



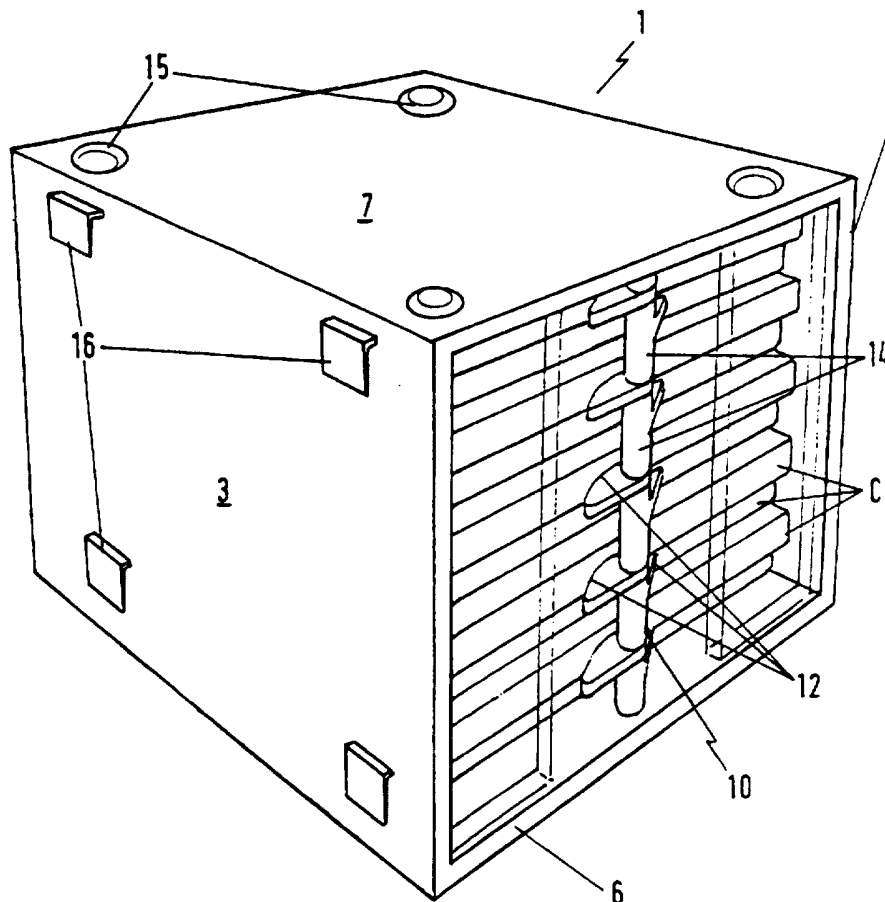
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/IE96/00023 (22) International Filing Date: 19 April 1996 (19.04.96) (30) Priority Data: S950277 19 April 1995 (19.04.95) IE (71)(72) Applicants and Inventors: DELANEY, Richard, Patrick [IE/IE]; Baltracey, Donadea, Naas, County Kildare (IE). CUNNANE, Mark [GB/IE]; 71 Seafield Crescent, Blackrock, County Dublin (IE). (74) Agent: MACLACHLAN & DONALDSON; 47 Merrion Square, Dublin 2 (IE).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DE (Utility model), DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>	

(54) Title: STORAGE RACK FOR COMPACT DISC CONTAINERS

(57) Abstract

A rack (1) for storing and displaying flat articles (C), such as compact discs and audio and video cassettes, which essentially comprises a pair of side walls (3, 4) held apart by a bottom section (6) and a top section (7). At the rear of the rack, a set of cams (10, 20, 30, 40) is positioned to align with a space to be occupied by the article (C) to be stored or displayed. The cams (10, 20, 30, 40) cooperate so that when an article (C) aligned with a first cam (10) is urged rearwardly against that cam, an associated cam moves in the opposite direction to urge the adjacent article outwardly for easy access by a user.



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STORAGE RACK FOR COMPACT DISC CONTAINERS

The present invention relates to a rack for storing and displaying rectangular articles and more particularly to a storage rack adapted to slidably receive substantially rectangular articles such as containers used for holding audio media such as cassettes and compact discs and video media such as cassettes for video cassette recorders.

5
10 Known storage racks comprise two side walls held apart by a bottom section and a top section. The side walls are profiled to include ledges on which the rectangular articles are supported. Many different arrangements are available to present a selected article to the user so
15 that the article may be extracted from the rack. In one particular well known arrangement a lip is provided at the foremost edge of the ledge and a spring is provided at the rearward end of the ledge to bias the article against the lip, thereby retaining the article until it is deflected
20 over the lip. In this and other of the known arrangements, a particular disadvantage is that sufficient space is required between each article either to allow it to be gripped or so that the article may be deflected from a storage position for release.

25
It is an object of the present invention to provide a storage rack for rectangular articles having increased storage density from which stored articles are easily extracted.

30
Accordingly, the present invention comprises a rack for storing and displaying flat articles, characterised in that a set of cam elements is provided at the rear of the rack, each cam element being aligned with a space to be
35 occupied by the article to be stored or displayed, the cam

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elements cooperating so that when an article aligned with a first cam element is urged rearwardly against that cam element, an associated cam element moves in the opposite direction to urge at least one adjacent article
5 outwardly.

The invention further provides a rack for storing and displaying flat articles, having side walls that are profiled to include ledges on which an article is
10 supported, each cam element being aligned with the space defined between the side wall ledges, and cooperating so that when an article on one ledge is urged rearwardly against a first cam element, an associated cam moves in the opposite direction to urge the article on at least one
15 adjacent ledge outwardly.

Conveniently, the cam elements are mounted on a spindle.

Preferably, the cam elements are rotatably mounted on the
20 spindle.

The spindle is fixed between a bottom section and top section of the rack at the rear of the rack and preferably is disposed approximately mid-way between the two side
25 walls.

Preferably, the cam elements are arranged in cooperating pairs.

Each cam element comprises a relatively short collar mounted on the spindle and a cam surface formed on the collar for abutting the stored or displayed article, the collar having a smooth face at one end to prevent
30 interaction with adjacent elements and at the other end is provided with a stud protruding axially from the collar
35

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and a stud receiver to facilitate interaction with an adjacent element.

5 The side walls are provided with interengagement means so that a row of storage racks can be modularly constructed.

10 Conveniently, the top and bottom sections of the rack are profiled to interengage with complementary profiled sections of other racks to facilitate stacking of a series of storage racks one on top of the other.

15 A bracket may be provided at the rear of the rack so that the rack is mountable on a wall or two walls of storage racks are securable back-to-back by their respective brackets.

20 The invention further provides a cam assembly for use with the rack, the cam assembly comprising a backing plate, a spindle secured at each end to the backing plate and a set of cam elements mounted on the spindle, the assembly being attachable to the rear of the rack.

25 The invention will now be described more particularly with reference to the accompanying drawings which show by way of example only, one embodiment of storage rack according to the invention. In the drawings:

30 Figure 1a and Figure 1b are front elevations of a prior art storage rack and a storage rack of the present invention, respectively;

Figure 2 is a rear perspective view of the storage rack illustrating a first arrangement of cams;

35 Figure 2a is a rear perspective view similar to that

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shown in Figure 2 in which a backing plate is included;

Figure 3 is a front perspective view of the storage rack;
and

5

Figures 4a to 4c are three other arrangements of cams
suitable for use with the storage rack of the invention.

Referring to the drawings, a prior art storage rack R is
10 shown in Figure 1a and has capacity for housing ten
compact disc containers C. To allow a user to extract a
single compact disc sufficient space must be provided
between each ledge L to allow the user to grip the compact
disc container C. In many prior art constructions, a lip
15 P is provided at the end of the ledge L to hold the
container C against a biasing spring (not shown) located
at the rear of the ledge thereby retaining the compact
disc container C.

20 Figure 1b shows the embodiment of compact disc storage
rack 1 according to the invention having a capacity for
ten compact disc containers C. A minimal amount of space
is provided between each container C, the space provided
being the thickness of each ledge L. To extract a compact
25 disc, an adjacent compact disc container C is pushed
rearwardly which, by means of a cam arrangement which will
be described in more detail hereinafter, urges the
required compact disc container outwardly.

30 Figures 2, 2a and 3 show a preferred arrangement of
storage rack 1 suitable for use with compact discs
containers C but can be constructed for use with other
rectangular articles such as video cassette and audio
cassette containers. The storage rack 1 comprises a pair
35 of side members 3,4, having ten ledges L running along

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their inner surfaces, a bottom section 6 and a top section 7 which are secured to the side walls 3,4 to form a box having a front aperture and rear aperture. At the rear aperture a spindle (hidden from view) is provided

5 approximately mid-way between the side walls 3,4 and is rigidly held between the bottom section 6 and the top section 7. An arrangement of cams 10 is rotatably mounted to the spindle and presents a cam surface 12 to the rear edge of each compact disc container C. In the arrangement

10 shown, the cam surfaces 12 are formed on a spindle receiving collar 14, so that when one compact disc container is pushed rearwardly every second compact disc container is urged forward so that they may be gripped by a user. In Figure 2a, a backing plate 50, which obscures

15 the cam elements from view, is provided to prevent the cam surfaces being rotated into an ineffectual position away from the containers C. The top and bottom sections 6,7 of the rack 1 can be optionally provided with raised and depressed regions 15 to facilitate stacking of a number of

20 storage racks one on top of the other. Additionally or alternatively, catches 16 and receivers 17 are provided on the outer surface of the side walls so that a row of storage racks can be modularly constructed.

25 The storage rack 1 may be orientated so that the containers C are presented vertically. Where containers are presented vertically, it is advantageous to remove the ledges L from the construction of the side walls (now top and bottom sections) to allow the containers to be moved

30 within the rack 1. For example, a collection of compact discs may be arranged in alphabetical order in a row of connected racks or a rack having a large capacity (50 or 60 discs). If an additional disc is to be included in the collection, the existing discs may be moved to one side to

35 make room without having to remove each disc from its

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respective ledge. This arrangement has distinct advantages when restocking displays of articles.

Further cam arrangements are shown in Figures 4a to 4c.

5 The first alternative arrangement comprises five cam units 20 of the type shown in Figure 4a which comprise a collar 24 for mounting the cam 20 on the spindle. Two cam surfaces 22 are formed on the collar 24 at a predetermined angle to one another and a stud 26 and a stud receiver 27
10 are provided at each end of the collar 24. A series of five of these units may be assembled on the spindle to provide an arrangement as described with reference to Figures 2 and 3. A semi-circular track (not shown) may be provided in the top and bottom sections 6,7 to facilitate
15 the studs 26 or optionally the studs may be omitted from the upper and lower units 20 of the arrangement. In a further arrangement, similar to that shown in Figure 4a, the studs and stud receivers are omitted from each end of the hollow tubing 34 to provide a cam unit 30. Again,
20 five of these units 30 are provided for a storage rack for ten compact discs. In this arrangement, the cam surfaces 32 operate in pairs so that when one compact disc container C is urged rearwardly, one adjacent compact disc container will be urged forward by the action of the cams.
25 A preferred construction of cam unit 40 is shown in Figure 4c. In this construction, a pair of identical units 40 cooperate to form a unit similar to that described with reference to Figure 4b. Each unit 40 comprises a short collar 44 having a cam surface 42 centrally mounted
30 thereon. One end of the collar 44 is smooth to prevent interaction with adjacent surfaces and the other end is provided with a stud 46 and a stud receiver 47. The stud 46 and stud receiver 47 are arranged so that a pair of identical units may be combined one on top of the other to
35 form a pair of cooperating cams surfaces. Ten of these

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identical units 40 are required for the storage unit 1 illustrated.

5 The rack 1 optionally includes a cam assembly which
comprises a rectangular backing plate 50 for securing
between the top and bottom sections 6,7 at the rear of the
rack, a spindle secured at each end to the backing plate
and a set of cam elements mounted on the spindle. The
10 cam assembly allows a rack to be packaged and shipped in
a relatively compact form and facilitates easy
construction of a rack from a kit of parts comprising the
side walls 3,4, the top and bottom sections 6,7 and the
cam assembly. The backing plate restricts the rotation of
the cam elements on the spindle and retains the cam
15 surfaces in position with respect to the containers C.

A bracket (not shown) may be provided at the rear of the
storage rack so that the rack may be wall mounted or so
that racks can be connected together back-to-back.

20 It will of course be understood that the invention is not
limited to the specific details described herein, which are
given by way of example only, and that various
modifications and alterations are possible within the scope
25 of the appended claims.

CLAIMS:

1. A rack for storing and displaying flat articles, characterised in that a set of cam elements (10,20,30,40) is provided at the rear of the rack (1), each cam element (10,20,30,40) being aligned with a space to be occupied by the article (C) to be stored or displayed, the cam elements (10,20,30,40) cooperating so that when an article (C) aligned with a first cam element is urged rearwardly against that cam element, an associated cam element (10,20,30,40) moves in the opposite direction to urge at least one adjacent article (C) outwardly.
2. A rack according to claim 1, having side walls (3,4) that are profiled to include ledges (L) on which an article (C) is supported, each cam element (10,20,30,40) being aligned with the space defined between the side wall ledges (L), and cooperating so that when an article on one ledge is urged rearwardly against a first cam element, an associated cam moves in the opposite direction to urge the article on at least one adjacent ledge outwardly.
3. A rack according to claim 1 or claim 2, in which the cam elements (10,20,30,40) are mounted on a spindle.
4. A rack according to any one of claim 1 to claim 3, in which the cam elements (10,20,30,40) are rotatably mounted on a spindle.
5. A rack according to claim 3 or claim 4, in which the spindle is fixed between a bottom section (6) and top section (7) of the rack (1) at the rear of the rack.
6. A rack according to claim 5, in which the spindle is disposed approximately mid-way between the side walls

(3,4) of the rack.

7. A rack according to any one of claims 1 to 6, in which
the cam elements (10,20,30,40) are arranged in cooperating
5 pairs.

8. A rack according to any one of claims 3 to 7, in which
each cam element (10,20,30,40) comprises a hollow collar
(14,24,34,44) mounted on the spindle and a cam surface
10 (12,22,32,42) formed on the collar for abutting the stored
or displayed article, the collar having a smooth face at
one end to prevent interaction with adjacent elements and
at the other end is provided with a stud (26,46)
protruding axially from the collar (14,24,34,44) and a
15 stud receiver (27,47) to facilitate interaction with an
adjacent element.

9. A rack according to any one of claims 1 to 8, in which
the side walls (3,4) are provided with interengagement
20 means (16) so that a row of storage racks (1) can be
modularly constructed.

10. A rack according to any one of claims 5 to 9, in
which the top and bottom sections (6,7) of the rack (1)
25 are profiled to interengage with complementary profiled
sections (15) of other racks to facilitate stacking of a
series of storage racks one on top of the other.

11. A rack according to any one of claims 1 to 10, in
30 which a bracket is provided at the rear of the rack (1) so
that the rack is mountable on a wall.

12. A rack according to claim 11, in which a pair of
modular rack walls are secured back-to-back by their
35 respective brackets.

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13. A rack for storing and displaying flat articles such as compact discs and audio and video cassettes (C) substantially as herein described with reference to and as shown in Figure 1b and Figures 2 to 4c of the accompanying
5 drawings.

14. A cam assembly for use with a rack according to any one of the preceding claims, the cam assembly comprising a backing plate (50), a spindle secured at each end to the
10 backing plate (50) and a set of cam elements (10,20,30,40) mounted on the spindle, the assembly being attachable to the rear of the rack (1).

15

PRIOR ART

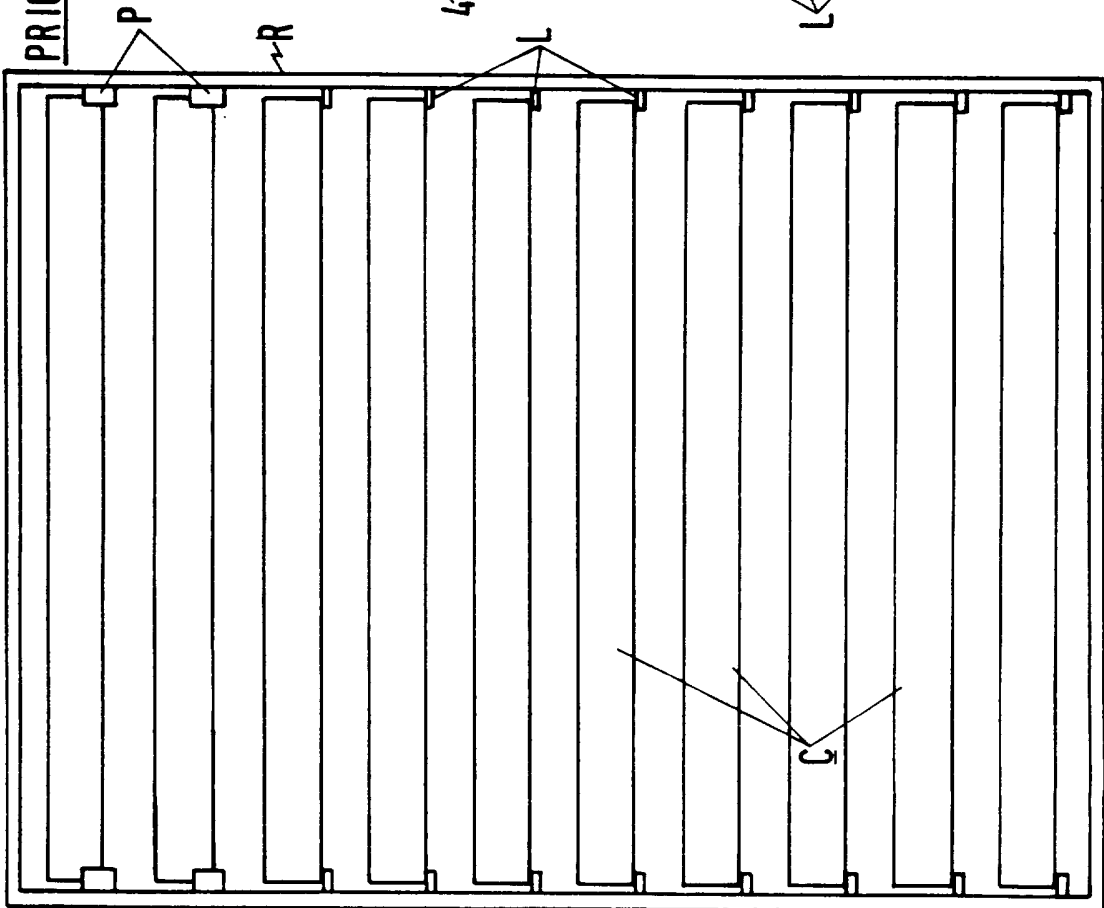


FIG 1a

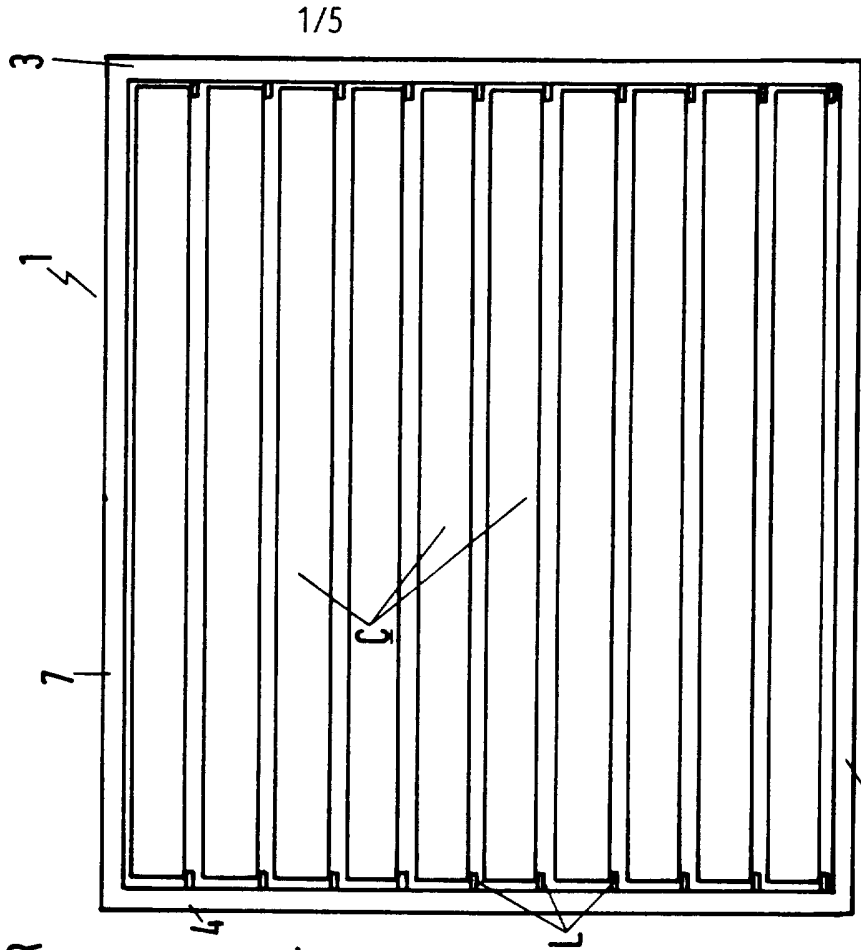
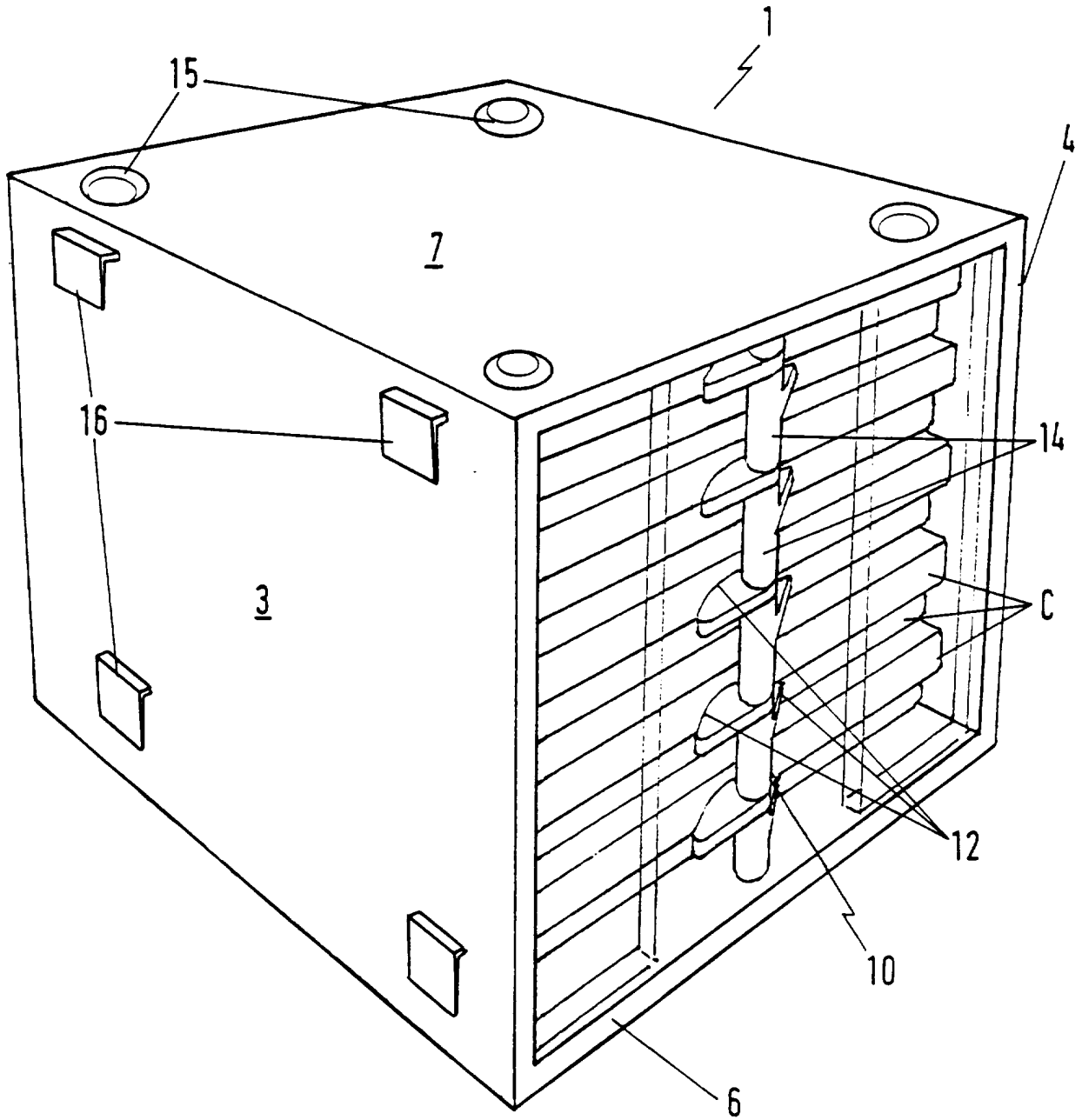


FIG 1b

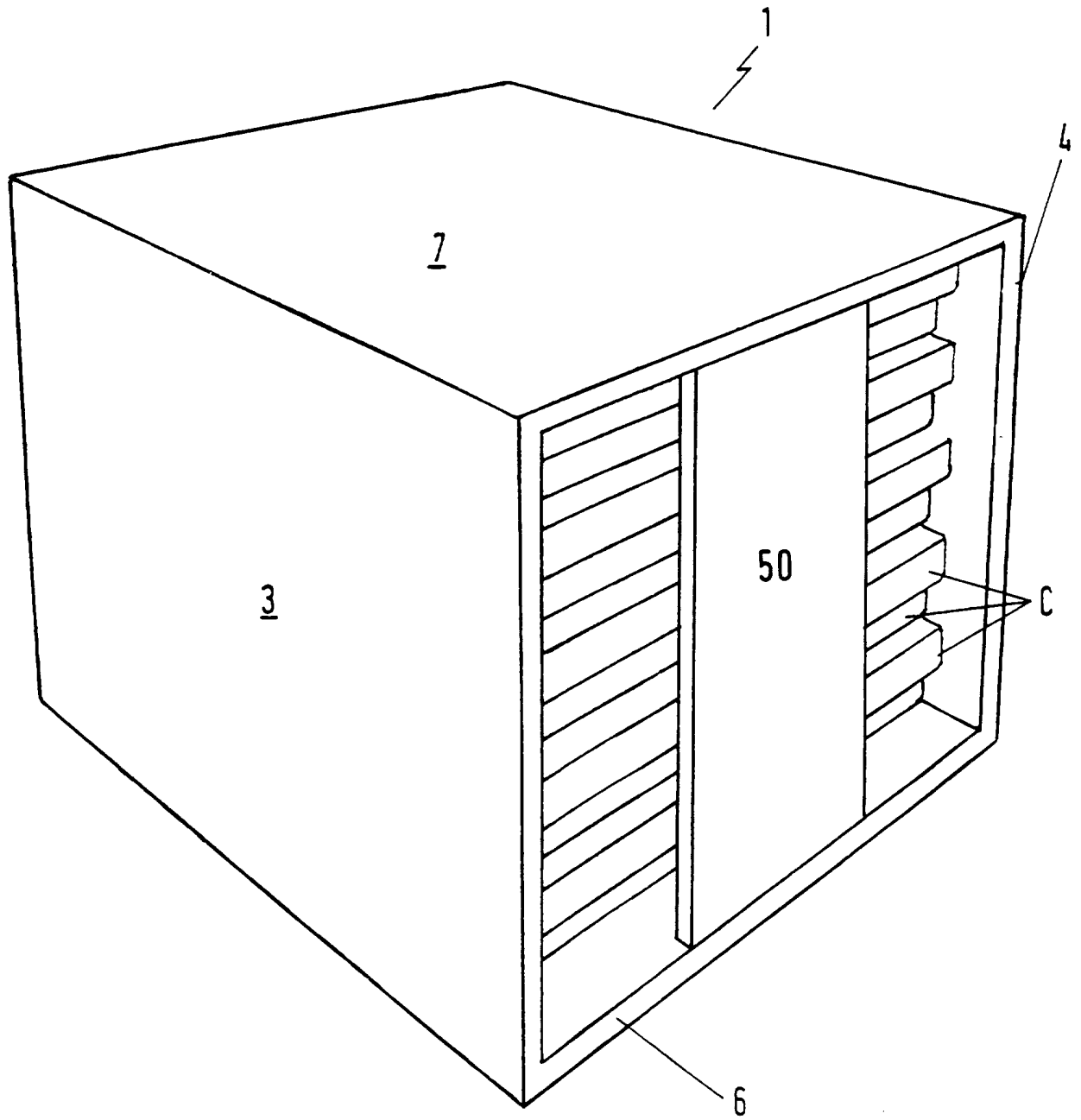
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FIG 2



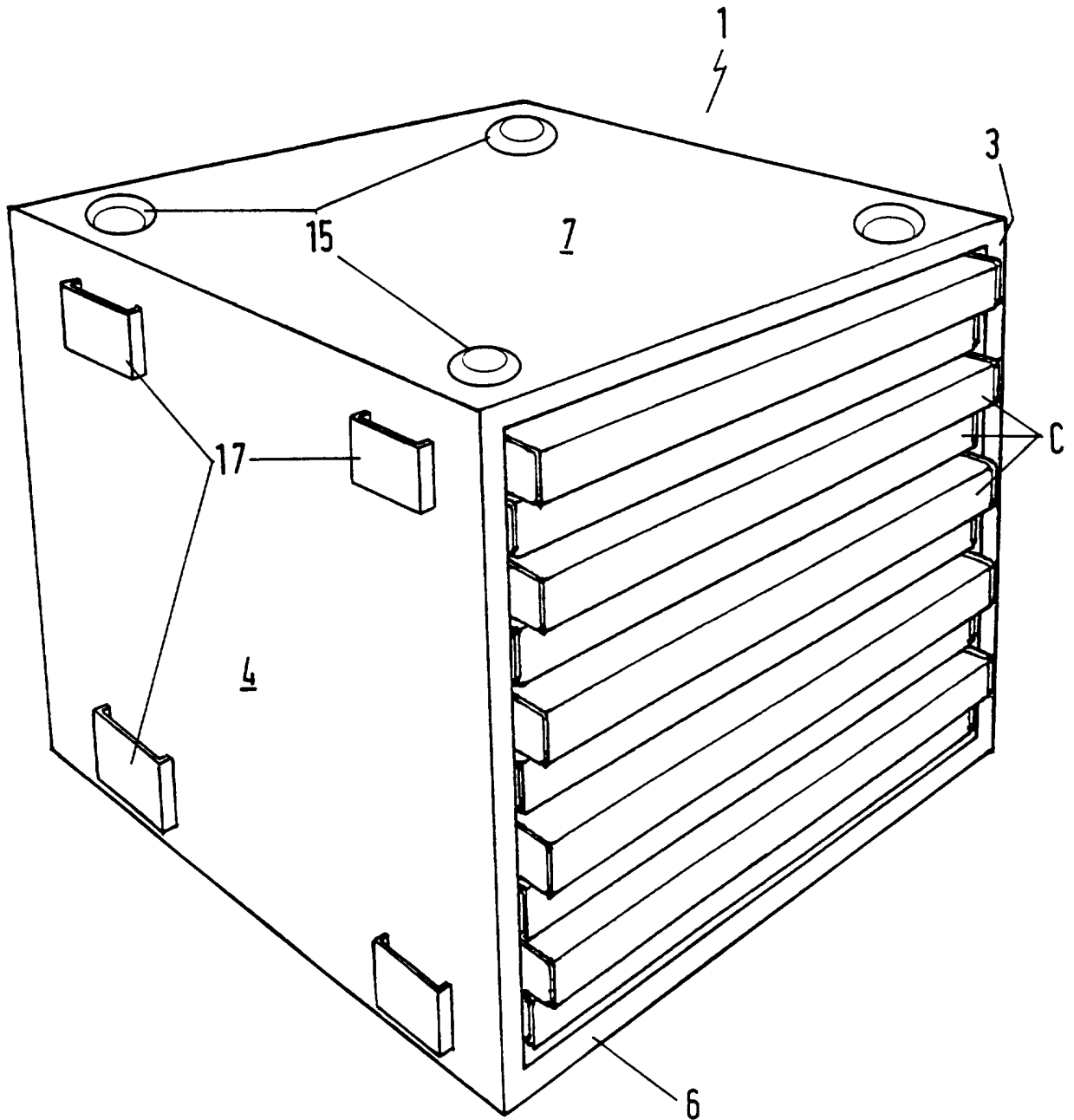
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FIG 2a



4/5

FIG 3



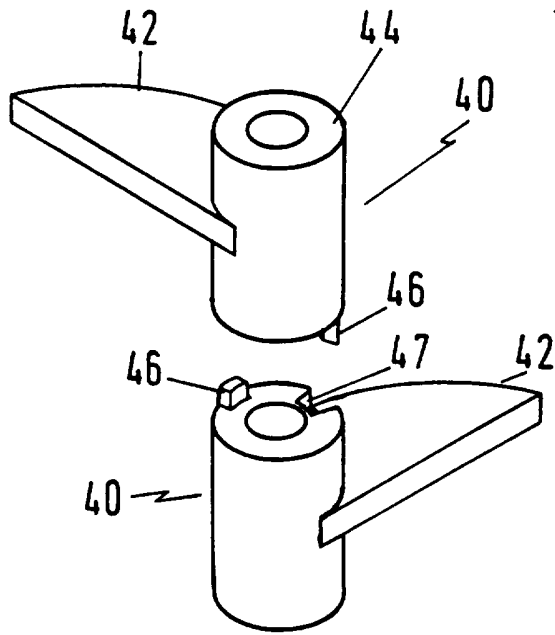


FIG 4c

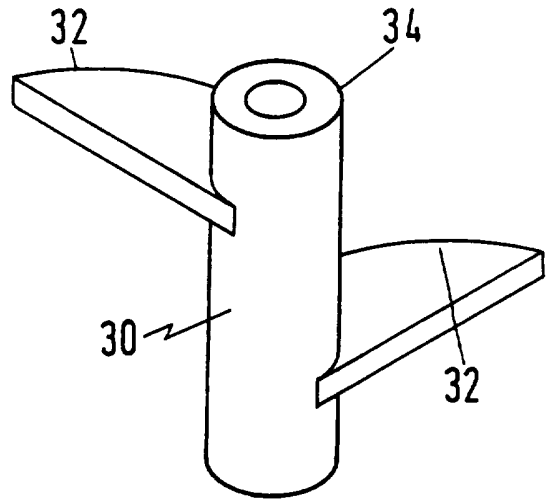


FIG 4b

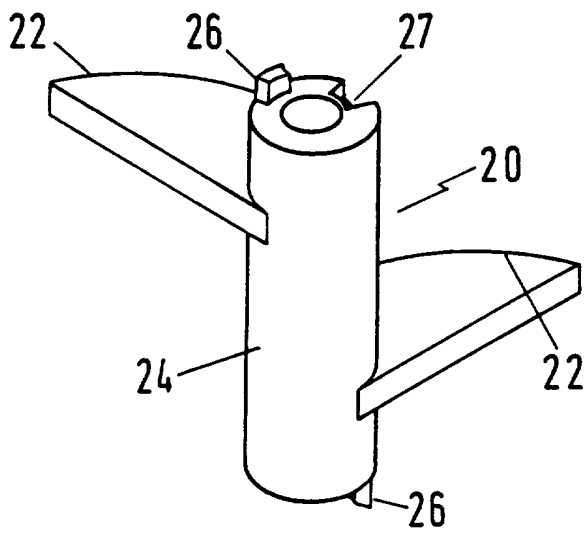


FIG 4a

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IE 96/00023

A. CLASSIFICATION OF SUBJECT MATTER IPC 6 G11B33/04				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) IPC 6 G11B				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US,A,4 609 231 (NEUMAN ELI) 2 September 1986 see column 7, line 15 - line 35; figures 1-4 ---	1		
A	US,A,3 056 529 (ROY F. DE SHON) 2 October 1962 see column 1, line 41 - column 54 see column 6, line 34 - column 7, line 27; figures 1,2 ---	1		
A	US,A,4 695 103 (MACDONALD JOHN B ET AL) 22 September 1987 see column 3, line 36 - column 4, line 3; figure 2 --- ---	1		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
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* Special categories of cited documents :				
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Date of the actual completion of the international search <p style="text-align: center; font-size: 1.2em;">27 June 1996</p>	Date of mailing of the international search report <p style="text-align: center; font-size: 1.2em;">24.07.96</p>			
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Inter. Application No
PCT/IE 96/00023

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,4 867 311 (METCALF DARRELL J) 19 September 1989 see column 3, line 13 - line 33 see column 6, line 39 - column 7, line 18; figures 1-3,7-9 <p style="text-align: center;">-----</p>	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IE 96/00023

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