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SPRUSON & FERGUSON

Australia

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NOTICE OF ENTITLEMENT

We, Jorg Wiemers, and Frank Wiemers, both of Industriestrasse 2, Hovelhof, 4794, Germany, being the Applicants/Nominated Persons in respect of Application No 27682/92 state the following:-

The Applicants/Nominated Persons are the actual inventors.

The Applicants/Nominated Persons are the applicants of the application listed in the Declaration under Article 8 of the PCT. The basic application listed on the Declaration under Article 8 of the PCT is the first application made in a Convention country in respect of the invention.

DATED this day of Sept 1993

Jorg Wiemers

DATED this 16th day of Sept 1993

Frank Wiemers

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In a modular system, in particular for the construction of devices for holding, clamping, and/or positioning work pieces, there is a base part (1) that extends in the X-Y planes and at least one clamping part (2) that can be secured on this in various selectable positions. The base part (1) incorporates elevations (3) that are arranged in the X-Y planes in a grid pattern, these elevations having surfaces that are configured as supporting surfaces (4). Each of these elevations (3) has reference surfaces (11) that face in the Z-direction and incorporates undercut areas that serve to accommodate connecting elements. The connecting elements extend between the elevations (3) and the clamping part (2). On each elevation there are two reference surfaces (5; 6) that are spaced one above the other and spaced apart. The reference surfaces are separated from each other by the undercut areas. The modular system permits a high level of flexibility in positioning or determining position, while ensuring a high degree of stability and precise replication. Connection is effected by connecting elements that fit positively between the base part (1) and the clamping part (2).

.../2

CLAIM

1. A modular system, in particular for the construction of devices for holding, clamping, and/or positioning workpieces, preferably on machines, with a base part that extends in the X-Y plane, and at least one clamping part that can be secured on this in various selectable positions, this base part comprising elevations that are arranged to form a regular pattern in the X-Y plane, these elevations having surfaces that are configured as supporting surfaces, and which in each instance have reference surfaces that extend in the Z-direction, said elevations incorporating undercut sections within the reference surfaces that are used to accommodate connecting elements, these undercut areas being disposed at the same height, the connecting elements extending between the elevations and the clamping part, wherein in each instance reference surfaces are provided above each other, separated by the undercut areas, and spaced apart from each other.

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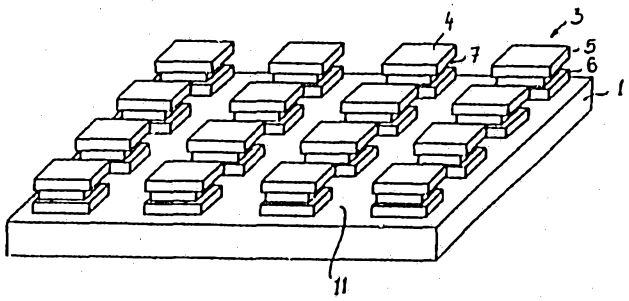
654404

(54) Title: COMPONENT SYSTEM, ESPECIALLY FOR CLAMPING WORKPIECES

(54) Bezeichnung: ELEMENTSYSTEM, INSBESONDERE ZUM SPANNEN VON WERKSTÜCKEN

(57) Abstract



In a component system, especially for the construction of devices for holding, clamping and/or positioning workpieces, there is a basic unit (1) extending in the X-Y plane and at least one clamping component (2) which can be secured thereto in various selectable positions. The basic unit (1) has projections (3) regularly arranged in a grid in the X-Y Plane with areas designed as supporting surfaces (4). These projections (3) have reference surfaces (11) pointing in the Z direction and undercuts to accept connecting components. The connecting components extend between the projection (3) and the clamp (2). On each projection there are two spaced superimposed reference surfaces (5; 6). The reference surfaces are separated by the undercut. The component system provides great flexibility in positioning or location while conferring great stability and reproducibility. This makes it possible to interconnect matching joining components between the basic unit (1) and the clamping component (2).

(57) Zusammenfassung

Bei einem Elementsystem, insbesondere zum Aufbau von Vorrichtungen für das Halten, Spannen und/oder Positionieren von Werkstücken, ist ein sich in X-Y-Ebene erstreckendes Grundteil (1) vorgesehen und mindestens ein auf diesem in verschiedenen wählbaren Positionen befestigbares Spannteil (2). Das Grundteil (1) weist regelmäßig in der X-Y-Ebene in einem Raster angeordnete Erhebungen (3) mit als Auflageflächen (4) ausgebildeten Oberflächen auf. Diese Erhebungen (3) besitzen jeweils in Z-Richtung weisende Referenzflächen (11) und haben Hinterschneidungen, die zur Aufnahme von Verbindungselementen dienen. Die Verbindungselemente erstrecken sich zwischen den Erhebungen (3) und dem Spannteil (2). An jeder Erhebung sind jeweils zwei mit Abstand voneinander angeordnete Referenzflächen (5; 6) übereinander vorgesehen. Die Referenzflächen sind durch die Hinterschneidung voneinander getrennt. Das Elementsystem erlaubt eine große Flexibilität in der Positionierung bzw. Lagebestimmung bei hoher Stabilität und hoher Wiederholgenauigkeit. Dabei erfolgt die Verbindung über formschlüssig zwischen Grundteil (1) und Spannteil (2) eintauchende Verbindungselemente.

Component System, Especially for Clamping Workpieces

TECHNICAL FIELD

This invention relates to a modular system, in particular for the construction of devices for holding, clamping, and/or positioning workpieces, preferably on machines, with a base part that extends in the X-Y plane, and at least one clamping part that can be secured on this in various selectable positions, this base part comprising elevations that are arranged to form a regular pattern in the X-Y plane, these elevations having surfaces that are configured as supporting surfaces, and which in each instance have reference surfaces that extend in the Z-direction, said elevations incorporating undercut sections within the reference surfaces that are used to accommodate connecting elements, these undercut areas being disposed at the same height, the connecting elements extending between the elevations and the clamping part.

PRIOR ART

In a known device of this kind, the base plate of the device incorporates T-grooves that are so arranged as to cross each other to form a grid and serve to accommodate a T-nut that has an interior thread. The area of the T-groove that faces upwards, and which is restricted, is not only designed to allow screws to pass through it but is, at the same time, designed as a fitting groove. The clamping part, which lies upon the supporting surface of the base plate of the device has, on its underneath supporting surface a T-groove that forms a mirror image of the first T-groove referred to above. A double-T-nut, which is a precise fit, is inserted into the adjacent and aligned T-grooves. The double-T-nut is designed so as to be divided and the parts are drawn together by a common connecting screw. The stability of this connection is determined, essentially, by the strength of the screw connection. The double-T-nut, which is a fitting and clamping element, must accommodate the shear forces in the X-direction or the Y-direction. The greater the number of connections of this kind that are incorporated in the structure, the greater the errors in precision and losses of stability. A further, significant disadvantage of the known device is the fact that drilled holes and grooves are required to provide accessibility to the connecting elements. These serve exclusively to secure the parts of the device to each other. The workpiece or device supports that are so constructed are of limited use because of the openings that have to be provided.

In addition, DE-PS 34 07 003 describes a clamping device for machine tools, in which the strength of the connection between the base part and the clamping part or between the members themselves is not determined by screws. This known device incorporates an arrangement of parallel dove-tail grooves in the base part. Narrower ribs or rails of the associated counterpart, that are, however, complementary to the first-named grooves as far as arrangement and shape are concerned, engage in these first-named grooves. The angles of the slanting edges of the grooves are identical. The grooves are selected so as to be wide enough that the rails can always be inserted into the grooves from above. The space in the corresponding groove that is left free by the complementary rail is filled by a clamp strip in order to connect the two parts to each other rigidly and immovably once adjustment has been completed. Although the strength of the connection between the base part and the associated counterpart or clamping part is not determined by the strength of a screw connection, in this instance, there are, however, no reference surfaces that extend in the Z-direction. The incorporation of inclined reference surfaces not only restricts the flexibility of this known system very considerably in comparison to the known solution that incorporates double-T-nuts; the known system with inclined reference surfaces on dove-tailed grooves is also comparatively costly to manufacture.

OBJECT AND SUMMARY OF THE INVENTION

It is the object of the present invention to overcome or substantially ameliorate the above disadvantages.

There is disclosed herein a modular system, in particular for the construction of devices for holding, clamping, and/or positioning workpieces, preferably on machines, with a base part that extends in the X-Y plane, and at least one clamping part that can be secured on this in various selectable positions, this base part comprising elevations that are arranged to form a regular pattern in the X-Y plane, these elevations having surfaces that are configured as supporting surfaces, and which in each instance have reference surfaces that extend in the Z-direction, said elevations incorporating undercut sections within the reference surfaces that are used to accommodate connecting elements, these undercut areas being disposed at the same height, the connecting elements extending between the elevations and the clamping part, wherein in each instance reference surfaces are provided above each other, separated by the undercut areas, and spaced apart from each other.

Furthermore, the new modular system is typically intended to provide for rapid replication, with a high degree of stability and consistency, without any need for supplementary measuring means or measurements. Beneficially, the modular system is intended to make secure and reliable connection by means of connecting elements that engage positively between the base part and the clamping part. To this end, on each elevation there may be, in each instance, two separate reference surfaces arranged so as to be spaced apart from each other, and spaced apart above each other by undercutting.

In a preferred embodiment, the reference surfaces are aligned.

Preferably, the provision of two reference surfaces that are offset relative to each other in the Z-direction and are both recessed behind the supporting surface of the base part entails the advantage that extremely solid bracing with contact on the reference surfaces is made possible. The clamping part may be pressed under very high pressure against the reference surfaces by means of a filler piece, for example, a wedge. When this is done, the connecting element may be inserted parallel to the X-Y axis, with the result that it is possible to produce very high structures in the Z-direction and that these require comparatively little space in the area where they are connected to the base part. Beneficially, the symmetrical arrangement of the reference surfaces relative to the undercut area or groove ensures the optimal transfer of force between the base part and the clamping part. Advantageously, the present invention provides a very high level of rigidity and accuracy of the connection.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will be described in greater detail below on the basis of the drawings appended hereto. These drawings show the following:

Figure 1: a perspective view of a base part;
Figure 2: a perspective view of an arrangement of various clamping parts on the base part;
Figures 3 to 8: different embodiments of the elevations that are arranged in a grid pattern on the base part;
Figure 9: a cross-section through a special configuration of the elevation;
Figure 10: a plan view of the elevation as in figure 9;
Figure 11: a perspective view of a clamping wedge in the assembled state;
Figure 12: an exploded view of another clamping wedge;
Figure 13: an embodiment of a differently shaped clamping wedge, in perspective;
Figure 14: a perspective view of an embodiment of another clamping wedge;
Figure 15: a view from the front of an elevation at the edge of a base part with an attached auxiliary component, both sides being coupled by means of a specially formed connecting element;
Figure 16: a perspective drawing of the connecting element;
Figure 17: a front view of a clamping part that is fixed in position by a connecting element;
Figure 18: a perspective view of another arrangement;
Figure 19: a perspective view of the arrangement of a further arrangement shown by way of example;
Figure 20: a perspective view of a specially shaped base part;
Figure 21: a perspective view of another base part shown as an example;

Figure 22: a perspective view of a structural situation of the two base parts 20 and 21;
Figure 23: a plan view of a base part with a supplementary structural member fixed thereon.

THE BEST MODE FOR CARRYING OUT THE INVENTION

In the various embodiments that are shown, identical or corresponding parts are in each case identified by the same reference numbers. If necessary, they are distinguished only by the number of apostrophes following the reference numbers.

Figure 1 is a perspective view of a base part that bears the collective reference number 1. This base part 1 incorporates elevations 3 that are arranged in a regular grid pattern. Viewed from above, the elevations 3 have a square surface. The elevations have supporting surfaces 4 on their upper sides. At their sides, the elevations have two reference surfaces 5 and 6 that are provided on all four sides and separated from each other by a circumferential groove 7. A reference surface 11 extends between the elevations, parallel to the supporting surface 4. The reference surfaces 5 and 6 serve as reference surfaces for measurements taken in the X-direction and the Y-direction. The reference surface 11 serves as a reference surface for measurements made in the Z-direction. The reference surfaces 5 and 6 that are so arranged as to be spaced one above the other each lie in common planes.

Figure 2 shows an exemplary arrangement of the clamping means or supporting members on the base part.

Flat bars 21, the width [flank spacing] of which corresponds to the spacing between the reference surfaces 6, 5, respectively, of adjacent elevations 3, are arranged parallel to each other on the reference surface 11 of the base part. Flat bars 20, the width

of which corresponds to the spacing between the base of the grooves of two opposing grooves 7 of the elevations 3, lie on these lower flat rods 21. The thickness of the flat rod 21 corresponds to the height of the reference surface 6. The thickness of the flat rod 20 corresponds to the depth of the groove 7. Two additional flat rods 21, the surfaces of which are flush with the supporting surface 4 of the elevations 3 are arranged parallel to each other and transversely to the flat rods 20 and 21. The different flat rods 20 and 21 can be pinned together permanently, when they are then fixed immovably in the base part.

Figures 3 to 8 show different forms and arrangements both of the grooves and of the reference surfaces. The outline shape of the elevations 3 can vary, for example, it can be round instead of square. In the embodiment shown in figures 3, 4, and 5, the reference surfaces 5 and 6 are configured so as to be rectilinear in the Z-direction. In the embodiment shown in figure 6, the reference surfaces 5′ and 6′ are rounded. Figures 7 and 8 show the reference surfaces 5′′ and 6′′ in an embodiment in which only the central area of the reference surfaces is rectilinear in the Z-direction, whereas there are in each instance adjacent bevelled surfaces above and below.

Figures 9 and 10 show an elevation 3 which is of square outline and which each have at the centre of the reference surfaces 5 and 6 that are arranged around the circumference, a square half-groove 22 that continues in the base part 1 in a square continuous groove 23.

Figures 11, 12, 13, 14, and 16 show different shapes of connecting elements that are in the form of clamping wedges. The shape of the connecting elements corresponds to the shape of the grooves which, on the one hand, are provided in the elevations 3 of the base part, and to the grooves in the clamping parts 2 that

are meant to be secured to the base part 1, said grooves being disposed at the same height. Figure 17 shows the arrangement of a clamping part 2 between two opposing elevations 3. The clamping part 2 is only shown in part. It lies with its lower face surface on the reference surface 11 of the base part 1 and has rectangular grooves 2c which extend at the same height as the opposing grooves 7, in its side faces. In the embodiment shown, clamping wedges 8' are used as the connecting elements between the clamping part 2 and the elevations 3; these clamping wedges clamp in the direction of the resultant C (see the force diagram, figure 17) when the tightening screws 8a that extend axially are drawn tight.

In the embodiment shown in figure 18, the clamping part consists of two wedge-shaped, complementary plates 2a and 2b. The plates 2a and 2b are fixed in the X plane and the Y plane between the opposing reference surfaces of opposing elevations 3 by appropriate displacement in the longitudinal direction. They are prevented from moving in the Z-direction by the continuous connecting elements that are configured as bars 8, which are inserted into the grooves in the clamping part halves and the elevations 3 that are opposite each other in each instance.

In the embodiment shown in figure 19, four base parts, each having four elevations 3'', are arranged on a common supporting plate 22 which may be, for example, a machine table. The arrangement of the four base parts 1'' is such as to result in a completely uniform grid between all sixteen elevations 3''. Beneath the reference surface 11' there are two intersecting channels 23 on each base part 1''. Two intersecting but lower channels 24 are formed between the four base parts 1''. Filings, chips, and similar machine waste, diluted soluble oil, cutting oil, and the like can run off through the channels 23 and 24.

The clamping part 2'' that can be secured by conventional connecting elements, for example, bars, between the elevations 3'' is, in its turn, provided with additional grooves and that extend in the Z-direction, and matching reference surfaces. Other clamping parts or attachments can be secured to the clamping part 2'' in the same or a similar manner as the clamping part 2'' is itself secured to the base part 1''.

Figure 20 shows a base part 1' that incorporates elevations 3' that face downwards and an elevation 3''' which faces upwards. All of the elevations incorporate the reference surfaces 5 and 6 referred to heretofore as well as the grooves 7 that run between these.

Figure 21 shows an additional base part 1'' that incorporates two elevations 3'. There is a groove 7a beneath the reference surface 6.

Figure 22 shows how the two base parts 1' and 1'' are assembled using bars 8 that serve as connecting elements. In this arrangement it is possible that one element 1' be regarded as a base part and the second element 1'' be regarded as the clamping part. In this sense, in this solution too, a base part 1' is connected to a clamping part 1'' through connecting elements 8.

Figure 23 shows a further design variation in which one base part 1 is provided with elevations 3. A base part 1' with elevations 3' is fixed in place on this base part. This fixing is effected by way of connecting elements 8 and 8' as well as by the locking parts 18 and 19.

The modular system according to the present invention is of universal application. It can also be used, to great advantage, to produce modular toys and toy building blocks.

The claims defining the invention are as follows:

1. A modular system, in particular for the construction of devices for holding, clamping, and/or positioning workpieces, preferably on machines, with a base part that extends in the X-Y plane, and at least one clamping part that can be secured on this in various selectable positions, this base part comprising elevations that are arranged to form a regular pattern in the X-Y plane, these elevations having surfaces that are configured as supporting surfaces, and which in each instance have reference surfaces that extend in the Z-direction, said elevations incorporating undercut sections within the reference surfaces that are used to accommodate connecting elements, these undercut areas being disposed at the same height, the connecting elements extending between the elevations and the clamping part, wherein in each instance reference surfaces are provided above each other, separated by the undercut areas, and spaced apart from each other.

2. A modular system as defined in claim 1, wherein the reference surfaces are aligned with each other.

3. A modular system as defined in claim 1 or claim 2, wherein in plan view the elevations are configured to be polygonal.

4. A modular system as defined in claim 1 or claim 2, wherein in plan view the elevations are round.

5. A modular system as defined in one or more of the claims 1 to 4, wherein the connecting elements are configured as flat bodies that, on two opposing side surfaces, are of a shape and dimensions that correspond with the shape and dimensions of the undercut areas in the elevations.

6. A modular system as defined in one or more of the claims 1 to 5, wherein the undercut areas are grooves.

7. A modular system as defined in claim 6, wherein the grooves extend around the elevations.

8. A modular system as defined in claim 6 or claim 7, wherein the grooves are of a rectangular cross-section.

9. A modular system as defined in one or more of the claims 6 to 8, wherein the grooves are of a semi-circular cross-section.

10. A modular system as defined in one or more of the claims 6 to 9, wherein the groove are of a V-shaped cross-section.

11. A modular system as defined in one or more of the claims 1 to 10, wherein the connecting elements are formed as bars, the cross-section of which fills, at least essentially, the opposing grooves in the elevations and the clamping part.

12. A modular system as defined in claim 11, wherein the width of the

bars corresponds to the spacing of the opposing groove bases of adjacent elevations and clamping parts.

13. A modular system as defined in one or more of the claims 1 to 12, wherein the elevations incorporate a plurality of grooves that are parallel to each other and are arranged one above the other in the Z-direction.

14. A modular system as defined in one or more of the claims 1 to 13, wherein the reference surfaces are configured so as to be rectilinear in the Z-direction.

15. A modular system as defined in one or more of the claims 1 to 14, wherein the reference surfaces are configured so as to be rounded in the Z-direction.

16. A modular system as defined in one or more of the claims 1 to 15, wherein the references surfaces are configured with a plurality of edges in the Z-direction.

17. A modular system as defined in one or more of the claims 6 to 16, wherein the connecting elements can be clamped in the grooves.

18. A modular system as defined in one or more of the claims 6 to 17, wherein the connecting elements are configured from a plurality of parts, and the different parts, which have inclined surfaces that are adjacent to each other, can be moved in the longitudinal direction by means of a screw so as to be clamped in the grooves.

19. A modular system as defined in one or more of the claims 6 to 18, wherein the clamping part incorporates grooves at the level of the grooves in the elevations, and are configured to rest on the reference surfaces.

20. A modular system as defined in one or more of the claims 1 to 19, wherein the space between the reference surfaces of adjacent elevations corresponds to the space between the reference surfaces of an elevation or else is an even-numbered multiple thereof.

21. A modular system as defined in one or more of the claims 1 to 20, wherein the base part incorporates a reference surface that extends parallel to the supporting surfaces of the elevations.

DATED this First Day of September 1994

Jorg Wiemers, Frank Wiemers

Patent Attorneys for the Applicants

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ABSTRACT

In a modular system, in particular for the construction of devices for holding, clamping, and/or positioning work pieces, there is a base part (1) that extends in the X-Y planes and at least one clamping part (2) that can be secured on this in various selectable positions. The base part (1) incorporates elevations (3) that are arranged in the X-Y planes in a grid pattern, these elevations having surfaces that are configured as supporting surfaces (4). Each of these elevations (3) has reference surfaces (11) that face in the Z-direction and incorporates undercut areas that serve to accommodate connecting elements. The connecting elements extend between the elevations (3) and the clamping part (2). On each elevation there are two reference surfaces (5; 6) that are spaced one above the other and spaced apart. The reference surfaces are separated from each other by the undercut areas. The modular system permits a high level of flexibility in positioning or determining position, while ensuring a high degree of stability and precise replication. Connection is effected by connecting elements that fit positively between the base part (1) and the clamping part (2).

FIG.1

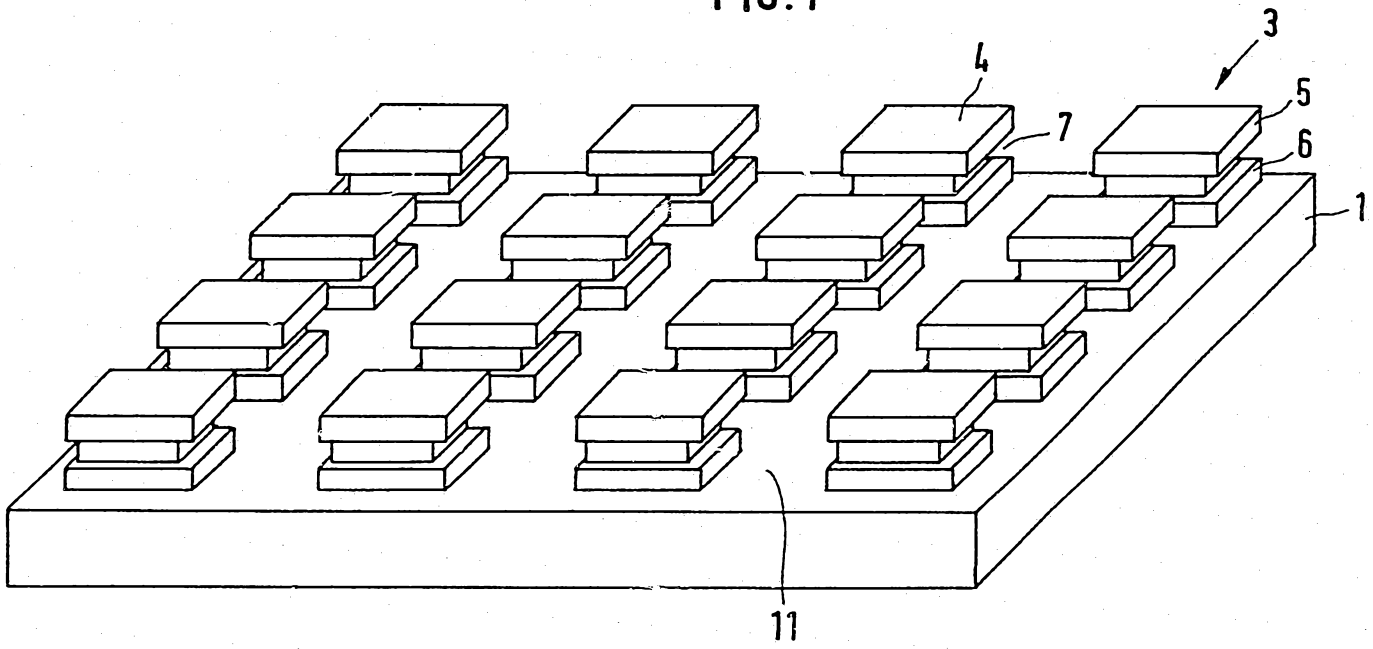

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FIG. 2

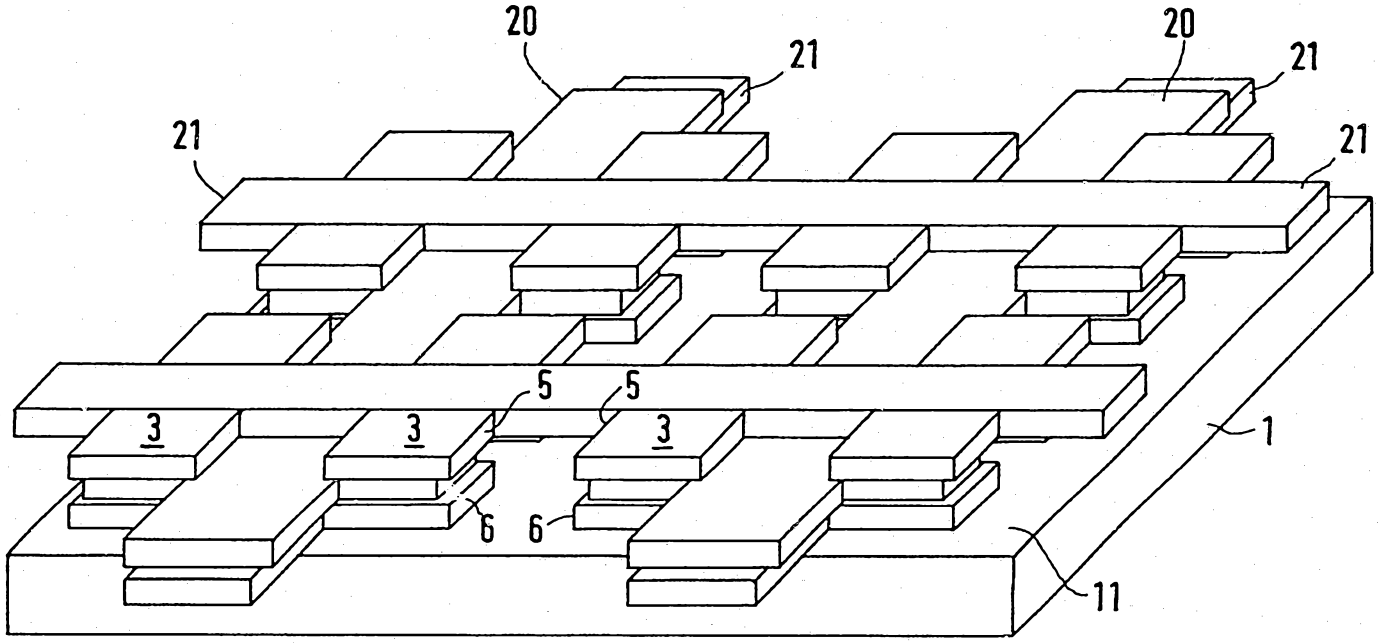


FIG. 3

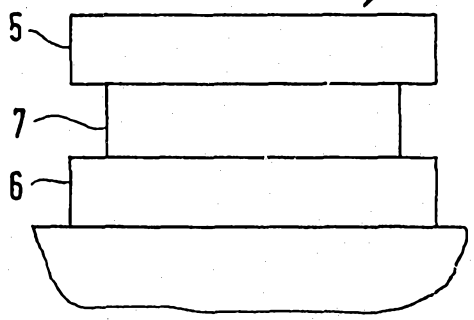


FIG. 4

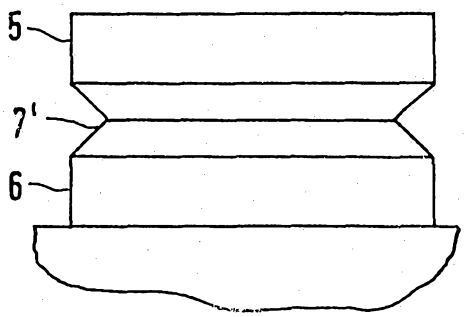


FIG. 5

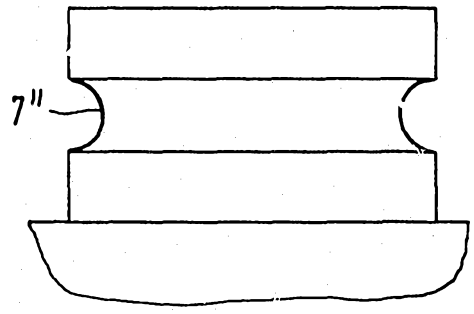


FIG. 6

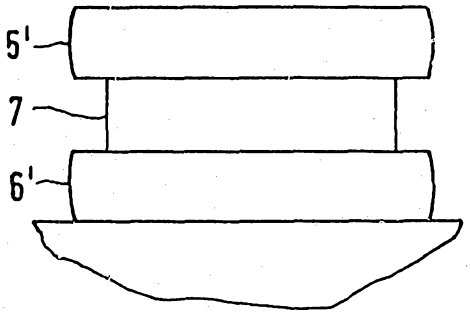


FIG. 7

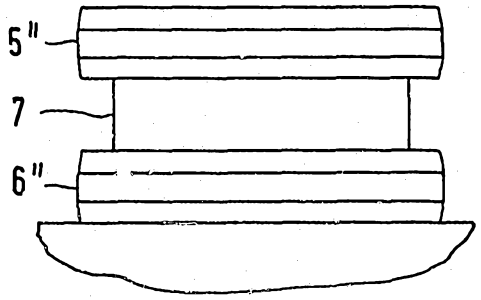
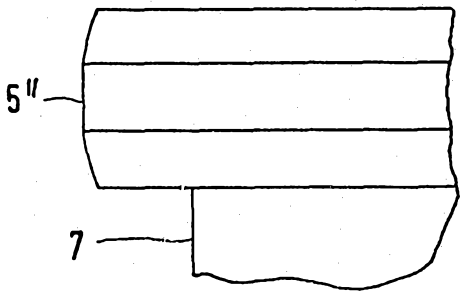


FIG. 8



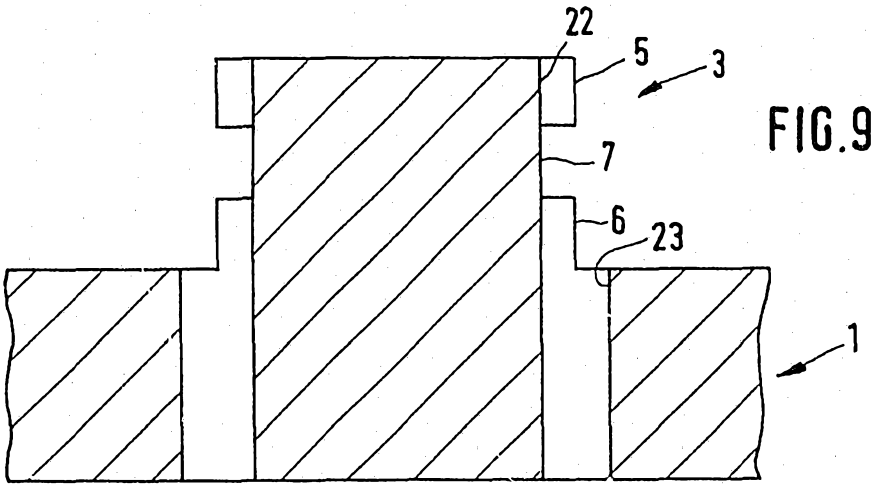


FIG.9

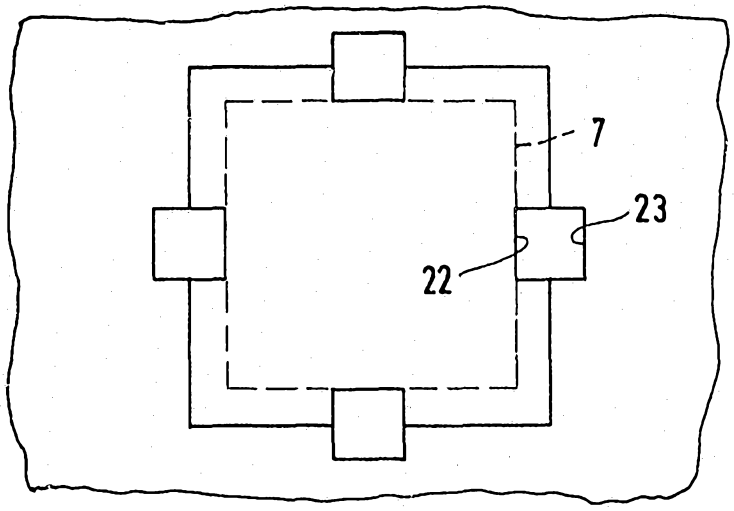


FIG.10

FIG.11

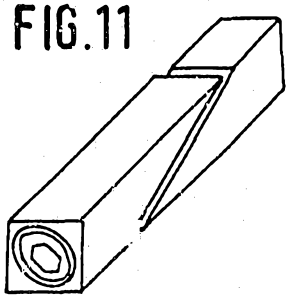
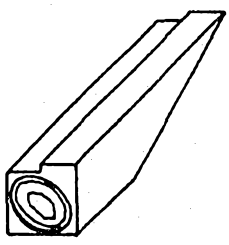


FIG.12



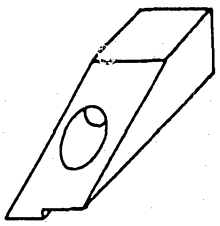


FIG. 13

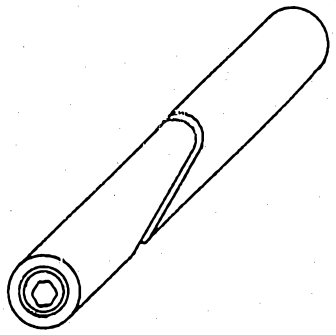


FIG. 14

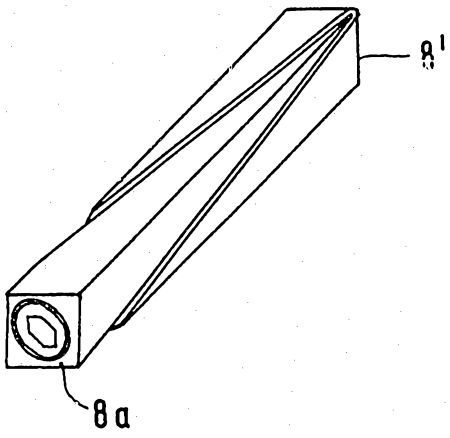


FIG. 15

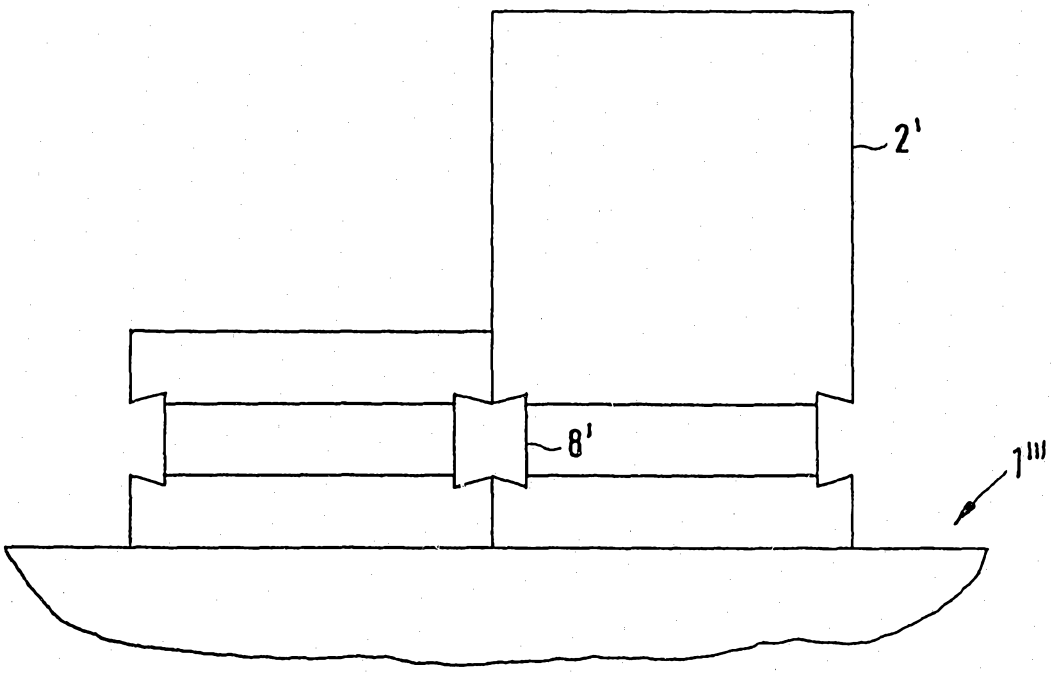


FIG. 16

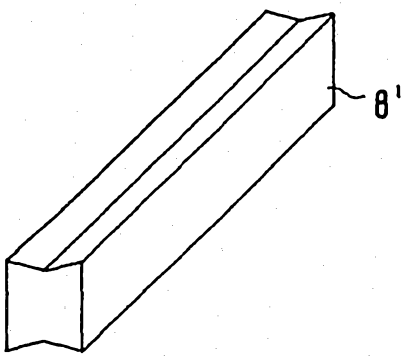


FIG.17

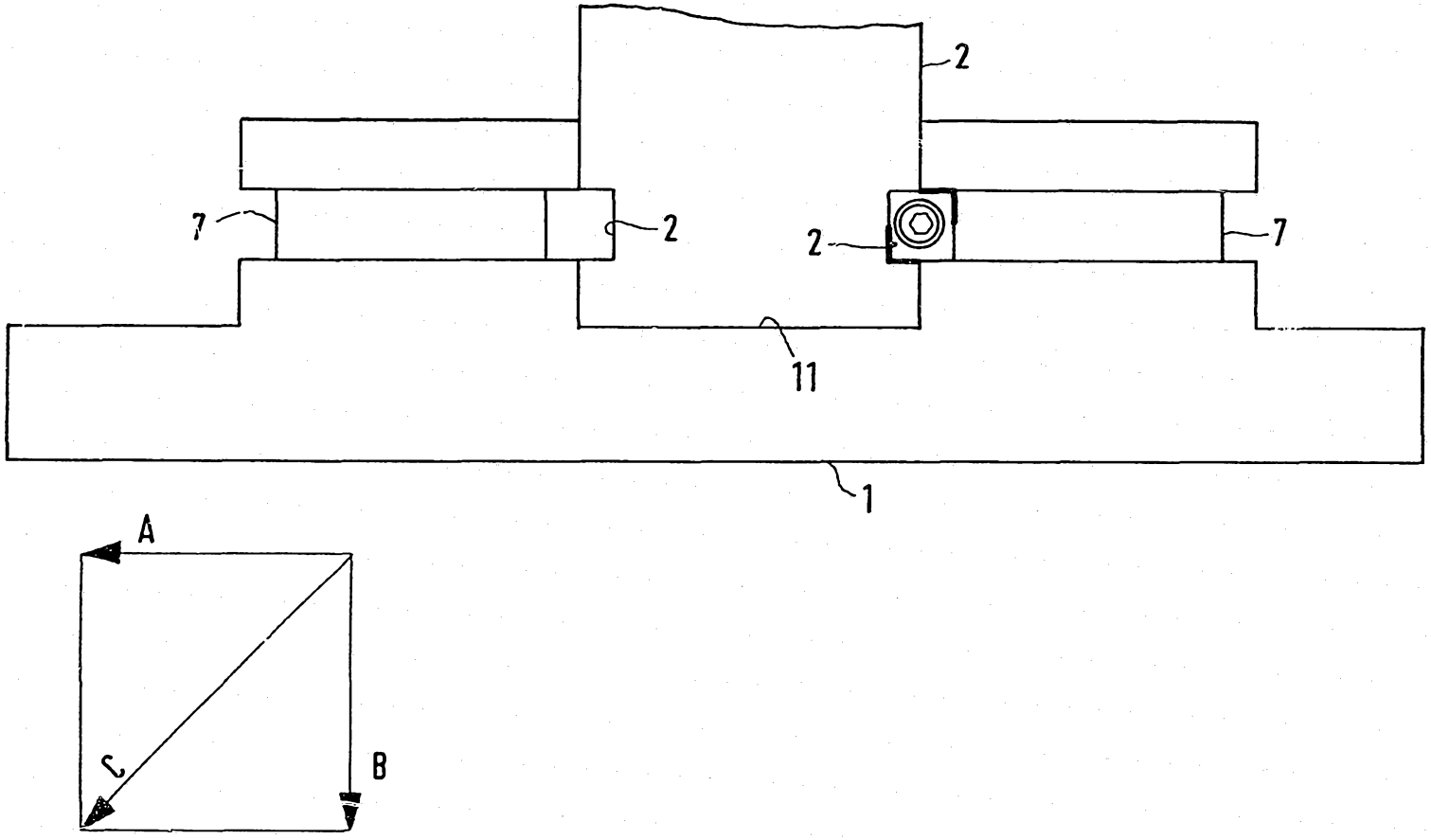


FIG.18

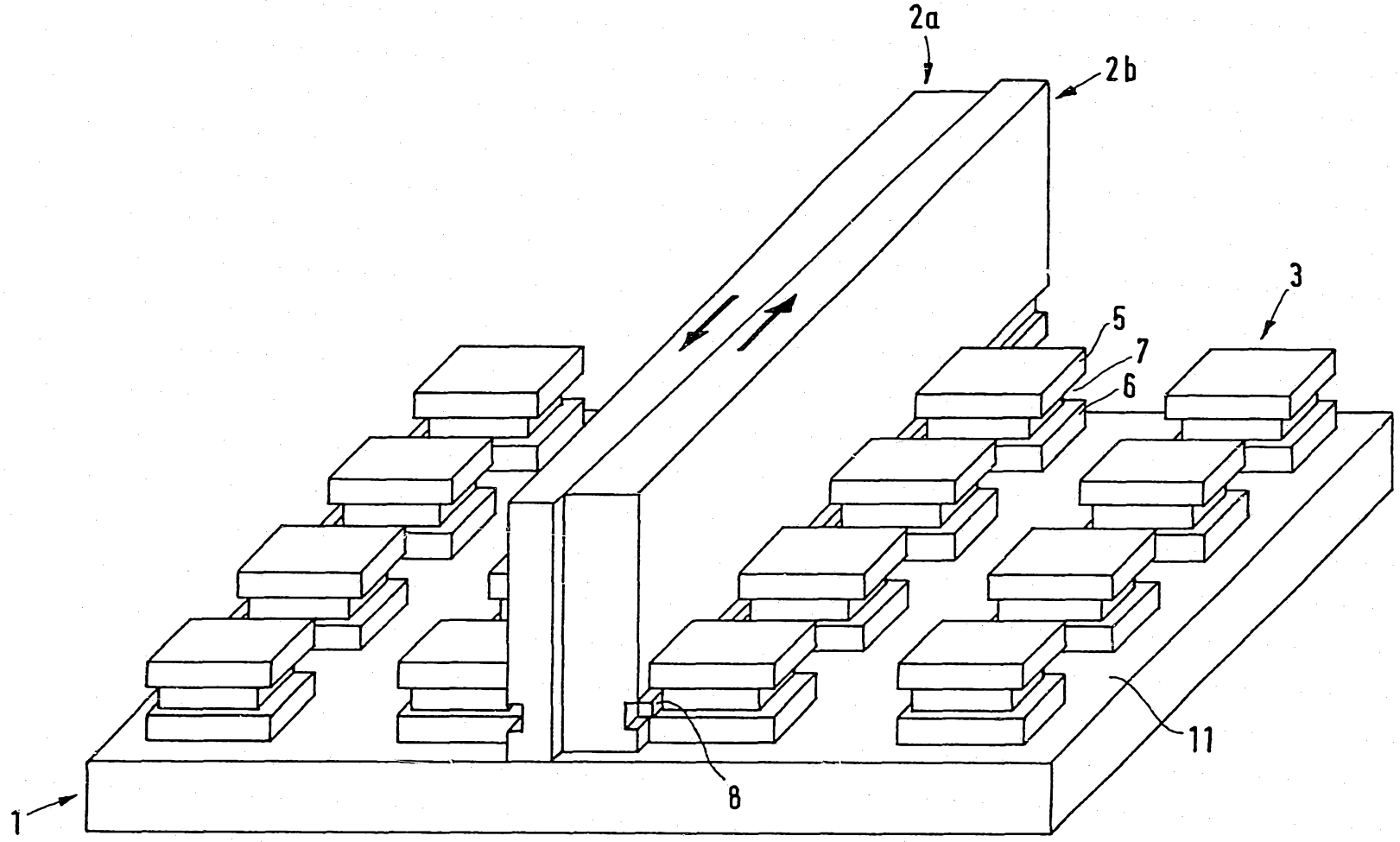


FIG.19

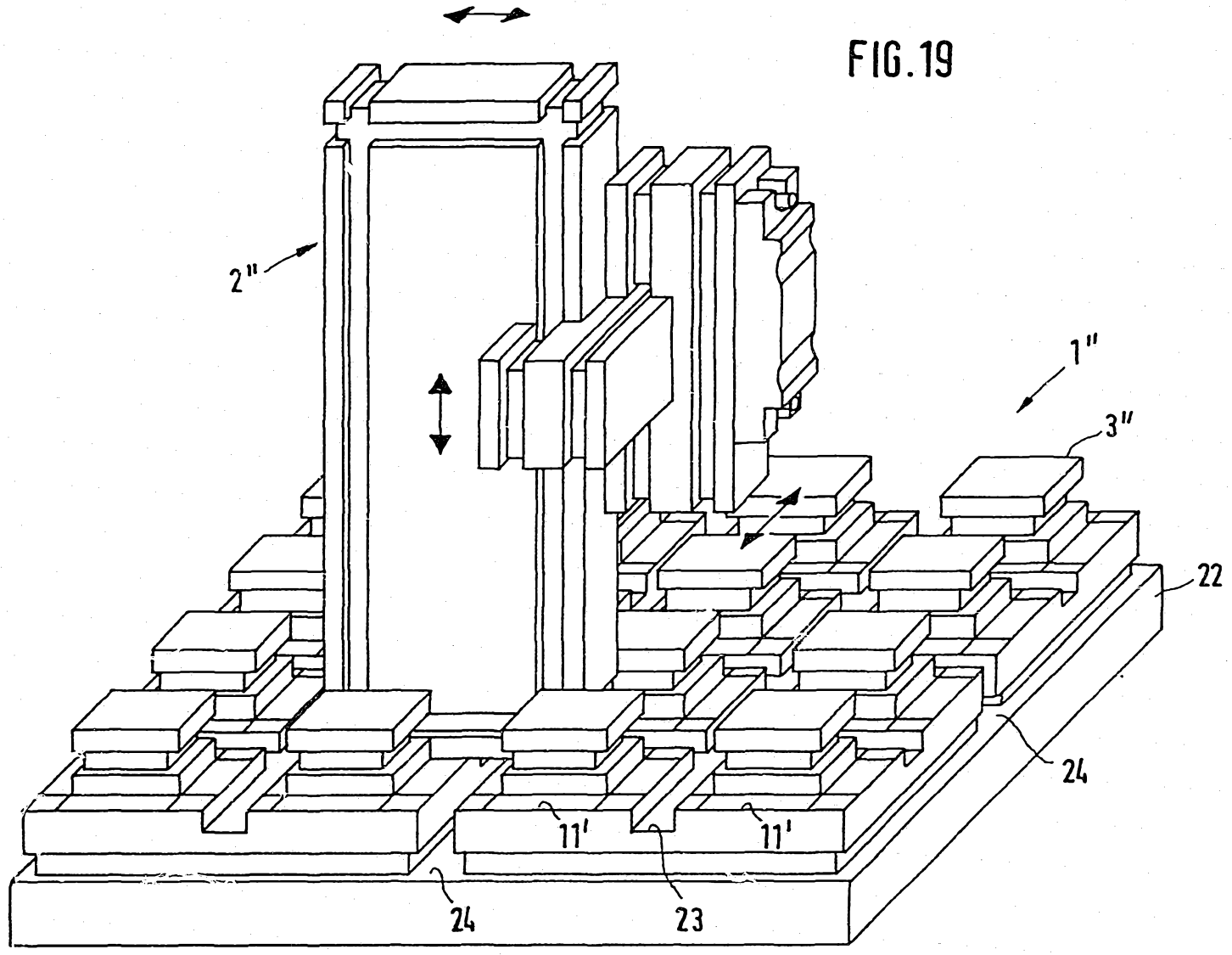


FIG. 20

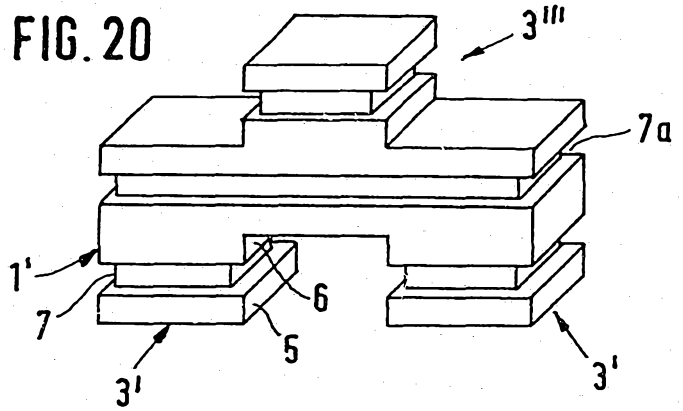


FIG. 22

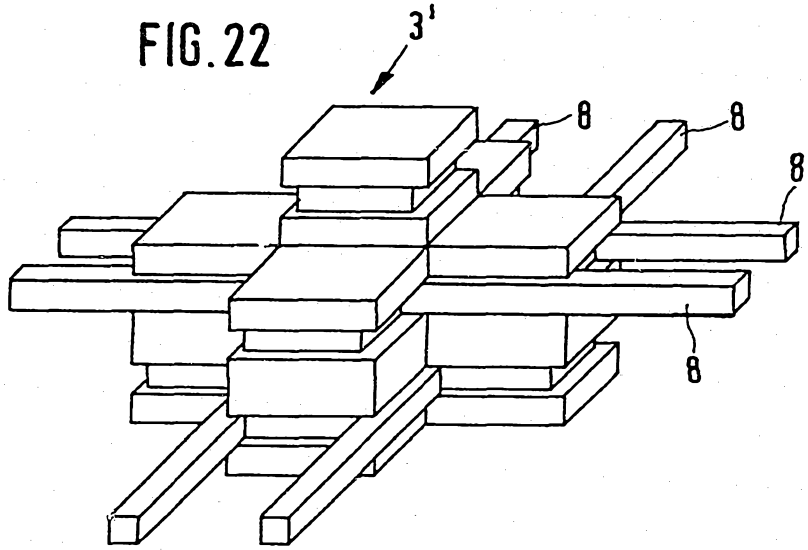


FIG. 21

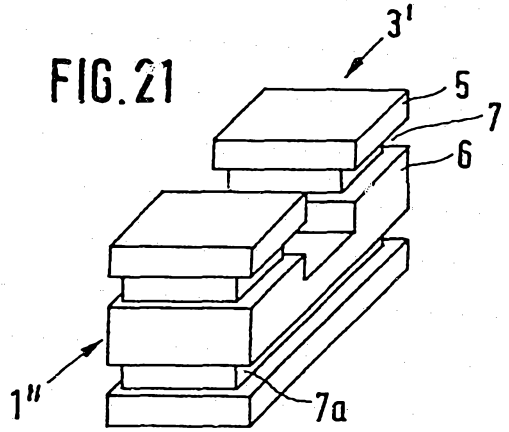
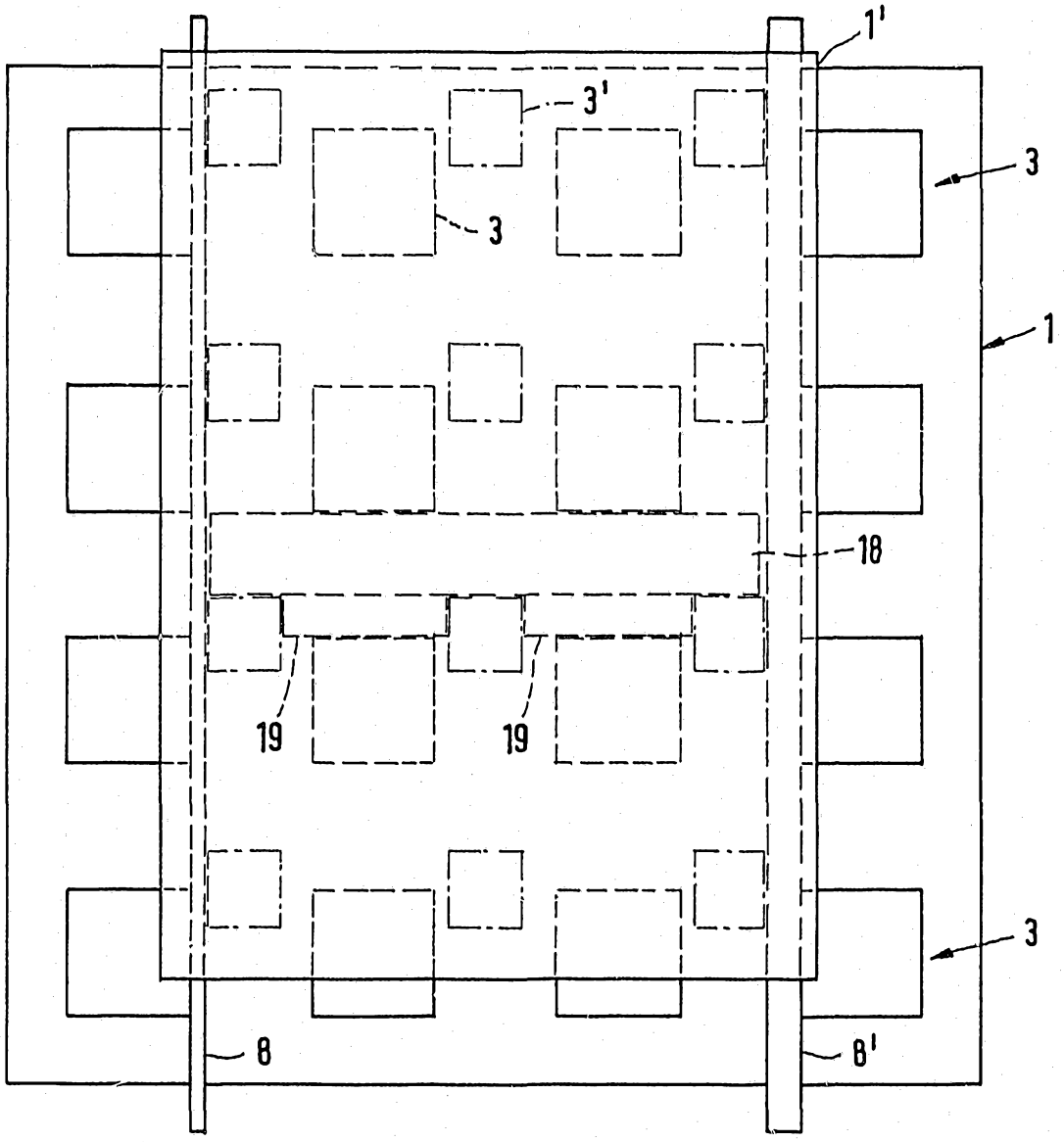


FIG. 23



INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP92/02411

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.^{5} · B23Q 3/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl.^{5} : B23Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	DE, A, 3 407 003 (WITTE) 14 February 1985, cited in the application see column 4, lines 25-45; figure 6	1 3,6,9,12
Y A	DE, A, 3 503 008 (PAGEL) 24 October 1985, see pages 6-7; figure 1.1	1 2,6,7,12,13, 17-19
A	DE, A, 3 402 260 (BERENZ) 1 August 1985, see figure 5	
A	DE, A, 3 237 705 (AIOI) 1 September 1983, figure 4 ref. 16	
A	GB, A, 852 792 (WHARTON & WILCOCKS) 2 November 1960, see figure 4	
A	FR, A, 2 351 755 (MAUSER-WERKE OBERNDORF) 16 December 1977,	

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 January 1993 (22.01.93)	4 February 1993 (04.02.93)
Name and mailing address of the ISA/ European Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP92/02411

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 2 676 413 (WHARTON) 27 April 1956, see figures 3A,3B	

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. EP 9202411
SA 65610

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 22/01/93

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE-A-3407003	14-02-85	EP-A-	0154813	18-09-85
DE-A-3503006	24-10-85	None		
DE-A-3402260	01-08-85	None		
DE-A-3237705	01-09-83	FR-A,B	2521892	26-08-83
		US-A-	4489927	25-12-84
GB-A-852792		None		
FR-A-2351755	16-12-77	DE-A-	2623143	01-12-77
		AU-A-	2536677	23-11-78
		BE-A-	854922	16-09-77
		GB-A-	1577746	29-10-80
		JP-A-	52143572	30-11-77
		NL-A-	7705400	24-11-77
		SE-A-	7705438	23-11-77
US-A-2676413		None		

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/EP 92/02411

I. KLASSIFIKATION DES ANMELDUNGSGEGENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben)[6]

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

Int.Kl. 5 B23Q3/10

II. RECHERCHIERTE SACHGEBIETE

Recherchierter Mindestprüfstoff [7]

Klassifikationssytem	Klassifikationssymbole
Int.Kl. 5	B23Q

Recherchierte nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen [8]

III. EINSCHLAGIGE VEROFFENTLICHUNGEN [9]

Art.°	Kennzeichnung der Veröffentlichung [11], soweit erforderlich unter Angabe der maßgeblichen Teile [12]	Betr. Anspruch Nr.[13]
Y	DE.A,3 407 003 (WITTE) 14 Februar 1985 in der Anmeldung erwähnt	1
A	siehe Spalte 4, Zeile 25 - Zeile 45; Abbildung 6	3,6,9,12

Y	DE,A,3 503 008 (PAGEL) 24. Oktober 1985	1
A	siehe Seite 6 - Seite 7; Abbildung 1.1	2,6,7, 12,13, 17-19

A	DE,A,3 402 260 (BERENZ) 1. August 1985 siehe Abbildung 5	

	-/--	

° Besondere Kategorien von angegebenen Veröffentlichungen [10]:

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist

"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)

"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht

"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist

"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist

"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden

"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist

"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

IV. BESCHEINIGUNG

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
22.JANUAR 1993	04. 02. 93
Internationale Recherchenbehörde	**Unterschrift des bevollmächtigten Bediensteten**
EUROPAISCHES PATENTAMT	BOGAERT. F.L.

III. EINSCHLAGIGE VEROFFENTLICHUNGEN (Fortsetzung von Blatt 2)

Art °	Kennzeichnung der Veröffentlichung, soweit erforderlich unter Angabe der maßgeblichen Teile	Betr. Anspruch Nr.
A	DE,A,3 237 705 (AIOI) 1. September 1983 Abbildung 4 ref. 16	
A	GB,A,852 792 (WHARTON & WILCOCKS) 2. November 1960 siehe Abbildung 4	
A	FR,A,2 351 755 (MAUSER-WERKE OBERNDORF) 16. Dezember 1977	
A	US,A,2 676 413 (WHARTON) 27. April 1956 siehe Abbildungen 3A,3B	

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT
ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR.

EP 9202411
SA 65610

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 22/01/93
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
DE-A-3407003	14-02-85	EP-A-	0154813	18-09-85
DE-A-3503008	24-10-85	Keine		
DE-A-3402260	01-08-85	Keine		
DE-A-3237705	01-09-83	FR-A,B	2521892	26-08-83
		US-A-	4489927	25-12-84
GB-A-852792		Keine		
FR-A-2351755	16-12-77	DE-A-	2623143	01-12-77
		AU-A-	2536677	23-11-78
		BE-A-	854922	16-09-77
		GB-A-	1577746	29-10-80
		JP-A-	52143572	30-11-77
		NL-A-	7705400	24-11-77
		SE-A-	7705438	23-11-77
US-A-2676413		Keine		

EPO FORM P0473

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82