Sept. 9, 1952 J. C. GARAND 2,609,631

MEANS FOR SECURING LINERS TO FIREARM BARRELS

Filed May 24, 1948

Fig. 1.

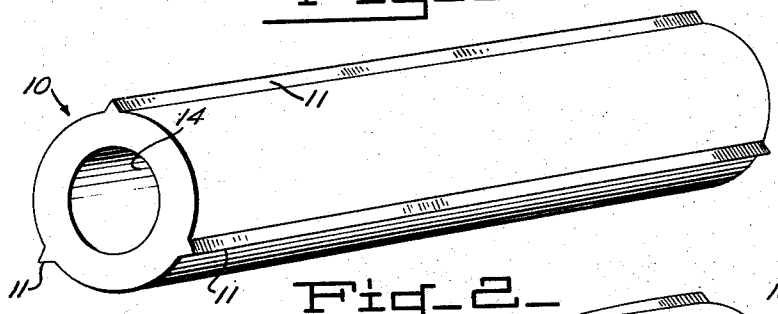


Fig. 2.

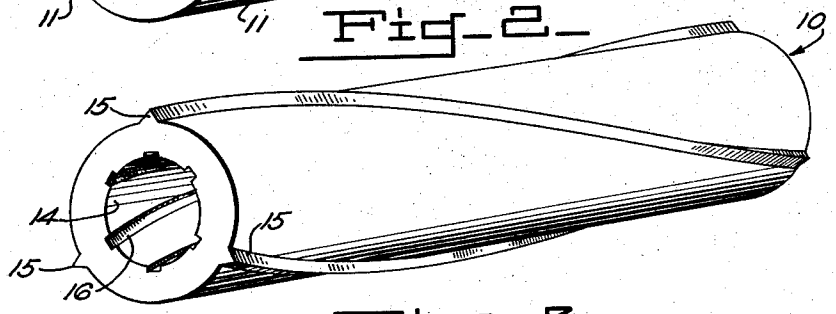


Fig. 3.

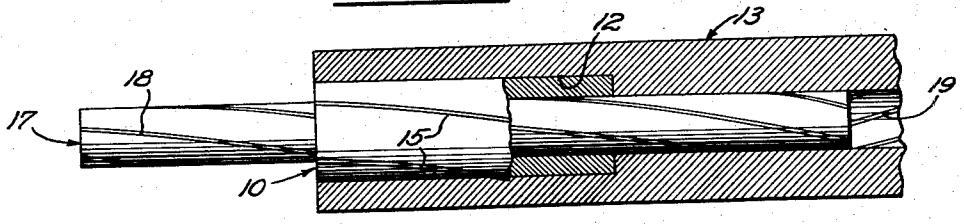
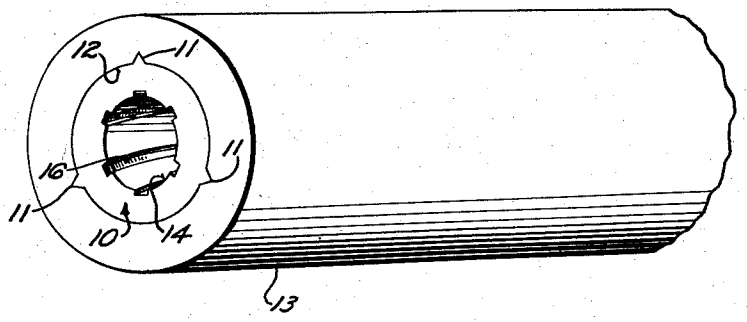


Fig. 4.



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MEANS FOR SECURING LINERS TO FIREARM BARRELS

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2 Claims. (Cl. 42—76)

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

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The invention described in the specification and claims may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to means for fastening a liner to a firearm barrel for securing such liner against displacement due to rotation of the projectile and to a method for aligning a rifled barrel liner with the rifling of the barrel.

It is common knowledge in the firearm art that the heat of combustion of the powder in the firearm barrel is concentrated slightly ahead of the chamber. This concentration of heat plus the erosive effect of the gases rapidly erodes the bullet seat and consequently shortens the accuracy life of the barrel. Among the few successful devices employed to overcome such erosion is a liner fabricated from a highly corrosive and erosive resistant material known as Stellite. The firearm barrel is bored out at the breech end to accommodate such liner and such liner extends preferably several inches beyond the "hot spot" forwardly of the chamber.

While a liner made of this material has more than proven its worth, considerable trouble has been encountered in securing the liner to the barrel so that such liner will remain immovably in place. The rotation of the bullet due to the rifling in the liner sets up a torque force of considerable magnitude which eventually unseats the liner in the barrel. One of the means commonly employed for securing the liner to the barrel is by threads including shrinking of the liner simultaneously with screwing the liner into the barrel. Other means for securing the liner to the barrel includes pinning or screws, or a combination of both. Experience has shown, however, that none of the securing means utilized so far has proven satisfactory for the reason that the torque forces transmitted to the barrel liner are of such a high order that the securing means are entirely inadequate to hold the liner in place without subsequent displacement after a somewhat limited use of the firearm barrel.

When the liner is axially displaced by the rotation of the projectile even though such displacement be a minute amount, an opening is produced between the end of the liner and the bottom of the counterbore provided in the barrel to accommodate the liner. It is thus possible for a portion of the propulsion gases to enter such opening and thus act to hasten the separation of the liner from the barrel proper.

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This obviously is not a good condition as unpredictable forces are then acting on the barrel and forces which are not considered in the design of the barrel with the result that dangerous fractures may obtain particularly if the barrel has been weakened in machining prior to insertion of the liner. In addition to this the liner may be rapidly displaced rearwardly with extremely harmful effects.

As the barrel liner above-referred to extends a short distance beyond the throat of the chamber, such liner must be rifled in order to properly start the bullet on its way. It should also be obvious therefore, especially to those skilled in the art that the liner must be immovably secured to the barrel, otherwise any displacement of the liner either radially or axially will misalign the rifling in such liner with the rifling in the barrel thereby contributing to loss of accuracy of the projectile.

Accordingly it is an object of this invention to provide means for securing a barrel liner to a firearm barrel whereby the liner is secured against the torque of the bullet to immovably secure such liner to the barrel.

Another object of this invention is to provide a method for securing a rifled liner to a firearm barrel having corresponding rifling wherein the rifling of the liner is aligned with the barrel rifling.

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 drawings in which:

Fig. 1 illustrates a barrel liner showing the key securing means constructed in accordance with this invention in enlarged detail.

Fig. 2 is a view similar to Fig. 1 showing another arrangement of the securing means of this invention.

Fig. 3 is a fragmentary view of a firearm barrel shown partly in longitudinal section with a barrel liner secured in place therein by means of this invention and also illustrating the manner of aligning the rifling in such liner with the rifling of the firearm barrel.

Fig. 4 illustrates a firearm barrel showing the liner secured therein by the device of this invention.

In Fig. 1 there is shown a rifle barrel liner 10 embodying one form of this invention. Liner 10 is preferably made from a highly corrosion and erosion resistant material such as Stellite. A plurality of longitudinally disposed keys 11 are

provided about the outside surface of liner 10 and are preferably evenly disposed thereabout. A preferred form of keys 11 is a substantially prismatic shape as shown in Fig. 1. The shape of such keys however is not limited to such form as other shapes may be employed and still lie within the scope of this invention. Keys 11 may be of any height desired and any number of such keys may be provided about the periphery of liner 10. Still further, keys 11 may extend the full length of liner 10 or only part way as desired. At any rate such keys should extend a sufficient distance to insure adequate locking engagement when liner 10 is assembled into a barrel 13.

Keys 11 disposed longitudinally on the surface of liner 10 parallel to the axis of such liner are preferably utilized when chambering and rifling of the liner are to be done after the liner is assembled to the barrel. Keys 11 are integrally formed with liner 10 and may be produced by casting or machining. A counterbore 12 is provided in firearm barrel 13 of suitable shape to accommodate liner 10. Liner 10 is of such a size as to obtain a tight press fit. Liner 10 is forced into counterbore 12 as by a hydraulic press. As liner 10 is forced into barrel 13, keys 11 provided on such liner cut their own recesses as such liner is forced into the barrel. When liner 10 is fully seated, keys 11 are then firmly embedded in the side wall of barrel 13. The sectional area of keys 11 is such as to adequately resist any shearing action produced by the tendency of liner 10 to rotate due to the torque forces imparted to such liner by the rotation of the projectile passing therethrough. Thus liner 10 is securely held in barrel 13.

In the fabrication of liner 10, it is sometimes more convenient to rifle and chamber such liner prior to assembly to barrel 13. Rifling 16 provided in a bore 14 in liner 10 corresponds to rifling 19 provided in the bore of barrel 13. In this instance, keys 15 are then helically disposed on the periphery of liner 10 having a lead corresponding to that of rifling 16 and 19. A mandrel 17 is utilized for aligning the rifling 16 of liner 10 with rifling 19 of barrel 13 when assembling liner 10 to barrel 13.

Mandrel 17 is provided with keys 18 which are engageable with rifling 16 and 19. Liner 10 is placed over mandrel 17 and then such liner is forced into counterbore 12 by a suitable press. The keys 18 on mandrel 17 cooperate with rifling 16 to induce such liner to revolve in accordance with the lead of keys 18 on the mandrel. Thus when liner 10 is fully seated in counterbore 12, rifling 16 therein will be aligned with rifling 19 in barrel 13. Helically disposed keys 15 will then be embedded in the wall of barrel 13, such keys cutting their own path.

It is therefore apparent from the foregoing description to those skilled in the art that there is here provided a positive locking means for securing a barrel liner to a firearm barrel which will positively secure the liner in the barrel against the torque forces of the projectile produced by rotation thereof. The securing means of this invention eliminates costly manufacturing techniques required with prior art devices and

provides for a liner cheaper to produce and one which is easier and more securely fastened in the barrel. This invention also discloses a novel method for aligning the rifling with the barrel rifling while simultaneously securing the liner to the barrel. While the preferred form of this invention is utilized to secure a liner to a barrel, it is desired to emphasize that the securing means of this invention is readily applicable to any other similar situations wherein a tubular member must be secured within another member in such fashion as to overcome the torque produced by the rotational effect of a body passing through such member.

I claim:

1. In a firearm barrel having a counterbored breech end, a liner comprising a tubular body having an external diameter of sufficient size relative to the internal diameter of the barrel counterbore to form a press-fit therebetween, and a plurality of radially disposed key members projecting outwardly from the exterior periphery of said liner and extending longitudinally from the rear to the front end thereof, said key members being of triangular configuration terminating in an outer knife-like cutting edge embeddable in the wall of the barrel counterbore during the act of forcing said liner therein whereby said liner is immovably secured in the barrel against rotational and longitudinal displacement.

2. In a firearm barrel having a rifled bore terminating in a counterbored breech end, a liner comprising a tubular body having interior rifling of the same lead and size as the barrel rifling, said tubular body having an external diameter of sufficient size relative to the internal diameter of the barrel counterbore to form a press-fit therebetween, and a plurality of radially disposed key members projecting outwardly from the exterior periphery of said liner and extending helically from the rear to the front end thereof with the same lead as the rifling in said liner and in the barrel, said key members being of triangular configuration terminating in an outer knife-like cutting edge embeddable in the wall of the barrel counterbore during the act of forcing said liner therein whereby said liner is immovably secured in the barrel against rotational and longitudinal displacement.

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