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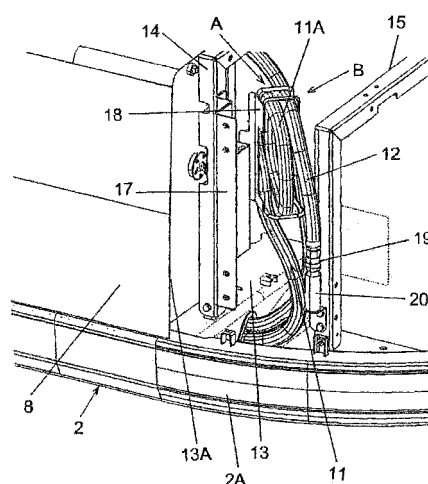
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(54) **FUEL FILLING HOSE STOWAGE DEVICE**

(57) **PROBLEM:** To provide a refueling hose storage assembly which can store a refueling hose in a storage compartment without allowing its coiled portion to bounceback or bounce out evenwhen the refueling hose contains a mixed reinforcing material.

SOLUTION: A refueling hose storage assembly has a storage compartment 13 for storing a suction hose 11 and a supply hose 12 to be used upon refueling a fuel tank 8, and also a hose holding structure arranged in the storage compartment 13 to hold the suction hose 11 with a portion of the suction hose being coiled to form a coiled portion 11A. The hose holding structure includes a second bracket 18 arranged in the holding compartment 13 and having an upper restraining part 18B for restraining an upper part of the coiled portion 11A of the suction hose 11 and a lower restraining part 18C for restraining a lower part of the coiled portion 11A. The upper restraining part 18B and lower restraining part 18C of the second bracket 18 each include a first restraining means for restraining the coiled portion 11A of the suction hose 11 in its thickness direction and a second restraining means for restraining the coiled portion 11B in its radial direction.

FIG.3



Description

Technical Field

[0001] This invention relates to a refueling hose storage assembly to be disposed in a construction machine such as a hydraulic excavator and having a storage compartment for storing a refueling hose useful upon supplying fuel to a fuel tank.

Background Art

[0002] As a conventional technology of this sort, there is one disclosed in Patent Document 1. This conventional technology is directed to a construction that a fuel tank is arranged on a revolving upperstructure of a hydraulic excavator as a construction machine, a storage compartment for storing therein a refueling hose useful upon refueling the fuel tank is arranged adjacent the fuel tank, and a hose holding structure for holding in the storage compartment the refueling hose with a portion thereof being coiled to form a coiled portion is arranged. This hose holding structure includes a member arranged in the storage compartment and an upwardly open, square U-shaped hook fixed on the member. The coiled portion of the refueling hose can be held on the hook.

Patent Document 1: JP-A-2003-328887

Disclosure of the Invention

Means to Be Solved by the Problem

[0003] A conventionally-used refueling hose is formed in its entirety from rubber and is relatively soft. Even when after completion of refueling work of the fuel tank, for example, a portion of the refueling hose is coiled over a plurality of times to form a coiled portion and the coiled portion is held on the hook that makes up the hose holding structure of the above-mentioned conventional technology, the refueling hose can, therefore, be stored in the storage compartment such that the coiled portion remains in a stable form without developing a problem.

[0004] A problem, however, arises if one tries to store in such a storage compartment a refueling hose which has been being developed in recent years and contains a mixed reinforcing material. Described specifically, a refueling hose with a mixed reinforcing material mixed therein as mentioned above has higher stiffness and larger resilience compared with one simply making use of rubber as a material. Therefore, an attempt to coil a portion of the refueling hose to form a coiled portion and to hold the coiled portion on the above-mentioned hook making up the hose holding structure according to the conventional technology may lead to a potential problem that by the resilience of the coiled portion, the coiled portion may bounce back to become unstable or may bounce out from the storage compartment. For such a potential problem, it has conventionally been desired to develop

a storage assembly that can store in a storage compartment a coiled portion of a refueling hose while allowing it to retain its stable form even when the refueling hose contains a mixed reinforcing material.

5 [0005] With the above-mentioned circumstances of the conventional technology in view, the present invention has as an object thereof the provision of a refueling hose storage assembly that can store in a storage compartment a coiled portion of a refueling hose without allowing its coiled portion to bounce back or bounce out even when the refueling hose contains a mixed reinforcing material.

Means for Solving the Problem

15 [0006] To achieve the above-described object, a refueling hose storage assembly according to the present invention is **characterized in that** in the refueling hose storage assembly to be disposed in a construction machine provided with a fuel tank, said refueling hose storage assembly having a storage compartment for storing therein a refueling hose to be used upon refueling the fuel tank and a hose holding structure for holding the refueling hose with a portion thereof being coiled to form a coiled portion, wherein the hose holding structure is arranged in the storage compartment, and includes a bracket having an upper restraining part for restraining the coiled portion of the refueling hose at an upper part thereof and a lower restraining part for restraining the coiled portion at a lower part thereof.

30 [0007] According to the present invention constructed as described above, upon storing the refueling hose in the storage compartment, for example, after completion of refueling work of the fuel tank, the portion of the refueling hose is coiled to form the coiled portion, and in this state, the coiled portion is held at its upper and lower parts by the upper and lower restraining parts of the bracket, respectively. The refueling hose can, therefore, be stored in the storage compartment while maintaining a stable form without allowing its coiled portion to bounce back or bounce out even when the refueling hose contains a mixed reinforcing material. Accordingly, the storage work of the refueling hose into the storage compartment is facilitated. It is to be noted that, when it is desired to take the stored refueling hose out of the storage compartment upon refueling the fuel tank, the refueling hose can be readily taken out of the storage compartment by releasing the restraint to the upper and lower parts of the coiled portion of the refueling hose by the upper and lower restraining parts of the bracket.

50 [0008] The refueling storage assembly according to the present invention may also be **characterized in that** in the above-described invention, the upper and lower restraining parts of the bracket each include first and second restraining means for restraining the coiled portion of the refueling hose, which has been stored in the storage compartment, such that the coiled portion is prevented from bouncing back in thickness direction and radial di-

rection thereof, respectively.

[0009] According to the present invention constructed as described above, the coiled portion of the refueling hose can be restrained by the first restraining means of the upper restraining part of the bracket and the first restraining means of the lower restraining part of the bracket such that the coiled portion is prevented from bouncing back in the thickness direction, and the coiled portion of the refueling hose can be restrained by the second restraining means of the upper restraining part and the second restraining means of the lower restraining part such that the coiled portion is prevented from bouncing back in its radial direction. The refueling hose can, therefore, be stored in the storage compartment while surely maintaining a stable form by these restraining means without allowing its coiled portion to bounce back or bounce out even when the refueling hose contains a mixed reinforcing material and has large resilience.

[0010] The refueling storage assembly according to the present invention may also be **characterized in that** in the above-described invention, the storage compartment is arranged adjacent the fuel tank, and is provided in a side wall thereof with an opening for enabling carry-in and carry-out of the refueling hose into and from the storage compartment, the storage assembly is further provided with a cover for opening and closing the opening of the storage compartment, and the bracket is fixed in the storage compartment such that the coiled portion of the refueling hose remains in a form that the coiled portion is positioned in a direction oblique to an imaginary plane defined by the cover.

[0011] According to the present invention constructed as described above, it is only necessary, upon storing the refueling hose into the storage compartment, to open the cover and then to carry the refueling hose into the storage compartment through its opening such that the coiled portion of the refueling hose is positioned in the oblique direction. Therefore, the storage work of the refueling hose into the storage compartment can be readily performed. When the storage compartment is formed, for example, such that it has a substantially rectangular shape as seen in plan, the coiled portion of the refueling hose can be arranged to extend along a diagonal of the rectangular shape. As a consequence, the shape and dimensions of the storage compartment can be set relatively small.

[0012] The refueling storage assembly according to the present invention may also be **characterized in that** in the above-described invention, the storage assembly is further provided with a rear support arranged as a reinforcing member in the storage compartment at a rear position which is on a side of the fuel tank, a front support arranged as another reinforcing member in the storage compartment at a front position, and another bracket fixed on the rear support, the bracket includes a plate member having a tilted plate portion fixed on the another bracket, the refueling hose has a strainer forming a fuel suction port, and the hose holding structure includes a

strainer holding section, which is fixed on the front support and can hold the strainer of the refueling hose.

[0013] According to the present invention constructed as described above, the bracket having the upper and lower restraining parts can be firmly fixed on the rear support as the reinforcing member via the tilted plate portion of the plate member of the bracket and the another bracket. As a consequence, the upper and lower restraining parts of the bracket can be stably maintained in the direction oblique to the imaginary plane defined by the cover. When the refueling hose has been stored in the storage compartment, the strainer of the refueling hose can be held at the strainer holding section fixed on the front support. As a consequence, the refueling hose can be stored in a more stable form in the storage compartment.

[0014] The refueling storage assembly according to the present invention may also be **characterized in that** in the above-described invention, the upper and lower restraining parts of the bracket are arranged on the plate member of the bracket at portions thereof other than the tilted plate portion, respectively, the first and second restraining means of the upper restraining part form a downwardly-open, square U-shaped part capable of receiving therein the upper part of the coiled portion of the refueling hose, and the first and second restraining means of the lower restraining part form a ring-shaped part having a substantially rectangular shape as seen in plan and capable of receiving therein the lower part of the coiled portion of the refueling hose.

[0015] Upon storing the refueling hose in the storage compartment according to the present invention constructed as described above, the coiled portion of the refueling hose can be readily held in the upper and lower restraining parts of the bracket, for example, by receiving the lower part of the coiled portion of the refueling hose in the ring-shaped part having the substantially rectangular shape as seen in plan and formed by the first and second restraining means of the lower restraining part and then vertically pressing the coiled portion in this state to press down the coiled portion and to receive the upper part of the coiled portion in the upwardly-open, square U-shaped part. As a consequence, the storage work of the refueling hose can be efficiently performed. When it is desired to take the stored refueling hose out of the storage compartment upon refueling the fuel tank, it is only necessary, for example, to take out the stored refueling hose in an order reverse to the above-mentioned order, specifically to vertically press the coiled portion of the refueling hose to release it from the upper restraining part of the bracket and then to take the coiled portion out of the lower restraining part. Therefore, the take-out work of the refueling hose can be readily performed.

Advantageous Effects of the Invention

[0016] In the present invention, the hose holding structure that holds the refueling hose with the portion thereof

being coiled to form the coiled portion is arranged in the storage compartment, and includes the bracket having the upper restraining part for restraining the coiled portion of the refueling hose at the upper part thereof and the lower restraining part for restraining the coiled portion at the lower part thereof. After completion of refueling work of the fuel tank, the refueling hose can, therefore, be stored in the storage compartment while maintaining a stable form by the upper and lower restraining parts of the bracket without allowing its coiled portion to bounce back or bounce out even when the refueling hose contains a mixed reinforcing material and has great resilience. Accordingly, the storage work of the refueling hose into the storage compartment is facilitated. As a consequence, it is possible to improve the efficiency of the refueling work of the fuel tank. In a construction machine which is prone to be subjected to impact force and large vibrations as a result of various work, the refueling hose stored in the storage compartment can be maintained in a stable state during the various work even when the refueling hose contains a mixed reinforcing material and has large resilience. It is, therefore, possible to realize a refueling hose storage assembly of high reliability.

Best Mode for Carrying out the Invention

[0017] A best mode for carrying out the refueling hose storage assembly according to the present invention will hereinafter be described with reference to drawings.

[0018] FIGS. 1A and 1B are views illustrating a hydraulic excavator of the small swing radius type cited as an example of a construction machine in which one embodiment of the refueling hose storage assembly according to the present invention is to be disposed, in which FIG. 1A is a side view and FIG. 1B is a front view.

[0019] The refueling hose storage assembly according to this embodiment is to be disposed in the construction machine, for example, the hydraulic excavator of the small swing radius type as illustrated in FIGS. 1A and 1B. This hydraulic excavator is provided with a travel base 1, a revolving upperstructure 2 mounted on the travel base 1, and a front working mechanism 3 attached tiltably in an up-and-down direction to the revolving upperstructure 2. The front working mechanism 3 includes a boom 4, an arm 5, and a bucket 6. On the revolving upperstructure 2, an operator's cab 7 is also mounted on one side of the front working mechanism 3 as illustrated in FIG. 1B. On an opposite side, a fuel tank 8 and the refueling hose storage assembly 9 according to this embodiment are disposed as illustrated in FIG. 1A.

[0020] FIG. 2 is a perspective view illustrating essential parts of the revolving upperstructure of the hydraulic excavator of the small swing radius type illustrated in FIGS. 1A and 1B, on which the refueling hose storage assembly according to this embodiment is to be disposed, and FIG. 3 is a perspective view illustrating the essential parts of FIG. 2 in a state that the cover has been removed. FIG. 4 is a view illustrating a hose holding structure arranged

in the refueling hose storage assembly according to this embodiment and is a view as observed from the direction of arrow "A" of FIG. 3, and FIG. 5 is a view illustrating the hose holding structure arranged in the refueling hose storage assembly according to this embodiment and is a view as observed from the direction of arrow "B" of FIG. 3. FIGS. 6A to 6C are views illustrating a rear support arranged as a reinforcing member in the refueling hose storage assembly according to this embodiment, in which FIG. 6A is a front view, FIG. 6B is a plan view, and FIG. 6C is a side view, and FIGS. 7A to 7C are views illustrating a front support arranged as another reinforcing member in the refueling hose storage assembly according to this embodiment, in which FIG. 7A is a front view, FIG. 7B is a plan view, and FIG. 7C is a side view. FIGS. 8A to 8C are views illustrating a first bracket making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 8A is a front view, FIG. 8B is a plan view, and FIG. 8C is a side view, FIGS. 9A to 9D are views illustrating a second bracket making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 9A is a front view, FIG. 9B is a plan view, FIG. 9C is a side view, and FIG. 9D is a rear view, and FIGS. 10A and 10B are views illustrating a strainer making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 10A is a front view and FIG. 10B is a plan view.

[0021] As illustrated in FIG. 3, the refueling hose storage assembly 9 according to this embodiment is provided with a storage compartment 13, in which a refueling hose, specifically a suction hose 11 and a supply hose 12 are stored. The suction hose 11 sucks up fuel stored in an unillustrated container such as a drum, while the supply hose 12 supplies to the fuel tank 8 the fuel sucked up by the suction hose 11. The suction hose 11 and supply hose 12 are made, for example, from a rubber material which contains a reinforcing material and has relatively strong flexibility and large resilience. This storage compartment 13 is arranged, for example, adjacent the fuel tank 8. Formed in a side wall of the storage compartment 13 is an opening 13A that enables carry-in and carry-out of the suction hose 11 and supply hose 12 into and from the storage compartment 13. As illustrated in FIG. 2, a cover 10 for opening and closing the opening 13A is attached over the opening 13A.

[0022] As illustrated in FIGS. 3, 4 and 5, this embodiment is also provided with a hose holding structure, which is arranged in the storage compartment 13 and holds the refueling hose, for example, the suction hose 11 with a portion thereof being coiled to form a coiled portion 11A. As illustrated in FIG. 5, this hose holding structure includes a second bracket 18A, which has an upper restraining part 18B for restraining an upper part of the coiled portion 11A of the suction hose 11 and a lower restraining part 18C for restraining a lower part of the coiled portion 11A.

[0023] The upper restraining part 18B and lower restraining part 18C of the second bracket 18A each include a first restraining means and a second restraining means. The first restraining means restrains the coiled portion 11A of the suction hose 11, which is stored in the storage compartment 13, such that the coiled portion 11A is prevented from bouncing back in a direction in which loops of the hose overlap each other, that is, in a thickness direction of the hose, while the second restraining means restrains the coiled portion 11A of the suction hose 11, which is stored in the storage compartment 13, such that the coiled portion 11A is prevented from bouncing back in a radial direction of the coiled portion. It is to be noted that as illustrated in FIG. 3, the second bracket 18A is fixed in the storage compartment 13 to maintain the coiled portion 11A of the suction hose 11 in a coiled form positioned in a direction oblique to an imaginary plane defined by the above-mentioned cover 10.

[0024] This embodiment is also provided with a rear support 14 arranged as a reinforcing member at a rear position in the storage compartment 13, said rear position being on a side of the fuel tank 8, as illustrated in FIGS. 3 and 6A to 6C, a front support 15 arranged as another reinforcing member at a front position in the storage compartment 13 as illustrated in FIGS. 3 and 7A to 7C, and another bracket fixed on the rear support 14, specifically a first bracket 17 as illustrated in FIG. 3.

[0025] As illustrated in FIGS. 6A to 6C, the rear support 14 is formed in the shape of letter "L" having an upright part and a horizontal part arranged in conjunction with an upper portion of the upright part, and the upright part is provided with two bolt holes 14A. As illustrated in FIGS. 7A to 7C, the front support 15 is also formed in the shape of letter "L" having an upright part and a horizontal part arranged in conjunction with an upper portion of the upright part, and the upright part is provided with two bolt holes 15A.

[0026] As illustrated in FIG. 8B, the first bracket 17 is formed of a first plate member 17A having, for example, a shape of letter "W" as viewed in plan and a second plate member 17B fixed on the first plate member 17A and having, for example, a shape of letter "L" as viewed in plan. As illustrated in FIG. 8A, two holes 17A1 are formed in the first plate member 17A. These two holes 17A1 match with the above-mentioned bolt holes 14A in the rear support 10. By inserting bolts through these holes 17A1 into threaded engagement with the bolt holes 14A, the first bracket 17 is fixed on the rear support 14. As illustrated in FIGS. 8A and 8B, holes 17B2, which communicate to two nuts 17B1 and threaded holes of these nuts 17B1, respectively, are formed in the second plate member 17B.

[0027] As illustrated in FIGS. 9A to 9D, the second bracket 18 includes a plate member 18A having a tilted plate portion 18A1. The upper restraining part 18B is fixed on the plate member 18A at an upper position other than the tilted plate portion 18A1, while the lower restraining part 18C is fixed on the plate member 18A at a lower

position other than the tilted plate portion 18A1. The tilted plate portion 18A1 is provided with holes 18A1a formed at positions matching with the nuts 17B1 and holes 17B2, respectively, which are arranged on and in the above-mentioned second plate member 17B of the first bracket 17 illustrated in FIGS. 8A to 8C. These nuts 17B1 and holes 17B2 arranged on and in the first bracket 17 match with the tilted plate portion 18A1 of the second bracket 18. By inserting bolts through these holes 18A1a and holes 17B2 into threaded engagement with the nuts 17B1, the tilted portion 18A1 of the second bracket 18B is fixed on the first bracket 17 as illustrated in FIG. 3.

[0028] As illustrated in FIGS. 9A to 9D, the upper restraining part 18B of the second bracket 18 has fixed portions 18B1 formed of a pair of pipe-shaped members fixed on the plate member 18A, horizontal portions 18B2 formed of a pair of pipe-shaped members arranged in conjunction with upper ends of the fixed portions 18B1, and a U-shaped pendant portion 18B3 which is pendant from free ends of the horizontal portions 18B2, and is formed as a downwardly-open, reversed square U-shaped part capable of receiving the upper part of the coiled portion 11A of the suction hose 11. The fixed portions 18B1 and pendant portion 18B3 of the upper restraining part 18B, said pendant portion 18B3 being located opposite the fixed portions 18B1, make up the first restraining means that restrains the upper part of the coiled portion 11A of the suction hose 11 such that the upper part is prevented from bouncing back in its thickness direction, and the horizontal portions 18B2 of the upper restraining part 18B make up a second restraining means that restrains the upper part of the coiled portion 11A of the suction hose 11 such that the upper part is prevented from bouncing back in the radial direction of the coiled portion.

[0029] As also illustrated in FIGS. 9A to 9D, the lower restraining part 18C of the second bracket 18 has a fixed portion 18C1 fixed on the plate member 18A, a front portion 18C2 arranged opposite the fixed portion 18C1, and side portions 18C3, 18C4 arranged in conjunction with these fixed portion 18C1 and front portion 18C2, and is formed as a ring-shaped part which has a substantially rectangular shape as seen in plan and can receive the lower part of the coiled portion 11A of the suction hose 11. The fixed portion 18C1 and front portion 18C2 make up a first restraining means that restrains the lower part of the coiled portion 11A of the suction hose 11 such that the lower part is prevented from bouncing back in its thickness direction, and the side portions 18C3, 18C4 make up a second restraining means that restrains the lower part of the coiled portion 11A of the suction hose 11 such that the lower part is prevented from bouncing back in the radial direction of the coiled portion.

[0030] As illustrated in FIG. 4 described above, one end of the suction hose 11 is connected to a refueling pump 21, and to an opposite end of the suction hose 11, a strainer 19 is attached. This strainer 19 forms a suction port upon suction of fuel from a drum or the like in which

the fuel is stored. This strainer 19 is internally provided with a check valve that prevents a reverse flow toward the container such as the drum. One end of the supply hose 12 is connected to the above-mentioned refueling pump 21. An opposite end of the supply hose 12 serves as a supply port to the fuel tank 8. The refueling pump 21 can be arranged, for example, within a space formed in a revolving frame 2A located underneath the fuel tank 8 illustrated in FIG. 3.

[0031] As illustrated in FIGS. 3 and 4, a strainer holding section 20 that holds the strainer 19 of the suction hose 11 is fixed on the front support 15. This strainer holding section 20 is also included together with the above-mentioned second bracket 18 in the hose holding structure that holds the suction hose 11. As illustrated in FIGS. 10A and 10B, this strainer holding section 20 is provided with a cylindrical part 23 and a receiving part 23. Into the cylindrical part 23, the strainer 19 of the suction hose 11 can be inserted. The receiving part 23 supports the cylindrical part 23, and is fixed on the front support 15. The receiving part 23 is formed of an upright portion 22A and a horizontal portion 22A. The upright portion 22A has holes 22A1 through which bolts are inserted to fix the receiving part 23 on the front support 15. The horizontal portion 22A is arranged in conjunction with an upper end of the upright portion 22A, and carries the cylindrical part 23 fixed thereon. The holes 22A1 in the upright portion 22A of the receiving part 23 match the bolt holes 15A in the front support 15 illustrated in FIGS. 7A to 7C. By bolts inserted through the holes 22A1 into engagement with the bolt holes 15A, the receiving part 23 is fixed on the front support 15.

[0032] According to this embodiment constructed as described above, upon storing the refueling hose, that is, the suction hose 11 and supply hose 12 in the storage compartment 13 after completion of refueling work of the fuel tank 8, the coiled portion 11A of the suction hose 11 can be readily held in the upper and lower restraining parts 18B, 18C of the second bracket 18, for example, by coiling the portion of the suction hose 11 to form the coiled portion 11A, carrying these suction hose 11, supply hose 12 and refueling pump 21 into the storage compartment 13 through the opening 13A, receiving, for example, the lower part of the coiled portion 11A of the suction hose 11 in this state in the ring-shaped part having the substantially rectangular shape as seen in plan and formed by the fixed portion 18C1, front portion 18C2 and side portions 18C3, 18C4, in other words, in the lower restraining part 18C of the second bracket 18, and vertically pressing the coiled portion 11A in this state to receive it in the reversed square U-shaped part formed by the fixed portions 18B1, horizontal portions 18B2 and pendant portion 18B3, in other words, in the upper restraining part 18B of the second bracket 18. The strainer 19 attached to the suction hose 11 is inserted into the cylindrical part 23 of the strainer holding section 20. Further, the refueling pump 21 is stored, for example, underneath the fuel tank 8. Subsequently, the opening 13A

of the storage compartment 13 is closed by the cover 10 as illustrated in FIG. 2. In this manner, the storage work of the suction hose 11 and supply hose 12 can be efficiently performed.

[0033] Upon refueling the fuel tank 8, on the other hand, it is only necessary to open the cover 10 of the storage compartment 13, to pull the strainer 19, which is attached to the suction hose 11, out of the cylindrical part 23 of the strainer holding section 20, to vertically press the coiled portion 11A of the suction hose 11 to release the coiled portion 11A from the upper restraining part 18B of the second bracket 18, to release the coiled portion 11A from the lower restraining part 18C, to carry out the suction hose 11, supply hose 12 and refueling pump 21 in this state, for example, through the opening 13A of the storage compartment 13, to insert the strainer 19, which is attached to the suction hose 11, into a container such as a drum containing fuel stored therein, to insert the opposite end of the supply hose 12 into the fuel tank 8, and then to drive the refueling pump 21 in this state. As a result, the fuel stored in the container such as the drum is guided by the suction hose 11 and supply hose 12 and is supplied into the fuel tank 8. After completion of the supply of the fuel, the suction hose 11, supply hose 12 and refueling pump 21 are received and stored as mentioned above.

[0034] According to this embodiment constructed as described above, upon storing the suction hose 11, which makes up the refueling hose, into the storage compartment 13 after completion of refueling work of the fuel tank 8, the coiled portion 11A of the suction hose 11 can be stored in the storage compartment 13 while maintaining a stable form without allowing the coiled portion 11A to bounce back or bounce out by restraining the coiled portion 11A of the suction hose 11 at the upper and lower parts thereof by the upper and lower restraining parts 18B, 18C of the second bracket 18 as mentioned above even when the suction hose 11 contains a mixed reinforcing material. Accordingly, the storage work of the suction hose 11 and supply hose 12 into the storage compartment 13 is facilitated. As a consequence, it is possible to improve the efficiency of the refueling work of the fuel tank 8. In a construction machine which is prone to be subjected to impact force and large vibrations as a result of various work, specifically in a hydraulic excavator of the small swing radius type, the suction hose 11 and supply hose 12 stored in the storage compartment 13 can be maintained in a stable state during the various work even when the suction hose 11 and supply hose 12 contain a mixed reinforcing material and have large resilience. It is, therefore, possible to realize a high-reliability storage assembly for the suction hose 11 and supply hose 12.

[0035] The coiled portion 11A of the suction hose 11 can be restrained by the fixed portions 18B1 and pendant portion 18B3, which make up the first restraining means of the upper restraining part 18B of the second bracket 18, such that the coiled portion 11A is prevented from

bouncing back in the thickness direction, and the coiled portion 11A of the suction hose 11 can be restrained by the horizontal portions 18B2 making up the second restraining means of the upper restraining part 18 and the side portions 18C3, 18C4 making up the second restraining means of the lower restraining part 13C such that the coiled portion 11A is prevented from bouncing back in the radial direction. The suction hose 11 can, therefore, be stored in the storage compartment 13 while surely maintaining a stable form by these restraining means.

[0036] Upon storing into the storage compartment 13 the suction hose 11 with the portion thereof being coiled to form the coiled portion 11A, it is only necessary to open the cover 10 and then to carry the suction hose 11 into the storage compartment 13 through the opening 13A such that the coiled portion 11A of the suction hose 11 is positioned in the oblique direction. Therefore, the storage work of the suction hose 11 and supply hose 12 into the storage compartment 13 can be readily performed. When the storage compartment 13 is formed, for example, such that it has a substantially rectangular shape as seen in plan, the coiled portion 11A of the suction hose 11 can be arranged to extend along the diagonal of the rectangular shape. As a consequence, the shape and dimensions of the storage compartment 13 can be set relatively small.

[0037] Further, the second bracket 18 having the upper and lower restraining parts 18B, 18C can be firmly fixed on the rear support 14 as the reinforcing member via the tilted plate portion 18A1 of the plate member 18A of the second bracket 18 and the first bracket 17. As a consequence, the upper and lower restraining parts 18B, 18C of the second bracket 18 can be stably maintained in the direction oblique to the imaginary plane defined by the cover 10. When the suction hose 11 and supply hose 12 have been stored in the storage compartment 13, the strainer 19 attached to the suction hose 11 can be held in the strainer holding section 20 fixed on the front support 15. As a consequence, the suction hose 11 can be stored in a more stable form in the storage compartment 13.

Brief Description of the Drawings

[0038]

[FIGS. 1A and 1B] FIGS. 1A and 1B are views illustrating a hydraulic excavator of the small swing radius type cited as an example of the construction machine in which one embodiment of the refueling hose storage assembly according to the present invention is to be disposed, in which FIG. 1A is a side view and FIG. 1B is a front view.

[FIG. 2] FIG. 2 is a perspective view illustrating essential parts of the revolving upperstructure of the hydraulic excavator of the small swing radius type illustrated in FIGS. 1A and 1B, on which the refueling hose storage assembly according to this embodiment is to be disposed.

[FIG. 3] FIG. 3 is a perspective view illustrating the essential parts of FIG. 2 in a state that the cover has been removed.

[FIG. 4] FIG. 4 is a view illustrating a hose holding structure arranged in the refueling hose storage assembly according to this embodiment and is a view as observed from the direction of arrow "A" of FIG. 3.

[FIG. 5] FIG. 5 is a view illustrating the hose holding structure arranged in the refueling hose storage assembly according to this embodiment and is a view as observed from the direction of arrow "B" of FIG. 3.

[FIGS. 6A to 6C] FIGS. 6A to 6C are views illustrating a rear support arranged as a reinforcing member in the refueling hose storage assembly according to this embodiment, in which

FIG. 6A is a front view, FIG. 6B is a plan view, and FIG. 6C is a side view.

[FIGS. 7A to 7C] FIGS. 7A to 7C are views illustrating a front support arranged as another reinforcing member in the refueling hose storage assembly according to this embodiment, in which FIG. 7A is a front view, FIG. 7B is a plan view, and FIG. 7C is a side view.

[FIGS. 8A to 8C] FIGS. 8A to 8C are views illustrating a first bracket making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 8A is a front view, FIG. 8B is a plan view, and FIG. 8C is a side view.

[FIGS. 9A to 9D] FIGS. 9A to 9D are views illustrating a second bracket making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 9A is a front view, FIG. 9B is a plan view, FIG. 9C is a side view, and FIG. 9D is a rear view.

[FIGS. 10A and 10B] FIGS. 10A and 10B are views illustrating a strainer making up the hose holding structure arranged in the refueling hose storage assembly according to this embodiment, in which FIG. 10A is a front view and FIG. 10B is a plan view.

Legend

[0039]

2	Revolving upperstructure
2A	Revolving frame
8	Fuel tank
9	Refueling hose storage assembly
10	Cover
11	Suction hose (refueling hose)
11A	Coiled portion
12	Supply hose (refueling hose)
13	Storage compartment
13A	Opening
14	Rear support
15	Front support
16	Hose holding unit
17	First bracket

- 17A First plate member
- 17B Second plate member
- 18 Second bracket (hose holding structure)
- 18A Plate member
- 18A1 Tilted plate portion 5
- 18B Upper restraining part
- 18B1 Fixed portion (first restraining means)
- 18B2 Horizontal portion (second restraining means)
- 18B3 Pendant portion (first restraining means)
- 18C Lower restraining part 10
- 18C1 Fixed portion (first restraining means)
- 18C2 Front portion (first restraining means)
- 18C3 Side portion (second restraining means)
- 18C4 Side portion (second restraining means)
- 19 Strainer 15
- 20 Strainer holding section (hose holding structure)
- 21 Refueling pump
- 22 Receiving part
- 22A Upright portion 20
- 22B Horizontal portion
- 23 Cylindrical part

Claims

1. A refueling hose storage assembly to be disposed in a construction machine provided with a fuel tank, said refueling hose storage assembly having a storage compartment for storing therein a refueling hose to be used upon refueling the fuel tank and a hose holding structure for holding the refueling hose with a portion thereof being coiled to form a coiled portion, wherein: 25

the hose holding structure is arranged in the storage compartment, and includes a bracket having an upper restraining part for restraining the coiled portion of the refueling hose at an upper part thereof and a lower restraining part for restraining the coiled portion at a lower part thereof. 30

2. The refueling hose storage assembly according to claim 1, wherein: 35

the upper and lower restraining parts of the bracket each include first and second restraining means for restraining the coiled portion of the refueling hose, which has been stored in the storage compartment, such that the coiled portion is prevented from bouncing back in thickness direction and radial direction thereof, respectively. 40

3. The refueling hose storage assembly according to claim 2, wherein: 45

the storage compartment is arranged adjacent the fuel tank, and is provided in a side wall thereof with an opening for enabling carry-in and carry-out of the refueling hose into and from the storage compartment, the storage assembly is further provided with a cover for opening and closing the opening of the storage compartment, and the bracket is fixed in the storage compartment such that the coiled portion of the refueling hose remains in a form that the coiled portion is positioned in a direction oblique to an imaginary plane defined by the cover.

4. The refueling hose storage assembly according to claim 3, wherein: 50

the storage assembly is further provided with a rear support arranged as a reinforcing member in the storage compartment at a rear position which is on a side of the fuel tank, a front support arranged as another reinforcing member in the storage compartment at a front position, and another bracket fixed on the rear support, the bracket includes a plate member having a tilted plate portion fixed on the another bracket, the refueling hose has a strainer forming a fuel suction port, and the hose holding structure includes a strainer holding section, which is fixed on the front support and can hold the strainer of the refueling hose.

5. The refueling hose storage assembly according to claim 4, wherein: 55

the upper and lower restraining parts of the bracket are arranged on the plate member of the bracket at portions thereof other than the tilted plate portion, respectively, the first and second restraining means of the upper restraining part form a downwardly-open, square U-shaped part capable of receiving therein the upper part of the coiled portion of the refueling hose, and the first and second restraining means of the lower restraining part form a ring-shaped part having a substantially rectangular shape as seen in plan and capable of receiving therein the lower part of the coiled portion of the refueling hose. 60

FIG.1A

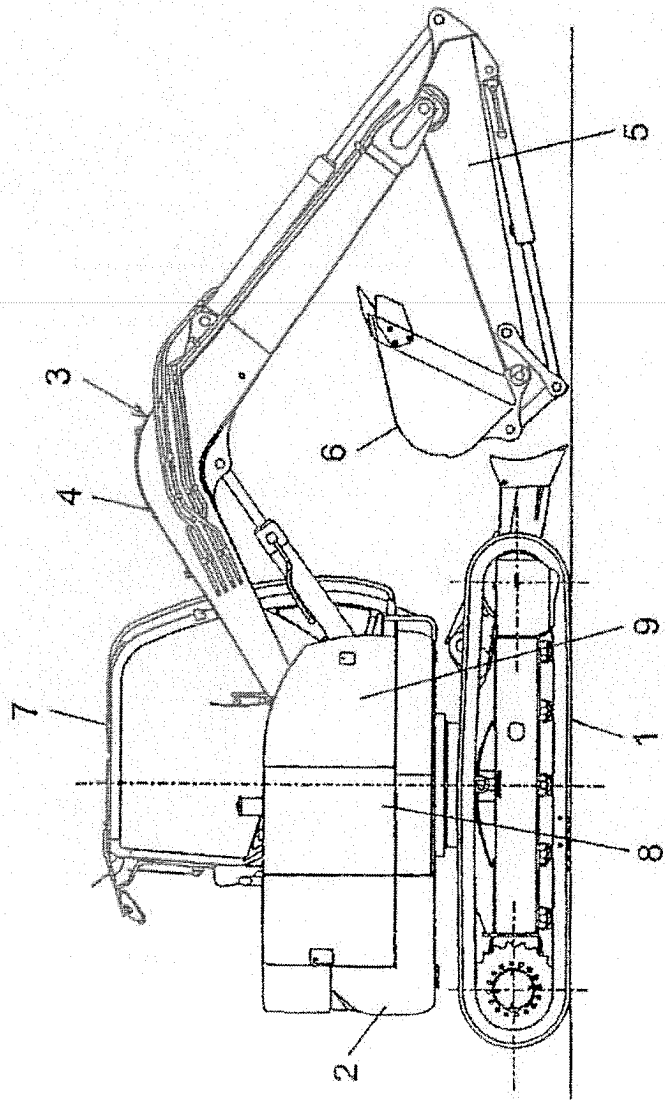


FIG.1B

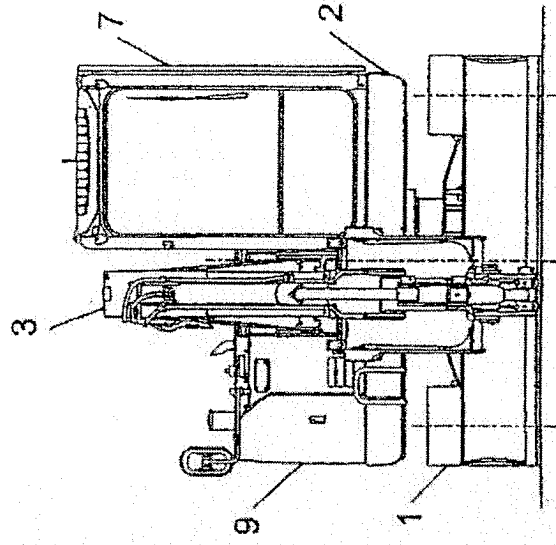


FIG.2

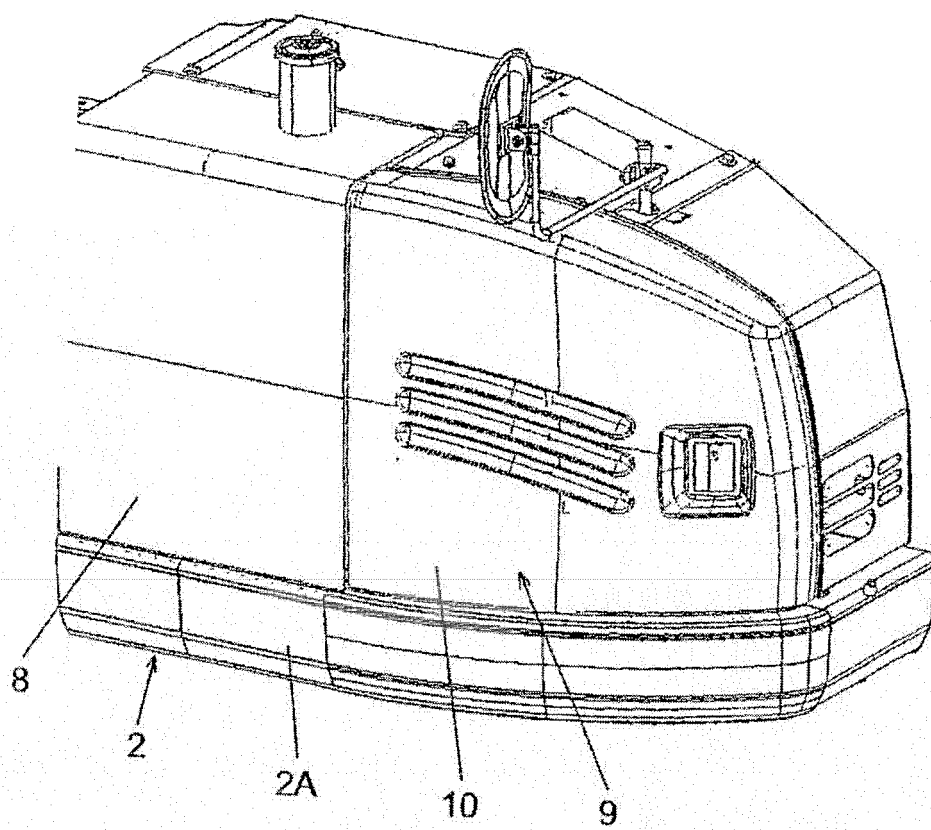


FIG.3

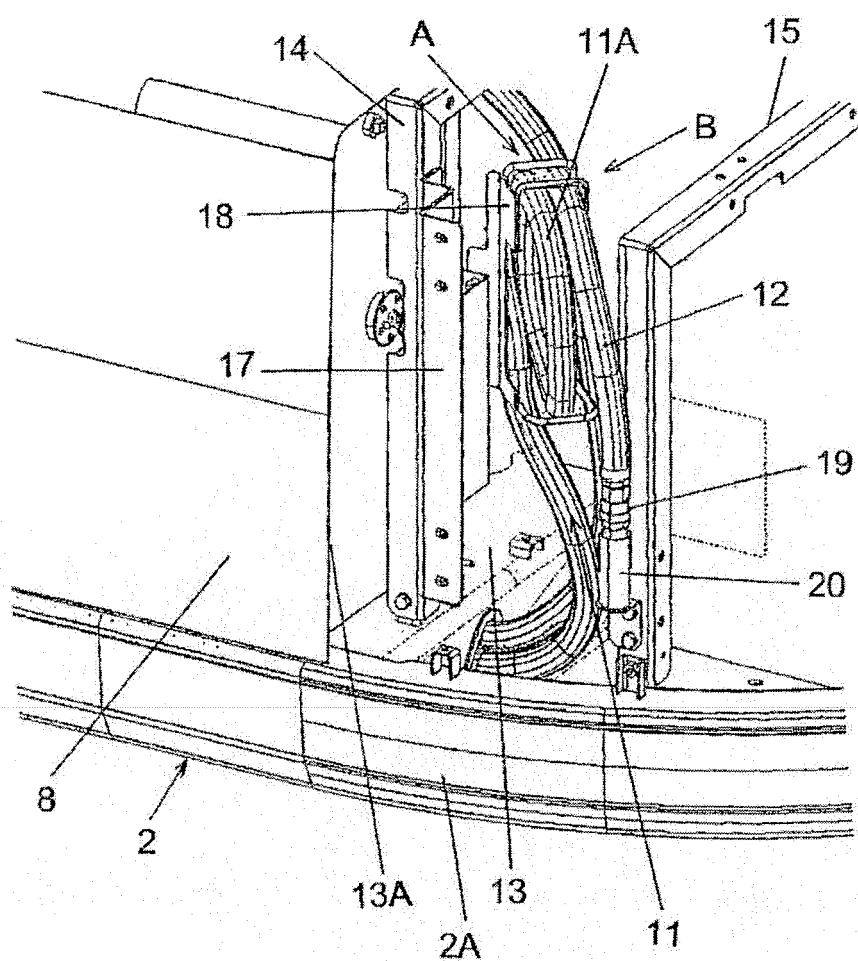


FIG.4

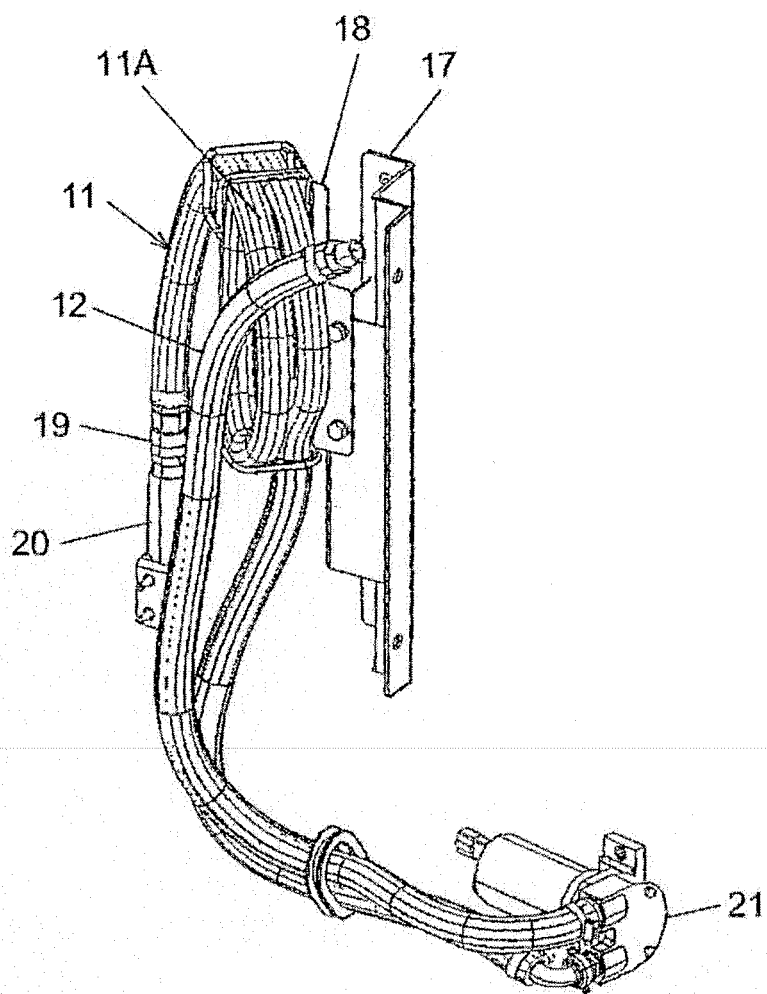


FIG.5

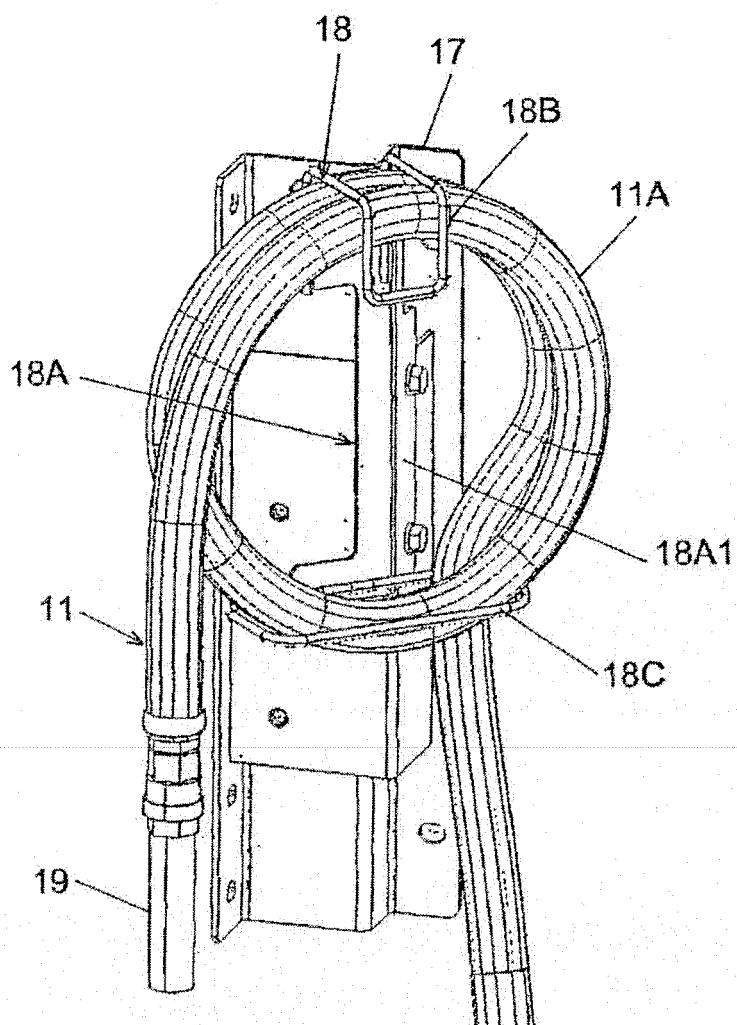


FIG.6B

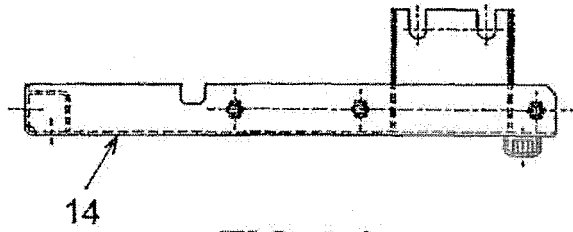


FIG.6C

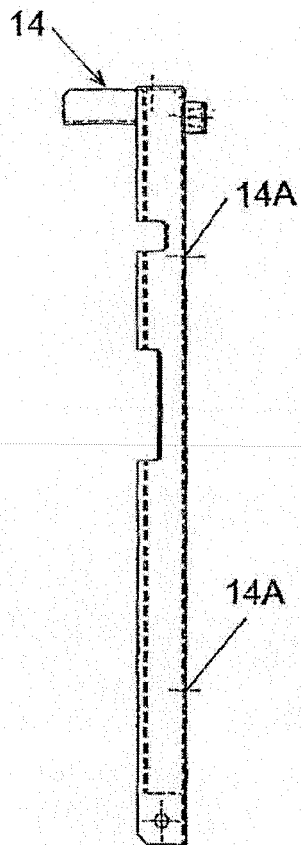


FIG.6A

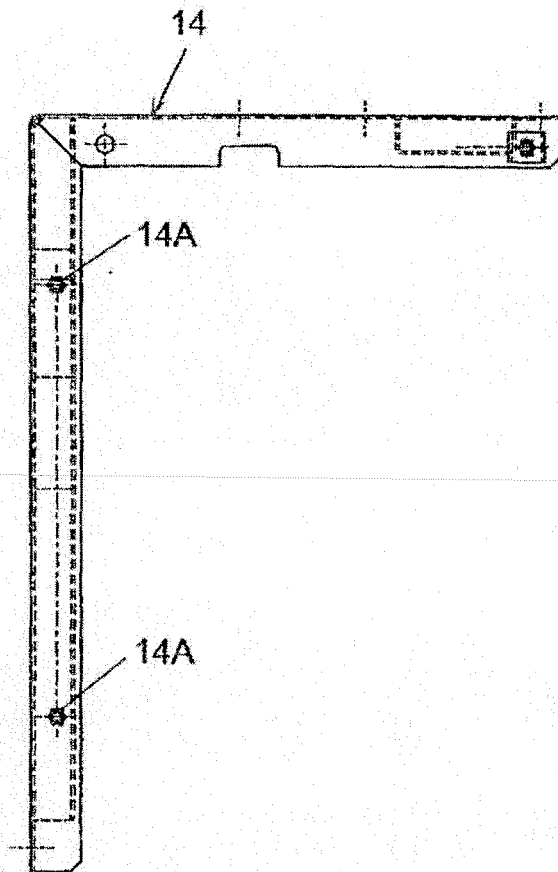


FIG. 7B

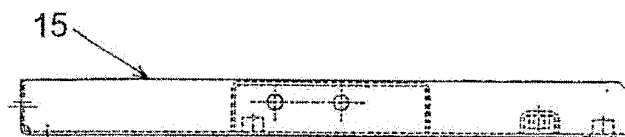


FIG. 7C

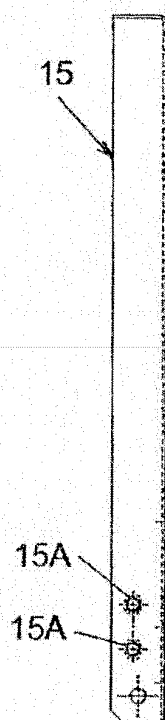


FIG. 7A

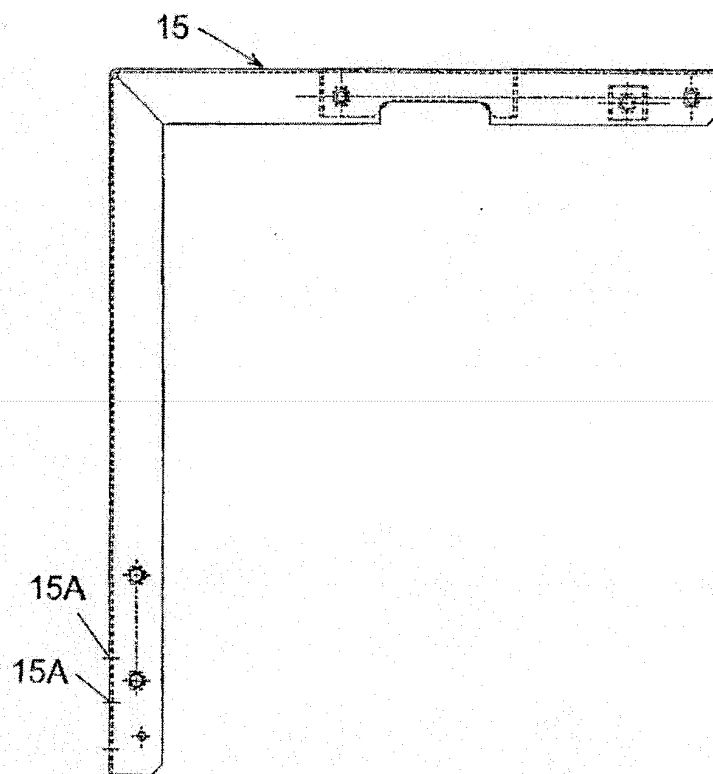


FIG.8B

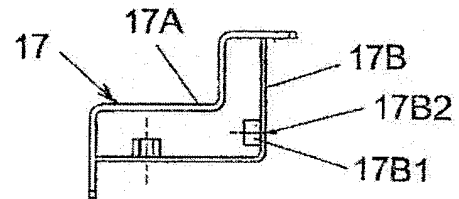


FIG.8C

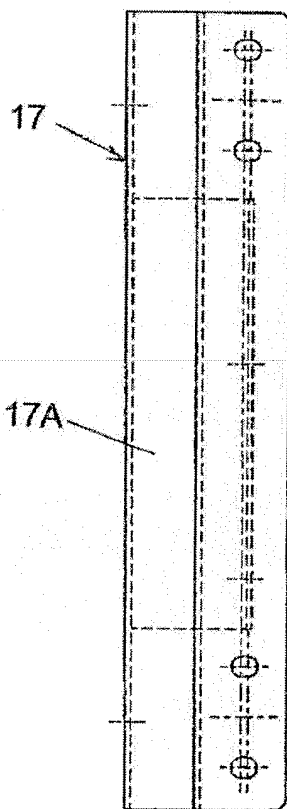


FIG.8A

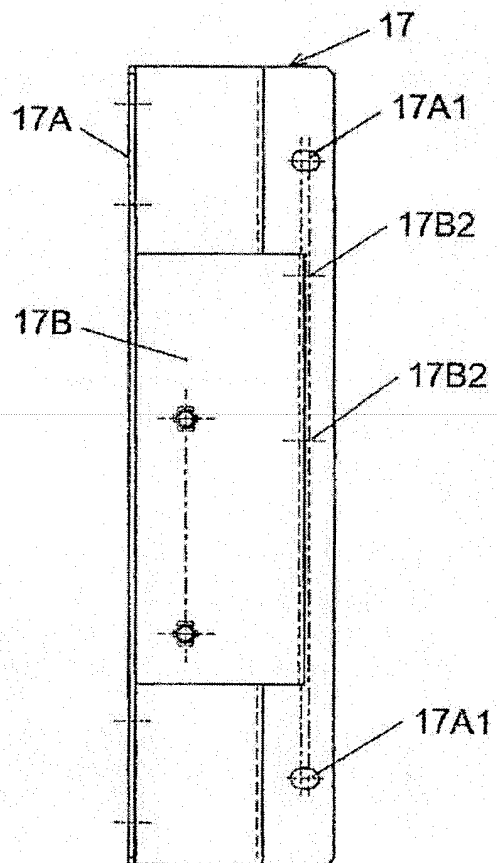


FIG.9B

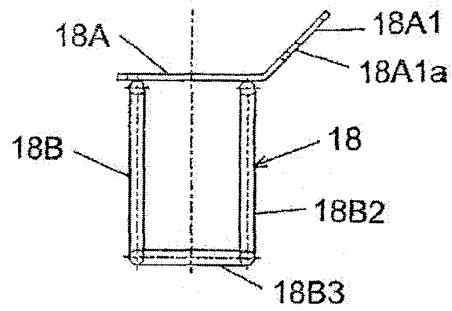


FIG.9A

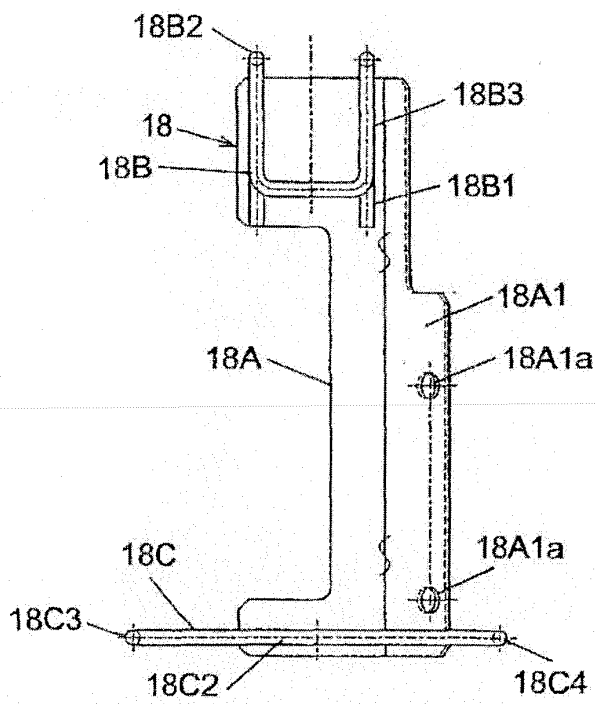


FIG.9C

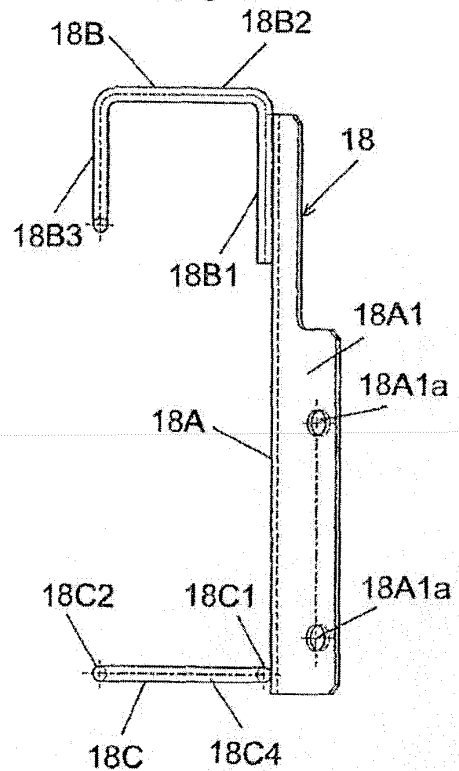


FIG.9D

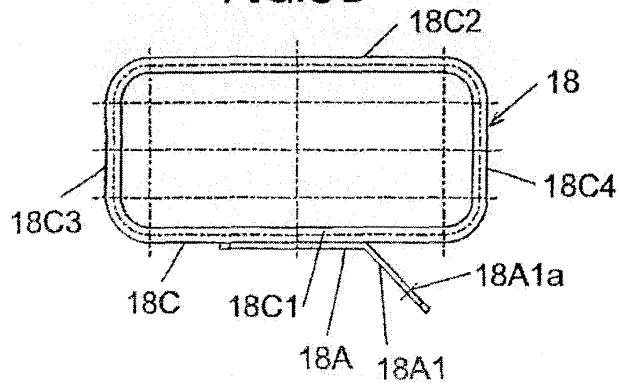


FIG. 10B

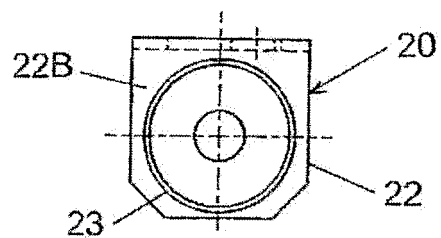
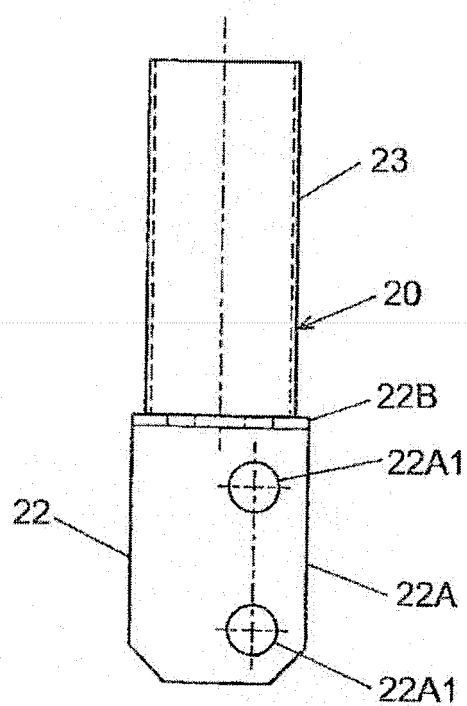


FIG. 10A



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/053073

A. CLASSIFICATION OF SUBJECT MATTER B60K15/04(2006.01)i, E02F9/00(2006.01)i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) B60K15/04, E02F9/00, B67D5/365, B65H75/36		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009 Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2002-89391 A (Hitachi Construction Machinery Co., Ltd.), 27 March, 2002 (27.03.02), Par. Nos. [0014] to [0018], [0024], [0025]; Figs. 1 to 5 (Family: none)	1-3 4, 5
Y A	JP 2000-70398 A (Shokasen Kiko Kabushiki Kaisha), 07 March, 2000 (07.03.00), Par. Nos. [0007] to [0009]; Figs. 1 to 5 (Family: none)	1-3 5
Y A	JP 2007-224568 A (Kubota Corp.), 06 September, 2007 (06.09.07), Par. Nos. [0046] to [0048]; Figs. 17 to 20 (Family: none)	3 4
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 07 May, 2009 (07.05.09)		Date of mailing of the international search report 19 May, 2009 (19.05.09)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/053073

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 101830/1980 (Laid-open No. 24122/1982) (Seirei Industry Co., Ltd.), 08 February, 1982 (08.02.82), Description, page 2, line 2 to page 3, line 12; Figs. 1 to 4 (Family: none)	1

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003328887 A [0002]