US 20180105351A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2018/0105351 A1**

Gelmetti (43) **Pub. Date: Apr. 19, 2018**

(54) **WELDING WIRE CONTAINER**

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(21) Appl. No.: **15/295,797**

(22) Filed: **Oct. 17, 2016**

Publication Classification

(51) **Int. Cl.**

B65D 85/04 (2006.01)

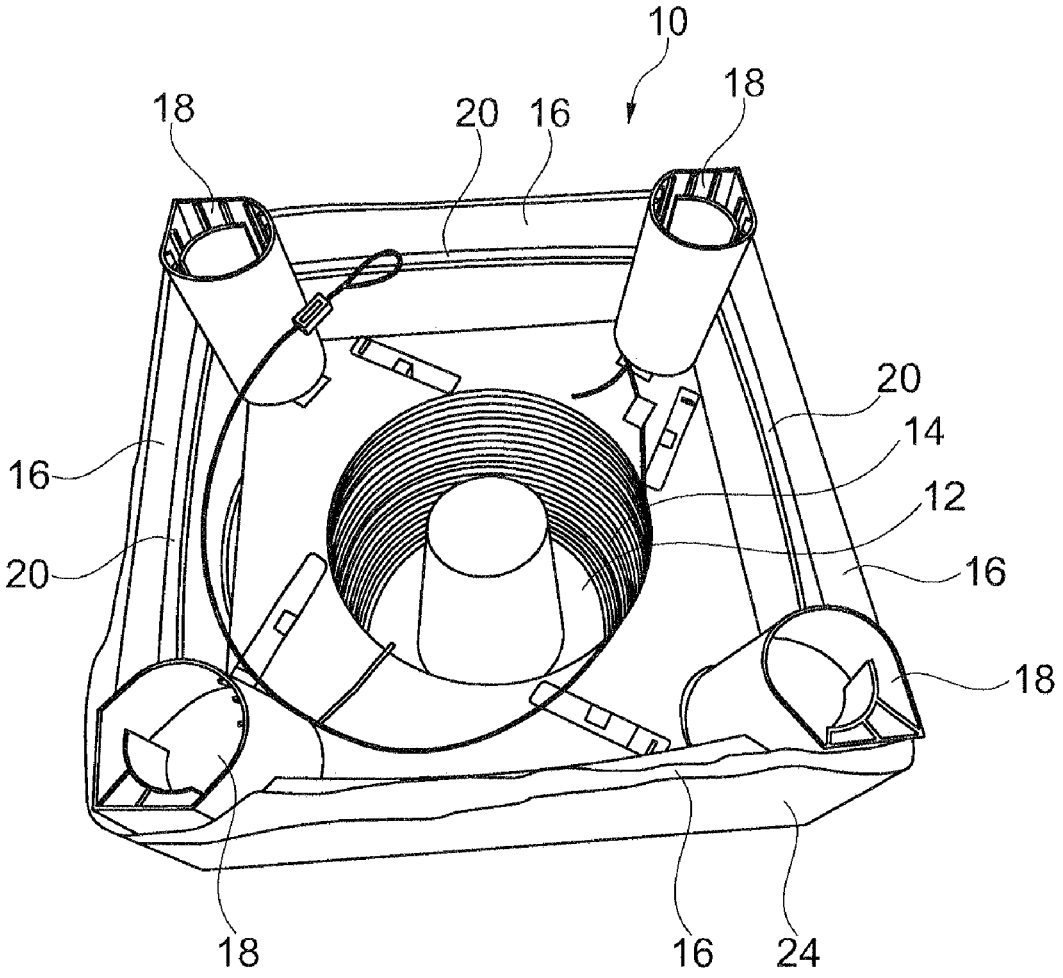
B65D 19/06 (2006.01)

(52) **U.S. Cl.**

CPC ***B65D 85/04*** (2013.01); ***B65D 19/06*** (2013.01); *B65D 2519/00054* (2013.01); *B65D 2519/00626* (2013.01); *B65D 2519/00034* (2013.01)

(57) **ABSTRACT**

A welding wire container has a base element, a plurality of walls which extend upwardly from the base element and circumscribe a space in which a coil of welding wire can be placed. A reinforcement post is arranged in each of the corners of the space. A spacing rod is provided between adjacent reinforcement posts.



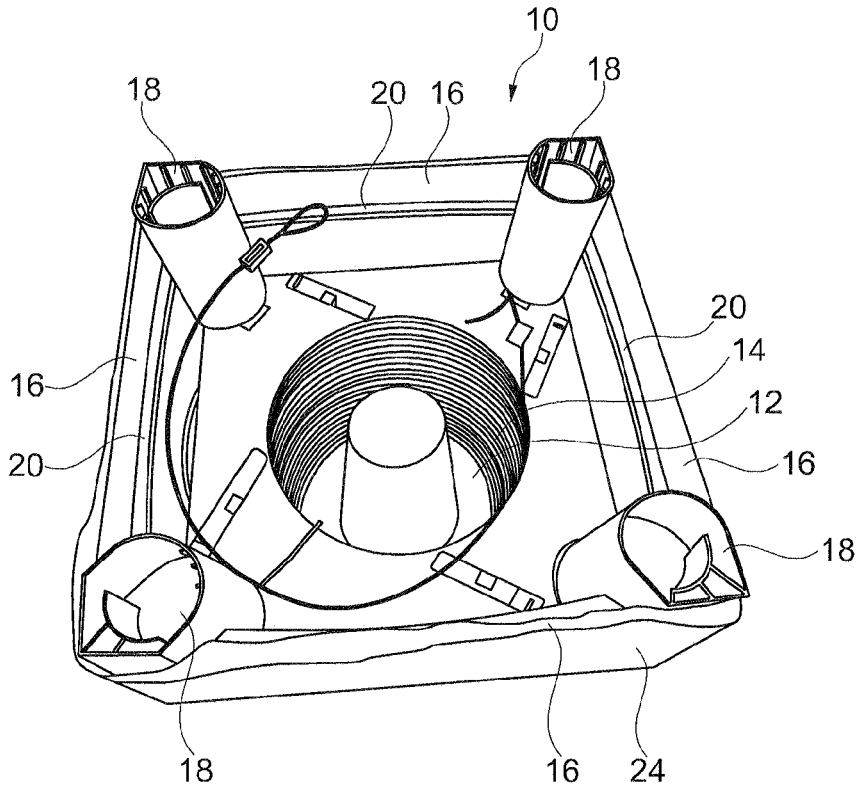


Fig. 1

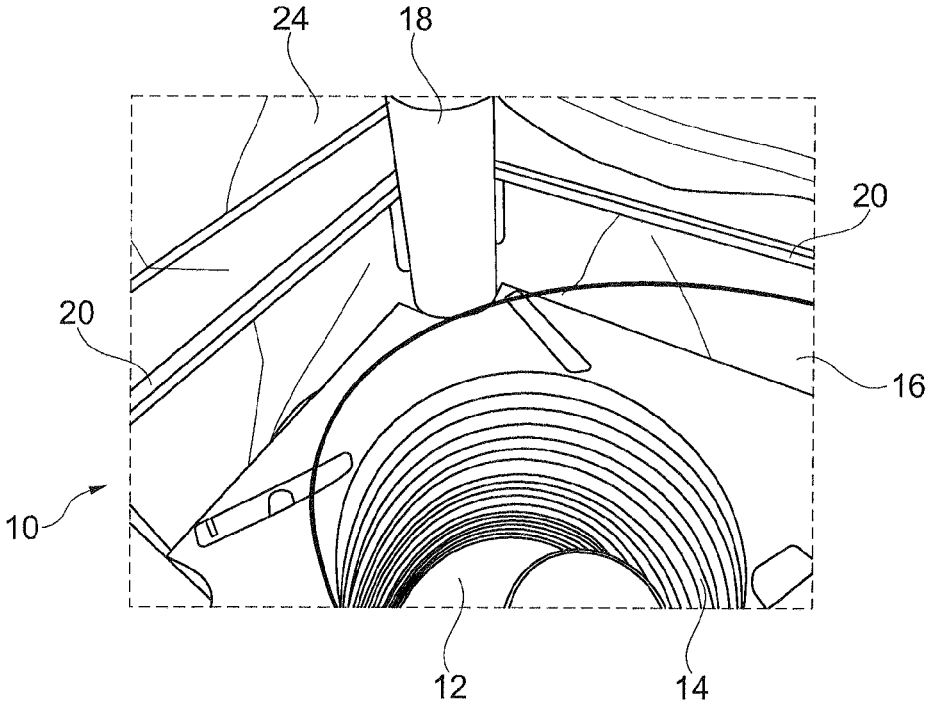


Fig. 2

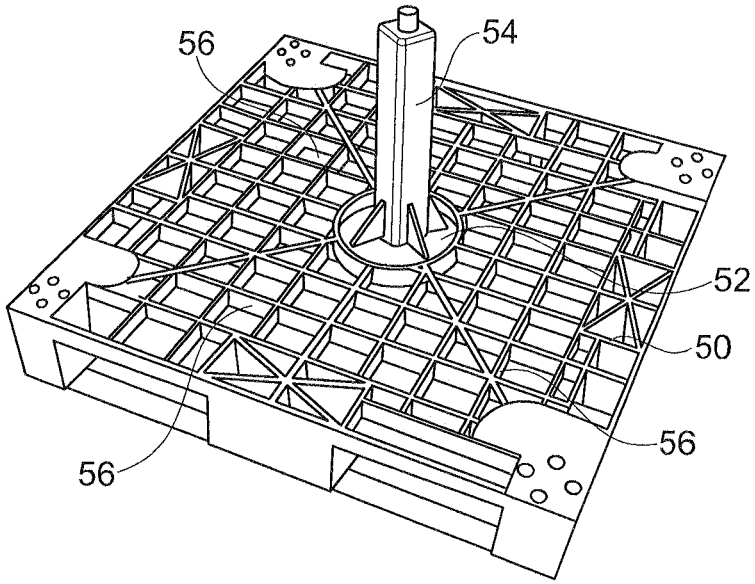
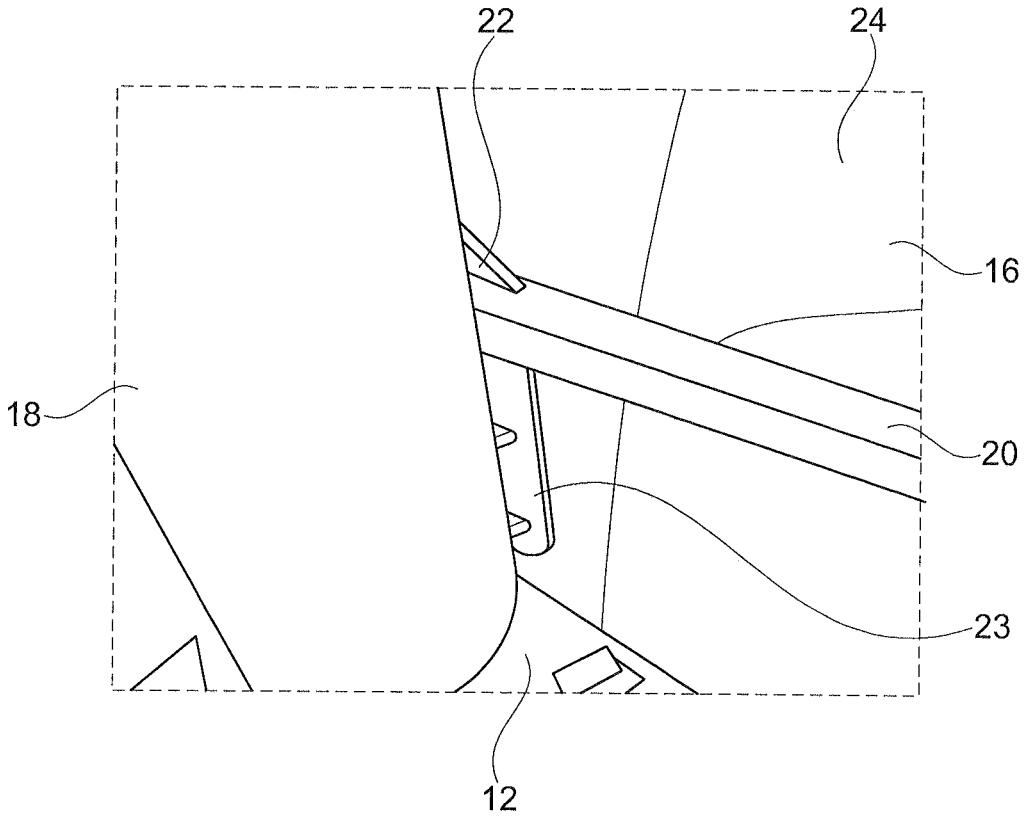


Fig. 9



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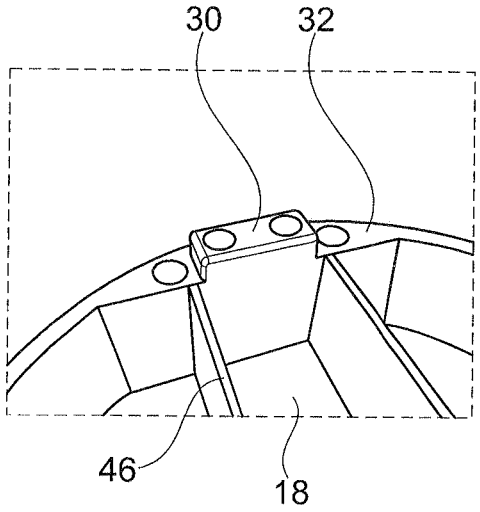

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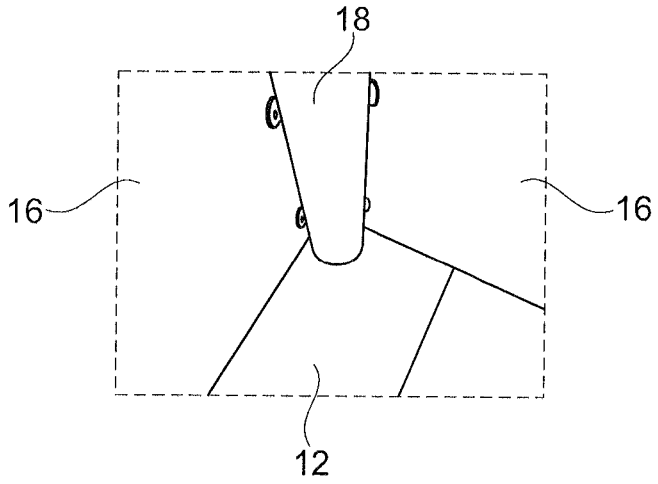


Fig. 5

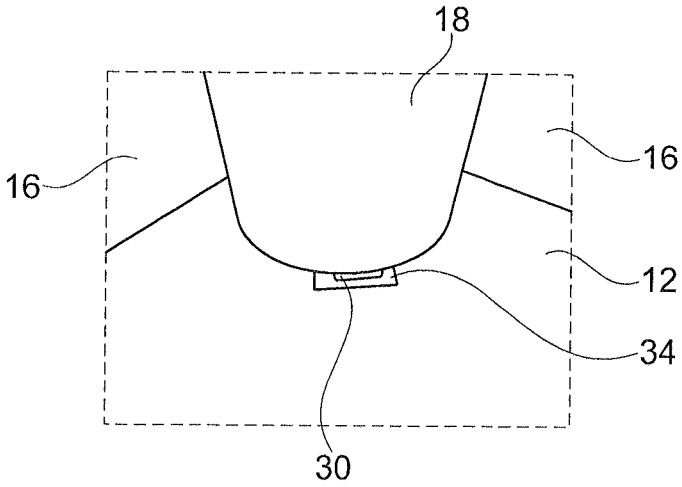


Fig. 6

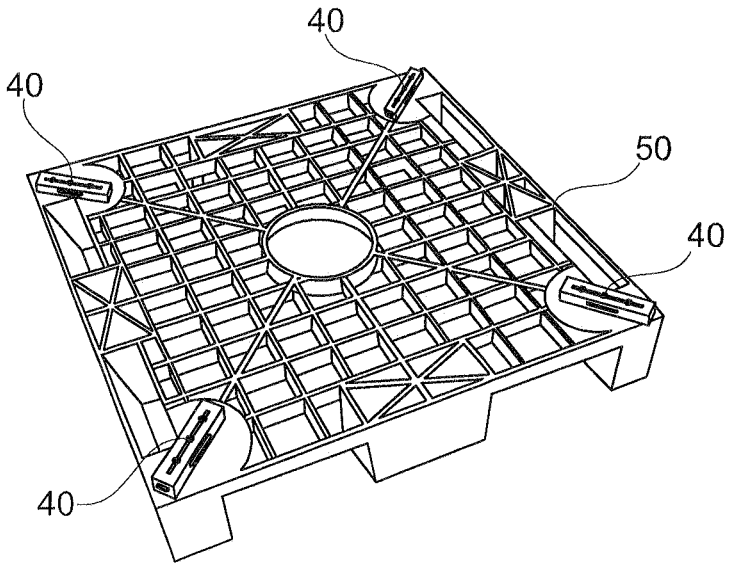
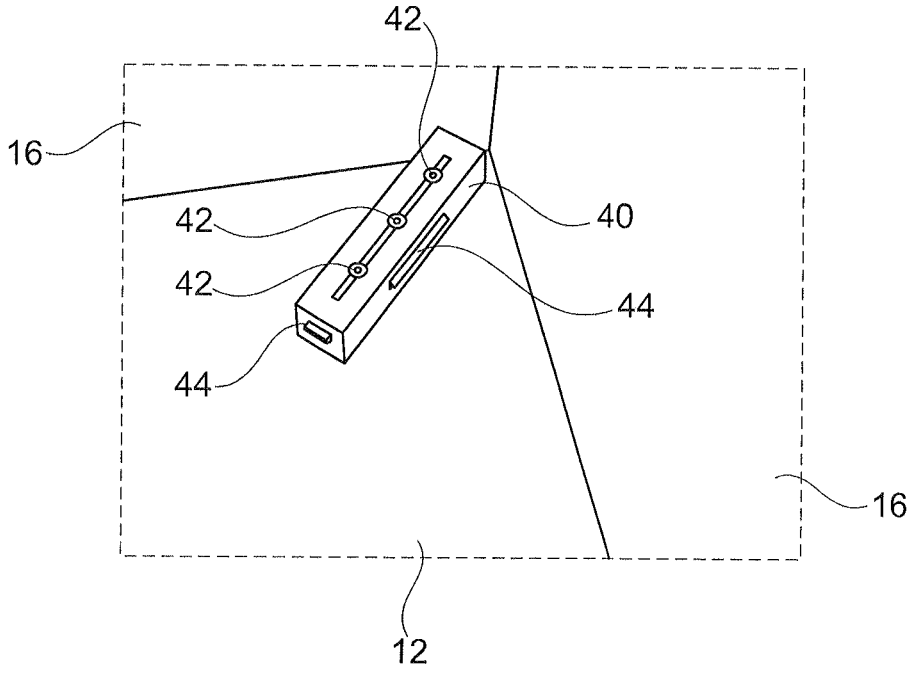


Fig. 7



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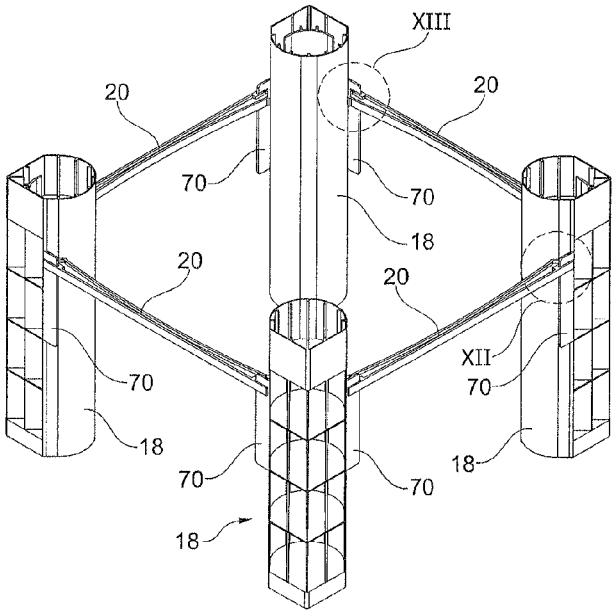

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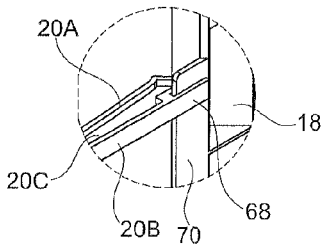


Fig. 12

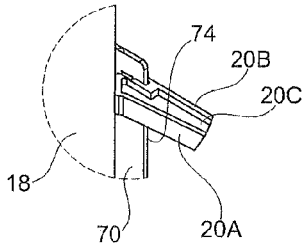
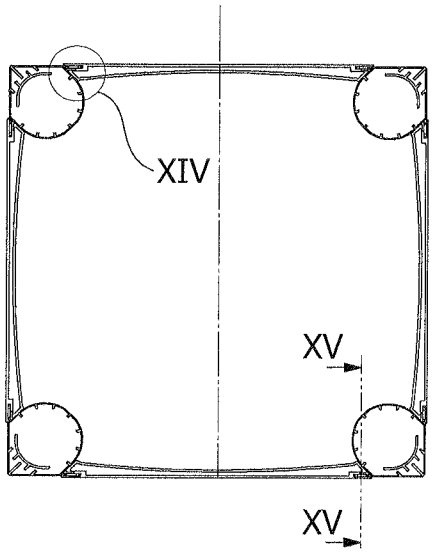


Fig. 13



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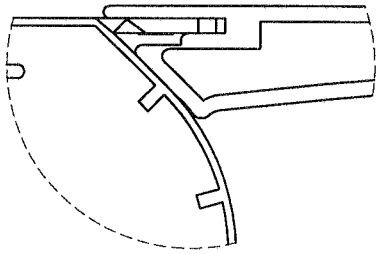


Fig. 14

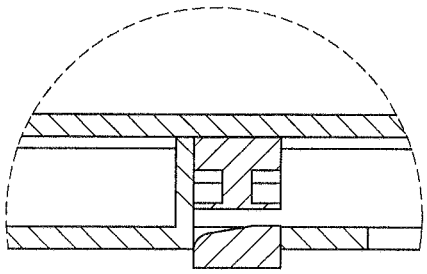


Fig. 15

Fig. 16

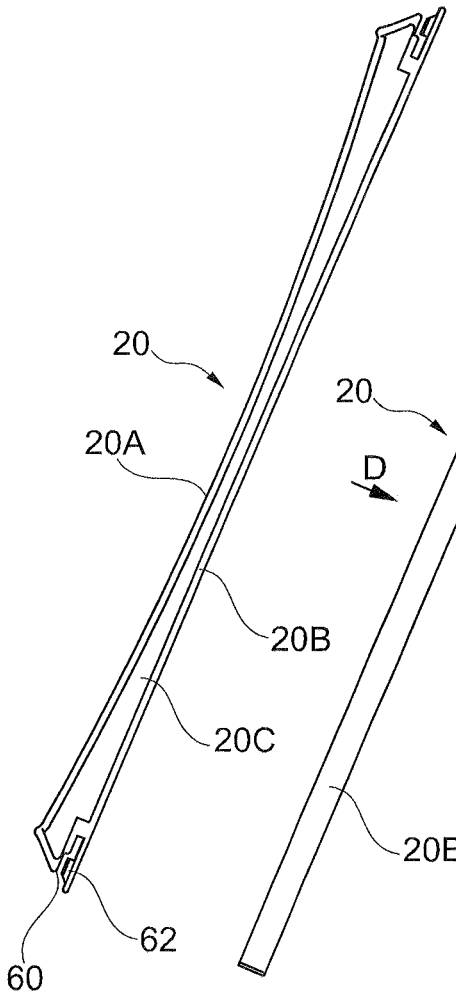
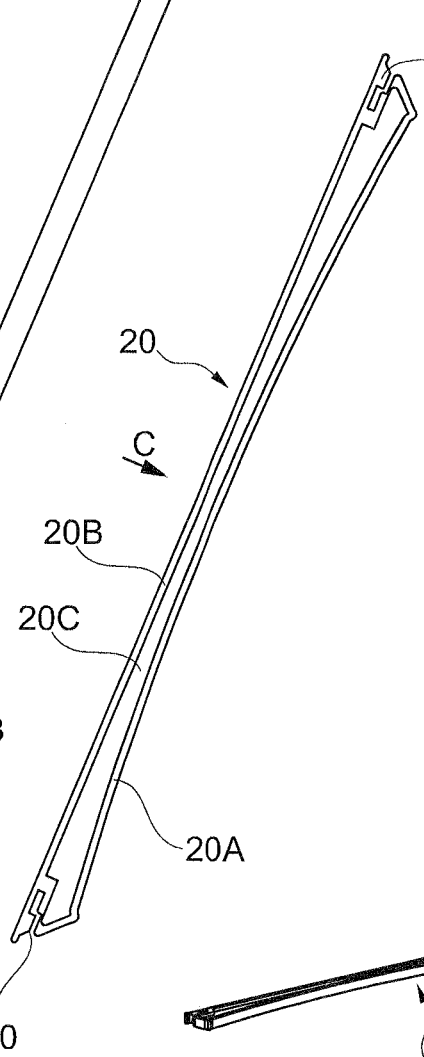
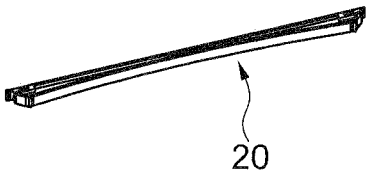


Fig. 17

Fig. 18





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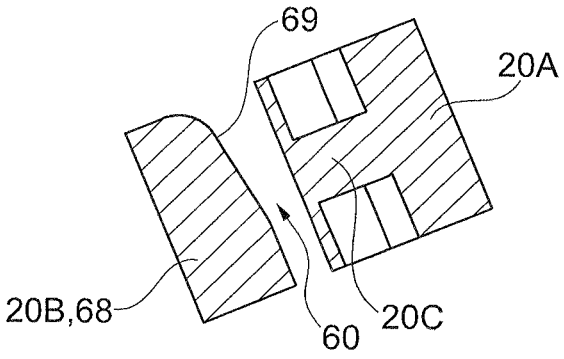


Fig. 20

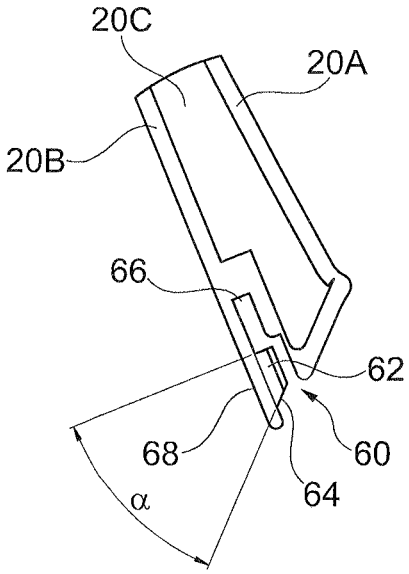
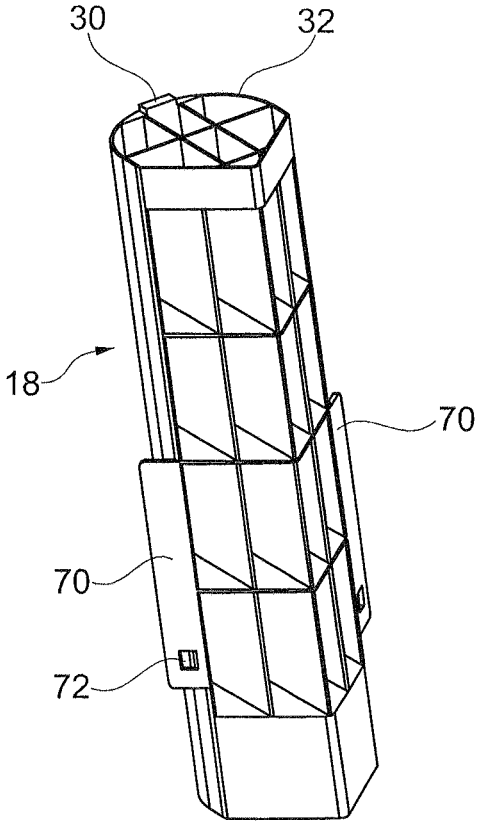


Fig. 21



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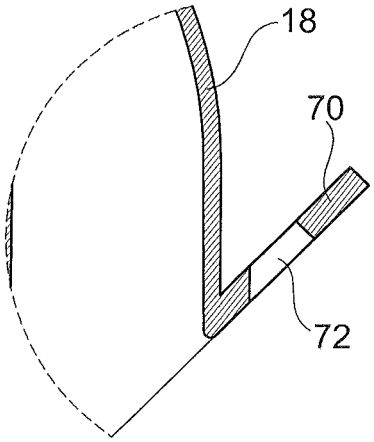

Fig. 23

WELDING WIRE CONTAINER

[0001] The invention relates to a welding wire container.

BACKGROUND OF THE INVENTION

[0002] Welding wire for automatic or semi-automatic welding processes is often provided in the form of a coil consisting of several kilometers of welding wire. For transportation and storage of the welding wire coil, the welding wire container is used which has two primary functions. First, the container serves as a means for transporting the welding wire coil and for protecting it. In particular, the container is to be sufficiently rigid so as to prevent a deformation of the welding wire coil or an entanglement of the individual turns of the welding wire. Second, the welding wire container serves as a take-out device allowing continuous withdrawal of the welding wire from the coil.

[0003] Welding wire containers are known which have a base element (for example a wooden pallet) to which a plurality of walls are attached. The walls can be made from cardboard and circumscribe a space in which the coil of welding wire can be placed. In an embodiment where the welding wire container has a square cross section, four cardboard walls are used.

[0004] In the corners of the reception space for the welding wire coil, reinforcement posts are arranged. They serve as a radial support or abutment for the welding wire coil.

[0005] Usually, a plastic foil is arranged inside the welding wire container so as to protect the welding wire coil against humidity.

[0006] For transportation, the welding wire container is often provided with a plastic wrapping on its outside. The plastic wrapping increases the stability of the container. It is, however, essential that the plastic wrapping be removed when the welding wire container has been placed at the spot where the welding wire is withdrawn from the container as the plastic wrapping exerts an inwardly directed pressure. This pressure usually does not create any issues as long as only a small fraction of the welding wire has been withdrawn from the container because the considerable weight of the welding wire coil prevents the reinforcement posts from being displaced inwardly. If however a significant portion of the welding wire has been withdrawn, the pressure of the plastic wrapping is able to displace the reinforcement posts inwardly which might result in a retainer plate floating on top of the welding wire coil being pinched between the reinforcement posts.

[0007] Another issue sometimes encountered during operation results from improper handling of the plastic foil arranged inside the welding wire container for protecting the welding wire. Despite instructions to place the upper portion of the plastic foil along the outer surface of the container walls, it can sometimes be seen that the upper portion is cut off. This may result in some portions of the plastic foil falling into the container so as to interfere with the welding wire and/or the retainer.

[0008] The object of the invention is to improve the welding wire container so as to ensure that the welding wire can be properly withdrawn from the container even if the operating instructions are not being properly observed.

BRIEF DESCRIPTION OF THE INVENTION

[0009] In order to achieve this object, the invention provides a welding wire container having a base element, a plurality of walls which extend upwardly from the base element and circumscribe a space in which a coil of welding wire can be placed, with an reinforcement post being arranged in each of the corners of the space, a spacing rod being provided between adjacent reinforcement posts. The spacing rods provided between the reinforcement posts ensure that they cannot be displaced inwardly by an external pressure such as the pressure exerted by a plastic wrapping. Thus, it is guaranteed that there is the proper free space between the posts which allows a retainer floating on the welding wire coil to freely descend when the welding wire is being withdrawn. Further, the spacing rods prevent the plastic foil from dropping into the interior of the container.

[0010] According to a preferred embodiment, each of the spacing rods extends in a plane which is parallel to a plane defined by the base element of the welding wire container. This orientation of the spacing rods ensures that there is no vertical force which is being generated when an inwardly directed pressure is exerted on the reinforcement posts.

[0011] According to an embodiment of the invention, each of the spacing rods is arranged at a small distance from the upper end, the distance being in the order of 1 to 10 inches. At this position, the spacing rods do not interfere with a retainer on top of the welding wire coil.

[0012] According to a preferred embodiment, each spacing rod is made from plastic, thereby combining a light weight with a high rigidity and stability.

[0013] Preferably, each spacing rod is releasably connected with two of the reinforcement posts. This allows a quick mounting and also a disconnection of the spacing rod from the reinforcement posts for later recycling.

[0014] In order to facilitate mounting, the spacing rod has a latch element at its ends and the reinforcement posts are preferably provided with a complementary latching element, thereby allowing an automatic latching without the need of any tools or complicated mounting mechanism.

[0015] According to an advantageous embodiment of the invention, the reinforcement post has a bottom surface with which it rests on a floor which is the lower surface of the space for receiving the welding wire coil, the bottom surface comprising a stop element which protrudes downwardly beyond the bottom surface. The stop element, by extending beyond the bottom surface of the reception space, ensures that no turns of the welding wire can be pinched between the lower end of the reinforcement post and the lower surface of the reception space.

[0016] Preferably, the floor of the welding wire container is formed from a layer of cardboard, the cardboard having a cut-out into which the stop element protrudes. The cut-out provides for the space into which the stop element can extend when the reinforcement post is placed on the cardboard.

[0017] According to a preferred embodiment of the invention, a positioning element is provided on the floor for each of the reinforcement posts, the positioning element comprising an engagement configuration which engages with a complementary engagement configuration at the respective reinforcement post so as to prevent the reinforcement post from being lifted from the positioning element. The reinforcement post is thus latched to the base of the container, preventing it from being unintentionally separated from the floor of the reception space for the welding wire coil. This

even further reduces the risk of welding wire being pinched between the lower end of the reinforcement post and the floor.

[0018] The engagement configurations can be a catch and a corresponding recess which engage into each other automatically when the reinforcement post is correctly placed on the positioning element.

[0019] The base element of the welding wire container can be in the form of a pallet made from plastic. This material avoids the problems associated with pallets made from wood or cardboard.

[0020] According to an embodiment, the base element has a central opening for a lifting yoke. The lifting yoke allows for safer transportation of the welding wire container filled with a welding wire coil as compared to handling the container with a forklift.

[0021] The invention will now be described with reference to a preferred embodiment which is shown in the drawings. In the drawings,

[0022] FIG. **1** is a perspective top view of a container containing a welding wire coil;

[0023] FIG. **2** shows at an enlarged scale a detail of the container of FIG. **1**;

[0024] FIG. **3** shows at a further enlarged scale the connection between a reinforcement post and a spacing rod;

[0025] FIG. **4** schematically shows a lower end of a reinforcement post;

[0026] FIG. **5** shoes the lower end of the reinforcement post placed on a floor of the welding wire container;

[0027] FIG. **6** shows at an enlarged scale the lower end after reinforcement post resting on the floor of the container;

[0028] FIG. **7** schematically shows a base of the welding wire container with positioning elements;

[0029] FIG. **8** shows at an enlarged scale the positioning elements arranged in a corner of the container;

[0030] FIG. **9** shows an embodiment of the base of the container;

[0031] FIG. **10** shows in a perspective view the reinforcement posts with the spacing rods;

[0032] FIG. **11** shows in a top view the reinforcement posts with the spacer rods;

[0033] FIG. **12** shows at an enlarged scale detail XII of FIG. **10**;

[0034] FIG. **13** shows at an enlarged scale detail XIII of FIG. **10**;

[0035] FIG. **14** shows at an enlarged scale detail XIV of FIG. **11**;

[0036] FIG. **15** shows a cross section along lines XV of FIG. **11**;

[0037] FIG. **16** shows a side view of a spacing rod;

[0038] FIG. **17** shows a bottom view of the spacing rod;

[0039] FIG. **18** shows a second side view of the spacing rod;

[0040] FIG. **19** shows the spacing rod in a perspective view;

[0041] FIG. **20** shows at an enlarged scale the cross section through the spacing rod along line XV-XV of FIG. **11**;

[0042] FIG. **21** shows at an enlarged scale the end portion of the spacing rod;

[0043] FIG. **22** shows a perspective view of the reinforcement post from the bottom side; and

[0044] FIG. **23** shows a cross section through a detail of the reinforcement post.

[0045] In FIGS. **1**, **2** and **3**, a container **10** for receiving welding wire is shown. Container **10** comprises a floor **12** which is made from a layer of cardboard resting on a base element. The base element will be explained later.

[0046] Within container **10**, a coil **14** is placed, coil **14** being formed from of windings of welding wire. The length of the welding wire forming coil **14** can be several kilometers, and the weight of the coil can range from some 10 kilograms up to 400 kilograms and more.

[0047] On top of welding wire coil **14**, a retainer plate **15** is arranged which prevents unintended entanglement of the welding wire turns during wire withdrawal. Retainer plate **15** rests under its proper weight on the upper surface of coil **14** and floatingly descends downwardly when the welding wire is being consumed.

[0048] In the shown embodiment, the container **10** has a square cross section. Thus, there are four walls **16** which circumscribe the space in which welding wire coil **14** is placed.

[0049] At each corner of the space for receiving coil **14**, a reinforcement post **18** is arranged. Viewed in the cross section, each reinforcement post **18** has a drop shaped cross section, with the tip of the drop being placed in the corner formed between adjacent walls **16**.

[0050] At their lower ends, reinforcement posts **18** are connected to the base element of the welding wire container **10** as will be described later. Close to their upper ends, a plurality of spacing rods **20** is provided. Each spacing rod **20** extends between adjacent reinforcement posts **18** and is capable of absorbing forces which tend to push reinforcement posts **18** closer together.

[0051] As can be seen in more detail in FIG. **3**, each end of each spacing rod **20** is provided with a latch element **22** which engages at a complementary latch element **23** provided at reinforcement post **18**. This allows to easily mount and disconnect spacing rods **20** to the reinforcement posts **18**.

[0052] As can be seen in particular in FIG. **2**, a plastic foil **24** is arranged inside container **10** between welding wire coil **14** and walls **16**. Plastic foil **24** serves as a barrier for humidity. As can be seen in particular in FIG. **3**, plastic foil **24** extends in-between wall **16** and spacing rod **20**. This guarantees that plastic foil **24** cannot fall into the reception space for welding wire coil **14**.

[0053] At its lower end, reinforcement post **18** as provided with a stop element **30** which protrudes over a bottom surface **32** with which reinforcement post **18** rests on floor **12** of welding wire container **10**. As can be seen in particular in FIG. **6**, floor **12** is provided with a cut-out **34** into which stop element **30** of reinforcement post **18** engages. Thus, stop element **30** extends below the surface of floor **12** on which welding wire coil **14** rests. This prevents individual windings of welding wire from becoming pinched between bottom surface **32** of post **18** and floor **12**.

[0054] For positioning reinforcement posts **18** in the corners of the reception space of welding wire container **10**, positioning elements **40** are arranged on base element **50**, in particular so as to clamp floor **12** between the four positioning elements **40** and base element **50**.

[0055] Positioning element **40** can be connected to base element **50** by means of a plurality of attachment elements **42** such as nails, bolts, screws, or rivets.

[0056] Each positioning element **40** is provided with at least one engagement configuration **44** which is adapted to

engage at a complementary engagement configuration at the lower end of reinforcement post **18**. In the embodiment shown in FIG. **8**, engagement configurations **44** are in the form of catches which are arranged at the side surfaces of positioning element **42** and at the end face which is oriented towards the center of the reception space for the welding wire coil. The complimentary engagement configurations in the bottom of reinforcement posts **18** are recesses **46**.

[0057] When the reinforcement post **18** is placed on positioning element **40**, the engagement configurations **44**, **46** engage into each other, thereby latching reinforcement post **18** at positioning element **40**. It is thus not possible that reinforcement post **18** is unintentionally lifted upwardly.

[0058] As can be seen in particular in FIG. **9**, base element **50** is in the form of a pallet and is made from plastic. It is provided with a centrally arranged opening **52** through which a lifting yoke **54** can extend. Lifting yoke **54** has a plurality of lifting arms **56** which extend below the central portion of base element **50** and carries the weight of the welding wire coil **14** when container **10** is being lifted and handled.

[0059] Details of the reinforcement posts **18** and the spacing rods **20** will now be described with reference to FIGS. **10** to **23**.

[0060] Reinforcement posts **18** are formed from plastic. As can be seen in particular in FIGS. **10** and **22**, reinforcement rods **18** are made in a skeleton manner, with several portions of reinforcement posts **18** directed towards walls **16** of the container being omitted. In order to achieve a high rigidity, the circumferential surface of reinforcement posts **18** is formed in a closed manner at the upper end and at the lower end of each reinforcement post.

[0061] Spacing rods **20** have the shape of an H-beam with two flanges **20**A, **20**B, and an intermediate web **20**C.

[0062] Latch element **22** provided at each and of spacing rod **20** is formed as an elastic slot **60** which have a latching tooth **62** at its forward end. Latching tooth **62** is formed with a chamfered front surface **64** which extends at an angle α with respect to a reward surface of latching tooth **62**. Angle α is in the order of 45 degrees.

[0063] The complementary latch element at the side of the reinforcement posts is formed by a plate **70** in which an opening **72** is formed. Each spacing rod can be connected to plate **70** so as to engage with teeth **62** into opening **72**. Pushing forces tending to move the reinforcement posts closer together, can be absorbed by bottom surface **66** of the slot **60** abutting at an outer, vertical edge **74** of plate **70**.

[0064] As can be seen in particular in FIG. **20**, the extension of flange **20**A forming one of the borders of slot **60** is provided with a chamfer **69** so as to facilitate the process of mounting spacing rods **20** at reinforcement posts **18**.

1. A welding wire container having a base element, a plurality of walls which extend upwardly from the base element and circumscribe a space for receiving a coil of welding wire, with reinforcement posts being arranged in each corner of the base, and spacing rods being provided between adjacent reinforcement posts, wherein each of the reinforcement posts has a bottom surface which rests on a floor which is a lower surface of the space for receiving the welding wire coil, the bottom surface having a stop which protrudes downwardly beyond the bottom surface.

2. The welding wire container of claim **1** wherein each of the spacing rods extends in a plane which is parallel to a plane defined by the base element of the welding wire container.

3. The welding wire container of claim **1** wherein each of the spacing rods is arranged at a distance of 1 to 10 inches from the upper end.

4. The welding wire container of claim **1** wherein the spacing rod is made from plastic.

5. The welding wire container of claim **1** wherein each of the spacing rods is releasably connected with two of the reinforcement posts.

6. The welding wire container of claim **1** wherein each of the spacing rods has a mechanical latch at its ends.

7. The welding wire container of claim **6** wherein each of the mechanical latches comprises a tooth.

8. The welding wire container of claim **7** wherein each of the mechanical latches further comprises a slot in which the tooth is arranged.

9. The welding wire container of claim **6** wherein each of the reinforcement posts is provided with a complementary mechanical latch.

10. The welding wire container of claim **1** wherein a chamfer is provided for facilitating the connection to the reinforcement posts.

11. The welding wire container of claim **1** wherein a plastic foil is arranged in the space for receiving the welding wire coil, the plastic foil extending between the spacing rods and the walls.

12. (canceled)

13. The welding wire container of claim **1** wherein the floor is formed from a layer of cardboard, the cardboard having a cut-out into which the mechanical element protrudes.

14. The welding wire container of claim **1** wherein the positioning elements are provided on the floor for each of the reinforcement posts, each of the positioning elements comprising mechanical engagement which engages with a complementary mechanical engagement at the respective reinforcement post so as to prevent the reinforcement post from being lifted from the positioning element.

15. The welding wire container of claim **14** wherein the mechanical engagement are a catch and a corresponding recess.

16. The welding wire container of claim **1** wherein the base element is a pallet made from plastic.

17. The welding wire container of claim **1** wherein the base element has a central opening for a lifting yoke.

18. A welding wire container having a base element, a plurality of walls which extend upwardly from the base element and circumscribe a space for receiving a coil of welding wire, with reinforcement posts being arranged in each corner of the base, and spacing rods being provided between adjacent reinforcement posts, wherein positioning elements are provided on the floor for each of the reinforcement posts, each of the positioning elements comprising a mechanical engagement which engages with a complementary mechanical engagement at their respective reinforcement posts so as to prevent the reinforcement posts from being lifted from the positioning element.

19. The welding wire container of claim **18** wherein each of the spacing rods extends in a plane which is parallel to a plane defined by the base element of the welding wire container.

20. The welding wire container of claim **18** wherein each of the spacing rods is arranged at a distance of 1 to 10 inches from the upper end.

21. The welding wire container of claim **18** wherein the spacing rod is made from plastic.

22. The welding wire container of claim **18** wherein each of the spacing rods is releasably connected with two of the reinforcement posts.

23. The welding wire container of claim **18** wherein each of the spacing rods has a mechanical latch at its ends.

24. The welding wire container of claim **23** wherein each of the mechanical latches comprises a tooth.

25. The welding wire container of claim **24**, wherein each of the mechanical latches further comprises a slot in which the tooth is arranged.

26. The welding wire container of claim **24**, wherein each of the reinforcement posts is provided with a complementary mechanical latch.

27. The welding wire container of claim **18** wherein a chamfer is provided for facilitating the connection to the reinforcement posts.

28. The welding wire container of claim **18** wherein a plastic foil is arranged in the space for receiving the welding wire coil, the plastic foil extending between the spacing rods and the walls.

29. The welding wire container of claim **18** wherein the engagement configurations are a catch and a corresponding recess.

30. The welding wire container of claim **18** wherein the base element is a pallet made from plastic.

31. The welding wire container of claim **18** wherein the base element has a central opening for a lifting yoke.

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