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(54) A method and device for working a supply of clay or similar mouldable material into mouldings suitable for the firing of bricks.

(57) A method and device for forming pieces cut from a clay strand (1) of a rectangular cross-sectional shape into mouldings for bricks. The forming is effected between the the downwardly moving opposing runs of two cooperating endless belts (2, 3). According to the invention the opposing runs of the belts are profiled rather than flat, so that the spaces delimited by said runs are of a cross section which deviates from the usual rectangular shape, and enables the forming of mouldings for profiled bricks.

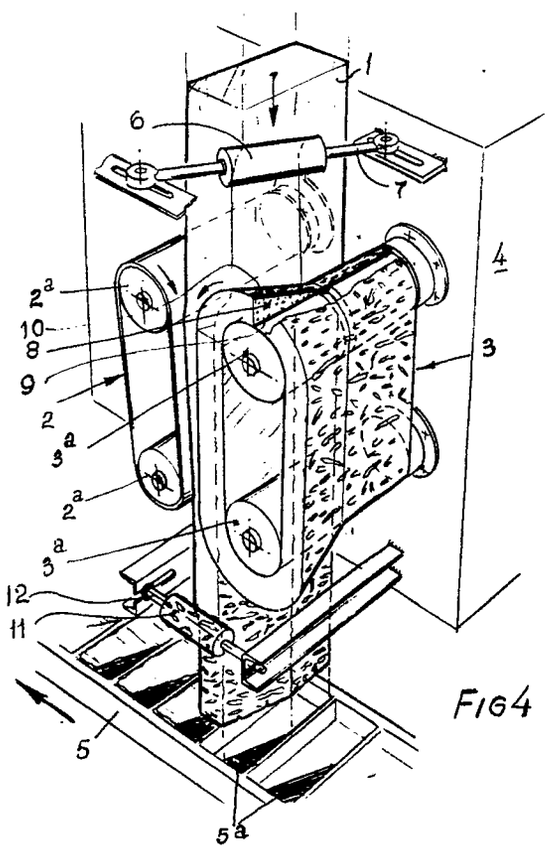

FIG4

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A METHOD AND DEVICE FOR WORKING A SUPPLY OF CLAY OR SIMILAR MOULDABLE MATERIAL INTO MOULDINGS SUITABLE FOR THE FIRING OF BRICKS.

A method and device for working a supply of clay or such mouldable material to mouldings adapted for firing bricks, making use of a press adapted to extrude from said supply of clay a vertically emerging (and possibly sanded) strand of a substantially rectangular cross-sectional shape, a cutting device disposed under said press for cutting lumps from the moving strand at regular intervals, and an assembly of two vertically disposed endless conveyor belts provided under said cutting device, which conveyor belts may be driven so as to have their opposing runs - which are vertically disposed at a spacing which is less than the thickness of the strand - move downwards and being adapted to catch each lump of clay, speed up the same in the downward direction and drop the same in a moulding tray disposed under said belts.

Such a method and an adapted device therefore are disclosed in NL-B-161.832. This method and device have a.o. been found suitable for the production of mouldings, which may be fired to bricks which show the "hand mould structure" which is characteristic for the former manual production.

In that case the press is cooperating with a sanding device, by means of which sand is brought into the superficial layer of the emerging strand. The forming of the "grains" - characteristic for the hand mould structure - starts when the lumps of clay are compressed between the cooperating belts and may be stimulated, if desired, by providing rib-shaped protuberances in a random pattern on the (usually rubber) surface of the belts. The grain forming is completed by allowing the clay lumps to sag out in the moulding tray into which they have been dropped by the belts.

In general bricks of the usual orthogonal-parallelepiped size are involved, while the primary interest is to be seen in that the oblong upstanding faces, and also the short end faces, which become exposed in the future brick-work, show a perfect grain structure. The flat surface of the moulding, which is "moulded" by the bottom of the moulding tray, gets its grain structure by sanding the moulding tray in advance, so that that surface is also permitted to be exposed in the future brick-work. Brick-work, however, is not always composed of bricks of the same size and shape. For architectural and other reasons often bricks of a different size and especially of a different shape have to be applied. In general the moulding trays required for such different brick forms, the so called "specials", can be made rather simply; in most cases they may be formed from moulding trays of the usual size by placing inserts adapted to the required deviations. Provided that the deviations not only fall within the horizontal confinement of the usual rectangular size, but do neither extend through the entire height of the brick, the dropping dces not yield great problems either. For in that case one of the bases of the brick in question will maintain its normal size. Thus it will not be necessary to change the receiving opening of the respective moulding tray, so that this opening remains fitted to the substantially rectangular cvross-section of the lump of clay delivered by the belts, while the adaptation to the special shape can be realized with the aid of inserts which are to be placed at the moulding tray bottom and cover only a part of the moulding tray height.

In case of deviations, however, which do extend through the entire height as compared with the usual brick size, the lump of clay delivered by the depositing belts will be locally arrested in its course by an edge portion surrounding the receiving opening of the moulding tray. As a result of this the (sanded) outerside of the clay lump will be trimmed off from the core of the clay lump. This results in affected brick faces, in which the undesired traces of the trimming off of a portion of the former clay lump can be seen quite clearly. In such a case the desired structure (either a hand mould structure of a smooth structure) is not obtained.

Due to the above mentioned problems connected with the machine-made mouldings for so called "specials", such mouldings are so far prepared by hand and placed into adapted moulding trays. So far brick industry has considered and accepted this hand labour as an inevitable gap in a manufacturing process which, for the rest, is completely mechanized or made automatic respectively.

The invention aims at providing a solution for the above problem.

According to the invention this aim is achieved in that for making mouldings having a base differing from a rectangular base, use is made of belts, the opposing surfaces of which are profiled in such a way, that the space delimited between the two belts has a cross-sectional shape, which corresponds to that of a brick of a non- rectangular form.

Thanks the method proposed by the invention the manufacturing of "specials" may be simply integrated in the manufacturing process for (hand mould) bricks of the normal, rectangular size, as it will be sufficient to substitute, for a short period of time, the "flat" belts used for the normal brick size

by profiled belts adapted to the desired "specials". It should be considered that the change of belts involves an action which can be quickly and simply carried out, whereas "specials" are usually needed in a relatively small number as compared with the production of bricks of the normal rectangular size. Consequently the forming of "specials" can hardly be considered as an interruption of the normal manufacturing process.

The invention also relates to a device for carrying out the above method, said device comprising a press capable of extruding a vertically emerging strand of a substantially rectangular cross-sectional shape, a cutting device provided thereunder for cutting lumps from the moving strand at regular intervals, and an assembly of two vertically disposed endless conveyor belts provided under said cutting device, which conveyor belts may be driven so as to have their opposing runs, which are vertically disposed at a spacing which is less than the thickness of the strand - move downwards and being adapted to catch each lump of clay, speed up the same in the downward direction and drop the same in a moulding tray disposed under said belts, said device being characterized in that at least one of the belts is provided, on its surface faced to the opposing belt, with a circumferentially constant profile, such, that the two belts are delimiting an intermediary space between them, which has a cross-sectional shape which deviates from a rectangle.

In a practical embodiment and according to a further feature of the invention at least one idly mounted pre-modelling roller is provided in the travelling path of the (clay) strand produced by the press.

By means of such a pre-modelling roller the produced strand of reactangular cross-section may be premoulded to a certain extent in correspondence with the moulding which is effected in the intermediary space between the belts.

In case of manufacturing "specials" having at least one end face positioned under a specific angle, it is preferred to apply, between the delivering end of the cooperating belts and the moulding tray, a finishing roller, which is disposed in accordance with a vertical tangent plane corresponding to the desired end face. Such pre-modelling and finishing rollers may be adjustably mounted.

The cross-sectional profile of the belt(s) required in dependence of the desired "specials" may be simply obtained by using on those places, where the belt has to be thicker, an easily stretchable and compressible filling material, such as foam plastic or foam rubber, the surface of which is covered by a thin, stretchable layer of the proper belt material.

The invention will hereinafter be further described by way of example with reference to the drawing.

Fig. 1 and 2 each show an example of a piece of brick work, in which - in a bend and a corner respectively - bricks have been used of a shape which deviates from the usual rectangular shape;

fig. 3 shows six additional examples of bricks of a shape deviating from the usual rectangular form, and

fig. 4 is a diagrammatic perspective view of the relevant part of the device to be used for carrying out the method according to the invention.

When manufacturing the bricks of a special size designated at a and b respectively in fig. 1 and 2, care should be taken that the surface structure of the exposed surfaces fits in well to that of the exposed surfaces of the adjacent bricks of the usual rectangular shape. If one would try to obtain such bricks of deviating form by dropping the usual (sanded) clay lumps into moulding trays adapted to the deviating shape, the obliquely connected, exposed faces in fig. 1 and the oblique corner face in fig. 2 would appear to have been improperly treated. Such improperly treated faces can be avoided and any exposed face, deviating from the usual orthogonal faces may be obtained with the desired surface structure by making use of the method and device of the invention.

Among the "specials" shown in fig. 3, the brick designated at g may be obtained in the usual manner, i.e. with an assembly of two cooperating "flat" moulding and depositing belts.

The device to be used for carrying out the method of the invention is of a type well-known per se, such as disclosed in NL-B-161,831, while improved versions of the same are disclosed in e.g. NL-A-8802565.

The example of fig. 4 relates to the manufacture of mouldings for bricks, which are to be used as corner bricks in the brick work of fig. 2. The device shown in fig. 4 comprises a press with an extruding nozzle which is described in detail in the publications mentioned hereinabove and for that reason has not been shown in the drawing. From an unshapen supply of clay the press may extrude a vertically emerging strand 1 of a substantially rectangular cross-section. Pieces are cut from this clay strand at regular intervals, which are then caught at the entrance of an assembly of two endless moulding and depositing belts, which are disposed one opposite the other in a substantially vertical position and are passing around horizontally disposed guide rollers. It should be noted that, when mouldings for bricks, having a hand mould structure, are to be manufactured, the strand has to be circumferentially "sanded" prior to cutting. The

two cooperating moulding and depositing belts are indicated at 2 and 3 respectively. The guide rollers 2a and 3a respectively of the belts 2 and 3 are of a well-known construction and are rotatably supported, in a cantilever fashion, by the frame of the device, diagrammatically indicated at 4. One roller of each pair of guide rollers 2a and 3a respectively is driven in such a direction, that the opposing runs of the belts 2 and 3 are moving downwardly. The drive speed is selected with respect to the delivering speed of the clay strand such, that the clay lumps cut from the strand will be accelerated by the catching belts 2 and 3 in the downward direction and will be successively dropped into juxtaposed moulding cavities of a moulding tray 5, which is moved stepwise under the cooperating belts 2 and 3 in the arrow direction. For sake of simplicity a continuous clay strand has been shown in fig. 4.

The device shown in fig. 4 differs from the usual constructions in that in the example shown one of the cooperating moulding belts, viz. the belt 3, has a profiled cross-sectional shape, which is characterized by a thickness that proportionally increases from one lateral edge to a location adjacent the middle of the belt and remains constant from that location onwards. The opposing belt 2 is of the usual "flat" type, i.e. a belt having a constant thickness across its entire width. The intermediary space between the opposing runs of the belts 2 and 3 has thus obtained a cross-sectional shape, which substantially corresponds to the shape of the base of the corner brick used in fig. 2. The moulding cavities in the moulding tray 5 have also been adapted to this base shape by placing wedge-shaped inserts 5a therein.

The cross-sectional profile of the belt 3 may be obtained in a simple manner by providing an annular belt core body 8 of a wedge-shaped cross-section between the e.g. canvas-reinforced inner circumferential layer 9 and a covering outer circumferential layer 10 (of e.g. silicone rubber). Such a core body is formed of a stretchable and compressible material, such as foam rubber or a suitable foam plastic, so that this body may readily stretch around the guide rollers 3a and contract in the straight runs. The usual construction of the guide rollers 2a and 3a permit a quick and simple substitution of a "flat" or profiled belt by a belt of a different profile.

In fig. 4 a pre-modelling roller 6 is provided over the entrance of the cooperating belts 2 and 3 and mounted for free rotation about an axis 7, by means of which the rectangularly cross-sectionally shaped clay lump may be premoulded to a certain extent prior to be taken up in the moulding space between the belts 2 and 3. As shown in the drawing, the roller 6 may be fixed above the belts 2 and 3 in various angular positions. In the example shown the roller 6 is tangent to a vertical plane which is substantially in line with the plane of the outer surface of the wedge-shaped portion of the downwardly moving run of the belt 3.

Furthermore a finishing roller 11 is provided under the cooperating belts 2 and 3, which is mounted for free rotation about a horizontal axis 12 and may be adjusted in the horizontal plane. Side faces of the moulding, which have not been directly treated by the belts 2 and 3, such as the side face indicated at 13, may be deformed by such a finishing roller in such a way, that this side face (which will constitute an exposed face of the future "special") will get into the right angular position, without the risk of being "affected" when dropped into the moulding tray 5.

It will be clear, that additional premodelling rollers and(or) finishing rollers may be used, if desired.

It will also be clear, that by using belt core bodies of a shape different from that shown in the drawing, with one or both of the belts 2 and 3, all of the brick profiles shown in fig. 3 and many other profiles may be realised.

Claims

1. A method and device for working a supply of clay or such mouldable material to mouldings adapted for firing bricks, making use of a press adapted to extrude from said supply of clay a vertically emerging (and possibly sanded) strand of a substantially rectangular cross-sectional shape, a cutting device disposed under said press for cutting lumps from the moving strand at regular intervals, and an assembly of two vertically disposed endless conveyor belts provided under said cutting device, which conveyor belts may be driven so as to have their opposing runs - which are vertically disposed at a spacing which is less than the thickness of the strand - move downwards and being adapted to catch each lump of clay, speed up the same in the downward direction and drop the same in a moulding tray disposed under said belts, characterized in that for making mouldings having a base differing from a rectangular base, use is made of belts, the opposing surfaces of which are profiled in such a way, that the space delimited between the two belts has a cross-sectional shape, which corresponds to that of a brick of a non-rectangular form.

2. A device for carrying out the method according to claim 1, comprising a press capable of extruding a vertically emerging strand of a substantially rectangular cross-sectional shape, a cutting device provided thereunder for cutting lumps from the

moving strand at regular intervals, and an assembly of two vertically disposed endless conveyor belts provided under said cutting device, which conveyor belts may be driven so as to have their opposing runs, which are vertically disposed at a spacing which is less than the thickness of the strand - move downwards and are adapted to catch each lump of clay, speed up the same in the downward direction and drop the same in a moulding tray disposed under said belts, characterized in that at least one of the belts is provided, on its surface faced to the opposing belt, with a circumferentially constant profile, such, that the two belts are delimiting an intermediary space between them, which has a cross-sectional shape which deviates from a rectangle.

3. A device according to claim 2, characterized in that at least one idly mounted pre-modelling roller is provided in the travelling path of the (clay) strand produced by the press.

4. A device according to claims 2 or 3, characterized in that between the delivering end of the cooperating belts and the moulding tray, a finishing roller is provided and is disposed in accordance with a vertical tangent plane corresponding to the desired end face.

5. A moulding and depositing belt for use in a device according to claims 2 - 4, characterized in that this belt is composed - as seen in cross-section - of an inner circumferential layer having a constant thickness, as well as a core body provided thereon, and formed of a stretchable and compressible material, such as foamed material, the thickness of which is varying along the width of the belt, said core body having its outer circumferential surface covered by a finishing layer of a uniform thickness and formed of an elastic material.

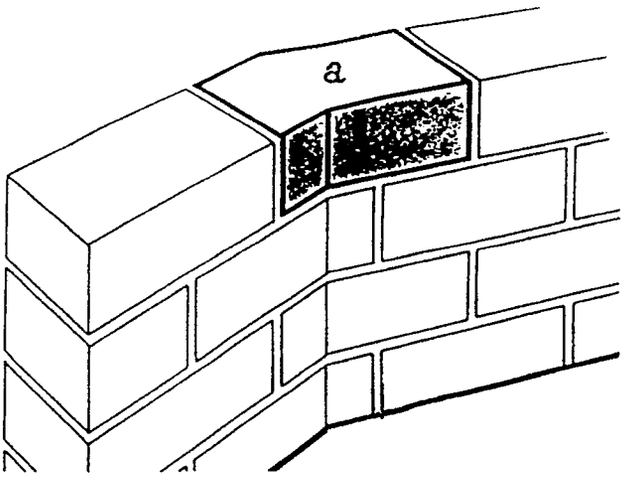
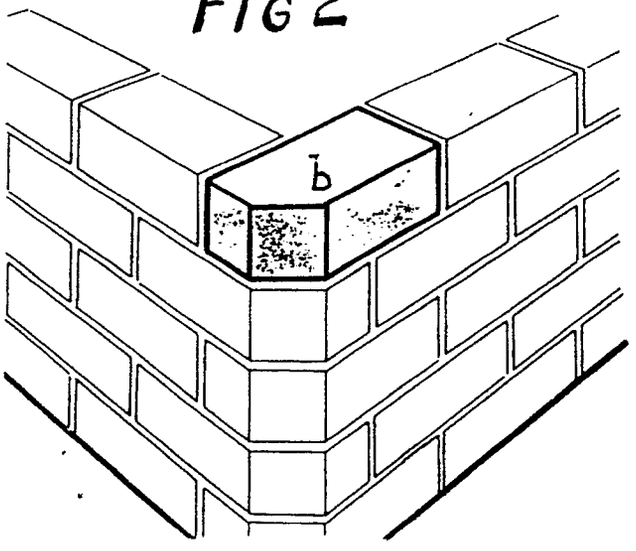
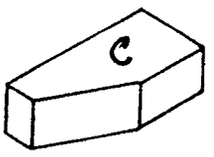
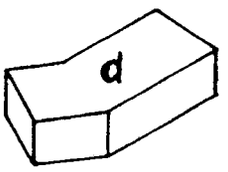


FIG 1

FIG 2







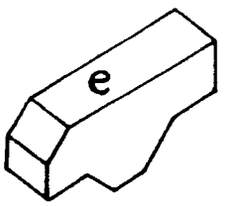
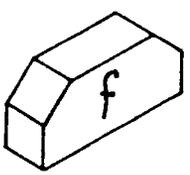
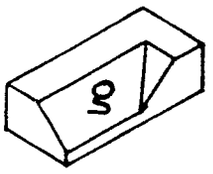
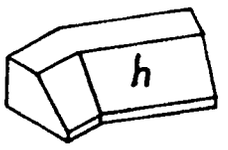


FIG 3







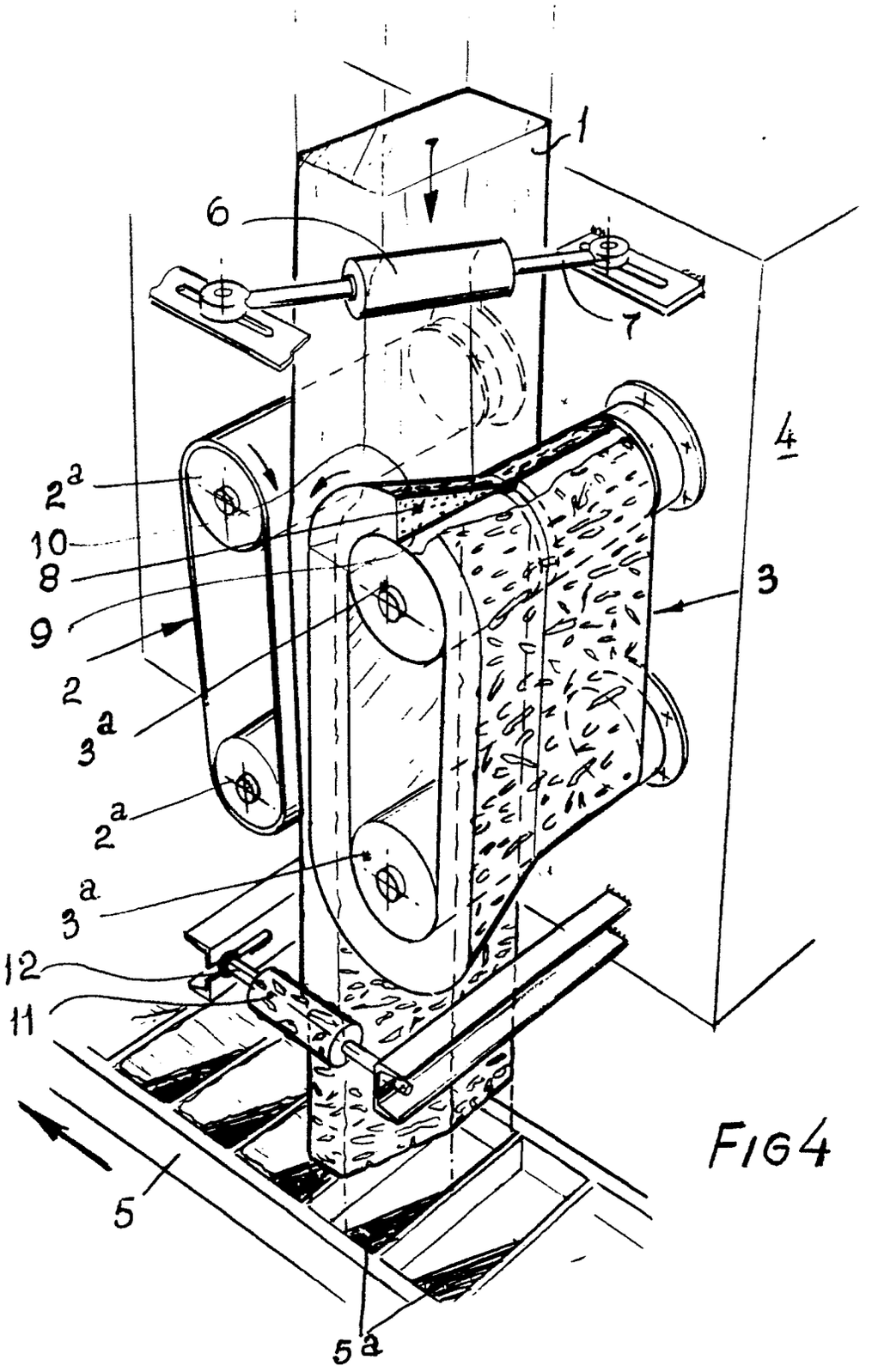


FIG4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2549

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)
A	US-A-1 444 519 (C.L. NORTON) * The whole document *	1,2	B 28 B 13/00 B 28 B 17/02
A	US-A-2 352 771 (E.G. COWAN) * The whole document *	1,2	
A	FR-A-1 039 878 (SOCIETE GENERALE DES TUILERIES DE MARSEILLE) * The whole document *	1,2	
A	NL-A-7 602 697 (MACHINEFABRIK W. HUBERT & CO. B.V.) * The whole document *	1,2,5	
A	NL-A-8 002 915 (MACHINEFABRIEK MATTIJSSEN N.V.) * The whole document *	1,2,5	
A	GB-A-1 548 535 (MACHINEFABRIEK W. HUBERT & CO. B.V.) * The whole document *	1,2,5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 28 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	04 December 90	GOURIER P.A.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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