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(12) # EUROPEAN PATENT APPLICATION

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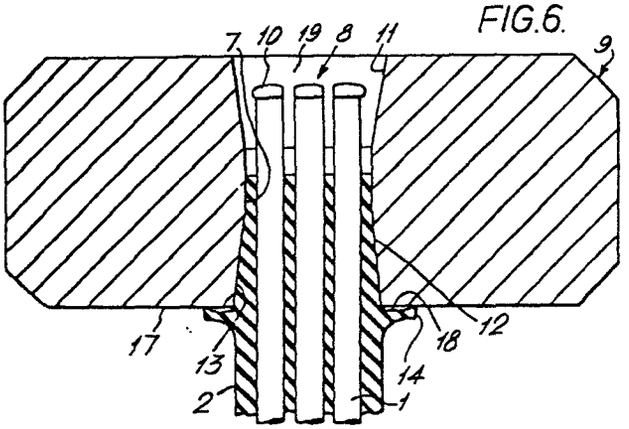
(54) **Resilient handle.**

(57) A resilient handle for carrying a tool head (9) formed with a waisted handle-receiving eye (8) said handle comprising at least three parallel laterally spaced rods (2) embedded and bonded in a body of moulded resilient material (1) to form the handle, the said resilient body terminating short of the ends of the rods at one end of the handle so as to enable the end regions of the rods to be resiliently displaced towards one another for passage through the waist (7) of the head eye, and those end regions of the rods having lateral enlargements (10) for engagement with the side wall (11) of the said eye to hold the head on the handle when the said end regions of the rods have been so passed through the waist of the eye.

FIG.6.



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"Resilient handle"

This invention relates to resilient handles for tools, particularly but not exclusively hammers or like percussion-type tools, and has as its main object to provide such a handle which may be used as a replacement handle for attachment to the head of an existing tool, as well as being equally capable of incorporation in a tool at the time of its original manufacture.

Viewed from one aspect the invention provides a resilient handle for carrying a tool head formed with a waisted handle-receiving eye, said handle comprising at least three substantially parallel laterally spaced rods embedded and bonded in a body of moulded resilient material to form the handle, the said resilient body terminating short of the ends of the rods at one end of the handle so as to enable the end regions of the rods to be resiliently displaced towards one another for passage through the waist of the head eye, and those end regions of the rods having lateral enlargements for engagement with the side wall of the said eye to hold the head on the handle when the said end region of the rods

have been so passed through the waist of the eye.

Such a handle may be applied to an existing tool head by springing the said end regions of the rods through the waist of the head eye, the rod ends then moving apart for their lateral enlargements to engage with the side wall of the eye beyond the waist, to hold the head on the handle.

The head end of the handle will be so arranged and dimensioned, relative to any particular head to which it is to be applied, that the part of the resilient body adjacent its said termination will enter the head eye to a substantial extent when the ends of the rods are passed through the waist of the eye as aforesaid, so as to provide a resilient engagement between the handle and the head. Preferably the said resilient body is formed with a peripheral flange rearwardly of its said termination for engagement with a tool head around the entrance to the head eye. The length of the part of the resilient body between its said flange and its said termination may then be commensurate with the length of the rods beyond said termination whereby, in use, the said resilient body terminates about half-way through the head eye.

Preferably the end region of the said resilient body adjacent its said termination is tapered to fit in a similarly tapered entrance portion of a head eye. This is not however essential as the said end region of the body could be parallel-sided but compressed into a tapered configuration when inserted in a tapered eye.

The said lateral enlargements of the rods are preferably at their ends although this is not essential. In a preferred form of the invention the said enlargements comprise button heads on the rods which are ground down, where they face inwardly, to enable the rods to be displaced towards one another as aforesaid. Conceivably such grinding down would not be necessary if the enlargements were to be located at staggered positions in the lengths of the respective rods so as not to engage one another when the rods are relatively displaced for passage through the waist of the head eye.

The said rods are preferably of steel and the said resilient material is preferably a natural or synthetic rubber or a mixture thereof.

Various different arrangements of rods may be employed depending mainly on the size and shape of the head with which the handle is to be used. Thus the rods may for example be three in number arranged in an equilateral array, or four in number in a rectangualar array, or six in number arranged as two rows of three in a rectangular array.

When the handle is applied to a tool, the end region of the said resilient body is preferably adhesively secured in the head eye. Preferably also the head eye around the said end regions of the rods is filled with a hardenable filler material which may conveniently be the same material as the adhesive just mentioned. Preferably a rigid filler piece is fitted between the said end regions of the rods to hold their enlargements firmly in engagement with the wall of the

head eye.

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

Figure 1 is a plan view of a tool handle according to the invention, partly broken away in its length and partly in cross-section at one end;

Figure 2 is a similar side view of the handle:

Figures 2 to 5 are three successive end views illustrating the process of inserting the handle in the eye of a tool head; and

Figure 6 is an axial cross-sectional view showing a hammer head mounted on the handle.

Referring first to Figures 1 and 2, the resilient handle comprises an array of six parallel laterally spaced steel rods 1 embedded and bonded in a moulded rubber body 2 to form the handle. The handle is produced by supporting the rods in two cages within a mould and forming the resilient body around them. One of the cages is indicated at 3 in Figures 1 and 2, and a recess 4 is formed in the surface of the handle where the support for the cage was located during the moulding process.

A passage 3 is formed through the rear end of the handle to receive a wire or cord for limiting the travel of the hammer should it accidentally leave the user's hands.

It will be noted that the resilient body 2 terminates short of the ends of the rods 1 at one end of

the handle. This is to enable the exposed end regions 6 of the rods to be resiliently displaced towards one another for passage through the waist 7 of the eye 8 in a tool head 9 (Figures 3 to 6). These end regions 6 of the rods have lateral enlargements in the form of button heads 10 for engagement with the side wall 11 of the head eye 8 to hold the head on the handle when the ends of the rods have been so passed through the waist 7 of the eye.

The end region of the body 2 adjacent its said termination is tapered at 12 to fit in a similarly tapered entrance portion 13 of the head eye 8. A peripheral flange 14 is formed on the body rearwardly of its said termination for engagement with a tool head around the entrance to the head eye (see Figure 6).

Figure 3 is an end view looking through the eye 8 in a tool head 9 just before the handle begins to pass through the eye. From this Figure it can be seen that the button heads 10 on the rods 1 have been ground down at 15, where they face inwardly, to enable the rods to be displaced towards one another for passage through the eye.

Figure 4 shows the condition when the ends of the rods are half-way through the eye, passing through the waist 7 of the eye. At this time the outer pairs of rods have been resiliently displaced into contact with one another at 16.

Figure 5 shows the condition when the handle has been fully engaged with the head and the end regions of the rods 1 have sprung apart into engagement with the outwardly tapered part 11 of the head eye 8 beyond its waist 7. At this time the flange 14 on the handle body engages with the rear face 17 of the head, as shown in Figure 6.

Before inserting the handle in the head eye the tapered surface 12 of the handle and the adjacent face 18 of the flange 14 is coated with epoxy adhesive to assist in securing and sealing the handle to the head. The flange 14 is formed with a flexible peripheral lip 18 to provide a seal against escape of adhesive displaced from the tapered surface 12 as the handle enters the head.

A rigid rectangular-section filler piece 20, e.g. of soft steel, is inserted between the end regions 6 of the rods to ensure that they cannot be withdrawn through the head eye.

Finally the space 19 (Figure 6) within the eye 8 surrounding the end regions 6 of the rods and the filler piece 20 is filled with a hardenable filler material, preferably the epoxy adhesive mentioned above, to protect the end regions of the rods against corrosion and to provide a neat appearance.

The rods of a handle according to the invention need not all be separate elements. Thus for example one or more pairs of such rods could each be formed from a

single rod bent double, the bend being at the rear end of the handle. Indeed any suitable arrangement could be employed which provides three or more rods extending along the handle as aforesaid, with at least three rod ends extending from the handle body for insertion in a head eye. The rods may be of any suitable cross-sectional shape, not only circular as in the illustrated embodiment.

It will thus be seen that the invention provides a resilient handle for a tool head which can readily be applied as a replacement handle to an existing head, as well as being equally usable as a handle for a tool when it is originally manufactured.

Claims:-

1. A resilient handle for carrying a tool head formed with a waisted handle-receiving eye, said handle comprising at least three substantially parallel laterally spaced rods embedded and bonded in a body of moulded resilient material to form the handle, the said resilient body terminating short of the ends of the rods at one end of the handle so as to enable the end regions of the rods to be resiliently displaced towards one another for passage through the waist of the head eye, and those end regions of the rods having lateral enlargements for engagement with the side wall of the said eye to hold the head on the handle when the said end regions of the rods have been so passed through the waist of the eye.

2. A handle as claimed in claim 1, wherein the end region of the said resilient body adjacent its said termination is tapered to fit in a similarly tapered entrance portion of a head eye.

3. A handle as claimed in claim 1 or 2, wherein the said resilient body is formed with a peripheral flange rearwardly of its said termination for engagement with a tool head around the entrance to the head eye.

4. A handle as claimed in claim 3, wherein the length of the part of the resilient body between its said flange and its said termination is commensurate with the length of the rods beyond said termination whereby, in use, the said resilient body terminates about half-way through the head eye.

5. A handle as claimed in any of the preceding claims, wherein the said lateral enlargements of the rods comprise button heads thereof which are ground down, where they face inwardly, to enable the rods to be displaced towards one another as aforesaid.

6. A handle as claimed in any of the preceding claims, wherein the said rods are of steel.

7. A handle as claimed in any of the preceding claims, wherein the said resilient material is natural or synthetic rubber or a mixture thereof.

8. A handle as claimed in any of the preceding claims, wherein the said rods are three in number arranged in an equillateral triangular array.

9. A handle as claimed in any of claims 1 to 7, wherein the said rods are four in number arranged in a rectangular array.

10. A handle as claimed in any of claims 1 to 7, wherein the said rods are six in number arranged as two rows of three in a rectangular array.

11. A tool having a head carried on a handle as claimed in claims 1 to 10.

12. A tool as claimed in claim 11, wherein the end region of said resilient body is adhesively secured in the head eye.

13. A tool as claimed in claim 11 or 12, wherein the head eye around the said end regions of the rods is filled with a hardenable filler material.

14. A tool as claimed in claims 12 and 13, wherein the adhesive and the hardenable filler material is the

same material.

15. A tool as claimed in any of claims 11 to 14, wherein a rigid filler piece is fitted between the said end regions of the rods, in the head eye.

16. A tool as claimed in any of claims 11 to 15, which is a hammer.

FIG.1.

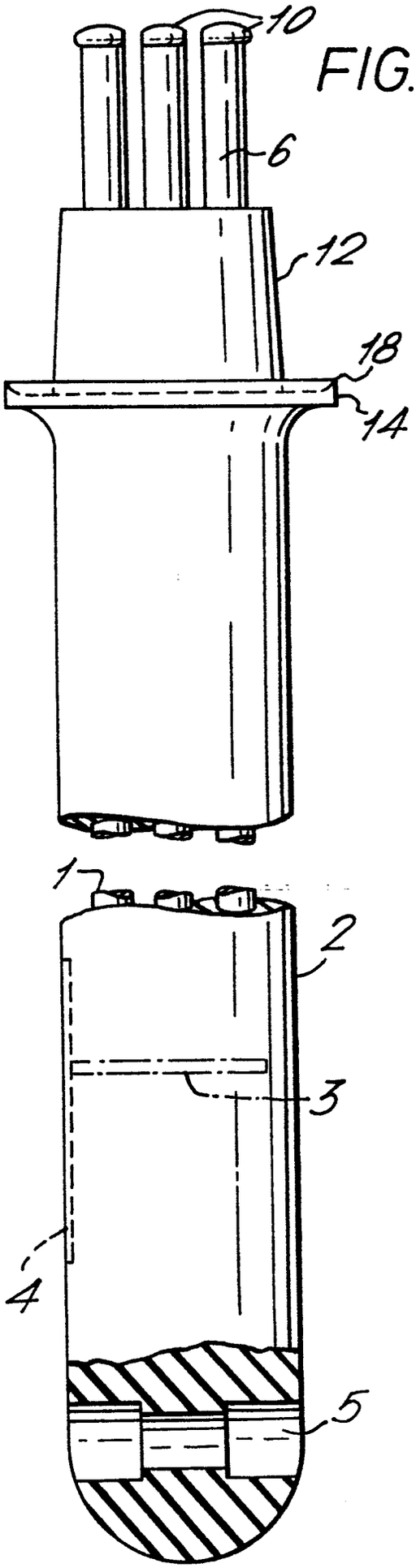
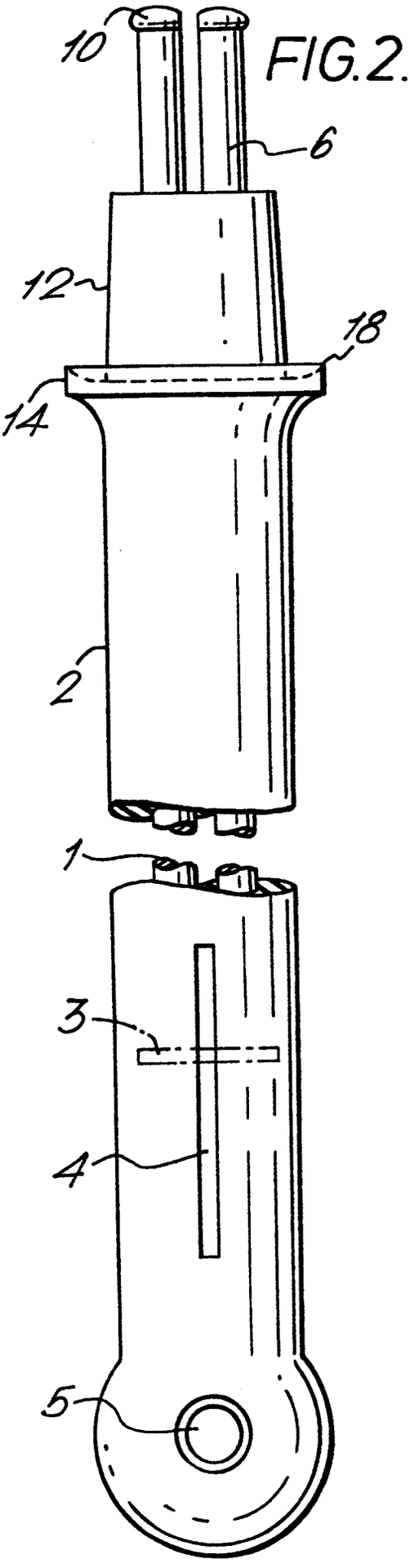


FIG.2.



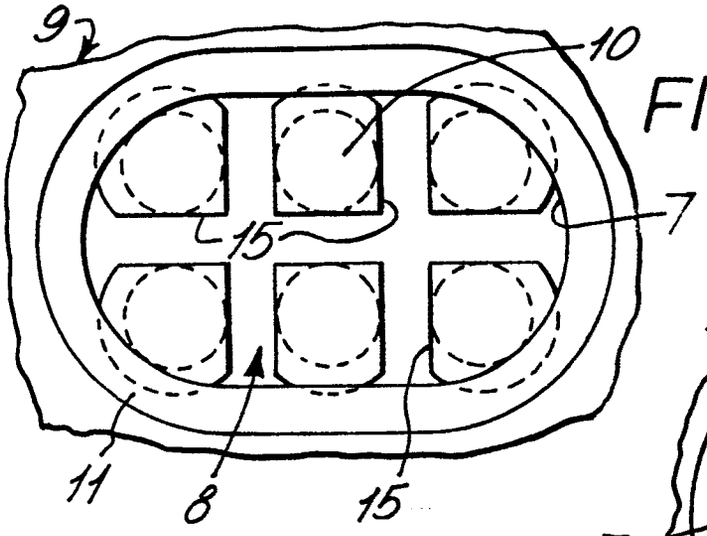


FIG.3.

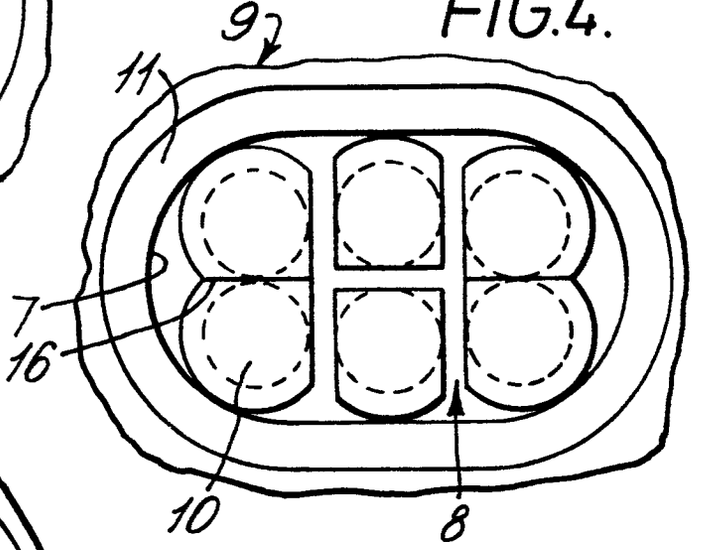


FIG.4.

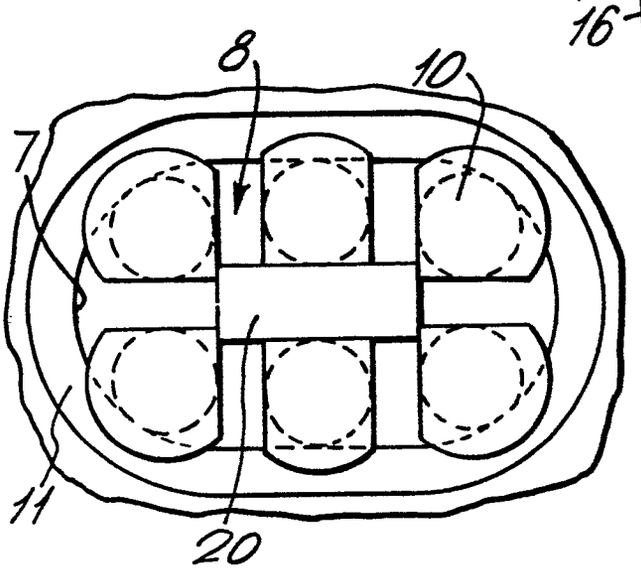
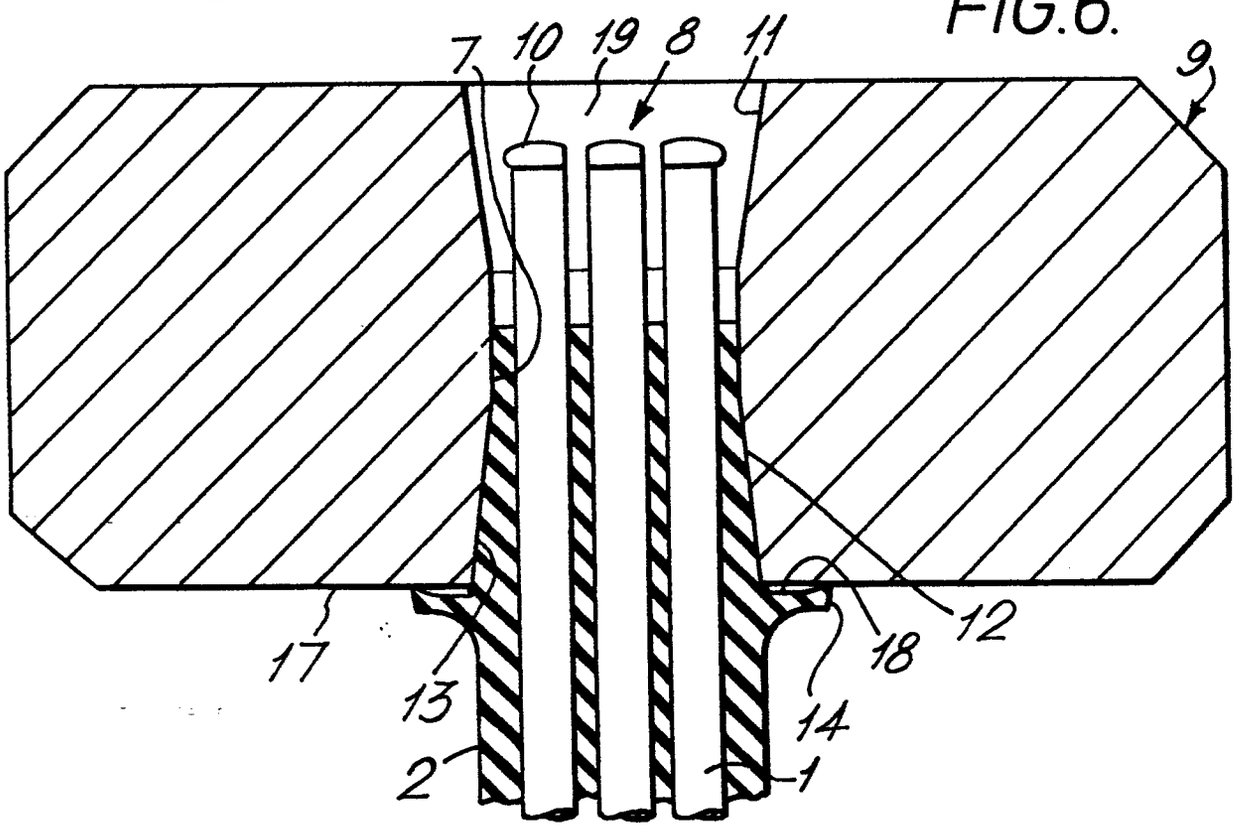


FIG.5.

FIG.6.



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EUROPEAN SEARCH REPORT

Application number

EP 79 300 878.0

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	FR - A - 499 135 (McKENZIE) * fig. 1; page 2, lines 1 to 38 *	1,6, 13,16
	DE - U - 7 310 757 (PIGETZKI) * fig. 1 to 4; page 4, lines 1 to 24 *	12,14, 15,16
	US - A - 3 779 296 (ECHEVERRIA) * fig. 2; column 2, lines 36 to 64 *	2,3, 12,14, 16
	FR - A - 2 030 605 (S.A. GOLDENBERG) * fig.; claim 1 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 25 G 1/02
B 25 G 3/12

TECHNICAL FIELDS SEARCHED (Int.Cl.³)

B 25 D 1/00
B 25 G 1/00
B 25 G 3/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
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T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	01-08-1979	HOFFMANN