May 22, 1923. 1,455,771

M. ANDERSON

PROCESS FOR EXPANDING AND SMOOTHING THE BORES IN GUN BARRELS

Filed Oct. 25, 1918

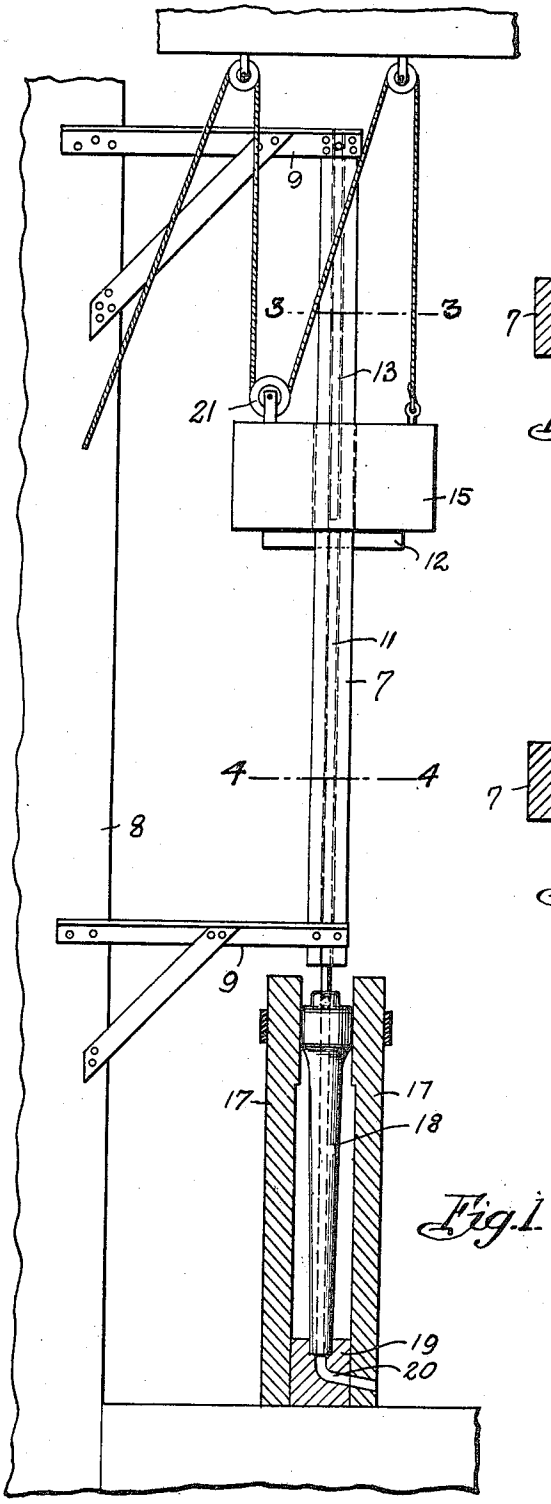


Fig. 1.

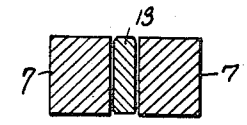


Fig. 3.

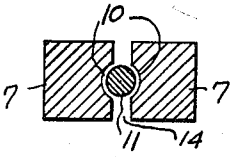


Fig. 4.

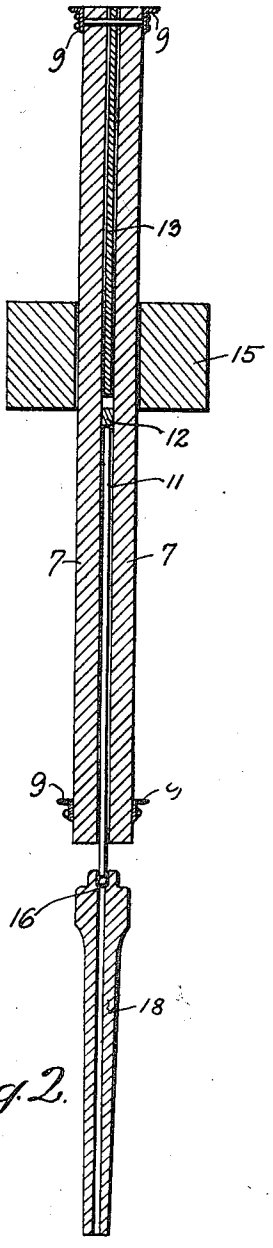


Fig. 2.

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UNITED STATES PATENT OFFICE.

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PROCESS FOR EXPANDING AND SMOOTHING THE BORES IN GUN BARRELS.

Application filed October 25, 1918. Serial No. 259,701.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, MARTIN ANDERSON, a subject of the King of Great Britain, residing at Randwick, near Sydney, in the State of New South Wales, Commonwealth of Australia, have invented certain new and useful Improvements in the Processes for Expanding and Smoothing the Bores in Gun Barrels (for which I have filed application in Australia, No. 1973, filed September 5, 1916; Great Britain, No. 12995, filed September 11, 1917), of which the following is a specification.

This invention relates to an improved process for expanding and smoothing the bores of gun barrels. Heretofore it has been the usual practice to bore a hole in the barrel to a size somewhat smaller than the bore will be when finished after which the hole is subjected to a series of reaming operations with special tools. These operations are tedious, expensive and not quite accurate in their result. The object of the present invention is to dispense with or simplify the subsequent operations and thereby reduce the time and cost.

According to my invention it is desirable to mount the barrel in a suitable matrix bed or retaining frame in order to avoid the possibility of distortion whilst it is undergoing the pressure necessary to the operation of expanding and smoothing the bore.

When the hole has been bored, as the internal surface will be left comparatively rough, it is advisable that a preliminary reaming or like operation should remove the superficial inequalities due to the passage of the boring tool. When the internal surface of the bore has been made sufficiently smooth for my process, a sphere or ball of hardened steel or material harder than the metal of the barrel is introduced into one end and forced therethrough by any suitable means such as by hydraulic or mechanical pressure. It is obviously requisite that the hardened sphere must be of a diameter slightly larger than the bore through which it is to be forced. In a succession of repeated operations in the same bore it is necessary that each successive sphere should be progressively larger than the sphere used in the preceding operation. For example, if the bore drilled be .293 the diameter of the sphere is preferably .295; in the next operation .298 and so on until a bore of say .303 has been attained.

The effect of forcing the hardened sphere or spheres through the bore is that the internal surface is slightly compressed at each operation and finally presents a polished smooth surface.

In practice, I find that a convenient way of carrying out the process is to rigidly secure the barrel in a matrix or frame in an absolutely vertical position. Above the barrel I provide a rod or plunger preferably of hardened steel in absolute alignment with the bore and freely movable in guides. Supported above the upper end of the rod is a suitable weight acting upon the upper end of the rod to force the sphere through the hole or bore leaving it smooth and polished.

In the drawings herewith is illustrated simple apparatus for carrying out my process.

Figure 1 is a side elevation, and,

Figure 2 a central section of the apparatus.

Figures 3 and 4 are sectional plans on lines 3—3 and 4—4 respectively of Figure 1.

In the drawings 7 represents two steel bars vertically supported to a framing 8 by brackets 9. In each of the bars is formed a groove 10 for a sliding rod 11 which is secured to a crosspiece 12. In the upper portion of the bars is a distance piece 13 for the purpose of obtaining greater rigidity. 14 is a vertical opening in which the cross piece 12 moves upwardly or downwardly. 15 represents a suitable weight adapted to slide on the bars 7 and to be raised thereon by ropes and a pulley 21 or other suitable means. 17 are uprights placed adjacent the barrel 18 which is held in a vertical position by a support 19 said uprights taking the impact of the cross piece 12 on its descent with the rod 11. 16 represents a ball which is inserted in one end of the barrel the bore of which for a short distance at that end is slightly enlarged to take it which ball on release of the weight is forced by the rod 11 through the bore expanding and smoothing it. The barrel support 19 preferably has a channel 20 to facilitate quick escape of the balls from the lower end of the barrel. Alternatively the rod or plunger may be forced against the sphere by hydraulic or air pres-

sure. In the case of employing hydraulic or air pressure directly I preferably couple a connecting pipe from the pressure reservoir to the end of the barrel in which the sphere is placed and on turning on the pressure the sphere is forced through the hole.

The bore may then be rifled or otherwise treated as required.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:—

1. A method of expanding and smoothing gun barrels, which consists in first drilling or forming a bore in the gun to be made and subsequently forcing through said bore a hardened sphere of slightly larger diameter than the bore, said sphere being advanced through the gun bore under the influence of a heavy weight which is guided in its movement to effect rectilinear movement of the sphere.

2. A method of expanding and smoothing gun barrels, which consists in first drilling or forming a bore in the usual manner and subsequently forcing through said bore a sphere of material harder than the metal of the bore and of slightly greater diameter than the bore, said sphere being acted on by an element which is held in alignment with the gun barrel and which is directed axially through said bore by a heavy weight suspended above the gun barrel and guided in its downward movement.

3. The method of producing a cylindrical hole of exact diameter in a machine element or other article of rigid material, which consists in first making an approximately accurate hole of slightly smaller diameter by means of any appropriate tool or tools, and subsequently enlarging the same to the desired accurate size by forcing therethrough a spherical ball of relatively harder material than that of said article, the diameter of said ball being slightly greater than that of the diameter of the finished hole.

4. The method of producing a cylindrical hole of exact diameter in a machine element or other article of rigid material, which consists in first making an approximately accurate hole of slightly smaller diameter by means of any appropriate tool or tools, and subsequently enlarging the same to the desired accurate size by forcing therethrough a succession of spherical balls of relatively harder material than that of said article, the diameter of said balls being slightly greater than that of the diameter of the finished hole.

In testimony whereof I have hereunto set my hand.

MARTIN ANDERSON