

[54] **COUPLING FOR COMBUSTION TUBES**

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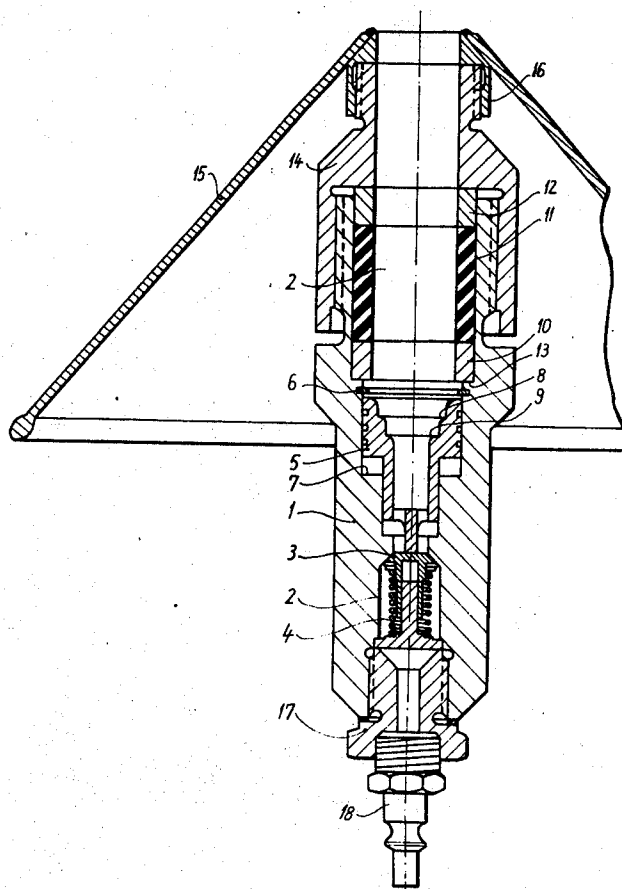
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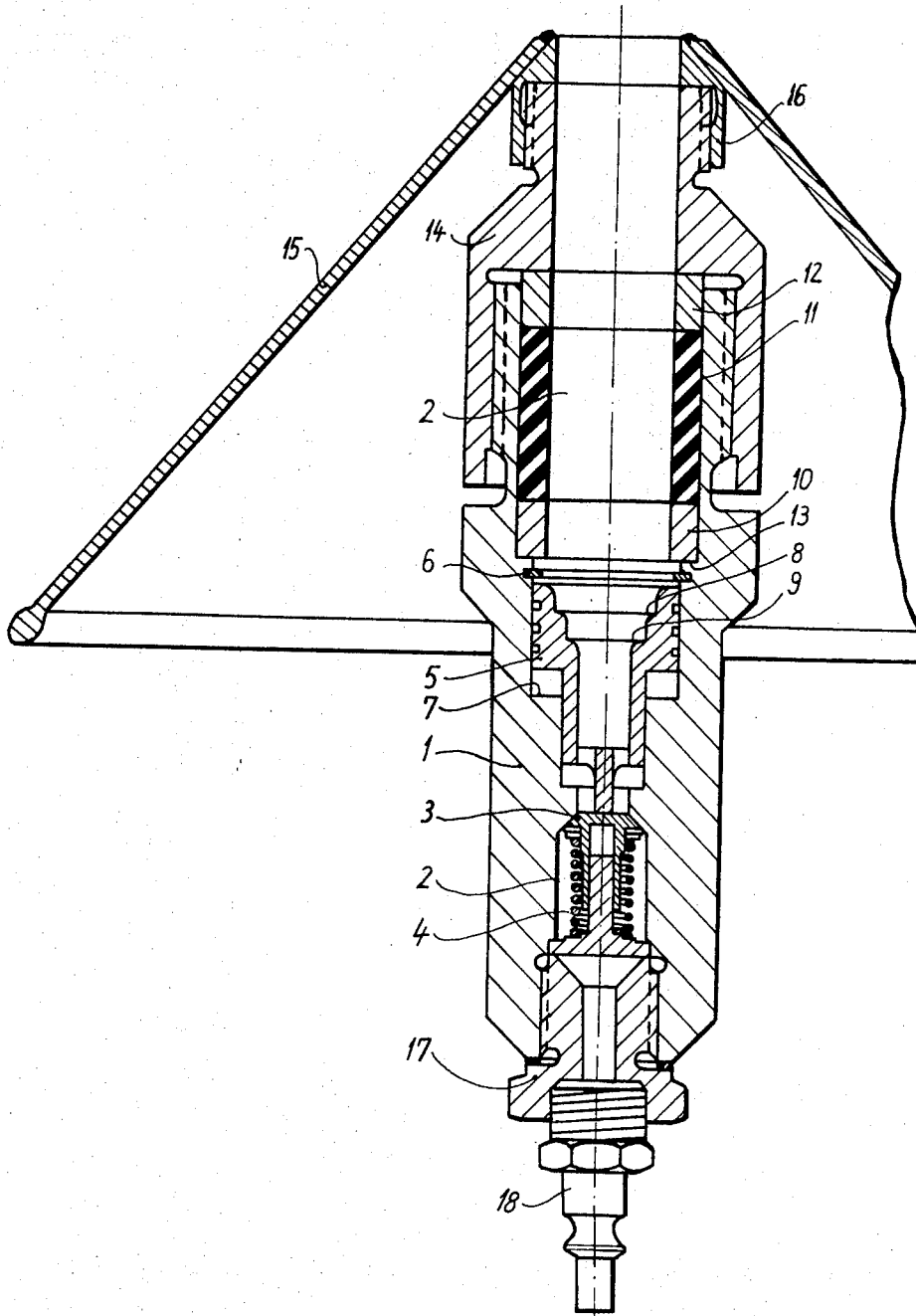
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[57] **ABSTRACT**

A coupling for connecting a thermal lance to an oxygen supply pipe having a casing with a valve therein held shut by a spring and the casing having an axial passage therein fitted with a pipe connection and a plunger therein slidable to open the valve, a clamping device is provided in the casing having at least one resilient ring-shaped member at that end of the hollow plunger which faces away from the valve and the clamping device adapted to receive the lance.

6 Claims, 1 Drawing Figure





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COUPLING FOR COMBUSTION TUBES

This invention relates to a thermal lance coupling, for connecting a thermal lance to an oxygen supply pipe. Such lances are used for the thermal boring of such hard materials as, for example, concrete, rock or cast iron, oxygen being blown under pressure through a tube known as a thermal lance, the far end of which has first been made white hot. This initiates a process of combustion in which the tube burns away from the front end as the hole is being bored. By way of a core, the tube contains a bundle of wires or rods, which fills the tube but allows the stream of oxygen to be fed through the interstices left between the core and the interior wall of the tube. For bringing the supply of oxygen to the lance, a connection between the lance and the oxygen supply pipe is required, in the form of a coupling, to enable a lance that has burnt away almost to the end to be quickly and easily changed for a new one. Another requirement is that this coupling should make it possible for lances of various diameters to be joined up to the oxygen supply pipe. In addition thereto the safety of such a connection is highly important, care having to be taken to ensure that the flame cannot reach the oxygen supply pipe by way of the lance as this burns back. A valve within the coupling, which is consequently necessary, must not only be able, in the emergency just mentioned, to cut off automatically when a flame nears the coupling if, for instance, it is no longer possible to interrupt the oxygen feed in time, but it must also block the oxygen supply pipe whenever there is no lance in the coupling, including moments when, for example, a lance that has burnt away to a stub is being changed for a new one.

To achieve this purpose, it is therefore an object of the invention to provide the lance coupling, such as described, in an axial passage through the casing of the coupling with a valve held shut by a spring, a hollow plunger bearing against the valve and being arranged to slide lengthwise in the casing for the purpose of opening the valve. A further object of the invention resides in the provision within the casing, at that end of the hollow plunger which faces away from the valve, of a clamping device having at least one resilient ring-shaped member, which device is intended to receive the lance and bears against an internal peripheral shoulder on the casing, axial thrust being applied thereto by a capping nut screwed on to the end of the casing, so that the clamping device, by deformation of the resilient member, grips the lance once this has been inserted in opposition to the spring as far as the valve-open position.

Further objects of the invention will be apparent from the following description when considered in connection with the accompanying drawing which is a longitudinal section of the lance coupling.

As shown in the drawing, the lance coupling has a generally tubular casing 1, which contains a bore 2, throughout its entire length, the said bore 2 varying in diameter from section to section. At some distance from one end of the casing, into which the oxygen supply pipe leads, there is a valve 3, which has a conical seating and is held shut by the action of a spring 4. One end of a hollow plunger 5, in the form of a pin, bears against the radial end face of the valve, the said plunger being held within the casing, with freedom to slide longitudinally, between a locking ring 6, at one end, and a step 7 on the casing at the other end. The valve which is shown closed, is opened by downward movement of the hollow plunger 5. On the end remote from the valve, this plunger is stepped internally to form ring-shaped contact faces 8 and 9, which serve the purpose of centralizing lances — two in number, in the example illustrated — of different outside diameters. The lance is introduced from the top and thus pushes the plunger 5 down to its bottom position where it is brought to bear on the valve 3 and thus opens it.

For holding the lance tube fast in the casing of the coupling, use is made of the clamping device consisting of one rigid bottom ring 10, adjacent to which is a resilient ring member 11, preferably made of rubber, and adjacent thereto a top ring 12,

which again is made of unyielding material. The rigid bottom ring 10 bears against an internal peripheral shoulder 13, while a capping nut 14, which is screwed on to the end of the casing and bears on the upper edge of the ring 12, is tightened once the lance has been introduced as already stated and has thrust the valve into the "open" position. As the nut is tightened, the resilient member 11 undergoes slight deformation and makes firm contact both with the wall of the casing and with the outside of the lance tube. This also prevents oxygen from escaping along the outside of the lance tube. The top end of the nut 14, which forms a ring of smaller diameter, carries an external thread, on which a conical guard 15 is screwed with the aid of a threaded bush 16, fixed to the guard. This guard is interchangeable, so that when a lance of smaller diameter is used, a similar guard containing a smaller opening to match the diameter of that lance can be screwed into place.

Similarly, to enable lances of different diameters to be used, the members 10, 11 and 12 of the clamping device can be changed for others of suitably reduced inside diameter.

A gland 17 of a diameter such as to enable the valve 3 to be readily extracted for repair, is screwed into the opening in the casing below the valve. A connecting nipple 18 to which the oxygen feed pipe can be attached, is screwed into this gland.

The purpose of this two-part design is to enable the connecting nipple likewise to be easily changed for one of another size when it becomes necessary to use a feed pipe of different inside diameter.

The advantage of this lance coupling is that the valve will not open until the spring pressure has been overcome by the lance. Thus, for example, should it be impossible to turn off the flame as the lance burns away and the flame works its way back to the vicinity of the coupling, the first thing to happen will be that the resilient rubber ring will be scorched, releasing the residual stub of lance tube, and the spring will close the valve automatically. Since, however, an unusable rubber ring can readily be replaced by another ring, the coupling can be quickly be brought back into service.

What I claim is:

1. A coupling for connecting a thermal lance to an oxygen supply pipe, said coupling comprising a casing having a passage therethrough, means for connecting an oxygen supply pipe to said casing so as to provide communication with said passage, a valve seat in said passage downstream of said connecting means, a valve in said passage downstream of said connecting means, means for resiliently biasing said valve to a closed position against said valve seat, a hollow plunger downstream of said valve, said plunger being slidably disposed in said passage and being arranged to abut against said valve and a clamping device in said passage for holding a lance in the coupling, said clamping device including a resilient annular-section member and a capping nut threadedly engaged with said casing and arranged, when tightened, to deform said resilient member to grip the inserted lance, said plunger being displaced toward said valve by said lance to thereby open said valve against said resilient biasing means, said plunger being displaced away from said valve to thereby close said valve when a flame reaches the vicinity of said clamping device which thereby scorches said resilient member and causes it to release its grip of the inserted lance.

2. A lance coupling as claimed in claim 1, in which said hollow plunger is provided with different sized annular contact faces at its end remote from said valve for respectively centering lance tubes of different outside diameters. members

3. A lance coupling as claimed in claim 1 in which said clamping device further includes a ring member of unyielding material located in abutment with opposite end faces of said passage and said capping nut, each having an internal shoulder therein, said ring members abutting respectively against said shoulders.

4. A lance coupling as claimed in claim 3 in which said capping nut is externally threaded at its outer end, and a frustoconical guard having means engaging said nut outer end for protecting the hand of an operator grasping said casing.

5. A lance coupling as claimed in claim 4 in which said supply pipe connecting means comprises a gland member threadedly engaged with an end of said passage remote from said capping nut, and an interchangeable pipe-union nipple threadedly engaged with said gland member. 5

6. A lance coupling as claimed in claim 1 in which said resilient member is made of rubber.

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