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

(11) Publication number: **0 130 353**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **84105972.8**

(22) Date of filing: **25.05.84**

(51) Int. Cl.⁴: **E 04 H 6/04**

(30) Priority: **01.06.83 IT 8412083**

(43) Date of publication of application: **09.01.85 Bulletin 85/2**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI LU NL SE**

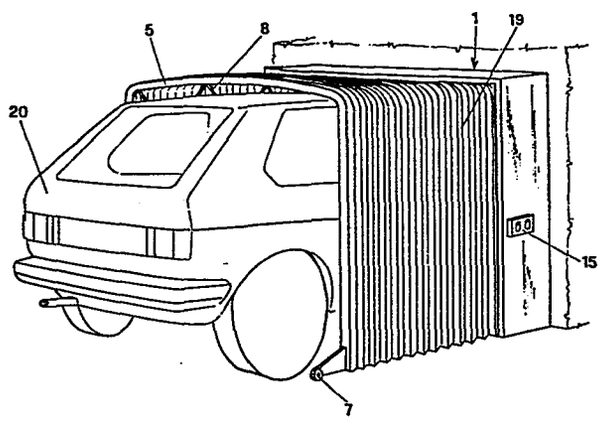
(71) Applicant: **FERRARI ENGINEERING S.r.l., Via S. Francesco d'Assisi 7, IT-31030 Dosson di Casier (Treviso) (IT)**

(72) Inventor: **Ferrari, Luciano, Via A. de Gasperi 1, I-31030 Dosson di Casier Treviso (IT)**
Inventor: **Locatelli, Ferdinando, Via Mazzini, I-31030 Dosson di Casier Treviso (IT)**

(74) Representative: **Piovesana, Paolo, Corso del Popolo, 70, I-30172 Venezia-Mestre (IT)**

(54) Retractable shed, particularly for garaging motor vehicles.

(57) The retractable shed according to the invention comprises a rigid essentially arch-shaped structure (5, 5') which can translate horizontally from a rest position in which it substantially adheres to a fixed support structure (1, 1'), to a working position in which it is separated from said fixed structure (1, 1') by a distance substantially corresponding to the desired length of the space to be covered, a retractable cover (19) interposed between said fixed structure (1, 1') and said mobile structure (5, 5'), and means for moving said mobile structure away from and towards said fixed structure.



EP 0 130 353 A2

RETRACTABLE SHED, PARTICULARLY FOR GARAGING MOTOR VEHICLES

This invention relates to a retractable shed, particularly for garaging motor vehicles.

Sheds used generally for protecting objects and goods in general, and in particular for garaging motor vehicles, are well known. They are generally in the form of actual buildings or portions of buildings, ie comprising perimetral walls and a roof. In some cases they lean against other buildings, and have at least one wall in common with these. In other cases they are erected on open ground and their four walls are thus separate from surrounding buildings. In all cases they represent constructions of masonry, wood, metal, plastics material or composite materials, in the sense that they comprise a load-bearing structure and a plurality or panels or other curtainwall systems.

These known sheds have certain drawbacks, and in particular:

- as they resemble actual buildings, their construction is dependent on the observence of building regulations, including permission by the competent authority; this results on the one hand in the frequent impossibility of constructing the shed in the desired position and/or with

the desired characteristics, and on the other hand, where building is possible, in the need to satisfy a series of regulations of legal, fiscal and other character;

- a cost which in all cases is very high;
- the need to use a contractor or at least specialised personnel for building;
- the occupation of a certain area which then becomes unavailable for other use;
- its dimensional rigidity, in the sense that the shed dimensions are necessarily invariable. This means that if it has been originally constructed of small size, suitable for example for containing a small automobile, it cannot then be used for containing larger automobiles; on the other hand, if it has been originally constructed larger in order to avoid this possible future limitation, then until this need becomes real it represents the useless occupation of an area which could be put to other use;
- the need in all cases to provide greater space than that required by the article to be protected. If for example this article is a motor vehicle, the covered area must correspond not only to at least the overall dimensions thereof, but must also include additional space to enable

at least the driver to open the door and move into the shed in order to be able to leave it.

All these drawbacks are known, and various solutions have been proposed for eliminating them, or at least for attempting to eliminate them. The most common of these is the automobile cover sheet. This is a sheet, generally of impermeable plastics material, which is cut and sewn to the configuration of a motor vehicle and to be stretched over it in the form of a hood during the periods in which it is not used, to protect it from the sun, rain and bad weather in general. Such a sheet thus constitutes a remedy of limited effectiveness, rather than a proper solution. In this respect, its fitting and removal are very slow, laborious and uncomfortable. In addition, the direct contact between the sheet and the motor vehicle body on the one hand can damage the body paintwork, and on the other hand prevents any internal ventilation of the vehicle, with the resultant humidity and possible damage to the upholstery and accessories, particularly over prolonged periods of non-use.

The object of the invention is to obviate these drawbacks, and in particular to provide a shed, particularly for garaging motor vehicles, which in contrast to automobile

cover sheets represents a proper shed but at the same time obviates all the aforesaid drawbacks connected with conventional fixed sheds.

This object is attained according to the invention by a retractable shed, particularly for garaging motor vehicles, characterised by comprising a rigid essentially arch-shaped structure which can translate horizontally from a rest position in which it substantially adheres to a fixed support structure, to a working position in which it is separated from said fixed structure by a distance substantially corresponding to the desired length of the space to be covered, a retractable cover interposed between said fixed structure and said mobile structure, and means for moving said mobile structure away from and towards said fixed structure.

According to the invention, the fixed support structure can constitute a vertical wall of a closable container, in which the mobile structure, the retractable cover and the means for moving said mobile structure are housed when in the rest state.

Advantageously, the shed according to the invention can comprise suspension means for the cover sheet which are interposed between the mobile structure and the fixed

structure.

Preferably said suspension means can be constituted by cables fixed to the arch-shaped structure and wound on pulleys rigid with the fixed structure, and unwindable as the mobile structure withdraws therefrom.

Again according to the invention articulated pantograph assemblies, operable by mechanical screw systems or by hydraulic and/or pneumatic systems, can be interposed between the fixed structure and the mobile structure.

Some preferred embodiments of the present invention are described hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a retractable shed according to the invention in a partly open state;

Figure 2 is a front view thereof in the closed state;

Figure 3 is a longitudinal vertical section on the line III-III of Figure 2;

Figure 4 shows the shed in the same view as Figure 3, but in the open state;

Figure 5 shows the shed in the same view as Figure 4 but with a different embodiment of the movement means;

Figure 6 shows the shed in the same view as Figure 2 but in the form of a different embodiment suitable for

garaging a boat;

Figure 7 is a side view on the line VII-VII of Figure 6; and

Figure 8 is the same view as Figure 4, but showing the embodiment of Figure 6.

As can be seen from the figures, in the embodiment shown in Figures 1 to 4 the retractable shed according to the invention comprises a container 1, preferably constituted by modular panels which define a parallelepiped compartment able to contain the shed when in its retracted state (closed), as will be apparent hereinafter.

The container 1 is provided on its rear wall 2 or base 2' with conventional systems for fixing to a vertical masonry structure 3 or to a horizontal base 4 respectively. Instead of being fixed to a masonry structure, the shed according to the invention can freely rest on the ground, and in this case the container 1 should be provided with suitable ballast to ensure its stability.

A rigid structure 5 essentially of arch shape and provided with front closure means 6 can be housed in the container 1. Said closure means 6 can be of roll shutter, sheet, door or other type.

The structure 5 is provided lowerly with wheels 7

which can slide on the ground or on a platform, or on guide rails. It is connected to the interior of the container 1 by two pantograph assemblies each constituted by a plurality of articulated arms 8. More particularly, each assembly 8 is fitted between an upright of the structure 5 and an operating device 9 housed in the container 1. The operating device 9 is preferably constituted by a shaft 10 divided into two oppositely threaded portions, each engaged with a threaded bush 11,11' pivoted to one of the two inner end arms of the pantograph assembly 8. On the centre of the shaft 10 there is keyed a helical gear wheel 12 which is constantly engaged with a worm 13 keyed to a shaft 14 which is common to the two pantograph assemblies 8. An electric motor (not shown on the drawings for simplicity) rotates said shaft 14 in one and the other direction as will be apparent hereinafter, under the control of switches 15 provided on the outside of a side wall of the container 1.

On said shaft 14 there are also keyed a number of pulleys 16 for winding that number of steel cables 17, which are fixed at their other end to the arch-shaped structure 5. A transmission system comprising sheaves 18 maintains the cables 17 horizontally taut over the ground.

The ends of an impermeable cover sheet 19, which

can fold in the manner of a bellows and is constructed for example of rigid or semirigid plastic-coated material, are fixed to the container 1 and arch-shaped structure 5. The sheet is supported by the cables 17.

The operation of the retractable shed according to the invention is as follows.

When not in use, its container 1 is closed and either fixed to a vertical masonry structure 3 or simply positioned on a base on the free ground. When in this state, the overall size of the container 1 is extremely small, and the surrounding space can be freely used for any requirement.

When it is to be used, for example for covering an automobile 20, this latter is firstly positioned facing the front closure means 6. The operator, after descending from the automobile, then operates the controls 15, which causes the following series of operations to take place, preferably in automated sequence: the front closure means 6 are firstly raised, then the drive motor for the shaft 14 is started. This latter, by virtue of the engagement between the worm 13 and helical gear 12, causes the two threaded shafts 10 to rotate in such a direction as to cause the threaded bushes 11, 11', pivoted to the two inner end arms of each pantograph assembly 8, to approach each other. This mutual

approach has the effect of elongating the two assemblies 8, with the consequent emergence of the rigid arch-shaped structure 5 from the container 1. At the same time, the cover sheet 19, which is fixed at its end to the arch-shaped structure 5, emerges with this latter from the container 1, to form a covering structure. As the arch-shaped structure 5 advances, it also unwinds the steel cables 17, which by virtue of correct dimensioning of the various members always remain under tension and thus support said sheet 19 in a perfectly horizontal manner.

When the sheet 19 has emerged by the programmed distance or by a distance sufficient to completely cover the automobile 20, the arch-shaped structure 5 stops, and the front closure means 6 are made to descend either automatically or manually.

In order to make the vehicle 20 again accessible, the operations are carried out in the reverse sequence. The front closure means 6 are firstly raised and the drive motor for the shaft 14 is operated. This latter, on rotating, on the one hand rotates the shafts 10 which by way of the two pantograph assemblies 8 withdraw the arch-shaped structure 5, and on the other hand rewinds the cables 7 supporting the cover sheet 19 synchronously with the movement of said

arch-shaped structure 5.

On termination of this travel, the sheet 19 and arch-shaped structure 5 are completely retracted into the container 1, which can then be completely closed at its front aperture.

From the aforegoing it is apparent that the retractable shed according to the invention has numerous advantages, and in particular:

- it can be fitted to any masonry structure, and can also be positioned on the free ground, substantially without any limitation, without requiring building permission, and without expense of any kind;
- it can also be installed by non-specialised personnel, in that all the members necessary for its operation are already contained within the container 1, correctly connected together; essentially, its installation requires only connection to the electricity supply and possible fixing to the masonry structure;
- it does not permanently commit the ground, as the ground is covered only during periods of effective use;
- it has considerable dimensional flexibility in the sense that the extent of extraction of the covering tunnel can correspond exactly to the size of the vehicle to be

covered; if the length of the vehicle exceeds a certain minimum dimension which could compromise the stability of the cover sheet, then one or more intermediate arch-shaped structures can be used (not shown on the drawings), to ensure correct support of said cover sheet;

- in all cases the covered area is only just greater than the vehicle size, and without the additional space for the driver to enter and leave the vehicle when garaged in the shed.

In a different embodiment, not shown on the drawings, the two pantograph assemblies are kept in an elongated state elastically (for example by means of springs), and the cables 7 besides supporting the cover sheet 19 also retain the arch-shaped structure against the reaction of said elastic means. In this case, the shed is formed by simply slackening the cables 17, which then elongate spontaneously by the effect of the elastic means, and is re-closed by the pull exerted by the cables 17 on the structure 5, against the reaction of said elastic means.

In a further embodiment, also not shown on the drawings, instead of being constructed in the form of a bellows, the cover sheet is formed as substantially rigid arch-shaped segments which telescopically withdraw one into

the other and are provided lowerly with wheels for their support and movement on the ground.

In the embodiment shown in Figure 5, the arch-shaped structure 5 is not connected to pantograph assemblies 8 for its movement, but instead is provided with a motor for autonomous movement. In this case, the pulleys 16 can be mounted in a fixed support, with spiral springs interposed between them in order to elastically rewind the cables 17 which support the cover sheet 19.

In the embodiment shown in Figures 6, 7 and 8, the retractable shed according to the invention is provided for covering a boat 21. The container 1' is suspended from the jetty 25 and is provided with a door 23 for access to its interior. The arch-shaped structure 5' is mounted on floats 24 and is provided with a pantograph movement system of the type shown in Figure 4. An intermediate structure 25 also connected to the pantograph systems 8 and provided with floats is preferably provided in order to obviate the inevitable drawbacks which the yieldability and instability of the supporting arrangement could give rise to. In all cases, the uprights of the arch-shaped structure 5' and of any intermediate structures are of telescopic type, in order to allow the shed to be adapted to the water level.

C L A I M S

1. A retractable shed, particularly for garaging motor vehicles, characterised by comprising a rigid essentially arch-shaped structure (5,5') which can translate horizontally from a rest position in which it substantially adheres to a fixed support structure (1,1'), to a working position in which it is separated from said fixed structure (1,1') by a distance substantially corresponding to the desired length of the space to be covered, a retractable cover (19) interposed between said fixed structure (1,1') and said mobile structure (5,5'), and means for moving said mobile structure away from and towards said fixed structure.

2. A shed as claimed in claim 1, characterised in that the fixed support structure (1,1') constitutes a vertical wall (2) of a closable container, in which the mobile structure (5,5'), the retractable cover (19) and the means for moving the mobile structure are housed when in the rest state.

3. A shed as claimed in claims 1 and 2, characterised in that the fixed structure (1) simply rests on the ground.

4. A shed as claimed in claims 1 and 2, characterised in that the container (1) is provided with means for its fixing to the horizontal plane at the surface to be covered.

5. A shed as claimed in claims 1 and 2, characterised in that the container (1,1') is provided with means for its fixing to a vertical structure (3), in particular a masonry wall.

6. A shed as claimed in claims 1 and 2, characterised in that the container (1') is provided with means for its fixing to a vertical structure (22) in a manner such that it is raised above the horizontal plane of the surface to be covered.

7. A shed as claimed in claims 1 to 4, characterised in that the arch-shaped structure (5) is provided lowerly with wheels (7) mobile on the surface to be covered.

8. A shed as claimed in claims 1, 2 and 5, characterised in that the arch-shaped structure (5') is provided lowerly with floats (24).

9. A shed as claimed in claims 1 and 7, characterised in that between the floats (24) and the mobile structure (5,25') there are disposed elements for regulating their distance apart.

10. A shed as claimed in claims 1 and 6, characterised in that the arch-shaped structure (5) is provided lowerly with wheels (7) slidable along guide rails provided on the surface to be covered.

11. A shed as claimed in claim 1, characterised in that at least one intermediate arch-shaped structure (25) is provided between the arch-shaped structure (5,5') and the fixed structure (1,1').

12. A shed as claimed in claim 1, characterised in that the retractable cover (19) is essentially tunnel-shaped, and extends lowerly substantially as far as the surface to be covered.

13. A shed as claimed in claims 1 and 11, characterised in that the retractable cover (19) is substantially of bellows type.

14. A shed as claimed in claim 1, characterised by comprising suspension means for the cover sheet (19) which are disposed between the mobile structure (5,5') and the fixed structure (1,1').

15. A shed as claimed in claims 1 and 14, characterised in that the suspension means for the retractable cover (19) are constituted by cables (17) stretched between the mobile structure (5,5') and the fixed structure (1,1').

16. A shed as claimed in claims 1 and 15, characterised in that the cables (17) are fixed to the arch-shaped structure (5,5') and are wound on pulleys (16) rigid with the fixed structure (1,1'), and unwind in conformity with

the withdrawal of the mobile structure (5,5') therefrom.

17. A shed as claimed in claim 1, characterised in that the pulleys (16) are mounted on fixed supports, and are provided with elastic rewinding members.

18. A shed as claimed in claims 1 and 15, characterised in that the pulleys (16) are connected to a motor for driving them in both directions of rotation.

19. A shed as claimed in claim 1, characterised in that the mobile structure (5,5') is connected to the fixed structure (1,1') by means of an assembly of members which cause them to withdraw from each other.

20. A shed as claimed in claims 1 and 17, characterised in that articulated pantograph assemblies (8) are interposed between the fixed structure (1,1') and the mobile structure (5,5').

21. A shed as claimed in claims 1 and 19, characterised by comprising screw elements (10,11,11') for operating each pantograph assembly (8).

22. A shed as claimed in claims 1 and 19, characterised by comprising hydraulic and/or pneumatic systems for operating each pantograph assembly (8).

23. A shed as claimed in claim 1, characterised by comprising elastic means acting in the sense of causing the

mobile structure (5,5') to withdraw from the fixed structure (1,1'), and means for returning said mobile structure (5,5') to its rest position against the reaction of said elastic means.

24. A shed as claimed in claims 1 and 19, characterised in that movement systems in the form of telescopic elements operated mechanically, hydraulically or pneumatically are interposed between the mobile structure (5,5') and the fixed structure (1,1').

25. A shed as claimed in claim 1, characterised in that the wheels (7) of the mobile structure (5) are motorised.

26. A shed as claimed in claim 1, characterised in that the mobile structure (5) is provided with a door (6) for access to the interior of the covered zone.

0130353

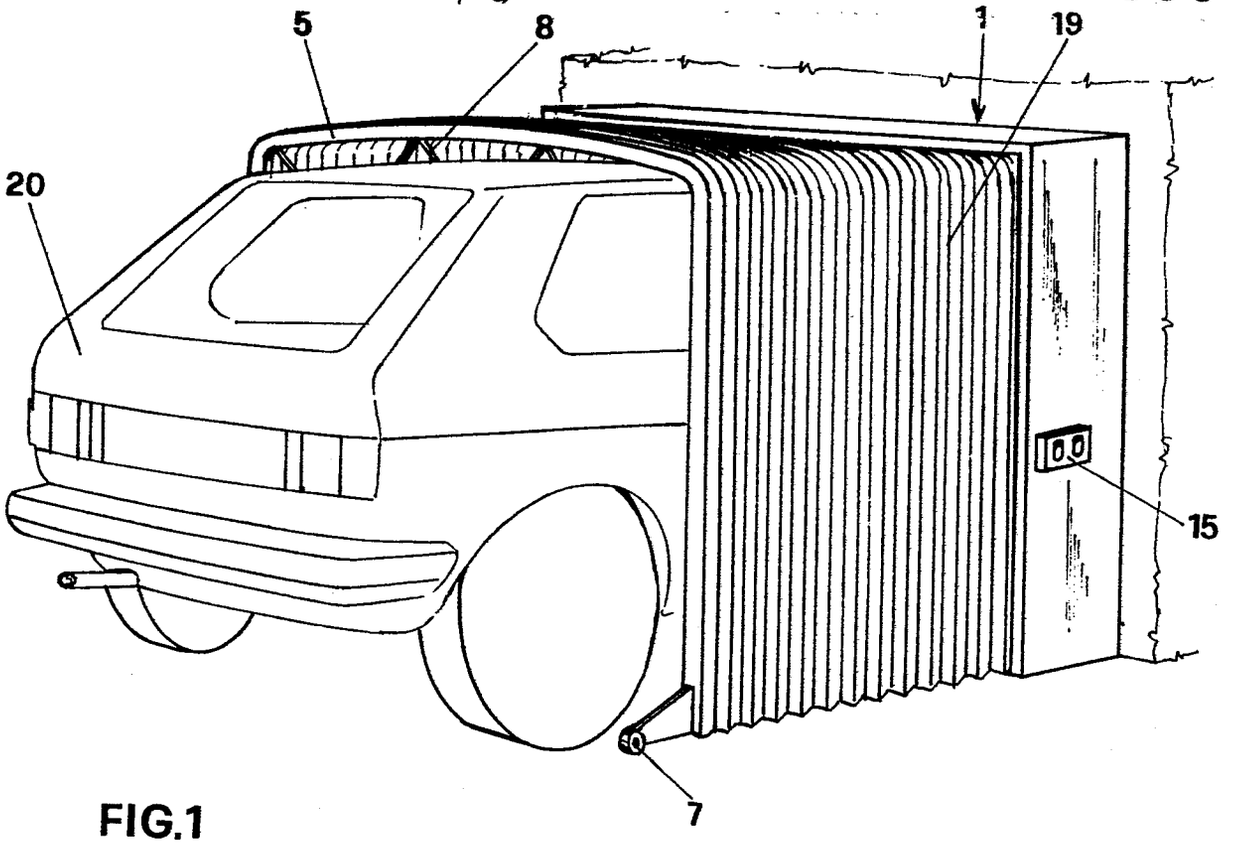


FIG.1

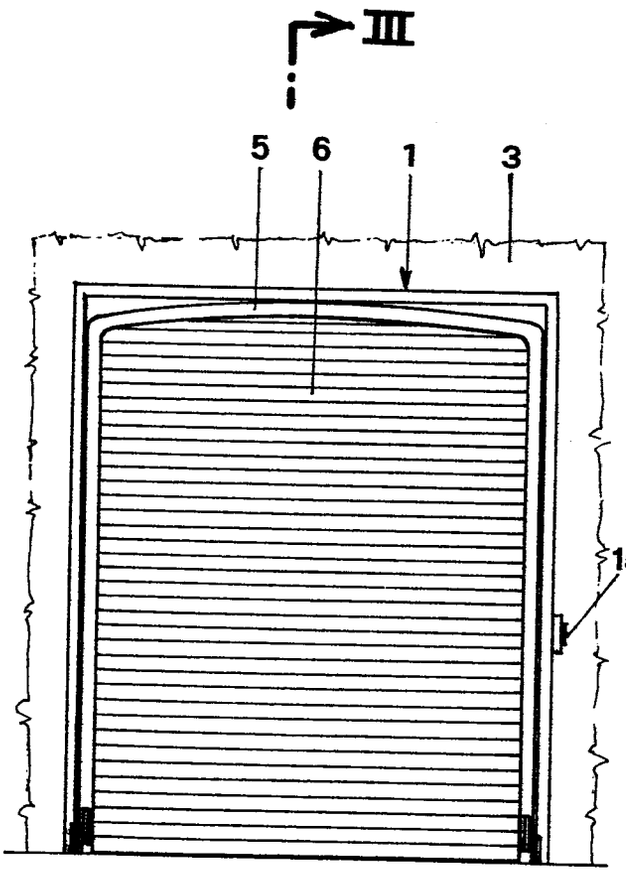


FIG.2

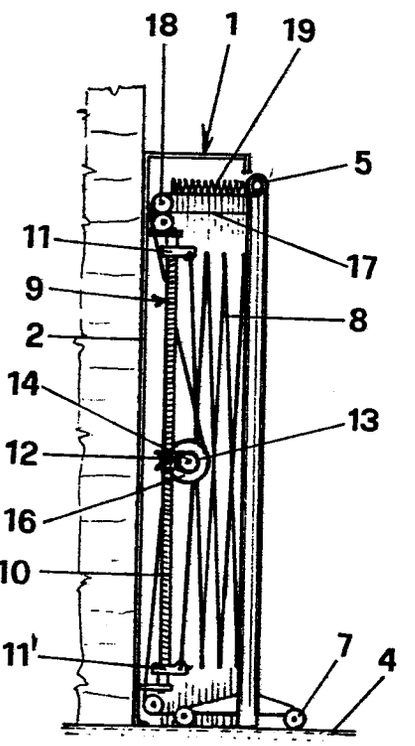


FIG.3

III

FIG.4

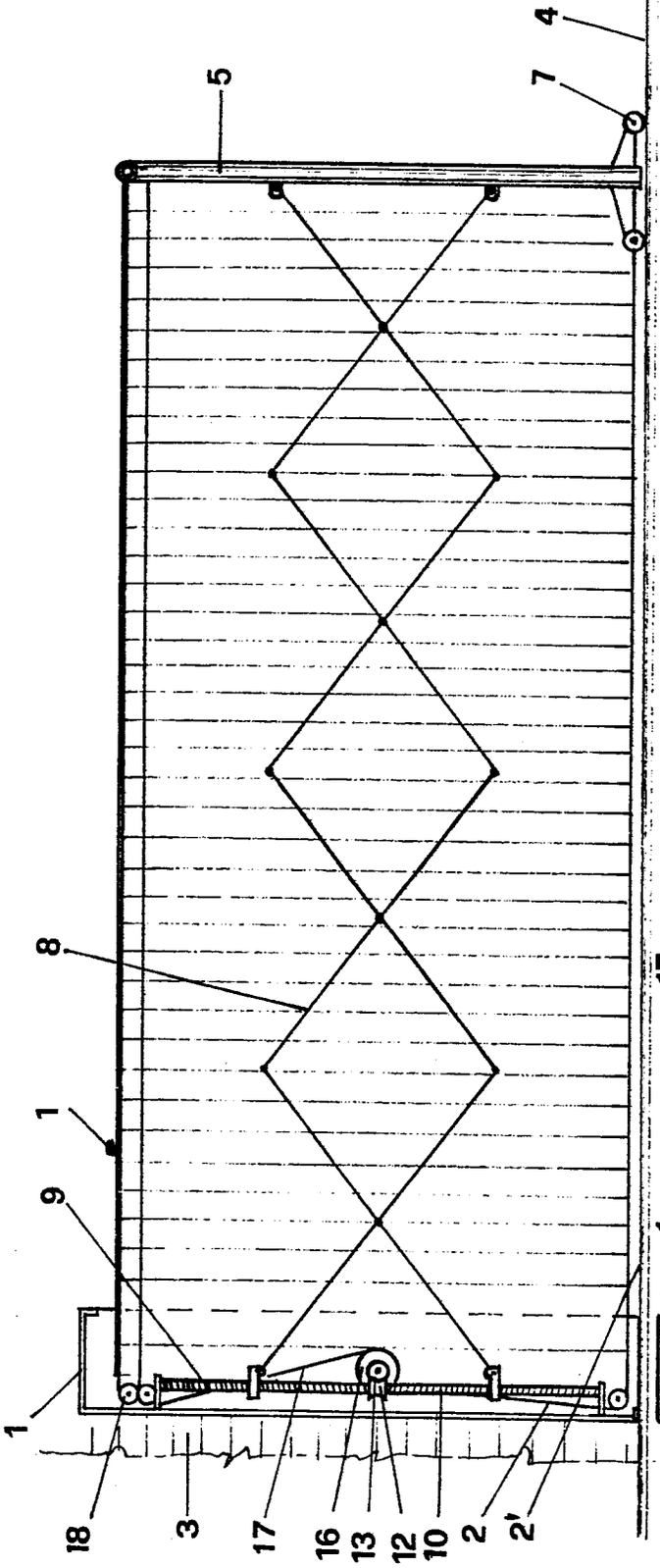
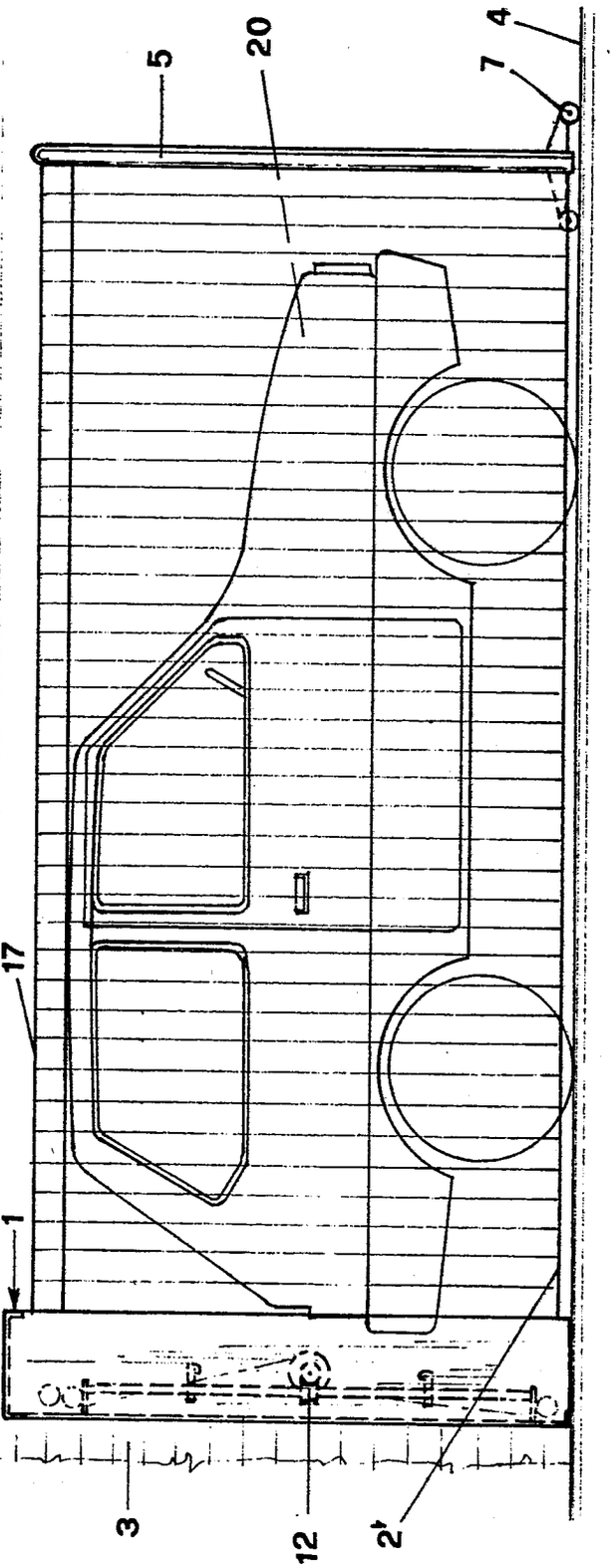


FIG.5



0130353

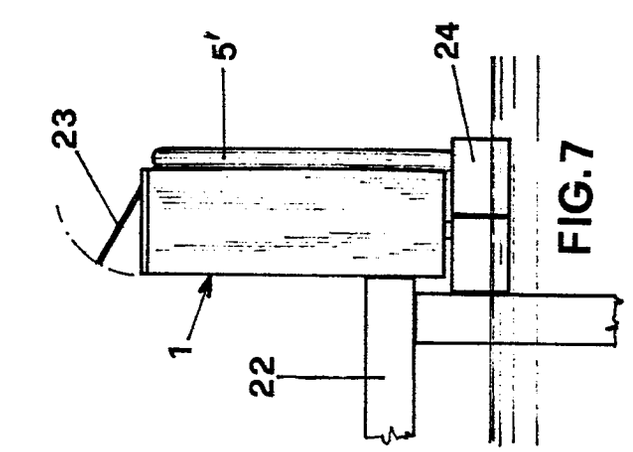


FIG.7

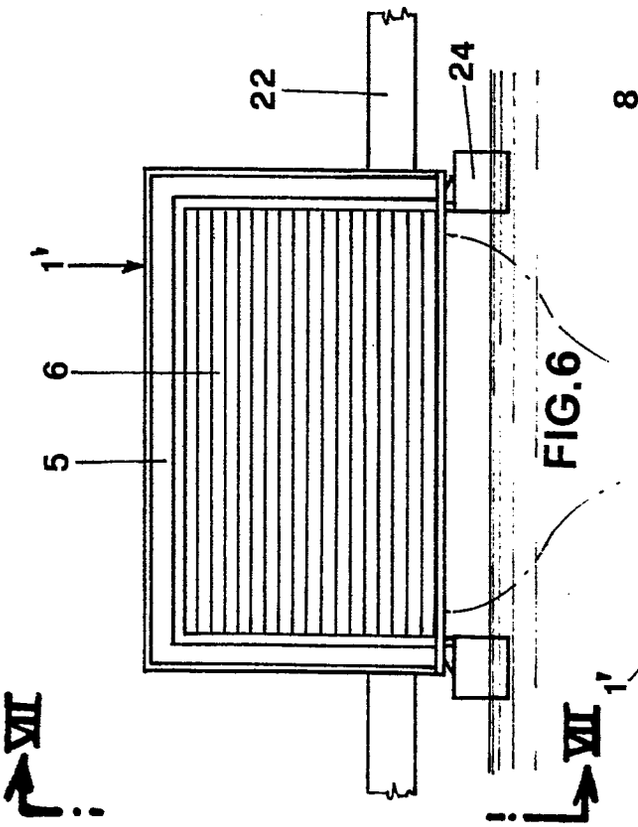


FIG.6

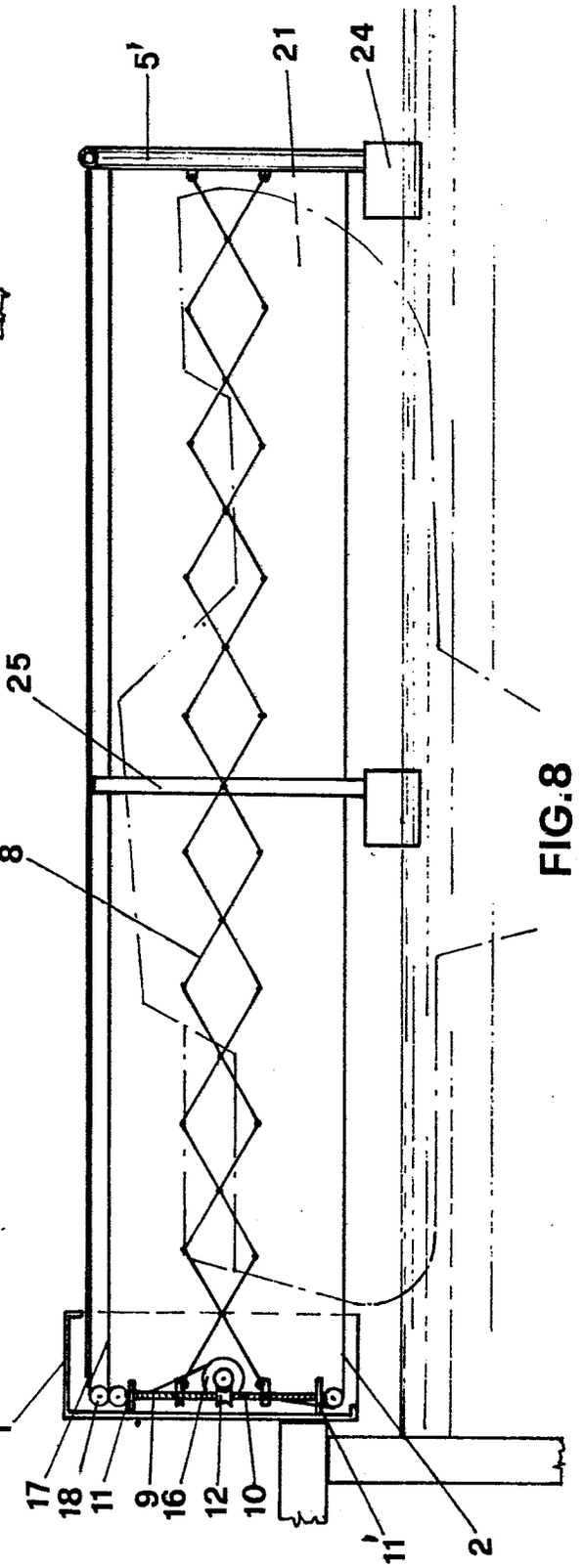


FIG.8