Oct. 21, 1969 U. PFITZNER ET AL 3,473,568

MODULATOR CONSTRUCTION SYSTEM FOR LOGIC CIRCUITS AND THE LIKE

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Fig. 1

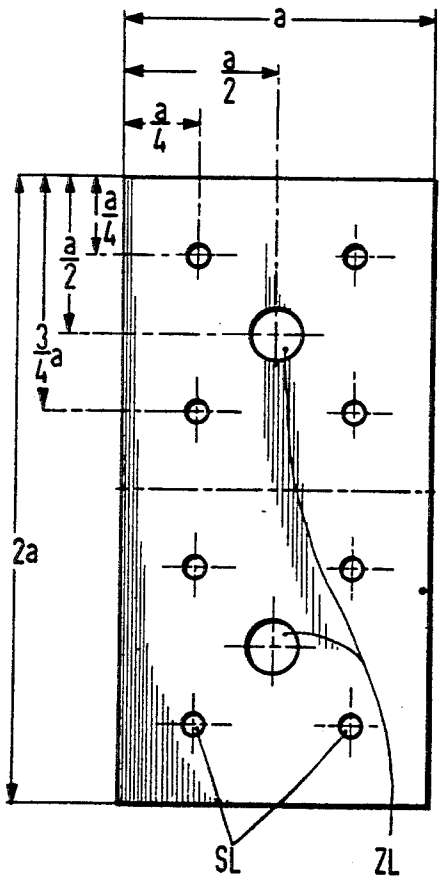


Fig.2a

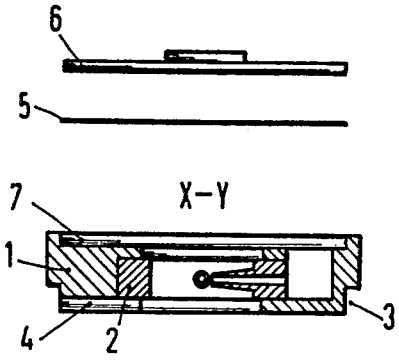
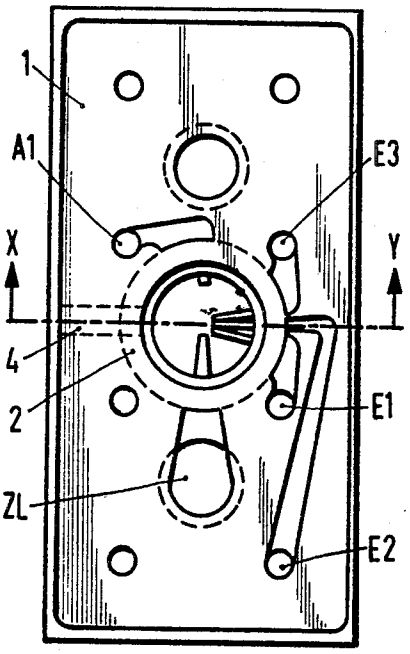


Fig.2b



INVENTORS
Ulrich Pfitzner
Kurt Bantle
BY Lee & Lee
ATTYS.

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Fig. 3a

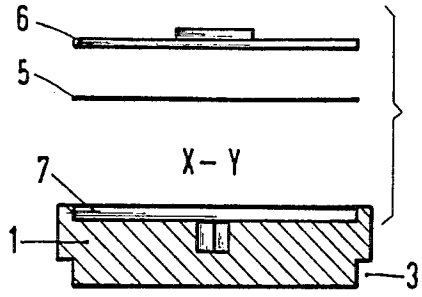
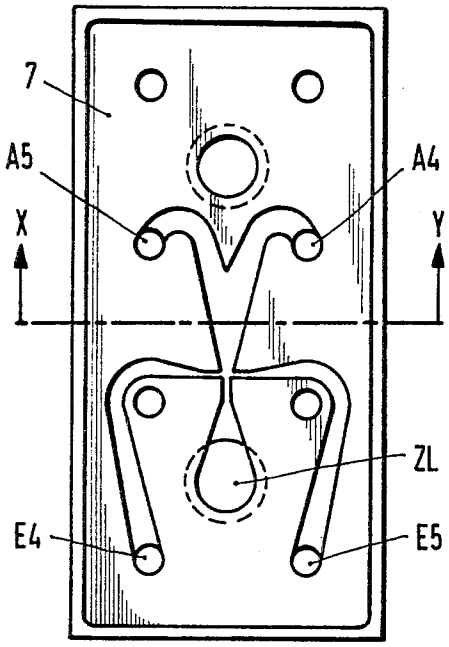


Fig. 3b



INVENTORS
Ulrich Pfitzner
Kurt Bantle
BY Lee & Lee
ATTYS.

Oct. 21, 1969 U. PFITZNER ET AL 3,473,568

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Fig. 4a

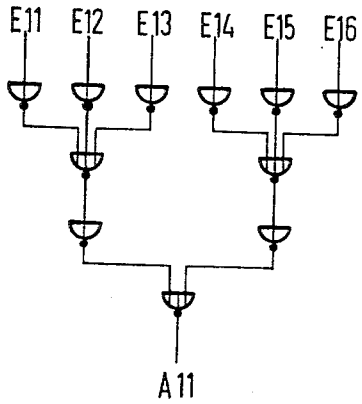


Fig. 4b

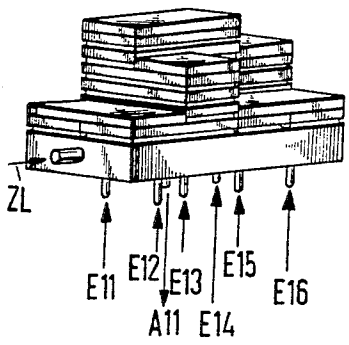
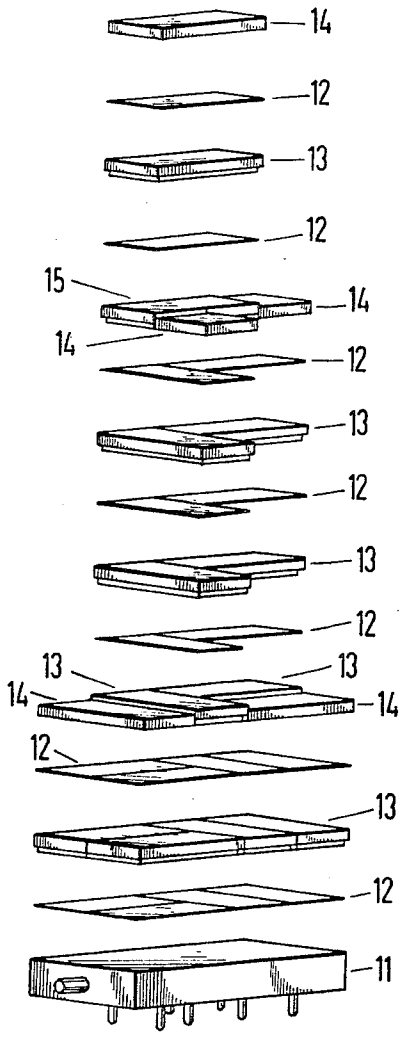


Fig. 4c



INVENTORS
Ulrich Pfitzner
Kurt Bantle

BY Stiee & Stiee
ATTYS.

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3,473,568

MODULATOR CONSTRUCTION SYSTEM FOR LOGIC CIRCUITS AND THE LIKE

Ulrich Pfitzner, Karlsruhe, and Kurt Bantle, Munich, Germany, assignors to Siemens Aktiengesellschaft, a corporation of Germany

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Claims priority, application Germany, Nov. 26, 1965, S 100,669
Int. Cl. E03b; E03c; F17d
U.S. Cl. 137—608 2 Claims

ABSTRACT OF THE DISCLOSURE

A module construction such as an individual pneumatic logic element, a sweep circuit, an amplifier or the like adapted for assembly with other module constructions to form a modulator construction system. Each of the module constructions has a uniform, rectangularly-shaped base having dimensions of *a* and 2*a*. Each of the module constructions has perpendicular extending bores for air supply lines having a distance of *a*/2 from the edges and signal line bores having a distance of *a*/4 from the two longer edges 2*a* and a distance of *a*/4 and 3/4*a* from the shorter edge *a*.

The invention relates to a modulator construction system, in particular for the production of pneumatic logic circuits.

Generally the connection of individual pneumatic logic elements, sweep circuits, amplifiers and the like for the forming of larger functional units is achieved by means of connecting or sealing plates, structures which serve on the one hand for the fastening of the individual modules or units and on the other hand connect the signal inputs, signal outputs and the air supply channels with one another. Such connection plates quite considerably increase the total expenditure for pneumatic apparatus.

It is the purpose of the invention to eliminate the hitherto existing connecting plates or to at least considerably reduce their number by means of appropriate construction of known type of individual pneumatic elements. According to the invention, this is achieved by means of a modulator construction system which is characterized by uniform, rectangularly-shaped modules or units with base dimensions of *a* and 2*a* and a height which is small in comparison with the base dimensions, for which modules the perpendicularly extending bores for the air supply lines have a distance *a*/2 from the end edges and the likewise perpendicularly extending signal lines have a distance *a*/4 from the two longer edges 2*a* and a distance *a*/4 and 3/4*a* from the two shorter edges *a*.

Referring to the drawings, wherein like reference characters indicate like or corresponding parts:

FIG. 1 illustrates the organization plan, in accord and with which the external proportions of the constructional module and the location of the bores for the air supply lines ZL and the signal lines SL are determined;

FIGS. 2*a* and 2*b* illustrate a constructional example of a pneumatic constructional module for the realization of the logical linkage Or-Not with three inputs E1, E2 and E3, FIG. 2*b* being a top plan view and FIG. 2*a* a sectional view taken approximately along the line X–Y of FIG. 2*b*;

FIGS. 3*a* and 3*b* are similar to FIGS. 2*a* and 2*b* and illustrate an example of construction of a boundary layer amplifier or sweep circuit, in which FIG. 3*b* is a plan view of the module, and FIG. 3*a* is a section taken approximately on the line X—X of FIG. 3*b*; and

FIGS. 4*a*, 4*b* and 4*c* illustrate the assembly of Or-Not modules, FIG. 4*a* schematically illustrating the same, FIG. 4*b* illustrating the assembled modules and FIG. 4*c* being an exploded view of the elements comprising the assembly.

Referring to FIG. 2, a nozzle ring **2**, provided with the nozzles for the Or-Not linkage and arranged in a known manner, is embedded in the basic body **1**. The nozzle bores are connected exteriorly of the nozzle ring **2** with appropriate bores for the input signal lines E1 to E3, the output signal line A1 and the air supply line ZL through channels opening on the top face. In the top view the washer **5** and the cover plate **6** are removed. The washer **5** of rubber or similar resilient material and the cover plate **6** normally are disposed in the recess **7** of the basic body **1** and form the upper seal of the pneumatic element.

The lower portion of the lateral edge surfaces of the construction module are offset inwardly forming a ventilating channel **3**. A vent hole **4** establishes the connection between the interior of the nozzle ring **2** and the channel **3**. The securing of the construction modules (assembled one upon another) with a base plate can be undertaken in simple manned by screws or similar fastening means which may be inserted through the bores or supply air lines, with the dimensioning being such that the air flow is not undesirably restricted.

FIG. 3 illustrates as further example of construction a boundary layer amplifier or a sweep circuit with the inputs E4 and E5 as well as the outputs A4 and A5. This element is likewise known in itself so that it does not have to be considered more in detail.

As a result of the structure of the construction modules, it is achieved that such construction modules not only be assembled one upon another congruently, but may also be displaced in relation to one another by half a length or at a right angle relationship to each other by turning one module 90° or 180° to the other. Because of this and through appropriate allocation of the signal lines, very many combinations of individual pneumatic elements for the construction of complex function groups may be formed in which case no additional connecting or sealing plates are required, or only in small number.

In FIG. 4*a* a combination of Or-Not construction modules for the realization of an And-linkage of six input signal E11 to E16 is schematically illustrated as example of construction of a function group. FIG. 4*b* illustrates the assembled block with a base plate **11** which serves on the one hand for the mounting of the construction modules, and on the other hand for the connection of the air supply line ZL and the signal lines A11 and E11 to E16. For better functional clarity, FIG. 4*c* illustrates an exploded view of this assembly. The base plate **11** is followed by the Or-Not construction modules **13** with intermediate gasket **12** which provide for a good exclusion of air and possibly separate signal lines of individual logic construction modules **13** from one another. If a construction module or module half is not followed by a further construction module, it is covered by a complete or half of a sealing plate **14**. Only at one spot is a connection module (connection plate) **15** required in order to connect signal lines of the logic construction modules not correspondingly positioned with respect to one another.

We claim:

1. A construction module containing a basic pneumatic circuit to perform a basic pneumatic function and adapted to be assembled with other modules to form a modular construction system, said construction module comprising

a uniform, rectangularly-shaped construction having base dimensions of a and $2a$ and a height which is small in comparison therewith, said construction module having inwardly off-set portions at the lower portion of the lateral edge surfaces to provide ventilating channels, said construction module having perpendicularly extending bores therein for the air supply lines which are disposed at a distance of $a/2$ from each of the edges and having perpendicularly extending bores for the signal air lines which are disposed a distance of $a/4$ from the two longer edges $2a$ and a distance of a $a/4$ and $3/4a$ from the two shorter edges a so that the construction module may be assembled in said modulator construction system in relationship with each other that is either congruent, displaced, a distance of a or at right angles with a reduction in the number of connecting plates required.

2. A construction module according to claim **1**, wherein each construction module comprises a basic body for the reception of the pneumatic element, a gasket member and a covered plate.

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SAMUEL SCOTT, Primary Examiner

U.S. Cl. X.R.

137—81.5