(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 071 691**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **81830145.9**

(22) Date of filing: **12.08.81**

(51) Int. Cl.³: **B 44 B 5/00**

(43) Date of publication of application: **16.02.83**
Bulletin 83/7

(84) Designated Contracting States: **AT BE CH DE FR GB LI LU NL SE**

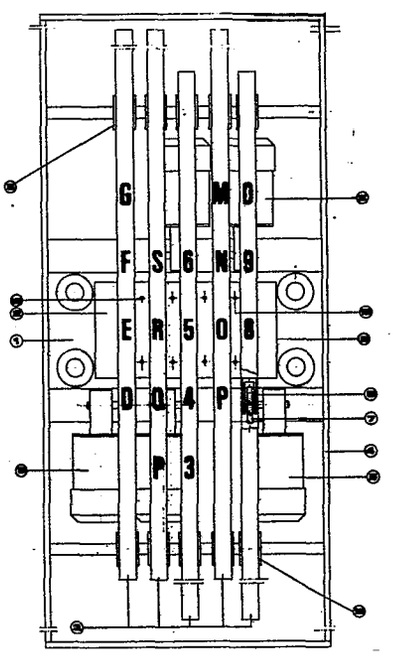
(71) Applicant: **INSTITUTO POLIGRAFICO E ZECCA DELLO STATO, PIAZZA VERDI N.10, I-00198 Roma (IT)**

(72) Inventor: **Giardini, Cesare c/o Istituto Poligrafico, e Zecca dello Stato Piazza Verdi 10, I-00198 Roma (IT)**

(74) Representative: **Tonon, Gilberto et al, c/o Società Italiana Brevetti Piazza Poli 42, I-00187 Roma (IT)**

(54) A device for embossing metal plates and the like, with automatic change of punches.

(57) A device for embossing, by means of an elastomer counterdie, metal plates and strips, and comprising: a bar bearing block (2) in which grooves are provided for the lengthwise sliding of flat bars (3); lengthwise sliding flat bars which along their length are provided with embossing punches representing letters and/or symbols; ejectors (12) housed in the bar bearing block for ejecting the plate after the embossing; electrical motors (5), one for each bar, for the movement, through pinion and gear wheel (7), of the bars according to pre-arranged displacements; and idle rollers (13) on which the flat bars rest, out of the bar bearing block.



EP 0 071 691 A1

0071691

ISTITUTO POLIGRAFICO E ZECCA DELLO STATO

A device for embossing metal plates and the like, with automatic change of punches.

The present invention relates to a device for embossing metal plates and the like, with elastomer counterdie and with automatic change of the punches.

For embossing metal plates and strips in order to obtain on them letters and symbols in relief, arranged in one row (as for example in the production of car licence plates), usually devices are used made either of a series of dies (normally one for each letter), with punch and die of metal or plastic, or of a single punch holder die with elastomer counterdie; in the latter case, the punches are positioned on a punch holder plate usually extractable.

The plate or the section of metal strip positioned between a punch and a counterdie is embossed upon closing of same, for example by means of a press.

In particular cases, as the production sequence progresses, it becomes necessary to change one or more letters and/or symbols to emboss according to prearranged successions (for example to follow alphanumeric progressions as for car licence plates).

It is therefore necessary to procede, upon variation of the letters, to change same, particularly in embossing with an elastomer counterdie to change only the punches, operation which is usually done manually.

The above production system has the inconvenience of a low production rate; furthermore, it is not suitable for a total automation of the productive cycle, obtainable with the use of automatic arms and feeders to feed the die.

Up till today embossing apparatus using the die and counterdie method are known, wherein changing of the letters mounted on rotation disks may be done automatically; the cost however of such apparatus is very high, and another drawback thereof consists in the fact that the number of letters mounted on each disk is limited, since the disks must be of reduced size in order to obtain a sequence of not too spaced embossed letters, and in any case the distance which can be obtained between one embossed letter on the next one, cannot be reduced more than to a certain extent.

At present embossing devices with elastomer counterdie, with automatic punch change by means of series of punches mounted on flat bars, are not known.

The object of the present invention is to provide a device in which changing of the punches is automatically made by flat parallel bars moving in a prearranged way.

The enclosed schematic drawings show an exemplifying and not limiting embodiment according to the present invention:

fig. 1 shows a plan view of the device without the upper counterdie holding member;

fig. 2 is a side view of the device;

fig. 3 shows a front view of the device;

fig. 4 shows a plan view of a punch carrying bar of the device (fig. 4a) and a partially cut-away side view of said bar (fig. 4b).

The device is formed essentially by a block 2 fixed to a lower support 1 and in which grooves are formed in which punch carrying bars 3 slide, there being a bar for each series of variable letters to be embossed on a metal plate(not shown); ejectors 12 for removing the embossed plate are also positioned in the above mentioned block; said ejectors are mounted on compression springs (not shown) and, when not in operation, they protrude from the upper surface of block 2 as shown in the drawings.

Each bar 3, as shown in fig. 4 (where the punches represent, for example, only five decimal numbers) carries

the punches, in relief, having the symbols arranged according to successions which are desired and at such a distance from each other so that only one punch at a time is underneath the elastomer counterdie 10 (mounting and working of said counterdie will be explained hereinafter).

Each bar 3 is moved by gear wheel 7 engaging with a rack 8 placed on the lower side of the entire length of the bar; the gear wheel 7 is mounted on a bracket 9 fixed to the block 2 and in turn engages with a driving pinion 6.

When the die is open, rotation of a motor 5 (there is a motor 5 for each bar 3) determines, through the pinion 6 and the gear wheel 7, the lengthwise movement of the corresponding bar 3 after the exact embossing position of the desired punch under the elastomer counterdie 10.

Devices of different kinds, even electronic, may be used to control the exact revolution of said driving pinion, either checking the position reached by the punch holder bars or checking the number of the output revolutions of the motor.

When all the punches have reached the correct positions in the bar bearing block 2, forming the configuration of the desired letters, suitable devices (not shown) insert horizontally between the counterdie 10 and the bars 3,the metal plate to be embossed, and then the die is closed (for example by means of a press), i.e.

the die holder 11, at the base of which the elastomer counterdie 10 is fixed, is vertically moved so as to press against said plate; by the effect of the pressing force thus applied the plate is deformed according to the shape of the punches.

When the die opens, said spring ejectors 12 lift the embossed plate.

The ejectors 12 are disposed in such a manner that the free longitudinal movement of the punch holder bars 3 is not hindered; the bars 3 are slidably supported on the outside of the bearing block 2 on idle rollers 13 which partially bear their weight; the rollers 13 are supported by a frame 4,which for simplicity reasons is only partially represented in fig. 1,and with only one row of rollers for each side.

The changing of the punch holder bars 3 is made by operating the corresponding motor 5 until complete extraction of the bar to be replaced from the bar bearing block 2; the supporting rollers 13 take care of holding the extracted bar.

For the introduction of a bar with another punch series, after its positioning on the rollers 13, the motor 5 is driven in the opposite direction to that of the extraction operation.

The production rate of the described device is very high, it being possible to position through choice of adequate geared motors, in a very short time, the

punches; said rate is also higher than that of known automated embossing systems using the method of punch and die fitted on rotation disks.

The advantages of this new device are the following:

1) high production rate;
2) possibility to automate the sequence of the punches also by means of electronic equipment;
3) possibility to completely automate the embossing line of variable letters, using either automatic arms for feeding the plates to be embossed or linear feeders for feeding the strips to be embossed;
4) higher safety for the operator who does not have to work on the die.

By adequatly varying the transversal dimensions of the punch carrying bars, without changing the principle of the present invention, it is possible to place, under the elastomer counterdie, rows of bars in a larger or smaller number than that shown, however compatibly within transversal dimensions of the punches.

It is clear that constructional and shape features, and the number of bars, may vary with respect to those described and illustrated, without departing from the scope of the present invention.

0071691

Claims

1. A device for embossing metal plates and the like, characterized in that it comprises: a bar bearing block in which grooves are provided for the lengthwise sliding of flat bars; lengthwise sliding flat bars which along their length are provided with embossing punches representing letters and/or symbols, said bars being in number correspondent to the series of variable letters and/or symbols to be embossed and being received in said grooves of the bar bearing block; driving means for the lengthwise movement of said bars; support means for the bars, allowing their sliding movement; ejection means for ejecting the plate after embossing, said ejection means allowing the free lengthwise movement of said bars; and press means for pressing together said bars and a counterdie, in particular an elastomer counterdie, with said metal plate or the like interposed between bars and counterdie.

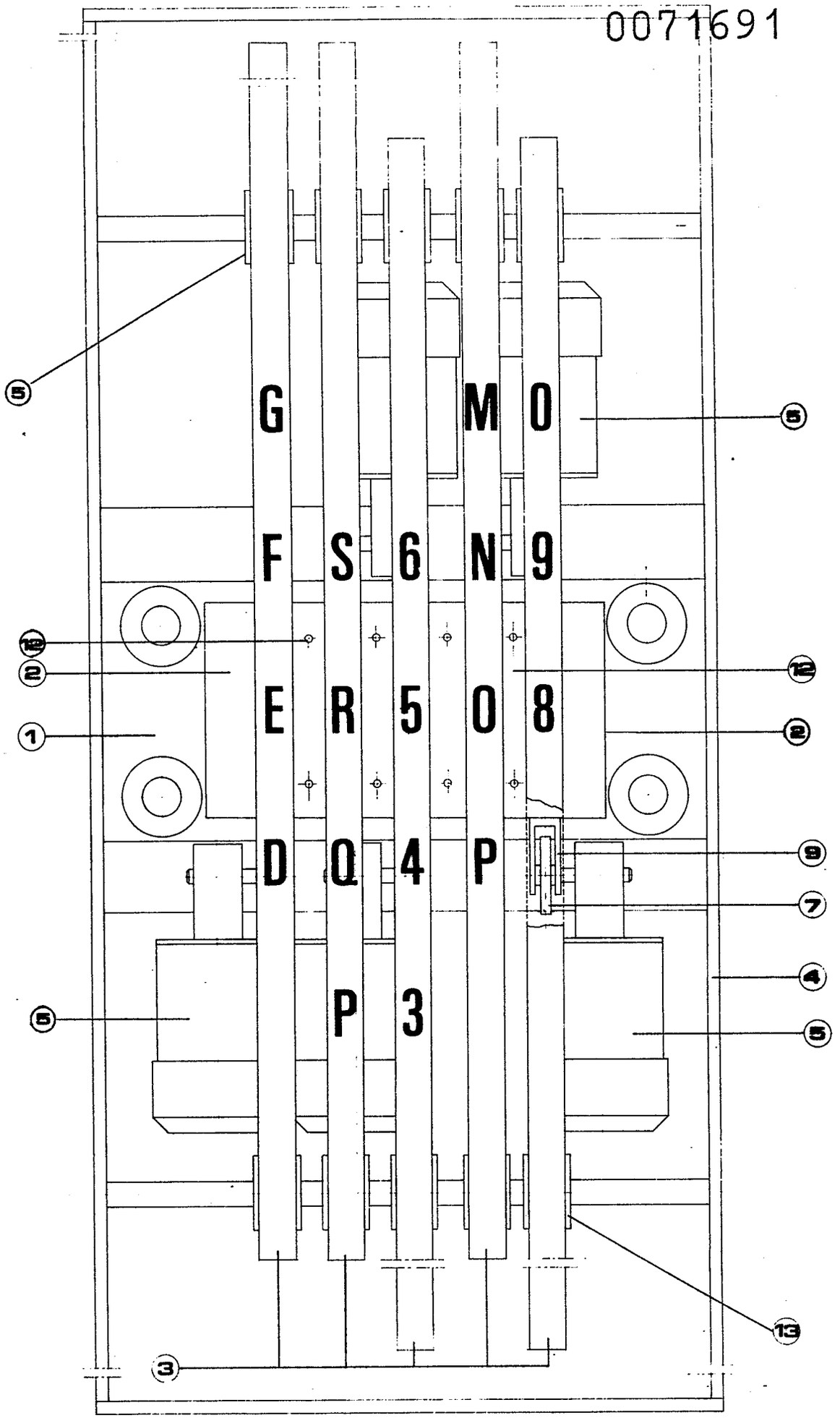
2. A device according to claim 1, characterized in that said driving means consist of electric motors, one for each bar, and pinion and gear wheeled drives from said motors to racks disposed on the bars.

3. A device according to claim 1 or 2, characterized in that said support means for the bars comprise a support frame which carries, out of said bar bearing block, idle rollers for sliding movement of the bars.

4. A device according to any of the preceding claims, characterized in that said ejection means consist of ejectors housed on said bar bearing block and mounted on compression springs, said ejectors protruding, when not in operation, from the surface of said block.

0071691

fig.1



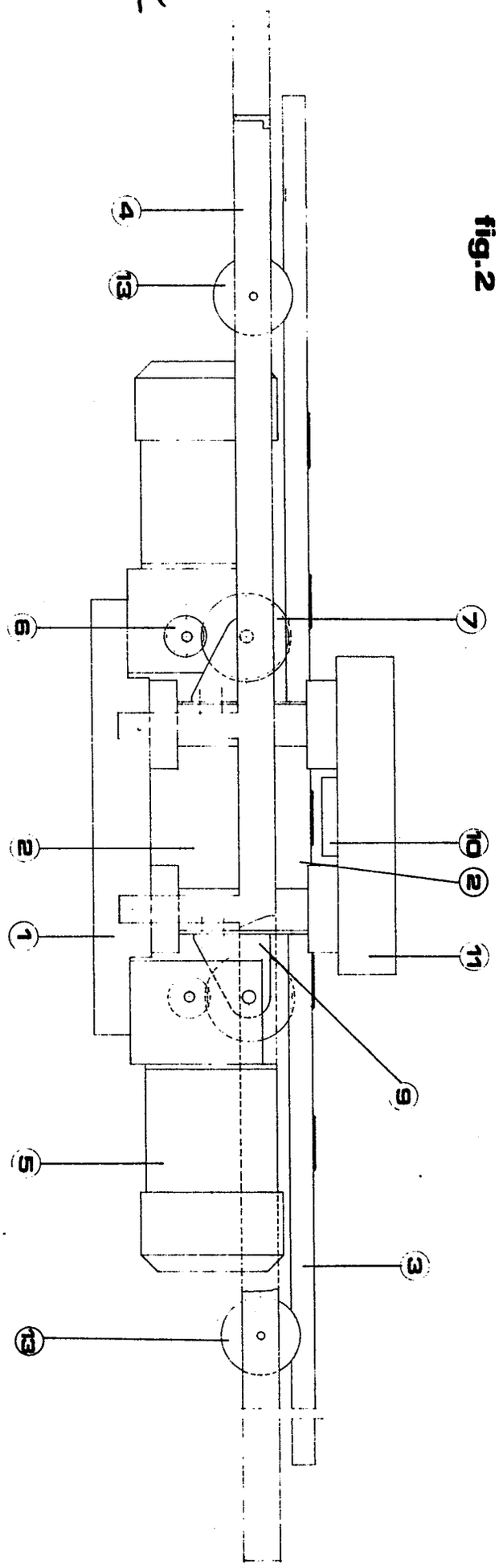
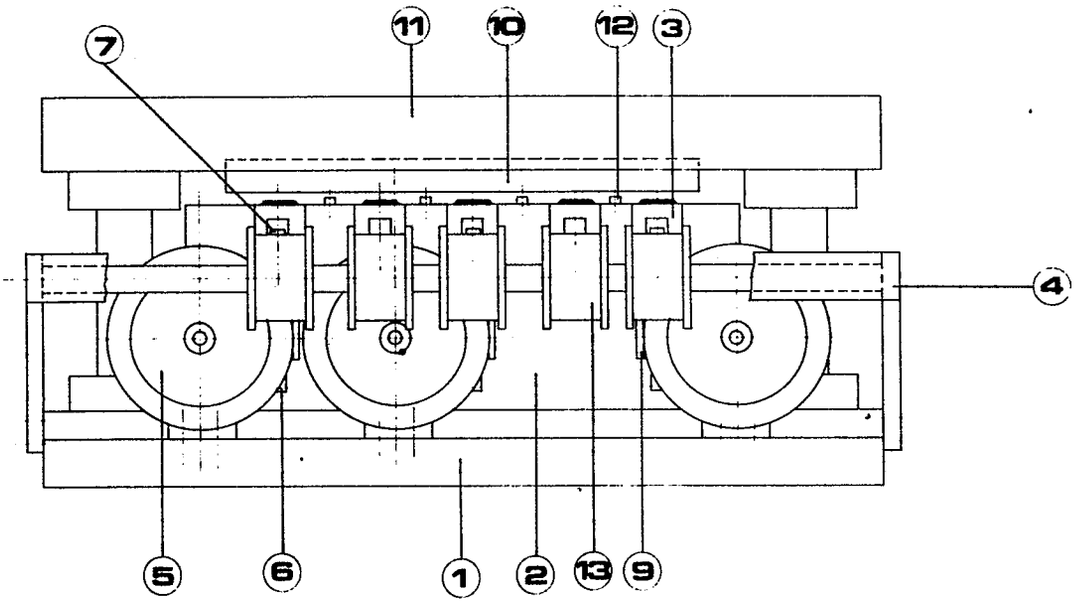


fig.2

0071691

fig. 3



0071691

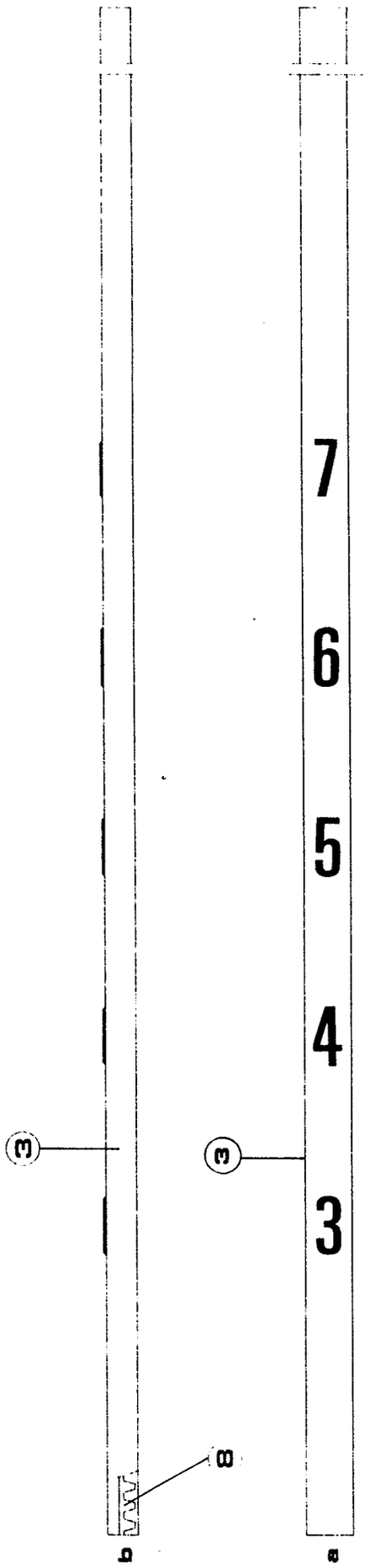


fig.4

European Patent Office

EUROPEAN SEARCH REPORT

0071691
Application number
EP 81 83 0145

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 4 072 098 (GRANZOW) * Column 9, line 48 to column 10, line 14; column 10, line 66 to column 11, line 47; figures *	1-4
X	US - A - 3 592 039 (FRYE) * Column 6, lines 21 to 53; figures *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 44 B 5/00

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 44 B

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

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	01-04-1982	PEETERS S.

EPO Form 1503.1 06.78