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Device to reduce volume particularly in the recovery of metal cans.

(57)

Device to reduce volume, particularly in the recovery of metal cans, being made up of a hanging accessory (A), comprising an external body (1) and a niche, inside which a can to be crushed is able to be inserted, impinging upon extractable means of support and in which, guided in the said niche, a perpendicularly mobile group (10) is provided, supplied with an interchangeable punch (9), the said group (10) being movable from the exterior by means of a lever (17) and relative handle (18).

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This invention relates to a device to reduce volume, particularly in the recovery of metal cans.

The innovation finds particular even if not exclusive application in the sector of the recycling of metal, as a hanging domestic accessory, integrated in a rational environmentally friendly system, for example in the recovery of aluminium cans.

At the present state of the art there are no devices known able to fulfil this scope, but nevertheless cans as packaging are somewhat common, so much so that an indefinite quantity are thrown away daily. The cans, as is commonly known, have found wide use mainly in the supply of slightly alcoholic drinks, as for example beers, but also for the majority of non-alcoholic beverages to which carbon dioxide has also been added.

However, their wide circulation has created and is creating notable elimination problems causing evident concern not only to the most ardent environmentalists. In this regard, it is certainly true that these cans in most cases end up in the traditional rubbish dumps together with common refuse, such as daily household refuse, made up of paper and plastic material that is more or less biodegradable, food wastes, etc. But while the latter can easily be burnt in incinerators, or being buried, may in time disintegrate, cans together with other scrap metals do not disintegrate and therefore greatly contribute to environmental pollution. The necessity thus arises to provide a selection process for refuse, as far as possible, which is mainly carried out manually or with the assistance of operating machines. It is logical to expect little from such a selection process, which is mostly carried out superficially and never with particular dedication, to the detriment of a satisfactory result.

A noticeable drawback of metal cans is also due to their bulkiness, as they are cylindrical in shape and generally of two sizes, which may nevertheless be considerable in relation to other refuse, and to the normal capacity of collection in a domestic bin. The bulkiness of the can is already a sufficient motive in itself, to justify its immediate elimination, even to the detriment of good manners. So it is a daily event to see cans left everywhere or filling plastic bags to the brim to then be thrown away.

With the intention of resolving some of the problems highlighted, following the trail of recycling consortia, differentiated containers for the collection firstly of paper then of plastics and glass and finally even for cans have come into being. These however, either because of the difficult location (which, when present are outside the house, and often far away), or for the inconvenience and enormous bulkiness, are poorly diffused and therefore do not justify the existence of structures organised for this purpose. In the second place, the cans in compari-

son to their weight, and therefore of recyclable raw material, occupy a considerable volume, whereby it is not conveniently practical under an economic profile to organise an articulated recycling technique as has been carried out for other materials. Just as an example, it is sufficient to imagine how much the transportation cost of empty cans (characterised by a strongly-reduced net weight) from the collection place to the foundry would be.

Aim of the present invention is also to prevent the above-mentioned drawbacks.

This and other aims are obtained with the present innovation according to the characteristics of the included claims, resolving the problems displayed by means of a device to reduce volume, particularly in the recovery of metal cans, made up of a hanging accessory, comprising an external body and a niche, on the inside of which a can to be crushed is able to be inserted, impinging on an extractable support means and in which, guided in the said niche, a perpendicularly mobile group is provided, supplied with an interchangeable punch, the said group being movable from the outside by means of a lever and relative handle.

In such a way, through the notable creative contribution, the effect of which provides an immediate technical progress, different advantages are achieved, but above all the possibility to considerably reduce the volume of the cans. In such a case the recovery is certainly made easier, on one hand by being able to collect a large number of cans in the refuse bins, and on the other by being able to achieve easily a more complex recovery programme to safeguard the environment. In fact, while previously the required volume was an obstacle in the execution of a similar idea, this idea now becomes easily feasible, transportation costs being decidedly less regarding the net weight of the transported cans. Collection bins furthermore can be reduced in size, which allows a better distribution on the territory and a greater accessibility for the user. The matchless commodity of the device is such as to consent an easy placement, since it may be fixed to the wall at man height in different places and is not cumbersome.

These and other advantages will appear from the subsequent specified description of preferential solutions realized with the help of the schematic diagrams included, the particulars of which are not to be considered limiting but only illustrative.

Figure 1 represents a side view of a can-crushing device able to be anchored to a wall.

Figure 2 represents a longitudinal sectional view of the can-crushing device according to Figure 1., taken along the A-A axis.

Figure 3 represents a longitudinal sectional view, rotated at 90° with respect to the previous one, of the can-crushing device according to Figure

1., taken along the B-B axis of Figure 2.

Figure 4 represents an aerial cross sectional view of the can-crushing device according to Figure 1, taken along the C-C axis of Figure 3.

Finally, Figure 5 represents a cross sectional view of the can-crushing device according to Figure 1, taken along the D-D axis of Figure 3.

Referring to the figures it is revealed that a crushing device, particularly for metal cans, is made up of a hanging structure (A), which is able to be anchored to the wall by means of traditional screws. In more detail, a body (1) is provided which acts as an external wrap, essentially parallelepiped in shape, and that peripherally embeds itself in an underlying support frame (2) of the device (A). The body (1), boxed, is provided respectively with a frontal part, which has a protecting door (3) able to be raised, two parallel facing flanks (1') as well as a cover and a base (1''). In such case the body (1) is deprived of a back, allowing the vertical edge to come almost in contact with the wall. As far as the support frame (2) of the device (A) is concerned, it is contained inside the body (1), and is also made from a box-like structure, comprising vice versa a back (2') (in contact with the wall), two flanks being parallel and opposite (2''), as well as a base and an upper part. The back (2') is provided both above, as well as further down, with a pair of appendices (2''') per side, conveniently drilled, which constitute anchorage stirrups of the frame (2) to the wall. The base of the frame (2), is provided, on the inside, with a dovetailed guide (4) for the extraction of a drawer (5), analogously shaped in negative, at the end of which and underneath, a hollow (5') is dug out which allows the formation of a handgrip for extraction. The drawer (5) is provided with an elastic recoil action, carried out by means of an helical spring (6) hooked with its ends, on one side, to a swivel (5'') that rises perpendicularly and backwardly from the drawer, on the other to an integral base point of the frame (2). The conformation of the extractable drawer (5) is such as to provide, on the upper part, the realization of a place to hold the base of the can, the said place being made from two containment edges, a first external semicircular edge (7) and a second internal circular edge (7') less pronounced than the external one, defining between the two an annular place (7'') able to contain the edge of a can.

On the inside of the structure, in the niche so obtained, and above the drawer (5), a mobile group (10) is provided which comprises a punch (9), the conformation of which forms an annular edge (9'), that centrally encloses a rounded asperity (9''), that protrudes beyond the defined edge itself. The punch (9) is fixed to the base of the mobile group (10), that may be made of a plastic material suffi-

ciently rigid to amortize the compression, by means of a screw, or other equivalent means (11), the function of which consists in making the punch (9) interchangeable depending on the shape of the can to be crushed. Along the sides (2'') of the frame (2), slides (12) are provided which consent the striking and guiding of a corresponding rack beam (13), per side, integral to the mobile group (10). In such a case, the rack beams (13), during the downward movement of the mobile group (10), exit from the underside of the structure (A), little openings (14) being made on the base of the frame (2) for this purpose. In more detail, the rack beams (13) are moved by a pair of corresponding toothed wheels (20) keyed to a first transverse shaft (16'). Immediately beneath this, second wheels (15), that couple to the said first wheels, are analogously keyed to a transverse shaft (16), the ends of which extrude from both sides of the body (1). On the ends of the said shaft (16) that extrude from the frame (2), a further pair of toothed wheels (8) are keyed externally, which are forced to rotate in counter-position to the former. On the outside of the body (1), two levers (17) are engaged, respectively one per side and pivoted anteriorly with respect to the position of the shaft (16), by means of sealing screws that also engage the corresponding slide (13). Said levers (17), with the device in the rest position, extend vertically in an upward direction, beyond the body (1), to be joined across the top by a transverse handle (18). On the opposite end, or in connection with the fulcrum of the body (1), they are of a circular shape that is provided peripherally with teeth (17') which impinge on the corresponding toothed wheel (8) keyed to the shaft (16). Finally the connection of the levers (17) to the frame is concealed by means of casings (19) that cover the mechanism and that are held in position by recognised means.

To allow the can-crushing device (A) to function, it will therefore be sufficient to firstly raise the door (3), extract the drawer (5), place the base of the can on the suitable references (7, 7') and release the drawer followed by the door. At this point with just one hand one will grasp the handle (18) which operates the levers (17), to pull it towards oneself, and complete a rotation of the shaft (16) by means of the transmission (17', 8). As it has toothed wheels (15), these will transmit the movement to a couple of corresponding toothed wheels (20) keyed to an transverse shaft (16') placed above and thus moving the vertical rack beams (16), integral to the mobile group (10) for the descent and return of the relative punch (9). Finally, an elastic recoil group could be provided operating on the inside of the shaft and/or co-operating with the levers and the external recoils, to allow the resetting of the device in the original

rest position.

Also not excluded, in a further preferential solution, is the electric activation of said device by means of a small motor placed on the inside of the apparatus, and in particular acting on the toothed wheels of conversion of the rotation movement in a vertical motion for the descent and return of the punch or equivalent can-crushing (g) means .

Claims

1. Device to reduce volume, particularly in the recovery of metal cans, characterized by the fact that it comprises an external body and a niche, on the inside of which a can to be crushed is able to be inserted, impinging on an extractable support means and in which, guided in said niche, a perpendicularly mobile group is provided, supplied with an interchangeable punch, the said group being movable from the outside by means of a lever with relative handle.
2. Device according to claim 1., characterized by the fact that it consists of:
 - a shell acting as an external body (1), essentially parallelepiped, associable to an underlying support frame (2) of the device (A);
 - a support frame, comprising a back, two parallel and opposite flanks, as well as at least one support base for the can;
 - a means able to compress the can, the said means being movable perpendicularly with respect to the support base for the can;
 - and a movement group for the means that is mobile perpendicularly with respect to the support base for the can, the said group, comprising at least one lever operable manually that transmits the rotary motion to a conversion means of the said motion, into the vertical.
3. Device according to claims 1. and 2., characterized by the fact that a means able to compress the can constitutes a punch (9), removable, being fixed to the base of the mobile group (10), and by rack beams (13), of which there is at least one per side that are integral to said mobile group (10).
4. Device according to preceding claims, characterized by the fact that the rack beams (13) are guided along the sides of the frame (2), impinging upon corresponding slides (12).
5. Device according to preceding claims, characterized by the fact that there are small openings (14) on the base of the frame (2), corresponding with the rack beams (13) above.
6. Device according to preceding claims, characterized by the fact that the rack beams (13) are moved by a pair of corresponding toothed wheels (20) keyed to a first transverse shaft (16'), and immediately beneath which, second wheels (15) are provided that couple to the said first wheels, keyed to a transverse shaft (16), on whose ends, each of which extrudes from the sides of the body (1), external transmissions of the movement are provided, impressed to the same by means of levers (17) connected to the frame (2) in an adjacent position.
7. Device according to claim 6., characterized by the fact that on the ends of said shaft (16) that extrude from the frame (2), a second pair of toothed wheels (8) are keyed externally to the first, engaged with teeth (17') provided by the lever (17).
8. Device according to preceding claims, characterized by the fact that externally to the body (1), two levers (17) are engaged joined by a transverse handle (18), respectively one on each side and connected to the frame (2) anteriorly with regard to the position of the shaft (16).
9. Device according to claims 7 and 8, characterized by the fact that the levers (17), in correspondence with their attachment to the body (1), have a circular shape peripherally provided with teeth (17') which impinge on the respective toothed wheels (8) keyed to the shaft (16) .
10. Device according to preceding claims, characterized by the fact that the base of the frame (2), is provided on the inside with a guide (4) for the extraction of a drawer (5) analogously shaped in negative, on the end of which a hollow (5') is obtained, the said drawer (5) being supplied with an elastic recoil.
11. Device according to preceding claims, characterized by the fact that, on its upper side, the extractable drawer (5) provides a place for containing the base of the can, the said place being made up of two containing edges, a first external semicircular edge (7) and a second circular edge (7'), internal and less pronounced than the external one, defining between the two an annular place (7'').

12. Device according to preceding claims, characterized by the fact that an elastic recoil group is provided, operating on the inside of the shaft and/or co-operating with the levers and the external recoils, allowing the resetting of the device in the rest position. 5

13. Hanging device according to preceding claims, characterized by the fact that the back (2') of the frame (2) is provided both above, as well as below, with a pair of appendices (2''') per side, conveniently drilled, which constitute anchorage stirrups of the wall frame (2). 10

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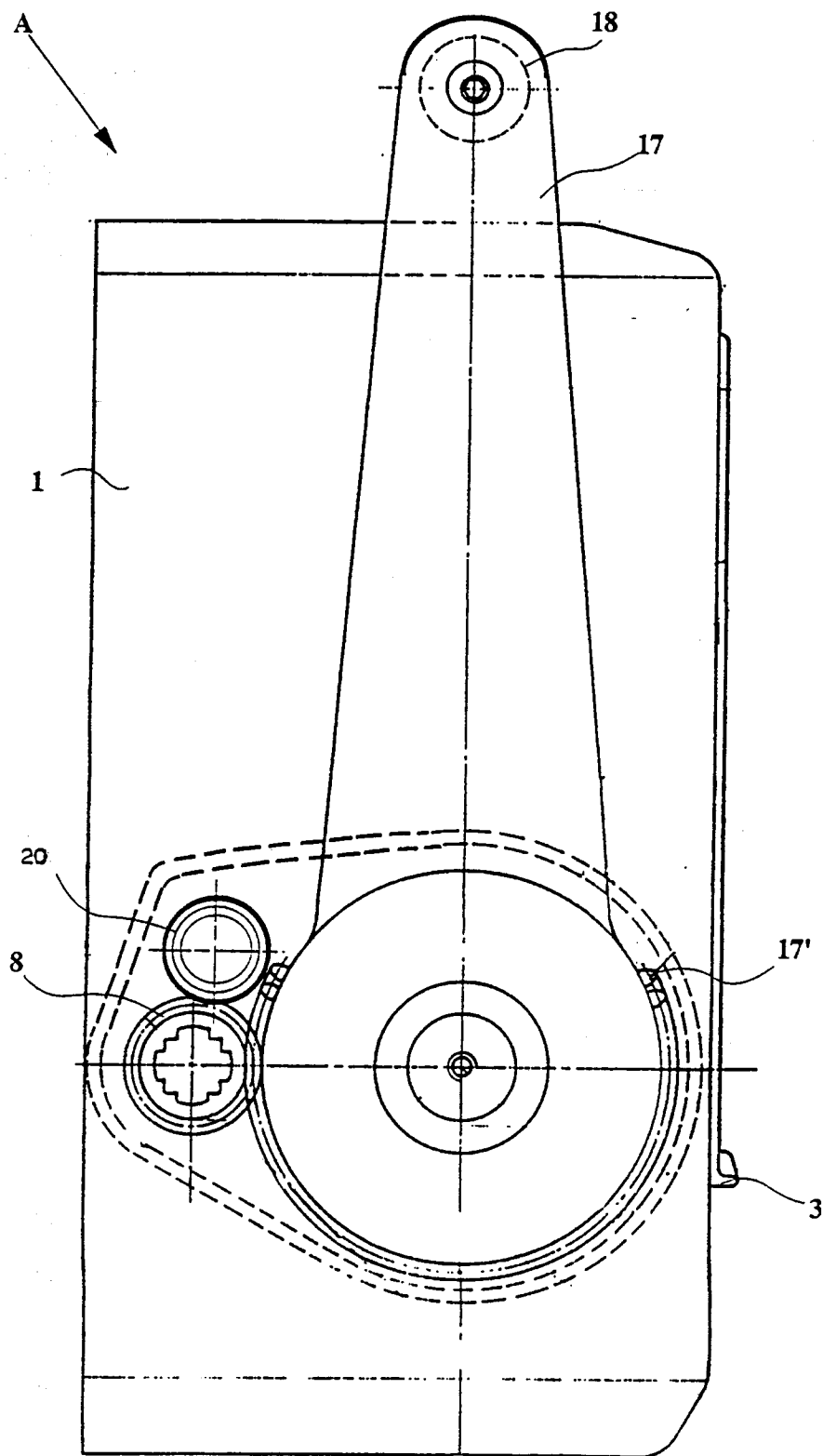


Fig. 1

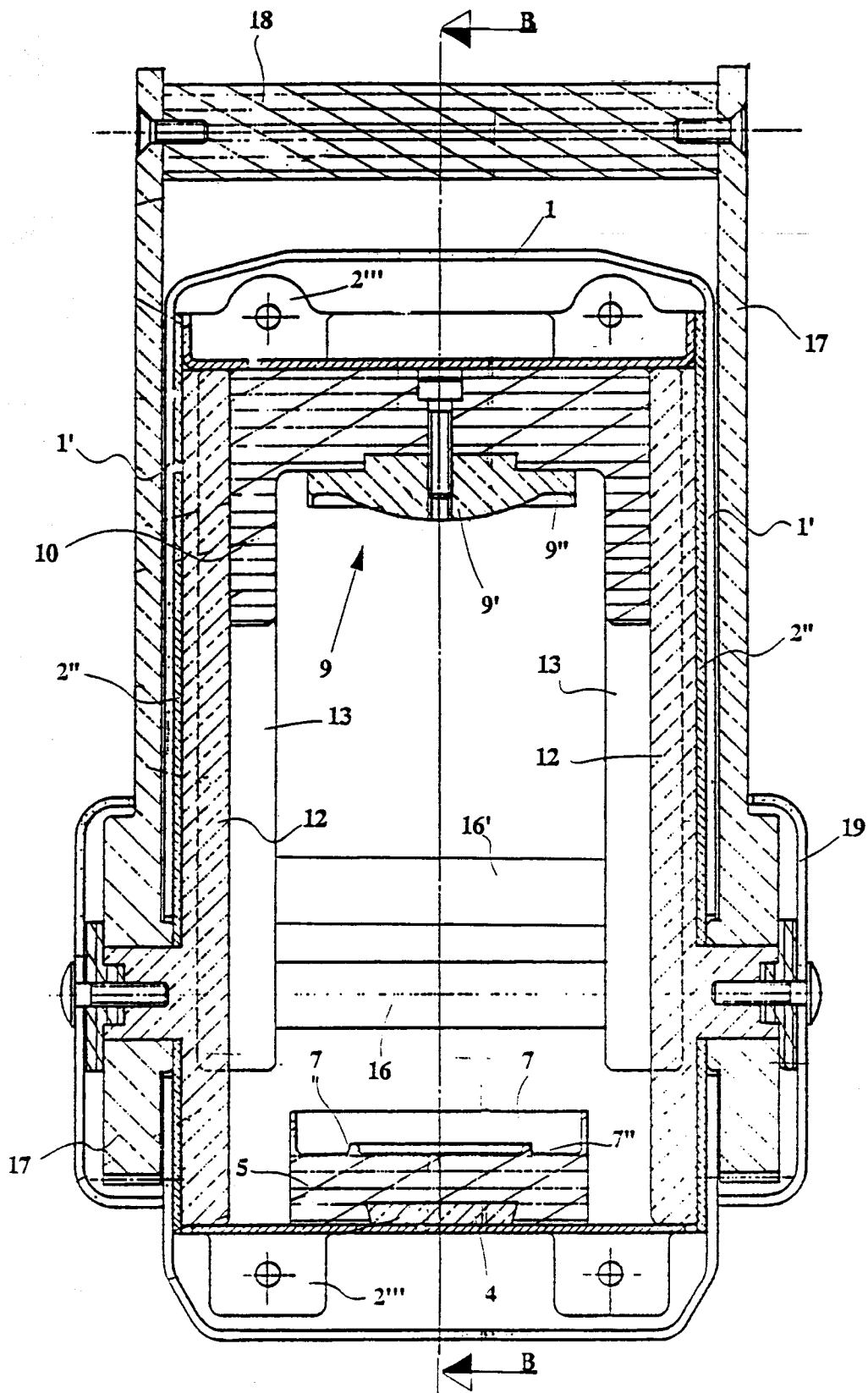


Fig. 2

SECTION B-B

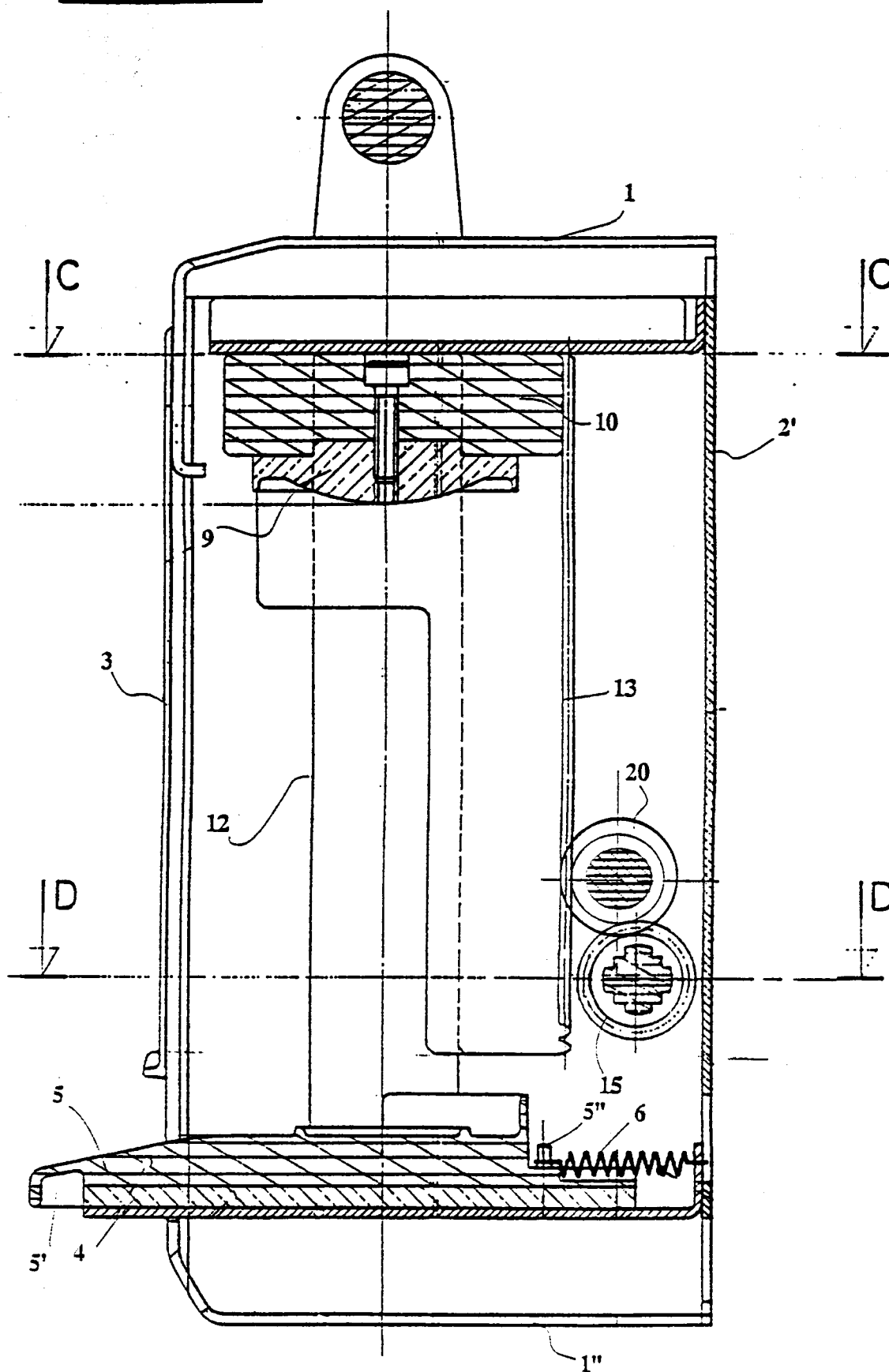
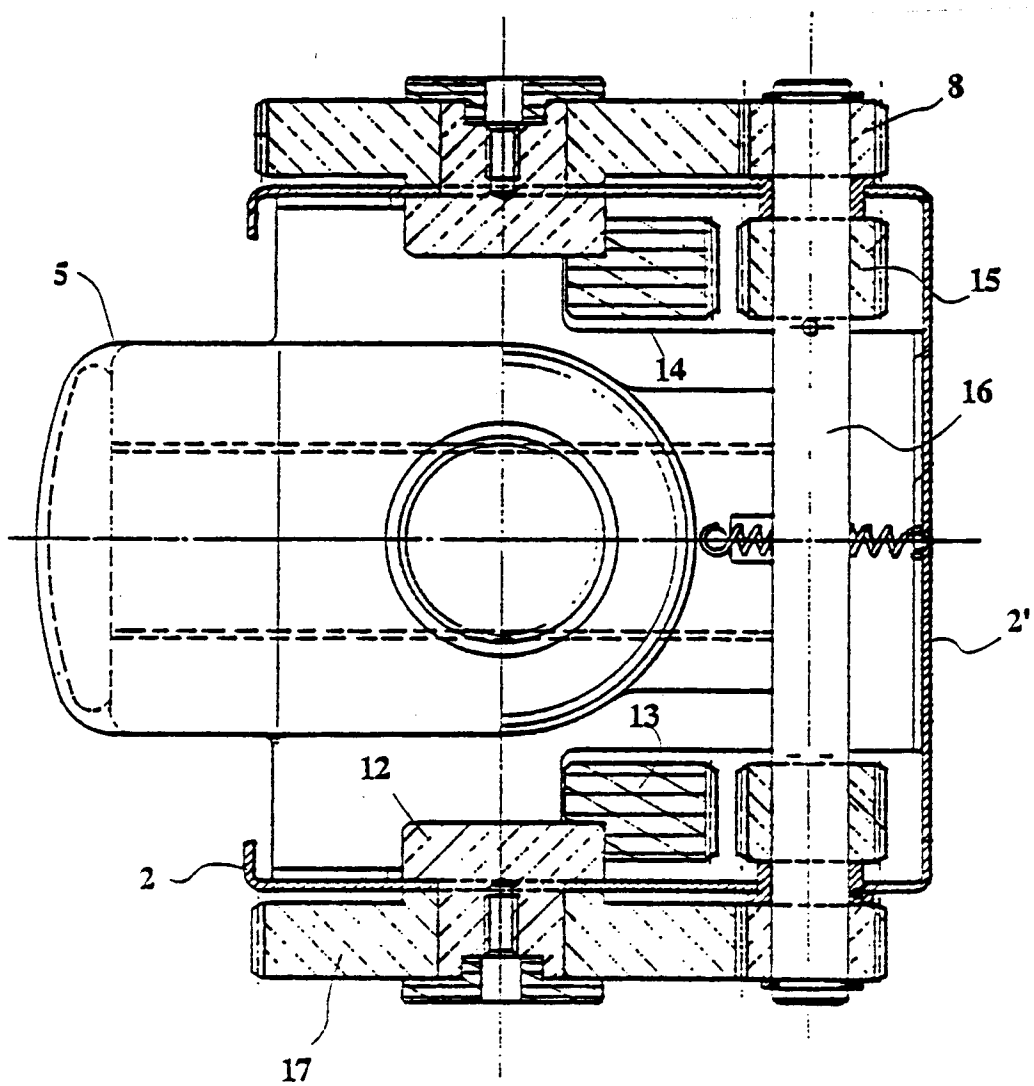
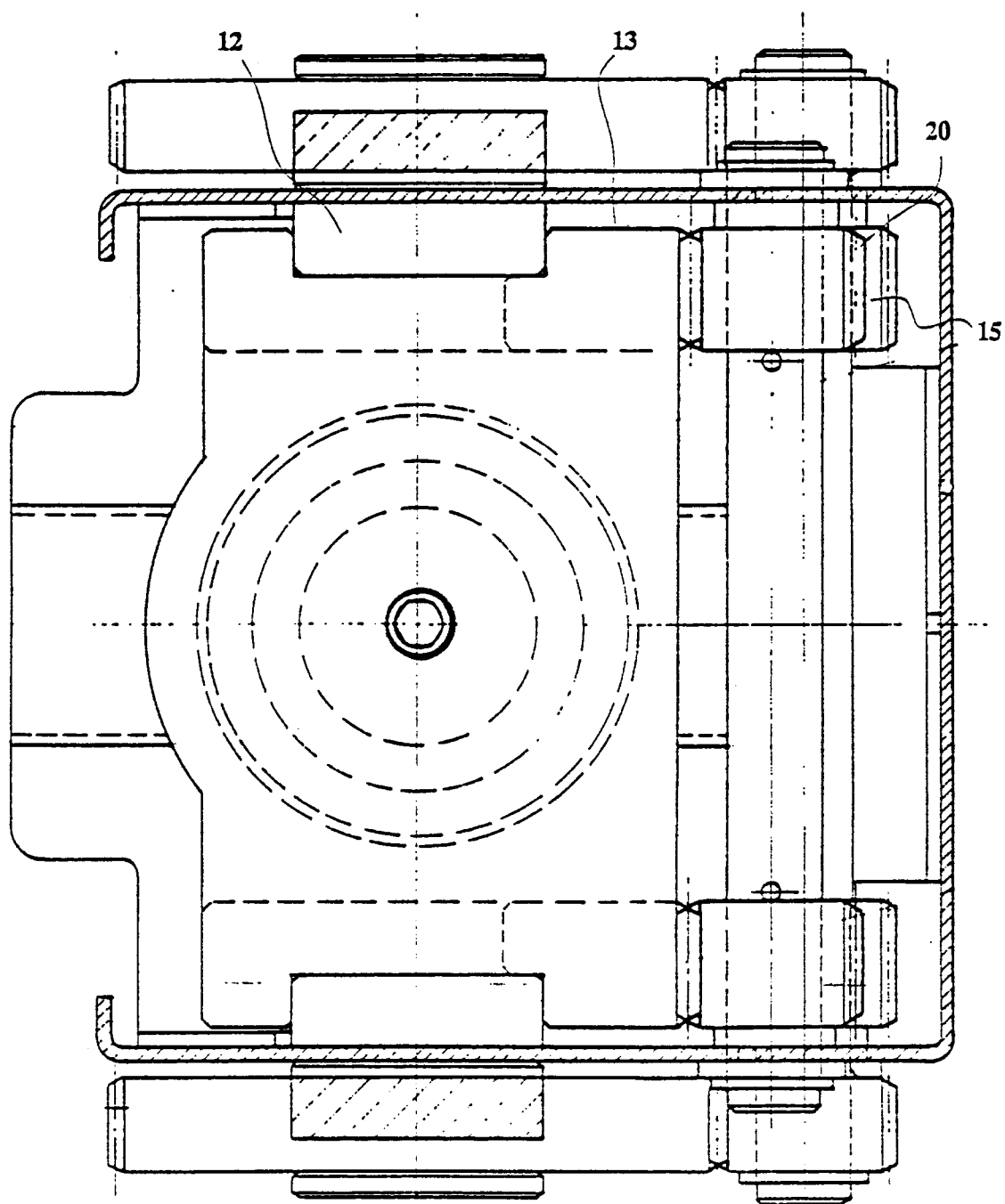


Fig. 3



SECTION D-D



SECTION C - C

Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 5205

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)
Y	GB-A-2 245 208 (CLOUD 10 LTD) * the whole document * ---	1,3,11, 12	B30B9/32
Y	US-A-5 109 763 (MORRIS ET AL.) * column 4, line 53 - column 6, line 6; figures * ---	1,3,11, 12	
A	AU-B-455 972 (SCHEUFENS) * the whole document * ---	1-3,10	
A	US-A-5 058 498 (CHEN) * abstract; figures * ---	1,2,4, 6-9,13	
A	US-A-4 334 469 (TANNER ET AL.) * figures * ---	1,6-9	
A	US-A-4 599 941 (JOHNSON ET AL.) * abstract; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B30B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 June 1994	Examiner Voutsadopoulos, K
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 I : document cited for other reasons & : member of the same patent family, corresponding document			