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# EUROPEAN PATENT APPLICATION

21 Application number: 81104415.5

51 Int. Cl.<sup>3</sup>: **B 23 K 9/18**

22 Date of filing: 09.06.81

30 Priority: 19.06.80 US 161233

43 Date of publication of application:  
30.12.81 Bulletin 81/52

84 Designated Contracting States:  
DE FR GB IT NL

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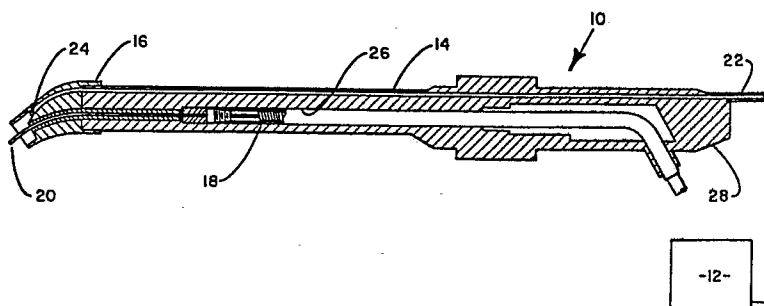
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54 Submerged arc welding gun.

57 A submerged arc welding gun includes a housing (14) having a bore (26) extending therethrough. The housing includes a welding nozzle (16) defining one end. Welding wire (20) is directed through the bore of the housing to said nozzle. A flux tube (22) is disposed in spaced relation to the welding wire for delivering flux from a source (12) thereof to the nozzle. The flux tube terminates substantially adjacent to the nozzle. The flux tube (22) is connected to a source of pressure for feeding the flux through the tube to the nozzle.



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Submerged Arc Welding Gun

This invention relates to a submerged arc welding gun, and in particular, to an improvement therein which permits use of the gun in a horizontal position during the welding process.

5 The use of the submerged arc welding process to weld metallic pieces in various industrial applications has become quite prevalent in recent years. Heretofore, one of the drawbacks to increased utilization of the submerged arc welding process, has been the need to maintain the welding gun in a generally vertical  
10 position during the welding process. The vertical positioning of the gun during the welding process has been necessitated because the flux employed in the submerged arc welding process has been fed through the gun, at least partially by gravity.

15 Since gravity has been used to feed the flux through the welding gun, the gun could not be placed in a horizontal position during the welding process as this would prevent proper feeding of the flux.

20 Even though, in some instances, the flux has been partially fed through the gun under pressure, such pressurized feeding of the flux has not obviated the use of gravitational forces to feed the flux to the nozzle of the welding gun.

25 Accordingly, it is an object of this invention to improve submergeable arc welding guns.

It is a further object of this invention to eliminate the use of gravitational forces to feed flux through the welding gun.

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It is a further object of this invention to enable a submerged arc welding gun to be used in a horizontal position during the welding process.

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These and other objects of the present invention are attained in a submerged arc welding gun including a housing having a bore extending therethrough and including a welding nozzle defining one end thereof. Guide means are disposed within the bore for  
5 directing a welding wire to the nozzle. A flux tube is also disposed within the bore in spaced relation to the guide means. The flux tube terminates substantially adjacent to the nozzle for delivering flux from a source thereof to the nozzle for submerging the weld wire within the flux. The flux tube is connected to a  
10 source of pressure for feeding the flux through the tube to the nozzle.

The present invention further includes a method of operating a submerged arc welding gun comprising the steps of feeding a  
15 welding wire to the nozzle of the welding gun and using a pressurized fluid to feed flux to the nozzle for discharge therefrom for covering the weld material disposed from the weld wire.

20 The single figure of the drawing is a longitudinal sectional view of a submerged arc welding gun including the present invention.

Referring now to the drawing, there is disclosed a preferred embodiment of the present invention. In particular, reference  
25 numeral 10 refers to a submerged arc welding gun including the present invention. Welding gun 10 includes a generally elongated housing 14, which in the preferred embodiment, is generally cylindrical. A nozzle 16 is provided at one end of housing 14. Housing 14 further includes an axially extending bore 26.

30 Bore 26 has guide means 18 extending therethrough for delivering welding wire 20 from end 28 of the housing to nozzle 16. Guide means 18 is formed from a suitable dielectric material.

Housing 14 further has a tubular conduit 22 extending therethrough. Tubular conduit 22 is connected at one end to a source 12 of flux. The source of flux is maintained under pressure through the use of a pressurized fluid, as for example compressed air, for feeding the flux through conduit 22. The other end of the tubular conduit terminates substantially adjacent nozzle 16. Nozzle 16 further includes at least one vent hole 24 located downstream of conduit 22. The function of vent hole 24 shall be more fully explained hereinafter.

As known in conventional submerged arc welding guns, the welding wire is automatically advanced through the gun by a conventional mechanism, not shown, and granular flux is fed from a source through a delivery conduit for free flow from the end of a nozzle to insure that the weld material deposited from the weld wire is submerged under a coating of the granular flux material.

As indicated previously, it has heretofore been necessary to maintain welding gun 10 in a vertical position during the welding process as gravity has been the main motivating force for delivering the flux from its source to the open end of nozzle 16. The foregoing requirement has limited utilization of submerged arc welding guns.

To eliminate the use of gravitational forces to permit submerged arc welding gun 10 to be employed in applications whereat the gun is maintained in a horizontal position during the welding process, the flux is delivered from pressurized source 12. The pressure within source 12 forces the flux through conduit 22 to nozzle 16 provided at the end of housing 14. From the nozzle, the flux freely flows through the open end of the nozzle to the material being welded. The pressurized source acts as the sole motivating force for delivering the flux through conduit 22. Vent holes 24 in nozzle 16 are provided as control means for maintaining the pressure within conduit 22 below a maximum predetermined

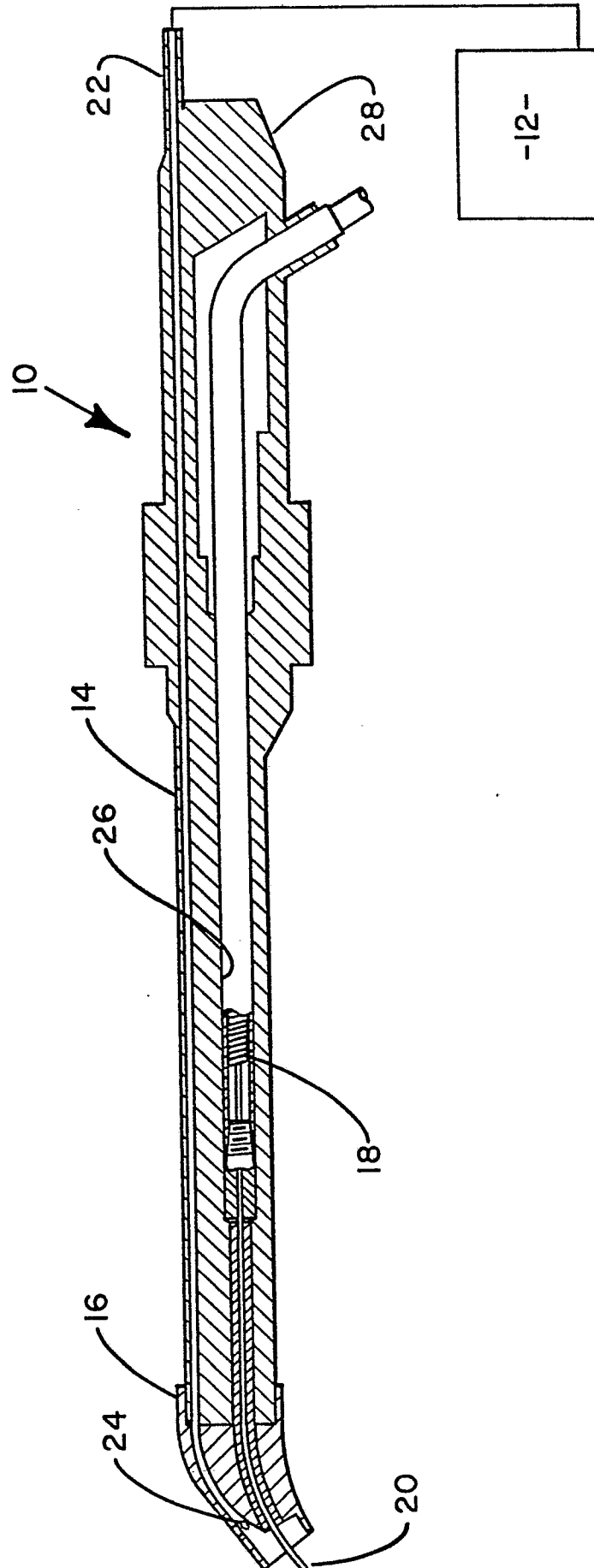
magnitude. By employing the present invention the submerged arc welding gun may be used to weld inaccessible areas where the gun could not heretofore be utilized.

- 5 While a preferred embodiment of the present invention has been described and illustrated, the invention should not be limited thereto but may be otherwise embodied within the scope of the following claims.

C L A I M

A submerged arc welding gun comprising a housing (14) having a bore (26) associated therewith, a welding nozzle (16) connected to one end of the housing; a guide (18) disposed within said bore for directing a welding wire (20) to said nozzle characterized by a passage (22) for directing flux under pressure to the area adjacent to the end of the welding nozzle (16), the passage being substantially linear with an arcuate end of relatively short extent, the passage being provided with a vent (24) for relieving pressure while permitting flux to fall around the welding wire.

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. <sup>3</sup> )
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P	<u>GB - A - 1 564 295</u> (KOBÉ) + Fig. 2 + --	1	B 23 K 9/18
	<u>US - A - 2 947 847</u> (CRAIG) + Fig. 1 + --	1	
	<u>US - A - 3 178 552</u> (MULLER) + Fig. 1 + --	1	
	<u>US - A - 4 221 957</u> (BARGER) (09-09-1980) + Fig. + & EP-A1-O 015 414 (17-09-1980) ----	1	TECHNICAL FIELDS SEARCHED (Int. Cl. <sup>3</sup> )  B 23 K 9/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search  VIENNA		Date of completion of the search  24-08-1981	Examiner  BENCZE