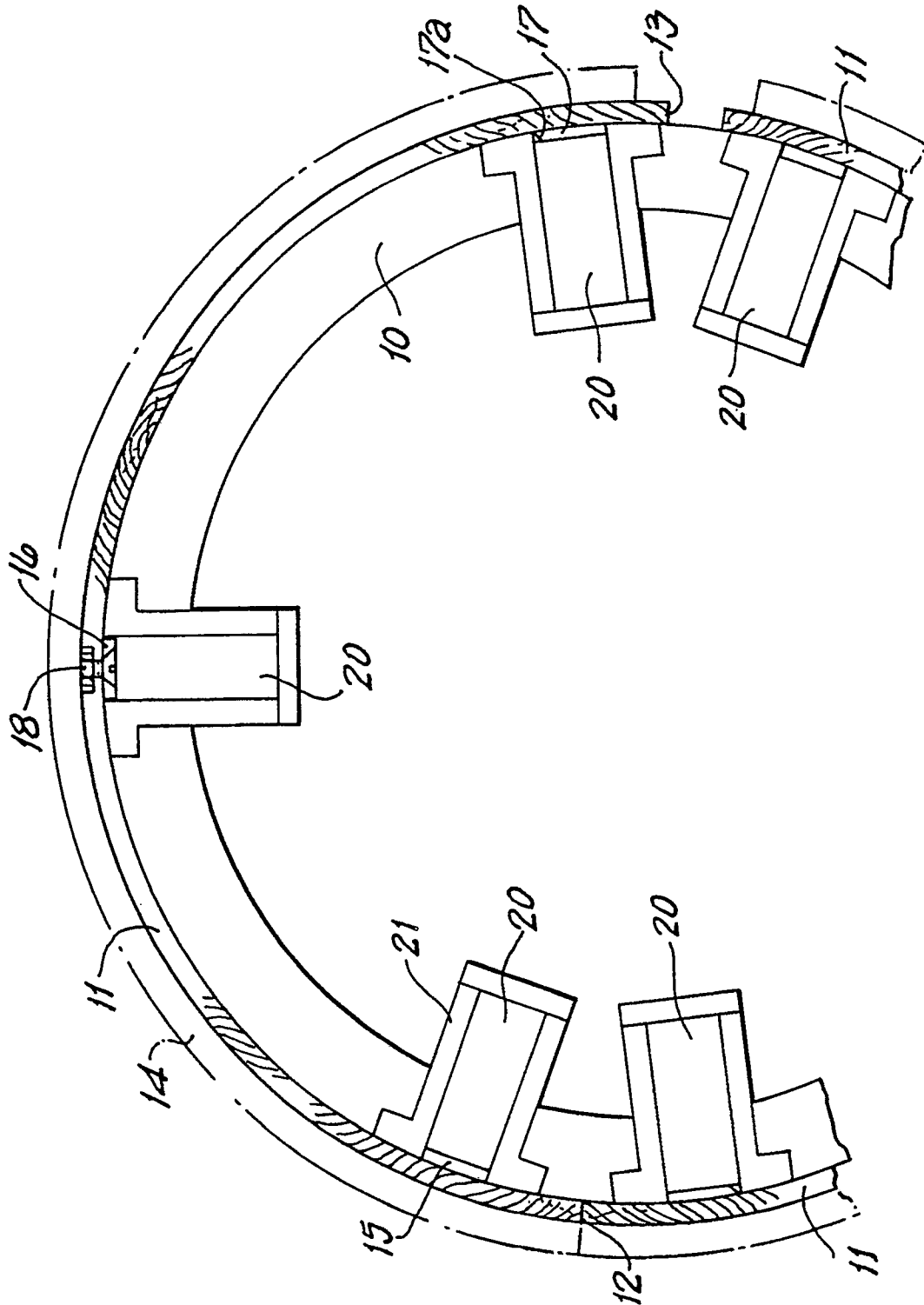


FIG.1

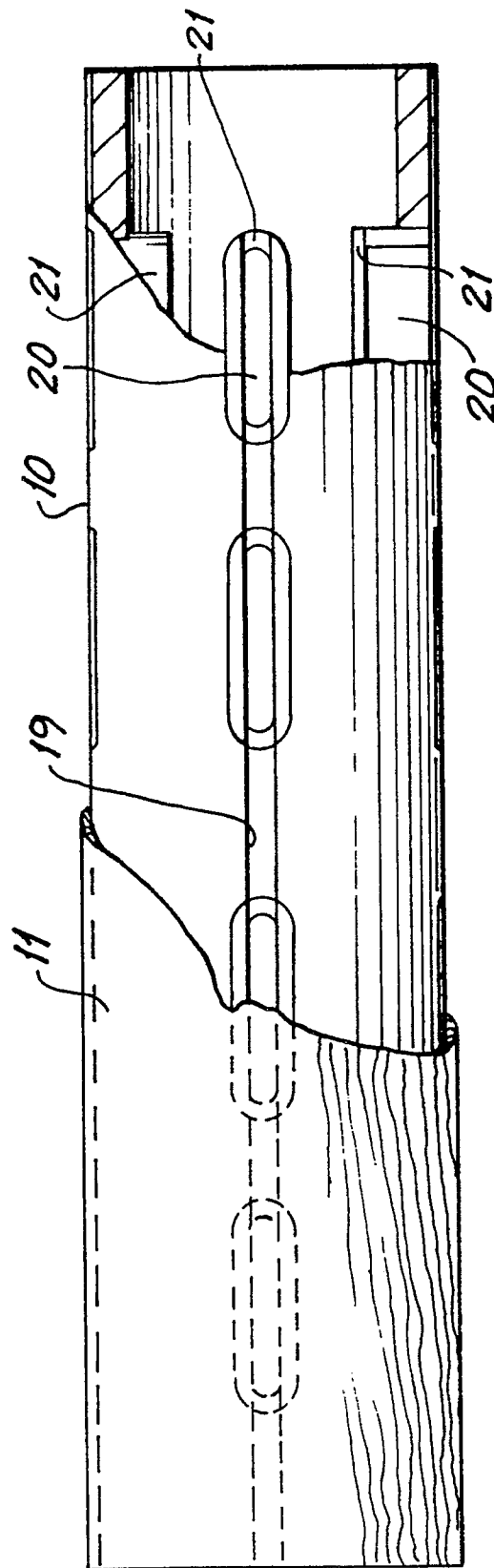


FIG. 2



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# EUROPEAN SEARCH REPORT

Application Number

EP 91301314.0

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>EP - A1 - 0 220 432</u> (PETERS MASCHINENFABRIK GMBH) * Column 3, lines 25ff; fig. 1-3 *	1-5	
A	<u>DE - C - 949 212</u> (JAGENBERG-WERKE AKT.-GES.) * Page 2, lines 82ff; fig. 3 *	2-5	
A	<u>DE - A - 2 126 018</u> (EICKHOFF, UNIVERSAL WELL-PAPPENMASCHINEN GMBH) * Especially fig. 1,3 *	7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 26 D 1/00 B 26 D 3/00 B 26 D 7/00
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
VIENNA	06-05-1991	SCHNEEMANN	
CATEGORY OF CITED DOCUMENTS		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	
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			