E. A. GRENELLE.

PROJECTILE BANDING MACHINE.

APPLICATION FILED OCT. 30, 1916.

1,233,343.

Patented July 17, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

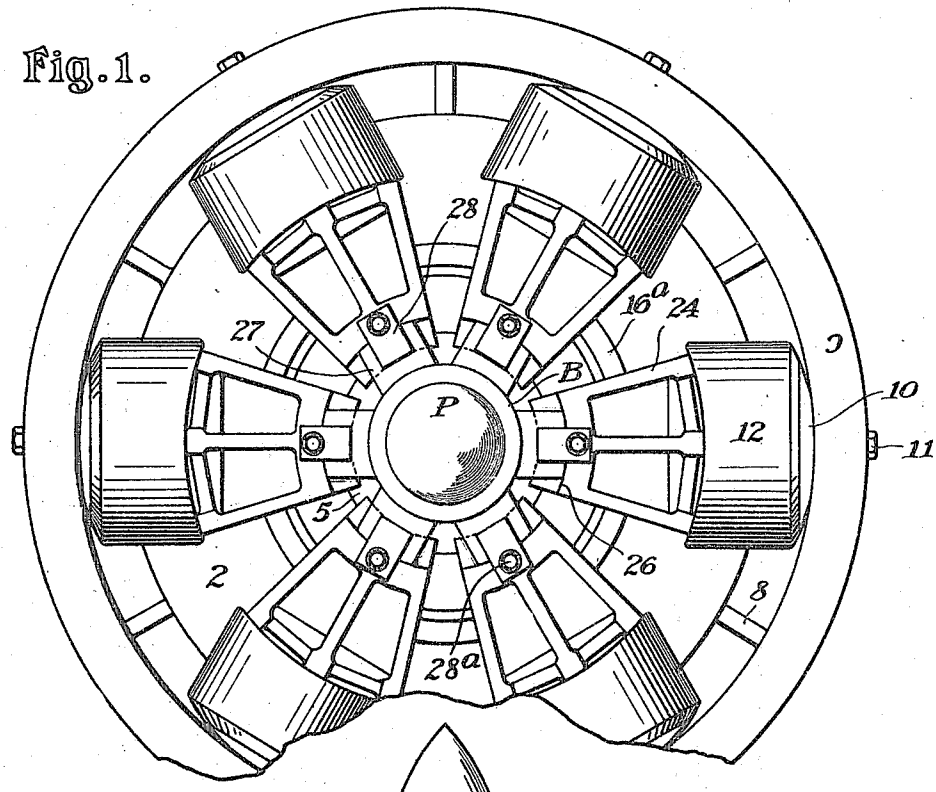
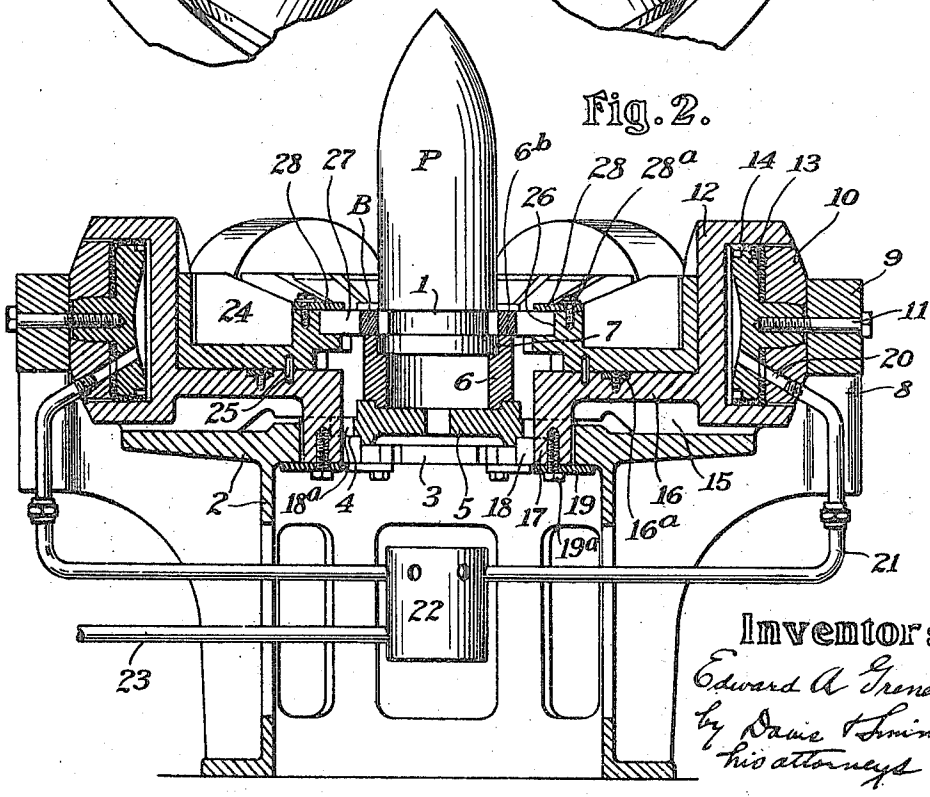


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

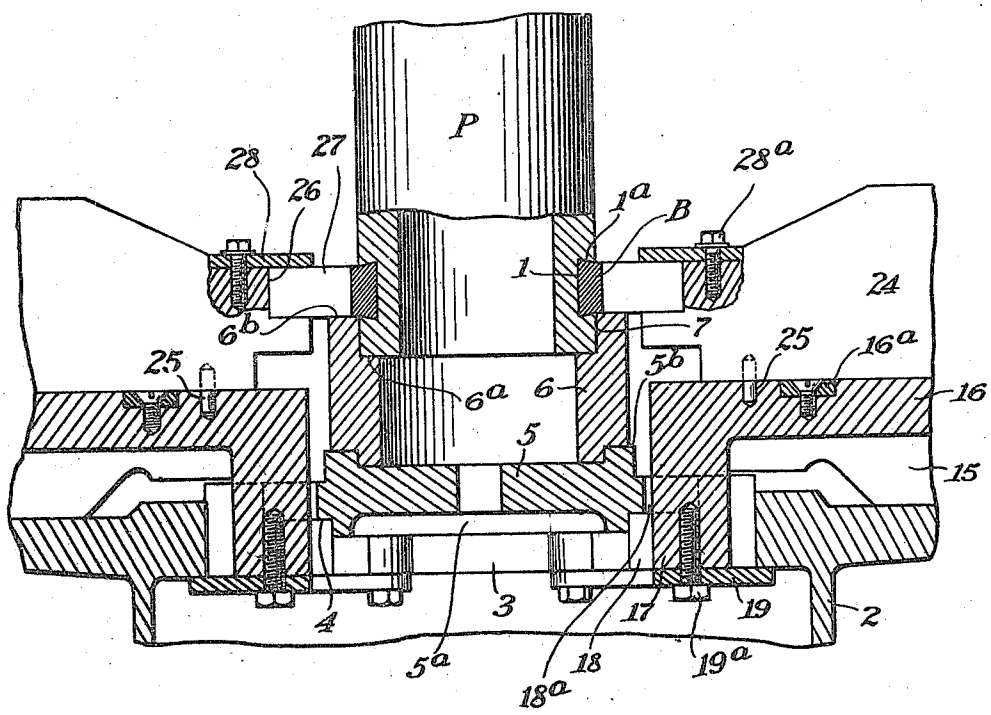


Fig. 4.

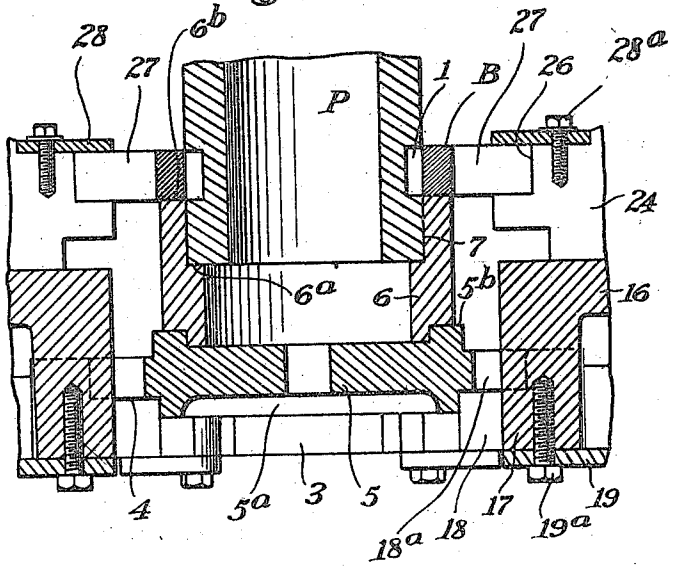
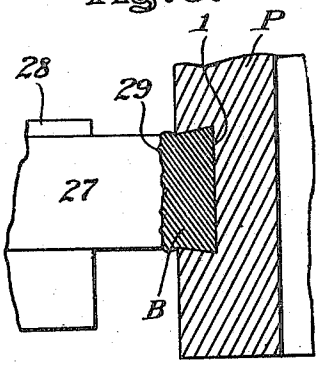


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PROJECTILE-BANDING MACHINE.

1,233,343. Specification of Letters Patent. Patented July 17, 1917.

Application filed October 30, 1916. Serial No. 128,427.

To all whom it may concern:

Be it known that I, EDWARD A. GRENELLE, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Projectile-Banding Machines, of which the following is a specification.

The present invention relates to projectile banding machines of the type which forces a soft metal band into a circumferential groove of a projectile, the purpose of the band being to conform to the rifling of the gun in order to provide a gas-tight joint between the projectile and the gun barrel during the flight of the projectile through the barrel. An object of this invention is to provide a banding machine which may be readily adapted to operate upon projectiles of different sizes and also upon projectiles in which the bands are located at different distances from the butt ends of the projectiles and this without requiring any preliminary insertion of the bands within the projectile grooves.

To this and other ends, the invention consists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:—

Figure 1 is a top plan view of a banding machine embodying the present invention;

Fig. 2 is a central vertical section through the machine;

Fig. 3 is a partial section on an enlarged scale illustrating the operating portions of the invention as they appear after forcing the band upon the projectile;

Fig. 4 is a partial section of the machine showing the latter adjusted for operating upon another type of projectile, the band being shown in the position ready to be forced onto the projectile; and

Fig. 5 is an enlarged detail view showing a section of a gas band after it has been forced on a projectile.

Referring more particularly to the drawings, 2 indicates a base frame having a central opening 3 above which the projectile P is supported. This support comprises preferably a plate 5 having an annular reduced portion 5^a received within the central opening 3 to permit the plate to be held centered within said opening. This plate may have also an annular projection 5^b on the upper side thereof for centering the projectile supporting ring or member 6, which has two supporting surfaces 6^a and 6^b, the surface 6^a being engaged by the lower end of the projectile while the surface 6^b acts to support the band B. The plane of the surface 6^b is substantially the same as that of the bottom wall of the groove 1 of the projectile P so as to guide such band into said groove. It is apparent that the supporting band 6 and the supporting plate may be replaced by other bands and plates so that projectiles of other diameters and projectiles having their grooves located in different positions may be operated upon.

For the purpose of forcing the band into the groove of the projectile, a plurality of radially movable jaws 27 are provided, the lower faces of these jaws operating substantially in the plane of the band supporting surface 6^b and the jaws being substantially coextensive in height to the width of the band. These jaws are preferably detachably carried by jaw-carrying members 24, being in this instance held to seats 26 on the jaw-carrying members by means of clamping plates 28 which are secured by screws 28^a to the jaw-carrying members and overlap the jaws 27.

The jaw-carrying members are preferably operated by fluid operated devices each comprising a stationary piston and a movable cylinder 12. Each movable cylinder has a jaw-carrying member 24 detachably mounted thereon, preferably upon an extension 16, which has supporting ribs 15 on its under side and also has a guide extension 17 depending therefrom and operating within a recess or slot 18 in the base frame 2 and a slot 18^a in the plate 5, a plate 19 being secured to the lower end of the extension 17 by a bolt 19^a and serving to guide and hold the cylinder. The extensions 25 are connected so as to partake of a simultaneous movement by means of curved slides 16^a which are anchored at one end to one extension and are guided in the curved path on the other extension.

The piston of each of the fluid pressure devices comprises preferably two members 10 and 13 with a cupped packing 14 between them, said members being held to a ring 9 by a bolt 11 and the ring being supported by arms 8 from the base 2. Liquid or other

fluid may be forced, by way of piping 23, into the receiver 22 from which it is distributed by pipe branches 21 to the fluid pressure operated devices, a port 20 being provided in the piston by which the fluid enters the space between the piston and the cylinder.

The jaw-carrying members 24 rest upon the extensions 16 and are held against movement thereon by pins 25. The jaws 27 are so arranged that they are in line with the axes of their respective cylinders 12 so that the action of the fluid pressure devices will be direct.

In Fig. 5 the jaw 27 is formed with a grooved or serrated face 29 to produce corrugations or serrations on the band. Usually these corrugations are formed on the projectile band after the latter has been pressed in the projectile groove and by this invention this separate operation is unnecessary. These corrugations also tend to force the metal into an undercut groove.

In operation, a projectile and band support is selected which will bring the band in alinement with the centers of the cylinders and also in alinement with the groove of the projectile. Upon the admission of fluid to the cylinders, the jaws 27 are caused to force the band B simultaneously in the direction of a plurality of the diameters of the band, so that the latter is caused to enter the groove 1, the pressure being so controlled that the proper pressure is secured to cause the band to entirely fill the groove even though the latter be undercut, as shown in Fig. 3. At the finish of the compressing action, the dies or jaws 27 will have their adjacent ends substantially in abutment so that no portion of the band will be uncompressed.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A banding machine for projectiles comprising a supporting surface for the projectile, a supporting surface for the band arranged above the supporting surface for the projectile in a plane with the lower edge of the band groove in the projectile, and a plurality of compression jaws movable radially with reference to the longitudinal axis of the projectile and having their under faces operating substantially in the plane of the band supporting surface.

2. A banding machine for projectiles comprising a plurality of radially movable jaws, and a detachable ring arranged centrally of said jaws and having two supporting surfaces thereon, one for supporting the projectile and the other for supporting the band in a position for entry into the groove of the projectile, the band supporting surface being substantially in the plane of movement of the under surface of the radially movable jaws.

3. A banding machine for projectiles comprising a base frame, a detachable plate mounted on the base frame, a ring detachably supported on said plate and having two supporting surfaces, one for the projectile and one for the band, and a plurality of compression jaws each having a face movable substantially in a plane with the plane of the band supporting surface.

4. A banding machine comprising a base frame having a central opening, a detachable plate supported on the base frame, a ring detachably supported on the plate and having two supporting surfaces, one for the band and one for the projectile, a plurality of fluid operated devices arranged on the base frame about the supporting plate and formed of two members, one of which is stationary and the other of which is movable, a jaw-carrying member detachably supported on each movable member of a fluid operated device, and a jaw detachably secured on each jaw-carrying member and having one face thereof movable substantially in the plane of the band supporting surface.

5. A banding machine for projectiles comprising a supporting surface for the projectile, a supporting surface for a band, and radially movable compression jaws arranged about the supporting means, each jaw having a face thereof operating substantially in the plane of the band supporting surface, and also having a corrugated face for engaging the band to force the latter into a groove of a projectile on the projectile supporting surface.

EDWARD A. GRENELLE.

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