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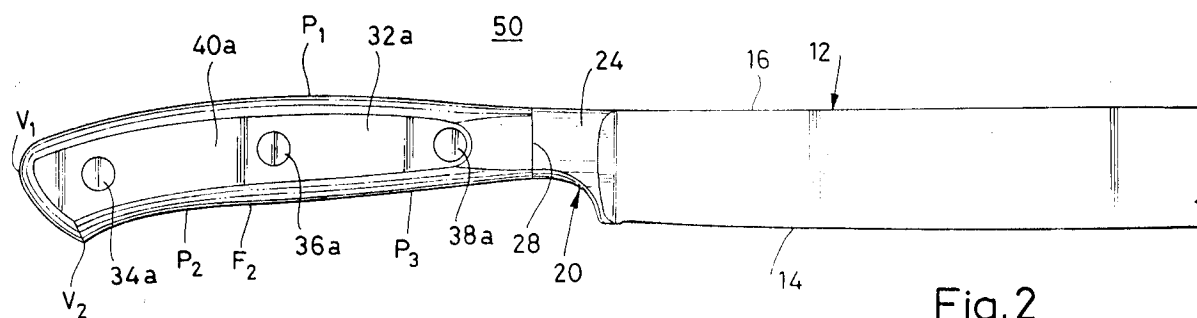
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I-20122 Milano(IT)(54) **Forged knife provided with ergonomic handle.**

(57) Knife consisting of a metal member forged to form a blade (12) integral with a tang (18), provided with a hitch (20), on which is fastened a handle (30a,

32a) having ergonomical shape for helping handling and allowing a prolonged use thereof.

**Fig.2****EP 0 474 295 A1**

The present invention pertains to a forged knife provided with ergonomical handle, in which the metallic portions forming the blade and the tang, at least partially thickened to form a so-called hitch, are obtained by forging, and the handle is given an ergonomical shape to allow to handle it safely and without any trouble for a prolonged use thereof. Since long time are well-known household knives of the so-called forged kind in which the blade with the tang is obtained by forging a suitable metal piece under a proper forge and then to the tang a handle is joined to allow to handle in a practical way the so obtained knife.

It was, however, recognized in said knives that, as none was concerned with the specific handle shape, there were knives with handles safely fastened to the tang which, however, showed poor handling comfort with attending danger to tire the hand and cause accidents or injuries to the users.

It was decided, to obviate this problem, to reshape the handles of said knives giving them an ergonomical shape, i. e. such a shape to be suited in the best way with the human hand.

A very simple way for obtaining the ergonomical shape of a handle in a forged knife is to take a blade with its tang, to coat said tang with a mouldable matter, such as plasticin, and to have said coated tang handled by a person having medium-sized hands for obtaining on said mouldable coating a mark indicating the ideal shape to be given to a knife handle, in order to be perfectly ergonomical. Subsequently, the handle and possibly the internal tang are shaped, according to said mark, obtaining a handle perfectly suited to the hand of the individual having to handle it.

However, this system provides too personal handles which cannot be suited for a mass production of knives, such as household knives. Consequently, a knife handle has been to be studied, having ergonomical shape, starting from a hand track left on a mouldable material coating the tang of a forged knife and then processing the so-obtained shape for obtaining a handle of generally ergonomical shape suitable for any user.

To obtain this ergonomical handle, it is necessary to provide a general shape thereof upside convexly curved with a tip ending a little above the back of the knife blade and then descending both to a first end of the handle itself and to a junction point between handle and blade, showing moreover said handle downside at the edge of the blade a first re-entrant curve, starting from a second external end of the handle and ending in an inflexion point substantially halfway with respect to said handle from which starts a second convexed curve, less pronounced than the re-entrant curve joined with said blade at the junction point.

Preferably, said upper curve of the handle,

according to the invention lowers more at the external end of the handle than at the junction point of the handle with the blade.

Also preferably, said lower re-entrant curve is more pronounced at the external end of the handle than at the subsequent inflexion point.

Further preferably, the subsequent lower convexed curve is marked substantially in the same way at both the inflexion point and the junction point with the blade.

The features and the advantages of the present invention will be better understood from a detailed description of an embodiment thereof, given in an exemplifying way and not in a limiting way, and provided with the enclosed drawings, wherein:

Figure 1 is a lateral partial view of a forged knife provided with a traditional handle, according to the most common prior art;

Figure 2 is a lateral partial view of a forged knife according to the present invention provided with ergonomical handle;

Figure 3 is a partial top view of a forged knife which could be both the one of the prior art depicted in figure 1 and the one, according to the present invention depicted in figure 2;

Figure 4 is a view, similar to that of figure 2, depicting more in detail and more carefully the criteria for designing the ergonomical shape to be given to a knife handle, according to the present invention.

Referring first to figures 1 and 3, it is seen that a forged knife 10 provided with traditional handle, according to the prior art, consists of a metallic portion forming a blade 12 provided with edge side 14 and back side 16.

The blade itself 12 is obtained by forging in just one piece with a tang 18 connected to the blade 12 through a hitch 20 consisting of two divergent connecting surfaces 22 and 24 ending with two shoulders 26 and 28 generally perpendicular to the lateral faces of the blade 12 and the tang 18. Between the lateral faces of the tang 18 rest two half handles 30 and 32 connected to the tang itself through well-known means, as for example the rivets 34, 36 and 38 shown in the half handle 32 depicted in figure 1. Further, said half handle 32 has a lateral planar portion 40 containing the rivets 34, 36 and 38, and connected through curved surfaces to the rims thereof, is provided with a rear protrusion 42, having the purpose to avoid any lost of grasp from the handle, and with a central relief 44 to help the finger grasp thereon.

As it is well seen in figure 1, the handle of the knife 10 is absolutely traditional, not having other feature than properly coating the tang 18 to allow at least to not too uncomfortably and relatively safely grasp the knife 10 itself, avoiding any un-comfort or injury to the user. However, as already

explained, said handle is anything but suitable to the human hand and shows many poor grasping and tiring out problems for the user hand. The problems shown by traditional handles, such as that depicted in figure 1, are relieved in a knife 50, according to the present invention, depicted in the figures 2 and 3, provided with a handle having curves and generally indexed as suggested by a human hand, the directions for said curves and general indexing being obtained by coating a tang 18, integrally connected to a blade 12, with a mouldable material, as for example plasticine, and making grasp said coating by a person having average sized hands, in order to give thereto an anatomical shape to be repeated both in the half handles 30a and 32a (just the half handle 32a is visible in figure 2), coating said tang 18, and possibly in the tang outline, and resting between said tang 18 and the shoulders 26 and 28, remaining connected to the tang 18 by means of rivets 34a, 36a and 38a, as visible in figure 2. Further, as visible in figure 2 and analogously to what depicted in figure 1, said half handle 32a contains a lateral planar portion 40a containing the rivets 34a, 36a and 38a and connected through curved surfaces to the rims thereof.

Looking at figure 2, it is seen that the general shape of the half handle 32a is complexly curved having a top point or tip P_1 , located a little above the back 16 of the blade 12, and then lowers to both an end vertex V_1 of the half handle 32a and the shoulder 28 indicating the junction of the half handle 32a with the hitch 20, being the lowering more at the vertex V_1 than at the shoulder 28. Further, the half handle itself 32a shows below, at the edge side 14 of the blade 12, a first re-entrant curve culminating in the point P_2 , starting from a vertex V_2 and arriving to an inflexion point F_2 followed by a second less sharp convexed curve culminating in the point P_3 , starting from the inflexion point F_2 and arriving to the shoulder 28, being the re-entrant curve sharper at the vertex V_2 and less sharp at the inflexion point F_2 , while the convexed curve is substantially sharp at the same rate at both the inflexion point F_2 and the shoulder 28.

For giving more carefull criteria to define the ergonomical handle, according to the present invention, refer to figure 4 having the duty to define ratings for designing the ergonomical shape to be given to a knife handle, according to the present invention.

To this purposes is described a straight line, to be considered substantially horizontal, between a left end vertex V_1 of the handle and the lower right end of the shoulder 28, and the straight line segment comprised between said points is indicated by L. A straight line N perpendicular with respect to the above-mentioned straight line, passing through

the top point or tip P_1 of the handle, is then described, intersecting the horizontal straight line in a point and dividing the segment, having length L, in two adjacent segments L_1 and L_2 , being the length of L_1 comprised between $0.60L$ and $0.76L$ and the length of L_2 between $0.24L$ and $0.40L$. On said straight line N, at a distance from the point P_1 of a radius R_1 , is marked a rotation center for the upper curve of the handle, having said radius R_1 length comprised between $1.98L$ and $2.42L$ and being permitted to form with its limiting straight line R_{1a} , leftside to the straight line N, an angle comprised between 24° and 30° and with its limiting straight line R_{1b} , rightside to the same straight line N an angle comprised between 9° and 11° . Further, on the same straight line N and starting from the same rotation center is determined a radius R_2 , having length comprised between $1.53L$ and $1.87L$, removed from said straight line N by an angle between 10° and 12° , forming said radius R_2 with its left limiting straight line R_{2a} an angle comprised between 14° and 10° and with the right limiting straight line R_{2b} an angle comprised between 5° and 7° , the angle between said straight lines R_{2a} and R_{2b} resulting comprised between 15° and 21° .

At last, always on the same perpendicular straight line N, though above the point A, at a distance from the point P_3 equal to a radius R_3 comprised between $0.80L$ and $0.94L$ is described a pivoting point for the lower convexed curve of the handle culminating in the point P_3 , forming said radius R_3 with its limiting straight line R_{3a} an angle on the left side of the straight line N comprised between 7° and 9° and with its limiting straight line R_{3b} on the right side of the straight line N an angle comprised between 18° and 22° , resulting the whole angle comprised between the straight lines R_{3a} and R_{3b} comprised between 25° and 31° .

The above-mentioned data indicate the limits within which is defined the shape of an ergonomical handle for a knife, according to the present invention. However, the preferred shape data for said handle are:

$L_1 = 0.68L$; $L_2 = 0.32L$;
 $R_1 = 2.20L$; $R_2 = 1.70L$; $R_3 = 0.87L$;
 angle between R_{1a} and R_{1b} 32° ;
 angle between R_{2a} and R_{2b} 14° ; and
 angle between R_{3a} and R_{3b} 28° .

Of course, what has been hereabove disclosed and depicted is just an embodiment of the present invention, and those skilled in the art will be able to devise equivalent or alternate approaches, all to be considered as here covered.

Claims

1. Forged knife provided with an ergonomical handle (32a), characterized by having a general shape upside curved in a convexed way with a tip (P_1), located a little above the back (16) of the knife blade (12), and then lowers both to an external end (V_1) of the handle itself and to a junction point (28) between handle and blade, further having said handle down-side, at the edge side of the blade, a first re-entrant curve, starting from another external end (V_2) of the handle and ending in an inflexion point (F_2) substantially halfway with respect to said handle from which starts a second convexed curve, less pronounced than the re-entrant curve connected with said blade (12) in the junction point (28).
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2. Forged knife, as in claim 1, characterized in that said upside curve of the handle lowers more at the external end (V_1) of the handle than at the junction point (28) of the handle with the blade(12).
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3. Forged knife, as in claim 1, characterized in that said lower re-entrant curve of the handle is more pronounced at the external end (V_2) than at the subsequent inflexion point (F_2).
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4. Forged knife, as in claim 1, characterized in that the subsequent lower convexed curve is pronounced substantially in the same way both at the inflexion point (F_2) and at the junction point (28) with the blade (12).
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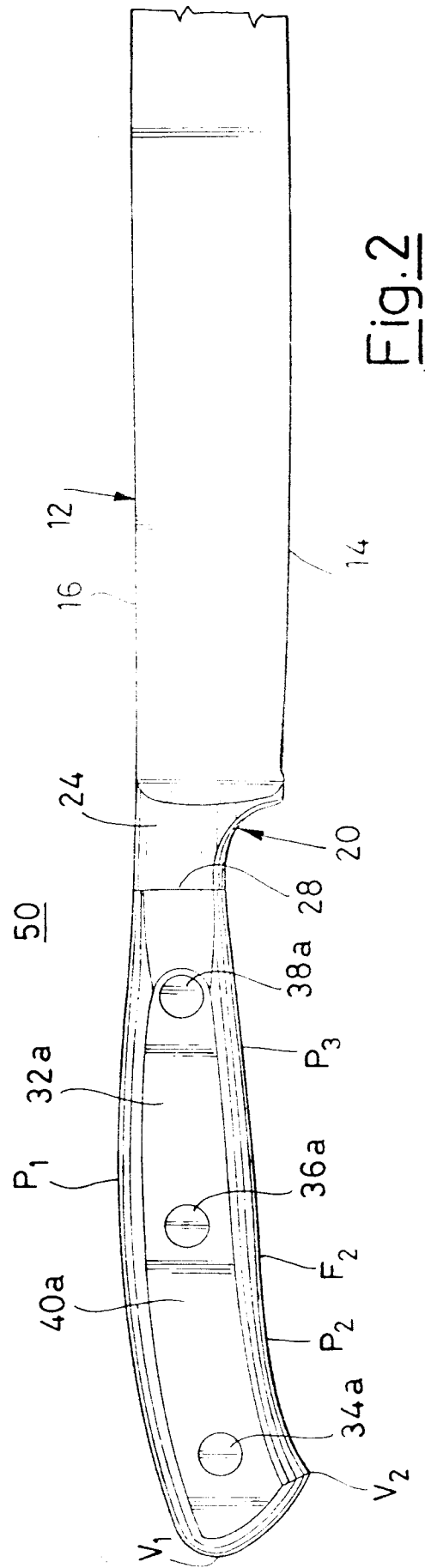
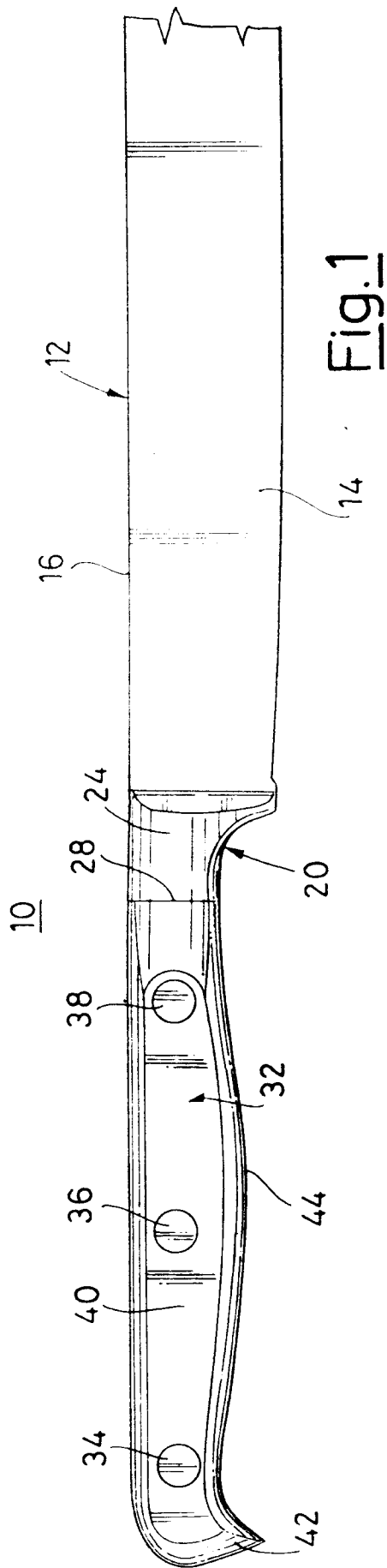
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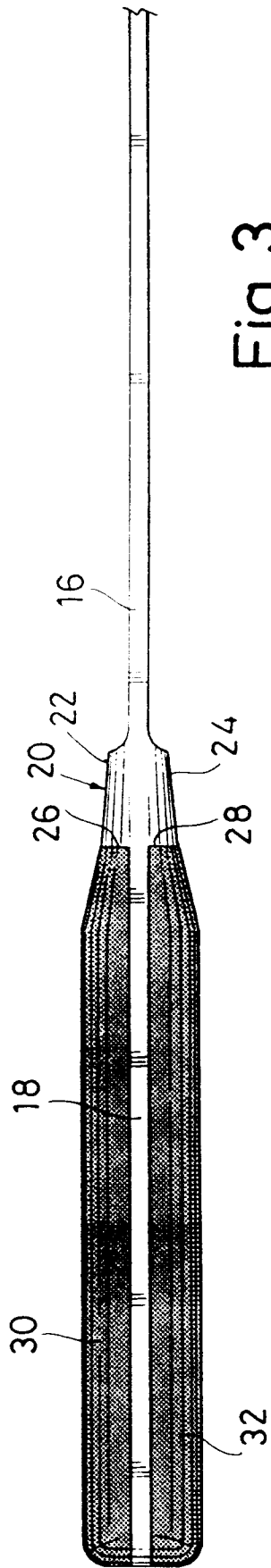


Fig. 3

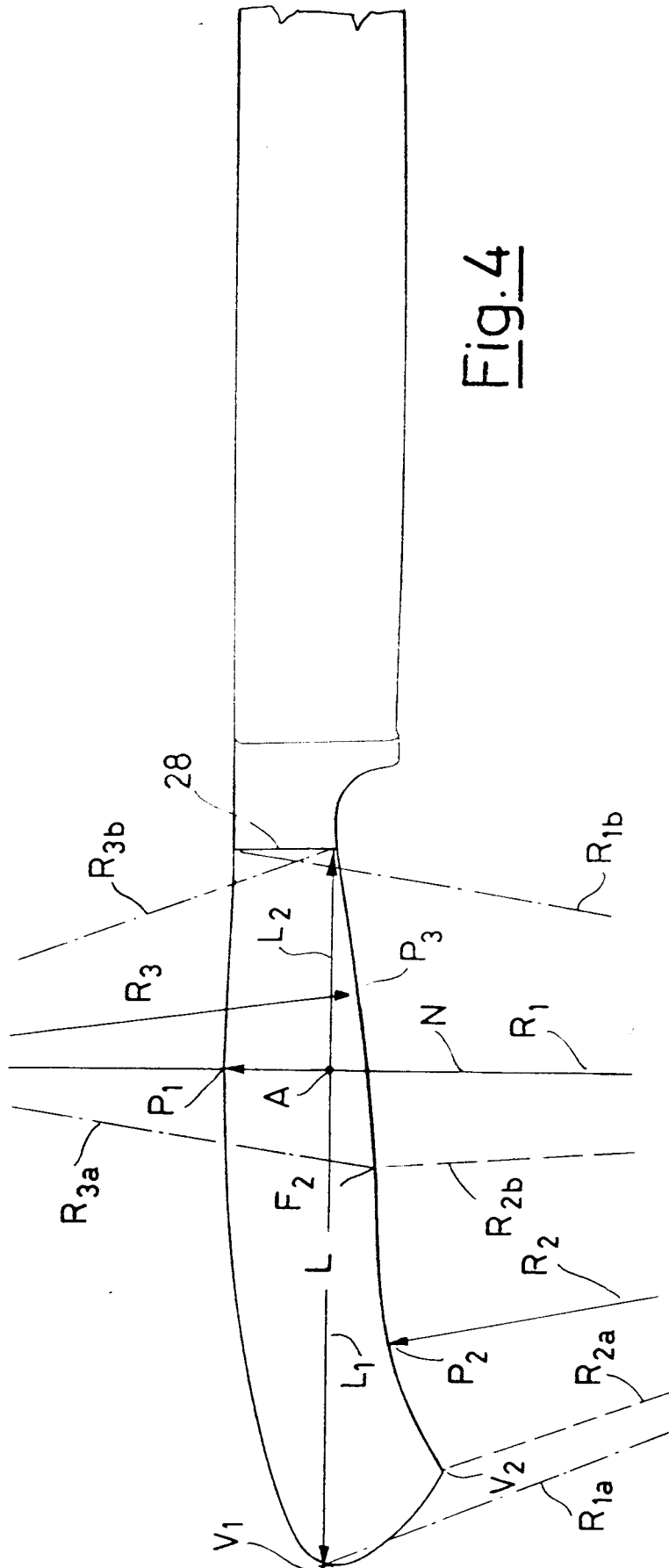


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 91 20 2210

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)
X	US-A-4 178 684 (P. MIGHTLY) * column 1, line 4 - line 24; figures 1-5 ** - - -	1-4	B 26 B 3/00
A	DE-U-8 614 089 (FRIEDR. DICK GMBH) * figure 1 *** page 2, line 14 - line 28 *** page 4, line 18 - page 5, line 10 ** - - -	1-4	
A	EP-A-0 090 256 (MARTOR-ARGENTAX E. H. BEERMAN KG.) * page 11, line 1 - line 29; figures 2,6 ** - - -	1-4	
A	DE-A-2 637 172 (O. H. HAPPE) * page 3 - page 4; figure 1 ** - - - - -	1-4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 26 B B 25 G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 04 December 91	Examiner RAVEN P.A
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