

## Description

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### FLUX CORED WELDING ROD FORMING MODULE, PREPARATION DEVICE AND PREPARATION METHOD THEREOF

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#### TECHNICAL FIELD

[0001] The present invention relates to the technical field of welding rod forming, and particularly to a preparation device for a welding rod and a preparation method for a welding rod.

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#### BACKGROUND

[0002] Alloy welding rods such as copper alloy and silver alloy are common hard solders, which are widely applied in welding between metals. During specific use of a welding rod, addition of soldering flux (welding flux) is usually required to assist welding for the purpose of eliminating metal oxidation and increasing fluidity of a molten metal, so as to obtain a better welding effect.

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[0003] As to a soft solder such as a tin alloy, the welding flux is directly injected into a welding wire through a shunting combination and extrusion method, before being prepared into welding wires with different specifications through drawing. The shunting combination, however, is only applicable to metals with a small resistance to deformation and good welding performance.

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[0004] Reference document CN103551757B discloses an aluminum-silicon

alloy seamless flux core welding wire for braze welding, and preparation and application thereof, wherein an aluminum-silicon alloy is placed in an extrusion mold to obtain a strip with a certain thickness, which is rolled and closed up by different-sized pressing rollers to obtain a hollow welding rod with an O-shaped end face, while flux core power is wrapped in the welding rod, and finally the flux cored welding rod is placed in an annealing furnace for drafting to a certain dimension. But the aforementioned preparation method is complex and is not available to continuous production. A steel welding rod, also having a flux core welding wire, is a welding wire with a crease, which is prepared by continuous winding and folding a steel strip for wrapping a flux core, followed by drawing for closing up to a certain specification, such a method also requires using plenty welding flux, and the welding rod has a thin metal layer (a great thickness acts against winding and folding). In addition, creases present in the welding rod are likely to cause lubricant residue in the crease during drawing, affecting performance of the welding rod. Therefore, presently alloy welding rods of copper, silver, etc. have yet to find applications.

[0005] It is difficult for metallic materials with great resistance to deformation, e.g., copper, to be prepared into flux core welding wires with the aforementioned method. The current method can only obtain solid welding rods, with extra addition of welding flux during welding to be used alongside with the welding rod; moreover, there is a coated copper welding rod, wherein the surface of solid copper is coated with welding flux, for ensuring adhesion between copper and the welding flux, with a large amount of adhesives added in the welding flux.

This coated copper welding rod has a fine welding effect, but performs poor in production efficiency and environmental costs due to a complicated coating process and generation of fume by the massive adhesives during welding.

[0006] To this end, a continuous production method for a short process is  
5 needed to be developed, whereby a flux core is filled into the centre of metal welding flux with a continuous length, without winding creases on a flux core steel welding rod.

## SUMMARY

10 [0007] Therefore, the technical problem to be solved by the present invention is to overcome the deficiency in the prior art, of generation of a great amount of fume due to adhesive use when adopting a welding rod produced from a metallic material with great resistance to deformation, and the problem of crease formation caused by rolling and folding, thereby providing a welding  
15 rod forming module, a preparation device for a welding rod and a preparation method for a welding rod.

[0008] To this end, the present invention provides a flux cored welding rod forming module, including:

[0009] a housing forming portion, for forming an elongated housing with a  
20 hollow portion; and

[0010] a mold core, including a flux core passage and a flux core introducing passage, the flux core passage is in fluid communication with the flux core introducing passage which is in fluid communication with the

elongated housing, for filling up the interior of the elongated housing with the welding flux.

[0011] The housing forming portion is a tubular housing forming portion, the elongated housing is an elongated alloy tube, and both the flux core passage and the flux core introducing passage are circular pipes.

[0012] The tubular housing forming portion includes: a casting tube, including an outer tube and an inner tube arranged coaxially, a forming cavity is formed between the outer tube and the inner tube, and the outer tube is provided with an alloy inflow hole; a draft rod, arranged in and capable of moving in the forming cavity, with an end in contact with alloy liquid, for drafting the alloy pipe to the outside of the casting tube after the alloy liquid is formed into an alloy tube.

[0013] The outer tube includes: an alloy inflow portion, with the alloy inflow hole formed thereon; and an alloy tube forming portion, provided with a protection sleeve on its outer side, coolant liquid flowing between the protection sleeve and the alloy tube forming portion.

[0014] The flux core introducing tube includes: an inner tube shared with the casting tube; an inner tube support, which is connected with the inner tube and connected with the outer tube via a screw thread.

[0015] The present invention meanwhile provides a preparation device for a flux cored welding rod, including:

[0016] a flux tank with welding flux held therein;

[0017] an alloy casting furnace for storing melting metal alloy;

[0018] wherein, the preparation device for a flux cored welding rod further includes at least one flux cored welding rod forming module.

[0019] One end of the flux core passage is connected with the inner tube support, and the other end is communicated with the flux tank.

5 [0020] The alloy inflow portion of the outer tube is arranged in the interior of alloy casting furnace, allowing melted alloy to flow in through the alloy inflow hole.

[0021] The flux tank is connected with an air compressor, for pressurizing the welding flux in the flux tank.

10 [0022] A valve is provided at a portion joining the flux tank with the flux core passage, for controlling entry of the flux core into the flux core passage.

[0023] The preparation device for a welding rod further includes an updraft casting machine which includes two rollers arranged apart at fixed distances, and the draft rod is sandwiched between the two rollers.

15 [0024] The present invention meanwhile provides a preparation method for a flux cored welding rod by using the preparation device for a flux cored welding rod, including the following steps:

[0025] a. melting alloy in the alloy casting furnace, and maintaining the temperature;

20 [0026] b. closing the valve, and melting the welding flux in the flux tank;

[0027] c. connecting the alloy inflow hole on the alloy inflow portion with the alloy casting furnace, allowing the high temperature liquid alloy to enter the forming cavity, and forming an elongated housing after cooling down of

the liquid alloy;

[0028] d. turning on the updraft casting machine for drafting the draft rod, which drafts the elongated housing over a certain distance;

[0029] e. starting the air compressor, enabling the welding flux to enter the  
5 flux core passage, pressing the welding flux in and filling the interior of the elongated housing, allowing the welding flux to cool down and solidify above the elongated housing, thereby forming a solid flux core;

[0030] f. driving the draft rod, by the updraft casting machine, for  
continuingly drafting the flux cored welding rod out to the outer side of the  
10 casting tube.

[0031] The following steps are further included:

[0032] g. winding the prepared flux cored welding rod or cutting it to a predetermined length as needed.

[0033] The technical solutions of the present invention have the following  
15 advantages.

[0034] 1. The present invention provides a flux cored welding rod forming module, including:

[0035] a housing forming portion, for forming an elongated housing with a hollow portion;

20 [0036] a mold core, including a flux core passage and a flux core introducing passage, the flux core passage is in fluid communication with the flux core introducing passage which is in fluid communication with the elongated housing, for filling up the interior of the elongated housing with the

welding flux.

[0037] The device of the present invention is applicable to various metals or alloys, in contrast to the practice in the prior art of typical application of welding flux on the outer side of a metallic material with great resistance to deformation, due to great challenges in injection molding of the metallic material using an extrusion apparatus. Even if the welding flux is wrapped in a metal strip to form a flux core welding wire, the processing is complex and continuous production is impossible.

[0038] In adopting the flux cored welding rod forming module provided by the present invention, firstly an elongated housing with a hollow portion is formed in a housing forming portion, then the cavity of the housing is filled up with welding flux through a flux core introducing passage. In such a preparation method, the welding flux is efficiently filled in the housing, thereby preventing the drawback in the prior art of generating a large volume of fume during use when applying the welding flux on the outer side and using an adhesive for adhesion. Meanwhile, the present invention is further applicable to soft metallic materials with a small resistance to deformation, such as aluminum-silicon materials, tin alloys, etc.

[0039] Meanwhile, the production process employs no preparation method in the prior art of continuous rolling and folding of a steel strip for wrapping a flux core, therefore, the produced welding rod is free of creases, thus avoiding contamination to the welding rod caused by lubricating oil entering the crease during subsequent drawing process of the welding rod.

[0040] 2. The present invention provides a flux cored welding rod forming module, wherein the tubular housing forming portion includes: a casting tube, including an outer tube and an inner tube arranged coaxially, wherein a forming cavity is formed between the outer tube and the inner tube, and the  
5 outer tube is provided with an alloy inflow hole; and a draft rod, arranged in and capable of moving in the forming cavity, with an end in contact with alloy liquid, for drafting the alloy pipe to the outside of the casting tube after the alloy liquid is formed into an alloy tube.

[0041] During use, high temperature liquid alloy flows into the interior of  
10 the forming cavity through the alloy inflow hole on the outer tube, and cools down in the forming cavity into solid, thereby forming an elongated housing.

[0042] Meanwhile, the draft rod is in contact with the alloy liquid phase in the forming cavity, and since the draft rod has a lower temperature and the alloy liquid has a higher one, the alloy liquid immediately solidifies and bonds  
15 with the end of the draft rod once the two comes into contact, at this point, it only requires to pull the draft rod for the elongated housing to be continuously pulled out of the casting tube.

[0043] 3. The present invention provides a flux cored welding rod forming module, wherein the outer tube includes: an alloy inflow portion, with the  
20 alloy inflow hole formed thereon; and an alloy tube forming portion, provided with a protection sleeve on its outer side, coolant liquid flowing between the protection sleeve and the alloy tube forming portion.

[0044] The alloy liquid flows into the outer tube from the alloy inflow hole,

keeps moving forward under the pressure, herefrom into the alloy tube forming portion, and because the coolant liquid flows on the outer side of the alloy tube forming portion, the alloy liquid is rapidly cooled and solidifies, forming a solid elongated housing.

5     **[0045]**     4. The present invention provides a flux cored welding rod forming module, wherein the flux core introducing tube includes: an inner tube shared with the casting tube; an inner tube support, which is connected with the inner tube and connected with the outer tube via a screw thread.

10     **[0046]**     the outer tube and the inner tube are coaxially arranged via the inner tube support, the inner tube support is communicated with the inner tube, and because the elongated housing is formed in the forming cavity between the outer tube and the inner tube, the flux core is able to be accurately injected into the elongated housing through the inner tube support.

15     **[0047]**     5. The present invention provides a preparation device for a flux cored welding rod, including:

**[0048]**     a flux tank with welding flux held therein; and an alloy casting furnace for melting metal alloy. The preparation device for a flux cored welding rod further includes at least one flux cored welding rod forming module.

20     **[0049]**     The alloy casting furnace is in contact with the housing forming portion, melted liquid metal alloy in the alloy casting furnace flows into the forming cavity through the alloy inflow hole on the outer tube, forming the solid elongated housing; the flux tank holds welding flux and is connected

with the mold core which injects the welding flux into the elongated housing.

[0050] 6. The present invention provides a preparation device for a flux cored welding rod, the flux tank is connected with an air compressor, for pressurizing the welding flux in the flux tank, and the welding flux fills up the  
5 cavity of the elongated housing.

[0051] 7. The present invention provides a preparation device for a flux cored welding rod, a valve is provided at a portion joining the flux tank with the flux core passage, for controlling entry of the flux core into the flux core passage.

10 [0052] With the valve opened, the welding flux in the flux tank flows into the flux core passage, beginning a flux core injection process at the hollow portion of the elongated housing; when the hollow portion is filled up with the flux core, the valve is closed to stop injection of the flux core.

[0053] 8. The present invention provides a preparation device for a flux  
15 cored welding rod, the welding rod preparation device further includes an updraft casting machine which includes two rollers arranged apart at fixed distances, and the draft rod is sandwiched between the two rollers.

[0054] The draft rod mainly functions to carry the formed welding rod to the outside of the flux cored welding rod forming module, and the roller  
20 imposes a certain holding force to the draft rod, driving the draft rod to carry the formed welding rod outside. The presence of the updraft casting machine enables continuous production of the welding rod.

[0055] Meanwhile, multiple welding rods may be simultaneously prepared

through combination of multi-group flux cored welding rod forming modules and the updraft casting machine.

[0056] 9. The present invention provides a preparation method for a flux cored welding rod by using the preparation device for a flux cored welding rod, including the following steps:

[0057] a. melting alloy in the alloy casting furnace, and maintaining the temperature;

[0058] b. closing the valve, and melting the welding flux in the flux tank;

[0059] c. connecting the alloy inflow hole on the alloy inflow portion with the alloy casting furnace, allowing the high temperature liquid alloy to enter the forming cavity, and forming an elongated housing after cooling down of the liquid alloy;

[0060] d. turning on the updraft casting machine for drafting the draft rod, which drafts the elongated housing over a certain distance;

[0061] e. switching on the valve for starting the air compressor, enabling the welding flux to enter the flux core passage, pressing the welding flux in and filling the interior of the elongated housing, allowing the welding flux to cool down and solidify above the elongated housing, thereby forming a solid flux core; and

[0062] f. driving the draft rod, by the updraft casting machine, for continually drafting the flux cored welding rod out to the outer side of the casting tube.

[0063] The preparation method for a flux cored welding rod provided by

the present invention is capable to realize continuous preparation of a flux cored welding rod, and has an outstanding capability in preparing metallic materials of different types, especially those with a large resistance to deformation, such as copper alloys.

5 [0064] Meanwhile, flux cored welding rods with different specifications may be prepared by varying the dimensions of the casting tube and the flux core pipe when preparing a welding rod using the method herein.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

10 [0065] In order to make a clearer description of technical solutions in specific implementations of the present invention or prior art, figures involved in description for the specific implementations or the prior art will be briefly introduced, and apparently, the figures described below illustrate some implementations of the present invention, for one with ordinary skill in the art,  
15 other figures can also be obtained in accordance with these figures without delivering creative efforts.

[0066] FIG. 1 is a structural diagram for a flux cored welding rod provided by the present invention;

[0067] FIG. 2 is a structural diagram for a flux cored welding rod forming  
20 module provided by the present invention;

[0068] FIG. 3 is a structural diagram for a preparation device for a flux cored welding rod provided by the present invention;

[0069] Demonstration for reference numerals:

[0070] 1- elongated housing; 2- flux core passage; 3- flux core introducing passage; 4- casting tube; 41- outer tube; 411- alloy inflow hole; 42- inner tube; 43- forming cavity; 5- draft rod; 6- alloy inflow portion; 7- alloy tube forming portion; 8- protection sleeve; 9- inner tube support; 10- flux tank; 101- valve; 5 11- welding flux; 12- alloy casting furnace; 13- air compressor; 14- updraft casting machine; 141- roller; 15- insulation asbestos; 16- graphite protective sheath; 17- coolant liquid.

#### **DETAILED DESCRIPTION**

10 [0071] Technical solutions of the present invention will be described clearly and completely as follows in conjunction with the figures, apparently, the described embodiments are just a part, but not all, of the embodiments of the present invention. Based on the embodiments in the present invention, all other embodiments obtained by one with ordinary skill in the art without any 15 creative efforts shall fall into the protection scope of the present invention.

[0072] In the description of the present invention, it should be noted that, the terms such as “centre”, “above”, “below”, “left”, “right”, “vertical”, “horizontal”, “inner”, “outer”, etc. refer to orientation or position relationships on the basis of the orientation or position relationships in accompanying 20 figures, which are only intended to facilitate description or simplified description of the present invention, rather than indicating or suggesting that the involved apparatus or element shall have specific orientations, or be configured and operated specifically, and therefore shall not be construed as

limitations to the present invention. In addition, terms such as “first”, “second”, “third”, which are merely intended to deliver description, but cannot be construed as indicating or suggesting relative importance.

[0073] In the description of the present invention, it should be noted that, unless specified and defined otherwise, terms such as “mounting”, “interconnected”, “connected” shall be construed in a broad sense, for example, fixedly connected, removably connected, integrally connected; mechanically connected, electrically connected; directly connected, indirectly connected via intermediate medium, or further, internally communicated between two elements. Case-by-case interpretation can be made to the above terms in the present invention by one with ordinary skill in the art.

[0074] In addition, technical features involved in the described different implementations of the present invention can be combined with each other in the case of no contradictions.

#### 15     **Embodiment 1**

[0075] This embodiment provides a flux cored welding rod forming module, including:

[0076] a housing forming portion is used for forming an elongated housing 1 with a hollow portion;

20     [0077] a mold core includes a flux core passage 2 and a flux core introducing passage 3, the flux core passage 2 is in fluid communication with the flux core introducing passage 3 which is in fluid communication with the elongated housing 1, for filling up the interior of the elongated housing 1 with the

welding flux 11.

[0078] In the prior art, welding flux 11 is typically applied on the outer side of a metallic material with great resistance to deformation, due to great challenges in draw forming of the metallic material using an extrusion apparatus.

[0079] In adopting the flux cored welding rod forming module provided by the present invention, firstly an elongated housing 1 with a hollow portion is formed in a housing forming portion, then the hollow portion of the housing is filled up with welding flux 11 through a flux core introducing passage 3. In such a preparation method, the welding flux 11 is efficiently filled in the housing, thereby preventing the drawback in the prior art of generating a large volume of fume during use when applying the welding flux 11 on the outer side using an adhesive for adhesion.

[0080] Meanwhile, the production process employs no preparation method in the prior art of continuous rolling and folding of a steel strip for wrapping a flux core, therefore, the produced welding rod is free of creases, thus avoiding contamination to the welding rod caused by lubricating oil entering the crease during subsequent drawing process of the welding rod.

[0081] In this embodiment, the housing forming portion is a tubular housing forming portion, the elongated housing 1 is an elongated alloy tube, the flux core passage 2 and the flux core introducing passage 3 are both circular tubes.

[0082] In this embodiment, the elongated housing 1 is of a circular-tube shape. As a variant, the elongated housing 1 may have other shapes, for example,

may be a tube with a rectangular or oval cross section.

[0083] The tubular housing forming portion includes: a casting tube 4, including an outer tube 41 and an inner tube 42 arranged coaxially, a forming cavity 43 is formed between the outer tube 41 and the inner tube 42, and the outer tube 41 is provided with an alloy inflow hole 411; a draft rod 5, arranged in and capable of moving in the forming cavity 43, an end of draft rod 5 being contact with high temperature alloy liquid, for drafting the solid alloy tube to the outside of the casting tube 4 after the high temperature alloy liquid is formed into an solid alloy tube.

[0084] The inner tube 42 is designed to have a large proximal end and a small distal end with a conicity of  $1-2^{\circ}$ , such that the high temperature liquid alloy is rapidly cooled in the interior of the forming cavity 43 and demolded, facilitating drawing the elongated housing 1 out from the forming cavity 43.

[0085] During use, the high temperature liquid alloy flows into the interior of the forming cavity 43 through the alloy inflow hole 411 on the outer tube 41, and cools down in the forming cavity 43 into solid, thereby forming an elongated housing 1.

[0086] Meanwhile, the draft rod 5 is in contact with the high temperature liquid alloy in the forming cavity 43, and since the draft rod 5 has a lower temperature and the alloy liquid has a higher one, the high temperature liquid alloy immediately bonds at the end of the draft rod 5 once the two comes into contact, at this point, it only requires to pull the draft rod 5 for the elongated housing 1 to be continuously pulled out of the casting tube 4.

[0087] The outer tube 41 includes: an alloy inflow portion 6, with the alloy inflow hole 411 formed thereon; and an alloy tube forming portion 7, provided with a protection sleeve 8 on its outer side, coolant liquid 17 flowing between the protection sleeve 8 and the alloy tube forming portion 7.

5 [0088] The high temperature alloy liquid flows into the outer tube 41 from the alloy inflow hole 411, keeps moving forward under the pressure, into the alloy tube forming portion 7, and because the coolant liquid 17 flows on the outer side of the alloy tube forming portion 7, the high temperature alloy liquid is rapidly cooled, forming a solid elongated housing 1.

10 [0089] Specifically, the coolant liquid 17 may be cooled with cooling water or oil, insulation asbestos 15 is wrapped on the outer side of the protection sleeve 8, a graphite protective sheath 16 is mounted on the outer side of the insulation asbestos 15, and the two fulfil the function of heat preservation.

[0090] In this embodiment, the flux core introducing tube includes: an inner  
15 tube 42 shared with the casting tube 4; and an inner tube support 9 connected with the inner tube 42 and connected with the outer tube 41 via a screw thread.

[0091] The outer tube 41 and the inner tube 42 are coaxially arranged via the inner tube support 9, the inner tube support 9 is communicated with the inner tube 42, and because the elongated housing 1 is formed in the forming cavity  
20 43 between the outer tube 41 and the inner tube 42, the welding flux 11 is able to be accurately injected into the interior of the elongated housing 1 through the inner tube support.

[0092] Specifically, the inner tube support is formed with an outer screw

thread, and the inner side of the outer tube 41 is formed with an inner screw thread.

## **Embodiment 2**

[0093] This embodiment provides a preparation device for a flux cored welding rod, including:

[0094] a flux tank 10 with welding flux 11 held therein;

[0095] an alloy casting furnace 12 for melting metal alloy; and

[0096] the preparation device for a flux cored welding rod further includes at least one flux cored welding rod forming module.

[0097] The alloy casting furnace 12 is in contact with the housing forming portion, melted liquid metal alloy in the alloy casting furnace 12 flows into the forming cavity 43 through the alloy inflow hole 411 on the outer tube 41, forming the solid elongated housing 1; the flux tank 10 holds welding flux 11 and is connected with the mold core which injects the welding flux 11 into the interior of the elongated housing 1.

[0098] Specifically, a heating unit is arranged in both the flux tank 10 and the alloy casting furnace 12 for heating the welding flux 11 and the alloy and keeping the two in a molten state. The flux tank 10 and the alloy casting furnace 12 are internally provided with a thermocouple, for monitoring the temperature of the high temperature melt in real time. The heating unit may employ a resistor or electromagnetic stirring and other heating methods for heating.

[0099] Specifically, in this embodiment, one end of the flux core passage 2 is

connected with the inner tube support 9, and the other end is communicated with the flux tank 10.

[00100] Specifically, as shown in FIG. 3, the entire preparation device for a flux cored welding rod is immersed in the interior of the alloy casting furnace 12, the alloy inflow portion 6 of the outer tube 41 is surrounded by the high temperature liquid alloy melt so that the melted alloy can flow in through the alloy inflow hole 411.

[00101] In this embodiment, multi-group flow holes may be arranged below the flux tank 10 at the same time, and multiple flux core passages 2 may be connected with the flow holes, and because each flux cored welding rod forming module may produce one welding rod, multiple welding rods may be prepared simultaneously through coordination of multiple flux core passages 2 and multi-group flux cored welding rod forming modules, thus realizing coordinated forming through “multi-production lines-per furnace”.

[00102] The outer side of the flux core introducing passage 3 is enveloped in a refractory material, for preventing burning out at a high temperature due to oxidation.

[00103] The flux tank 10 is connected with an air compressor 13, for pressurizing the welding flux 11 in the flux tank 10, so as to fill the hollow portion of the elongated housing 1 with the welding flux 11.

[00104] The flux tank 10 is further internally provided with a pressure gage, for detecting pressurizing capacity of the air compressor 13, which is conducive to controlling the flux core introducing rate.

[00105] A valve 101 is provided at a portion joining the flux tank 10 with the flux core passage 2, for controlling entry of the flux core into the flux core passage 2. With the valve 101 opened, the welding flux 11 in the flux tank 10 flows into the flux core passage 2, beginning a flux core injection process at the hollow portion of the elongated housing 1; when the hollow portion is filled up with the welding flux 11, the valve 101 is closed to stop injection of the welding flux 11.

[00106] In this embodiment, the welding rod preparation device further includes an updraft casting machine 14 which includes two rollers 141 arranged apart at fixed distances, and the draft rod 5 is sandwiched between the two rollers 141.

[00107] The draft rod 5 mainly functions to carry the formed welding rod to the outside of the flux cored welding rod forming module, and the roller 141 imposes a certain holding force on the draft rod 5, driving the draft rod 5 to carry the formed welding rod outside.

### **Embodiment 3**

[00108] This embodiment provides a preparation method for a flux cored welding rod by using the preparation device for a flux cored welding rod, including the following steps:

[00109] a. melting alloy in the alloy casting furnace 12, and maintaining the temperature;

[00110] b. closing the valve 101, and melting the welding flux 11 in the flux tank 10;

[00111] c. connecting the alloy inflow hole 411 on the alloy inflow portion 6 with the alloy casting furnace 12, allowing the high temperature liquid alloy to enter the forming cavity 43, and forming an elongated housing 1 after cooling down of the liquid alloy;

5 [00112] d. turning on the updraft casting machine 14 for drafting the draft rod 5, which drafts the elongated housing 1 over a certain distance;

[00113] e. switching on the valve 101, enabling the welding flux 11 to enter the flux core passage 2, starting the air compressor 13, pressing the welding flux 11 into and filling the interior of the elongated housing 1, allowing the  
10 welding flux to cool down and solidify above the elongated housing 1, thereby forming a solid flux core;

[00114] f. driving the draft rod 5, by the updraft casting machine 14, for continually drafting the flux cored welding rod out to the outer side of the casting tube 4;

15 [00115] The preparation method for a flux cored welding rod provided by the present invention is able to realize continuous preparation of a flux cored welding rod, and has an outstanding capability in preparing metallic materials of different types, especially those with a large resistance to deformation, such as copper alloys. The solid flux core can seal the liquid flux core in the pipe,  
20 preventing ejection thereof from above the elongated housing 1.

[00116] The preparation method for a flux cored welding rod herein is applied widely, to soft materials such as aluminum-silicon materials, tin alloy materials, and hard materials alike, such as copper.

[00117] Meanwhile, flux cored welding rods with different specifications may be prepared by varying the dimensions of the casting tube 4 and the inner tube 42 when preparing a welding rod using the method herein. Specifically, the inner tube 42 is able to control the internal diameter of the elongated housing 1, and the external diameter of the casting tube 4 is used for controlling the external diameter of the elongated housing 1.

[00118] Because each flux cored welding rod forming module can undergo dimension adjustment, and multi-group flux cored welding rod forming modules can be arranged in parallel in the preparation device for a flux cored welding rod, multiple flux cored welding rods with different dimensions can be prepared simultaneously in a furnace per batch.

[00119] In step b, the welding flux 11 may adopt a rosin material which is melted by heating it to a temperature of 150° C and maintaining the temperature. In the preparation process, a layer of charcoal or graphite flakes is required to cover on the alloy melt for isolating the air and heat preservation.

[00120] The welding rod preparation method provided by this embodiment further includes the following steps:

[00121] g. winding the prepared flux cored welding rod or cutting it to a predetermined length as needed.

[00122] Winding or cutting the prepared flux cored welding rod facilitates storage and transportation thereof.

[00123] Obviously, the above embodiments are merely intended to clearly

illustrate rather than limit the numerated implementations. For one with  
ordinary skill in the art, other different forms of modifications or changes may  
further be made on the basis of the aforementioned descriptions. It is  
unnecessary and impossible to exhaust all implementations. But modifications  
5 or changes derived herefrom obviously fall into the protection scope of the  
present invention.

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## Claims

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1. A flux cored welding rod forming module, characterized by comprising:

a housing forming portion, for forming an elongated housing (1) with a hollow portion; and

5 a mold core, comprising a flux core passage (2) and a flux core introducing passage (3), the flux core passage (2) is in fluid communication with the flux core introducing passage (3) which is in fluid communication with the elongated housing (1), for filling up the interior of the elongated housing (1) with the welding flux (11), and

10 the housing forming portion is a tubular housing forming portion, the elongated housing (1) is an elongated alloy tube, and both the flux core passage (2) and the flux core introducing passage (3) are circular pipes, and the tubular housing forming portion comprises:

a casting tube (4), comprising an outer tube (41) and an inner tube (42) arranged  
15 coaxially, a forming cavity (43) is formed between the outer tube (41) and the inner tube (42), and the outer tube (41) is provided with an alloy inflow hole (411); and

a draft rod (5), arranged in and capable of moving in the forming cavity (43), with an end in contact with alloy liquid, for drafting the alloy pipe to the outside  
20 of the casting tube (4) after the alloy liquid is formed into an alloy tube.

2. The flux cored welding rod forming module in accordance with claim 1, characterized in that, the outer tube (41) comprises:

an alloy inflow portion (6), with the alloy inflow hole (411) formed thereon; and  
an alloy tube forming portion (7), provided with a protection sleeve (8) on its  
outer side, coolant liquid flowing between the protection sleeve (8) and the alloy  
tube forming portion (7).

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3. The flux cored welding rod forming module in accordance with claim 1,  
characterized in that, the flux core introducing tube (3) comprises:

an inner tube (42) shared with the casting tube (4); and

an inner tube support (9), which is connected with the inner tube (42) and

10 connected with the outer tube (41) via a screw thread.

4. A preparation device for a flux cored welding rod, comprising:

a flux tank (10) with welding flux (11) held therein; and

an alloy casting furnace (12) for melting metal alloy;

15 characterized in that, the preparation device for a flux cored welding rod further  
comprises at least one flux cored welding rod forming module in any one of  
claims 1-3, and

one end of the flux core passage (2) is connected with the inner tube support (9),

and the other end is communicated with the flux tank (10), and

20 the alloy inflow portion (6) of the outer tube (41) is arranged in the interior of  
alloy casting furnace (12), allowing melted alloy to flow in through the alloy  
inflow hole (411).

5. The preparation device for a flux cored welding rod in accordance with claim 4, characterized in that, the flux tank is connected with an air compressor (13), for pressurizing on the welding flux (11) in the flux tank (10).

5 6. The preparation device for a flux cored welding rod in accordance with claim 4, characterized in that, a valve (101) is provided at a portion joining the flux tank (10) with the flux core passage (2), for controlling entry of the flux core into the flux core passage (2).

10 7. The preparation device for a flux cored welding rod in accordance with claim 4, characterized in that, the preparation device further comprises an updraft casting machine (14) which comprises two rollers (141) arranged apart at fixed distances, and the draft rod (5) is sandwiched between the two rollers (141).

15 8. A preparation method for a flux cored welding rod by using the preparation device for a flux cored welding rod of any one of claims 4-7, comprising the following steps:

a. melting alloy in the alloy casting furnace (12), and maintaining the temperature;

20 b. closing the valve (101), and melting the welding flux in the flux tank (10);

c. connecting the alloy inflow hole (411) on the alloy inflow portion (6) with the alloy casting furnace (12), allowing the high temperature liquid alloy to enter the forming cavity (43), and forming an elongated housing (1) after cooling down of

the liquid alloy;

d. turning on the updraft casting machine (14) for drafting the draft rod (5), which drafts the elongated housing (1) over a certain distance;

5 e. switching on the valve (101) for starting the air compressor (13), enabling the welding flux (11) to enter the flux core passage (2), pressing the welding flux (11) in and filling the interior of the elongated housing (1), allowing the welding flux to cool down and solidify above the elongated housing (1), thereby forming a solid flux core; and

10 f. driving the draft rod (5), by the updraft casting machine (14), for continuingly drafting the flux cored welding rod out to the outer side of the casting tube (4).

9. The method in accordance with claim 8, characterized in that, further comprising the following steps:

15 g. winding the prepared flux cored welding rod or cutting it to a predetermined length as needed.