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PACKED JOINT FOR GUNS

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5 Claims. (Cl. 89—1)

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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 packed joint and is especially applicable to automatic guns.

In the water-cooled type of gun, the barrel is surrounded by a water jacket and a fluid seal is provided at the movable joint between these members. According to present practice the sealing material is in direct contact with the barrel at some distance from the ends thereof with the result that the heat transmitted by the barrel injures the sealing material and the ends of the barrel are denied access to the cooling medium.

The purpose of the present invention is to provide a mounting whereby a shaft, rod, or barrel will be in direct contact with a cooling medium over all or practically all of its entire length and the packing material of the fluid seal will be spaced from the barrel by a portion of the cooling medium and by a metal sleeve.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A practical embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a longitudinal sectional view through the cooling jacket of a machine gun and showing the improved manner of mounting the front and rear ends of the gun barrel.

Figs. 2 and 3 are longitudinal sectional views showing modifications of the front mounting, the barrel being in position of recoil.

Referring to Fig. 1, there is shown a jacket 5 adapted to contain a cooling medium. The front plate 6 and the rear plate 7 are each provided with a bearing portion, respectively 8 and 9, for receiving a shaft, tube or gun barrel 10, which may be movable relative to the jacket and attains a high temperature in action. The barrel is radially spaced from the bearings by means of a front sleeve 11 and a rear sleeve 12, each of which is of greater length than its bearings. The sleeves are of equal external diameter to facilitate formation and alignment of the bearings 8 and 9, and reduce the vibration error of the barrel.

The sleeves 11 and 12 are substantially identical, being formed with inturned ends engageable with the barrel and serving to space the sleeves from the barrel. The outer ends 11a and 12a are internally threaded for connection with the barrel while the inner ends 11b and 12b are preferably inclined to facilitate insertion and removal of the barrel. Apertures 13 in the sleeves enable the cooling medium to come into direct contact with the barrel.

The front bearing 8 is formed with an internal flange 14 against which a packing member 15 is held by a gland 16 threaded into the bearing. The packing embraces the sleeve and is spaced from the barrel by the sleeve and the cooling medium.

The rear sleeve 12 is formed externally with one or more annular grooves 17 in which is placed a packing material 18 that presses against the wall of the bearing and prevents leakage of the cooling medium.

In the modification shown in Fig. 2 the rifled muzzle end 19 of the barrel is terminated considerably short of the front plate 20 of the jacket, and a tubular extension 21 on the barrel is threadedly connected to the inturned end 22 of the sleeve 23. By this arrangement the muzzle of the barrel is always surrounded by the cooling medium.

In the modification shown in Fig. 3 a pair of spaced concentric sleeves 24 and 25 are provided to separate the packing 26 from the gun barrel 27. The outer sleeve 25 is preferably shorter than the inner sleeve 24 to which it is attached and the cooling medium may or may not be admitted into the space between the sleeves.

While the invention is described with particular reference to a gun barrel it is to be understood that it has application to any packed joint for a stationary and rotatable as well as a reciprocable member.

I claim:

1. In combination with a cooling jacket adapted to contain a fluid medium and having bearings at its front and rear ends, a gun barrel mounted for reciprocation within the jacket, a sleeve on each end of the barrel fitting in the bearings and extending into the fluid space of the jacket, and inclined fluid passages in the sleeves, all passages in a sleeve having the same direction of inclination whereby fluid is circulated through the sleeves in one direction on recoil and in the opposite direction on counter-recoil.

2. In combination with a cooling jacket adapt-

- ed to contain a fluid medium and having bearings at its front and rear ends, a gun barrel mounted for reciprocation within the jacket, a sleeve on each end of the barrel, each sleeve in engagement with the barrel at the ends of the sleeve but spaced from the barrel throughout the greater portion of its length, said sleeves fitting the bearings and extending into the fluid space of the jacket, and means provided in said sleeves whereby fluid is circulated through the sleeves on recoil and counter-recoil of the barrel.
3. In combination with a cooling jacket adapted to contain a fluid medium, a bearing at the front end of the jacket and surrounded by the cooling medium, a gun barrel mounted for reciprocation within the jacket, a sleeve on the muzzle of the barrel having inturned ends whereby the sleeve is spaced from the barrel,

and means formed in the sleeve which circulates the fluid therethrough on recoil and counter-recoil of the barrel.

4. A sleeve for fluid cooled reciprocating gun barrels embodying a tubular member, inturned ends on the tubular member adapted to engage a gun barrel, and ports spaced about the sleeve and inclined at an angle other than 90° to the longitudinal axis of the gun barrel, the inclination of all ports being in the same direction.

5. A sleeve for fluid cooled reciprocating gun barrels embodying a tubular member adapted to fit on and be spaced from a gun barrel, and means formed in the sleeve which circulates the cooling fluid through the sleeve on recoil and counter-recoil of the gun barrel.

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