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(54) Shelf, particularly for metal sets of shelves

(57) A shelf (10), particularly for metal sets of shelves of the type produced by cutting and plastic deformation from metal plate, in which each one of the edge regions (11) of at least two opposite sides (12) is shaped so as to form three longitudinal parallel folds (13,14,15), forming a structural reinforcement (16) having a triangular cross-section and in which one side (17) is parallel to the shelf (10). A fourth fold (18) of the free end (19) of each one of the two edge regions (11) forms an edge flap (20) that abuts against the lower surface of the shelf (10).

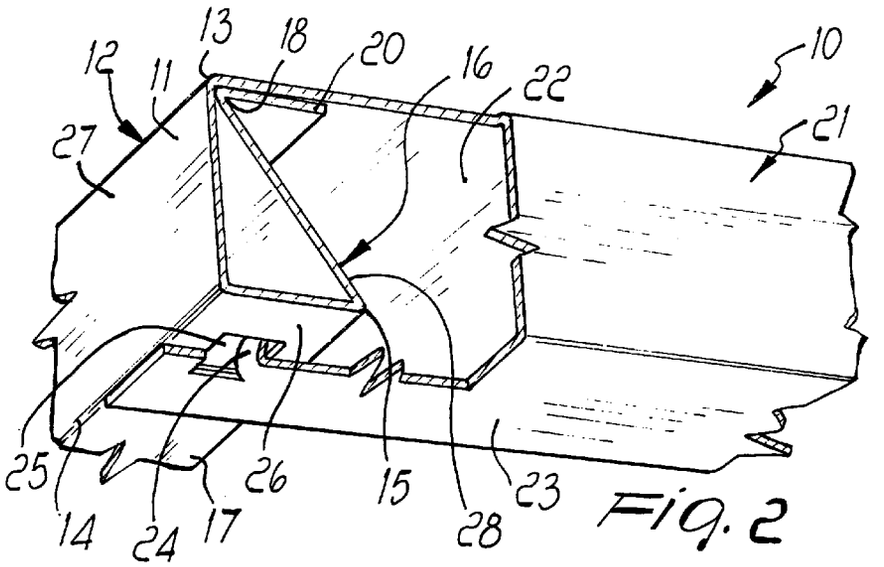

Fig. 2

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Description

The present invention relates to a shelf, particularly but not exclusively useful for metal sets of shelves.

Metal sets of shelves of various shapes, models, and sizes are currently increasingly widespread and are particularly useful both in the industrial field and in household appliances.

These metal sets of shelves have the advantage of rather good overall lightness combined with high mechanical strength.

Especially in the industrial and commercial fields, however, constant research is in progress to produce metal sets of shelves wherein the shelves, despite maintaining excellent lightness characteristics, achieve ever better mechanical load resistance characteristics.

A variety of structural reinforcements has been conceived for this purpose, ranging from various kinds of folding of the edges of the shelves to the application of auxiliary reinforcements constituted substantially by longitudinal profiles or tubular elements fixed below said shelves.

As regards the shaping of the edges of the shelves, one or more edges are currently conventionally folded so as to form a box-like reinforcement having a quadrangular cross-section, the edge flap whereof is welded, usually by spot welding, to the lower surface of the corresponding shelf.

Practical experience and structural studies conducted on these reinforcements have shown that the spot welds are subjected, during operation, to shearing tensions that cause the breakage of the spot welds in the presence of particularly heavy loads.

As regards auxiliary reinforcements, they are currently constituted, as described above, by longitudinal elements that are usually supported by appropriately shaped edges of the shelf.

The most commonly used cross-section is omega-shaped, with its base wings arranged against the upper surface of the shelf.

A negative consequence thereof is the tendency of the wings to open out when the shelf is loaded.

Longitudinally arranged reinforcement elements, furthermore, are also generally fixed by welding, with the consequent mentioned problems.

The aim of the present invention is to solve the described drawbacks of conventional models of sets of shelves, particularly by providing a shelf that offers a high ratio between mechanical strength and weight.

Accordingly, an object of the present invention is to provide a shelf the production whereof does not require welds with their corresponding drawbacks.

Another object of the present invention is to provide a shelf that can be produced in a wide variety of models and dimensions, and the structure whereof can be adapted to the different requirements to which it can be assigned.

Another object of the present invention is to provide a shelf in which any auxiliary reinforcement means can be applied in a stable manner and easily without however having position-shifting problems.

Another object of the present invention is to provide a shelf that can be installed easily and the manufacture whereof does not require specialized labor.

This aim, these objects, and others that will become apparent hereinafter are achieved by a shelf, particularly for metal sets of shelves of the type produced by cutting and plastic deformation from metal plate, said shelf being characterized in that each one of the edge regions of at least two mutually opposite reinforcement sides is shaped so as to form three longitudinal parallel folds, forming a structural reinforcement having a triangular cross-section and in which one side is parallel to said shelf, a fourth fold of the free end of each one of said two edge regions forming an edge flap that abuts against the lower surface of said shelf.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of the shelf according to the present invention, taken from below;
figure 2 is a view of a detail of the shelf according to the invention;
figure 3 is an exploded view of another detail of the shelf of figure 1;
figure 4 is a sectional view of the shelf of figure 1;
figure 5 is a partially sectional lateral view of the shelf of figure 1 during a step of its production.

With particular reference to figures 1 to 5, a shelf, particularly for metal sets of shelves, of the type obtained by cutting and plastic deformation from metal plate, according to the invention, is generally designated by the reference numeral 10.

In the shelf 10 there are provided edge regions 11 of two mutually opposite reinforcement sides 12, each edge region being shaped so as to form three parallel longitudinal folds 13, 14, and 15, forming a corresponding structural reinforcement designated by the reference numeral 16.

The structural reinforcement 16 has a cross-section shaped like a right-angled triangle with one side 17 parallel to said shelf 10.

A fourth fold 18 of the free end 19 of each one of the edge regions 11 forms an edge flap 20 that abuts against the lower surface of the shelf 10.

In this embodiment, the reinforcement sides 12 correspond to the longer sides of the shelf 10, which has a rectangular shape.

The shelf 10 also comprises two complementary sides 21, in this case the shorter sides, that are C-shaped and have their concavities 22 directed inwards.

Each one of the complementary sides 21 has a corresponding edge flap 23; means for anchoring to a corresponding structural reinforcement 16 are formed at

the ends of said edge flap 23 and are constituted in this case by two tabs 24 formed by cutting.

More specifically, each one of the two tabs 24 is formed at one of the ends of the corresponding edge flap 23; upon assembly, it is deformed so as to enter a through hole 25, formed in a flap 26 that corresponds to the side 17, and lock therein.

Each one of the structural reinforcements 16 furthermore comprises a flap 27 that is perpendicular to the shelf 10 and a diagonal flap 28 that ends at the inner part of the fold 13, which forms the flap 27 with respect to the shelf 10.

The shelf 10, in this embodiment, also comprises auxiliary reinforcement means constituted by three identical longitudinal supporting elements 29.

Each one of the supporting elements 29 has a cross-section that is shaped like an isosceles trapezoid and is open at the shorter parallel side, designated by the reference numeral 30.

The open side of each one of the supporting elements 29 that corresponds to the shorter parallel side 30 is in contact, upon assembly, with the lower surface of the shelf 10.

Furthermore, the corresponding ends of each one of the supporting elements 29 are inserted in, and supported by, the complementary sides 21.

More specifically, each one of the supporting elements 29 is shaped so as to form, at each one of its ends and at the surface corresponding to the longer parallel side 31, a seat 32 that is formed by plastic deformation and in which a corresponding stud 33, also formed by plastic deformation in the corresponding edge flap 23 of a corresponding complementary side 21, fits upon assembly.

The longitudinal opening of the shorter parallel side 30 has curled edges so as to form two opposite and substantially parallel flaps 34 directed towards the inside of the supporting element 29.

The isosceles-trapezoid shape of the supporting element 29 and its particular arrangement below the shelf 10 causes it to tend to close, with a consequent increase in strength, as the load increases.

As regards the execution of the structural reinforcements 16, with particular reference to figure 5, each reinforcement is formed by providing the folds 18, 13, 14, and 15 according to a preset sequence.

More specifically, the folds 14 and 15 and part of the fold 18 are formed simultaneously.

The fold 18 is in fact completed only after forming the fold 13.

In practice it has been observed that the present invention has achieved the intended aim and objects.

In particular, it should be noted that the structural reinforcements of the sides, besides not requiring any kind of welding for their production, close spontaneously, by virtue of their particular shape, as the load carried by the corresponding shelf increases.

It should also be noted that they are easy to manufacture in the technological field, since said structural reinforcements can be obtained substantially by folding.

Mention should also be made of the obvious economic advantages as regards both the elimination of troublesome welding operations and the short production times required by the shelf according to the invention.

It should also be noted that the auxiliary reinforcement means that can optionally be used in the shelf according to the invention can be placed very easily by the operator but at the same time have extreme positional stability even if they are subjected to considerable and intense loading and unloading cycles of the corresponding shelf.

The present invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

The materials and the dimensions may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A shelf, particularly for metal sets of shelves of the type produced by cutting and plastic deformation from metal plate, said shelf being characterized in that each one of the edge regions of at least two mutually opposite reinforcement sides is shaped so as to form three longitudinal parallel folds, forming a structural reinforcement having a triangular cross-section and in which one side is parallel to said shelf, a fourth fold of the free end of each one of said two edge regions forming an edge flap that abuts against the lower surface of said shelf.

2. A shelf according to claim 1, characterized in that it comprises two sides that are complementary to said reinforcement sides and are C-shaped with their concavity directed inwards, each one of said complementary sides having a corresponding edge flap in which means are formed for anchoring to a corresponding said structural reinforcement.

3. A shelf according to claim 2, characterized in that said anchoring means comprise, at one of the ends of the edge flaps of said complementary sides, a tab that is formed by cutting said edge flap and is deformed, upon assembly, so as to enter a through hole formed in the flap of said structural reinforcement that is parallel to said shelf and provide a locking action.

4. A shelf according to claim 1, characterized in that each one of said structural reinforcements comprises a flap lying at right angles to said shelf and a flap that is diagonal to said shelf, said diagonal flap ending at the inner part of the fold that forms said plane that is perpendicular to said shelf.

5. A shelf according to claim 2, characterized in that it comprises auxiliary reinforcement means.

6. A shelf according to claim 5, characterized in that said auxiliary reinforcement means comprise at least one longitudinal supporting element having a cross-section that is shaped like an isosceles trapezoid and is open at the shorter parallel side, which upon assembly is in contact with the lower surface of said shelf, said at least one supporting element having its ends inserted in, and supported by, said complementary sides.

7. A shelf according to claim 6, characterized in that said at least one supporting element comprises, at each one of its ends, and at the surface corresponding to the longer parallel side, a seat formed by plastic deformation and in which a corresponding stud, formed by plastic deformation in the corresponding edge flap of a corresponding complementary side, fits upon assembly.

8. A shelf according to claim 6, characterized in that the longitudinal opening of said shorter parallel side has curled edges so as to form two opposite and substantially parallel flaps that are directed towards the inside of said at least one supporting element.

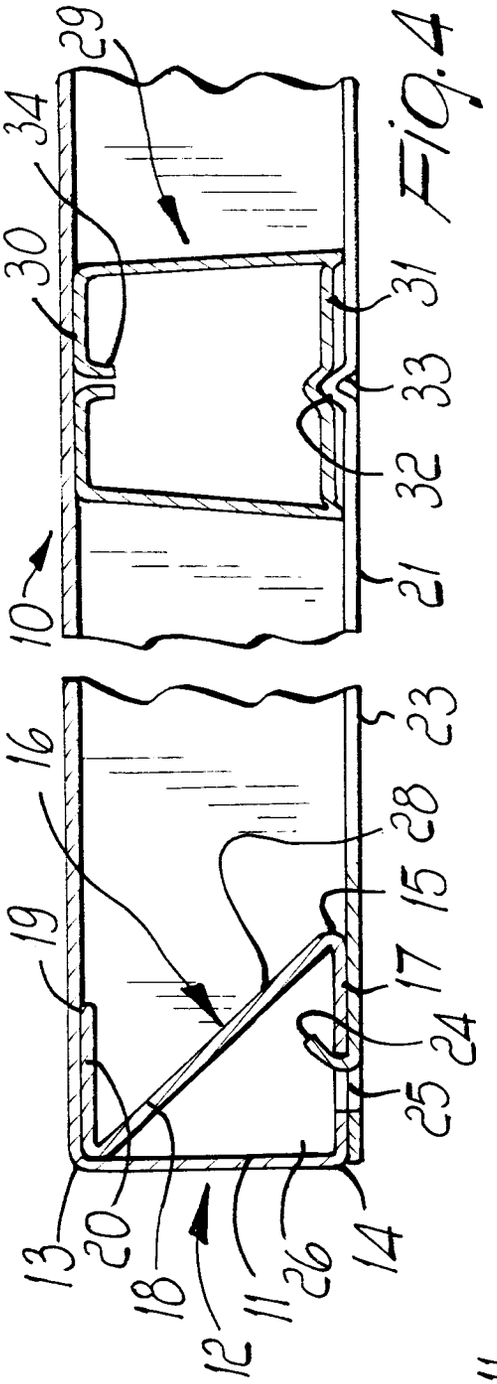

Fig.4

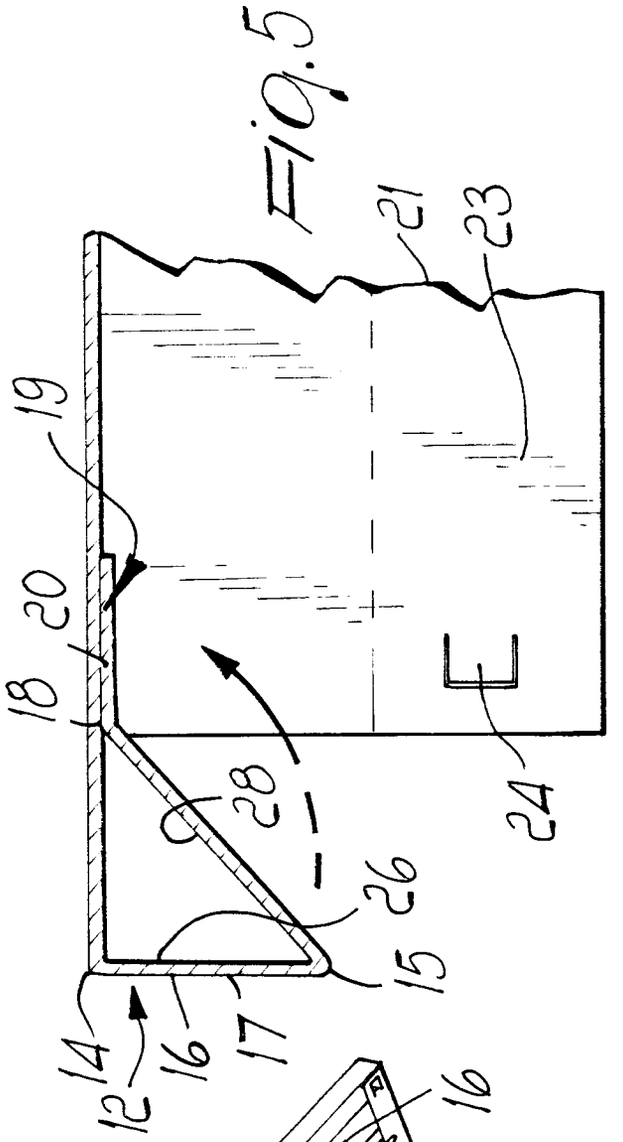

Fig.5

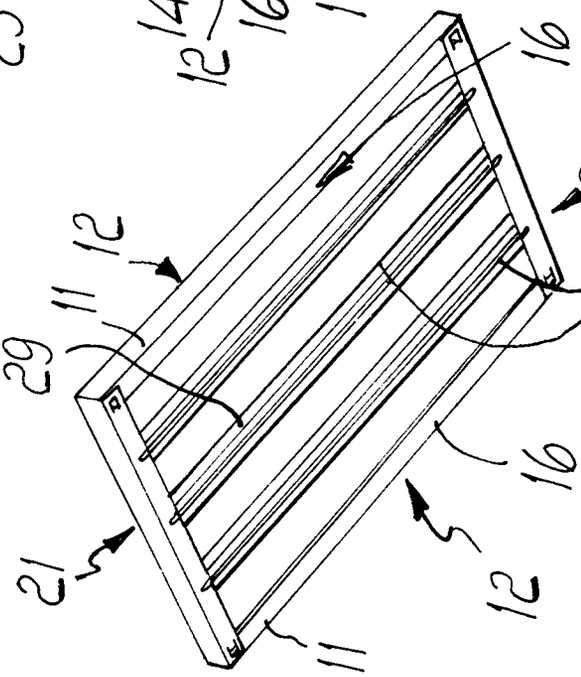

Fig.1

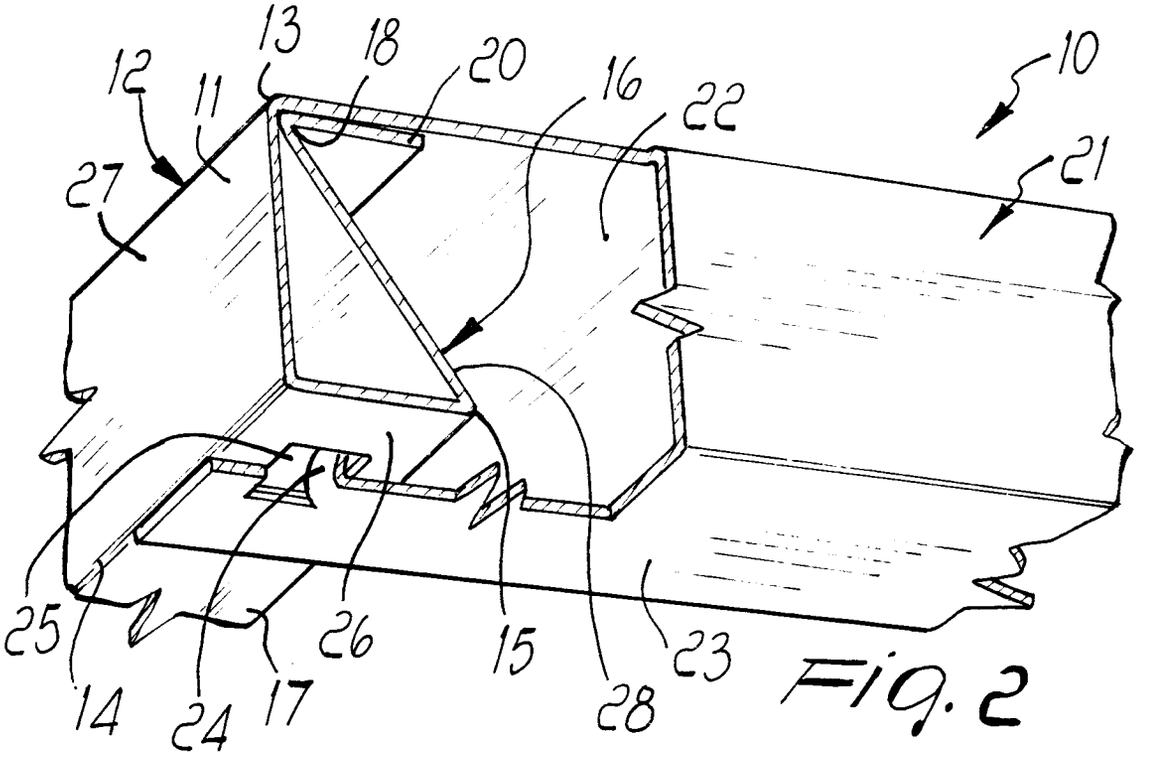
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FIG. 2

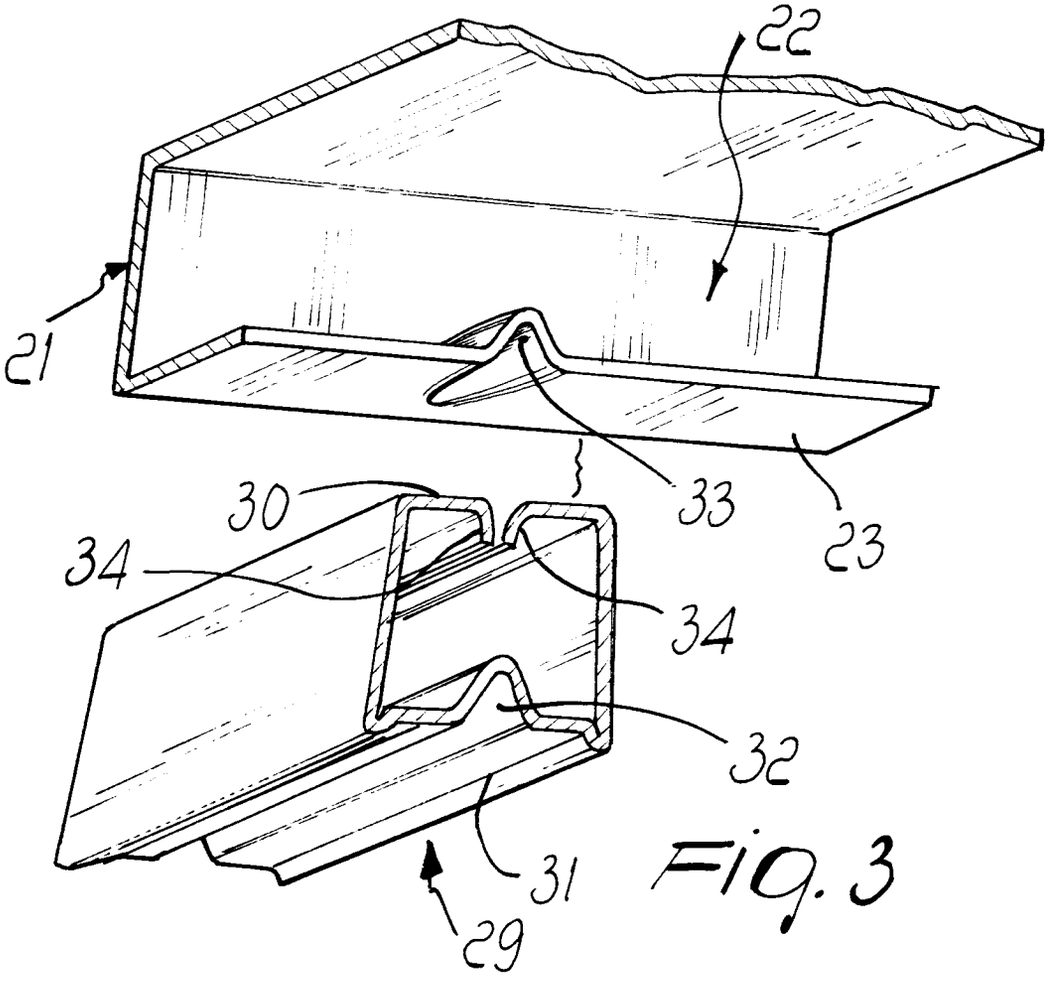
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FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 3830

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.6)
Y A	BE-A-781 831 (FRITZ SCHÄFER G.M.B.H.) * claims 1,2; figures 1-3 *	1,2,4,5 6	A47B96/02
Y	DE-U-295 01 559 (BLUM, MARTIN) * claims 1,2; figure 2 *	1,2,4,5	
A	DE-U-93 07 955 (FRIEDRICH FREUND GMBH) * claim 1; figures 1-3 * * page 3, last paragraph - page 4, paragraph 1 *	1	
A	US-A-3 643 607 (MACKENZIE) * abstract; figures 1,2 *	6,8	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 December 1996	Jones, C

CATEGORY OF CITED DOCUMENTS

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