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G. D. ROGERS

2,225,660

Pouring Spout

Filed Nov. 16, 1939

Fig. 1-

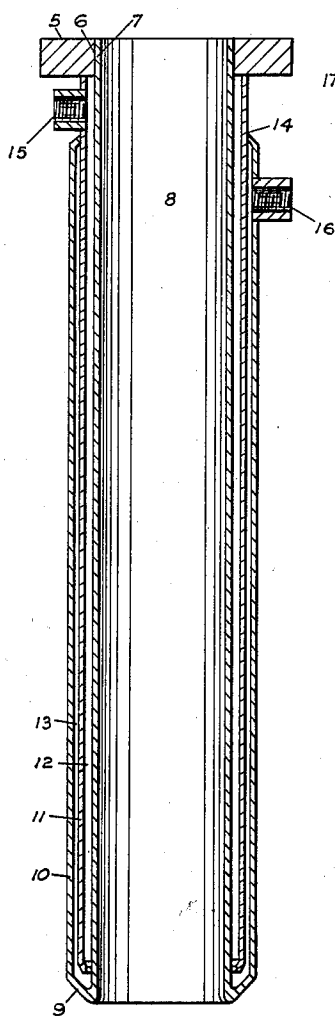


Fig. 2-

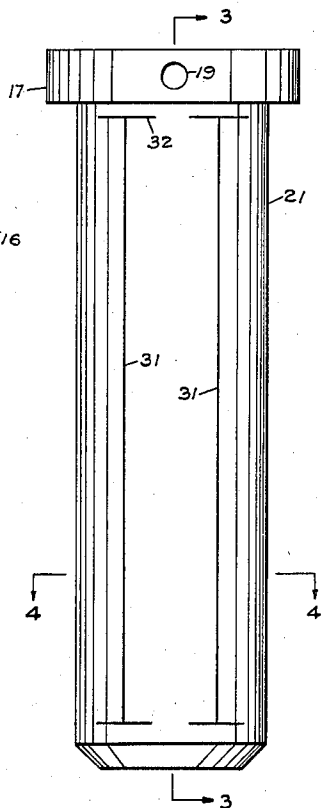


Fig. 3-

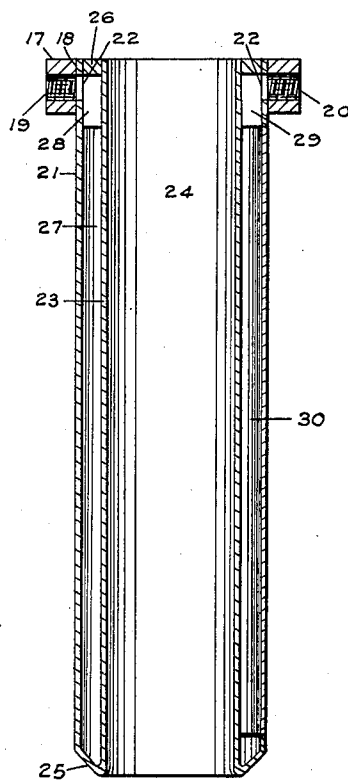


Fig. 4-

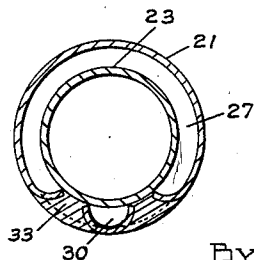
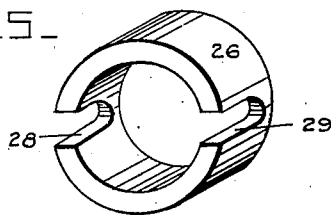


Fig. 5-



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UNITED STATES PATENT OFFICE

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POURING SPOUT

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4 Claims. (Cl. 221—84)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a pouring spout particularly intended for molten explosive.

The purpose of the invention is to provide a jacketed pouring spout in which condensate is purged under steam pressure in a direction opposite to that of gravity flow so that dry hot steam will be in direct contact with an inner tube and cold spots are avoided at the tip or lower end of the spout.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

Fig. 1 is a longitudinal sectional view of a pouring spout constructed in accordance with the invention.

Fig. 2 is a view in elevation of a modified form of spout showing the outer tube before final formation.

Figs. 3 and 4 are sectional views on the corresponding lines of Fig. 2.

Fig. 5 is a perspective view of the gland.

Referring to Fig. 1 there is shown a vertically arranged pouring spout comprising a plate 5 having an aperture 6. An inner tube 7 having one end inserted in the aperture and fixed to the plate provides a passage 8 for the flow of a liquid material such as molten explosive. The other end of the tube 7 is formed with a flange 9 which for convenience of manufacture serves as a lower support for an outer tube 10 which may be welded in place and also constitutes an end closure.

An intermediate tube 11 fixed to the plate 5 is disposed between and is spaced from the inner and outer tubes so that an inner annular chamber 12 and an outer annular chamber 13 are provided. The intermediate tube 11 terminates short of the flange 9 so that the annular chambers 12 and 13 are in communication. The upper end of the outer tube is turned in as at 14 and fixed to the intermediate tube in spaced relation to the plate 5.

A pipe coupling 15 fixed in the intermediate tube between the plate and the outer tube serves as a steam inlet for the inner chamber 12. A pipe coupling 16 fixed in the outer tube at its upper end serves as a steam outlet for the outer chamber 13.

In operation steam entering the inlet 15 into

the inner chamber 12 contacts the inner tube 7 and maintains it at a desired temperature. As condensate collects at the lower end of chambers 12 and 13 it rises to the lower edge of the intermediate tube and isolates these chambers. The inner chamber 12 remains under line pressure while the pressure in the outer chamber 13 drops. As a result the condensate is forced up through the outer chamber 13 under steam pressure and drained off through the outlet 16. In consequence of this arrangement cold spots are avoided at the tip or lower end of the spout.

Under some conditions of use, for example in loading a shell by means of an extruder screw, limitations on the internal and external diameters of the spout prohibit the employment of a structure as shown in Fig. 1. An arrangement which will comply with a requirement of limiting dimensions is shown in Figs. 2 to 5 in which a plate 17 has a central aperture 18 and a pair of oppositely disposed radial openings constituting a steam inlet 19 and an outlet 20.

An outer tube 21 inserted in the aperture 18 and fixed to the plate has oppositely disposed apertures 22—22 in alignment with the inlet 19 and outlet 20. An inner tube 23 spaced from the outer tube provides a passage 24 for receiving molten explosive and an extruder screw. The lower end of the inner tube is formed with a flange 25 to which the outer tube is connected. A gland 26 inserted between and fixed to the inner and outer tubes closes the annular steam chamber 27 and is provided with oppositely disposed slots 28—29 which respectively provide for fluid communication between the chamber 27 and the inlet 19 and between a passage 30 and the outlet 20.

The passage 30 is in communication with the chamber 27 at the lower end of said chamber. One manner of establishing the passage consists in forming two parallel slits 31—31 longitudinally of the outer tube, forming a transverse slit 32 at each end of each slit 31, folding those portions of the outer tube adjacent the slits inwardly against the inner tube and then welding, brazing or soldering in place as indicated at 33.

The operation is similar to that previously described, the condensate being forced up the passage 30 to the outlet 20.

I claim:

1. A pouring spout comprising a plate, an inner tube fixed to the plate, an intermediate tube fixed to the plate, an outer tube fixed to the upper part of the intermediate tube and having its lower end fixed to the inner tube in spaced relation to the lower end of the intermediate tube, a steam

inlet in the upper part of the intermediate tube and an outlet in the upper part of the outer tube.

2. A pouring spout comprising an inner tube, an outer tube and an intermediate tube providing an inner annular chamber and an outer annular chamber, the inner and outer tubes connected at their lower ends and spaced from the lower end of the intermediate tube, a steam inlet in the upper part of the inner annular chamber and an outlet in the upper part of the outer annular chamber.

3. A pouring spout comprising an inner tube, an outer tube having portions engaging the inner

tube to provide an annular chamber and a passage having fluid communication with the lower end of the chamber, a steam inlet in the upper part of the chamber and an outlet in the upper part of the passage.

4. A pouring spout comprising spaced tubes providing a steam chamber, a gland between the upper ends of the tubes, means forming a passage having communication with the lower end of the steam chamber, a steam inlet extending through the gland, and an outlet for the passage extending through the gland.

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