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**Tent roof or protective roof as part of a camping trailer**

The invention relates to a tent roof or protective roof in the form of a folding structure transportable with a camping trailer or similar camping vehicles according to the preamble of claim 1.

5

Folding structures forming a tent roof or protective roof transportable with a camping trailer have been long known (DE 28 41 550; US 7, 178, 536 B2), with a corresponding position of use for a flexible roof membrane being  
10 specified by means of a respective linkage structure connected to the trailer. The support rods forming the linkage structure are in this case provided in the form of substantially torsion-resistant tube parts which are held by joint parts or similar connectors such that different  
15 positions of use or non-use can be achieved for such folding systems by a corresponding actuating movement.

In the position of use of the linkage structure, a roof membrane consisting of special tent canvas is shaped by  
20 means of the substantially straight rod and tube parts into wall sections which are sloping, flat or running at an angle to one another. Through this construction of the linkage structure in the manner of a steep-wall tent, the system as a whole is susceptible to the wind and the inner  
25 usable space is narrowed in the immediate area of the rod and tube parts. In DE 39 08 603 A1, a gable tent used as a simple work tent for utilities companies is proposed, in which extends between two support rods, a transverse rod, which is in each case connected therewith at the end, and  
30 has respective bends or an arcuate curvature in the longitudinal direction. The usability of simple tents on

construction sites of utilities companies should be improved through this arcuate transverse rod connecting at both ends with support rods.

5 In the case of the linkage assemblies on the market and classified as heavyweight steep-wall tent roofs, distinguished from lightweight dome tents, "arcuate" support rods are also already used in addition to straight support rods, whose use has, however, not been tried and  
10 tested. Due to different radii of these support rods, these systems have a bulkiness increasing the space requirement during transport, packaging these parts together with straight rods is cumbersome and during assembly of a number of rods, precisely-positioned alignment is only possible  
15 with little user-friendliness. According to DE 690 17 150 T2, a dome tent in a lightweight construction is proposed, in which resiliently flexible rods known per se are fixed to the ground at both ends. This system must be protected with additional length-adjustable tension members from  
20 deformation in the region of the arcuately stretched rods. In the case of an awning for a caravan according to DE 20 2006 013 697 U1, a tarpaulin part secured to a wall of the caravan is combined with a linkage also to be fixed to the wall. This linkage supported towards the ground region  
25 cooperates with an additional linkage intersecting it such that an arcuate alignment of the tarpaulin part is achieved and between the caravan and the lateral ground region an awning having an arcuate side wall is formed. In US 8,080,426, a camping trailer with a tent is disclosed which  
30 provides pivotable extensions on the tent linkage to extend the tent contour. DE 202 16 105 shows a linkage for a tent roof, with which a canopy projecting over a tent wall can be implemented. US 5, 449, 032 shows a linkage for an

arcuate, profiled canopy of a camping accommodation. In this case, the arcuately formed linkage parts are telescopable.

5 In the case of a generic camping trailer in the form of a folding caravan according to DE 692 08 053 T3 (similar to US 7, 178, 536 B2), a frame also used for steep-wall tents is constructed from tube and profile parts. In the case of this tent construction, a profile part shaped as an arc rod  
10 is provided to receive a flexible panel as the cover part on the frame, said profile part having respective recesses and holding parts to receive the panel.

The invention addresses the problem of providing a tent  
15 roof or protective roof provided in particular for a camping trailer as a transportable folding structure, said tent roof or protective roof forming a usable space made of linkage parts less susceptible to the wind in a set-up position of use with less technical effort, having an  
20 improved level of comfort in the usable space with roof membrane dimensions remaining substantially the same and enabling shapeable extension zones with an optically pleasing roof contour.

25 The invention achieves this object with a tent roof or protective roof for a camping trailer having the features of claim 1. Further advantageous configurations emerge from the claims 2 to 14.

30 In the case of a tent roof or protective roof produced in particular for camping trailers with a base structure unfoldable in the manner of a steep-wall tent, it is provided according to the invention that this folding

system is supplemented by at least one additional pendulum arm which can be integrated into the linkage assembly or the flexible roof membrane held thereby. This pendulum arm is integrated in the manner of an auxiliary linkage into the system such that with the largely unchanged linkage assembly, even in the embodiment defined as heavyweight, respective functional and optically effective extension zones to the tent roof can be provided with little effort.

10 The concept of the pendulum arm is based on the fact that it defines a main connection point on at least one linkage part and from this point in each case two arms are acting as substantially freely projecting partial regions under the roof membrane such that the arm system can be set

15 "swinging" around the main connection point in accordance with the linkage assembly or performs a "swinging" balancing movement under the effect of an external or internal loading.

20 Using the pendulum arm according to the invention, a simple solution is proposed that is efficient in the application case for the functional extension to camping trailer tents, family tents, caravan awnings or similar structures. In the case of application of the auxiliary linkage with the

25 pendulum arm, a known simple tent linkage with substantially straight rods, which still enable a quick folding assembly when setting up or dismantling by folding back into the region of the trailer, can be used unchanged with the known advantages for handling. The pendulum arm

30 according to the invention as an additional component that can be used in variable sizes can be dimensioned such that an additional arc shape corresponding to different customer requests is produced in optically prominent regions of the

roof membrane. At the same time, the roof membrane largely unchanged in the dimensions can thereby be extended such that a volume or space extension is achieved in the usable space therebelow and the comfort of the user is improved.

5

In an advantageous embodiment, one or a plurality of pendulum arm(s) of the auxiliary linkage are integrated into the tent linkage such that an improved absorption of pressure and tensile loads is achieved in the region of the roof membrane, for example by wind pressure, rain water weight or the like. The pendulum arms arcuately tensioned in the installed position provide a contour shape here which is optimally adapted to impinging wind forces such that the system as a whole has an improved storm resistance through a wind-deflecting contour and optimal water drainage is also ensured in the case of heavy rain.

The pendulum arm structure, which can be largely extended as desired, can be designed such that linkage parts normally used hitherto for canopies, sun roofs or similar are replaced with the novel pendulum arms and thus the number of components is reduced. The pendulum arm parts provided as the auxiliary linkage can also be installed here into the support rods designed as tube parts or attached to them such that they can be carried as telescopable parts and pulled out in-situ into a corresponding position of use. Equally, it is provided that the pendulum arms are to be attached as parts which can be aligned parallel to the linkage parts such that a narrow packing position is possible in the position of non-use or transport position.

30

In the case of such roof embodiments with the pendulum arm parts, a first rod of the folding linkage can in particular be extended in its usage region, and the pendulum arms designed as flexible parts can in particular be positioned  
5 longitudinally or transversely to the middle longitudinal axis and therefore a number of functional extensions is possible in this roof region.

Further details and advantageous configurations of the invention emerge from the following description and the  
10 drawing, which illustrate a plurality of exemplary embodiments of a tent roof or protective roof with the pendulum arm according to the invention. In the drawing are shown:

15

Fig. 1 an embodiment of the camping trailer corresponding to the prior art with a tent roof or protective roof folded out therefrom,

20

Fig. 2 a perspective representation similar to Fig. 1 with a linkage assembly into which a pendulum arm according to the invention is integrated,

Fig. 3 and

25

Fig. 4 respective side views of the system similar to Fig. 2 with a plurality of pendulum arms,

Fig. 5 a side view similar to Fig. 3 with extension of the usable space,

30

Fig. 6 a main representation of different securing and movement possibilities of a plurality of the pendulum arms,

Fig. 7 a perspective representation similar to Fig. 1  
with a basic embodiment of the tent with a  
plurality of pendulum arms and

5

Fig. 8 a main representation of further usage  
possibilities of pendulum arms in the region of  
the linkage.

10 In Fig. 1, a camping assembly is illustrated in a  
perspective representation, in which a camping trailer 1  
receiving a transportable folding structure is used. A tent  
roof or protective roof designated as a whole with 2 is  
constructed from this camping trailer 1, said tent roof or  
15 protective roof being set up in the manner of a steep-wall  
assembly 3. This structure is provided with a linkage  
assembly 8 having a plurality of rigid support rods 4, 5, 6  
and specifying the position of use for a flexible roof  
membrane 7.

20

Proceeding from this embodiment known per se of a tent roof  
or protective roof structure of the steep-wall tent 2, it  
is provided according to the invention to provide this  
linkage assembly 8 with at least one pendulum arm 9  
25 profiling the roof membrane 7' in the installed position.  
The main representation according to Fig. 2 illustrates  
here that the pendulum arm 9 in particular arcuately  
profiling a roof membrane region 7' defines a main  
connection point P, which can be designated as a rigid or  
30 articulated holder, towards the linkage assembly 8 such  
that a "swinging movability" of the system illustrated by  
dashed lines is achieved and in said system the pendulum  
arm 9 is acting in the manner of an auxiliary linkage H.

It goes without saying that the linkage assembly 8 can also be provided with a plurality of pendulum arms 10, 11 (Fig. 3 to 6), 12 to 15 (Fig. 7) and/or 16, 17 (Fig. 8) engaging under respective regions of the roof membrane 7. In the case of 9', a further pendulum arm is connected to the supporting rods of the linkage assembly 8 (Fig. 2), with a connection point P' being defined which is to be considered "equivalent" to the front point P.

10

The embodiment of the pendulum arm 9 according to Fig. 2 already makes it clear that using this new type of auxiliary linkage H an arcuate roof membrane appearance (arc line D, dash-point representation) can be produced. Proceeding from this steep-wall concept according to Fig. 2, an additional extension contour can be provided in the roof regions resulting from straight support rods 4, 6' using little effort.

20 The overview of Fig. 2 and Fig. 5 illustrates that by means of the pendulum arms 9, 9' or 10 and 11 mounted in the respective connection point P, P' a clamping structure is formed by means of which pressure and/or tensile loads due to wind or similar weather influences (arrow A) acting on the respective arcuate regions of the roof membrane 7', 7'' can be balanced out. In Fig. 2 and Fig. 5, a pivot displacement resulting from these loads in the region of the pendulum arms 9, 10, 11 is illustrated by respective arrows W, with their length and the position of the roof membrane 7 being indicated by respective dashed lines.

30

These main representations also show that the loads of the roof membrane 7, proceeding from the region of the pendulum rods 9, 9', 10, 11 are introduced equally into the

respective linkage assembly 8. Through these arcuate contour extensions of the roof membrane 7', 7'', improved water drainage during heavy rain or dew formation can also be achieved.

5

The main representations according to Fig. 3 and Fig. 5 and Fig. 6 illustrate that with the pendulum arms 10, 11, which can be designed in variable dimensions, respective regions B, B', B'' of the roof contours arcuately delimiting and outwardly extending a tent interior 18 are formed. Through a corresponding concept of the auxiliary linkage H with pendulum arms, respective variable volume or area extensions in the region of the inner usable space 18 can thereby be specified for customer-specific, different roof structures such that an improvement in comfort for such camping tents can be achieved overall.

In the case of the constructive embodiment of the previously described auxiliary linkage H with the pendulum arms 9, 9', 10, 11, 12 to 17, it is conceivable to produce the pendulum arms from largely flexurally stable components shaped with arcuate longitudinal contours (not represented). The previously described effects of the arcuate contour extension and the load-bearing improvement can therefore be achieved, although these flexurally stable components are associated with the disadvantages of complicated handling and the disadvantageously large transport volumes of known heavyweight tent embodiments.

Therefore, the concept according to the invention provides auxiliary linkage H, H', H'', in which the pendulum arms 9, 9', 10, 11, 12 to 17 at least in regions consist of a flexible material and these pendulum arms in the installed

position can be largely variably re-shaped into an intended arc contour D, R. All of the main representations according to Fig. 2 to 8 assume that the pendulum arms of the auxiliary linkage H, H', H'', by means of respective  
5 clamping elements known per se for such folding structures, are formed into the arcuate roof contour in the installed position.

The concept of the auxiliary linkage H, H', H'' provides  
10 that the respective pendulum arms are integrated into the roof membrane 7 such that their wall clamping produced using the holding parts known per se can also be used to set respective radii R of the pendulum arms 10, 11 (Fig. 6, Fig. 8). Adapting to the respective embodiment of the tent  
15 roof or protective roof 2, equal radii R can therefore be visible as the arc shape in accordance with the arcuate longitudinal contour of the pendulum arms 9, 9', 10, 11, 12 to 17 such that the overall optical impression of the roof and wall parts of the tent 2 is improved as a whole or  
20 adapted to the user's specifications.

In Fig. 2, an application of the pendulum arm 9 forming an awning region of the system 2 is shown, with it being connected in its longitudinal direction substantially  
25 centrally to one of the vertically running support rods 4' of the linkage 8 and therefore also defining the main connection point P as substantially centrally arranged. It is also conceivable that the respective pendulum arm, proceeding from the main connection point P, forms two limb  
30 sections 19, 20 as parts of different lengths (not represented).

In Fig. 4, further principle setting possibilities of the auxiliary linkage H are represented on the basis of a system similar to the pendulum arms 10 and 11. These pendulum arms are held on the support rods 4 so as to be pivotable (arrow S, S') in the region of the respective holders 21 forming the connection point P. In the region of these holders 21, respective joint parts 22, 22' can be provided such that a corresponding displacement L into the longitudinal direction is conceivable. A further embodiment of the holder is indicated with 21', towards whose region a horizontal displacement (arrow N, N') of the parts of the auxiliary linkage H is conceivable. The system according to Fig. 4 can be designed such that the holder 22, 21' captures the "first" pendulum arm 9 (similar to Fig. 2) and at its ends the represented pendulum arms 10 and 11 form, with the holders 21 defining the outer connection points, a thereby three-fold acting "pendulum arm" chain.

In the embodiment of the auxiliary linkage H' with the pendulum arms 16, 17 according to Fig. 8, a further fixing variant of the pendulum arms 16, 17 in the region of the roof membrane 7 is represented, and, proceeding from the main connection points P', the respective overhang length K of the pendulum arms 16, 17 can be settable.

For a direct fixing of the pendulum arms 16, 17 on the roof membrane 7, corresponding regions 23 shaped as receiving pockets or receiving tabs are provided. It is conceivable to separate these by respective seam zones 24 and to fix the pendulum arms 16, 17 in the interior of these recesses 23. This system of the auxiliary linkage H'' can be completed in the case of assembly carried out in-situ, with the respective ends of the pendulum arms 16, 17 being

inserted at the ends into the pockets 23 of the roof  
membrane 7'. In accordance with the structure of the  
support rods 4, 6'' or the respective clamping means not  
represented in more detail, a roof membrane region 7'' or  
5 the pendulum arms 16, 17 accordingly held in the front tabs  
25 can be pulled into a respective position of use (arrow  
F, Fig. 8). In the region of the seam zones 24,  
corresponding zipper connections are conceivable such that  
the auxiliary linkage H'' can be easily assembled in the  
10 manner of a canopy or similar.

In Fig. 7, similar to the canopy embodiment according to  
Fig. 8, a fixing of the pendulum arms 12, 13, 14, 15 is  
provided in the manner of an auxiliary linkage H', with  
15 said auxiliary linkage being connected, on one side, to the  
trailer 1 and a canopy 7''' extending the roof membrane 7  
engages under the other end in the freely supporting  
region. It is also conceivable to provide this four-  
membered pendulum arm structure according to H' for a  
20 double roof linkage having a plurality of roof membrane  
layers such that in particular an upper layer of the roof  
membrane layers (e.g. 7''') can also be aligned in an  
arcuate contour (similar to Fig. 7).

## P A T E N T K R A V

1. Telt- eller beskyttelsestag, som er en foldekonstruktion som kan transporteres med en campingvogn (1), som har et stangsystemmodul (8) som stejlvægmodul (3) og en fleksibel tagbeklædning (7), hvor stangsystemmodulet (8) omfatter stive støttestænger (4, 5, 6) og indstiller brugspositionen for den fleksible tagbeklædning (7) k e n d e t e g n e t ved, at en pendularm (9, 9'; 10, 11; 12 til 15; 16, 17) er udformet til mindst områdevis at gribe tagbeklædningen (7') og til at definere et hovedforbindelsespunkt (P, P') på mindst én stangsystemdel af stangsystemmodulet (8, 8', 8''), hvor fra hovedforbindelsespunktet (P, P') virker to arme af pendularmene (9, 9'; 10, 11; 12 til 15; 16, 17) som delområder der rager i det væsentlige frit frem under tagbeklædningen.

2. Telt- eller beskyttelsestag ifølge krav 1, k e n d e t e g n e t ved, at pendularmen (9) er forbundet i sin længderetning i det væsentlige centralt med én af de vertikalt forløbende støttestænger (4') af stangsystemet (8) og dermed er hovedforbindelsespunktet (P) defineret.

3. Telt- eller beskyttelsestag ifølge krav 1, k e n d e t e g n e t ved, at pendularmen (9) som starter fra hovedforbindelsespunktet (P, P'), definerer to bensektioner (19, 20) af forskellige længder.

4. Telt- eller beskyttelsestag ifølge et af kravene 1 til 3, k e n d e t e g n e t ved, at pendularmen (10, 11; 16, 17) holdes så den er forskydelig i området af stangsystemet (8, 8') og/eller tagbeklædningen (7) på en sådan måde at, startende fra hovedforbindelsespunktet (P, P') kan forskellige længder (L, K) af pendularmen (10, 11; 16, 17) indstilles.

5. Telt- eller beskyttelsestag ifølge et af kravene 1 til 4, k e n d e t e g n e t ved, at pendularmen (9, 9'; 10, 11; 12 til 15; 16, 17) profilerer tagbeklædningen (7') mindst områdevis i en bueform.

6. Telt- eller beskyttelsestag ifølge et af kravene 1 til 5, k e n d e t e g n e t ved, at ved hjælp af mindst én pendularme (9, 9'; 10, 11; 12 til 15; 16, 17) som er tilvejebragt som en variabel tillægskomponent og virker som et hjælpestangsystem (H, H', H''), og startende fra det respektive hovedforbindelsespunkt (P, P'), kan en bueformet tagbeklædningsoptik (D) dannes på en sådan måde, at i tillæg til tagområderne (7) af stejlvægmodulet (3) som resulterer fra lige støttestænger (4, 5, 6), er stejlvægmodulet (3) forsynet med en udvidelseskantur (B, B', B'').

7. Telt- eller beskyttelsestag ifølge krav 6, k e n d e t e g n e t ved, at pendularmen eller pendularmene af hjælpestangsystemet (H, H', H'') består af overvejende bøjestabile komponenter som er forformede mindst områdevist med en bueformet længdekantur.

**8.** Telt- eller beskyttelsestag ifølge krav 6, kendes ved, at pendularmen eller pendularmene (9, 9'; 10, 11; 12 til 15; 16, 17) af hjælpestangsystemet (H, H', H'') består af et fleksibelt materiale og dermed danner disse pendularme, i monteringspositionen, den buformede tagkontur (D) ved hjælp af respektive spændeelementer som er kendt for foldekonstruktioner.

**9.** Telt- eller beskyttelsestag ifølge krav 8, kendes ved, at pendularmen eller pendularmene (9, 9'; 10, 11; 12 til 15; 16, 17) i monteringspositionen kan omdannes til en tilsigtet buet kontur (D, R) på en overvejende variabel måde.

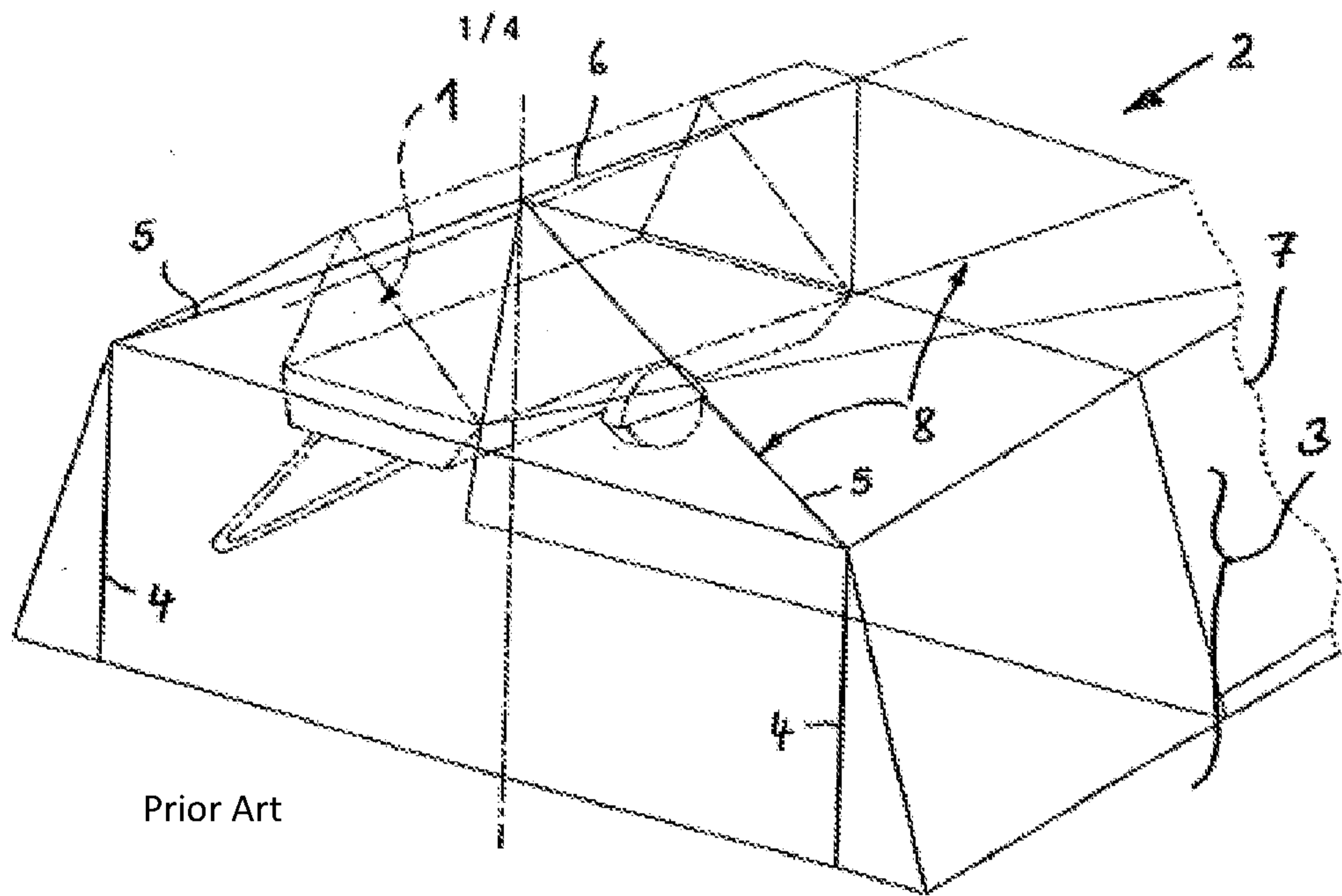
**10.** Telt- eller beskyttelsestag ifølge et af kravene 1 til 9, kendes ved, at stangsystemmodulet (8, 8', 8'') er forsynet med en flerhed af pendularme (9, 9'; 10, 11; 12 til 15; 16, 17) som griber under respektive områder af tagbeklædningen (7', 7'').

**11.** Telt- eller beskyttelsestag ifølge et af kravene 1 til 10, kendes ved, at dimensionerne af pendularmene (10, 11) er udformet til at være variable, og ved hjælp af pendularmene (10,11) formes respektive tagkonturer som strækker sig udad i en buform fra teltets indvendige rum (18), og dermed kan variable volumen- og arealudvidelser (B, B', B'') indstilles i området af det indre nytterum.

**12.** Telt- eller beskyttelsestag ifølge et af kravene 1 til 11, kendes ved, at pendularmen (16, 17) holdes således at den er forskydelig direkte på tagbeklædningen (7) i en optagelseslomme, optagelseslaske eller lignende område (23).

**13.** Telt- eller beskyttelsestag ifølge et af kravene 1 til 12, kendes ved, at en sømzone (24) som omgrænser pendularmen (16, 17), er forsynet med en lynlås.

**14.** Telt- eller beskyttelsestag ifølge et af kravene 1 til 13, kendes ved, at mindst én pendularm (12, 13, 14, 15) kan integreres i konstruktionen af et dobbelttagsstangsystem som omfatter to tagbeklædningslag (7).



Prior Art

Fig. 1

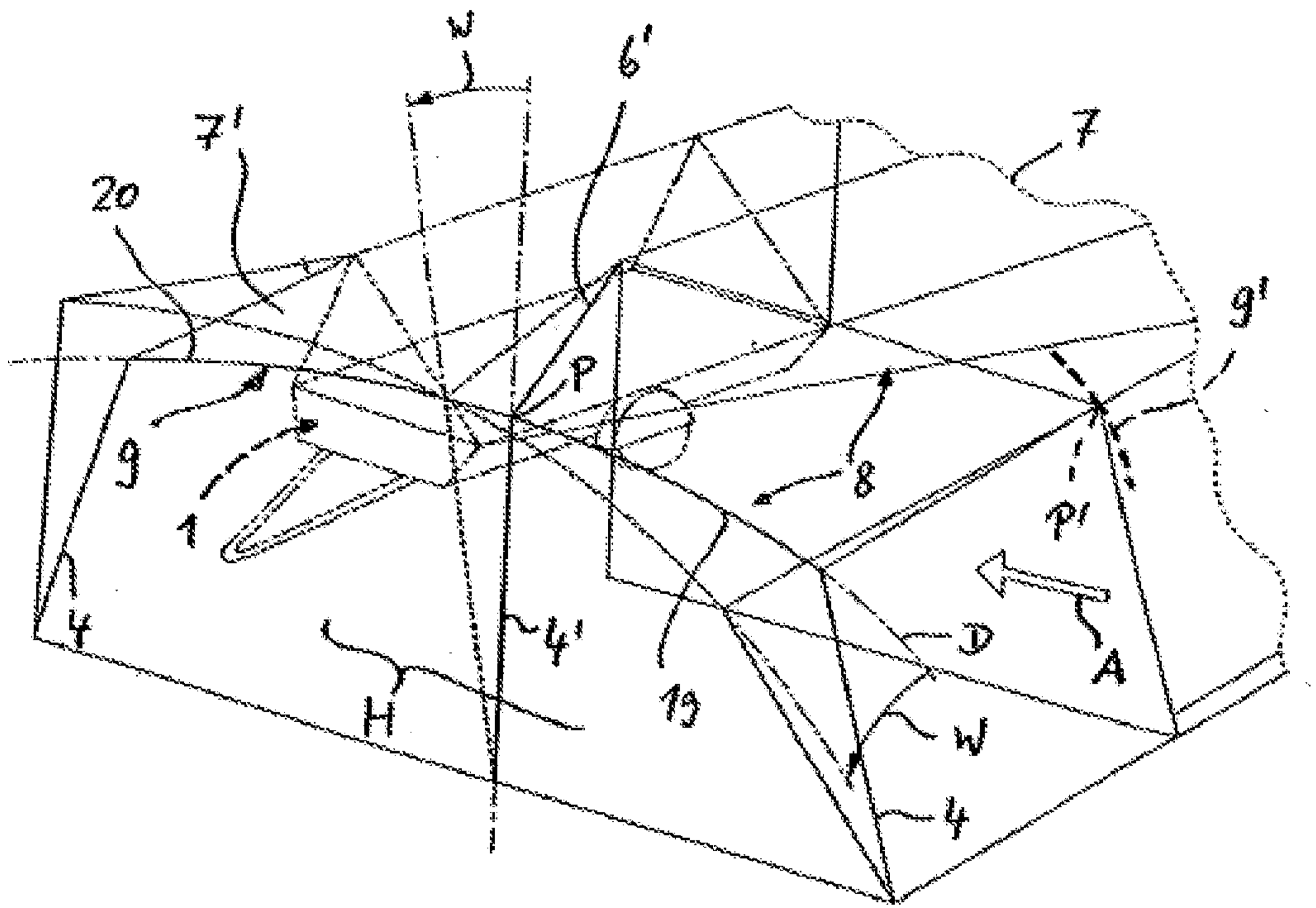


Fig. 2

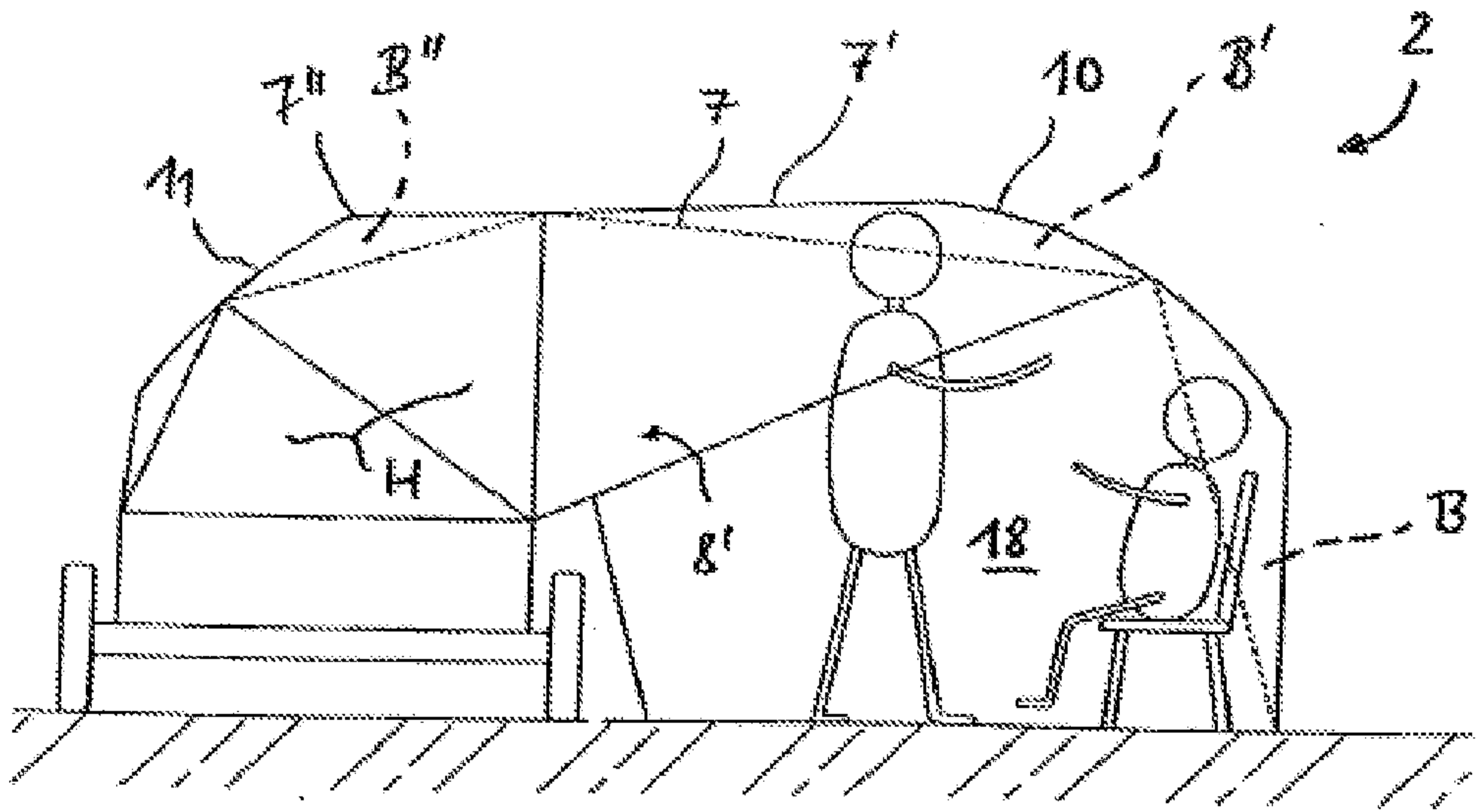


Fig. 3

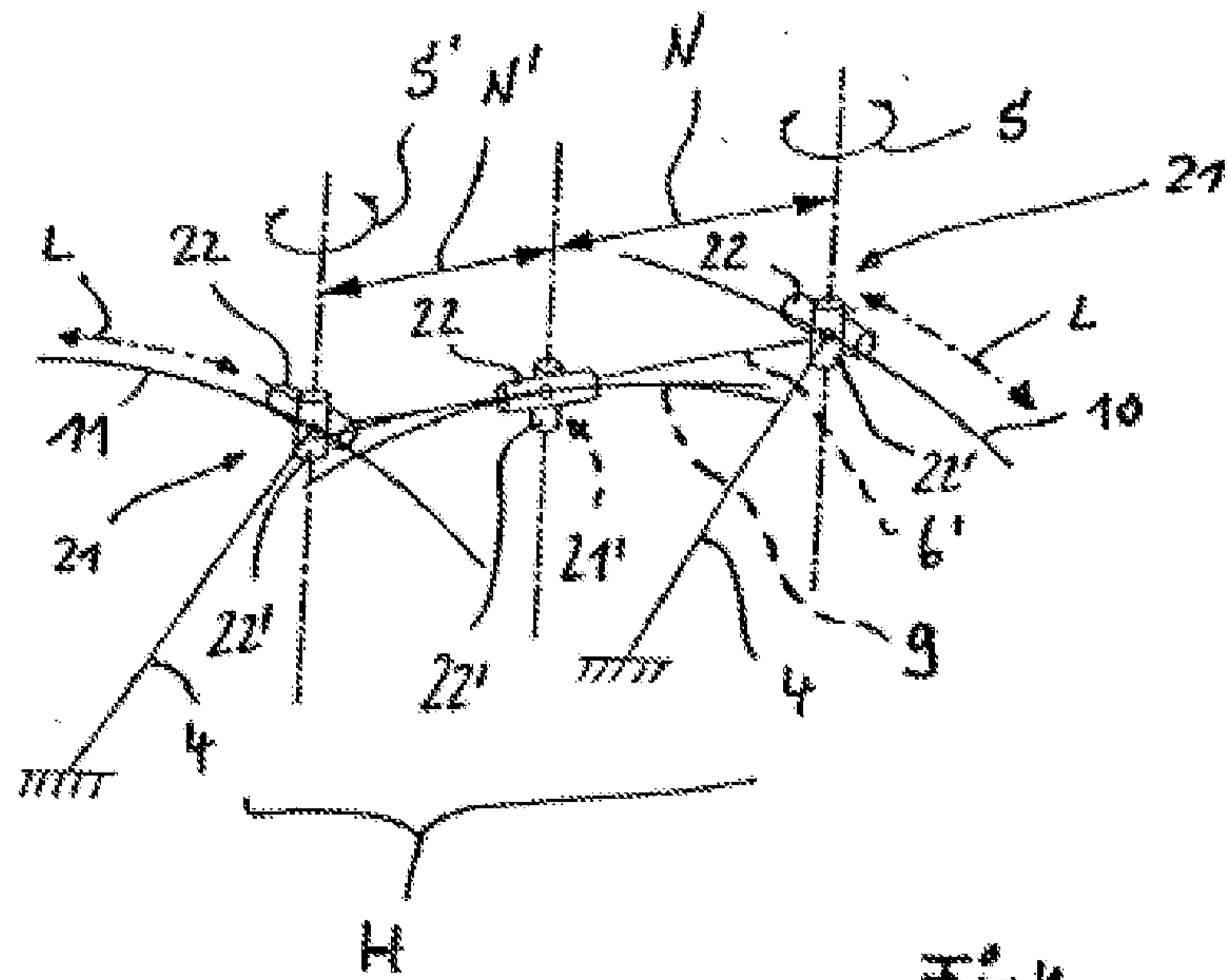


Fig. 4



