No. 681,448. Patented Aug. 27, 1901.

E. GATHMANN.

PROJECTILE.

(Application filed Mar. 16, 1899.)

(No Model.) 2 Sheets—Sheet 1.

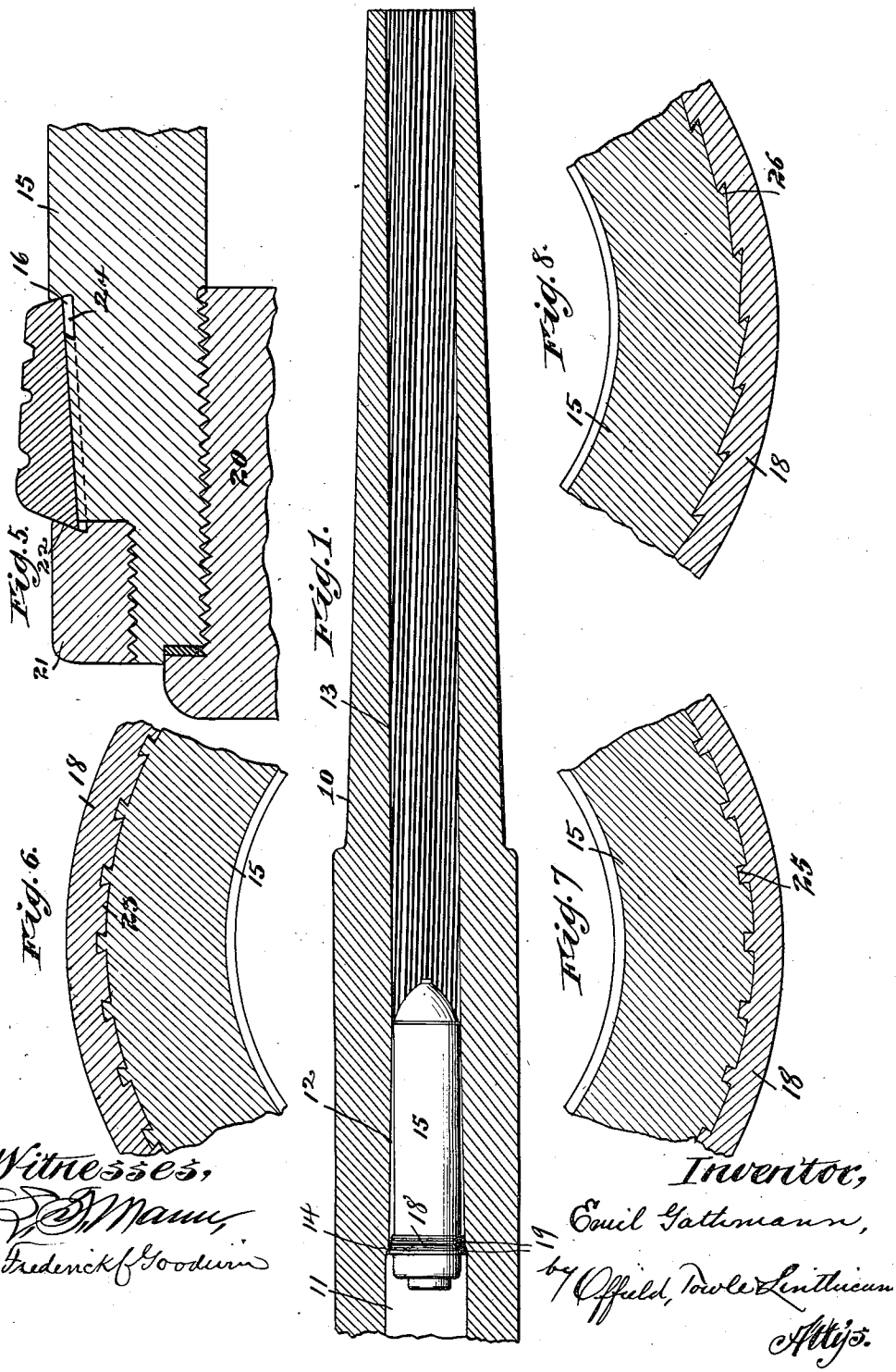

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Fig. 2.

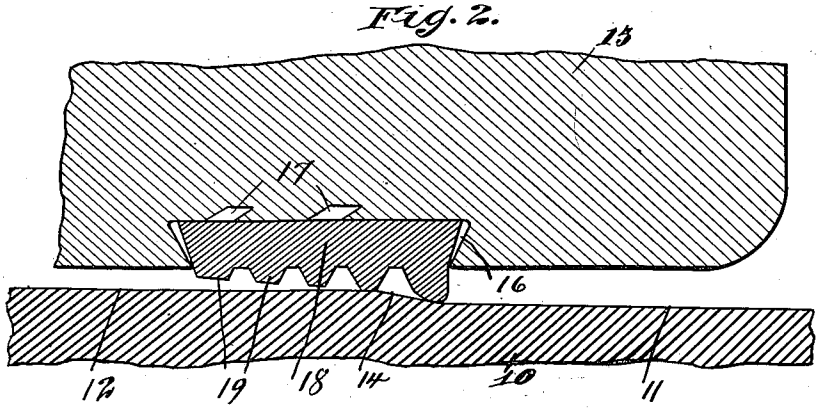


Fig. 3.

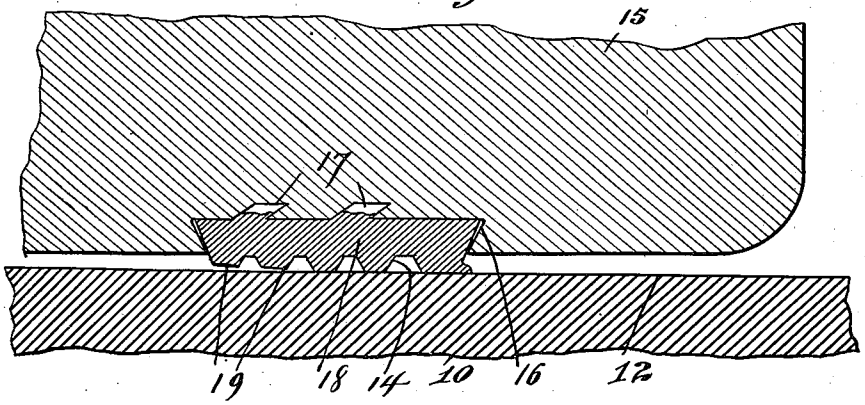
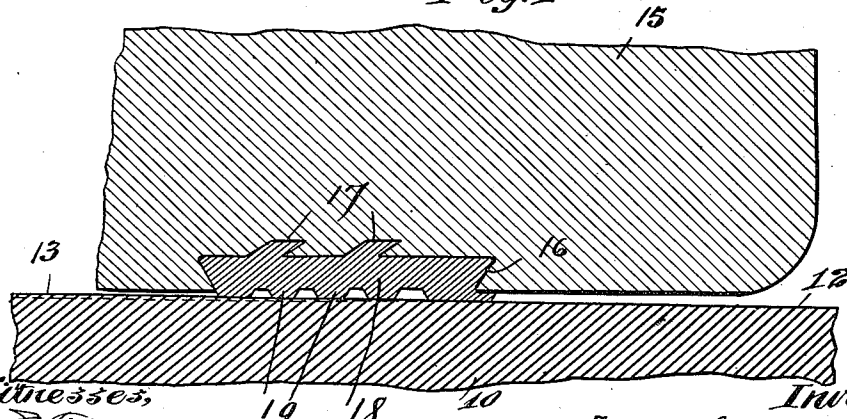


Fig. 4.



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UNITED STATES PATENT OFFICE.

EMIL GATHMANN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GATHMANN TORPEDO GUN COMPANY, OF SAME PLACE.

PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 681,448, dated August 27, 1901.

Application filed March 16, 1899. Serial No. 709,279. (No model.)

To all whom it may concern:

Be it known that I, EMIL GATHMANN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Guns and Projectiles Therefor, of which the following is a specification.

This invention relates to guns and projectiles therefor, and has for its object to provide a construction whereby the stripping of the compression-band from the projectile by reason of the centrifugal force generated by the whirling of the shell after it leaves the gun may be prevented; and to this end the invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 represents a longitudinal sectional view of a gun embodying my invention, a projectile being shown therein in full lines in its initial position. Fig. 2 is an enlarged detail sectional view through a portion of the gun and projectile at the compression-band of the latter, the parts being shown in the same relative position as in Fig. 1 of the drawings, or, in other words, in their initial position. Fig. 3 is a similar view illustrating the position of the parts after the projectile has advanced some distance into the gun. Fig. 4 is a similar view illustrating the parts in the position they assume when the projectile has entered the normal cylindrical or rifled portion of the gun and the compression-band has engaged with the rifling thereof. Fig. 5 is a detail view, in longitudinal section, of the base of a shell, illustrating a modified form of connection between the projectile and compression-band. Fig. 6 is a transverse sectional view of the structure shown in Fig. 5. Fig. 7 is a view similar to Fig. 6, illustrating a modification of the structure therein shown; and Fig. 8 is a similar view illustrating a further modification.

In ordnance as now constructed the projectile is usually provided with a compression-band of copper or the like to engage the rifling of the gun and impart a rotary motion to the projectile, and this engagement of the band with the projectile is effected by providing the projectile with a circumferential groove having slightly undercut margins, the band being bent so as to permit it to be slipped into place and then flattened out so as to thrust its edges underneath the undercut margins of the groove, and thereby cause it to engage the projectile. In practice it is found, particularly with high-explosive shells of large diameter, that this method of engaging the compression-band and projectile does not hold the band in place with sufficient strength to resist the centrifugal force produced by the whirling of the shell after it leaves the muzzle of the gun, in consequence of which the band is frequently torn or stripped from its place. I obviate this objection by the construction shown in the accompanying drawings, in which—

10 indicates the body of a gun having at its rear end the usual powder or charge chamber 11 and in advance of this a shell-chamber 12, lying intermediate between the powder-chamber and the chase or rifled bore 13 of the gun extending from the shell-chamber to the muzzle. The powder-chamber may be of any approved construction, being, as usual, of greater diameter than the shell and being connected with the shell-chamber 12 by means of a short inclined shoulder 14 in the usual manner. The shell-chamber 12 is of a gradually-decreasing diameter from rear to front, as shown in Fig. 1, and merging gradually into the rifled portion of the bore at its forward end, being, however, of greater diameter than the body of the shell at its forward end as well as at its rear end.

The projectile, the body of which is indicated at 15, is provided near its base with a circumferential groove 16, having its front and rear walls undercut to a comparatively great extent, as will appear more particularly from an examination of Figs. 2, 3, and 4 of the drawings, and there are preferably formed in the bottom of this groove 16 one or more inclined annular grooves 17, as shown in said figures. The compression-band, which is indicated at 18, is constructed of copper or other like material and is preferably provided with a plurality of circumferential ribs or projections 19 on its exterior, these projections preferably increasing in height rearwardly, as clearly shown in Fig. 2 of the drawings. This compression-band is smooth or without projec-

tions on its inner face when applied to the projectile and may be inserted in position in the manner shown in Fig. 2 by bending it so as to permit it to pass the comparatively narrow mouth of the groove 16, as in the case of the ordinary compression-band. The undercutting of the said groove 16 is, however, so great that when the compression-band is straightened out or flattened, as shown in Fig. 2, it does not fully engage underneath the undercut walls of the groove. A projectile thus constructed when employed in combination with a gun of the character described operates in the following manner: Upon the explosion of the propelling charge the projectile moves forward through the shell-chamber, and the tapering or decrease in diameter of the said chamber exercises a compressing action upon the copper band 18, so as to gradually swage the same into position within the groove 16, as indicated in Figs. 3 and 4. In Fig. 3 of the drawings the shell is shown in the condition in which it exists when the compression-band has passed partly through the shell-chamber, and it will be observed that the body of the band has not only been forced outward to a considerably greater extent underneath the undercut walls of the groove 16, but that a portion of the body at the base or inner face thereof has also been forced into the inclined grooves 17. In Fig. 4 of the drawings the shell is shown in the position wherein the compression-band has engaged the rifling of the gun, and it will be observed that the body of the band is now fully forced under the front and rear walls of the groove in the projectile and completely fills the undercut portions thereof, while at the same time the copper of which the band is composed has been forced into and fills the inclined grooves 17, so that the compression-band is firmly united to and permanently held in engagement with the body of the projectile. This result is obtained by the very act of discharging the projectile from the gun, and the nature of the union is such that the band is firmly held in position around the projectile after the discharge thereof from the gun and will not be stripped or torn therefrom.

The invention is of course capable of embodiment in numerous modified forms, although the specific form which I have just described and which is shown in Figs. 1 to 4 of the drawings is that which I prefer. In Fig. 5 of the drawings, for instance, I have shown the projectile 15 as a shell having a breech-plug 20 and having the base portion of its body rabbeted and threaded to receive a clamping-ring 21, which has a beveled or undercut forward edge 22, which forms one of the shoulders of the circumferential groove 16, which receives the compression-band. In this construction the compression-band is placed in position within the groove before the ring 21 is screwed into place. I have also shown in this construction the base of the groove 16 as provided with supplemental grooves 23, extending longitudinally of the shell instead of circumferentially, as in the case of the grooves 17 shown in Figs. 2, 3, and 4. These grooves 23 are dovetailed in the construction shown in Fig. 6, and in order to facilitate the formation of these dovetailed grooves by the use of ordinary milling machinery or the like there is provided at the forward end of the groove 16 a circumferential or annular supplemental groove 24. It is obvious that in some respects this construction offers advantages in the application and resistance to torsional strain of the compression-band. The grooves 23 may be made of other than dovetail form, and in Fig. 7 of the drawings I have shown grooves 25 which are rectangular in cross-section, while in Fig. 8 of the drawings I have shown the bottom of the groove 16 as serrated or provided with grooves 26, having one inclined and one substantially radial face, the arrangement being such of course that the radial face resists the tendency of the band to move around the body of the projectile. Other modifications in the details of construction may be made, and I do not wish to be understood as limiting myself to the precise construction hereinbefore set forth, and shown in the drawings.

I claim—

1. A projectile having a circumferential groove with undercut front and rear walls and supplemental grooves with inclined walls formed in the base or inner face of said main groove, and a compression-band of comparatively soft metal seated within but not normally filling said main and supplemental grooves, said band being adapted to be pressed into engagement with said grooves by the wall of a tapering shell-chamber when the gun is discharged, substantially as described.

2. A projectile having a circumferential groove with undercut front and rear walls and annular inclined supplemental grooves formed in the base of the main groove, and a compression-band of comparatively soft metal seated within but not normally filling said main groove, said band being adapted to be pressed into engagement with said main or supplemental grooves by the wall of a tapering shell-chamber when the gun is discharged, substantially as described.

EMIL GATHMANN.

Witnesses:
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