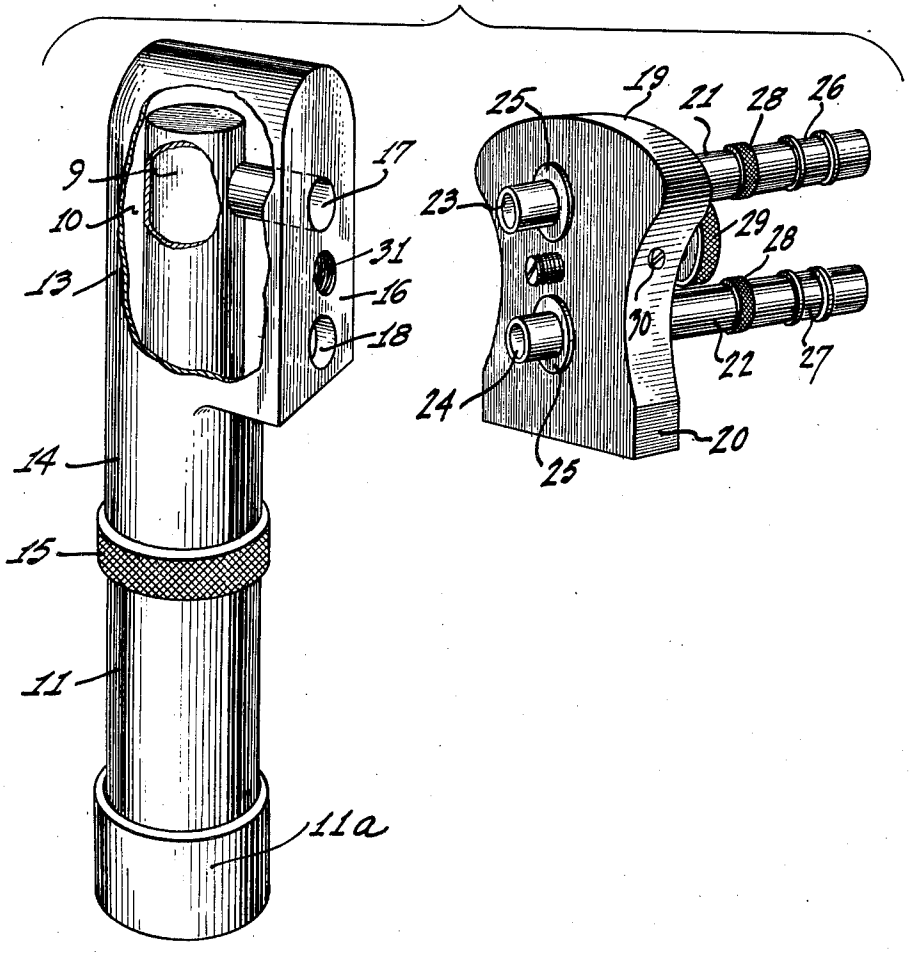
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DETACHABLE UNION FOR COOLING SYSTEMS

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DETACHABLE UNION FOR COOLING SYSTEMS

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1

The present invention relates to cooling means for electric discharge devices.

In some cases, for example for cooling the filament leads of thermionic discharge devices it is required to pass cooling water through a passage within each lead, and for this purpose water connections must be made with the entry and exit ends of the passage. The connections are usually made with flexible, for example rubber, tubing pressed over nipples fixed to the filament lead head.

In known arrangements, when it is required to detach the rubber tubing it is necessary to exert considerable force to remove it from the nipples and sometimes it has to be cut away. This involves risk of injury to the valve and is in any case inconvenient and may take an undesirably long time.

It is the object of the present invention to provide means whereby flexible tubing may be readily attached to and detached from an electric discharge device without causing appreciable strain in the device.

According to the present invention there is provided a detachable union for placing two flexible tubes in connection with a cooling passage in a part of an electric discharge device, the said union comprising a head portion fixed or fixable to the said part and having in one face apertures connecting respectively with the entry and exit ends of said passage, a detachable member having in one face apertures which register with those in the said head portion and which connect with nipples projecting from another face of said member and means for clamping the said detachable member to the said head portion with the corresponding apertures in said head portion and detachable member sealed to one another.

One embodiment of the invention as applied to a union for use in the cooling of a connecting lead of a thermionic discharge device will be described by way of example with reference to the accompanying drawing.

The outer end of the filament lead 11 is of cylindrical shape and has within it two concentric water passages 9, 10. The head portion 13 of the union has a cylindrical part 14 screwed onto the end of the filament lead 11 and locked by means of a knurled nut 15. A faced surface 16 is substantially parallel to the axis of the cylindrical part 14 and in this surface are two apertures 17 and 18, which are closed in watertight connection with the two passages when the head portion 13 is attached to the end of the filament lead 11 by the knurled nut 15. A coupling member 11a serves to connect the filament leads 11 to leads within a thermionic discharge device.

2

The detachable member 19 which forms the other part of the union comprises a body portion 20 having two tubes 21 and 22 fixed in apertures therein and projecting on both sides thereof. The tube projections 23 and 24 on one side of the member are an easy fit in the apertures 17 and 18 in the head portion and are surrounded by washers 25, for example of rubber. The tube projections 26 and 27 on the other side constitute the nipples and are grooved in order to give a good grip to rubber tubing which is pressed on to them. They may be provided with flanges 28 which act as stops and limit the extent to which the rubber tubing can be pressed up the nipples.

Between the two tubes is a clamping screw 29 having a knurled head. This screw is free to turn but is prevented from being withdrawn from the detachable member 19 by a grub screw 30 engaging in a groove (not shown) in the clamping screw. A threaded aperture 31 is provided in the head portion between the two apertures therein to receive the clamping screw.

The rubber tubes are normally kept attached to the detachable member, and when it is desired to remove the external water circuit from the thermionic valve, it is only necessary to unscrew the clamping screw 29 and withdraw the detachable member 19.

What is claimed is:

1. A union for a cooling system comprising two separable parts having cooperating surfaces for forming a fluid tight joint therebetween, said union having at least two ducts, at least two nipples on one of said parts and extending therethrough to project from different faces thereof, the nipples projecting from one of said faces being in registry with said at least two ducts, and means between said nipples for holding said parts together with said surfaces in abutment relation, said means being manually operable to selectively separate said parts and to hold them together.

2. A union for a cooling system for an electric discharge device comprising 2 separable parts having oppositely disposed faces for abutment relation, each of said parts having at least 2 ducts, the ducts in one of said parts being respectively in registry with at least 2 ducts in the other part, said ducts being coaxial in one portion of one of said parts and axially displaced in the other of said parts, at least 2 nipples supported on said other of said parts in registry with said ducts, and means between said nipples for detachably

supporting said oppositely disposed faces in said abutment relation.

3. A union for a fluid cooling system to be attached to a device to be cooled and including an elongated member having ducts extending coaxially therein, one end of said elongated member having a flattened surface, said ducts terminating in axially displaced openings in said flattened surface, another member having a flattened surface in registry and contact with the flattened surface on said elongated member and supporting a plurality of nipples having ends extending from said last-named surface and received within said openings, the other ends of said nipples extending from another surface of said member and adapted to receive flexible tubing, a screw intermediate said nipples for detachably securing said members together, and means for preventing separation of said screw from said other member.

4. A cooling system for an element in which heat is generated including means defining ducts in said element and a union for removably connecting said ducts to flexible tubing, said union comprising a face portion of said element having openings communicating with said ducts, and a detachable member comprising a body portion, nipples supported on and extending through said body portion, one end of said nipples being connectable to said flexible tubing, apertures in said body portion communicating with said nipples, said apertures being in registry with said ducts in said element when said union is assembled, and means for assembling said union, said means comprising a screw engaging an additional aperture in said body portion and a threaded aperture in said face portion of said element, and means for preventing separation of said screw from said body portion.

5. A detachable union for a cooling system for a device in which heat is generated, said system including feed and return ducts for a coolant, said union comprising a head portion connected to said device, said ducts being concentrically arranged in said head portion, said head portion having a flat surface, axially displaced ducts extending from said surface to said concentrically arranged ducts, said union including a detachable member having a flat surface, nipples extending from said flat surface in registry with said axially displaced ducts and fitting into said ducts, said nipples extending through said detachable member and projecting from another surface thereof, means on said nipples projecting from said other surface for receiving rubber hose in a firm and relatively fixed engagement, said rubber hose being separable from said systems without breaking said engagement.

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