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(54) **Collapsible boat**

(57) A boat comprises a hull having a bow (14) and a stern (16), as well as a keel (18) and lateral sides (20), above and below the waterline, respectively, that extend between the bow (14) and the stern (16). The hull (12) comprises a forward portion (12a) and an astern portion (12b) that can be mutually separated, which are articulated about an axis (A) transverse to the longitudinal axis of the hull (12) and placed close to said lateral sides (20), whereby the hull (12) can assume an extended configuration for navigation, in which it extends along its whole length, or a folded configuration, of a reduced length, as a result of the articulation of at least one of the forward and astern portions (12a, 12b) about the transverse axis (A). The boat (10) includes a connection device (28) for mutually connecting the forward portion (12a) and the astern portion (12b) in its extended configuration.

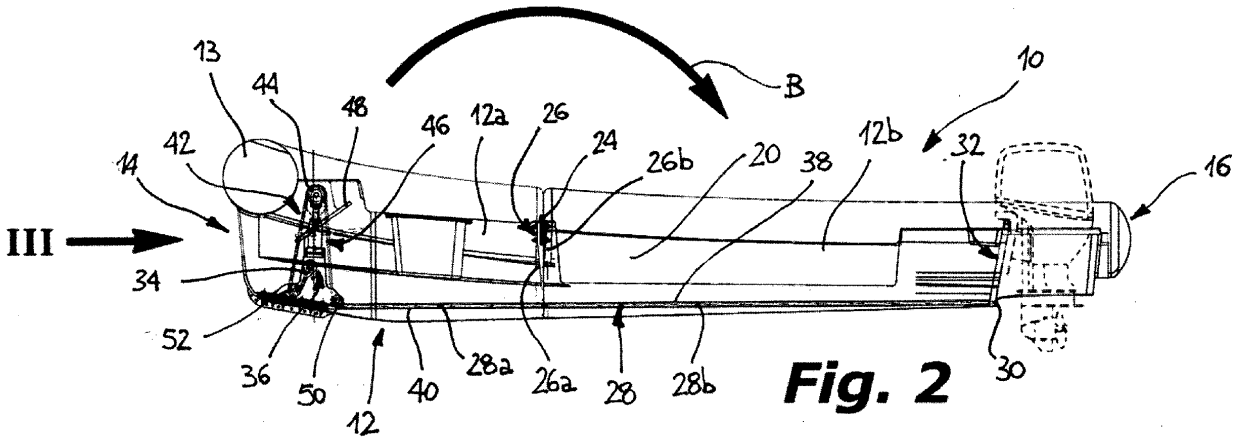

Fig. 2

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Description

[0001] The present invention refers generally to boats, for example pleasure boats.

[0002] In particular, the invention relates to a boat comprising a hull having a bow and a stern, as well as a keel and lateral sides above and below the waterline, respectively, that extend between the bow and the stern.

[0003] The known boats of the type defined above, for example for recreational use, may be transported by a trailer that can be towed by a motor vehicle. However, since the length of the trailer with the boat supported on it is generally big, maneuvering the vehicle with the trailer may reveal to be uncomfortable and difficult.

[0004] In some cases, the boat may be subject to garaging during non-use periods, and it would be convenient to make it little cumbersome when it is stored.

[0005] The main purpose of the invention is to provide a boat the hull of which, at least during transportation or garaging, may have a size smaller than that of its configuration suitable for navigation.

[0006] This purpose is achieved by a boat having the features mentioned in the appended claims.

[0007] By virtue of the fact that the hull comprises a forward portion and an astern portion that can be mutually separated, which are articulated about an axis transverse to the longitudinal axis of the hull and placed close to said lateral sides, whereby the hull can assume an extended configuration for navigation, in which it extends along its whole length, or a folded configuration, of a reduced length, as a result of the articulation of at least one of said portions about said transverse axis, and of the fact that the boat includes connection means for mutually connecting the forward portion and the astern portion in the extended configuration, the boat according to the invention can be folded so as to assume a reduced length along the direction of its longitudinal axis, with few operations easy to be performed.

[0008] According to an advantageous aspect of the invention, the connection means comprise at least one cable that extends close to the keel between the forward portion and the astern portion of the hull, along a direction substantially parallel to the longitudinal axis thereof, the opposite ends of the cable being respectively fixed or fixable to the forward portion and to the astern portion.

[0009] In this manner, the connection means have a simple structure which and are reliable in use.

[0010] According to another advantageous aspect of the invention, tensioning means are associated with the cable, which means are operable in order to apply to it a traction such as to keep the forward portion and the astern portion mutually connected during navigation.

[0011] This allows to effectively tension the cable, and to ensure a reliable connection between the forward portion and the astern portion of the boat.

[0012] Further characteristics and advantages of the invention will become apparent from the following detailed description, given by way of a non-limiting example and referred to the accompanying drawings in which:

Figure 1 is a schematic top elevational view of a boat according to the invention,

Figure 2 is a side view of the boat of Figure 1 sectioned along a longitudinal plane,

Figure 3 is an enlarged view of a detail indicated by arrow III of Figure 2,

Figure 4 is a front view sectioned along the line IV-IV of Figure 3, and

Figure 5 is a view similar to Figure 1, of the boat in its folded condition.

[0013] With reference to the figures, a boat, particularly for recreational use, is indicated 10 in general. The boat 10 includes a hull 12, for example of a composite material such as of fiber glass, or of aluminum or wood, having a bow 14 and a stern 16 that are connected, below the waterline, by a keel 18, and are provided, above the waterline, with lateral sides 20 extending between the bow 14 and the stern 16. The boat 10, in a manner known per se, may be equipped with a motor, for example of the outboard type.

[0014] Despite the boat 10 is shown in the accompanying drawings as an inflatable boat 10, or "inflatable rubber dinghy", of the rigid hull type provided with inflatable tubular sections 13 that at least partially surround its freeboards, it can be any type of boat provided with a rigid hull in the condition for navigation.

[0015] More particularly, the hull 12 includes a forward section 12a and an astern portion 12b that can be mutually separated, which are articulated about an axis (indicated A in Figure 1) transverse to its longitudinal axis, which transverse axis A is defined by a pair of coaxial hinges 24 arranged at the opposite lateral sides 20 of the hull 12.

[0016] The forward and astern portions 12a and 12b of the hull 12 are separated longitudinally by a transverse bulkhead 26 that includes a front wall 26a connected to the forward section 12a and a rear wall 26b connected to the astern portion 12b. In the extended configuration for navigation of the boat 10, and therefore of maximum elongation, shown in Figures 1 and 2, the front and rear walls 26a and 26b are arranged side by side to each other, so as to form the bulkhead 26.

[0017] By rotating the forward section 12a of the hull 12, starting from its extended configuration, about the axis A in the direction indicated by arrow B of Figures 2 and 5, the hull reaches a configuration of reduced length in the direction of the longitudinal axis.

[0018] In order to connect mutually the forward portion 12a and the astern portion 12b in the extended configuration of the hull 12, the boat 10 is provided with connection means that comprise at least one cable 28 having the function of a tension wire, typically a strand metal cable.

[0019] These means of connection, according to a first embodiment not shown in the figures, may comprise a

cable divided into two parts each of which is associated with a respective forward/astern portion 12a, 12b of the hull 12, and a coupling device for coupling the ends of these two parts of the cable, that are respectively adjacent to the walls 26a and 26b of the bulkhead 26, for example of the type comprising a cup-shaped body and a pin that can be engaged to each other and are fixed to the two walls 26a and 26b.

[0020] According to a preferred embodiment shown in the figures, the connection means for connecting the forward portion 12a to the astern portion 12b, comprise at least one continuous cable 28 that extends close to the bottom of the hull 12, typically close to the keel 16, conveniently at the bilge zone of the hull 12, along a direction parallel to the longitudinal axis of the hull 12. Although the solution with a single cable 28 is preferred, for reasons of structural simplicity, a plurality of cables 28, for example two mutually parallel cables, could be used.

[0021] The cable 28 passes through respective holes formed in the front and rear walls 26a and 26b of the bulkhead 26, and includes a front portion 28a intended to be associated with the forward portion 12a, and a rear portion 28b extending in the astern portion 12b. The opposite ends 30 and 34 of the cable 28, astern and forward, respectively, are connected or connectable to the astern portion 12b and to the forward portion 12a, respectively.

[0022] In particular, the rear portion 28b of the cable 28 is slidably inserted into the cavity of a first tubular guide body 38 fixed to the astern portion 12b between the stern board 32 of the hull 12 and the rear wall 26b of the transverse bulkhead 26, the rear end 30 of the cable 28 being fixed at the stern board 32, for example through a terminal bushing (not shown in detail) inserted into a corresponding seat formed in the stern board 32, so as to communicate with a through hole of the same board 32, that is crossed by the cable 28.

[0023] The front portion 28a of the cable 28 is slidably mounted into the cavity of a second tubular guide body 40 fixed to the forward section 12a, and has a front end 34 adapted to be connected to the forward portion 12a of the hull as a result of the coupling thereof with a coupling member 36 fixed to the portion 12a. In particular, the front end 34 of the cable 28 is eyelet shaped and it is preferably provided with a thimble to allow the eyelet to be inserted into a pin fixed to the portion 12a and provided with a peripheral groove.

[0024] Tensioning means, generally indicated 42 in the figures, are conveniently associated with the cable 28, which can be activated in order to apply a predetermined traction to the cable, the amount of which is such as to allow the forward and astern portions 12a and 12b to be kept mutually connected during navigation, which tensioning means can be made in any manner known per se in order to allow the cable 28 to undergo a suitable tension.

[0025] Although the tensioning means 42 can be made by means of a winch or a similar device, they preferably consist of a jack 46, for example of the hydraulically controlled type, associated with the forward section 12a and able to deflect the cable 28 with respect to its path along that portion 12a, so as to apply the aforesaid traction to the cable 28. Of course, the jack 46, or at any rate the tensioning device 42 also differently made, might be associated with the astern portion 12b, or associated with the hull 12 in an intermediate zone thereof which is close to the separation between the forward and astern zones 12a and 12b.

[0026] The jack 12b has a body fastened to the forward portion 12a, which allows the movement of a tension pulley 44 to be controlled along the direction transverse to the longitudinal axis of the boat 10, so as to deflect the cable 28 in order to apply to it the aforesaid traction between its front end 34 and its rear end 30. Although in the accompanying drawings the jack 46 can be of the manually operable type, through a lever 48 movable between two positions (one active, raised position shown in solid lines, and one inactive position shown in broken lines in Figures 2 and 3), it could be a jack or another known tensioning device, that can be operated automatically, for example electrically.

[0027] The front portion 28a of the cable 28 is also wound on a first idle pulley 50 rotatably mounted with respect to the forward portion 12a between the front wall 26a of the bulkhead 26 and the tensioning pulley 44, in a position adjacent to the end of the second tubular guide body 40 that faces the bow 14, and on a second idle pulley 52 also rotatably mounted with respect to the forward portion 12a in a position interposed, along the path of the cable 28, between the tensioning pulley 44 and the coupling member 36.

[0028] Conveniently, the length of the cable 28 between its forward end 34, which is intended to engage the coupling member 36, and its portion wound on the first idle pulley 50, in the extended condition of the boat 10, is at least equal to twice the distance between the articulation hinges 24 and the holes of the walls 26a and 26b of the bulkhead 26 that are engaged by the cable 28, that is between such hinges 24 and the two tubular guide bodies 38, 40.

[0029] In this manner, when the jack 46 is brought to its inactive condition, in which the tensioning pulley 44 is closest to the keel 16, the cable 28 can be manually disengaged from the pulley 44 so as to allow the hull 12 to be folded about the transverse axis A without requiring its end 34 to be disengaged from the coupling member 36.

[0030] In operation, the boat in its extended condition for navigation, corresponding to its maximum length, is in the configuration shown in the Figures 1 to 4. In this condition, the cable 28 is wound on the tensioning pulley 44 and on the idle pulleys 50 and 52, and it is subjected to a tension as a result of the raised position, that is arranged farthest from the keel 16, of the pulley 44, the jack 46 being in its active position that has been reached as a result of the displacement of the actuating lever 48 in the raised position shown in Figures 2 and 3.

[0031] In order to fold the boat 10 so that it may assumes the configuration shown in Figure 5, the user operates the lever 48 to bring it in its lowered position (position in broken lines in the Figures 2 and 3, and position of the Figure 5) with the aim of deactivating the jack 46. In this manner, the tensioning pulley 44 reaches its position closest to the keel 16, in which the cable 28 can be disengaged from the pulley 44. After having made the cable 28 free, the forward portion 12a of the boat 10 can be rotated about the axis A defined by the hinges 24, along the direction of the arrows B of Figures 2 and 5, and, as a result of such rotation, the cable 28 slides freely within the second tubular guide body 40, until the forward portion 12a overlaps the astern portion 12b. In this configuration, a portion of the cable 28 projects from the boat 10 folded, and it extends substantially parallel to the two walls 26a and 26b of the bulkhead 26, which reach an almost coplanar position.

[0032] By virtue of the fact that the cable 28 has an own elasticity, owing to its material and its length, in the extended condition of the boat 10 it can perform at least a moderate function of damping the loads applied to the bow 14 during navigation, particularly as a result of the impact with the waves, with respect to the astern portion 12b.

Claims

1. Boat comprising a hull having a bow (14) and a stern (16), as well as a keel (18) and lateral sides (20) above and below the waterline, respectively, that extend between the bow (14) and the stern (16), **characterized in that** the hull (12) comprises a forward portion (12a) and an astern portion (12b) that can be mutually separated, which are articulated about an axis (A) transverse to the longitudinal axis of the hull (12) and placed close to said lateral sides (20), whereby the hull (12) can assume an extended configuration for navigation, in which it extends along its whole length, or a folded configuration, of a reduced length, as a result of the articulation of at least one of said portions (12a, 12b) about said transverse axis (A), and **in that** the boat (10) includes connection means (28) for mutually connecting the forward portion (12a) and the astern portion (12b) in the aforesaid extended configuration.

2. Boat according to claim 1, **characterized in that** said transverse axis (A) of articulation of the hull (12) is defined by a pair of coaxial hinges (24) arranged at the opposite sides (20) of the hull (12).

3. Boat according to claim 1 or 2, **characterized in that** said connection means comprise at least one cable (28) that extends close to the keel (16) at the forward portion (12a) and at the astern portion (12b) of the hull (12), along a direction substantially parallel to the longitudinal axis thereof, the opposite ends (30, 34) of said cable (28) being respectively fixed or fixable to the forward portion (12a) and to the astern portion (12b).

4. Boat according to claim 3, **characterized in that** said at least one cable (28) has front (28a) and rear (28b) portions extending at the bilge zone of the hull (12).

5. Boat according to claim 3 or 4, **characterized in that** tensioning means (42) are associated with the cable (28), which means are operable in order to apply a traction to the cable such as to keep the forward portion (12a) and the astern portion (12b) mutually connected during navigation.

6. Boat according to any one of claims 1 to 5, **characterized in that** the hull (12) has a transverse bulkhead (26) for separating the forward portion (12a) and the astern portion (12b), which bulkhead (26) comprises a front wall (26a) connected to the forward portion (12a) and a rear wall (26b) connected to the astern portion (12b), which front and rear walls (26a, 26b) are arranged one close to the other in the extended configuration of the boat (10), and **in that** that the cable (28) has a front end (34) arranged to be connected to the forward portion (12) of the hull (12), and a rear end (30) fixed to the astern portion (12b) of the hull (12).

7. Boat according to claim 6, **characterized in that** the rear end (30) of the cable is fixed at the stern board (32) of the hull (12).

8. Boat according to claim 6 or 7, **characterized in that** the rear portion (28b) of the cable (28) is slidably mounted within a first tubular guide body (38) fixed to the astern portion (12b) of the hull (12), between the stern board (32) and the rear wall (26b) of said transverse bulkhead (26).

9. Boat according to any one of claims 6 to 8, **characterized in that** the front end (34) of the cable (28) has coupling means to be coupled with a coupling member (36) extending from the forward portion (12a) of the hull (12).

10. Boat according to any one of claims 6 to 9, **characterized in that** the forward portion (12a) of the hull (12) is associated with a tensioning pulley (44) that can be moved in order to deflect the cable (28) in order to apply to it a tension of a predetermined amount, between its front end (34) and its rear end (30).

11. Boat according to claim 10, **characterized in that** the tensioning pulley (44) is associated with a control jack (46) to control the movement thereof, which jack

is preferably provided with a manually actuating lever (48) in order to control the movement of said pulley between an active condition and an inactive condition, and vice-versa.

12. Boat according to claim 10 or 11, **characterized in that** the cable (28) is wound on a first idle pulley (50) rotatably associated to the forward portion (12a) of the hull (12) and arranged between the front wall (26a) of the transverse bulkhead (26) and the tensioning pulley (44).

13. Boat according to claim 12, **characterized in that** the cable (28), between said first idle pulley (50) and the front wall (26a) of the transverse bulkhead (26), is slidably mounted within a second tubular guide body (40) fixed to the forward portion (12a) of the hull (12).

14. Boat according to claim 12 or 13, **characterized in that** the cable (28) is adapted to be disengaged from said tensioning pulley (44) when the jack (46) is in its inactive condition, and **in that** its length, between said coupling member (36) and the first idle pulley (50), is at least twice the distance between said hinges of articulation (24) of the hull (12) and said first and second tubular guide bodies (38, 40), so as to allow,the hull (12) to be folded about said transverse axis without disengaging the first end (34) of the cable (28) from said coupling member (36).

15. Boat according to any one of claims 12 to 14, **characterized in that** the cable (28) is wound on a second idle pulley (52) rotatably associated to the forward portion (12a) of the hull (12) and operatively arranged between the tensioning pulley (44) and said coupling member (36).

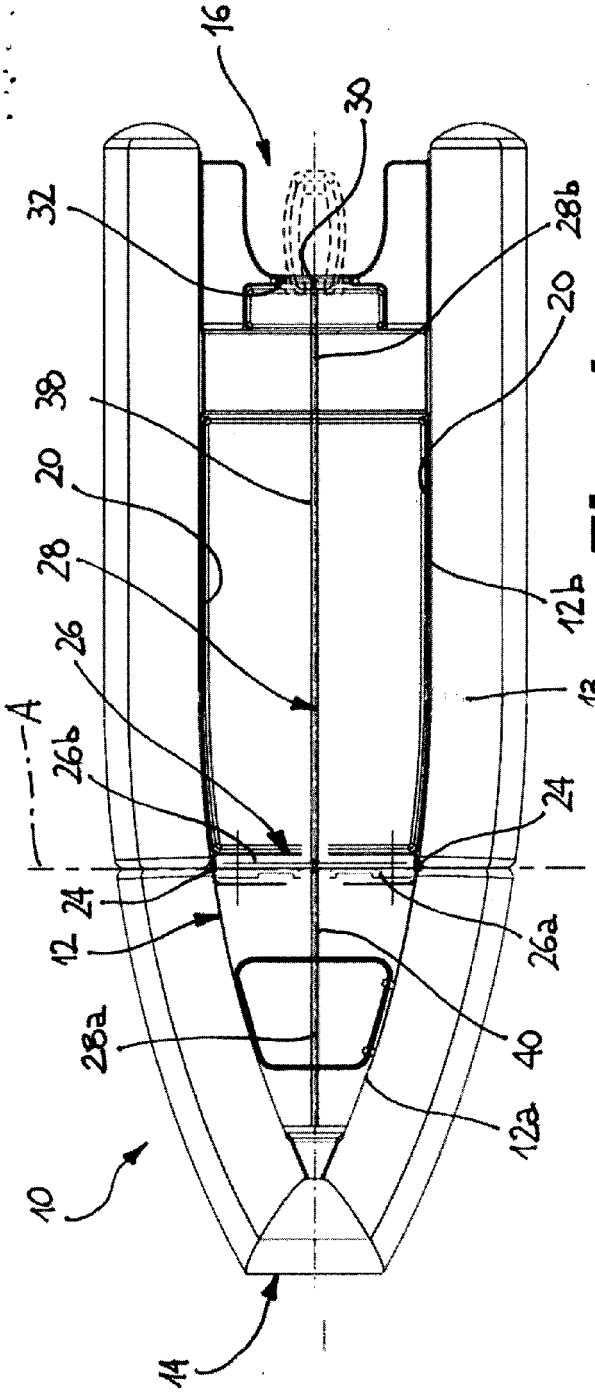
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Fig. 1

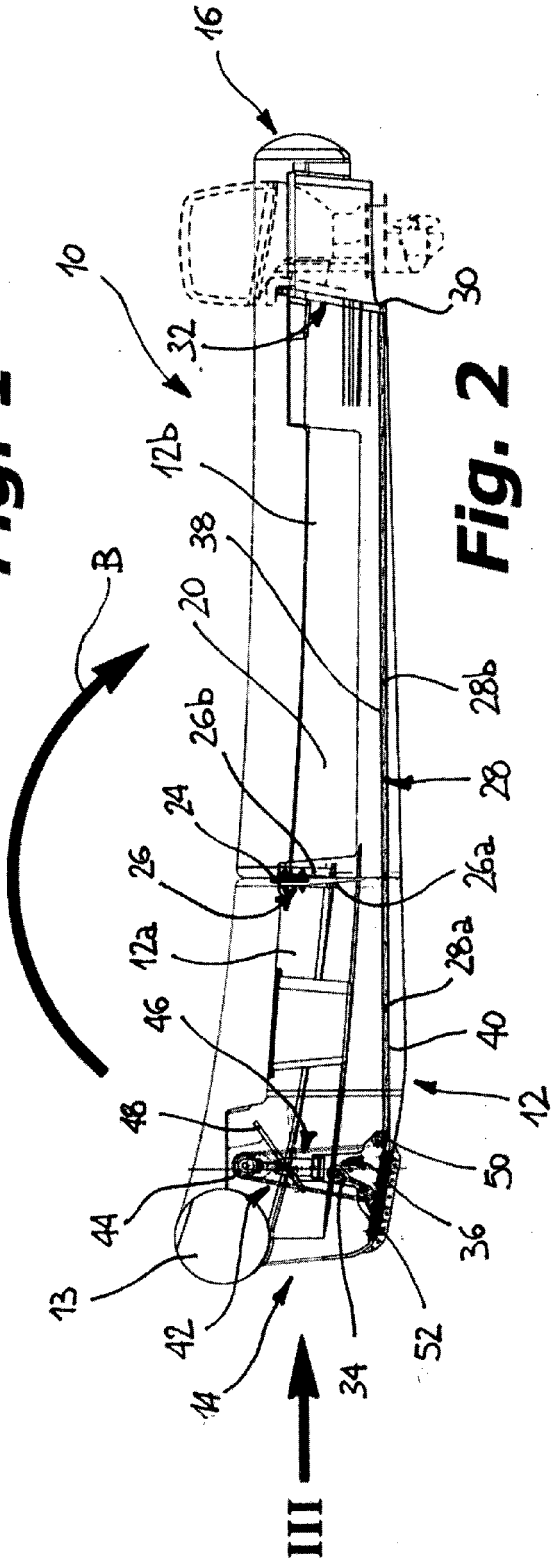
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Fig. 2

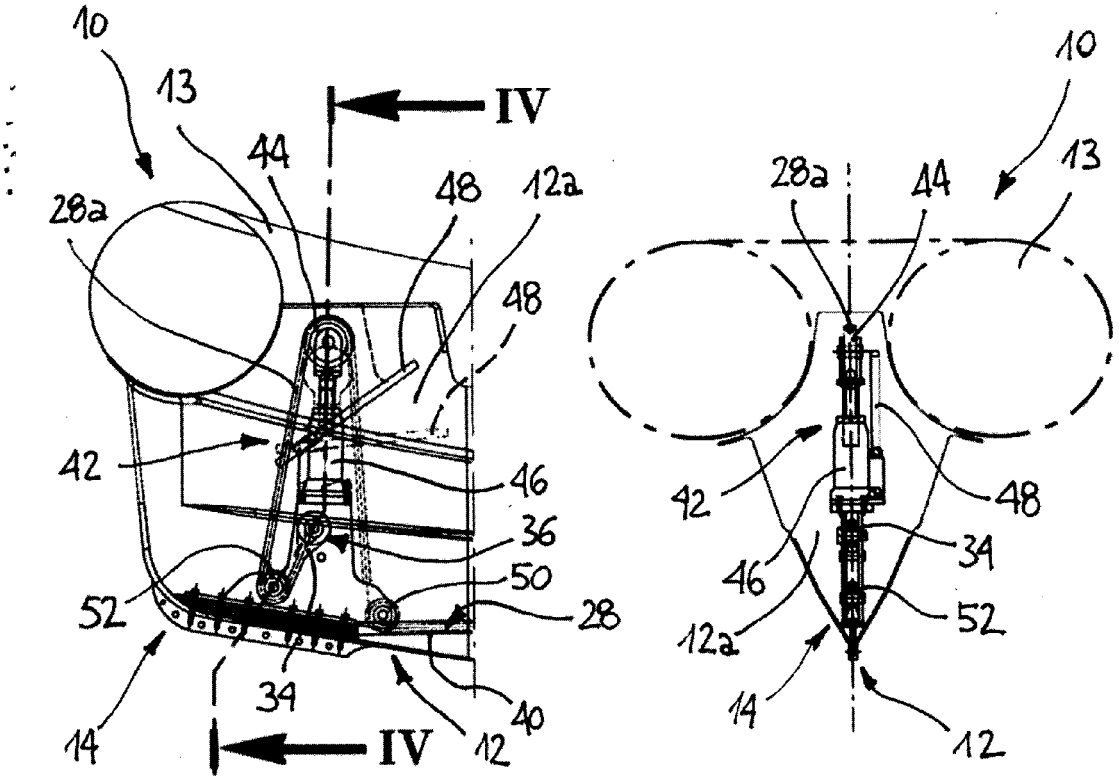
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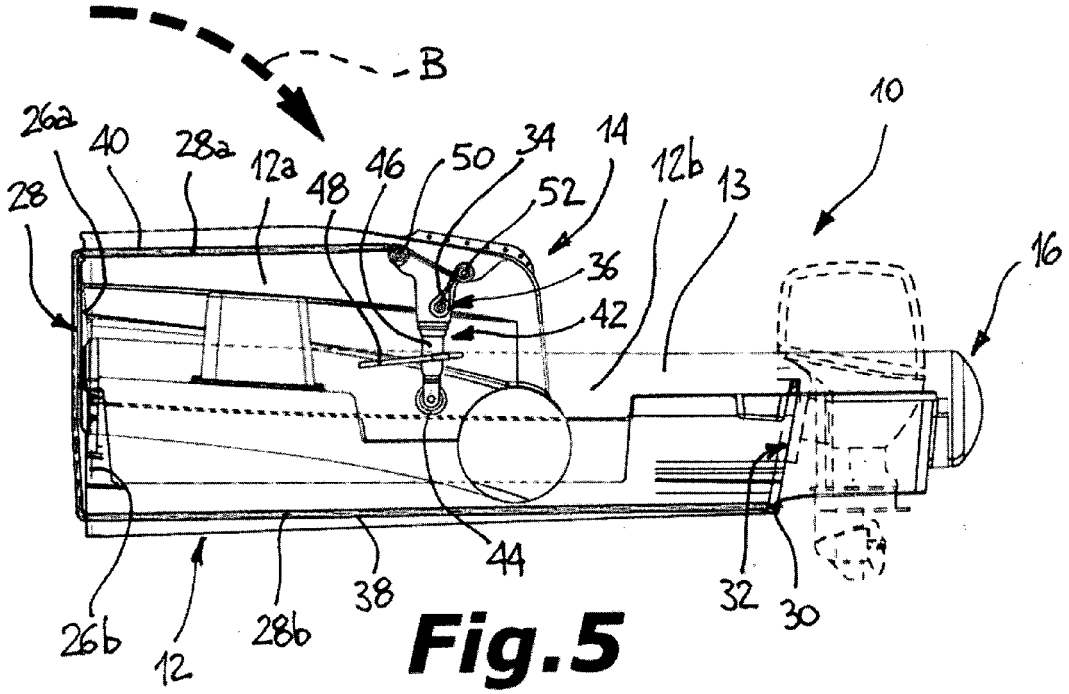
Fig. 3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26b
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28b

Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 13 00 4772

DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EP 2 165 928 A2 (NIETO LEON JOSE [ES]) 24 March 2010 (2010-03-24) * paragraphs [0016] - [0049]; figures 5, 6, 19A3, 20B3 * -----	1,2	
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1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 January 2014	Brumer, Alexandre

CATEGORY OF CITED DOCUMENTS

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