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(54) Sound deadening structure.

(57) A sound deadening structure comprising elements to be connected with one another whereby the structure comprises box-shaped parts provided round about with a plurality of coupling members for coupling filling parts extending between the box-shaped parts.

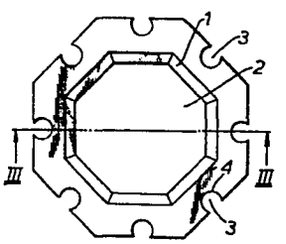

FIG. 1.

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Sound deadening structure.

The invention relates to a sound deadening structure comprising elements to be connected with one another.

In the usual sound deadening structures metal or concrete screens are frequently employed whereby generally one is limited to the erection of flat, straight walls. Thereby there are relatively few possiblities of use of such screens.

Sometimes earthen dike bodies are built up, but an adequate height of such a dike body requires a comparatively large ground surface.

The invention has for its object to provide a sound deadening structure which permits structures of varying shape and design in many ways by using a few standard components.

According to the invention this can be achieved in that the structure comprises box-shaped parts provided round about with a plurality of coupling members for connecting filling parts between the box-shaped parts.

In the structure according to the invention the filling parts can be coupled at various points with the box-shaped parts so that many variations in the development of the sound deadening structure can be obtained, as will become apparent hereinafter.

Apart therefrom the structure may serve as an earth retaining wall, as a reinforcement of tali or otherwise to bridge level differences or to stiffen earth bodies or the like.

The invention will be described more fully hereinafter with reference to the accompanying drawings.

Fig. 1 is a plan view of a box-shaped part of a sound deadening structure embodying the invention.

Fig. 2 is a side elevation of the structure of Fig. 1.

Fig. 3 is a cross-sectional view taken on the line III-III in Fig. 1.

Fig. 4 is a plan view of a second embodiment of a box-shaped element.

Fig. 5 is a cross-sectional view taken on the line V-V in Fig. 4.

Fig. 6 is an elevational view of a plate-shaped filling part generally used in a vertical position.

Fig. 7 is a plan view of the structure of Fig. 6.

Fig. 8 is a cross-sectional view of two plate-shaped parts of Figs. 6 and 7 disposed one on the other.

Fig. 9 is a plan view of a further embodiment of a plate-shaped filling part generally used in a horizontal position.

Fig. 10 is an elevational view in the direction of the arrow X in Fig. 9.

Fig. 11 is a sectional view taken on the line XI-XI in Fig. 9.

Fig. 12 is an elevational view of a coupling pin.

Fig. 13 is an elevational view of an embodiment of a wall constructed with the aid of box-shaped elements shown in Fig. 1 and of plate-shaped filling parts as shown in Fig. 9.

Fig. 14 is a schematic elevational view of one end of a potential embodiment of the sound deadening structure.

Fig. 15 is a schematic elevational view of one end of a further potential development of a sound deadening structure.

Fig. 16 is a schematic sectional view of an embodiment of a sound deadening structure.

Fig. 17 is a schematic sectional view of a sound deadening structure of the kind shown in Fig. 15.

Fig. 18 schematically illustrates the use of the filling parts at a break in an earthen wall.

Fig. 19 schematically illustrates various possibilities of disposition and connection for the box-shaped and plate-shaped elements.

Fig. 20 is a schematic, perspective view of a trough-shaped filling part.

Fig. 21 is a rear view of a trough-shaped filling part as shown in Fig. 20 with the associated filling pieces.

Fig. 22 is a schematic side elevation of a few nested troughs of the kind shown in Fig. 20.

Fig. 23 is a perspective elevational view of an auxiliary element.

Fig. 24 is a schematic sectional view of a few troughs disposed one above the other in a sound deadening structure.

Fig. 25 is a schematic, perspective view of a further embodiment of a trough to be used as a filling part.

The box-shaped element shown in the accompanying drawings has an octogonal cross-section, but it will be obvious that within the spirit and scope of the invention other cross-sections of the hollow elements may be chosen, for example, circular, elliptical or other sections differing from the octogonal cross-section.

The box-shaped element shown in Figs. 1 to 3 is hollow and the wall 1 of the box-shaped element is the boundary wall of a central cavity 2 slightly tapering in the direction of height of the element.

At equal intervals, in the embodiment shown at the centres of the boundary faces of the box-shaped element, recesses 3 extend along the full height of the box-shaped element 1. The recesses 3 are bounded by a wall 4, which preferably constitutes an arc of a circle, in which the distance between the ends of the wall 4 is smaller than the diameter of the art concerned, which will be apparent from Fig. 1.

Preferably the recesses 3 are also slightly tapering.

The height of such a box-shaped element may be 30 cms and the width may be 60 cms, although , of course, other dimensions may be used.

Figs. 4 and 5 show a similar box-shaped element and corresponding parts are designated by the same reference numerals as in Figs. 1 to 3. In the embodiment shown in Figs. 4 and 5, however the box-shaped element is provided near the end having the smaller

sectional area of the inner passage 2 with a closing wall 5, at the centre of which is provided a small hole 6. the element shown in Figs. 4 and 5 may be employed as the top element of a plurality of superposed, box-shaped elements as a terminal element.

The element shown in Figs. 4 and 5 is furthermore particularly suitable for use as a lowermost, ground-contacting element of a plurality of stacked elements. Owing to its large surface the closing wall then bearing on the ground ensures a low surface pressure so that sinking into the ground is minimized.

The above-described, box-shaped elements may be employed in conjunction with the filling parts shown in Figs. 6 to 8 in the form of plate-shaped elements 7. From Fig. 8 it will be particularly apparent that these plate-shaped elements are constructed so that, in a sectional view, an upwardly extending boundary wall 8 is at right angles to the horizontal base wall 9, whereas the other upwardly extending boundary wall 10 is upwardly inclined from its connection with the base 9 towards the wall 8. The upper boundary wall 11 has a stepwise design so that on the side of the upwardly inclined sidewall 10 a protruding nose 12 is formed.

The ends of the plate-shaped element 7 are joined by coupling members 13 having a sectional area such that they can be slipped into the recesses 3 of the box-shaped elements. The design is preferably such that when located in recesses 3 the coupling members 13 can still slightly turn about their longitudinal axes with respect to the box-shaped elements concerned.

The centre lines 14 of the coupling members 13 are in positions such that superposed plates coupled with box-shaped elements can be alternately disposed as is illustrated in Fig. 8. This design of the plates ensures a satisfactory, sound-deadening junction between the plates.

A further embodiment of a plate-shaped element suitable for use in conjunction with the box-shaped elements is shown in Figs. 9 to 11.

From these Figures it is apparent that this plate-shaped element is formed at least mainly by a flat plate 15, the ends of which are slightly tapering. These ends have holes 16. Along a longitudinal side the plate 15 is provided with an upwardly extending nose 17. For connecting the plate-shaped elements shown in Figs. 9 to 11 with the box-shaped

elements the coupling member 18 shown in Fig. 12 may be employed, said member being formed by a shaft 19 having a thickened central portion 20. The thickened central portion 20 fits in a hole 16 in the plate-shaped element, whereas the thinner parts on both sides of said thickened central portion 20 of the shaft 19 are fitting in the recesses 3.

When two box-shaped elements are disposed at the required distance from one another, the ends of a plate-shaped element 15 can be laid down on said two box-shaped elements.

By means of the elements described above many different constructions of sound-deadening structures can be obtained in a simple manner.

Fig. 13 is an elevational view of a sound deadening structure formed by stacked box-shaped elements with plate-shaped parts intermediate there between. An effective length of the plate-shaped parts is such that the centre-to-centre distance between successive columns of stacked box-shaped elements is about 150 cms, though, of course, other dimensions may be chosen.

The stacked box-shaped elements may be filled with earth or concrete.

As is shown in Fig. 14, columns of stacked box-shaped elements may be arranged side by side in the direction of length of the structure, whilst these box-shaped elements extending in the direction of length of the sound deadening structure can be coupled with plate-shaped parts 7 extending transversely of the direction of length of the structure. As is shown in Figs. 14 and 15 the box-shaped elements may be piled up perpendicularly one above the other or the distance between the box-shaped elements may be varied. As is shown in Figs. 16 and 17 the horizontal plate-shaped elements 15 or the perpendicularly stacked plate-shaped parts 7 can be arranged between the box-shaped elements in the direction of length of the sound deadening structure. When the inner space of the construction in which plates 7 and 15 may be arranged between box-shaped elements as anchoring elements, is filled out with earth, this earth bearing on the horizontal, plate-shaped elements 15 will form a given talus, where plants can grow between the plate-shaped elements 15.

Owing to the noses 19 of the plates 15, which continue up to the box-shaped elements, the ground layer may have a given thickness up to the front side of the plates so that plants can be grown up to the front

side of the plates 15. The noses 19 furthermore prevent the earth from being blown or flushed away due to wind or rain.

As is schematically shown in Fig.18, the plate-shaped elements may be arranged in a rampart 21 of earth or the like, having a break 22. In the area of said break the head ends of the earthen rampart may be surrounded by a wall formed in the manner described above by the stacked, box-shaped elements and the intermediate, plate-shaped parts.

Fig. 19 is a schematic plan view of an embodiment of the sound deadening structure, which will give a clear impression of the many variations in shape and design of the rampart obtainable by using the simple basic elements described above with reference to Figs. 1 to 12.

The recesses 3 in the box-shaped elements may furthermore be used for accommodating the posts of frames, which is thus disposed between two relatively spaced columns of stacked box-shaped elements. In this way for example, doors, transparent or opaque screens and similar elements may be mounted with the aid of the frames in a construction erected with the aid of the elements described above. If in building up the construction it is desired to arrange vertical plates rather than horizontal plates or conversely at a given level between the box-shaped elements, a so-called coupling pin half may be used, that is to say a pin having the shape of the pin shown in Fig. 12, in which the part of the shaft 19 on one side of the thickened central portion is omitted.

As filling parts between the box-shaped elements also troughs 23 of concrete, synthetic resin or similar material may be used as is shown in Fig. 20.

The embodiment of the trough shown in this Figure comprises a rear wall 24, sidewalls 25 and a front wall 26.

For reinforcing the connection between the front wall 26 and the rear wall 24 transverse partitions 27 extending more or less parallel to the sidewalls are arranged between the front wall and the rear wall. From Fig. 20 it will be apparent that these transverse partitions are disposed in groups of two partitions near one another, whilst the space between the transverse partitions 27 is covered near the top rims of the transverse partitions 27 by stip-shaped parts 28, below which hollow spaces 29 are thus formed.

At the top ends of the sidewalls 25 flanges 30 extend outwardly. Below these flanges are arranged coupling members 31, which are preferably hollow and the shape of which matches the recesses 3 in the box-shaped elements 1 so that these coupling elements can be inserted into the recesses 3. The lower ends of the coupling elements 31 are in engagement with strip-shaped parts 32 transversely adjoining the sidewalls 25, which strips will also fall into a recess when a trough 23 is coupled with a box-shaped element 1.

The troughs 23 described above can be effectively made from synthetic resin; the design may be such that they can be nested for transport purposes as is illustrated in Fig. 22.

When arranged as filling parts between the box-shaped elements 1 in order to obtain a sound deadening structure the sidewalls 24 will be in line with one another in vertical positions as is shown in Fig. 24. The front walls 26, the lower rims of which are connected with the aid of a bottom with the lower rims of the rear walls 24 of the troughs 23 concerned, are then upwardly inclined at an angle of, for example, about 45° in a direction away from the rear wall. The design is such that the top edge of the front wall 26 is located at a lower level than the top edge of the rear wall 24 in a manner such that the line of connection between these two top edges is at an angle of about 30° to 45° to the horizontal, which more or less corresponds to the natural talus of garden soil 34 or the like to be charged into the troughs. Thus plants 35 can be grown on the surface of the garden soil in the troughs so that a sound deadening structure is obtained with vegetation on at least one side.

In order to prevent the passage of sound in the cavities 29, these cavities can be closed by means of filling pieces 36 in recesses in the rear wall 24 as is schemtaically shown in Fig. 21.

When arranging the trough-shaped filling parts 23 between the box-shaped elements the auxiliary pieces 37 shown in Fig. 23 are used; they are formed by a disk 38 having a thickness equal to that of the flanges 30, a coupling piece 39 protruding below the disk and fitting in the top end of a recess 3 and a coupling piece 40 protruding above the disk and fitting in the lower end of a recess 3. At least in some of the recesses 3 not occupied by coupling pieces 32 associated with troughs 23 are arranged in the coupling pieces 39 of the auxiliary elements 37 so that apart from the

flanges 30 a few disks 38 will bear on the top sides of the box-shaped parts concerned. In this manner a satisfactory support of a box-shaped part to be disposed on the first box-shaped part is obtained at various points so that the higher box-shaped part does not tend to tilt.

Fig. 25 shows a further embodiment of a trough to be used as a filling part. Parts corresponding with those of the trough described above are designated by the same reference numerals as in the preceding Figures. In this embodiment the partitions 27 are omitted and the front wall and rear wall are provided with depressed parts or stiffening ridges 41.

It will be obvious that within the spirit and scope of the invention many variants and/or additions to the embodiments described above and illustrated in the Figures are conceivable.

The figures used in the claims are only meant to explain more clearly the intention of the invention and are not supposed to be any restriction ooncerning the interpretation of the invention.

Claims.

1. A sound deadening structure comprising elements to be connected with one another characterized in that the structure comprises box-shaped parts provided round about with a plurality of coupling members for coupling filling parts extending between the box-shaped parts.

2. A structure as claimed in Claim 1 characterized in that the outer periphery of a box-shaped part has recesses extending along the height of the box-shaped part and serving as coupling members.

3. A structure as claimed in Claim 2 characterized in that in a sectional view a recess is bounded by part of an arc of a circle, in which the distance between the ends of the arc of the circle located at the outer circumference of the box-shaped part is smaller than the diameter of the arc of the circle.

4. A structure as claimed in anyone of the preceding Claims characterized in that the box-shaped element has an octogonal sectional area.

5. A structure as claimed in Claim 4 characterized in that a recess is provided near the middle of a flat boundary face of the box-shaped element.

6. A structure as claimed in anyone of the preceding Claims characterized in that the sectional area of the inner passage of the box-shaped part decreases from one end of the box-shaped part to the other end thereof.

7. A structure as claimed in anyone of the preceding Claims characterized in that near one end of the box-shaped part is provided with a wall extending transversely of the longitudinal axis of the box-shaped part.

8. A structure as claimed in anyone of the preoeding Claims characterized in that a filling part formed by a plate-shaped element is provided at its ends with coupling members extending along at least substantially the full height of the plate-shaped element and fitting in recesses provided in the box-shaped part.

9. A structure as claimed in Claim 8 characterized in that in a sectional view the width of a plate-shaped element varies in the direction of height of the plate-shaped element.

10. A structure as claimed in Claim 8 or 9 characterized in that near the top end the plate-shaped element is provided with a protruding nose.

11. A structure as claimed in Claim 10 characterized in that the coupling members are arranged so that the plate-shaped elements can be alternately disposed one above the other in a manner such that the lower end of a plate-shaped element will engage a protruding nose of a subjacent plate-shaped element.

12. A structure as claimed in anyone of the preceding Claims 8 to 11 characterized in that the ends of a plate-shaped element have recesses for receiving coupling members, which also fit in recesses in the box-shaped parts.

13. A structure as claimed in Claim 12 characterized in that a coupling member is formed by a shaft having a thickened central portion, which portion fits in a hole in a plate-shaped element and in that the ends of said shaft fit in recesses in the box-shaped parts.

14. A structure as claimed in Claim 12 or 13 characterized in that along a longitudinal edge the plate-shaped element is provided with an upright rim.

15. A structure as claimed in anyone of Claims 1 to 7 characterized in that a filling part is formed by a trough-shaped member provided at its ends with coupling members co-operating with the coupling members of the box-shaped parts.

16. A structure as claimed in Claim 15 characterized in that the trough-shaped parts are designed so that when mounted in the structure the rear walls of said trough-shaped parts are in line with one another in

vertical positions and in that the top edges of the front walls upwardly inclined in a direction away from the rear walls are located at a lower level than the top edges of the rear walls and in that the troughs are filled with garden soil or the like.

17. A structure as claimed in Claim 15 or 16 characterized in that reinforcing partitions are arranged between the sidewalls and between the front wall and the rear wall of a trough, said partitions being arranged pairwise and being interconnected near their top edges by a strip-shaped part of the trough, whilst the cavities between the pairs of reinforcing partitions are closed with the aid of separate filling pieces.

18. A structure as claimed in Claim 15 or 16 characterized in that the front wall and the rear wall of a trough are provided with stiffening ridges.

19. A structure as claimed in anyone of the preceding Claims 15 to 18 characterized in that the coupling elements forming part of the troughs are formed by coupling pieces fitting in the recesses of the box-shaped parts, whilst the lower ends of said coupling pieces are adjoined by strip-shaped parts extending transversely of the sidewalls of the troughs and falling into the recesses of the box-shaped parts.

20. A box-shaped part apparently intended for use in a structure as claimed in anyone of the preceding Claims.

21. A filling part apparently intended for use in a structure as claimed in anyone of the preceding Claims.

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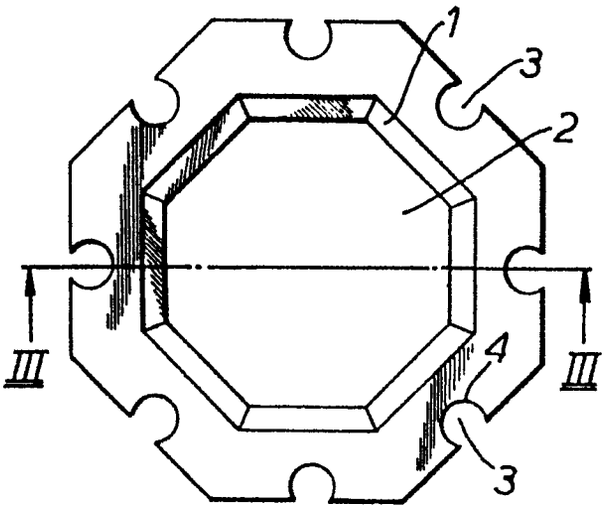


FIG. 1.

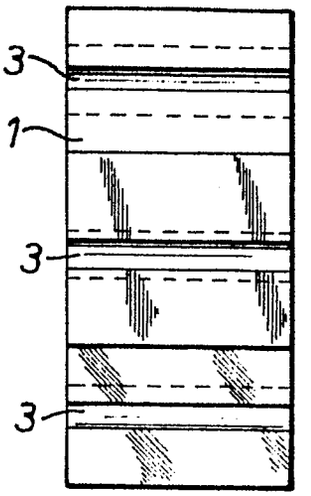


FIG. 2.

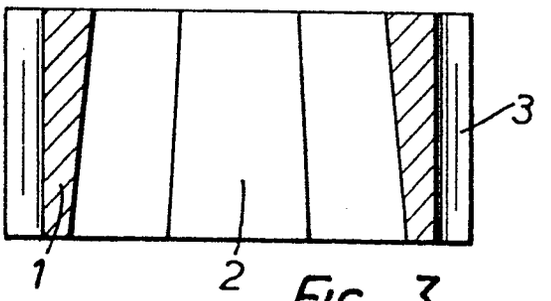
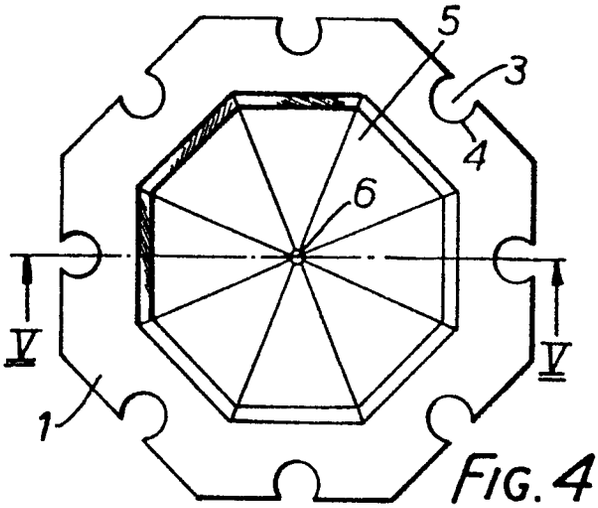


FIG. 3.



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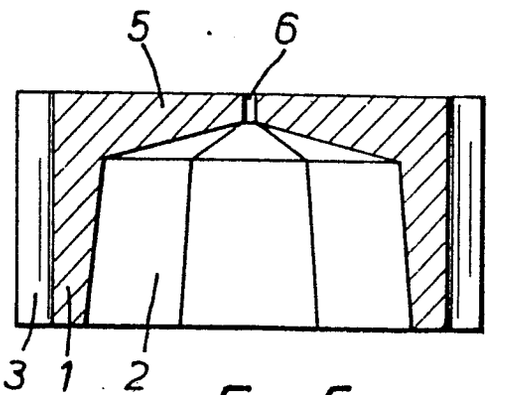


FIG. 5.

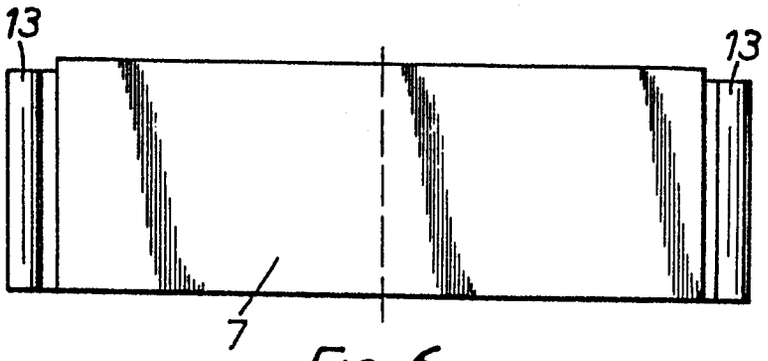
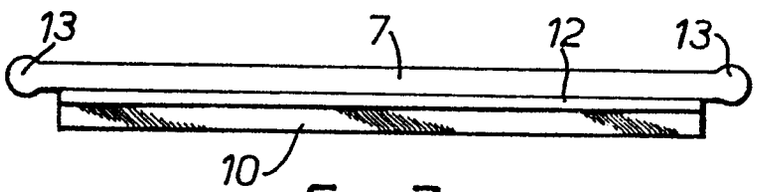


FIG. 6.



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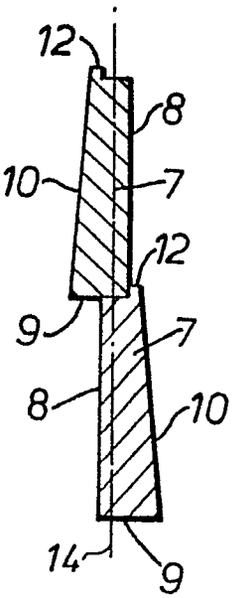


FIG. 8.

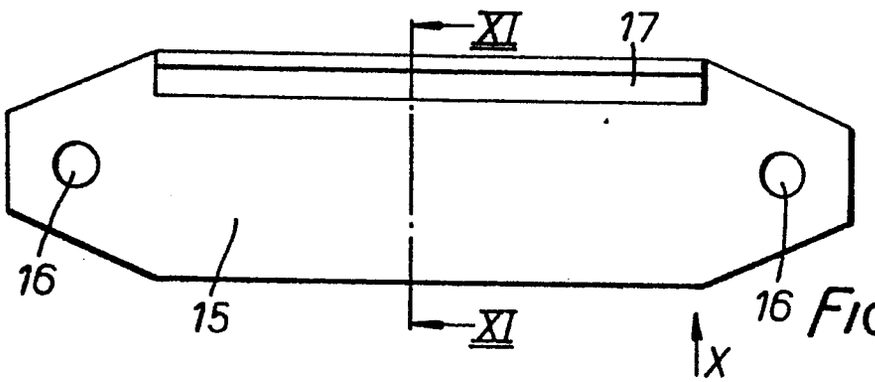


FIG. 9.

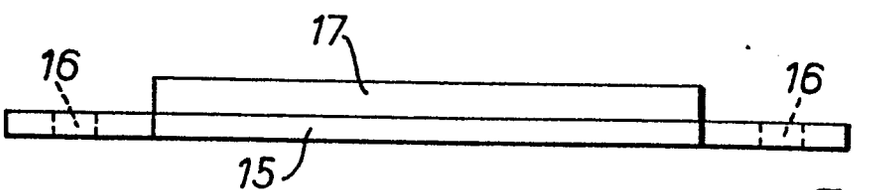


FIG. 10.

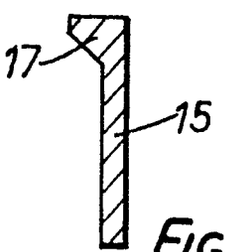
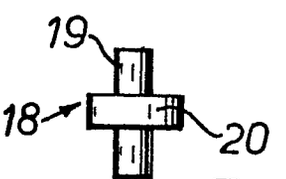


FIG. 11.



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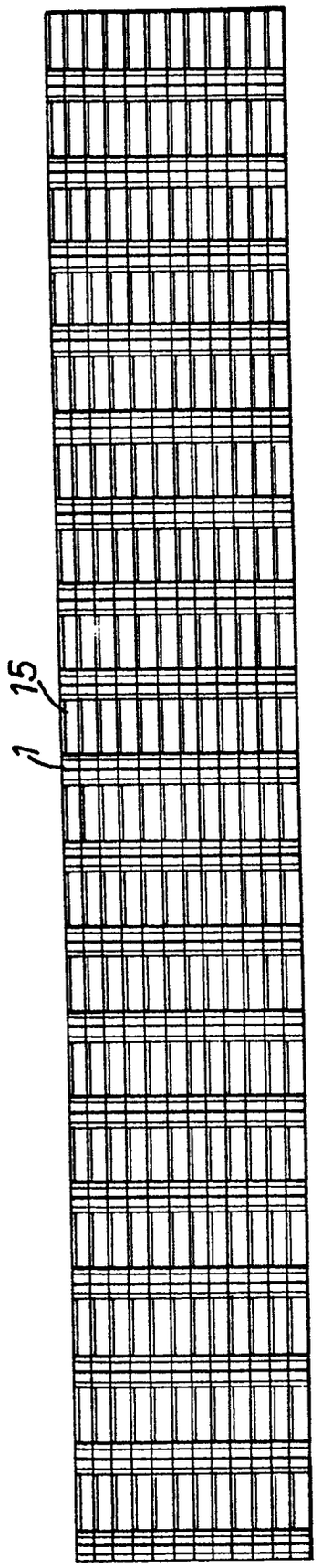

FIG. 13

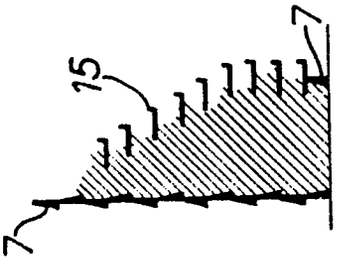

FIG. 17.

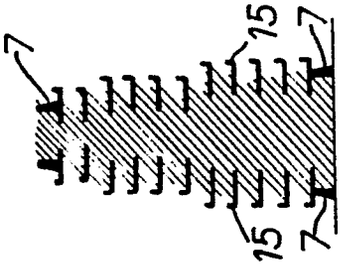

FIG. 16.

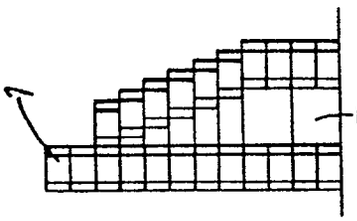

FIG. 15.

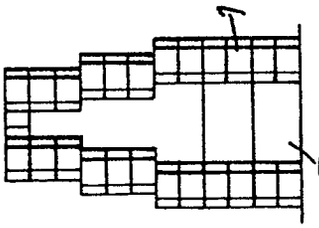

FIG. 14.

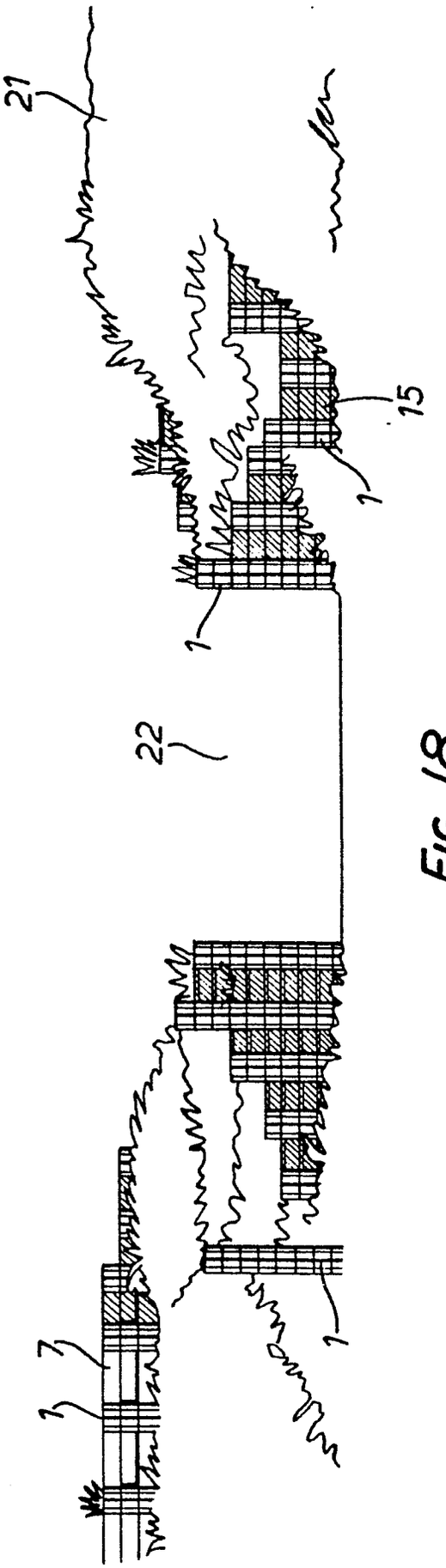

FIG. 18.

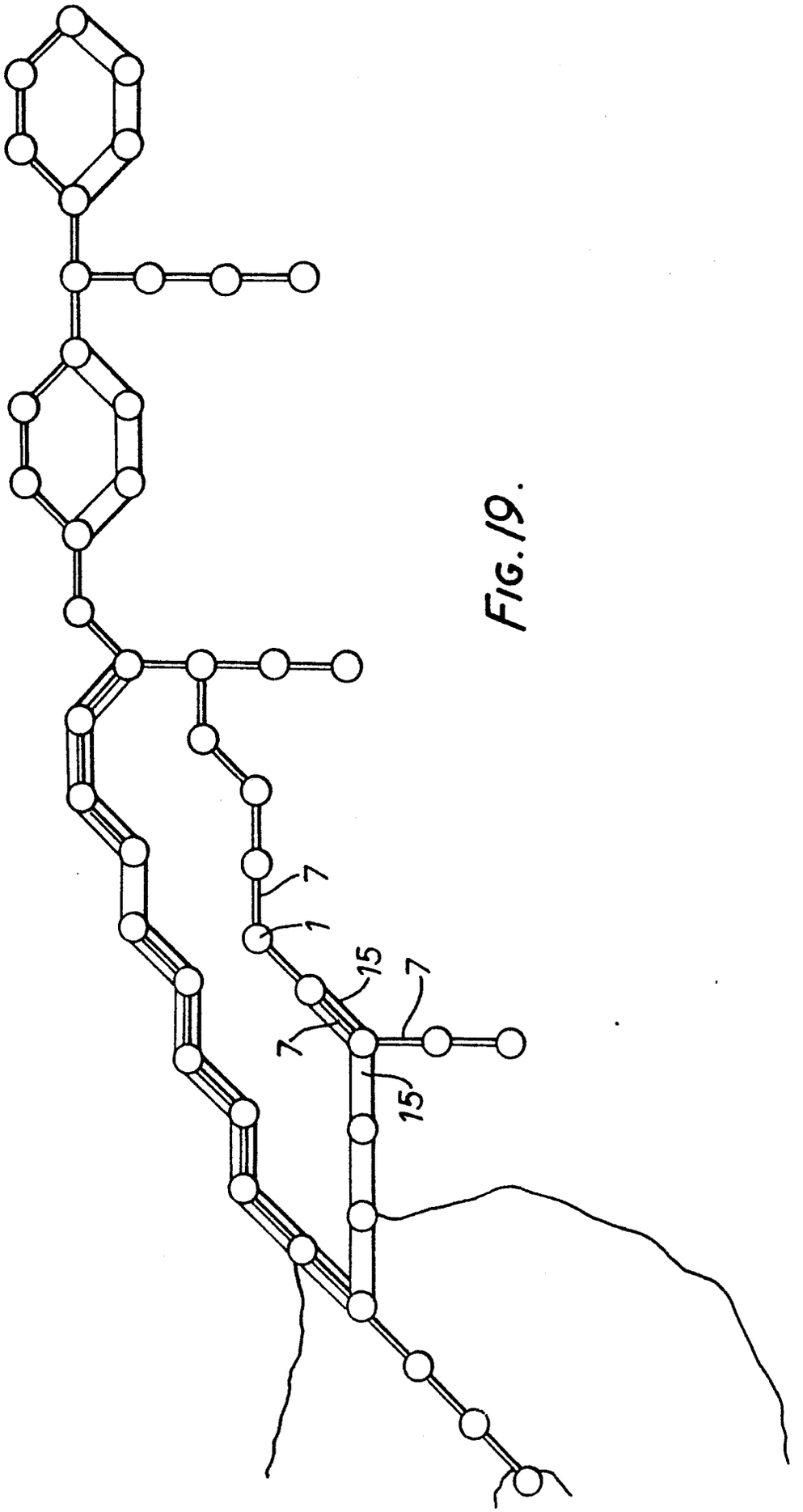

FIG. 19.

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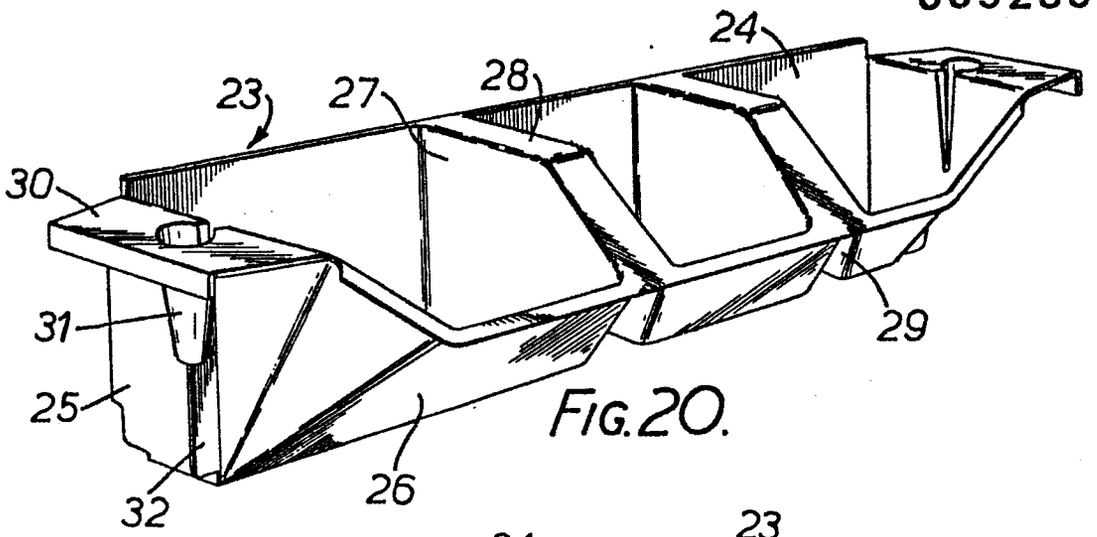

FIG. 20.

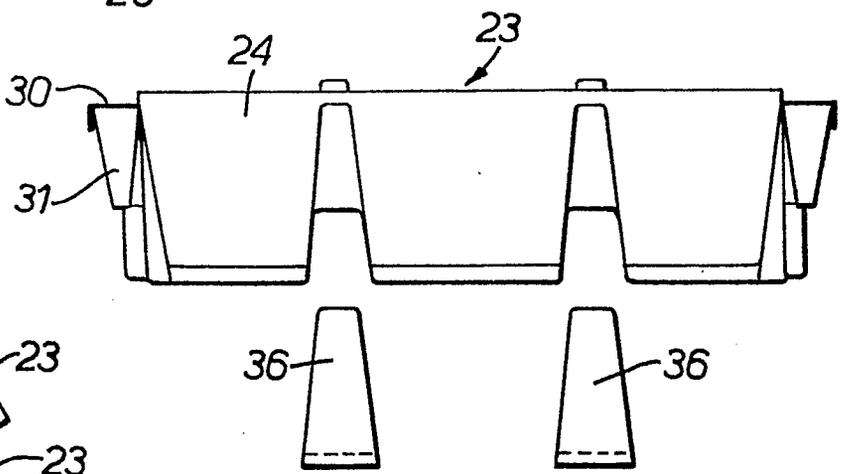

FIG. 21.

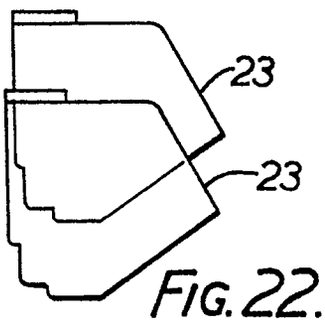

FIG. 22.

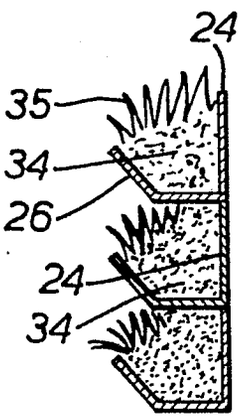

FIG. 24.

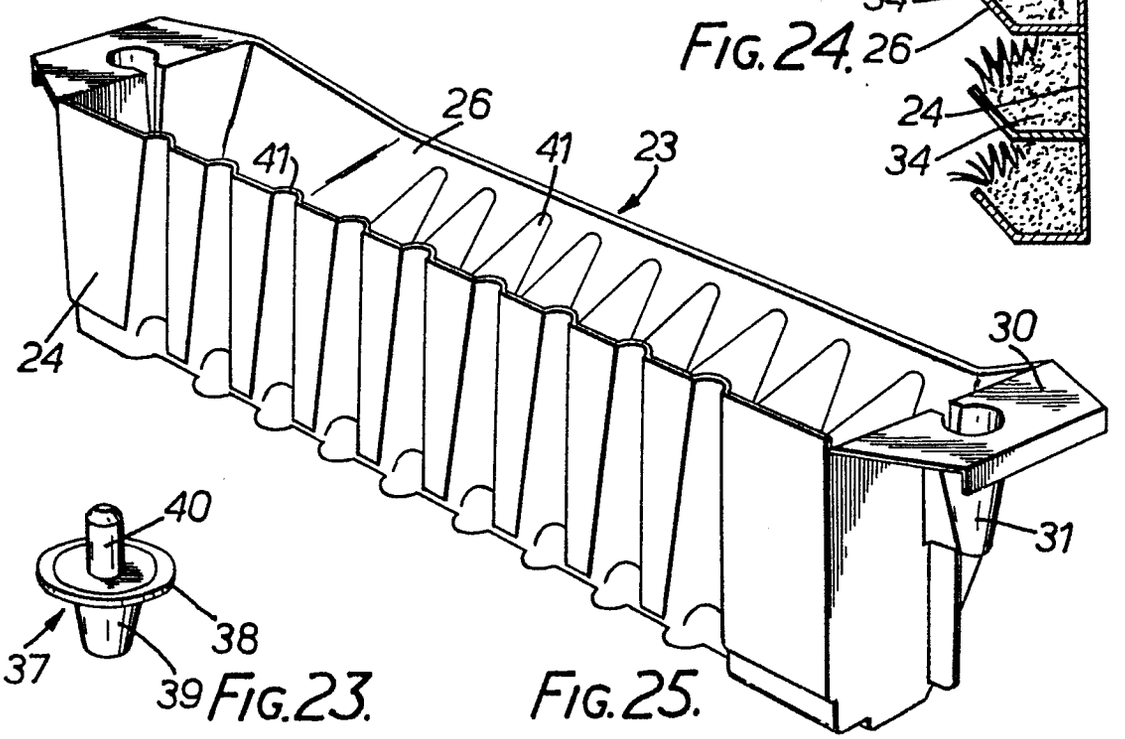

FIG. 23.

FIG. 25.

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EUROPEAN SEARCH REPORT

0092892
Application number

EP 83 20 0596

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. ³)
A	DE-U-8 005 242 (REINSCHÜTZ) * Figures 1-5 *	1,15	E 01 F 8/00
A	FR-A-2 379 650 (PRIEUR) * Figures 1-8; page 2, lines 27-30 *	1,4,7	
A	DE-U-7 804 709 (ADOLFF GMBH & CO. KG) * Figures 1, 2; claim 6 *	1,4	
A	FR-A-2 421 243 (ENTREPRISE A. PELLER & CIE)		

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
E 01 F 8/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	19-07-1983	PAETZEL H-J

CATEGORY OF CITED DOCUMENTS

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