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(54) **A hand-operated device for shredding documents and waste paper basket equipped with the same**

(57) The device comprises a pair of rollers (46a, 46b) with cooperating blades, integral with a pair of gears to actuate rotation thereof which are supported between a rest condition, in which they are held apart from a gear actuating means, and a work condition, in which at least one gear engages a fixed actuation means, generally consisting of a rack (23), and runs thereon. A funnel-shaped part (42) to receive the document to be shredded is mounted integrally with the blade rollers, above them. Once the document to be shredded has been introduced into the funnel, manual pressure applied to the blade-bearing frame (40) moves the blade rollers, which engage the rack causing a rotating movement in opposite directions of the blades, which thus shred the document. Release of the manual pressure on the blade frame allows the resting state to be restored under the action of elastic means (50, 52).

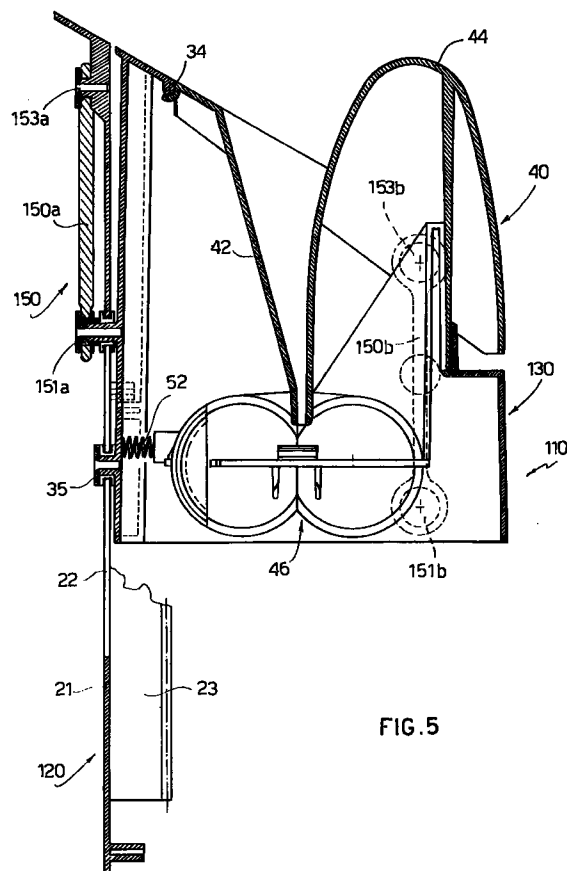


FIG. 5

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Description

[0001] The invention refers to shredding devices for destroying documents by reducing them to small strips or fragments, so as to make reconstruction difficult or impossible.

[0002] These devices, also known in the field as shredders, generally comprise two cooperating rollers rotating in opposite directions and equipped with peripheral blades. A sheet of paper interposed between these rollers is cut into thin portions or strips that exit downstream of the blades.

[0003] The document-destroying devices known thus far comprise a motor, generally an electric motor, as the actuation means for the shafts of the blade-carrying rollers rotating in opposite directions. The motor means is activated by a pushbutton, or automatically by introduction of a sheet.

[0004] Although operation of such devices is excellent and well-tryed, it is clear that they require a power source and have a certain production cost.

[0005] The object of this invention is to create a manually operated document-destroying device.

[0006] A further object is to create such a device that can be produced at low cost and substantially reduces both investment costs and running costs.

[0007] A further object is to create such a device that can be easily moved from one position to another, that is safe, easy to use and efficient, so that it can be used both in the office and in the home.

[0008] These objects have been achieved with a device as stated in claim 1.

[0009] Further new and desirable features are stated in the subsequent claims. A waste container equipped with said device also forms the subject-matter of the application.

[0010] The new device comprises a first assembly and a second assembly, one of which is movable with respect to the other. The first assembly is preferably fixed or stationary and carries a first blade actuation means, and the second is movable and carries blades rotatable in opposite directions and a second actuation means thereof that can engage with said first means, and preferably a guide for the document to be destroyed. Movement of the movable assembly against the fixed assembly and along it causes the first and second actuation means to engage with each other and thus sets the blades in rotation in opposite directions, whilst return of the movable assembly to a rest condition is obtained automatically, for example with elastic means and/or guide means.

[0011] The new device, though operating excellently, does not require external power sources, since it is operated by lowering a handle manually; it can be made of molded plastic and therefore has a limited production cost; it is durable and strong, and can be adapted to various situations and environments. The waste container equipped with the device, besides holding the advan-

tage of a convenient use of said device, allows the waste paper to be compressed and, in a variant, permits separate collection of waste by means of a removable bag.

[0012] Unrestrictive exemplary embodiments of the invention will be described below, with reference to the attached figures, in which:

Figure 1 is a side view of a first embodiment of the device of the invention incorporated in a waste container;

Figure 2 is a front view, from the right with respect to Figure 1;

Figure 3 is a vertical sectional view taken along 3-3 of Figure 4, enlarged with respect to the preceding figures, with a rack of the stationary assembly shown interrupted;

Figure 4 is a cross sectional view taken along 4-4 of Figure 3, interrupted, with a shell of the movable assembly partially removed to show the rollers beneath, which are partially shown in a sectional view taken along an axial plane;

Figure 5 is a vertical sectional view taken on a plane corresponding to that of Figure 3, of a currently preferred embodiment of the invention;

Figure 6 is a side elevation of the embodiment of Figure 5.

[0013] It should be noted that in the following description the words "vertical", "horizontal" and the like are used with reference to the embodiment described and are not to be understood as limiting. The words "fixed" or "stationary" assembly and "movable" assembly are also used with reference to the embodiment described, but it is understood that each assembly can be movable with respect to the other assembly which is kept fixed or stationary.

[0014] With reference first to Figures 3 and 4, the device of the invention is indicated as a whole with reference numeral 10 and substantially comprises a fixed assembly 20 and a movable assembly 28 comprising a sliding frame 30 and an oscillating frame 40.

[0015] The fixed or stationary assembly comprises a vertical wall 21 provided with a guide slot extending prevalently vertically, 22. From the wall 21 there extend vertical rack means, indicated as a whole by 23, generally in the form of two rack portions 23', 23" (Figure 4) spaced apart from each other and parallel. Further guide slots 22' can be provided spaced apart from the slot 22 on the wall 20; wall 20 can have a flat shape or be U-shaped in a plan view.

[0016] The sliding frame 30 is generally (but not necessarily) vertically sliding, and essentially comprises a wall 31 that defines an inner chamber 32 and has a slanting collar part 33 at the top; in the upper part, on the left in Figure 3, this forms a pivot 34 that defines a horizontal axis x. From the wall 31 there protrude one or more pins 35 slidably received for guiding engagement

in the slot or slots 22. An elastic return means 50 supports the vertically sliding frame 30 to its resting position, shown in Figure 3. The elastic return means 50, in the exemplary embodiment, has been conceived as a bar of elastic rubber or rubber-like material, constrained at the ends (not shown) in the fixed frame. The sliding frame 30 rests on said bar and is held thereon with a lower edge thereof. The sliding frame 30 can be made in one piece or in two pieces constrained to each other.

[0017] The oscillating frame 40 is made with a horizontally extending funnel-shaped structure 42, which ends with a lower mouth 42' in the form of an elongated slot. The funnel-shaped structure 42 ends on one side with an appendix 43 hinged on pivot 34 and on the other side has a curved operating handgrip or handle part, indicated by reference numeral 44. The oscillating frame carries, by means of the bracket 45, a pair of blade rollers rotating in opposite directions, indicated as a whole by 46 and respectively by 46a, 46b, enclosed in a shell 47 formed by upper and lower half-shells 47', 47". The rollers 46a, 46b rotating in opposite directions have respective horizontal axes a, b, and peripheral cooperating blades referenced 48a, 48b. At the ends, said rollers have sprocket wheel parts respectively referenced 49'a, 49"a (on roller 46a) and 49'b, 49"b (on roller 46b) the teeth of which mesh with each other and with the teeth of the aforementioned racks 23', 23". Between the sliding frame 30 and the oscillating frame 40 is interposed an elastic return means, in the form of a steel spiral spring 52, applied to the shell 47, which presses the oscillating frame toward the resting position, with the sprocket wheels disengaged from the rack.

[0018] The fixed frame 20 can be a wall of a waste basket, or it can be a rigid panel to which a waste bag can be connected.

[0019] Operation of the device will be explained briefly below.

[0020] In at a rest condition, which is shown with a continuous line in Figure 3, the sliding frame 30 is in its uppermost position and the oscillating frame is in its furthest position from the wall 31 of the frame 30. The sprocket wheels 49'a, 49"a are spaced from the sections 23', 23" of the rack. When a sheet document is to be destroyed, the sheet or pack of sheets is introduced into the funnel or hopper 42, the mouth of which 42' is in proximity to the engagement part between the rollers 46a, 46b which rotate in opposite directions. The maneuvering part 44 is then pressed, generally with a vertical or subvertical force F. The applied force causes an oscillation of the oscillating frame 40 around pivot 34 - x axis - through a small angle (clockwise in Figure 3) until the edge 44" of the wall 44 is engaged against an opposite edge (not visible) of the vertically sliding frame 30. The oscillation of the oscillating frame in a clockwise direction in Figure 3 then moves the rollers rotating in opposite directions slightly towards the left in said figure (position shown in dash-dot lines in Figure 3) against the action of the spring 52, so that the teeth of the gears

49'a and 49"a are on the vertical of the teeth of the rack 23. Continued application of the force F causes vertical lowering of the sliding frame 30 (and of the oscillating frame therein in an angled position) vertically along the wall 21 (arrow V), under the guidance of the reciprocal engagement of the pins 35 and the slots 22. This lowering engages the gear teeth 49'a and 49"a and the teeth of the racks 23', 23" with one another, and then the movement along the racks causes rotation of the roller 46a around the axis a (clockwise in Figure 3) and anti-clockwise rotation of 46b around the axis b. This causes the sheet to be destroyed to be drawn between the blades and shredded between them, exiting beneath into a collection chamber.

[0021] When application of the force F on the balancing frame is released, the combined action of the spring 52 and of the elastic element 50 returns the oscillating frame 40 and the blade rollers contained therein to rest condition spaced from the rack 23 and returns the sliding frame 30 and the oscillating frame therein to the raised position, without the return stroke causing reciprocal engagement of the teeth of the rack 23 and the gear teeth of the roller 46a. The return stroke, therefore, does not perform any cutting or transportation of the sheet material.

[0022] In a second currently preferred embodiment, shown in Figures 5 and 6, shredder device, referenced 110, is incorporated in a wastepaper basket 100. The parts of the device 110 that are similar to the corresponding parts of the device 10 bear the same reference numerals and will not be described in detail. The device 110 substantially differs from the preceding one in that the elastic return means 150 comprises one or more portions of elastic material 150a, 150b, external to the wall 21, and each extending between a pin 151a (respectively 151b etc.) integral with the sliding frame 130, and a pin 153a (respectively 153b etc.), integral with the wall 21 of the first assembly or fixed assembly 20. The pins 151a and 151b preferably slide within the guide slots 22 provided for the pins 35.

[0023] The pins 35 can preferably be eliminated, since the pins 151 can have a guiding function.

[0024] The waste container 100, which also forms a subject matter of this application, incorporates the shredding device 110 (or 10) in a first section 102 thereof and comprises a second section 104 designed to receive a removable bag S (drawn in dashlines). The container 100 is fit to easy separate collection of waste, in that it collects paper in section 102 and other waste in section 104; in addition, it can contain a large amount of paper, since this occupies little space when cut. Furthermore, each time the shredder device 110 is pressed, the cut paper is compressed, increasing the capacity of the paper collection section 102.

[0025] Lastly, the container 100 can be made and packed with the two parts 102 and 104 separate, equipped with coupling means for reciprocal engagement, so as to be of limited size for storage and trans-

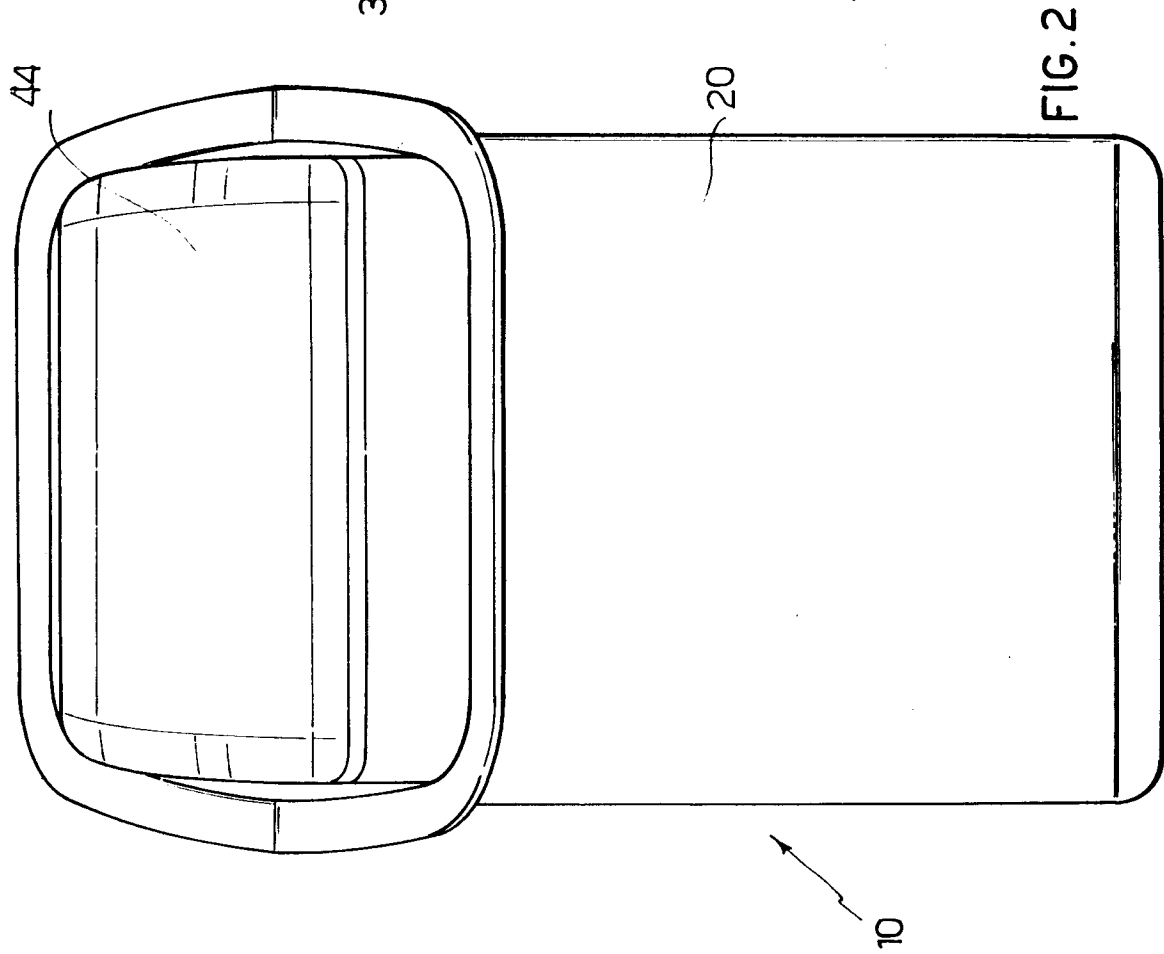
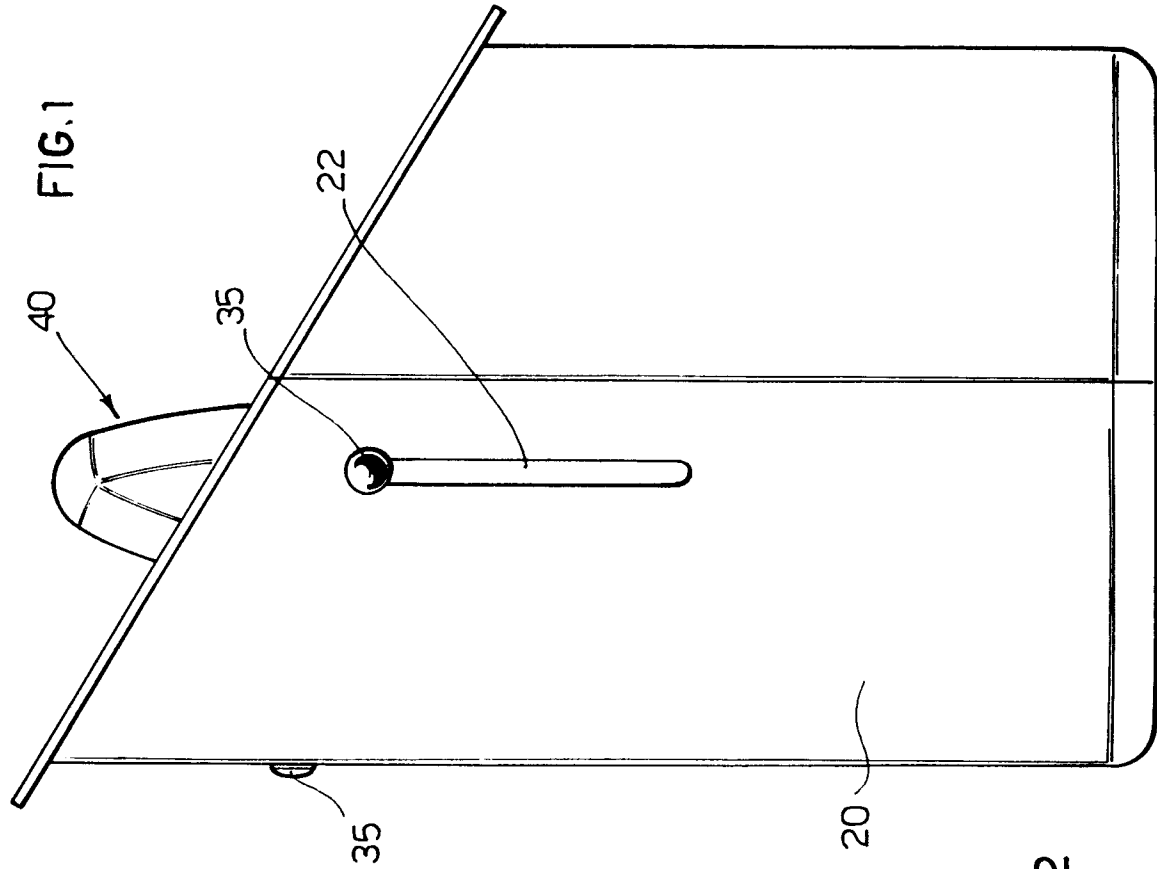
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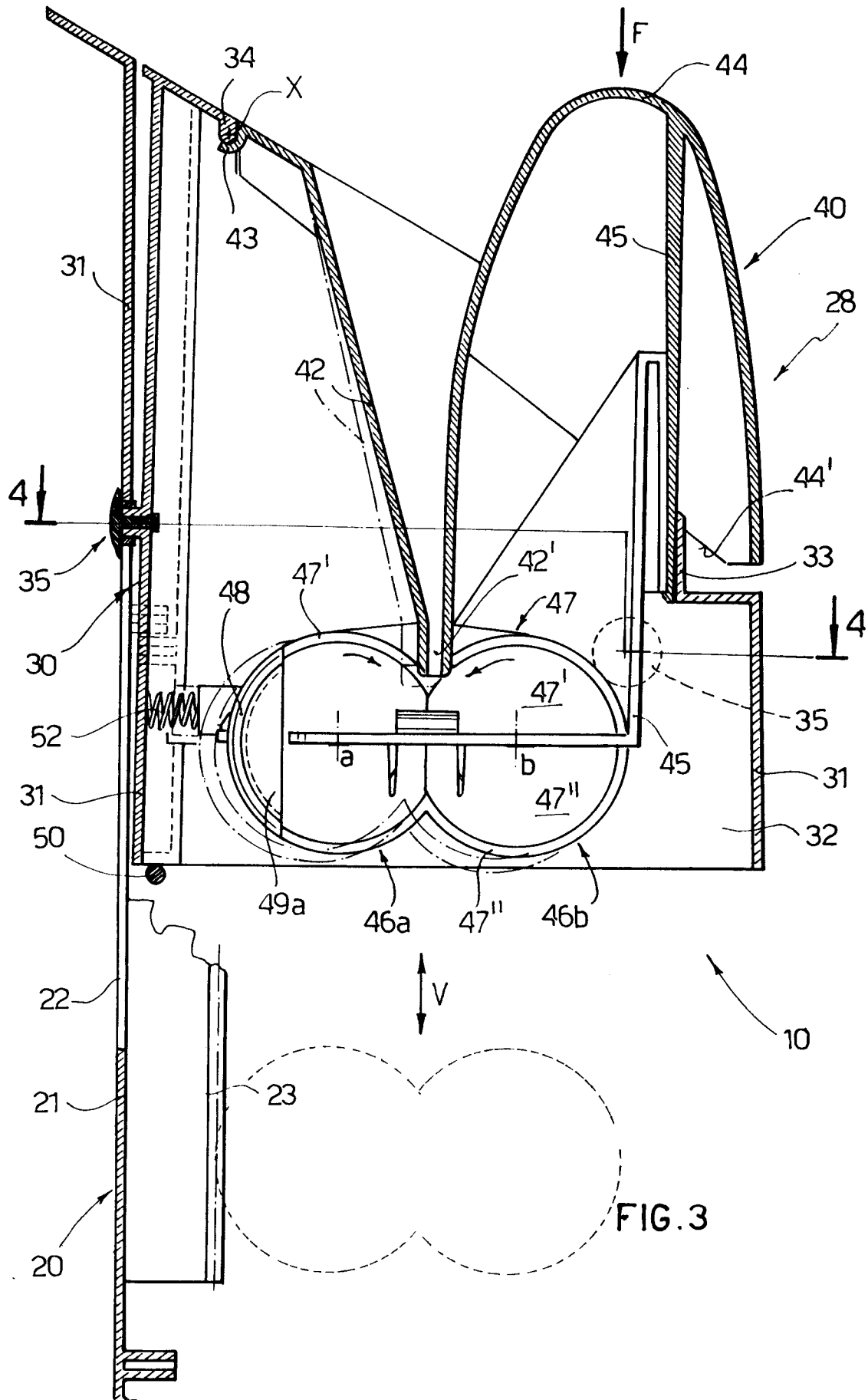
[0026] In a modified embodiment (not shown) guides with a particular shape are provided for cooperation between the oscillating frame and the fixed frame, so that the lowering or working stroke of the sliding frame-oscillating frame assembly follows a course that causes engagement between gears and rack, whilst the return or raising stroke keeps the sprocket wheels at a distance from the rack.

[0027] It can be noted that the device of the invention enables documents to be shredded without recourse to external power sources, is simple and safe to use because the cutting parts cannot be accessed accidentally, and moreover it can be produced entirely or almost entirely in molded plastic, which allows it to be produced at limited cost. The device also allows the waste to be separated and the volume of paper to be compressed.

Claims

1. A device for shredding sheet material, of a type comprising a pair of rollers rotatable in opposite directions, equipped with peripheral blades that cooperate with each other to shred sheet material interposed between them, characterized in that it comprises:
 - a first assembly (20) with first actuating means (23) for movement of the blade-carrying rollers (46);
 - a second assembly (28) with said rollers rotating in opposite directions, one of said assemblies being movable with respect to the other between at a rest condition, in which said rollers rotatable in opposite directions are not operated by the first actuation means, and a working condition, in which said rollers are operated by the first actuating means.
2. A device according to claim 1, characterized in that said first assembly (20) is stationary, and said second assembly (28) is movable, and said second assembly comprises a sliding frame (30) and an oscillating frame (40) on said sliding frame, said oscillating frame carrying said rollers (46a, 46b) rotating in opposite directions and second actuating means (49'a, 49"a) for the rollers.
3. A device according to claim 1, characterized in that said first actuation means comprise a vertical rack (23) and said second actuating means comprise circumferential teeth (49'a, 49"a, 49'b, 49"b) on said rollers rotating in opposite directions, the teeth of the rack and of the rollers being able to cooperate.
4. A device according to claim 2, characterized in that the oscillating frame (40) is hinged on a pivot (34) of the sliding frame, said pivot forming an axis parallel to the axes (a, b) of the rollers.
5. A device according to claim 2, characterized in that the oscillating frame (40) comprises a funnel part (42) to guide the sheet, with a mouth (42') tapering towards the reciprocal engagement area of the rollers.
6. A device according to claim 1, characterized in that it comprises elastic return means (50; 150) between the first assembly and the second assembly, to restore at the rest condition.
7. A device according to claims 2 and 6, characterized in that said elastic return means comprise an elastic bar (50) between the stationary assembly and the sliding frame (30).
8. A device according to claims 2 and 6, characterized in that said elastic return means comprise a plurality of elastic strips (150) extending between pins on the stationary assembly and pins on the movable assembly.
9. A device according to claim 2, characterized in that it comprises a spring return means (52) between the sliding frame (30) and the oscillating frame (40).
10. A device according to claim 1, characterized in that it comprises cooperating guide means (22, 35) on one and the other assembly, to guide the mutual movement.
11. A device according to claim 2, characterized in that it comprises guide means for the oscillating frame, to guide its course along the sliding frame.
12. A device according to claim 2, characterized in that it comprises an edge (44") of the oscillating frame that cooperates with an edge of the sliding frame to provide a limit position for the oscillation of the oscillating frame with respect to the sliding frame.
13. An apparatus according to claim 1, characterized in that the stationary assembly (20) is shaped like a wastepaper basket or part thereof.
14. A waste container comprising a device according to any one of the preceding claims and an adjacent section (104) for a different type of waste.
15. A container according to claim 14 characterized in that said two sections are separate pieces equipped with means for coupling to each other.





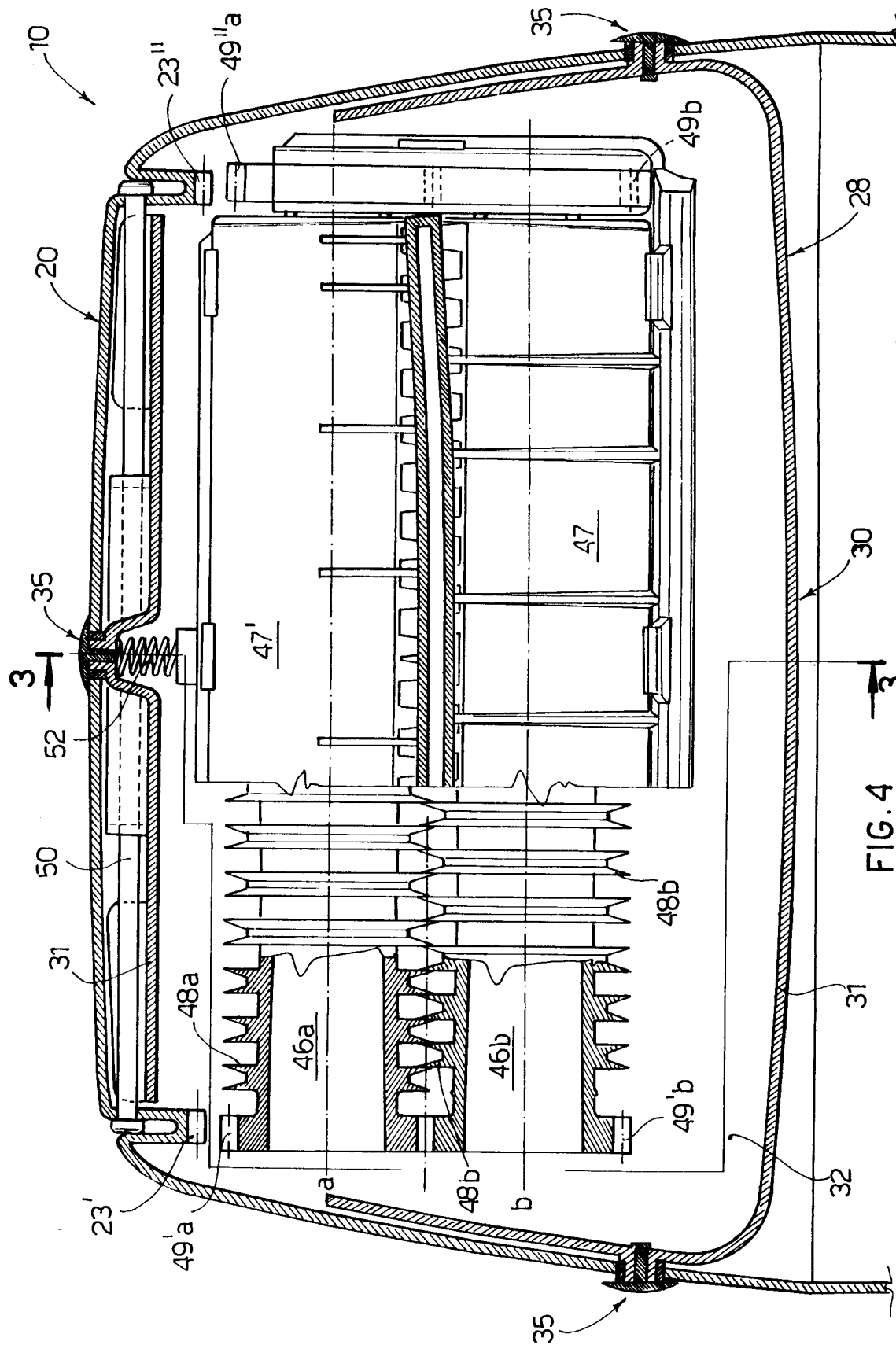


FIG. 4

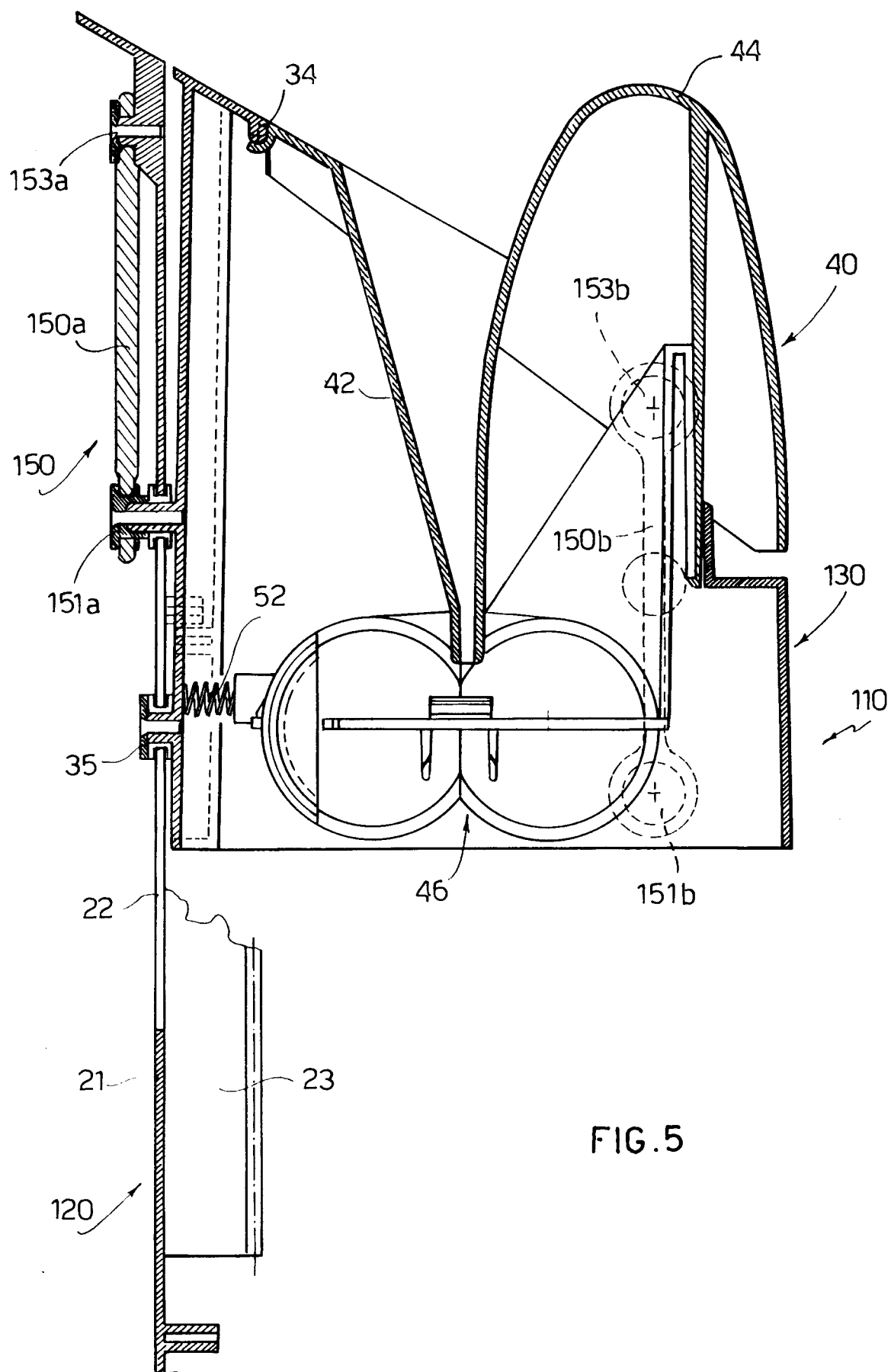
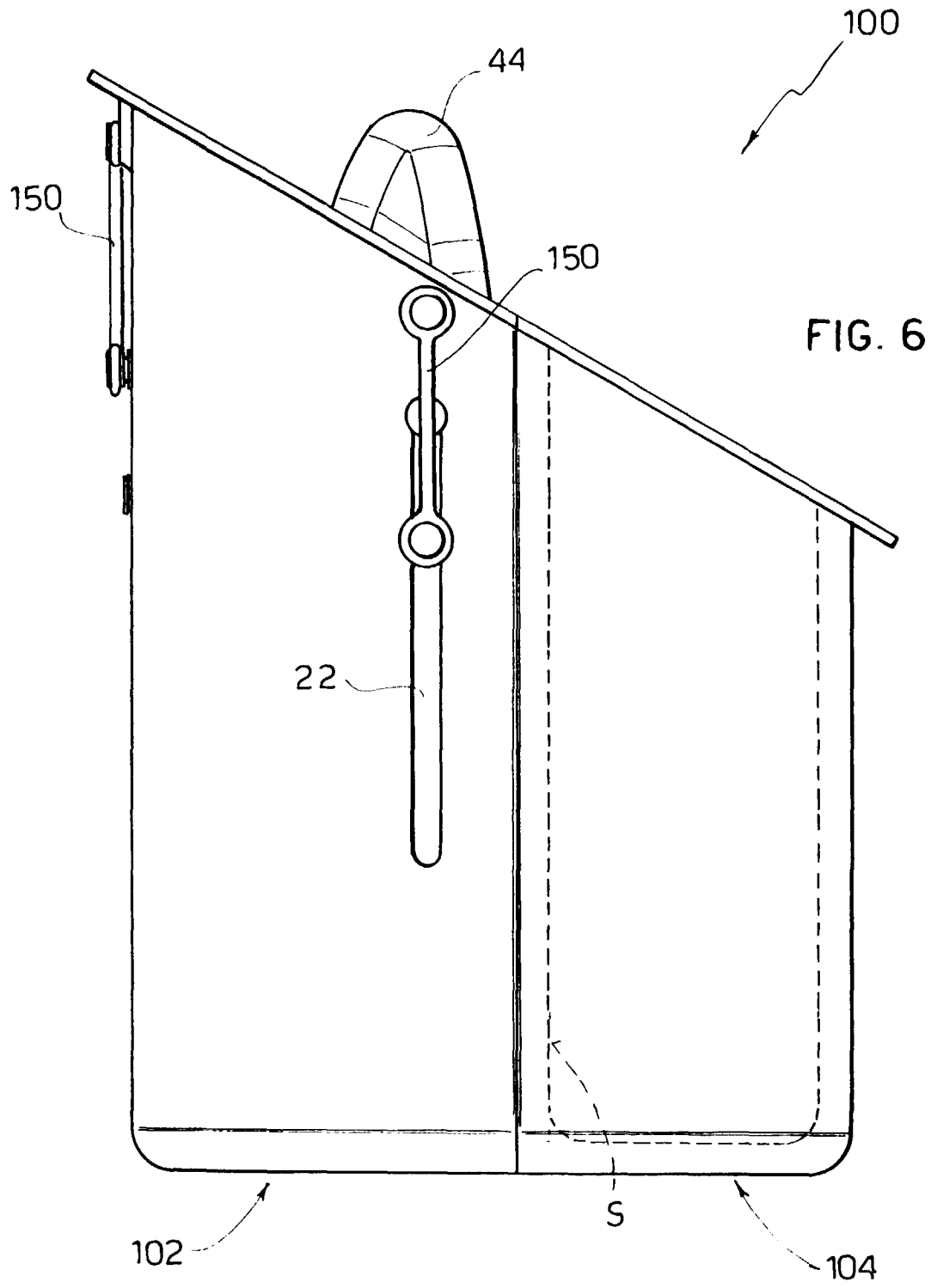


FIG.5





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 1408

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			B02C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 October 1998	Examiner Verdonck, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 11 1408

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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