April 4, 1933. G. J. KESSENICH 1,903,295

COMPOSITE GUN BARREL

Filed March 24, 1931

Fig-1-

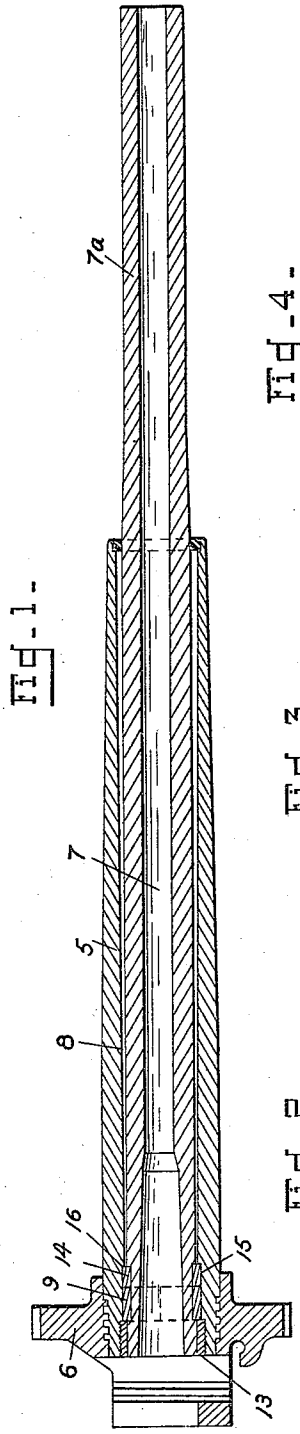


Fig-4-

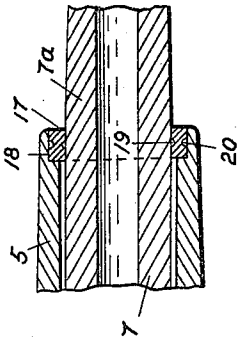


Fig-3-

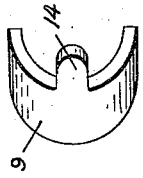


Fig-2-

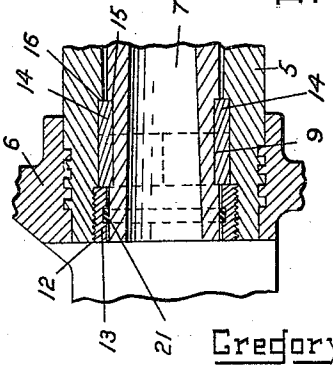


Fig-6-

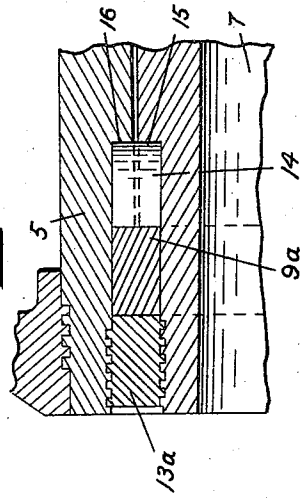
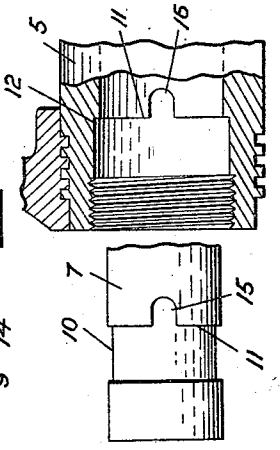


Fig-5-



INVENTOR.
Gregory J. Kessenich
BY W.N. Roach
ATTORNEY

Patented Apr. 4, 1933 1,903,295

UNITED STATES PATENT OFFICE

GREGORY J. KESSENICH, OF MADISON, WISCONSIN

COMPOSITE GUN BARREL

Application filed March 24, 1931. Serial No. 524,939.

(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 composite gun barrel, and more particularly it has reference to that type of barrel in which a radial play is established between the inner tube or liner and the outer tube or jacket for the purpose of enabling the tube to be easily removed when worn out.

The improvements proposed herein are directed in general to certain features whereby fabrication of the component elements of the gun barrel will be greatly facilitated. Specifically, the collar and keys employed to hold the tube against longitudinal and rotational movement relative to the jacket are provided as individual units and the tube is of externally cylindrical form capable of being inserted in an internally tapered jacket from either the front or rear.

To these and other ends, the invention consists in the details of construction and in the combination and arrangement of elements pointed out in the claims, forming a part of this specification.

A preferred embodiment of the invention is illustrated in the accompanying drawing in which:

Fig. 1 is a longitudinal sectional view of a gun barrel constructed in accordance with the invention.

Fig. 2 is an enlarged longitudinal sectional view of the joint at the breech end of the gun.

Fig. 3 is a perspective view of one of the combined collar and key units employed at the breech joint.

Fig. 4 is a longitudinal sectional view of the front joint.

Fig. 5 is a view in side elevation showing the relation of the tube and jacket when applying the breech joint.

Fig. 6 is a fragmentary longitudinal sectional view showing a modified form of collar unit.

Referring to Fig. 1, there is shown a gun barrel consisting of a jacket 5, a breech ring 6 threaded on the rear end of the jacket, and an inner tube or liner 7 inserted in the jacket and having a self sustaining muzzle portion 7a projecting from the jacket.

The inside of the jacket is tapered, the diameter gradually increasing from rear to front. The outside of the tube is cylindrical and the external diameter is less than the minimum internal diameter of the jacket so that it is possible to insert the tube from either the front or the rear of the jacket. This difference in diameters establishes a radial play space 8 that disappears when the gun is in action but is restorable when the gun is not in action to facilitate removal of the tube.

Since the pressure to which the gun barrel is subjected decreases from breech to muzzle the radial play space may have a correspondingly increasing value. This is conveniently provided by the relation existing between the cylindrical tube and the tapered jacket. The jacket is more or less of a permanent fixture and consequently considerably less labor is involved in tapering it than in tapering the numerous short-lived replaceable tubes.

A further advantage resulting from making the tube in the form of a cylinder consists in the uniformity that is obtained when cold-working the tube to produce self-hooping. This uniformity of denseness and homogeneity throughout the length of the tube insures equal resistance to strain at all points.

The tube is held against forward displacement with respect to the jacket by means of a collar formed of segments or half rings 9 engageable in an annular groove 10 adjacent the breech end of the tube and bearing against an annular shoulder 11 in the jacket. The shoulder is provided by a counterbored recess 12 the margin of which is threaded to receive a nut or ring 13 engageable with the rear face of the collar to prevent rearward movement of the tube.

The segments 9 of the collar each have a projecting key 14 which is partially receivable in key-ways 15 and 16 respectively in the tube and jacket. This key holds the tube against rotational displacement with respect to the jacket. While only one key is shown on each segment it is obvious that more may be employed.

The segments of the collar are placed in the groove of the tube when the tube is projecting from the rear of the jacket as shown in Fig. 5. The tube is then moved forwardly until the segments abut against the shoulder 11 and the ring 13 threaded to the jacket to complete the assembly. The segments are preferably covered with a heavy lubricant such as graphite which serves to seal the joint against the entry of moisture, facilitate their subsequent withdrawal and provide a fluid pressure medium acting as a lubricant during dilation of the tube. The separation of the segments when the gun barrel is in action is negligible. When replacing tubes the segments are removed from the old tube and applied to the new one.

The manner of applying the segments is advantageous in that it is not necessary to draw the muzzle portion 7*a* of the tube through the jacket. The muzzle portion is covered with paint and in service it may become roughened.

Referring to Fig. 4, the front joint between the tube and jacket consists of a gland 17 embracing the tube and fitting in a counterbored recess 18 in the tube. The gland is preferably formed with an internal annular groove 19 and an external annular groove 20 both filled with a lubricant such as graphite to effect a seal against the entry of moisture.

The gland will not interfere with the longitudinal expansion and contraction of the tube and when necessary it is radially compressible. It may be fixed to one or the other of the members in the manner of the ring 13 at the breech. Where the collar 9 is not present to effect a seal, the ring 13 may carry a packing ring 21.

In the modification shown in Fig. 6 the collar 9*a* is in one piece, the ring 13*a* engaging the full height of the collar and being threaded to the tube as well as the jacket.

I claim:

1. In a gun a jacket having a tapered bore increasing from rear to front, an externally cylindrical tube within the jacket, the diameter of the tube being less than the minimum diameter of the bore of the jacket to establish a radial play space restorable after firing.

2. In a gun, a jacket, a tube insertable in the jacket, the maximum diameter of the tube being less than the minimum diameter of the bore of the jacket, a segmental collar having keys engageable with both the tube and jacket adjacent the breech end, and retaining means attachable to the jacket and engageable with the collar.

3. In a gun, a jacket, a tube insertable in the jacket, the maximum diameter of the tube being less than the minimum diameter of the bore of the jacket, a collar having keys engageable with both the tube and jacket adjacent the breech end, and retaining means attachable to the jacket and engageable with the collar.

4. In a gun, a jacket, a tube insertable in the jacket, a segmental collar having keys engageable with both the tube and joint adjacent the breech end, and retaining means attachable to the jacket and engageable with the collar.

5. In a gun, a jacket, a tube insertable in the jacket, a collar having keys engageable with both the tube and jacket adjacent the breech end, and retaining means attachable to the jacket and engageable with the collar.

6. In a gun, a jacket, a tube insertable in the jacket, and spaced therefrom to establish a radial play space, an immobilizing connection between the jacket and tube at the breech end establishing a seal, and a movable sealed joint between the jacket and tube at the muzzle end.

7. In a gun, a jacket, a tube insertable in the jacket and spaced therefrom to establish a radial play space, and a seal between the jacket and tube at both ends of the jacket.

8. In a gun, a jacket, a tube insertable in the jacket and spaced therefrom to establish a radial play space, and a deformable seal restorable after firing between the forward end of the jacket and the tube for closing the radial play space.

GREGORY J. KESSENICH.

CERTIFICATE OF CORRECTION.

Patent No. 1,903,295. April 4, 1933.

GREGORY J. KESSENICH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 94, claim 8, strike out the words "restorable after firing" and insert the same after "space" in line 93; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of May, A. D. 1933.

M. J. Moore.

(Seal)

Acting Commissioner of Patents.

CERTIFICATE OF CORRECTION.

Patent No. 1,903,295. April 4, 1933.

GREGORY J. KESSENICH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 94, claim 8, strike out the words "restorable after firing" and insert the same after "space" in line 93; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of May, A. D. 1933.

(Seal)

M. J. Moore.

Acting Commissioner of Patents.