FILED
APR 26 2005
MICHAEL W. DOBBINS
CLERK, U.S. DISTRICT COURT

NF

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

CHATSWORTH PRODUCTS, INC.,	Case No. 05C 2466
Plaintiff,	
v.	JUDGE KOCORAS
PANDUIT CORP.	MAGISTRATE JUDGE GERALDINE SOAT BROWN
Defendant.	

COMPLAINT
FOR DECLARATORY JUDGMENT OF NONINFRINGEMENT, INVALIDITY, AND UNENFORCEABILITY OF UNITED STATES PATENT NO. 6,884,942

Plaintiff Chatsworth Products, Inc. ("Chatsworth") for its complaint avers:

PARTIES

1. Plaintiff Chatsworth Products, Inc. is a Delaware corporation having its principal place of business at 31425 Agoura Road, Westlake Village, California 91361.

2. On information and belief, Defendant Panduit Corp. ("Panduit") is a Delaware corporation having its principal place of business at 17301 Ridgeland Avenue, Tinley Park, Illinois 60477.

JURISDICTION AND VENUE

3. This complaint is for declaratory judgment of noninfringement, invalidity and unenforceability of a United States patent and arises under the Patent Laws of the United States, Title 35 of the United States Code.

4. Jurisdiction is conferred on this Court by 28 U.S.C. §§ 1331, 1338, 2201, and 2202.

5. This Court has personal jurisdiction over Panduit.

6. Venue is proper in this district under 28 U.S.C. §§ 1391(b) and (c).

ACTUAL CONTROVERSY BETWEEN CHATSWORTH AND PANDUIT

7. Panduit owns United States Patent No. 6,766,093 ("'093 Patent").

8. On the day that the '093 Patent issued, Panduit brought an action in this Court, Case No. 04 C 4765, against Chatsworth alleging that Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager infringed the '093 Patent.

9. Chatsworth continues to make and sell its Universal Horizontal Cable Manager and its Double Sided Universal Horizontal Cable Manager.

10. Panduit continues to assert that Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager infringe the '093 Patent.

11. On April 26, 2005 The United States Patent and Trademark Office issued United States Patent No. 6,884,942 ("'942 Patent"). A copy of the '942 Patent is attached as Exhibit A.

12. Panduit owns the '942 Patent.

13. As the '942 Patent states, the application from which it issued is a continuation application of the application from which the '093 Patent issued.

14. The '942 Patent has the same specification and drawings as the '093 Patent.

15. The '942 Patent differs from the '093 Patent only by its claims by claiming priority from the application for the '093 Patent.

16. The '942 Patent has claims that consist only of requirements that are the same as or equivalent to requirements of the claims of the '093 Patent that Panduit alleged were infringed by Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager.

17. By accusing Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager of infringing the '093 Patent, Panduit asserted that those products meet every requirement of claims of the '093 Patent.

18. Panduit's assertions that Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager meet every requirement of claims of the '093 Patent, are assertions that those products infringe of the '942 Patent.

19. Panduit asserts that Chatsworth's Universal Horizontal Cable Manager and Chatsworth's Double-Sided Universal Horizontal Cable Manager of infringe the '942 Patent.

COUNT I INVALIDITY

20. Chatsworth incorporates by reference the allegations in paragraphs 1-19 above, as if fully alleged herein.

21. The claims of the '942 patent are invalid for failure to meet the requirements of 35 U.S.C. §§ 102 and 103 because the alleged inventions of the '942 Patent are taught by, suggested by, and/or obvious in view of the prior art.

22. An actual and justiciable controversy exists between Panduit and Chatsworth with regard to the validity of the claims of the '942 Patent.

COUNT II – UNENFORCEABILITY

23. Chatsworth incorporates by reference the allegations in paragraphs 1-19 above, as if fully alleged herein.

Unenforceability of the '093 Patent

24. The application for the '093 patent was prosecuted by Panduit's in-house patent counsel.

Panduit's Duty To Disclose Prior Art

25. During prosecution of the '093 Patent, those persons specified by 37 C.F.R. §1.56(c) who were associated with the filing or prosecution of the application for the '093 Patent owed a duty of candor to the United States Patent and Trademark Office ("USPTO").

26. The persons who owed a duty of candor to the USPTO included Panduit's in-house counsel who prosecuted the '093 Patent and the named inventors of the '093 Patent.

27. The inventors named by the '093 Patent were employees of Panduit when the application for the '093 Patent was filed.

28. The inventors named by the '093 Patent were employees of Panduit throughout the prosecution of the '093 Patent.

29. The duty of candor to the USPTO obligated those persons identified by paragraph 25 to disclose to the USPTO information that was material to patentability of claims that were prosecuted in the application for the '093 Patent as set out by 37 C.F.R. §1.56(b).

Panduit Argued And The Examiner of the '093 Patent Accepted That A Hinged Cover Mounted To Cable Manager Fingers Was Patentable

30. During prosecution of the '093 Patent, Panduit's in-house counsel submitted claims that required a hinged cover that is attachable to fingers of a horizontal cable manager for use in a network rack.

31. The examiner of the application for the '093 patent allowed claims having those requirements stating:

> the prior art fails to teach and/or suggest a cable manager and network rack including a hinged cover rotatably attachable to at least one of the first plurality of fingers and the second plurality of fingers as set forth in the claimed combination.
>
> Paper No. 6 at ¶15 on p. 6.

32. The examiner's statement set out by paragraph 31 was a reason for allowance of claims of the '093 Patent.

33. After the examiner made the statement set out by paragraph 31 above, Panduit cited additional prior art including Panduit's prior rack mounted cable managers shown in Panduit's 1998 catalog.

34. The examiner allowed claims after Panduit cited its own 1998 catalog stating:

> While the Panduit Catalog does show covers, the covers snap-lock in place, and do not rotate. While Corsi teaches a snap-lockable and rotatable cover, it is not readily obvious to modify the Panduit devices to include the cover of Corsi, especially given that the cover of Corsi is for a duct, which is functionally not equivalent to the fingers of Applicant.
>
> Paper No. 12 at p. 2.

35. The examiner's statement set out by paragraph 34 was a reason for allowance of claims of the '093 Patent.

The Examiner of the '942 Patent Stated That Claims Were Allowable Because A Hinged Cover Mounted To Cable Manager Fingers Was Patentable

36. In a paper mailed on November 9, 2004, the examiner of the '942 Patent stated that the claimed combination of a cable manager "comprising: the front cable routing section including a plurality of spaced fingers extending transversely from the from side of the central section and a hinged cover rotatably attachable to the plurality of fingers" was "neither disclosed nor taught by the prior art of record, alone or in combination."

37. The statement set out by paragraph 36 is the primary reason that claims 1 through 5 of the '942 Patent (application claims 42 through 46) were allowable.

Panduit's Disclosed Rack Mounted Cable Managers With Snap-On Covers

38. Rack mounted cable managers shown by the section of Panduit's 1998 catalog that it provided to the examiner of the '093 Patent application included horizontal cable managers identified by part nos. WMPH2, WMPHF2, WMP1, WMPF1, WMPS, WMPLS, WMPFS, and WMPLFS.

39. As depicted and described by page D35 of the 1998 Panduit catalog provided to the patent examiner, every one of those Panduit horizontal rack mounted cable managers identified by paragraph 38 above had a cover that snapped into place but did not rotate.

40. Rack mounted cable managers shown by the section of Panduit's 1998 catalog that it provided to the examiner of the '093 Patent application included vertical cable managers identified by part nos. WMVS20, WMPVS45, WMPVSF20, WMPVSF45, WMPVC20, and WMPVC45.

41. As depicted and described by page D33 of the 1998 Panduit catalog provided to the patent examiner, every one of those Panduit vertical rack mounted cable managers identified by paragraph 40 above had a cover that snapped into place but did not rotate.

42. Every one of those horizontal cable managers referred to by paragraph 38 above and every one of the vertical cable managers referred to by paragraph 40 above was offered for sale by Panduit more than a year before the earliest priority date claimed by the '093 Patent.

43. Every one of those horizontal cable managers referred to by paragraph 38 above and every one of the vertical cable managers referred to by paragraph 40 above was offered for sale by Panduit more than a year before the earliest priority date claimed by the '942 Patent.

44. The 1998 Panduit catalog referred to by paragraphs 38 and 40 above was distributed by Panduit more than a year before the earliest priority date claimed by the '093 Patent.

45. The 1998 Panduit catalog referred to by paragraphs 38 and 40 above was distributed by Panduit more than a year before the earliest priority date claimed by the '942 Patent.

Panduit's Undisclosed Hinged Replacement Covers for Panduit's Vertical and Horizontal Rack Mounted Cable Managers

46. Beginning at least as early as June 10, 1999, and not later than July 22, 1999, Panduit shipped to customers, distributors, and/or outside sales representatives hinged replacement covers that were made to mount to the fingers of every Panduit vertical and horizontal cable manager identified in paragraphs 38 and 40 above.

47. Those hinged replacement covers that are referred to by paragraph 46 above were shipped to customers, distributors, and/or outside sales representatives prior to the earliest priority date claimed by the '093 Patent.

48. Those hinged replacement covers that are referred to by paragraph 46 above were shipped to customers, distributors, and/or outside sales representatives prior to the earliest priority date claimed by the '942 Patent.

49. Upon information and belief, those hinged replacement covers that are referred to by paragraph 46 above were received by customers, distributors, and/or outside sales representatives prior to the earliest priority date claimed by the '093 Patent.

50. Upon information and belief, those hinged replacement covers that are referred to by paragraph 46 above were received by customers, distributors, and/or outside sales representatives prior to the earliest priority date claimed by the '942 Patent.

51. Upon information and belief, at least some of the customers, distributors, and/or outside sales representatives to whom the hinged replacement covers that are referred to by paragraph 46

were shipped were under no obligation to maintain those hinged replacement covers in confidence.

52. Instruction sheets that were included with the hinged replacement covers referred to by paragraph 46 depicted and instructed attachment of those hinged replacement covers to fingers of every horizontal and vertical cable manager identified in paragraphs 38 and 40 above.

53. Upon information and belief, the instruction sheets referred to by paragraph 52 above were distributed to persons who were under no obligation to maintain them in confidence prior to the earliest priority date claimed by '093 patent.

54. Upon information and belief, the instruction sheets referred to by paragraph 52 above were distributed to persons who were under no obligation to maintain them in confidence prior to the earliest priority date claimed by '942 patent.

55. The instruction sheets referred to by paragraph 52 above identified by part number the hinged replacement covers with which the instruction sheets were distributed.

56. The instruction sheets referred to by paragraph 52 above do not disclose that the hinged covers to which those instruction sheets pertained were for rack mounted cable managers.

57. Beginning in or about September 1999, Panduit distributed a "Product Bulletin" that depicted the hinged replacement covers for both the vertical and the horizontal cable managers identified in paragraphs 38 and 40 above, and instructed that the standard covers sold with those cable managers be replaced with the hinged replacement covers.

58. The Product Bulletin referred to by paragraph 57 identified the hinged replacement covers to which it referred by part numbers.

59. The Product Bulletin referred to by paragraph 57 associated, by part number, the hinged replacement covers with the rack mounted cable managers identified by paragraphs 38 and 40.

60. The Product Bulletin referred to by paragraph 57 was distributed prior to the earliest priority date claimed by the '093 Patent.

61. The Product Bulletin referred to by paragraph 57 was distributed prior to the earliest priority date claimed by the '942 Patent.

62. Beginning in or about September 1999, the hinged replacement covers for the horizontal and vertical cable managers identified in paragraphs 38 and 40 above were offered for sale by Panduit and were depicted in promotional publications distributed by Panduit.

63. Panduit did not disclose the hinged replacement covers referred to by paragraph 46 above, the instruction sheet that was included with those hinged replacement covers that is referred to by paragraph 52 above, or the "Product Bulletin" referred to by paragraph 57 above to the examiner of the application for the '093 Patent.

64. Panduit did not disclose any other information that disclosed those hinged replacement covers referred to by paragraph 46 to the examiner of the '093 Patent.

65. Panduit did not disclose the "Product Bulletin" referred to by paragraph 57 to the examiner of the application for the '942 patent.

66. Panduit did not disclose the Instruction Sheet that identified the part numbers of the hinged replacement covers to the examiner of the application for the '942 patent.

67. Panduit did not disclose to the examiner of the application for the '093 Patent that it distributed and sold, prior to the earliest priority date claimed by the '093 Patent, hinged replacement covers for the rack mounted cable managers referred to by paragraphs 38 and 40 above.

68. Panduit did not disclose to the examiner of the application for the '942 Patent that it distributed and sold, prior to the earliest priority date claimed by the '942 Patent, hinged

replacement covers for the rack mounted cable managers referred to by paragraphs 38 and 40 above.

69. Upon information and belief, Panduit's in-house patent counsel who prosecuted the '093 Patent and the '942 Patent knew of the "Product Bulletin" referred to by paragraph 57, Instruction Sheet that identified the part numbers of the hinged replacement covers, and that Panduit distributed and sold, prior to the earliest priority date claimed by the '093 Patent, hinged replacement covers for the rack mounted cable managers referred to by paragraphs 38 and 40 above.

Passthrough Openings In Horizontal Rack Mounted Cable Managers

70. Claims of the '093 Patent require passthrough openings in horizontal rack mounted cable managers to provide access to a cable routing section of the cable manager.

71. All claims of the '942 Patent require passthrough openings in a horizontal rack mounted cable manager.

72. Page D36 of the 1998 Panduit catalog disclosed horizontal rack mounted cable managers having passthrough openings.

73. Panduit did not disclose page D36 of the 1998 Panduit catalog to the examiner of the application for the '093 Patent.

74. Panduit did not disclose page D36 of the 1998 Panduit catalog to the examiner of the application for the '942 Patent.

75. Upon information and belief, Panduit's in-house patent counsel who prosecuted the '093 Patent knew of page D36 of Panduit's 1998 catalog.

76. Upon information and belief, Panduit's in-house patent counsel who prosecuted the '942 Patent knew of page D36 of Panduit's 1998 catalog.

Panduit's Undisclosed Patent Application For A Hinged Cover That Mounted To Cable Manager Fingers

77. On March 3, 1999, Panduit filed a patent application with the USPTO that eventually issued as U.S. Patent No. 6,437,243 ("the '243 Patent").

78. The application for the '243 Patent was prosecuted by Panduit's in-house patent counsel.

79. The '243 Patent application names completely different inventors than did the application for the '093 Patent.

80. The application for the '243 Patent disclosed a hinged cover that mounted to the fingers of a duct that forms a section of Panduit's horizontal and vertical cable managers.

81. Panduit has represented that the hinged covers referred to by paragraph 46 above are within the scope of the '243 Patent.

82. Panduit did not disclose the application for the '243 Patent application to the examiner of the '093 Patent.

83. Upon information and belief, Panduit's in-house counsel who prosecuted the '093 Patent knew of Panduit's '243 Patent and of the application for that patent.

Unenforceability Of The '093 Patent

84. Upon information and belief, as alleged above individuals associated with the filing and prosecution of the application for the '093 Patent withheld prior art that was material to patentability from the examiner of the application for the '093 Patent with an intent to deceive the examiner.

85. The '093 patent is unenforceable due to inequitable conduct during its prosecution before the USPTO.

86. An actual and justiciable controversy exists between Panduit and Chatsworth with regard to the enforceability of the '093 Patent.

Unenforceability Of The '942 Patent

87. The examiner of the application for the '942 Patent rejected all claims that issued in the '942 Patent as not patentably distinct from the claims of the '093 Patent.

88. Panduit did not assert that the claims of the application for the '942 Patent were patentably distinct from the claims of the '093 Patent.

89. The '942 Patent is unenforceable based on Panduit's inequitable conduct in prosecuting the '093 Patent and the close relationship of the claims of the '093 Patent and the '942 Patent.

90. Upon information and belief, as alleged above individuals associated with the filing and prosecution of the application for the '942 Patent withheld prior art that was material to patentability from the examiner of the application for the '942 Patent with an intent to deceive the examiner.

91. The '942 Patent is unenforceable due to inequitable conduct during its prosecution before the USPTO.

92. An actual and justiciable controversy exists between Panduit and Chatsworth with regard to the enforceability of the '942 Patent.

COUNT III - NONINFRINGEMENT

93. Chatsworth incorporates by reference the allegations in paragraphs 1-19 above, as if fully alleged herein.

94. Chatsworth asserts that it has not induced infringement of, is not infringing, and has not infringed any claim of the '942 Patent.

95. An actual and justiciable controversy exists between Panduit and Chatsworth with regard to infringement of the '942 Patent.

JURY DEMAND

Chatsworth Products, Inc. demands a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Chatsworth Products, Inc. prays that this Court grant the following relief:

A. Judgment be entered that the '942 patent is invalid, unenforceable, and not infringed by Chatsworth.

B. A finding that this case is exceptional as provided by 35 U.S.C. § 285 and award to Chatsworth its costs and reasonable attorney fees.

C. Such further relief as this Court deems just.

Dated this 26th day of April, 2005.

Steven J. Hampton
Richard T. McCaulley, Jr.
Matthew A. Anderson
McANDREWS, HELD & MALLOY LTD.
500 West Madison Street, Suite 3400
Chicago, IL 60661
Telephone: (312) 775-8000
Facsimile: (312) 775-8100

Attorneys for Plaintiff
Chatsworth Products, Inc.

Exhibit A

United States Patent No. 6,884,942

US006884942B2

(12) **United States Patent**
McGrath et al.

(10) **Patent No.: US 6,884,942 B2**
(45) **Date of Patent: Apr. 26, 2005**

(54) **CABLE MANAGER FOR NETWORK RACK**

(75) Inventors: **Michael J. McGrath**, New Lenox, IL (US); **Kevin L. Goodwin**, Frankfort, IL (US)

(73) Assignee: **Panduit Corp.**, Tinley Park, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/842,666**

(22) Filed: **May 10, 2004**

(65) **Prior Publication Data**

US 2004/0206532 A1 Oct. 21, 2004

Related U.S. Application Data

(63) Continuation of application No. 09/814,621, filed on Mar. 22, 2001, now Pat. No. 6,766,093.
(60) Provisional application No. 60/192,989, filed on Mar. 28, 2000.

(51) **Int. Cl.**[7] **H01B 3/00**
(52) **U.S. Cl.** **174/68.1**; 174/68.3; 174/135; 174/97; 385/135
(58) **Field of Search** 174/100, 68.1, 174/68.3, 135, 97; 385/134, 135, 136; 242/586.6; 439/719; 361/825, 826

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,921,607	A	1/1960	Caveney
3,705,949	A	12/1972	Weiss
3,711,633	A	1/1973	Ghirardi et al.
3,786,171	A	1/1974	Shira
4,160,880	A	7/1979	Brey
4,177,359	A	12/1979	Naranjo
4,398,564	A	8/1983	Young et al.
4,423,284	A	12/1983	Kaplan
4,630,886	A	12/1986	Lauriello et al.

(Continued)

OTHER PUBLICATIONS

Panduit Corp. Installation Instructions Sheet, one page, 1999.

Hubbell Premise Wiring 2U Horizontal Cable Management Panel Assembly Drawing, one page, date unknown.

Photographs of the Siemon Co. Terminal Block Cover, one page, date unknown.

Panduit Communication Products Catalog, front cover and pp. D33–D35, 1998.

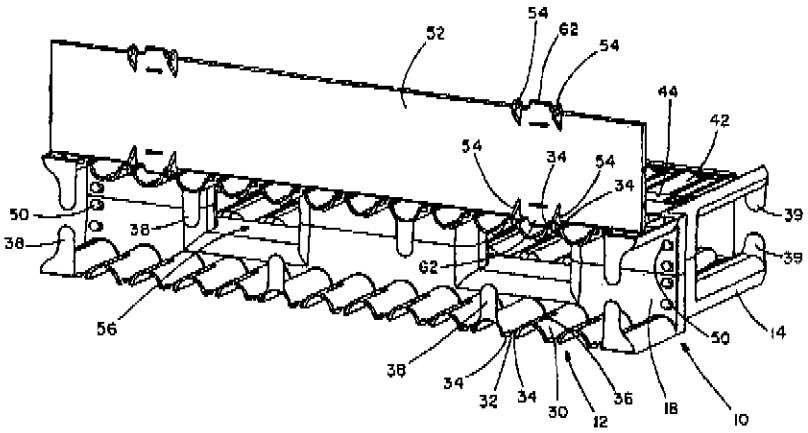
B–Line Systems, Inc. Telecom Equipment Supports Catalog, front cover, p. 48 and back cover, 1996. No Month & Date.

Primary Examiner—Dhiru R. Patel
(74) *Attorney, Agent, or Firm*—Robert A. McCann; Christopher S. Clancy

(57) **ABSTRACT**

A cable manager provides horizontal cable management of adjacent patch panels or network equipment on network distribution racks. The cable manager includes a central section and a front cable routing section and is mountable on a network rack, such as an EIA rack. The central section has a longitudinal width sized to fit within the network rack, a front side, a rear side, and rack mounting holes provided on opposite longitudinal ends of the central section. The front cable routing section extends from the front side of the central section and, includes a plurality of spaced fingers having an arcuate surface that provides bend radius control. A slit provides flexibility to the fingers. Ears extend laterally from the fingers. The cable manager can also include a rear cable routing section that includes a second plurality of spaced fingers. One or more passthrough openings can be provided in the central section to allow routing of cabling from the front section to the rear section. Either or both of the from and rear sections can include a removable cover. The cover may be hingedly connected.

15 Claims, 9 Drawing Sheets



U.S. PATENT DOCUMENTS

4,697,720	A	10/1987	Hotchkiss et al.		
4,759,057	A	7/1988	DeLuca et al.		
4,898,550	A	2/1990	Ayer		
4,942,271	A	7/1990	Corsi et al.		
5,023,404	A	6/1991	Hudson et al.		
5,024,251	A	6/1991	Chapman		
5,073,841	A	12/1991	DelGuidice et al.		
5,442,725	A	8/1995	Peng		
5,448,015	A	9/1995	Jamet et al.		
5,640,482	A	6/1997	Barry et al.		
5,715,348	A	2/1998	Falkenberg et al.		
5,728,976	A	3/1998	Santucci et al.		
5,902,961	A	* 5/1999	Viklund et al.	.....	174/100
5,964,611	A	* 10/1999	Jacob et al.	.....	439/372
6,215,069	B1	4/2001	Martin et al.		
6,321,340	B1	* 11/2001	Shin et al.	.....	713/310
6,424,781	B1	7/2002	Puetz et al.		
6,437,243	B1	8/2002	VanderVelde et al.		
6,468,112	B1	* 10/2002	Follingstad et al.	.....	439/719
6,539,161	B2	3/2003	Holman et al.		

* cited by examiner

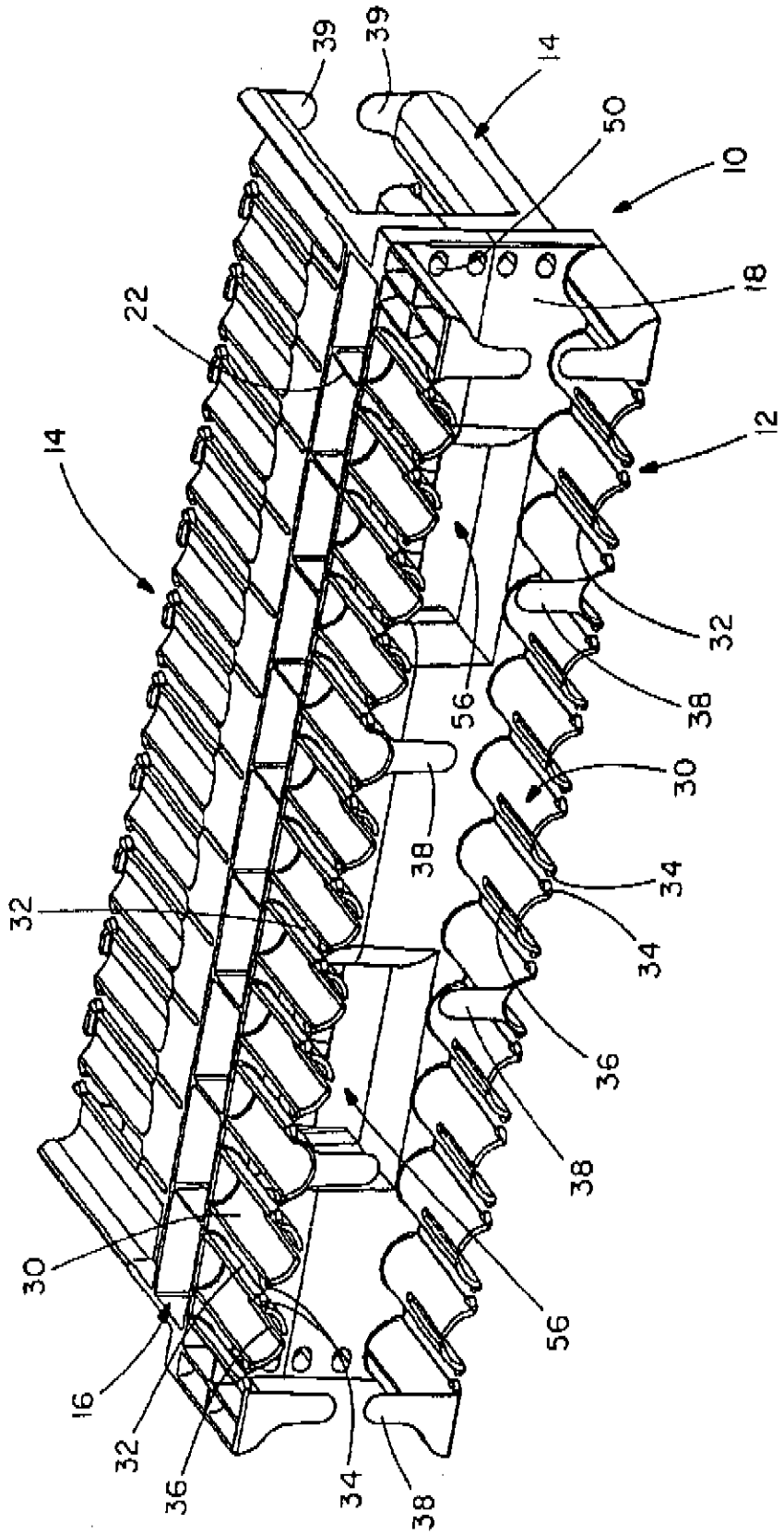

39
39
14
50
10
18
22
12
14
32
38
56
30
38
34
32
34
36
38
30
56
16
32
36
34
38

FIG. 1

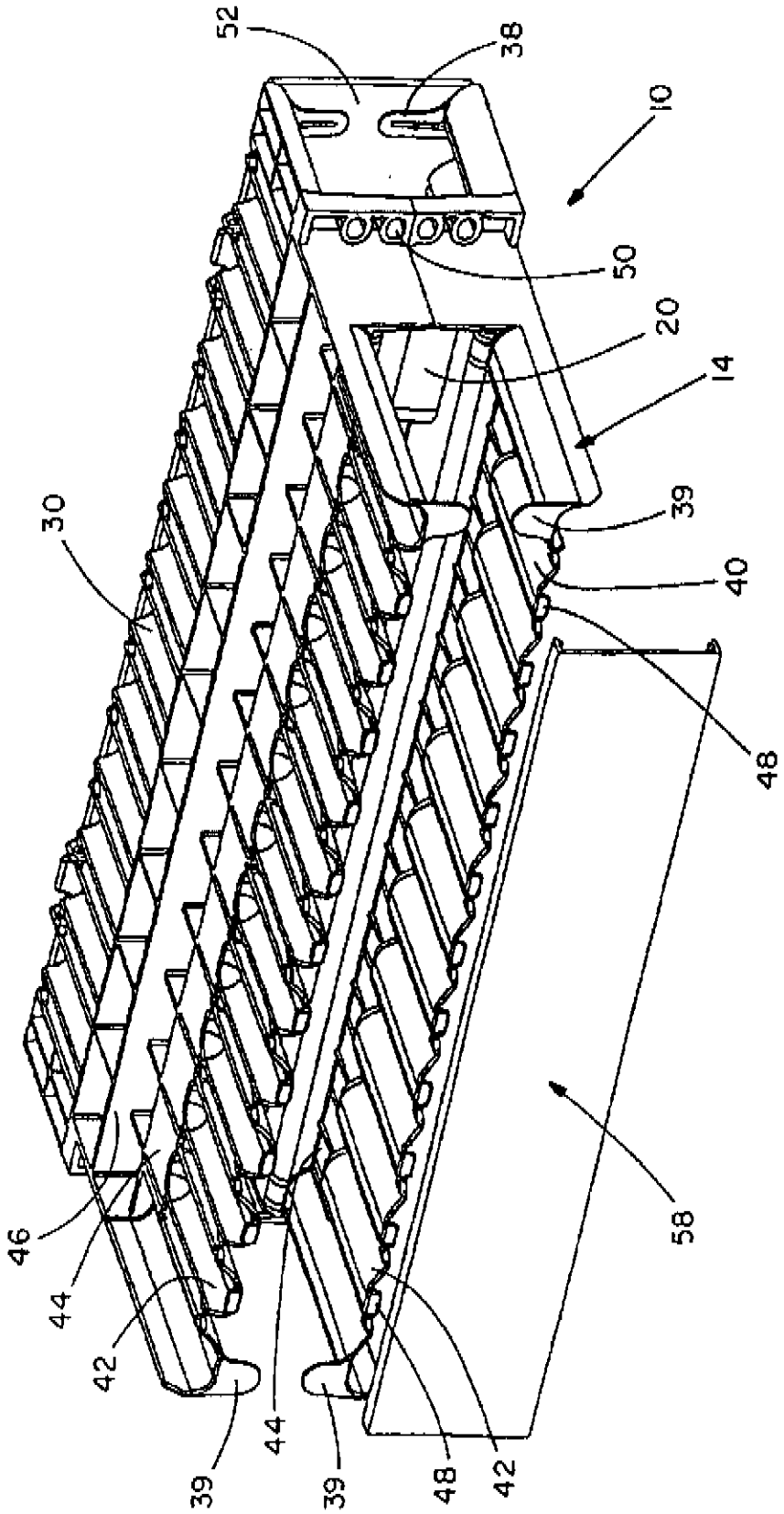


FIG.2

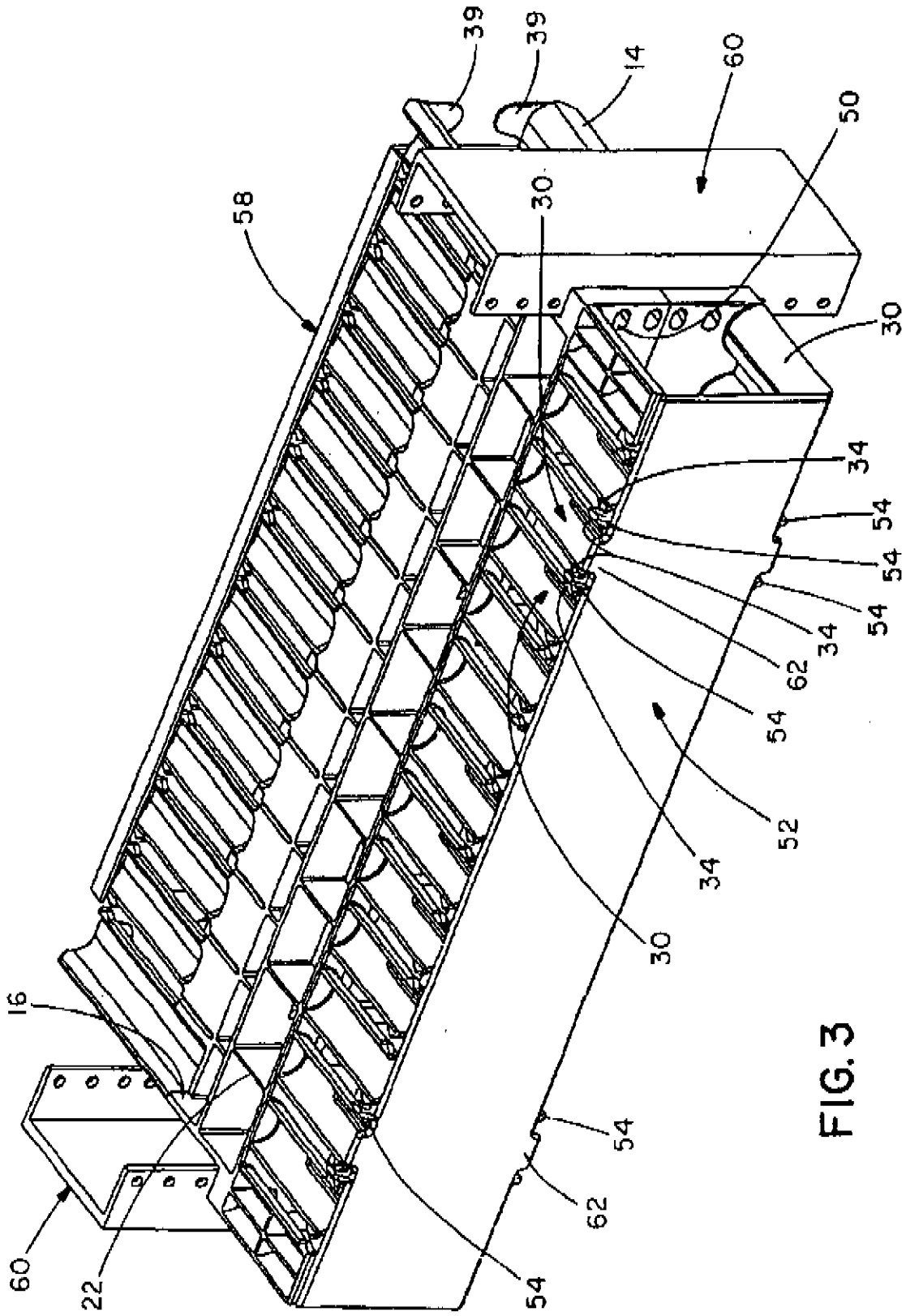


FIG. 3

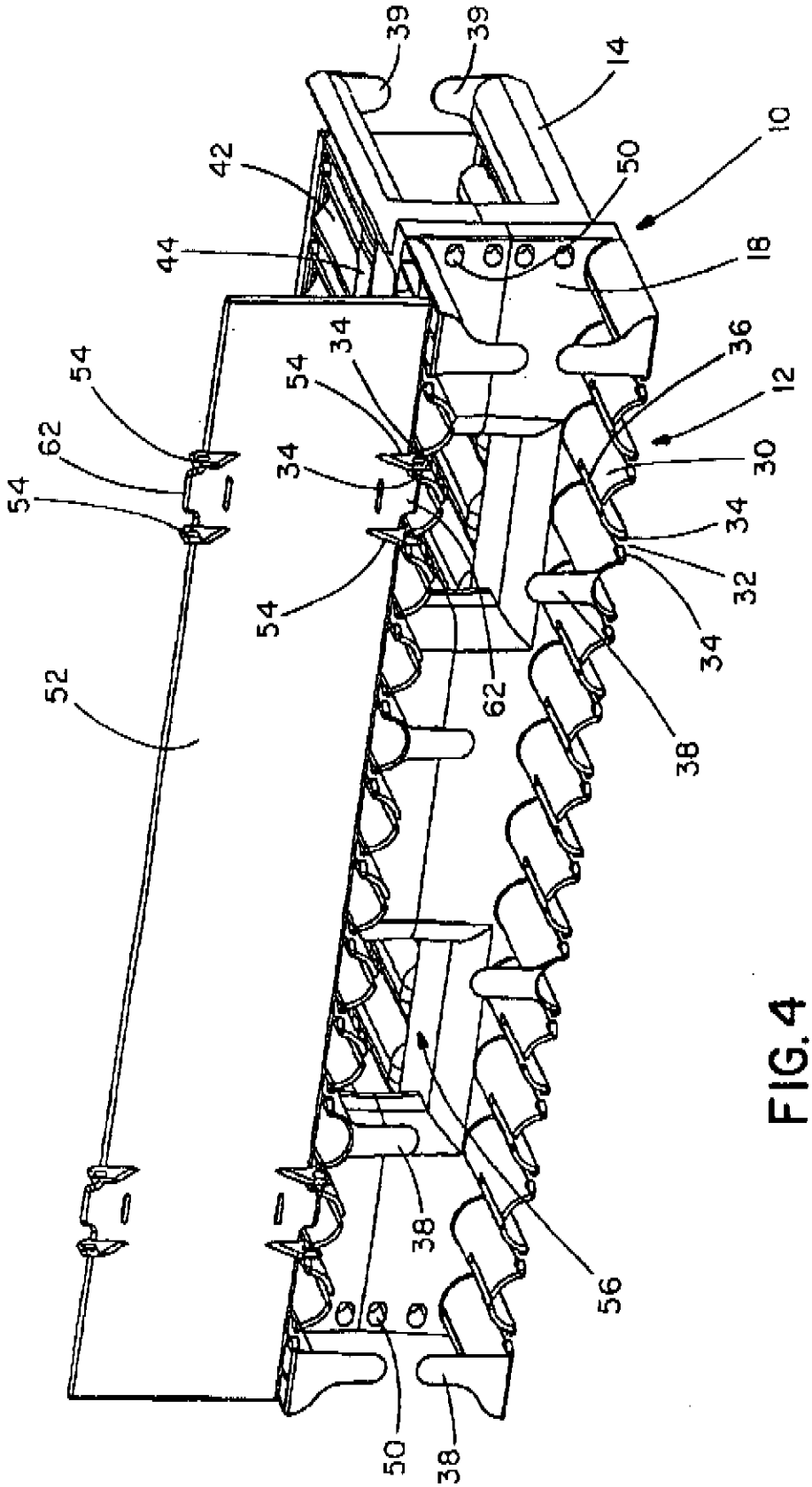

39
39
14
10
42
50
44
18
36
54
34
54
12
62
34
30
54
34
32
54
34
52
62
38
38
56
50
38

FIG. 4

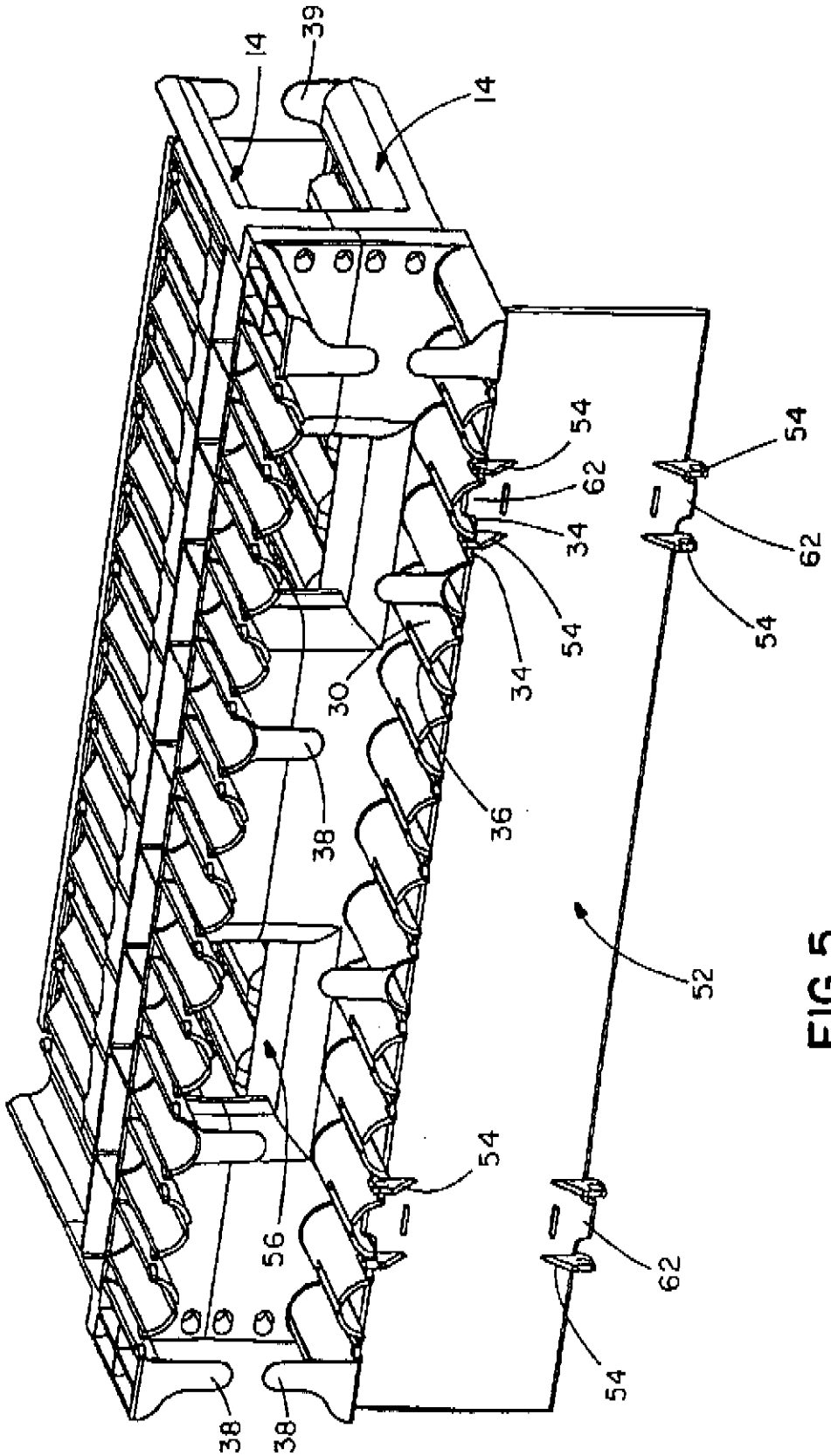


FIG.5

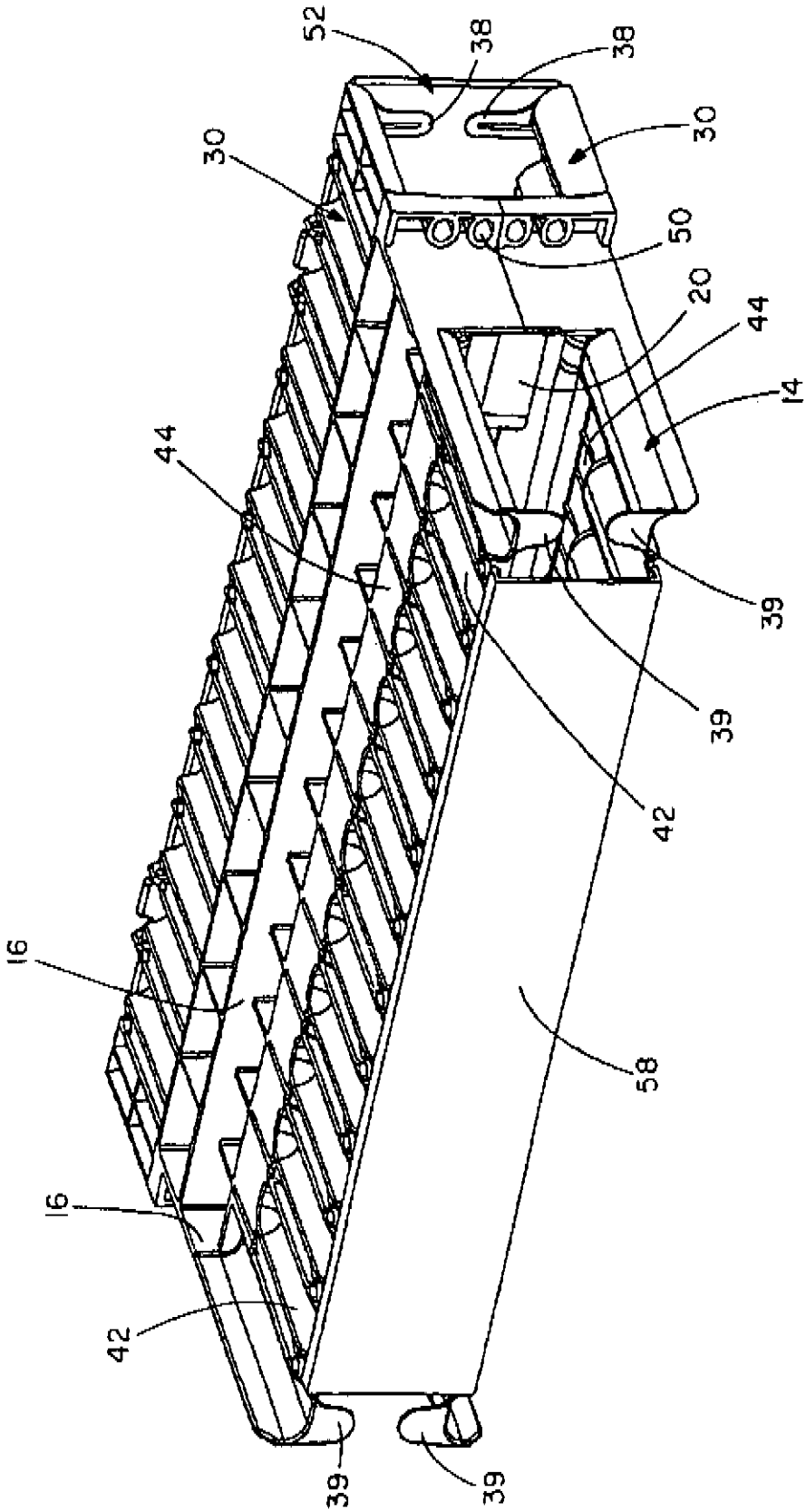


FIG.6

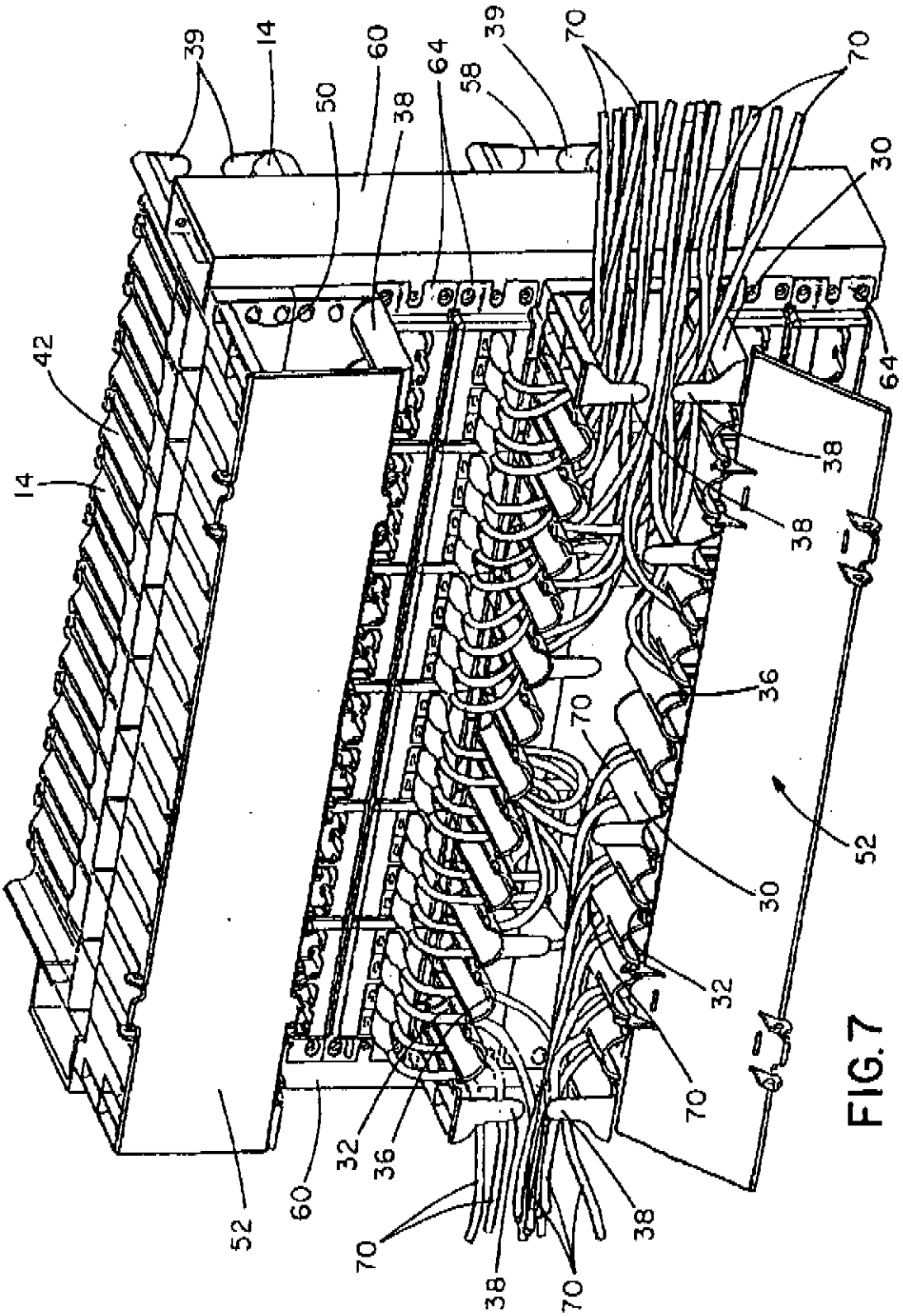

39
14
60
64
39
70
70
58
50
38
30
64
42
38
14
38
36
70
52
30
32
70
52
60
32
36
70
38
38
70

FIG. 7

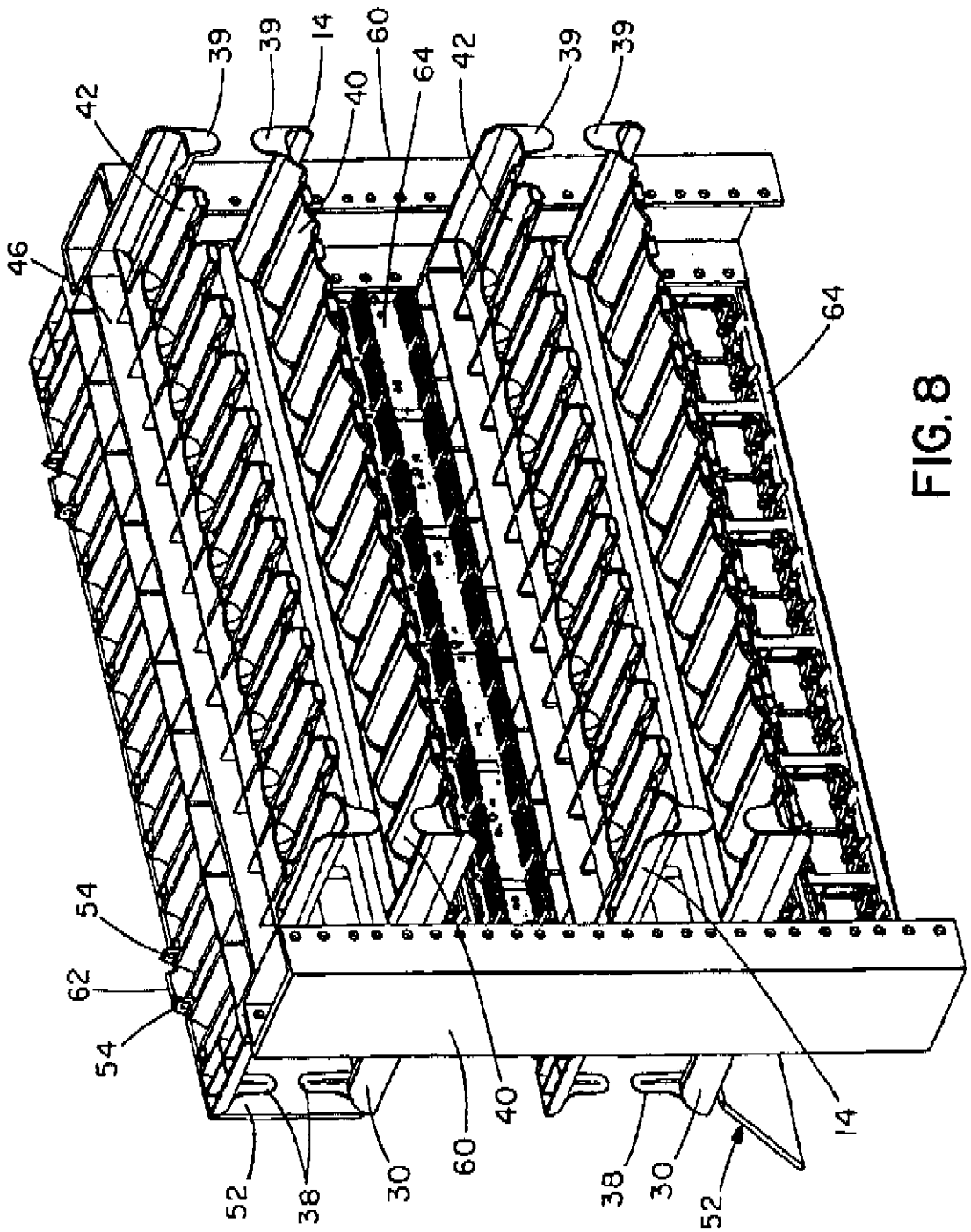


FIG. 8

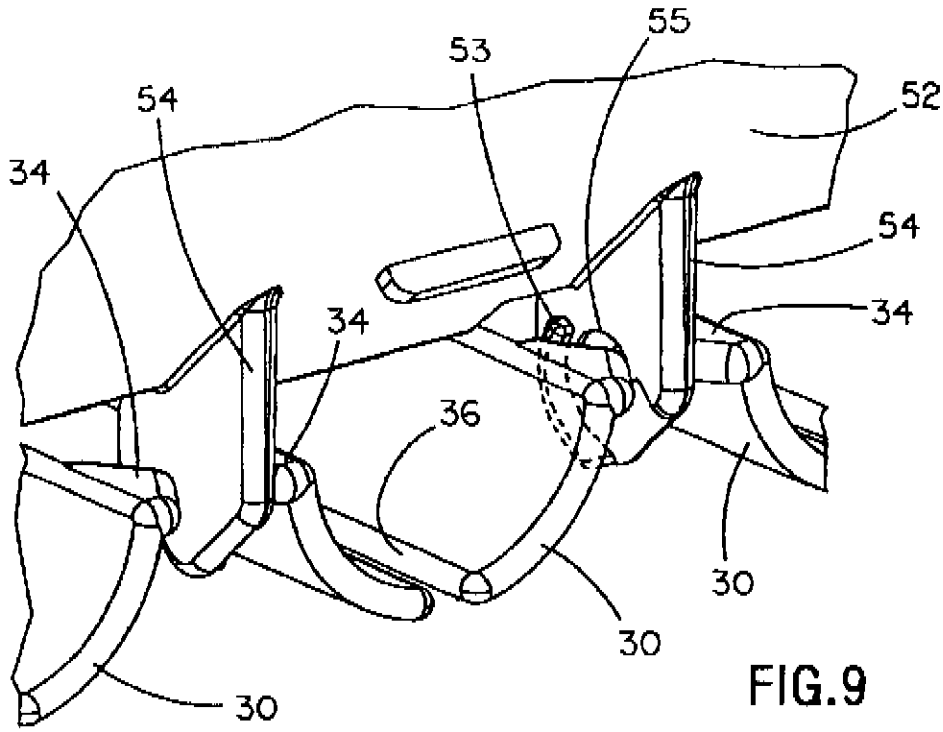


FIG.9

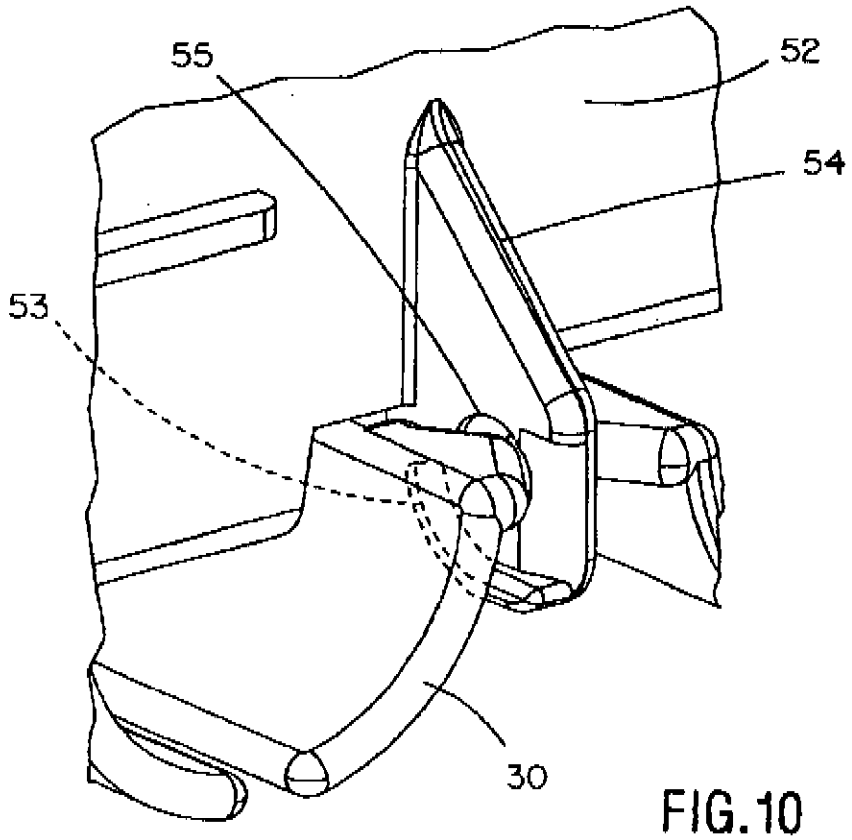


FIG.10

CABLE MANAGER FOR NETWORK RACK

BACKGROUND OF THE INVENTION

This Application is a Con of Ser. No. 09/814,621 Mar. 22, 2001 now U.S. Pat. No. 6,766,093 which claims under 35 U.S.C. § 119(e), the benefit of priority of the filing date of Mar. 28, 2000, of U.S. Provisional Patent Application Ser. No. 60/192,989, filed on the aforementioned date, the entire contents of which are incorporated herein by reference.

1. Field of Invention

The present invention relates generally to cable management devices for patch panel or network equipment racks, and more particularly to a cable manager for use with adjacent patch panels or network equipment on distribution racks or within cabinets, with an improved finger and cover design

2. Description of Related Art

Cabling, such as unshielded twisted pair, screened twisted pair, coax and fiber optic cabling, is being increasingly used in the telecommunications industry to provide data, voice, video or audio information. Patch panel or network equipment enclosure and rack systems are well-known in the industry and provided to manage and organize such cables to or from equipment or cross-connect systems. These systems usually include a standard EIA 19", 23" or other distribution frame rack on which one or more patch panels, network equipment, fiber optic enclosures and the like are mounted. Enclosures within the rack serve various functions, including operation as slack trays, splice trays, cable organizers and patch panels. These racks also serve as inter-connect or cross-connect enclosures when interfacing with equipment, or may serve as a telecommunications closet, allowing the cables to be terminated, spliced, patched or stored at places along their length.

The rack usually is formed of a frame having mounting apertures located along vertical legs or walls of the rack. Patching equipment, such as a patch panel, is mounted on the rack so as to define generally a patching side where patch cords coming from an active device or another patch panel can be cross-connected and interconnected, and a distribution side where cables from network equipment or a work station area are terminated. Generally some form of cable management is also provided on both sides of the rack to support and route the cables. While preventing detrimental bending is always important even for copper cabling, with the increasing use of fiber optic connectors as applied to connector rack systems, proper cable management and bend radius control has become increasingly important. Many known systems are unable to provide complete bend radius control, are inefficient in use, difficult to manufacture, or have other drawbacks and thus, improvement in the cable management of network rack systems is desired.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved cable management device.

It is a further object of the present invention to provide a cable manager for a network rack with an improved finger design that provides more effective bend radius control.

It is another object of the present invention to provide a single cable manager device that provides improved cable management to each side of a network rack.

It is still further an object of the present invention to provide an improved readily installable molded cable manager with a hinged cover for a network rack system.

Various ones of the above and other features and objects of the invention are provided by a cable manager mountable to a network rack. The cable manager includes a central section and a front cable routing section. The central section has a longitudinal width sized to fit within the network rack, a front side, a rear side, and rack mounting holes provided on opposite longitudinal ends of the central section. The front cable routing section extends from the front side of the central section and includes a plurality of spaced fingers extending transversely from the front side of the central section. Each of the plurality of spaced fingers has an arcuate surface that provides bend radius control. A slit is medially disposed along the arcuate surface and extends from a distal end of the finger towards a proximal end of the finger. At least one ear laterally extends from the distal end in a receiving space between adjacent fingers.

Various ones of the above and other features and objects of the invention are also provided by a cable manager mountable to a network rack, comprising a central section, a front cable routing section and a rear cable routing section. The central section has a longitudinal width sized to fit within the network rack, a front side, a rear side, and rack mounting holes provided on opposite longitudinal ends of the central section. The front cable routing section extends from the front side of the central section and includes a first plurality of spaced fingers extending transversely from the front side of the central section and retaining flanges extending from distal ends of multiple ones of the first plurality of spaced fingers. The rear cable routing section extends from the rear side of the central section, the rear cable routing section including a second plurality of spaced fingers extending transversely from the rear side of the central section and retaining flanges extending from distal ends of multiple ones of the second plurality of spaced fingers.

Various ones of the above and other features and objects of the invention are also provided by a network rack containing the above cable manager.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and further objects, features and advantages of the present invention will become apparent from the following description of preferred embodiments with reference to the accompanying drawings, wherein:

FIG. **1** shows a top front perspective view of a cable manager of the present invention;

FIG. **2** is a top rear perspective view of the cable manager of FIG. **1**, with the rear cover removed;

FIG. **3** is a top front perspective view of the cable manager of FIG. **1**, shown with closed covers;

FIG. **4** is a top front perspective view of the cable manager of FIG. **1** with a front cover in a top open position;

FIG. **5** is a top front perspective view of a cable manager of FIG. **1** with the cover in a bottom open position;

FIG. **6** is a top rear perspective view of the cable manager of FIG. **1**, shown with closed covers;

FIG. **7** is a top front perspective view of a network rack having a pair of the cable managers mounted on the rack;

FIG. **8** is a top rear perspective view of a network rack having a pair of the cable managers mounted on the rack;

FIG. **9** is a partial perspective view of a hinged cover; and

FIG. **10** is a partial view of the hinged cover of FIG. **9** in an open position.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

A cable manager **10** according to an exemplary embodiment of the present invention is generally shown in FIGS.

1–10 and is useful in providing horizontal cable management in a network rack.

Cable manager **10** is preferably formed by an injection molding process in which two halves, preferably identical halves, are molded and then snap fit together to form a single cable manager device that is mountable on and provides cable management to both a patching side and a distribution side of a network rack. A suitable rack is a conventional 19" or 23" EIA network rack that has spaced vertical rails or legs that allow mounting of various numbers of rack elements thereon. However, the invention is equally applicable to other known or subsequently developed racks. Moreover, a network rack need not be an open frame structure as in the above EIA racks, but may include mounting cabinets or enclosures having mounting features and walls defining openings that can receive and fix rack elements, such as cable manager **10**, patch panels, and the like.

As can be seen from FIGS. **1** and **2**, cable manager **10** generally includes a front cable routing section **12**, a rear cable routing section **14** and a central section **16**, which preferably has passthrough capabilities. The front and rear cable routing sections **12**, **14** generally include a pair of back-to-back channels each formed by a base section **18**, **20** and a plurality of upstanding fingers **30**, **40** disposed longitudinally along at least one and preferably two opposing sides (front and rear) of the respective base sections.

Central section **16** has a suitable height, a longitudinal width sized to fit within a desired network rack, and a depth which approximates the depth dimension of rack legs **60** (FIGS. **3** and **7**) or a mounting cabinet (not shown) to which the cable manager **10** is mounted. In the case of a 19" network rack, the width would be approximately 19" when mounted horizontally on the rack and the height would be a multiple of 1.75", which is a standard single device height. However, these are exemplary and may change depending on the size and type of rack used. Each longitudinal end of the central section **16** contains a plurality of mounting holes **50** that mount the cable manager to a frame structure, such as legs **60** of a standard rack system or to walls of a mounting cabinet (unshown). The legs **60** (or other equivalent mounting frame structure) have various apertures that allow mounting of the cable manager to the rack by a suitable mounting element, such as a bolt, that extends through the mounting holes and rack apertures aligned therewith. The base sections **18**, **20** are integrally connected by a central wall and a plurality of strengthening walls **22** to comprise the central section **16**.

The central section **16** of the cable manager is preferably a passthrough section that includes one or more passthrough openings **56**. The passthrough openings **56** allow installers the ability to route cables from one side of the rack to the other (i.e., from the patching side to the distribution side and the converse). The passthrough openings **56** preferably are formed with curved sidewalls that provide bend radius control to the cables routed through the passthrough openings.

The front cable routing side of the cable manager (front section **12**) preferably forms the patching side where active equipment is interconnected or patch cords on a patch panel are cross-connected. As shown in FIGS. **1**, **4**, **5** and **7**, patching side fingers **30** extend from base section **18** in the form of two parallel and spaced rows that define a cable channel. Fingers are separated from adjacent fingers **30** to provide a space **32** for routing cables from within the cable channel to the equipment either above or below on the rack. The fingers **30** preferably extend outwardly beyond the frame legs **60** as shown. Each of the plurality of patching side fingers **30** are formed having an inwardly directed arcuate surface at least on a distal portion of the finger. The arcuate surfaces of fingers **30** have a predefined minimum radius that provides a bend radius control surface for wires and cables. The minimum bend radius can vary depending on the types of wires and cables used. An exemplary radius may be 1" or greater for many applications. However, the minimum bend radius should be selected to correspond to desired criteria of cable(s) to be managed by the cable manager.

Fingers **30** are also provided with a pair of ears **34** formed near the distal end with each ear extending towards an opposing ear formed on an adjacent finger **30**. The ears **34** preferably have a generally triangular configuration that provides angled surfaces which assist in the insertion and removal of cables from in between the fingers. As the formation of the fingers with an arcuate cross-section has been found to result in a relatively stiff structure, each finger **30** on the patching side also includes a slit **36** medially disposed along the arcuate surface of the finger. Slit **36** is formed to extend from the distal end towards the base approximately one-half the length of finger **30**. Slit **36** provides additional flexibility to fingers **30** during routing of cables.

As best seen in FIGS. **3–5**, the patching side of cable manager **10** includes a hingedly connected front cover **52**, which can be rotated **180** up or down. That is, cover **52** can be opened from either side. Cover **52** may also be completely removable. Cover **52** is hingedly connected to cable manager **10** by a plurality of spaced apart pairs of hinge brackets **54** having apertures. The hinge brackets **54** are dimensioned so as to releasably engage with the tops of a pair of opposing ears **34** formed on adjacent patching fingers **30**. A release tab **62** is formed in between hinge brackets **54** to allow for easier releasing of cover **52** by extending beyond the remaining periphery of cover **52**.

A more detailed description of hinged cover **52** will be described with respect to FIGS. **9–10**. Hinge brackets **54** include a semi-spherical aperture **55** that mates with a corresponding ear **34** to allow rotation thereabout and a locking tab **53** that engages with an edge of ear **34** to lock the cover in an open position when cover **52** is opened about 180°. Cover **52** can be closed by pulling forward on the cover to release locking tab **53** and allow rotation of cover **52** back to a closed position.

FIG. **7** shows a pair of cable manager devices **10** mounted on a network rack having a pair of rack legs **60**, adjacent to a plurality of patch panels **64**. As shown, the cable managers **10** may be provided either above and/or below a patch panel **64**. The lower cable manager device **10** is shown with the cover **52** rotated open in the down position. As can be seen, cables **70**, which terminate connectors connected to patch panels **64**, are routed through the spaces **32** and around fingers **30** into the cable routing section whereby they exit at either end. With the inventive cable manager **10**, good horizontal cable management can be achieved.

The rear side of the cable manager (rear section **14**) preferably forms the distribution side where cables from network equipment or a work station area can be terminated. As shown in FIGS. **2** and **6**, distribution side fingers **40** are formed having arcuate portions **42** at least on a distal portion and a flat portion **44** at a proximal portion. As discussed above with reference to the front patching side, when the fingers are formed with an arcuate configuration, they are relatively stiff. On the distribution side, the installer often

has need for greater access to the adjacent patch panels for their hands and other tools. Thus, by forming fingers **40** with the initial flat platform section **44**, the fingers **40** can be made more flexible. The distal ends of fingers **40** on the distribution side include lips **48** for engagement with a duct cover **58**. A suitable duct cover may snap fit on upstanding member **49** (see FIGS. **6** and **8**). Alternatively, a hinged cover as used on the front section may be provided.

As shown in FIGS. **2** and **8**, the distribution side also includes a stepped down portion **46** that provides additional room to accommodate a tool and/or a hand of an installer. That is, the base section **20** on the distribution side is narrower than the base section **18** on the patching side so that fingers **40** on the distribution side are spaced a little farther from the rear side of adjacent patch panels to provide additional clearance for the installer.

Selected fingers from both sets of fingers **30,40** also include respective retaining flanges **38**, **39** formed on the distal ends to help retain routed cables **70** when a cover is not present.

While the particular embodiment of the present invention has been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only and not as a limitation

What is claimed is:

1. A cable manager mountable to a network rack having mounting legs, comprising:

a central section having a longitudinal width sized to fit between the mounting legs of the network rack, a predefined height, a front side, a rear side, and rack mounting holes provided on opposite longitudinal ends of the central section;

a front cable routing section extending from the front side of the central section, the front cable routing section including a plurality of spaced fingers extending transversely from the front side of the central section, wherein the central section includes at least one passthrough opening that provides access to the front cable routing section; and

a hinged cover rotatably attachable to the plurality of fingers.

2. The cable manager of claim **1**, further comprising retaining flanges extending from distal ends or multiple ones of the plurality of spaced fingers.

3. The cable manager of claim **1**, wherein the cover is hingedly openable in two opposite directions.

4. The cable manager of claim **1** wherein the plurality of spaced fingers are arranged in multiple spaced rows.

5. The cable manager of claim **4**, wherein the hinged cover is attachable to at least one finger on at least two of the multiple spaced rows.

6. A cable manager mountable to a network rack having mounting legs, comprising:

a central section having a longitudinal width sized to fit between the mounting legs of the network rack, a predetermined height, a front side, a rear side, and rack mounting holes provided on opposite longitudinal ends of the central section;

a front cable routing section extending from the front side of the central section, the front cable routing section including a first plurality of spaced fingers extending transversely from the front side of the central section; and

a rear cable routing section extending from the rear side of the central section, the rear cable routing section including a second plurality of spaced fingers extending transversely from the rear side of the central section,

wherein the central section includes at least one passthrough opening that provides access between the front cable routing section and the rear cable routing section.

7. The cable manager of claim **6**, further comprising a first cover attachable to the first plurality of spaced fingers.

8. The cable manager of claim **7**, further comprising a second cover attachable to the second plurality of spaced fingers.

9. The cable manager of claim **7**, further comprising a second hinged cover rotatably attachable to the second plurality of spaced fingers.

10. The cable manager of claim **9**, wherein the second hinged cover is hingedly openable in two opposite directions.

11. The cable manager of claim **6**, further comprising a first hinged cover rotatably attachable to the first plurality of spaced fingers.

12. The cable manager of claim **11**, wherein the first hinged cover is hingedly openable in two opposite directions.

13. The cable manager of claim **11**, further comprising a second cover attachable to the second plurality of spaced fingers.

14. The cable manager of claim **11**, further comprising a second hinged cover rotatably attachable to the second plurality of spaced fingers.

15. The cable manager of claim **14**, wherein the second hinged cover is hingedly openable in two opposite directions.

* * * * *