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METHOD OF AND MEANS FOR RIFLING GUNS.

APPLICATION FILED JUNE 4, 1918.

1,310,933.

Patented July 22, 1919.

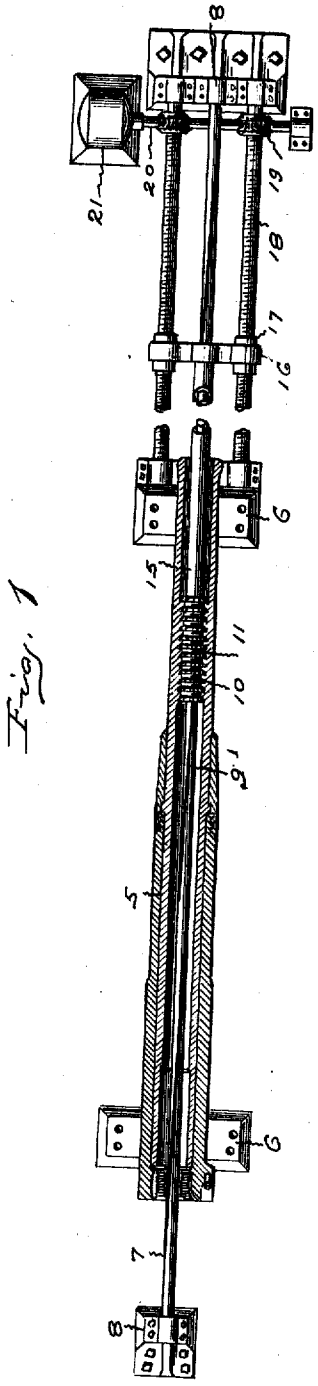


Fig. 1

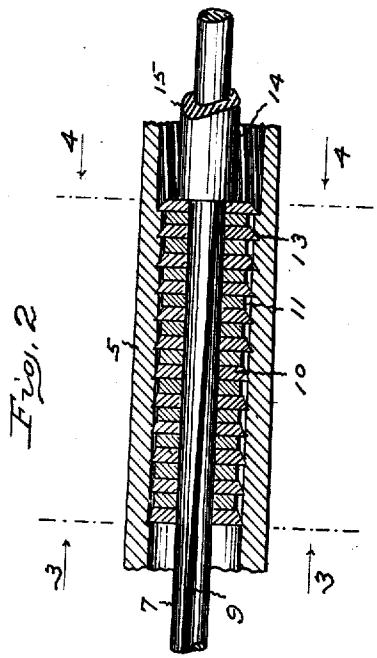


Fig. 2

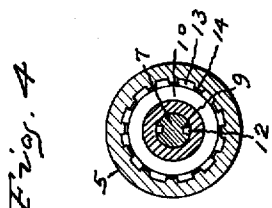


Fig. 4

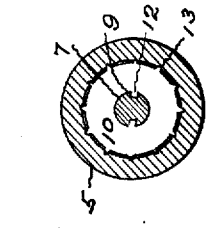


Fig. 3

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METHOD OF AND MEANS FOR RIFLING GUNS.

1,310,933. Specification of Letters Patent. Patented July 22, 1919.

Application filed June 4, 1918. Serial No. 238,106.

To all whom it may concern:

Be it known that we, EDWARD A. SUVERKROP, a citizen of the United States, residing at Sea Cliff, Long Island, New York, and ETHAN VIALL, a citizen of the United States, residing at East Orange, New Jersey, have invented a new and useful Improvement in Methods of and Means for Rifling Guns, of which the following is a specification.

This invention relates to a method of and means for forming the rifling lands in guns, and while it can be adapted for rifing the barrels of small arms it is more especially serviceable for cutting the rifling grooves in the tubes of heavy ordnance, such as field pieces, anti-air craft, coast defense and naval guns, particularly those pieces in which the rifling has a progressive twist.

The object of the invention is to provide a simple method and relatively inexpensive means whereby the grooves may be cut either forwardly or backwardly, as is considered most expedient, and the rifling lands formed very rapidly with any predetermined increasing or decreasing or uniform twist which is called for.

In attaining this end according to this invention all or a majority of the rifling grooves are cut at the same time and completed or substantially finished by one continuous passage of the broaching tool through the gun, the gun being held stationary, the tool guide being held fixed in the axis of the bore of the gun, and the broaching tool being made up of a plural number of independent toothed cutters so formed and arranged that each cutter, as they are pushed through the bore of the stationary gun and follow the fixed guide therein, removes more of the metal than the preceding cutter, and thereby the roughing out and finishing of the grooves proceeds coincidently.

In the accompanying drawings Figure 1 shows a horizontal section of a field gun being treated according to this invention and a plan of one form of apparatus which may be used for practising the invention. Fig. 2, on much larger scale, shows a section of a short length of the gun with the grooving cutters being pushed therethrough on the guide therein. Fig. 3 shows a transverse section on the plane indicated by the dotted line 3—3 on Fig. 2, looking toward the front of the first toothed cutter, that is, the one which makes the smallest cut. Fig. 4 shows a transverse section on the plane indicated by the dotted line 4—4 on Fig. 2, looking toward the back of the cutter that makes the largest or final cut.

In the views a common type of gun 5 is shown as mounted upon pillow blocks 6 to which the gun is firmly secured against movement of any kind while the rifling grooves are being cut. Extending longitudinally through the gun and some distance beyond each end is a circular shaft or guide bar 7. The bar is supported at its ends by standards 8 and is held firmly against movement with its axis coinciding exactly with the axis of the bore of the gun. Along the length of the bar are one or more, preferably two, grooves or guideways 9. These guide grooves are cut on a spiral or twist having exactly the same pitch as the rifling grooves to be cut, and it is essential, if the rifling twist is progressive, that the bar be positioned longitudinally in the bore so that at all points the pitch of the grooves will be the same as the predetermined pitch of the rifling, for the grooves in the bar determine the twist of the cuts made in the wall of the bore of the gun.

Fitted upon and movable along this fixed guide bar is a broaching tool which consists of a plural number of independent toothed cutting blades 10. These blades are separated by spacing washers or thrust collars 11 of suitable material. The cutting blades are in the form of annular disks and they have keys 12 that fit into the grooves in the guide bar. The outer edges of these blades which make up the broaching tool are provided with cutting teeth 13, desirably equal in number to all of the rifling grooves to be cut in the gun. These teeth are so ground and the blades are so located upon the guide bar that the advanced blade will make slight cuts, as shown in Fig. 3, the next making increased cuts and so on, each blade increasing the cuts until the last blade completes the grooves and forms the rifling lands 14 to finished size and shape, as shown in Fig. 4.

In the apparatus illustrated these toothed disk-like cutting blades which form the broach are forced through the bore of the gun by means of a tube 15 which is shown as pushed by a cross head 16 having nuts 17

fitting lead screws 18. These lead screws may be provided with worm wheels 19 which may be turned by worms on a shaft 20 that can be driven by a motor 21. The views illustrate the rifling as commencing at the muzzle and working toward the breech. It can, however, be commenced at the breech and worked toward the muzzle by simply mounting the gun end for end and turning the guide end for end.

With the construction described each cutting blade is free to take such a rotative movement as will be imparted by the grooves of the guide bar without interfering with the different rotative movement necessarily taken by the cutters from which it is separated by the spacing washers or thrust collars, which is essential when the cutters are being pushed through the bore and the rifling pitch is to be progressive, that is, increases in twist from breech to muzzle, or decreases in twist from muzzle to breech, according to the method adopted of commencing the rifling at breech or muzzle.

Great power can be applied with such an apparatus as is illustrated and as each cutter is required to cut but its own small section of the grooves the cuts are clean and true, and the entire grooving can be accomplished at the required pitch by once forcing the broach through the gun. As the guide bar is rigid in the bore of the stationary gun and merely has to guide the cutting blades the work can be accomplished very rapidly without great power but with exceedingly accurate results. Of course, if desired, the cutters may be so ground that, to complete the rifling, the broach may be passed through the bore of the gun more than once.

The invention claimed is;

1. The method of rifling a gun which consists in mounting the gun in a fixed position, fixing a guide bar in the bore of the gun with its axis coinciding with the axis of the bore, and simultaneously forcing a plural number of independent cutters having teeth of increasing size along the guide bar through the bore of the gun, and thereby at one continuous operation roughing and finishing the rifling grooves.

2. The method of rifling a gun which consists in mounting the gun in a fixed position, fixing a guide bar in the bore of the gun with its axis coinciding with the axis of the bore, and simultaneously advancing with a spiral movement a plural number of independent cutters having teeth of increasing size along the guide bar through the bore of the gun, and thereby at one continuous operation roughing and finishing the rifling grooves.

3. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun, and thereby at one continuous operation roughing and finishing the rifling grooves.

4. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun and imparting a rotary movement to the cutters as they are advanced, and thereby at one continuous operation roughing and finishing the rifling grooves.

5. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun and imparting an increasing rotary movement to the cutters as they are advanced and thereby at one continuous operation roughing and finishing the rifling grooves.

6. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun and imparting from the interior of the gun a rotative movement to the cutters as they advance, and thereby at one continuous operation roughing and finishing the rifling grooves.

7. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun, and thereby in one continuous operation forming rifling grooves in the bore which are deeper than the cut made by the first cutter.

8. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters having teeth of increasing size through the bore of the gun, and guiding said cutters from the interior of the gun and thereby in one continuous operation forming rifling grooves in the bore which are deeper than the cut made by the first cutter.

9. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters through the bore of the gun and supporting said cutters in the interior of the gun.

10. The method of rifling a gun which consists in simultaneously forcing a plural number of independent cutters through the bore of the gun and supporting and guiding said cutters from the interior of the gun.

11. The method of rifling a gun which consists in simultaneously forcing a plural number of independently rotatable cutters with a rotative advancing movement through the bore of the gun.

12. Means for cutting rifling grooves in the bore of a gun consisting of a fixed guide bar, a plural number of independent cutters movable along said guide bar and given

a rotative movement thereby, and means for moving said cutters along said guide bar.

13. Means for cutting rifling grooves in the bore of a gun consisting of a fixed guide bar, independent cutters having teeth of increasing size movable along said bar and guided thereby, and means for moving the cutters along the bar.

14. Means for cutting rifling grooves in the bore of a gun which consists of a spirally grooved guide bar, independent cutters movable along said guide bar and guided by said groove, and means for moving the cutters along the guide bar.

15. Means for cutting rifling grooves in the bore of a gun consisting of a fixed grooved guide bar and a broach movable along said bar and guided thereby, said broach consisting of a plural number of independent blades provided with cutting teeth of different sizes.

16. Means for cutting rifling grooves in the bore of a gun consisting of a fixed guide bar, a plural number of independent cutters movable along said guide bar and given a progressive rotative movement thereby, and means for moving said cutters along said guide bar.

17. Means for cutting rifling grooves in the bore of a gun consisting of a fixed guide bar, independent cutters having teeth of increasing size movable along said bar and guided thereby, means separating said cutters, and means for moving the cutters along the bar.

18. Means for cutting rifling grooves in the bore of a gun consisting of a fixed grooved guide bar and a broach movable along said bar and guided thereby, said broach consisting of a plural number of independent cutting blades provided with teeth of different sizes and also provided with keys fitting the grooves of the guide bar.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."