(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 December 2001 (20.12.2001)

PCT

(10) International Publication Number
WO 01/96193 A2

(51) International Patent Classification[7]: B65D 25/10, 85/48

(21) International Application Number: PCT/US01/41014

(22) International Filing Date: 12 June 2001 (12.06.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/211,233 12 June 2000 (12.06.2000) US

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/96193 A2

(54) Title: MICROSCOPE SLIDE CONTAINER

(57) Abstract: A container for removably retaining a plurality of microscope slides in a predetermined spaced relationship comprises a back wall, a pair of opposing side walls and a pair of opposing end walls. The side walls and end walls extend from the back wall, and the end walls extend between the side walls. The side walls have a plurality of side ribs. The back wall has a plurality of grippers, each of which include a first grip rib and a second grip rib. The first grip rib has a first grip location capable of firmly gripping one of the slides to prevent the slide from freely moving. Additionally, the first grip rib is capable of flexing away from the second grip rib. Moreover, each of the side walls has an outer surface, and one of said outer surfaces has a rail projecting outward from the outer surface. The outer surface also has an orientation notch and a circular-shaped projection with a depressed center.

MICROSCOPE SLIDE CONTAINER

The present application claims the benefit of co-pending U.S. Provisional Patent Application Serial No. 60/211,233, which was filed on June 12, 2000.

FIELD OF THE INVENTION

The present invention relates generally to a container for the handling, transportation and storage of microscope slides and, in particular, to a microscope slide container for removably retaining a plurality of microscope slides in fixed positions within a plurality of slide receiving projections.

BACKGROUND OF THE INVENTION

Microscope slide containers or folders manufactured of various materials such as cardboard and plastic have been made for many years for the purpose of storing and indexing microscope analyzeable specimen materials supported on a glass microscope slide. In the past, various features were employed in attempts to provide the microscope slide container with advantages. An example of one such feature is a finger recess to aid in the removal of a microscope slide. Other examples include structural elements within the microscope slide receiving compartments to maintain each microscope slide in a fixed position for handling and transport with minimal disturbance of the analyzeable specimen material. With the advent of automated pick-and-place machinery, it is desirable to have a microscope slide container that is adapted for automation and is more efficient than ones requiring the sometimes cumbersome accommodation of human fingers.

SUMMARY OF THE INVENTION

The present invention is a microscope slide container. In accordance with one aspect of the present invention, the container comprises a back wall, a pair of opposing

side walls and a pair of opposing end walls. The side walls and end walls extend from the back wall, and the end walls extend between the side walls. The side walls have a plurality of side ribs. The back wall has a plurality of grippers, each of which include a first grip rib and a second grip rib. The first grip rib has a first grip location capable of firmly gripping one of the slides to prevent the slide from freely moving. The second grip rib has a second grip location capable of firmly gripping one of the slides to prevent the slide from freely moving. The first and second grip ribs have tapered front ends to facilitate reception of the slide between the first and second grip ribs. The first grip rib is capable of flexing away from the second grip rib, and the first grip rib is biased toward the second grip rib such that the first grip rib flexes away from the second grip rib with the application of a force. The container further includes a cover. Additionally, each of the side walls has an outer surface. The outer surface includes a rail, an orientation notch and a circular-shaped projection with a depressed center.

In accordance with another aspect of the present invention, there is provided a container comprising a back wall, a pair of opposing side walls and a pair of opposing end walls. The side walls and end walls extend from the back wall, and the end walls extend between the side walls. The side walls have a pair of side ribs. The back wall has a first grip rib and a second grip rib. The first grip rib has a first grip location capable of firmly gripping one of the slides to prevent the slide from freely moving. The second grip rib has a second grip location capable of firmly gripping one of the slides to prevent the slide from freely moving. The first and second grip ribs have tapered front ends to facilitate reception of the slide between the first and second grip ribs. The first grip rib is capable of flexing away from the second grip rib. Additionally, the first grip rib is biased toward the second grip rib and flexes away from the second grip rib with the application of a force.

In accordance with a further aspect of the present invention, there is provided a container comprising a back wall, a pair of opposing side walls and a pair of opposing end walls. The side walls and end walls extend from the back wall, and the end walls extend between the side walls. The side walls have a pair of side ribs and an outer surface. The outer surface of the side wall includes a rail projecting outward. The outer surface also includes an orientation notch and a circular shaped projection with a depressed center.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings in which:

FIG. 1 is a perspective view of the microscope slide container of the present invention;

FIG. 2 is a front-elevational, partial cross-sectional view of the microscope slide container of the present invention;

FIG. 3 is a top cross-sectional view along 3-3 of FIG. 2 of the microscope slide container of the present invention;

FIG. 4 is a side-elevational view of the microscope slide container of the present invention;

FIG. 5 is a top view of the microscope slide container of the present invention;

FIG. 6 is a sectional perspective view of the back wall of the microscope slide container of the present invention;

FIG. 7 is a sectional front view of a microscope slide inserted into back wall of the microscope slide container of the present invention;

FIG. 8 is a side cross-sectional view along 8-8 of FIG. 7 of the microscope slide container of the present invention; and

FIG. 9 is a sectional side view of a gripper of the microscope slide container of the present invention.

While the invention is susceptible to various modifications and alternative forms, a specific embodiment thereof has been shown by way of example in the drawing and will herein be described in detail. It should be understood, however, that it is not intended to limit the invention to the particular forms disclosed but, on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Referring now to FIGs. 1 and 2, a container 10 in accordance with the invention is shown. As illustrated, the container includes a base 12 and a cover 14. The base 12 and cover 14 define a microscope slide storage chamber 16.

The base 12 includes a back wall 18, two opposing and side walls designated generally 20 and 22, two opposing end walls designated generally 24 and 26. The side walls 20, 22 and the end walls 24, 26 extend around the periphery of the back wall 18 defining a generally rectangular shape with the length of the longitudinal side walls 20, 22 being greater than the length of the end walls 24, 26. The base 12 may be constituted of any kind of material suitable for storing microscope slides such as thermoplastic or thermosetting solvent-resistant polymeric material such as polyethylene (PE) or polypropylene (PP).

Still referencing FIGs. 1 and 2, side wall 20 includes an outer surface 28 and an inner surface 30. Side wall 22 includes an outer surface 32 and an inner surface 34. Focusing now on FIGs. 3, 4 and 5, each of the outer surfaces 28, 32 include a pair of rails 36 and 38, respectively, for interlocking consecutively stacked containers. For example, as shown in FIG. 5, the rails 36 projecting from outer surface 28 are spaced farther apart from each other than the rails 38 projecting from outer surface 32 such that a series of covered containers may be vertically stacked on top of one another in a secure arrangement by inserting the closely-spaced rails 38 of one container into the complementary widely-spaced rails 36 of another container. The rails 36 provide camming surfaces for rails 38 and vice versa to create a secured stack of interlocked containers.

The outer surfaces 28 and 32 include a plurality of container orientation notches 40. These notches allow for the proper orientation and insertion of the container 10 with respect to lab automation equipment. For the removal of microscope slides, the container 10 must be properly oriented to work with loading and unloading apparatuses and the notches 40 are keyed in such a way that the container 10 can be loaded into a specific machine one way. For example, as shown in FIG. 4, at locations adjacent slide count 70-75 and 40-45, outer surface 28 does not include notches 40 that are found on outer surface 32. Additional features for compatibility with lab automation equipment that aid in the

loading and orientation of the container 10 include two circular-shaped projections 42 with depressed centers 44 and a rib 46 on each of the outer surfaces 28, 32.

Turning now to the inside of the container 10 and with particular reference to FIGs. 1, 2 and 3, the inner surfaces 30, 34 of the side walls 20, 22 are spaced from each other a distance that generally corresponds to the width of a standard microscope slide, approximately one inch. The inner surfaces 30, 34 include a plurality of integrally formed side ribs 48. Each of the side ribs 48 include a front end 50 and back end 52. The front ends 50 are tapered for the facilitated reception of microscope slides and are set back from the edge of the side walls 20, 22 by a distance of approximately 1/4 inch. The length of each side rib 48 is generally the same length of a standard microscope slide, approximately three inches. The back end 52 is integral with the back wall 18. Consecutive side ribs 48 are vertically spaced apart from each other a distance that generally corresponds to the thickness of a standard microscope slide (approximately 1/16 inch) to restrain vertical motion of the microscope slide. The side ribs 48 are also thick enough (approximately 1/16 inch) to adequately space the microscope slides away from each other in order to prevent disturbance and smearing of specimen materials supported on the microscope slide.

The cover 14 of the container 10, as shown in FIG. 1, includes a face 54 interconnected to an encompassing rim 56. The rim 56 is interconnected with a lip 58. The rim 56 has a depth that corresponds to the distance with which the front ends 50 of the side ribs 48 are set back from the edge of the side walls 20, 22, approximately 1/4 inch. To close the container 10, the cover 14 is inserted such that the rim 56 forms a friction fit or snap fit engagement with the side walls 20, 22 and end walls 24, 26. The cover 14 is in place with the lip 58 resting on the edges of the side walls 20, 22 and end walls 24, 26 and with the face 54 contacting the front ends 50 of the side ribs 48. Thus, the microscope slide storage chamber 16 is defined by the face 54, back wall 18, end walls 24, 26, and inner surfaces 30, 34 of side walls 20, 22 wherein the length of the side ribs 48 generally corresponds to the length of a standard microscope slide, approximately three inches, and the length of back wall 18 generally corresponds to the width of a standard microscope slide, approximately one inch. One hundred standard microscope slides are stackable in approximately 9 7/8 inches of ribbed container space. The overall length of the container 10 is approximately 10 3/4 inches. The microscope slide storage chamber 16 further contains a plurality of reinforcing walls 60 as shown in FIGs. 2 and 3.

These reinforcing walls 60 span the chamber 16 and interconnect with side walls 20, 22 and back wall 18.

Referring now to FIGs. 6, 7, 8 and 9, the back wall 18 includes a plurality of grippers 62. Each gripper 62 includes a first rib 64 and a second rib 66. The first and second ribs 64, 66 include slide surfaces 68 and 70, respectively, and grip locations 69, 71, respectively. The first and second ribs 64, 66 also include front ends 72, 74, respectively. The first and second ribs 64 and 66 are inclined towards each other at angle, α, as shown in FIG. 9. The front ends 72 and 74 of slide surfaces 68 and 70, respectively, are tapered at an angle, β, as shown in FIG. 9. The tapered front ends 72 and 74 facilitate reception of the microscope slide 76 between the first and second ribs 64, 66 and provide a camming surface for the insertion of a microscope slide.

When a microscope slide is inserted into the container, the microscope slide first contacts the tapered front end 50 of the side ribs 48. These tapered front ends 50 of the side ribs 48 direct the microscope slide between the side ribs 48. Then, the microscope slide contacts one or more of the tapered ends 72 and 74 of the first and second ribs 64, 66 of a gripper 62. Next, with slight force on the microscope slide, the first and second ribs 64, 66 flex slightly outwardly away from the microscope slide, thereby, spring-loading the first and second ribs 64, 66 to firmly grip the microscope slide at grip locations 69, 71. The microscope slide is continually passed towards the back wall 18 until the microscope slide is in position. This gripping action prevents the microscope slide from sliding out of the container even when the container is inverted and the cover removed. In an alternate embodiment, the grippers 62 may be connected to either one of the side walls or one of the end walls instead of the back wall to prevent the slide from sliding out of the container.

While the present invention has been described with reference to one or more particular embodiments, those skilled in the art will recognize that many changes may be made thereto without departing from the spirit and scope of the present invention. Each of these embodiments and obvious variations thereof is contemplated as falling within the spirit and scope of the claimed invention, which is set forth in the following claims.

WHAT IS CLAIMED IS:

1. A container for removably retaining a plurality of microscope slides in a predetermined spaced relationship, comprising

a back wall having a plurality of grippers, each of said grippers including a first grip rib and a second grip rib; and

a pair of opposing side walls and a pair of opposing end walls, said side walls and said end walls extending from said back wall, said end walls extending between said side walls, said side walls having a plurality of side ribs.

2. The container of claim 1 wherein said first grip rib has a first grip location capable of firmly gripping one of said slides to prevent said slide from freely moving.

3. The container of claim 2 wherein said second grip rib has a second grip location capable of firmly gripping one of said slides to prevent said slide from freely moving.

4. The container of claim 1 wherein said first grip rib has a tapered front end.

5. The container of claim 4 wherein said second grip rib has a tapered front end to facilitate reception of said slide between said first and second grip ribs.

6. The container of claim 1 wherein said first grip rib is capable of flexing away from said second grip rib.

7. The container of claim 6 wherein said first grip rib is biased toward said second grip rib, said first grip rib flexes away from said second grip rib with the application of a force.

8. The container of claim 1 wherein each of said side ribs have a tapered front end to facilitate reception of said slide between adjacent side ribs.

9. The container of claim 1 further including a cover having a face, said cover face capable of abutting portions of said side walls and said end walls.

10. The container of claim 9 wherein said cover further includes an encompassing rim interconnected to said face.

11. The container of claim 10 wherein said rim is capable of forming a friction fit with said side walls and said end walls.

12. The container of claim 1 further including a reinforcing wall interconnected with said side walls and said back wall.

13. The container of claim 1 wherein each of said side walls has an outer surface, one of said outer surfaces having a rail projecting outward from said outer surface.

14. The container of claim 1 wherein each of said side walls has an outer surface, one of said outer surfaces having an orientation notch projecting outward from said outer surface.

15. The container of claim 1 wherein each of said side walls has an outer surface, one of said outer surfaces having a circular-shaped projection with a depressed center.

16. The container of claim 15 wherein one of said outer surfaces further including a second circular-shaped projection with a depressed center and a rib projecting outward from said outer surface.

17. A container for removably retaining a microscope slide, comprising

a back wall having a first grip rib and a second grip rib, said first grip rib having a first grip location capable of gripping said slide to prevent said slide from freely moving; and

a pair of opposing side walls and a pair of opposing end walls, said side walls and said end walls extending from said back wall, said end walls extending between said side walls.

18. The container of claim 17 wherein said second grip rib has a second grip location capable of firmly gripping said slide to prevent said slide from freely moving.

19. The container of claim 17 wherein said first grip rib has a tapered front end.

20. The container of claim 19 wherein said second grip rib has a tapered front end to facilitate reception of said slide between said first and second grip ribs.

21. The container of claim 17 wherein said first grip rib is capable of flexing away from said second grip rib.

22. The container of claim 21 wherein said first grip rib is biased toward said second grip rib, said first grip rib flexes away from said second grip rib with the application of a force.

23. A container for removably retaining a microscope slide, comprising

a back wall;

a pair of opposing side walls and a pair of opposing end walls, said side walls and said end walls extending from said back wall, said end walls extending between said side walls, each of said side walls has an outer surface, one of said outer surfaces having an interconnected rail projecting outward from said outer surface.

24. The container of claim 23 wherein one of said outer surfaces having an orientation notch projecting outward from said outer surface.

25. The container of claim 23 wherein one of said outer surfaces having a circular-shaped projection with a depressed center.

26. The container of claim 23 further including a first grip rib and a second grip rib, said first grip rib having a first grip location capable of gripping said slide to prevent said slide from freely moving.

27. The container of claim 26 wherein said first grip rib is capable of flexing away from said second grip rib.

28. A container for removably retaining a microscope slide, comprising

a first grip rib and a second grip rib, said first grip rib having a first grip location capable of gripping said slide to prevent said slide from freely moving.

29. The container of claim 28 wherein said second grip rib has a second grip location capable of firmly gripping said slide to prevent said slide from freely moving.

30. The container of claim 28 wherein said first grip rib has a tapered front end.

31. The container of claim 28 wherein said first grip rib is capable of flexing away from said second grip rib.

32. The container of claim 31 wherein said first grip rib is biased toward said second grip rib, said first grip rib flexes away from said second grip rib with the application of a force.

33. The container of claim 28 further including a back wall, a pair of opposing side walls and a pair of opposing end walls, said side walls and said end walls extending from said back wall, said end walls extending between said side walls.

34. The container of claim 33 wherein said first grip rib and said second grip rib are connected to one of said side walls.

35. The container of claim 33 wherein said first grip rib and said second grip rib are connected to one of said end walls.

36. The container of claim 33 further including a first rib and a second rib capable of receiving said slide between said first and second rib.

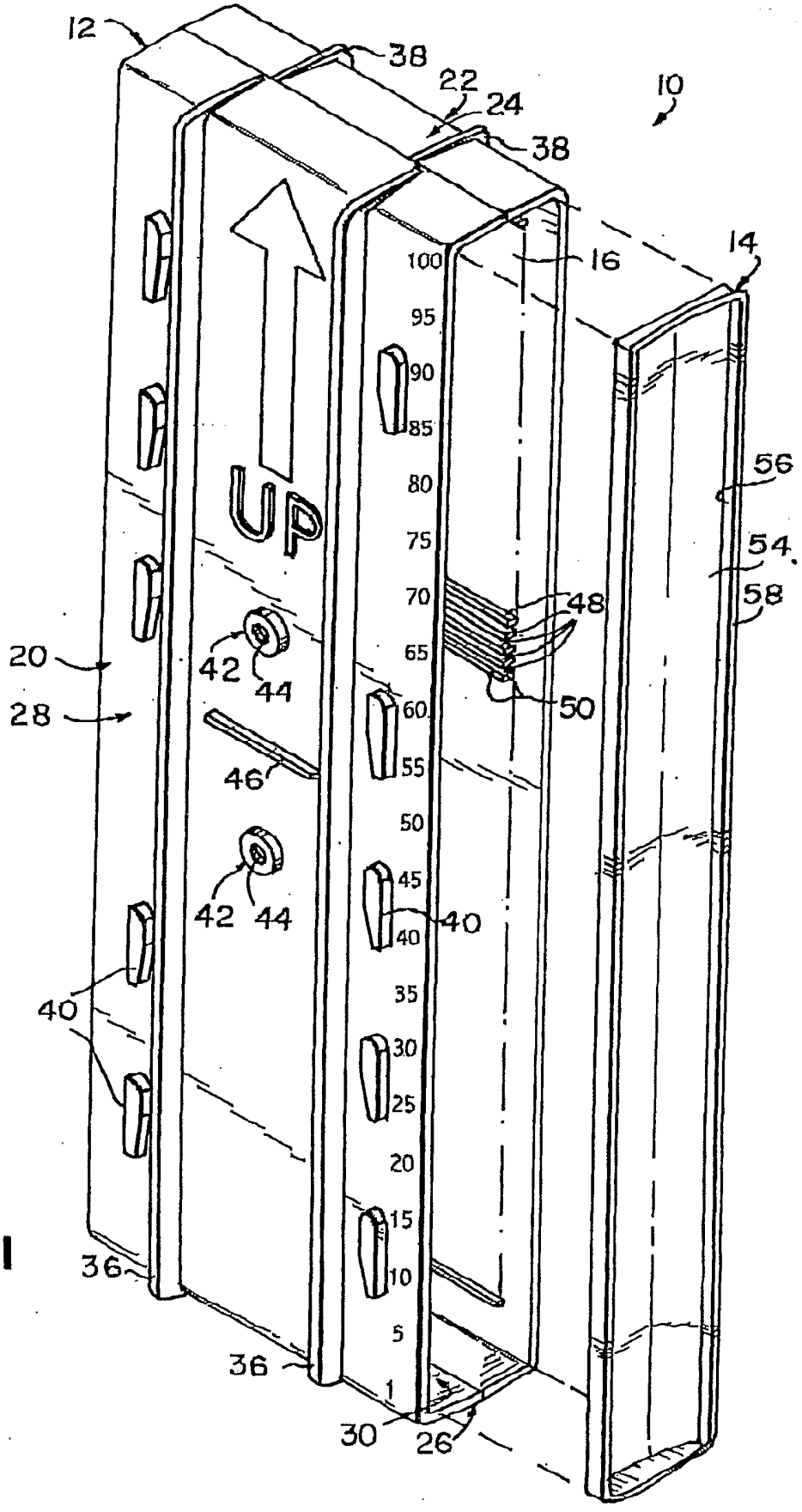
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FIG. 1

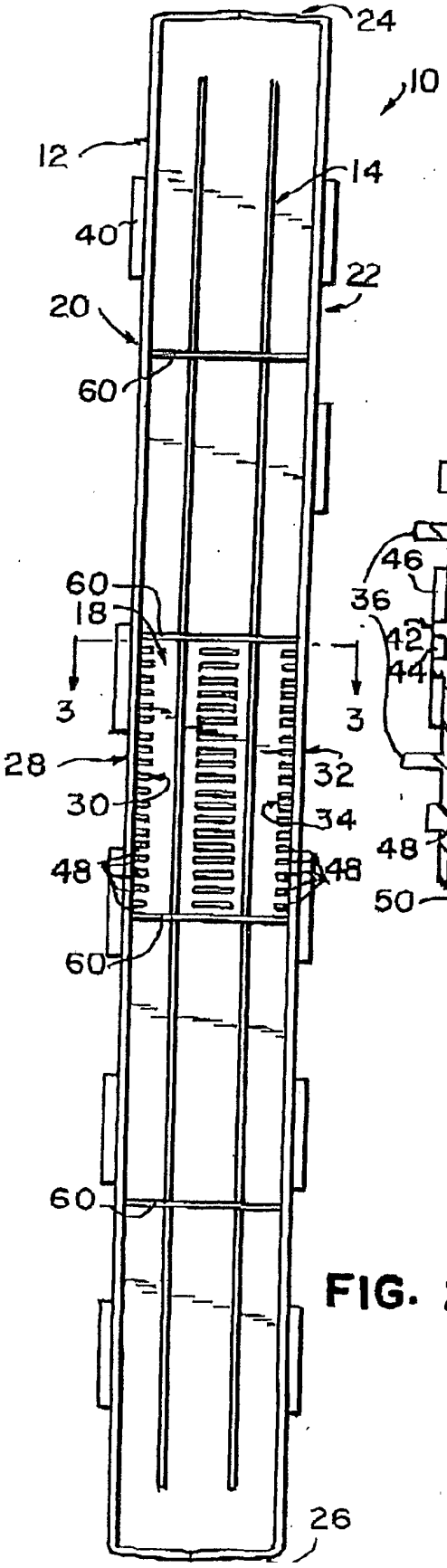
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FIG. 2

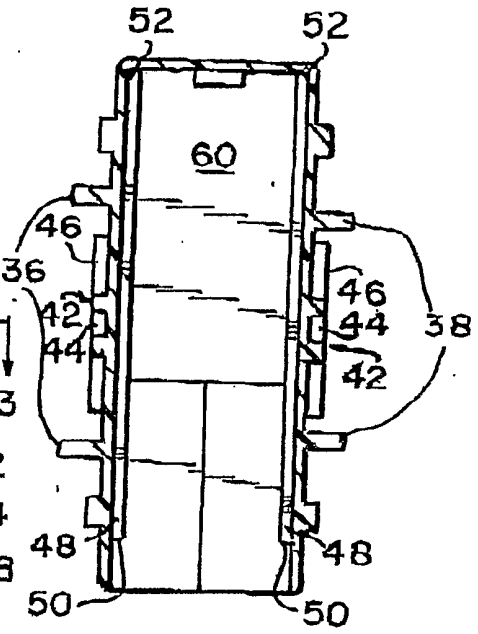
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FIG. 3

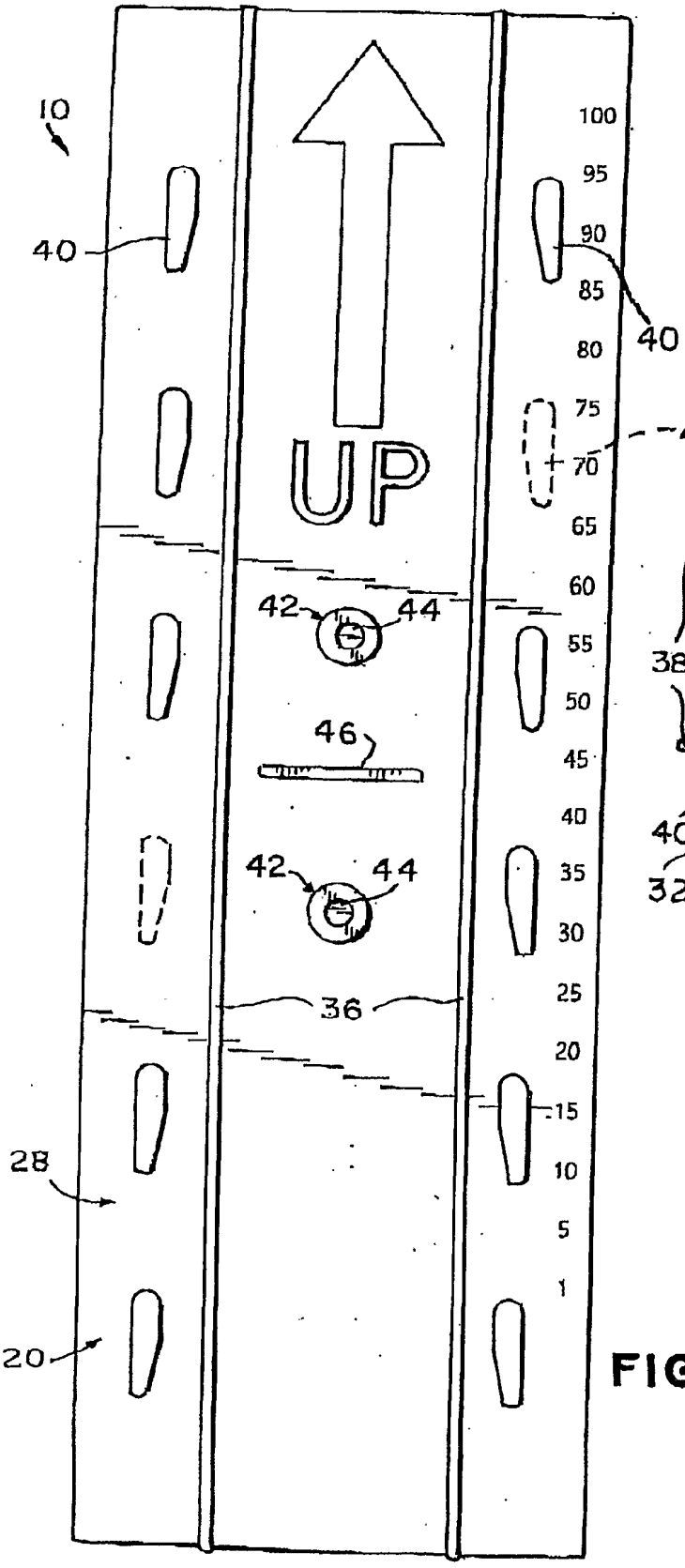
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FIG. 4

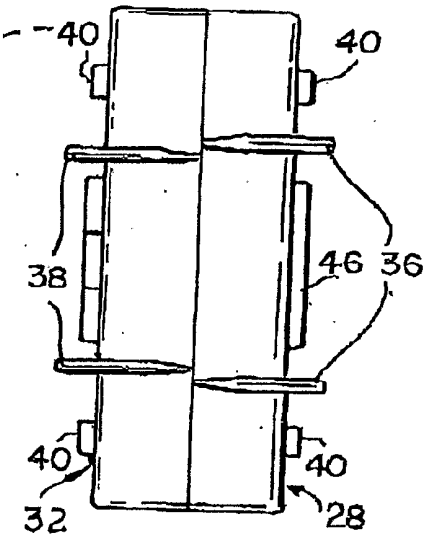
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FIG. 5

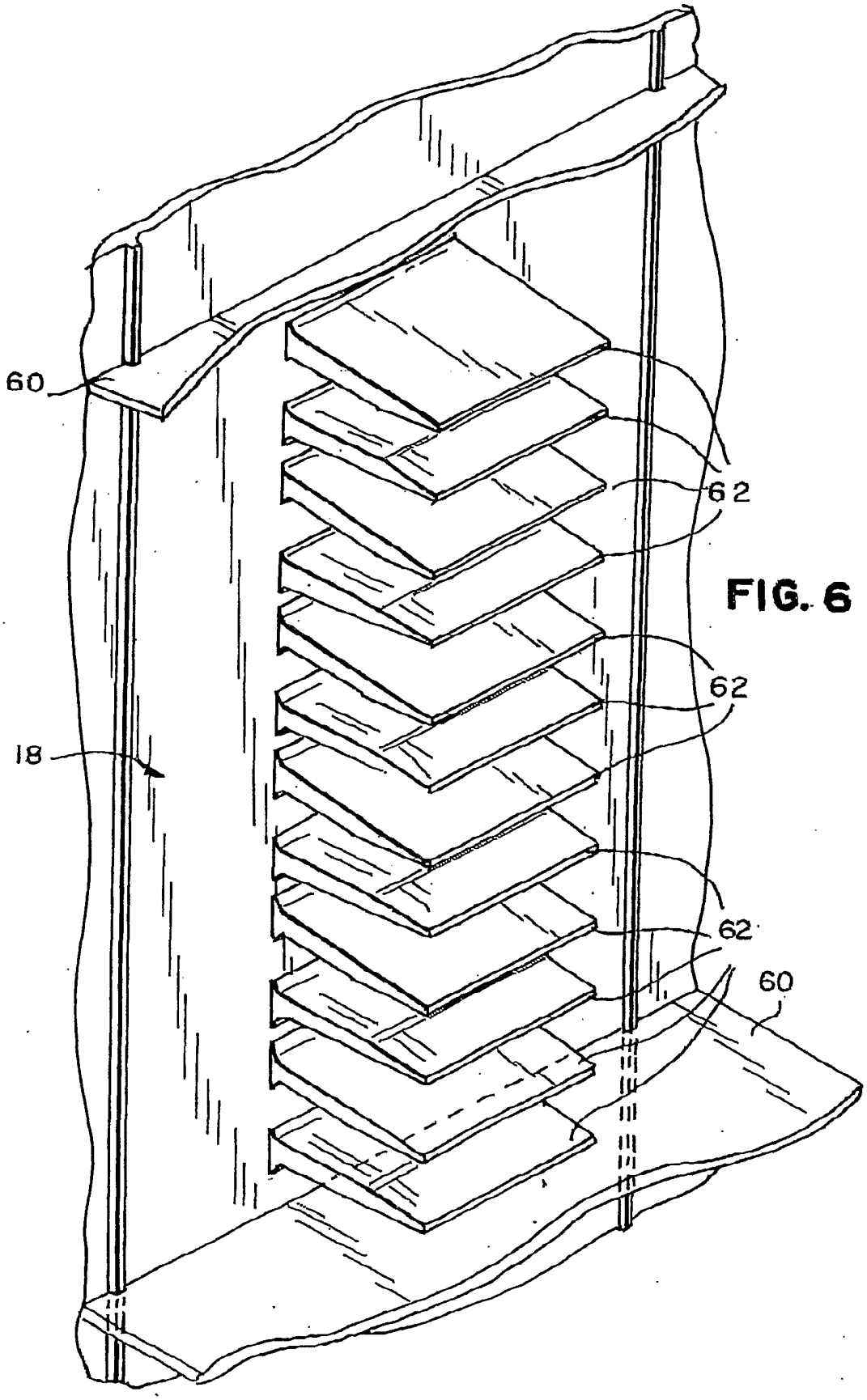

FIG. 6

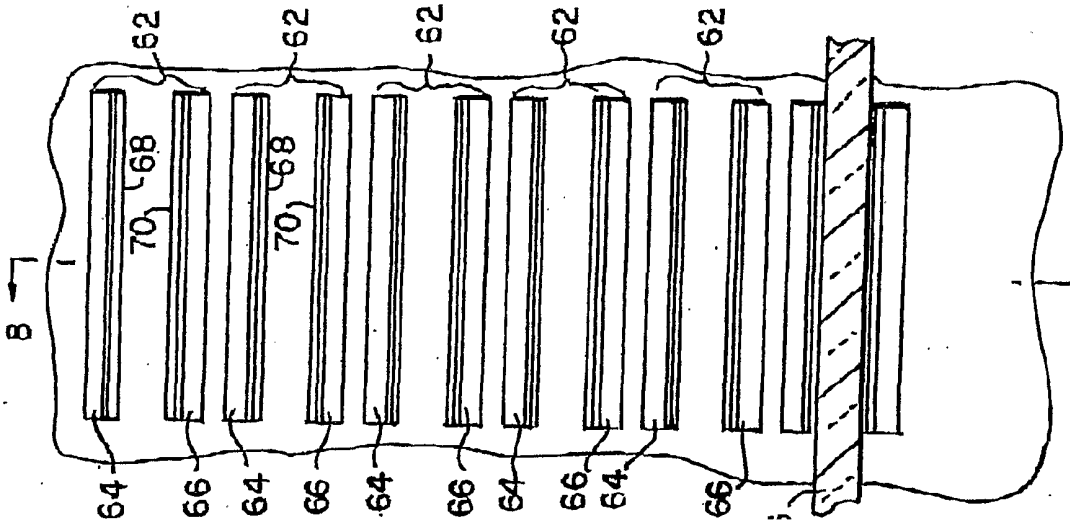

FIG. 7

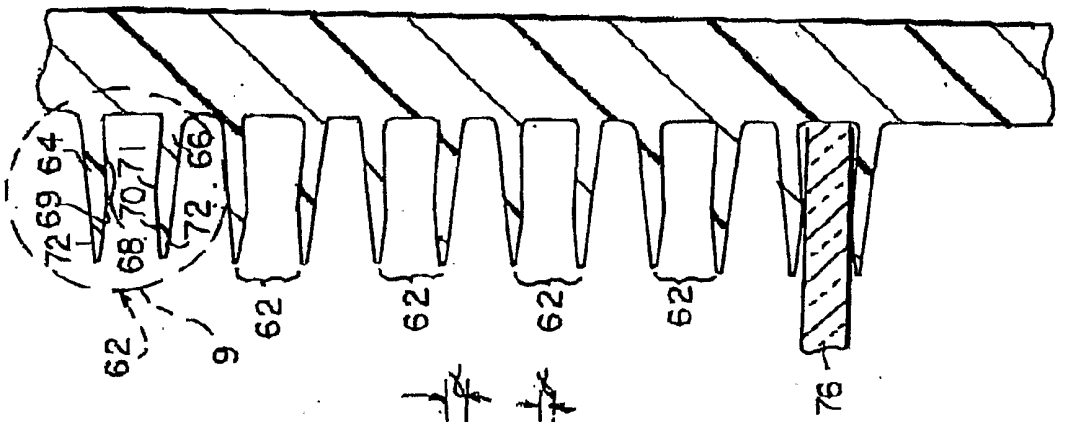

FIG. 8

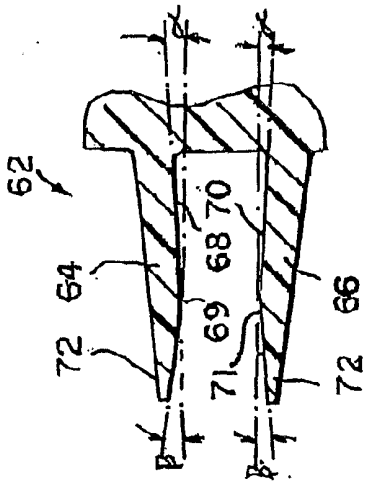

FIG. 9