(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 439 076 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91100615.3**

(51) Int. Cl.[5]: **H01R 29/00**

(22) Date of filing: **18.01.91**

(30) Priority: **22.01.90 IT 4570590**

(43) Date of publication of application:
31.07.91 Bulletin 91/31

(84) Designated Contracting States:
AT DE DK ES FR GB IT

(71) Applicant: **Zanussi Elettromeccanica S.p.A.**
Via Giardini Cattaneo 3
I-33170 Pordenone-C.P. 147(IT)

(72) Inventor: **Moret, Dorino**
Quartiere Europa 23
I-32926 Mel, Belluno(IT)

(74) Representative: **Patentanwälte Grünecker, Kinkeldey, Stockmair & Partner**
Maximilianstrasse 58
W-8000 München 22(DE)

(54) Method for the realization of perfectioned connector device for multiple electric circuits.

(57) A method for the realization of polyvalent electric connection devices between a number of electric components pertaining to independent and different electric circuits, particularly in domestic refrigerators.

The method is devised to realize an association between a variety of connectors and a base in such a manner that one and the same base and a suitable combination of connectors selected from the variety thereof may be used as required for interconnecting selected electric circuits having different functional and structural characteristics.

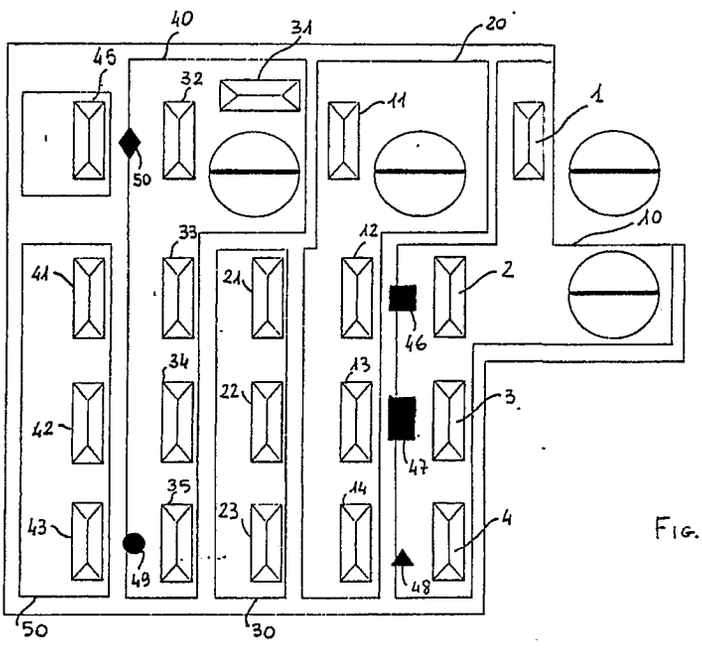

Fig. 1

EP 0 439 076 A1

METHOD FOR THE REALIZATION OF PERFECTIONED CONNECTOR DEVICE FOR MULTIPLE ELECTRIC CIRCUITS

The present invention relates to a method for the realization of connection devices for a plurality of independent electric circuits to interconnect a number of electric components by the employ of corresponding connectors and a particular base, said connectors and base having determined characteristics.

For a better understanding of the present invention, reference shall be made to the electric components and their connections installed in a refrigeration appliance for domestic use, without of course limiting the invention to only this type of components and use.

It is generally known that the compressor of a refrigerator appliance for domestic use often constitutes the point of convergence of all of the electric connections of the refrigeration appliance, i. e. the point whereat the appliance is connected to the mains power supply and from where the respective connections extend to the various "consumers" embodied in components that have to be supplied with electric power and/or generate signals to be applied to the compressor or other components.

These "consumers" may typically include one or more thermostats, a second compressor, one or more solenoid valves, an ice maker and so on.

The reason for which it is preferred to concentrate all of the connections at the compressor, and specifically at a connector base associated thereto, resides in the fact that the compressor is usually directly connected to all of the various components and disposed in a readily accessible manner in an open housing portion at the rear of the refrigeration appliance, so that the required connections to the compressor can be made very simply and correctly.

There exist known proposals for improving the connection of the various components to the compressor, as described for instance in the present applicant's Italian utility model application no. 34058 B/87, which proposes an advantageous form of connection to the compressor applicable in the case of employ of a separate base whereat the connections of all components including the compressor converge, and in the case of a base devised as an integral part associated to the compressor.

The actual market trends in the domestic refrigeration sector have led to the appearance, however, of an inconveniency: the widening of the range of performance and functional characteristics of refrigeration appliances entails a corresponding increase of the number of functional components to be supplied with electric power, for instance two compressors, two thermostats, one or two fans, an automatic ice maker, an electronic monitoring and control circuit and so on.

This obviously entails a corresponding increase of the number of connections required for connecting the various components to the base associated to the compressor, as a result of which the base itself assumes steadily growing dimensions, resulting in the twofold disadvantage of cost increase and progressively increasing difficulties as regards the installation of the compressor and the establishment of the connections due to the increasing dimensions and reduced accessibility of the base.

As anybody skilled in the art will recognize, these disadvantages have as an additional negative consequence the degradation of the quality of the connections as regards both their mechanical reliability and correctness.

It has of course been tried to eliminate these problems by the employ of fool-proof connectors (provided with polarizingkeys and grooves) for the conductors leading to the various components, but while this has solved the problem of possible connection errors,, it has also resulted in a still further problem: because the number of different models of refrigeration appliances and their complexity is continually increasing, while the number of different compressor models remains limited for obvious economical reasons, there is an increasing proliferation of connector base constructions, resulting in a steep rise in design and manufacturing costs.

It is therefore an object of the present invention to overcome the difficulties explained above and to provide a method for the realization of compact multiple connection devices adapted to be used, without any possibility of errors, for a great number of different refrigeration appliances having different components and circuit connections, while being of economic and reliable construction and designed to be readily installed with the employ of known and generally accepted materials and techniques.

This object is attained according to the invention by associating to a specific connector base a defined variety of connectors, as will be described by way of non-exclusive example with reference to the accompanying drawings, wherein:

fig. 1 shows a connector base according to an embodiment of the invention,

fig. 2 shows an example of a variety of connectors associated to the base shown in fig. 1,

figs. 3, 4, 5 and 6 show four groups S1, S2, S3, S4 of connectors selected from the variety shown in fig. 2 for simultaneous use with the base of fig. 1, and

figs. 7, 8, 9 and 10 show the placement of the connectors of the four groups on the base of fig. 1.

The characteristics of the invention will be specified in the attached claims.

The basic idea of the invention can be described as follows: Proceeding from a multiplicity of different refrigerators each having different electric circuits devised to converge on a single connector base, preferably associated to a compressor, what is intended to be achieved is the greatest possible reduction of the dimensions of the base (and consequently the greatest possible reduction of the number of terminals provided thereon), and the possibility of using one and the same connector base in the greatest possible number of different refrigerators.

This object is attained by using selected ones of the terminals provided on the base for different types of refrigerators by causing them to cooperate with different types of connectors.

For the practical implementation of this solution, use is made of a connector base having a particular configuration, and of a variety of connectors of specific geometric characteristics in association with the base.

The base and connectors satisfy the following requirements:

a) a specific base is adapted to have a specific variety of connectors associated thereto;

b) the connectors included in a given variety are designed for use in selected groups for connecting the components in specific refrigerator models (so that there are as many groups of connectors as there are different models of refrigerators);

c) one or more connectors can be included in different groups, i.e. different groups may have one or more connectors in common (in practice any group of connectors is a combination of connectors selected from a given variety thereof);

d) the various groups of connectors of a given variety thereof are adapted to make the connections in all refrigerator models provided with a specific base (possibly in combination with the respective compressor);

e) any given base can at the same time accommodate any single group of connectors selected from the associated variety thereof.

The invention functions in the following manner: all of the conductors connected to the various components of any refrigerator model equipped with a specific connector base and associated compressor are connected to a selected group of connectors which are themselves placed on the base at determined positions. When a specific base (possibly in combination with a specific compressor) is mounted in a refrigerator of a different model, the conductors associated to the various components are connected to a different group of connectors which are then placed on the same base, although at different positions.

It is evident that in a first model, the connectors cooperate with a certain number of terminals of the base, and that the connectors in a second model cooperate with terminals of the base which may at least in part be the same as in the case of the first model (this being a particular advantage of the present invention), while part of the terminals are different ones permitting a different circuit configuration to be established.

The connectors cooperating with these different terminals are necessarily different from the connectors of the first model, whereas the same connectors or types of connectors may be used for the terminals the two models have in common

At this point it will be evident to those skilled in the art for what reason the connectors can be combined in different groups selected from a given variety or set of connectors:it is because in this manner it is possible to use the greatest possible number of terminals of the base for accommodating different connectors pertaining to different groups thereof associated to respective refrigerator models.

As it is possible in this manner to use individual terminals of the base for different refrigerator models, one obtains the desirable result that the number of terminals can be considerably smaller than in the case of each terminal being "dedicated" to a specific function in a specific model.

The reduced number of terminals permits a more compact design of the connector base, which is therefore more accessible and more economical than an equivalent prior-art base while retaining the capability of having variable combinations of components connected thereto.

A practical example of the invention shall now be explained with reference to figs. 1 to 10 of the drawings.

Shown by way of example in fig. 1 is a connector base according to the invention, provided with terminals 1 - 4 interconnected by a metal strip 10, terminals 11 - 14 interconnected by a metal strip 20, terminals 21 - 23 interconnected by a metal strip 30, terminals 31 - 35 interconnected by a metal strip 40, terminals 41 - 43 interconnected by a metal strip 50, and an insulated single terminal 45.

Also shown in fig. 1 are polarizing elements 46, 47, 48, 49 and 50 provided on the connector base.

These polarizing elements serve the purpose of preventing connectors provided with complementary polarizing elements from being mounted

on the base in any position other than the correct one.

Fig. 2 shows a set or variety of connectors provided for use with the base described above. As shown in this figure, there is a total of nine connectors designated by letters A to I.

Shown in figs. 3, 4, 5 and 6 are four groups of connectors designated respectively S1, S2, S3 and S4 and composed of selected ones of the variety of connectors shown in fig. 2.

It is noted that in the examples shown, some of the connectors are included in more than one group; thus connector I is included in groups S1 and S3, connector F is included in groups S1 and S4, connector E is included in groups S1 and S4, connector D is included in groups S2 and S4, and connector C is included in groups S2 and S3.

As already indicated above, each group of connectors can be mounted on the connector base, the mounting configurations of the respective groups S1, S2, S3 and S4 on one and the same connector base being shown in figs. 7, 8, 9 and 10, respectively.

The possible connection combinations are based on the following conditions:

The total number of terminals required for accommodating all groups of connectors would be forty (arithmetic sum of all terminals shown in figs. 3 to 6).

The actual number of terminals on the connector base shown in fig. 1 is twenty.

A certain number of these base terminals is therefore designed to cooperate with respective terminals of connectors of more than one group as already explained. The connectors of any single group can be accommodated on one and the same base as illustrated in figs. 7 to 10. It is finally impossible to mount the connectors of any group at wrong positions, since the above described complementary polarizing elements only permit them to be mounted at their correct positions.

It is to be understood that what has been described above with reference to the accompanying drawings is solely intended to explain the principle of the invention by way of example, and that numerous variations and modifications are possible within the scope of the present invention.

Claims

1. A method for the realization of connection devices for for the electric connection of the components of a plurality of different electric circuits, particularly of domestic refrigeration appliances, comprising a connector base and a multiplicity of connectors associated to said connections and adapted to be mounted on said connector base, characterized in that

   a) a connector base of a determined type has a defined set or variety of connectors associated thereto;

   b) the connectors of said set or variety are adapted to be combined in different groups, the connectors in each group being useful for connecting the components of a particularly defined electric circuit corresponding to a specific refrigeration appliance model,

   c) one or more connectors are adapted to be included in more than one group, in the sense that each group is a different combination of connectors selected from the one set or variety,

   d) all of the groups of connectors are adapted to connect all of the circuits for which a specific connector base is provided, while all connectors of a given set or variety are servicable for different electric circuits or refrigeration appliance models of a number equal to that of the groups of connectors,

   e) each connector base is adapted to accommodate all of the connectors of any single group at a time.

2. A method according to claim 1, characterized in that said connector base is provided with a number of polarizing elements (46,47,48,49), and that said connectors of each group (S1,S2,S3,S4) are provided with complementary polarizing elements permitting said connectors to be mounted on said connector base only in a predetermined position.

3. A connector base and set of connectors adapted to be mounted thereon, characterized in that

   a) said connectors are adapted to be combined in a plurality of different groups,

   b) one ore more connectors are common to more than one group, i.e. each group of connectors is a different combination of connectors selected from one and the same set,

   c) said connector base is adapted to accommodate all of the connectors of any single group thereof at a time.

4. A connector base and connector set according to claim 3, characterized in that said connector base is provided with a number of polarizing elements (46,47,48,49) and said connectors of each group (S1,S2,S3,S4) are provided with complementary polarizing elements permitting said connectors to be mounted on said connector base only in a predetermined position.

5. A connector base and connector set according

to claim 3 or 4, characterized in that each and any type of said connector base is positively associated to a predetermined type of a compressor installed in refrigeration appliances for domestic use.

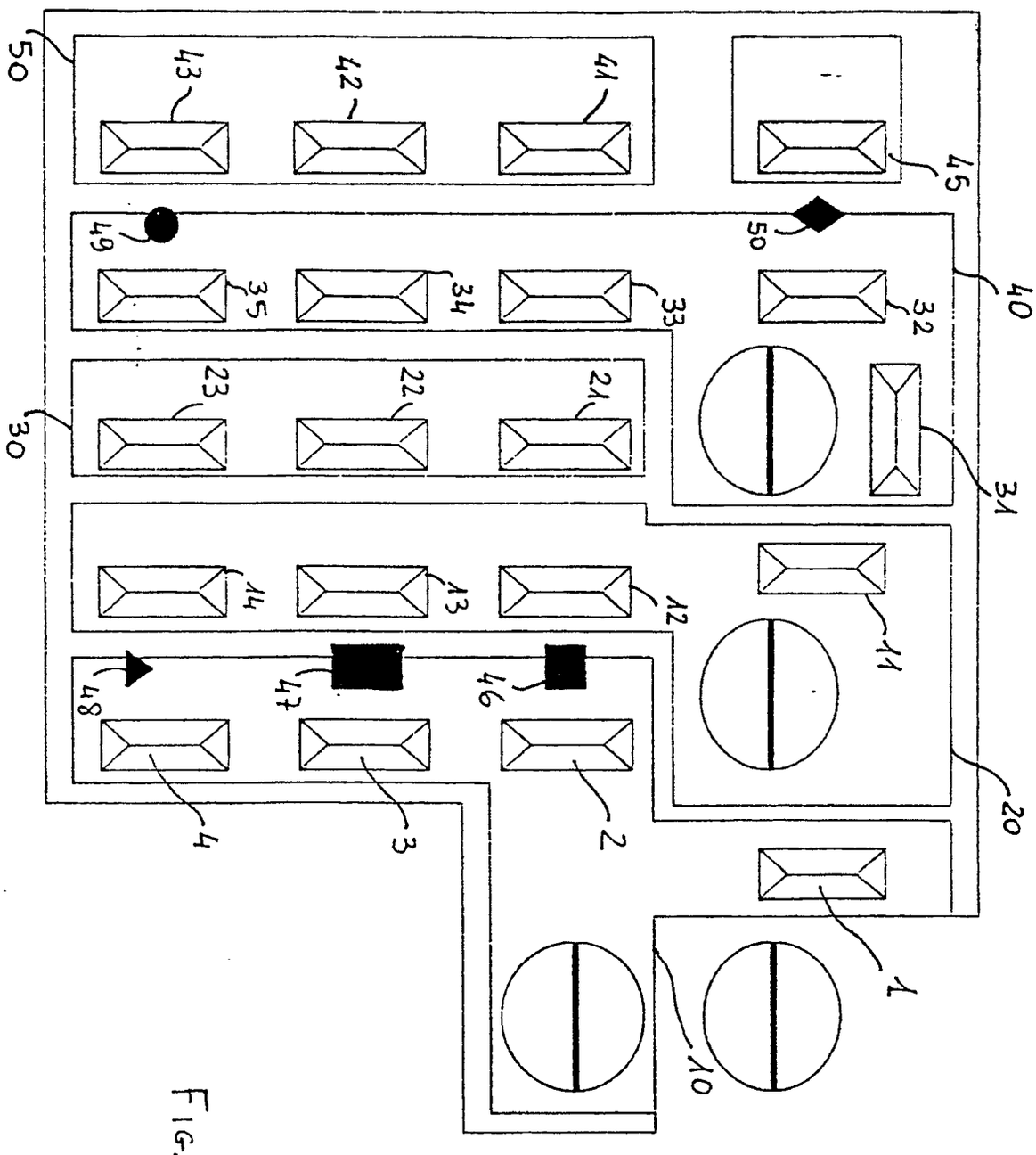
50
43
42
41
45
49
50
40
35
34
33
32
30
23
22
21
31
14
13
12
11
48
47
46
4
3
2
20
1
10

FIG. 1

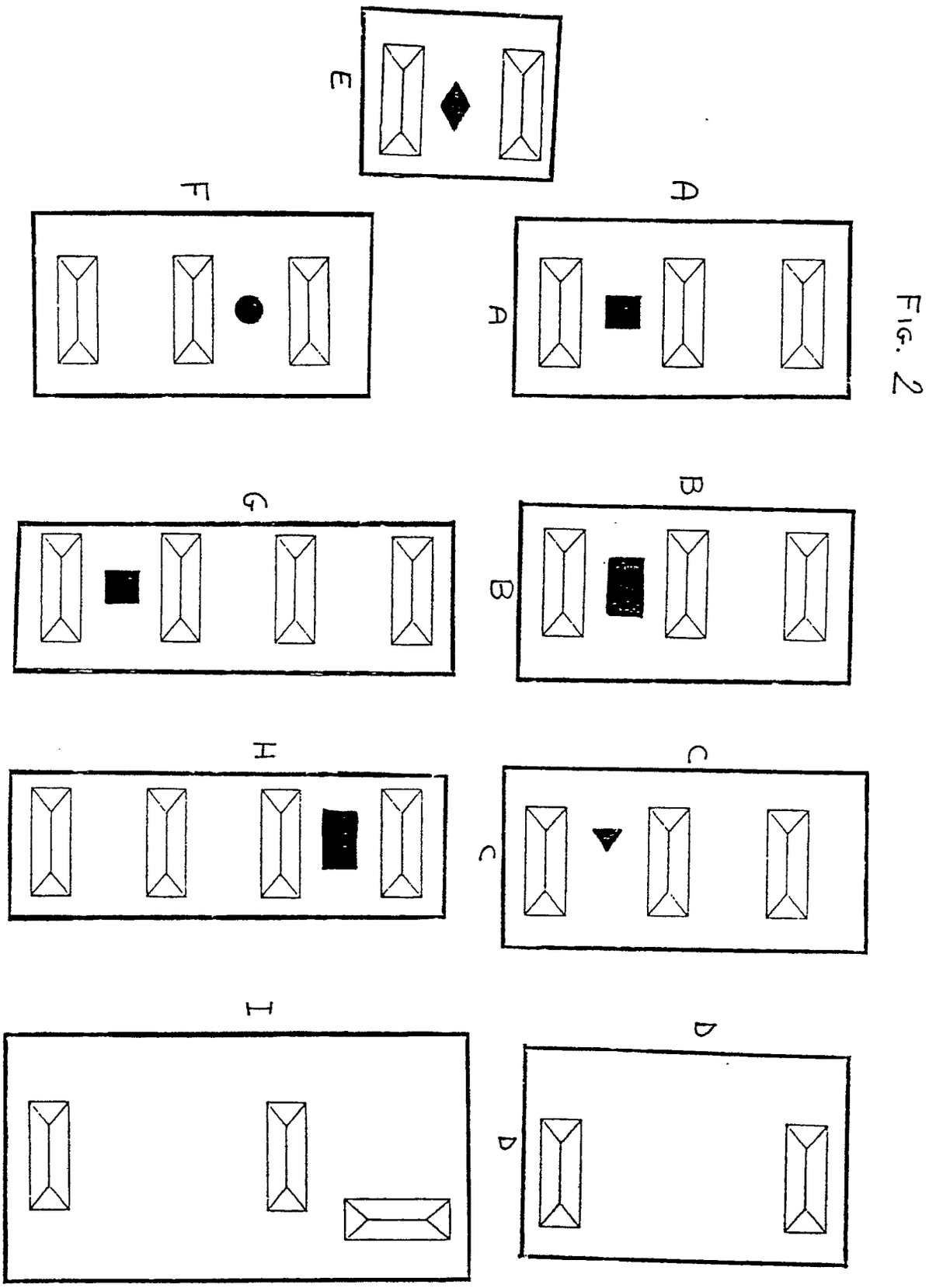

Fig. 2

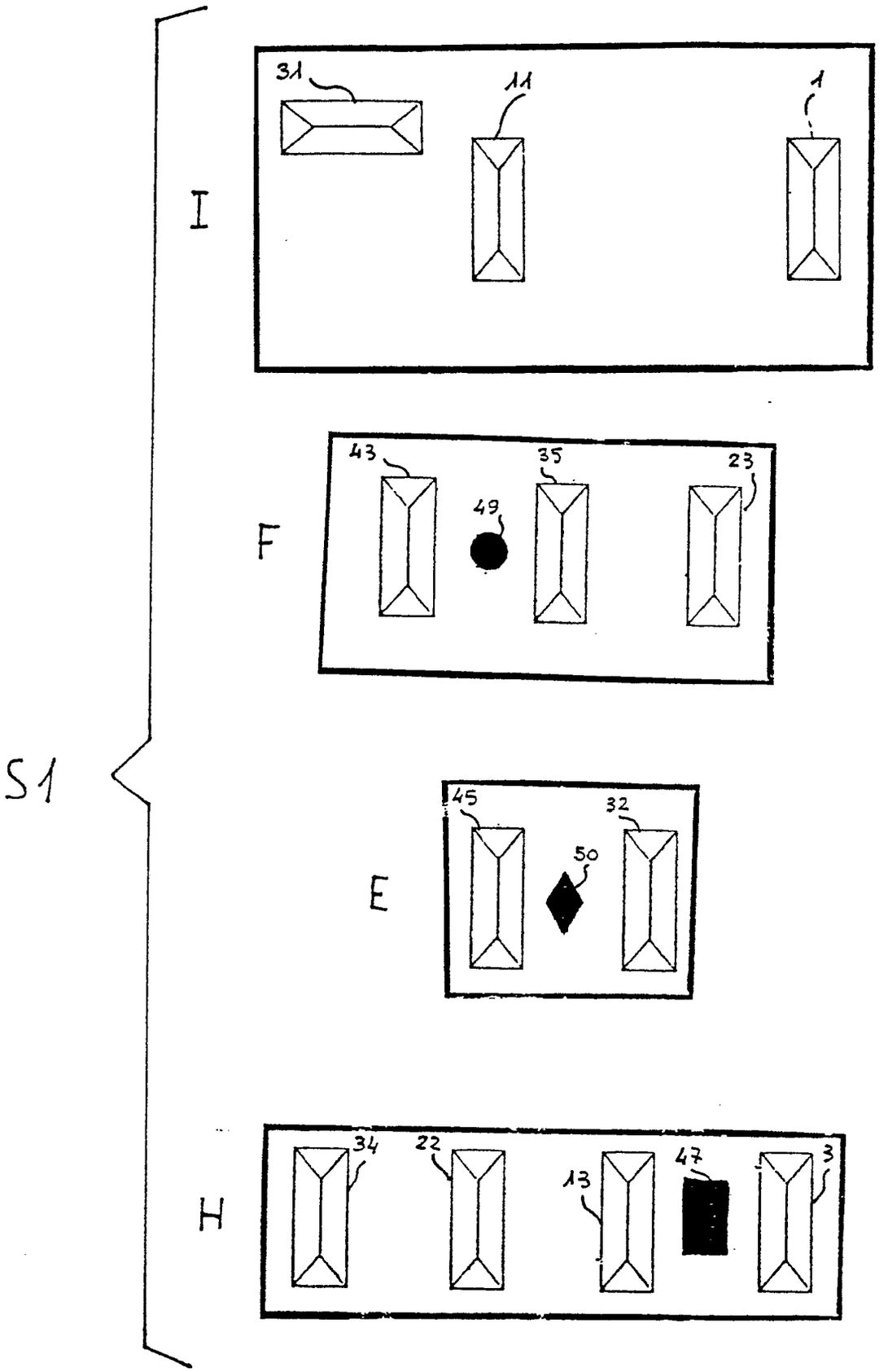

FIG. 3

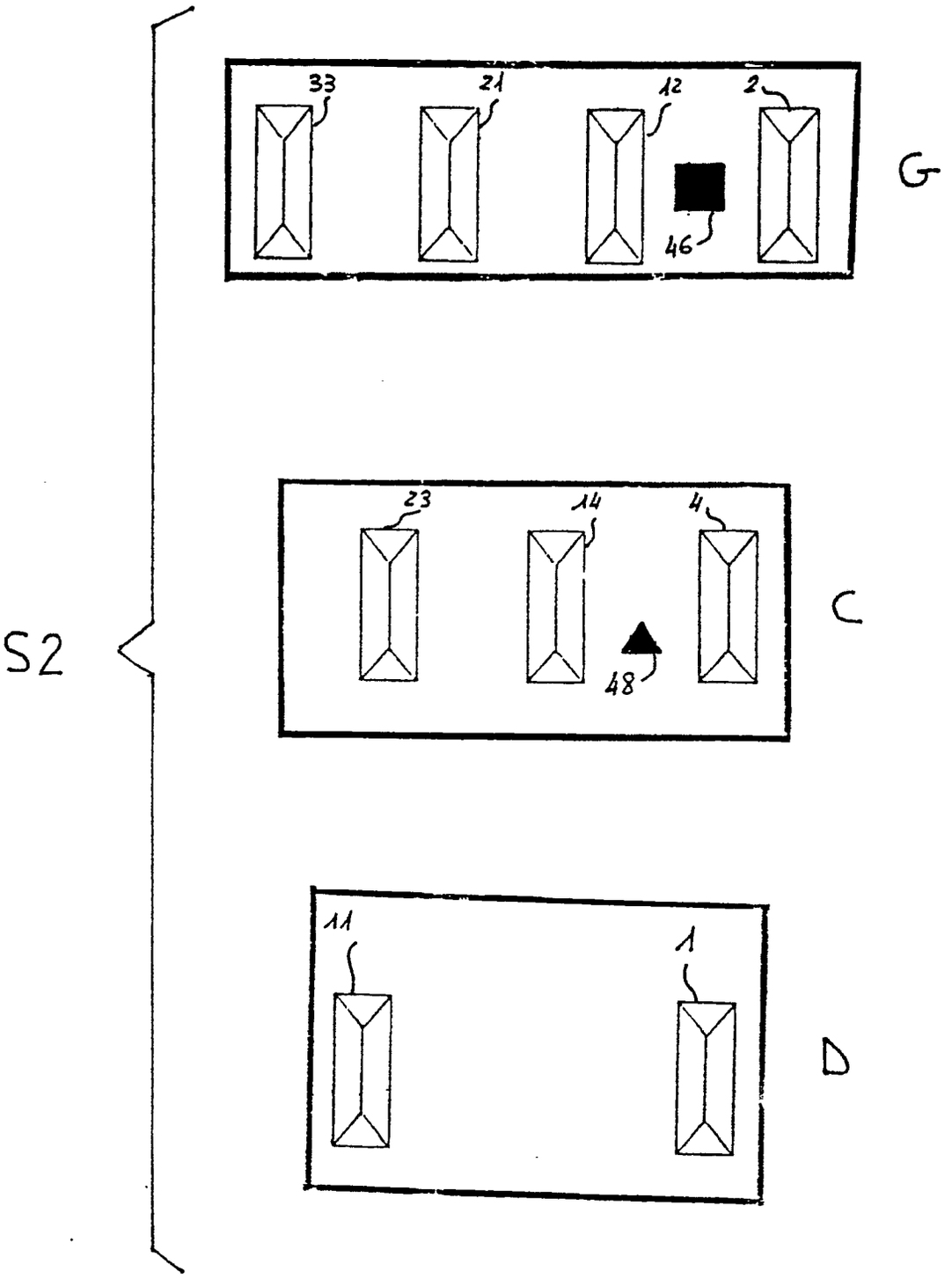

FIG. 4

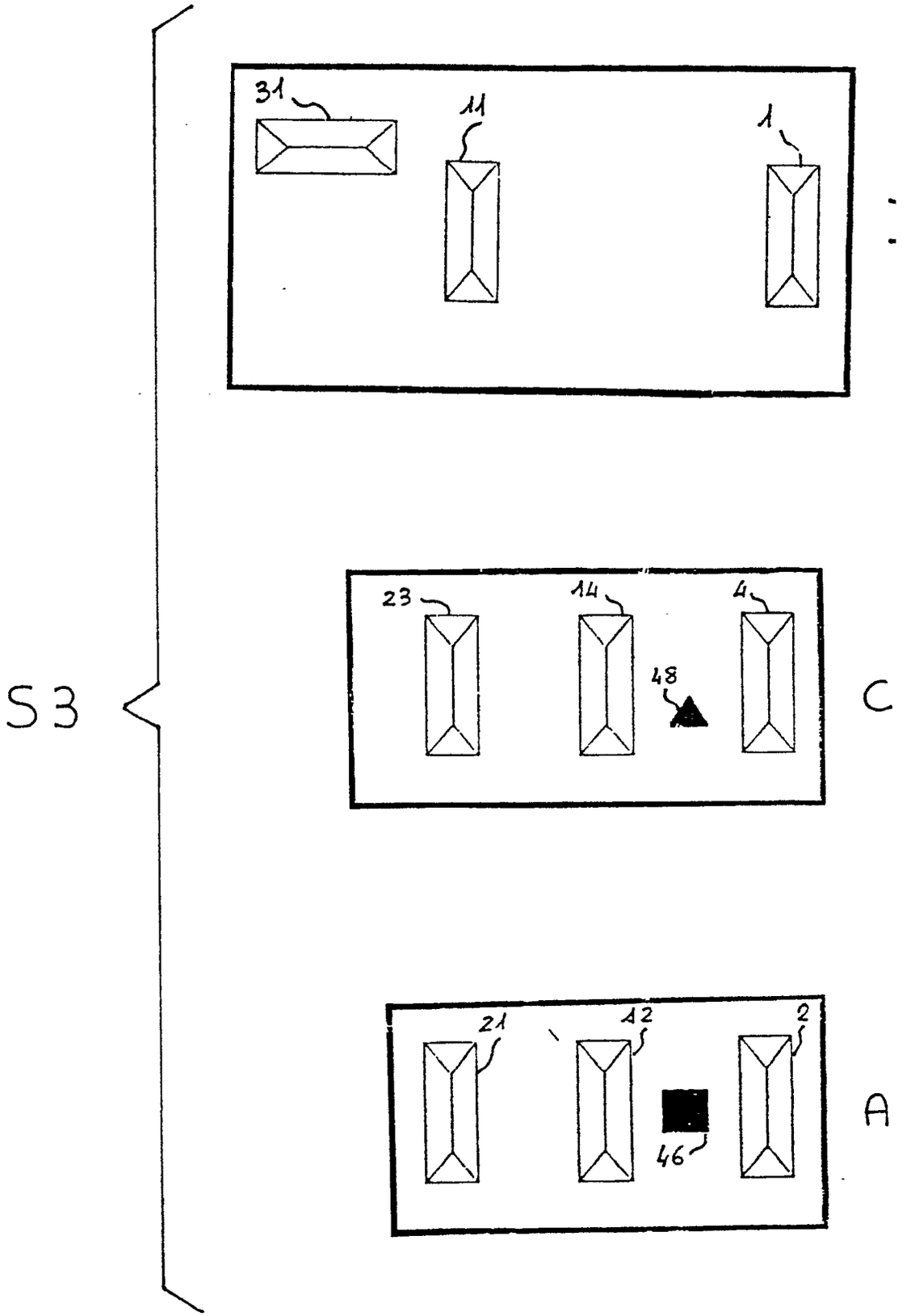

FIG. 5

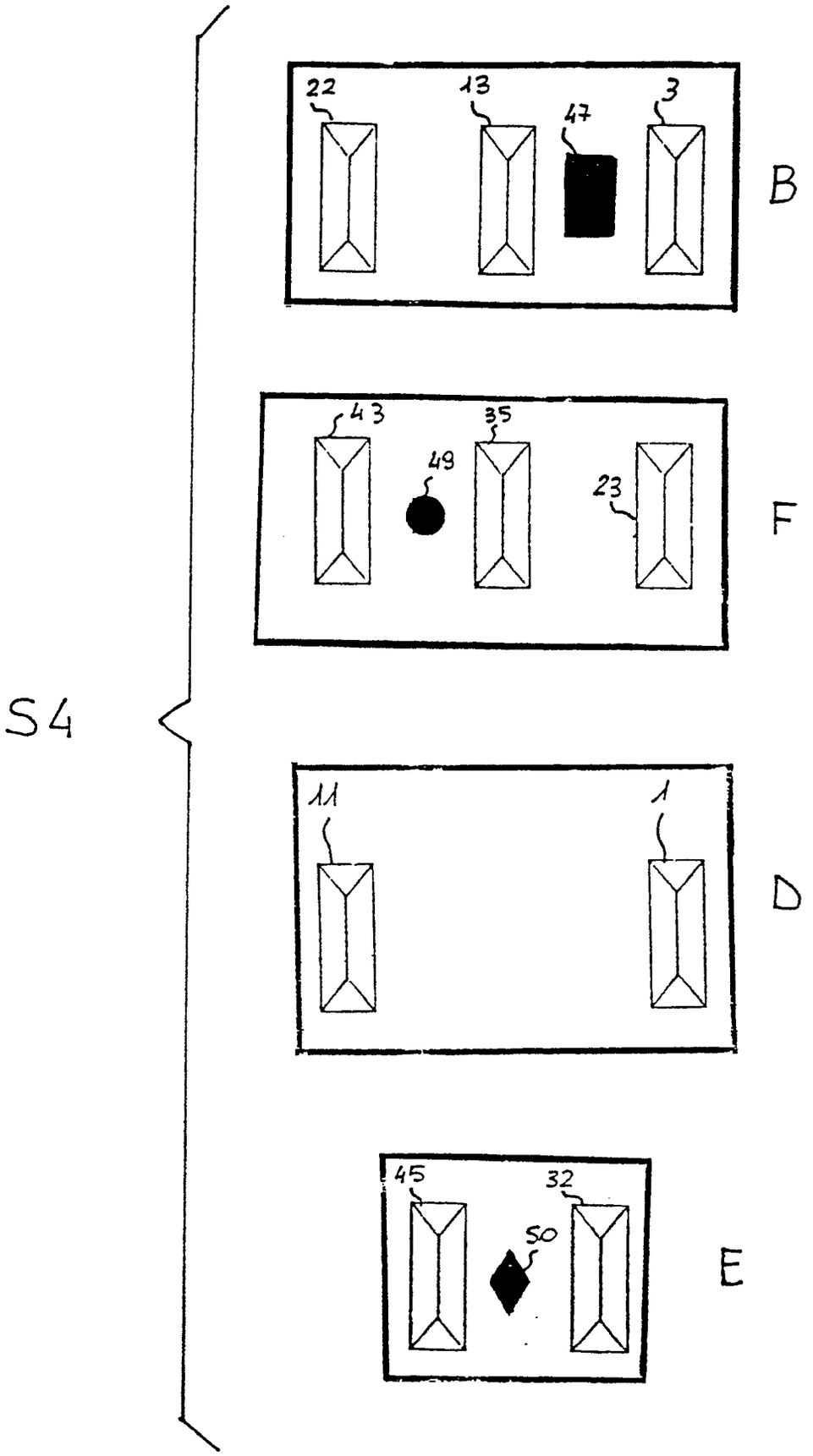

FIG. 6

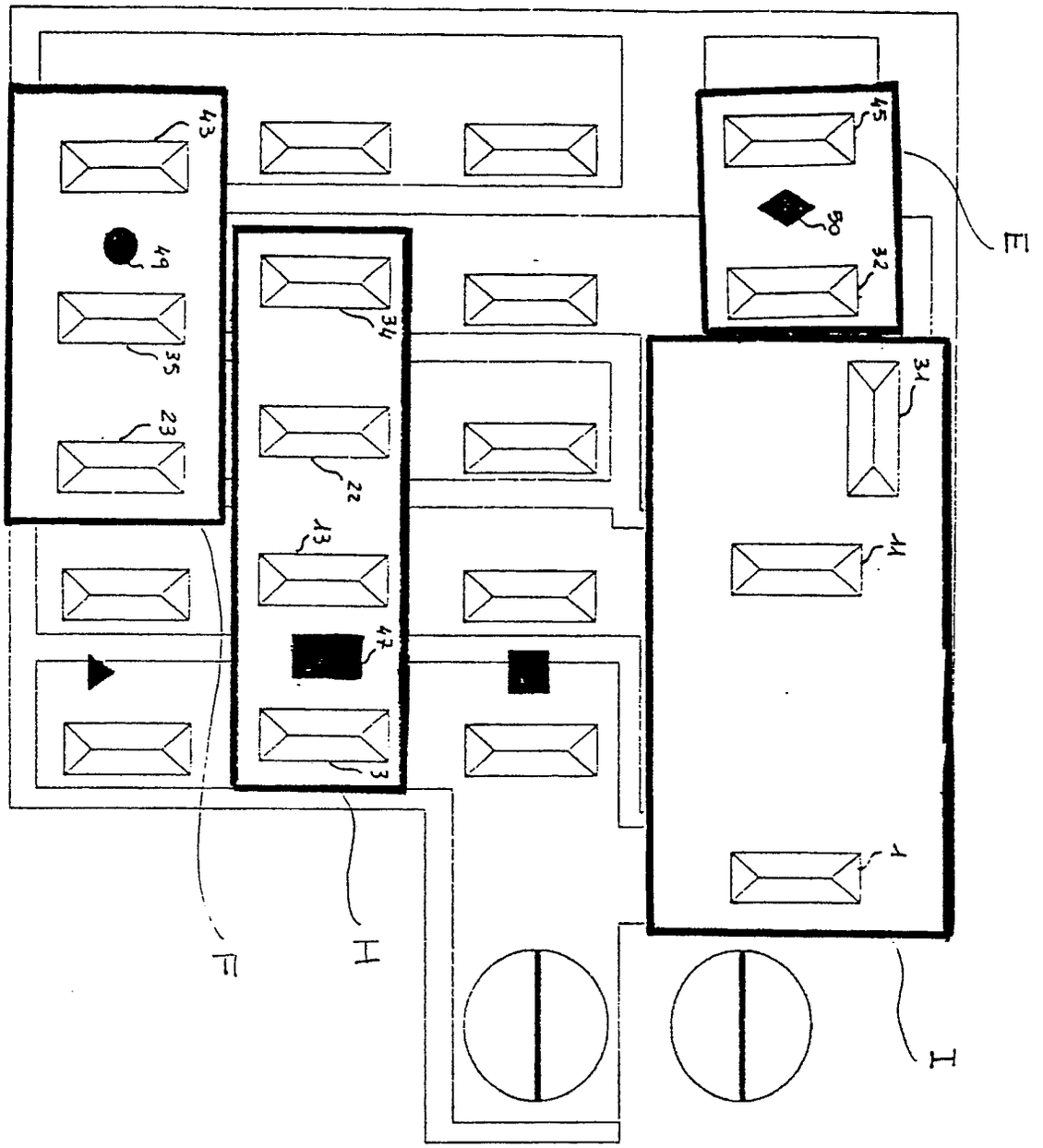

FIG. 1

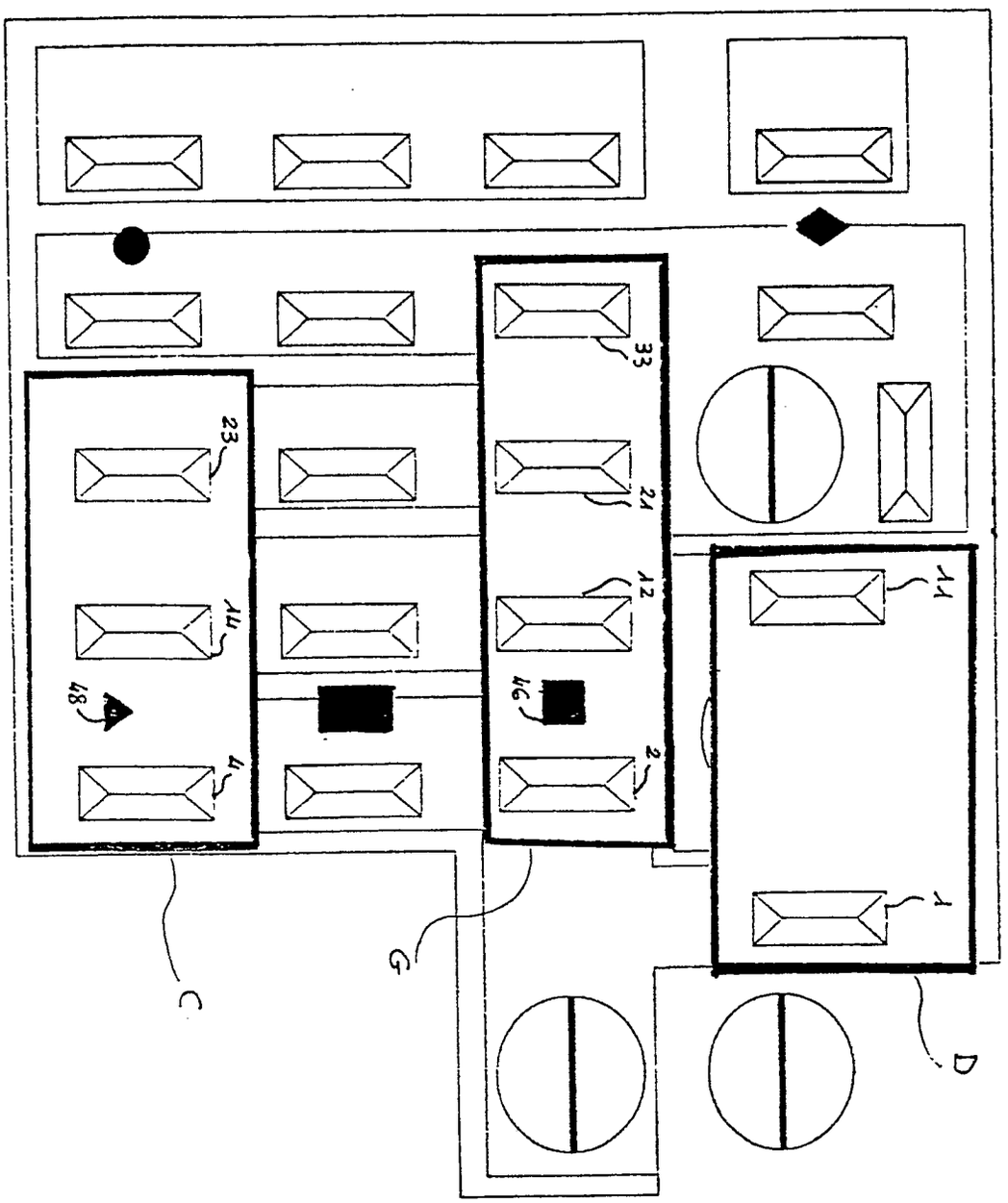

Fig. 8

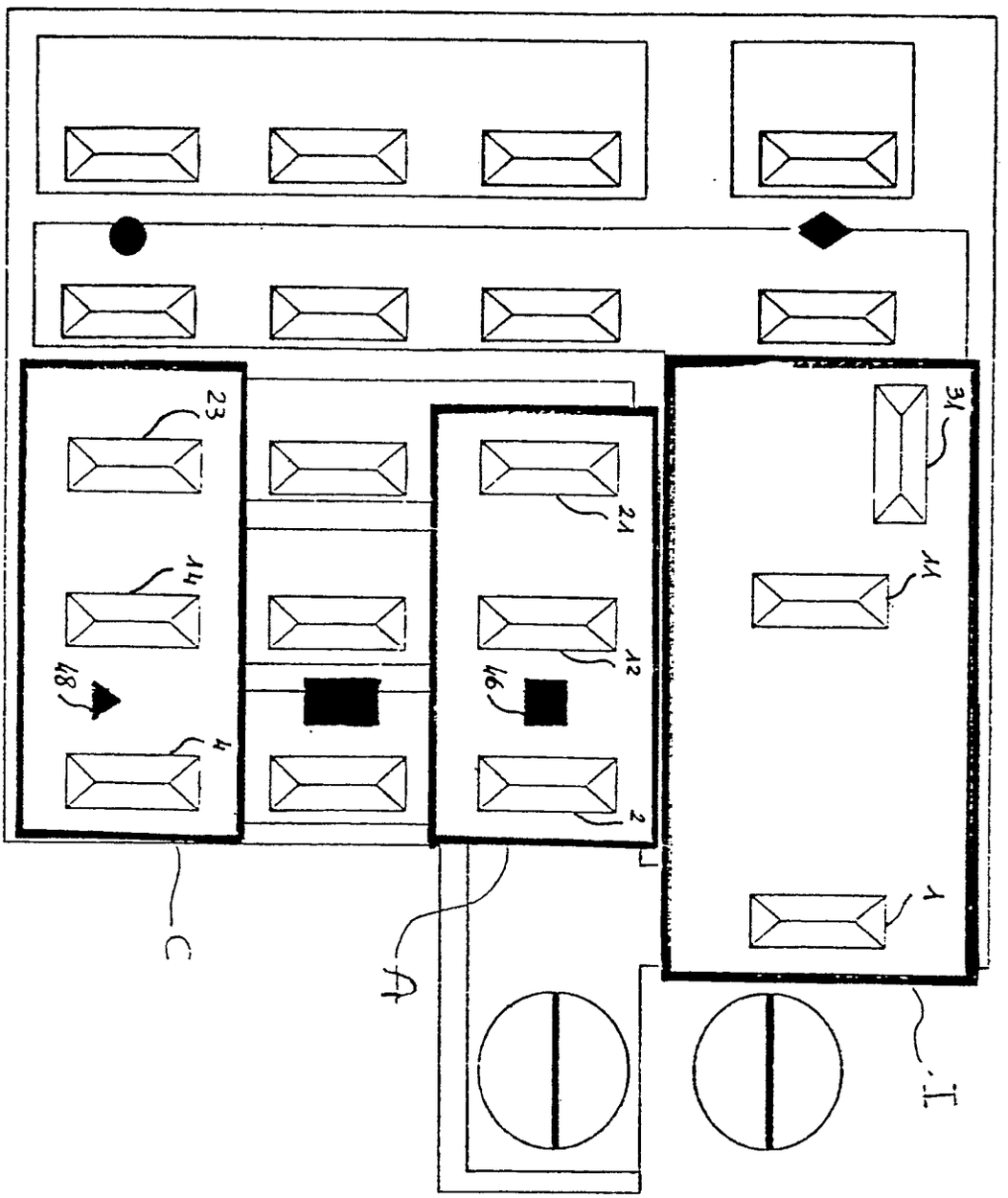

FIG. 9

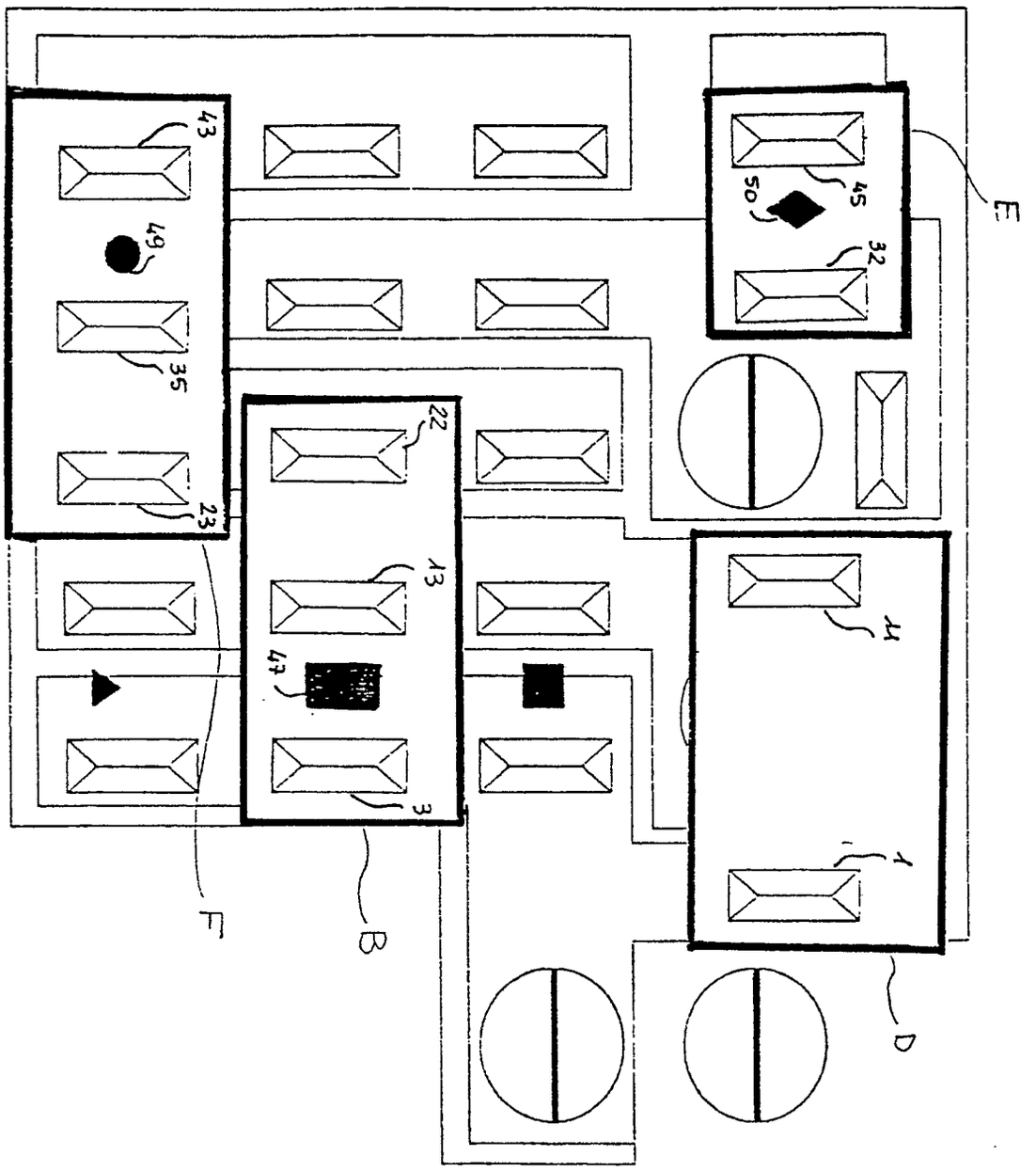

Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 10 0615

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 240 454 (UNITED TECHNOLOGIES AUTOMOTIVE) * column 1, line 54 - column 4, line 18; figures 1-3 *	1-4	H 01 R 29/00
X	EP-A-0 240 453 (UNITED TECHNOLOGIES AUTOMOTIVE) * column 2, line 8 - column 4, line 46; figures 1-5 *	1-4	
A	US-A-4 429 935 (LAMB ET AL.) * column 1, lines 24 - 37 * * abstract; figure 1 *	5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
H 01 R

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
Berlin	22 April 91	CLOSA D.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document