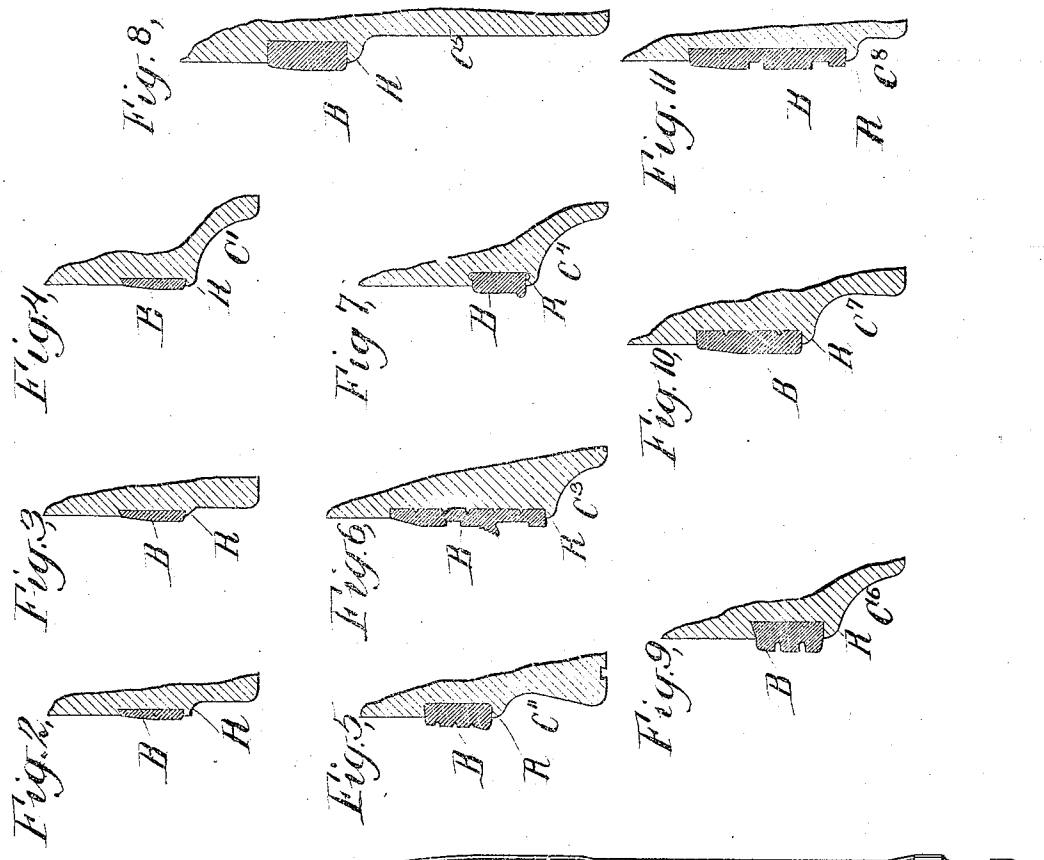
No. 725,385 PATENTED APR. 14, 1903.

C. VAN C. WHEELER & A. G. McKENNA.

PROJECTILE.

APPLICATION FILED JUNE 3, 1902.

NO MODEL.



WITNESSES:

E. Van Zandt, Jr.

H. G. Dyer

INVENTORS:

Charles Van Cin Wheeler

Alexander George McKenna

BY

ATTORNEY

BEST AVAILABLE COPY

UNITED STATES PATENT OFFICE.

CHARLES VAN CISE WHEELER, OF ALLEGHENY, AND ALEXANDER GEORGE McKENNA, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO FIRTH STIRLING STEEL COMPANY, A CORPORATION OF PENNSYLVANIA.

PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 725,385, dated April 14, 1903.

Application filed June 3, 1902. Serial No. 110,110. (No model.)

To all whom it may concern:

Be it known that we, CHARLES VAN CISE WHEELER, engineer, of Allegheny, and ALEXANDER GEORGE McKENNA, engineer, of Pittsburg, Pennsylvania, citizens of the United States of America, have invented certain new and useful Improvements in Projectiles, of which the following is a specification, illustrated by drawings.

The object of the present invention is to improve the formation of the base of projectiles, and especially those designed for armor-piercing in the vicinity of the band-score.

At the moment of impact of a projectile upon an armor-plate the relative strength of the projectile and the plate determines which shall yield. A very small increase in the strength of the projectile will determine whether it shall pierce the armor-plate or go to pieces without piercing. Consequently even a slight increase in difference in the strength of the projectile will determine absolutely whether it can or cannot pierce a plate of given strength. Probably the strongest portion of the modern armor-piercing projectile is the solid mass of the projectile immediately in front of the chamber. Projectiles fail frequently by the breaking off of the rear end of the projectile. This is often caused by the strains brought to bear upon the wall of the chamber of the projectile at the band-score at the instant the rifling-band or rotation-band, which is set in the band-score, reaches and is forced through the hole made in the plate by the projectile. The rifling-band, although of softer metal than the projectile, is usually set in a band-score, which to the extent of its depth weakens the wall of the projectile, for as the band projects and is of larger diameter than the rest of the projectile it produces a sudden increase of resistance and a consequent strain upon the weakened wall of the chamber at that point.

The object of the present invention is to so conform the wall of the projectile behind the band that the band and an exterior portion of the projectile-wall may readily break off, leaving the chamber of the projectile absolutely intact. To facilitate this, it is desirable that the band-score itself be cut at a slight taper toward the rear, so that frictional resistance between the band and the band-score will be proportionally reduced, thus facilitating the breaking off of a thin ring of metal behind the band without creating excessive strains throughout the thickness of the wall of the chamber.

Under the present invention an annular space or recess is made behind the band and band-score, so that the breaking off of a thin ring of metal is thereby facilitated and at the same time space is preferably afforded for the broken fragments.

In the accompanying drawings, Figure 1 is a view of a projectile embodying the invention in one preferred form, one portion of the rear end of the projectile being shown in radial section. Figs. 2 to 11 are sectional views on radial sections of the rear corners of various projectiles of different design embodying the improvement.

In Fig. 1, B is the band set in the band-score of one form of United States naval projectile. E is the shoulder of the extraction-score. The bottom surface of the band-score may taper slightly rearward, so as to diminish frictional resistance between the band and the score and facilitate the directing of the strains produced by the band in a direction favorable to the breaking off of a ring of metal in the rear of the band instead of directing the strain through the thickness of the wall of the chamber. In the rear of the band-score is a cut-away portion C, which is preferably deeper than the band-score, so as to provide a recess into which the fragments of the flange or ring R, immediately behind the band, and the fragments of the band B may readily pass without producing great strains between the armor-plate and the wall of the projectile. From this reduction of the diameter of the projectile at C a further advantage results, because the wall of the projectile being weaker at the point C than at the band-score the strength of the chamber-wall at the band-score is greater instead of being less than at portions of the projectile in the rear of the band-score, thus add-

ing to the relative strength of the chamber-wall at the band-score as compared with other portions of the projectile and greatly diminishing the danger of rupture of the chamber-wall at this point.

In Fig. 2 a modified design of the same elements is shown, omitting, however, the extraction-score and shoulder E of Fig. 1.

Fig. 3 shows another form, which is self-explanatory.

In Fig. 4 the cutting away of the projectile in the rear of the band-score at C' is much greater than in Figs. 1, 2, and 3.

In Fig. 5 a United States Army shell is shown modified by cutting away the wall forming the annular space C''.

In Fig. 6 a modified form of English shell construction is shown, cut away as at C^3.

In Fig. 7 a German shell construction, modified by cutting away at C^4, is shown.

In Fig. 8 a Russian form of shell construction is shown, the band-score B being farther forward than on the previously-described shells and the cut-away portion C^5 being correspondingly longer.

In Figs. 9, 10, and 11, French, Austrian, and Japanese shell constructions are shown, modified by cutting away the metal in the rear of the band-score, as at C^6, C^7, and C^8, respectively.

In all the forms shown it will be seen that when the rifling-band or rotating band B engages the surface of the armor-plate as the shell passes through, the band, together with the ring of metal in its immediate rear, can be retarded and broken away without excessively straining the wall of the shell. In the majority of the designs shown the wall of the shell is stronger at the band-score than in the rear of it, so that if the entire corner of the shell should be sheared away it would break off as an annular segment of triangular section without tearing through the wall into the chamber of the shell.

Obviously some features of this invention may be used without other features and may be embodied in widely-varying forms. For this reason

We claim the following:

1. A projectile having a band and band-score, the outside diameter of the projectile being smaller in the immediate rear of the band-score, leaving a frangible ring of metal in the rear of the band-score and an open space behind the said ring whereby the breaking off of the said ring will not be impeded by the inertia of heavy parts in its immediate rear, for substantially the purposes set forth.

2. A projectile having a band and band-score, the diameter of the projectile being smaller in the immediate rear of the band-score, leaving a frangible ring of metal in the rear of the band-score, and affording an unoccupied space to receive the band and fragments of the ring of metal in its rear, for substantially the purposes set forth.

3. A projectile having a band and a band-score the side walls of which are relatively rigid and the bottom tapered toward the rear to facilitate rearward motion of the band, said projectile being reduced in the immediate rear of the score, whereby the band may readily shear away the metal in its rear, for substantially the purposes set forth.

4. A projectile having a band, and a band-score, the rear wall of the band-score being tapered outward and of less average thickness than its height whereby relatively small force is required to break the said wall, for the purposes set forth.

Signed this 23d day of May, 1902, at Pittsburg, Pennsylvania.

CHARLES VAN CISE WHEELER.
ALEXANDER GEORGE MCKENNA.

Witnesses:
JAMES W. KINNEAR.
B. TROTH.