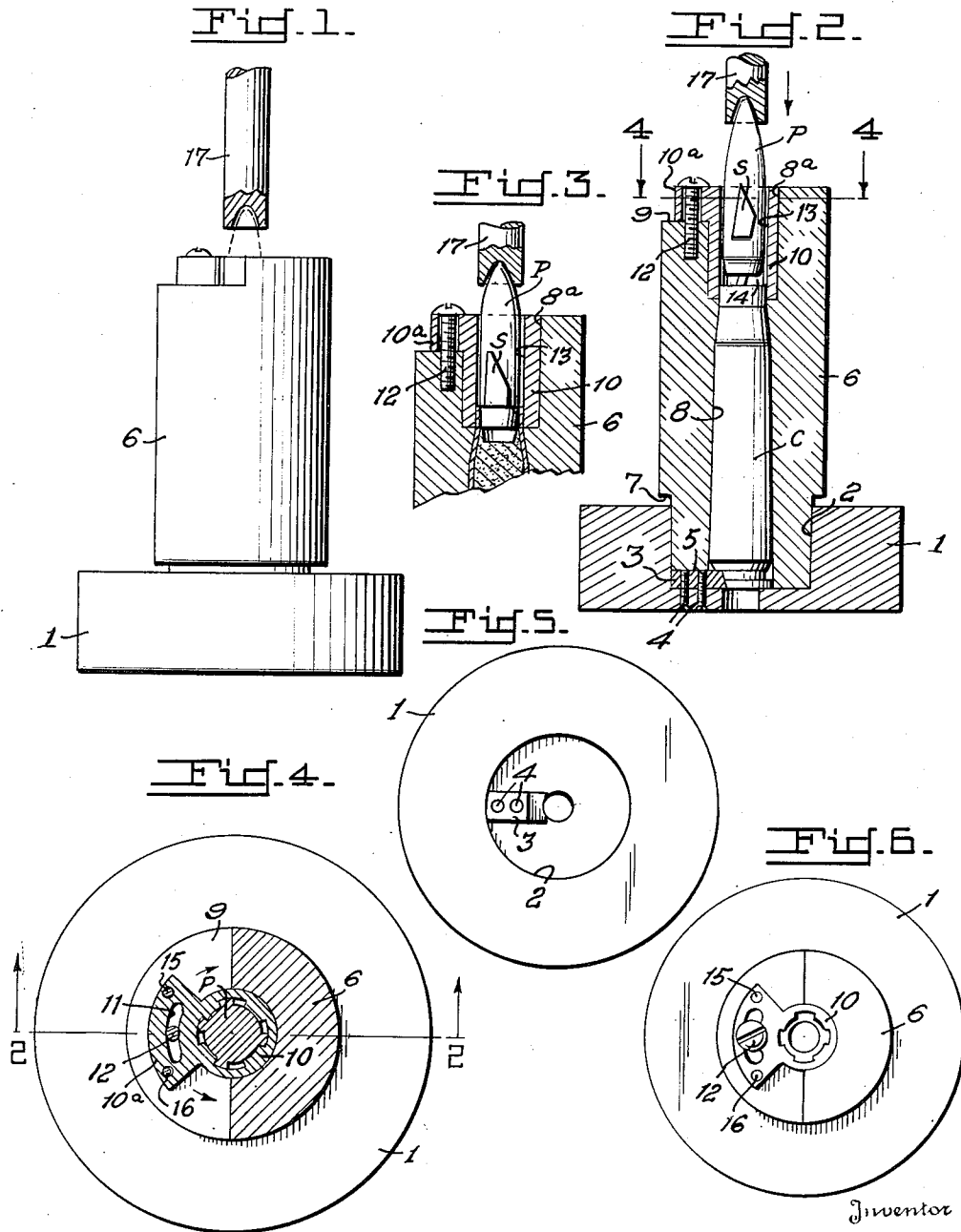


Nov. 17, 1953

F. R. SIMPSON
TOOL FOR ASSEMBLY OF PRE-ENGRAVED
PROJECTILES WITH CARTRIDGE CASES
Filed May 18, 1951

2,659,262



Frank R. Simpson
334 J. H. Church & A. W. Dew
Attorneys

UNITED STATES PATENT OFFICE

2,659,262

TOOL FOR ASSEMBLY OF PRE-ENGRAVED
PROJECTILES WITH CARTRIDGE CASES

Frank R. Simpson, Upper Darby, Pa.

Application May 18, 1951, Serial No. 227,035

1 Claim. (Cl. 86—43)

1

This invention relates to mechanism for the assembly of a pre-engraved projectile with its case to form a complete cartridge.

The use and advantages of pre-engraved projectiles in affording greater muzzle velocity for a given charge of propellant and in greatly prolonging the life of a gun barrel by reducing friction and wear, are well known. Where rapid fire automatic guns are used with pre-engraved projectiles, considerations of safety and satisfactory operation require that the cartridge be in a predetermined angular relation with respect to the rearward terminals of the rifling lands and grooves at the instant that the cartridge is rammed into the breech, in order to insure that the lands or helically disposed projections upon the projectile may enter or "mesh" with the rifling grooves of the barrel, that is, between the lands of the barrel rifling, smoothly and with a minimum of interference.

This requirement calls, first, for a cartridge case so formed or having indexing means whereby the cartridge may be gripped or located in predetermined angular relation by the loading mechanism during loading and, secondly, for the assembly or seating of the projectile in a predetermined angular relation within its case.

The present invention relates to the second purpose so that it is the principal object of the invention to provide a mechanism whereby the projectile may be positively guided axially into its press fit within the open end of the cartridge case so that the two are angular related in a predetermined relation in the completed cartridge. This relation, of course, is so correlated with the locating or indexing means upon the cartridge case and the loading or ramming means of the gun, that the splines or lands upon the projectile enter smoothly, and without substantial interference, between the lands of the rifling of the barrel.

Other objects and advantages will be apparent from a study of the following description in connection with the accompanying drawing.

In the drawing:

Fig. 1 is an elevation of the base, case holder, and seating mandrel.

Fig. 2 is a longitudinal axial section in a plane identified by the line 2—2 of Fig. 4 and showing a cartridge case in position and a projectile or bullet being forced downwardly towards its seat in the case.

Fig. 3 is a cross section corresponding to Fig. 2 but showing the projectile fully seated within the cartridge.

2

Fig. 4 is a transverse cross section in a plane indicated by the line 4—4 of Fig. 2.

Fig. 5 is a top plan view of the base.

Fig. 6 is a top plan view of the case holder and bullet guide.

Referring in detail to the drawing, the numeral 1 identifies a base having a central cylindrical recess 2 extending through its upper face only. The bottom of this recess has a key or lug 3 secured in generally radial position by means of screws 4 and terminating a little short of the common central axis of the base and recess. This key is generally rectangular in plan and is shaped so that it has a smooth fit within a radial channel or notch 5 in the bottom face of a case holder 6 when the latter is inserted into recess 2 in a certain angular position with respect thereto. It will be noted from Fig. 2 that the lower end of holder 6 is reduced in diameter at 7 to have a smooth fit within recess 2.

The holder 6 has a central axial bore 8 the lower portion of which is shaped to receive the case C of a cartridge such as a .50 caliber and its flanged head. The cartridge case, while of generally conventional form, has a radial notch or other indexing means in the rim of its head so formed as to fit smoothly over the end of key 3 when the case is inserted into the holder with its notch in alignment with and forming a continuation of channel 5 and the holder and case are inserted into recess 2 in the proper angular relation with base 1. When this has been done, case C is fixed in a definite predetermined angular relation with respect to base 1 as will be apparent from inspection of Fig. 2.

The upper portion of bore 8 is counterbored as indicated at 8a, Figs. 2 and 3, and has a semi-cylindrical portion cut out, as indicated at 9, Fig. 4. This cut-out portion may be of less depth than the counterbore, as shown in Fig. 2. A bullet index guide 10 is of generally tubular form with an outside diameter smoothly fitting counterbore 8a and an axial dimension preferably equal to that of the counterbore so that when in position within the counterbore, the ends of the guide and case holder are flush. The guide 10 has an integral flange 10a flush with the upper end thereof and having an axial dimension shown as equal to the depth of cut-out portion 9. This flange is conveniently of a shape defined by two mutually normal radial faces lying in respective planes through the central longitudinal axis of the holder 6 so that the guide may have limited rotational adjust-

ment, as is clear from Fig. 4. The flange 10a has an arcuate slot 11 through which a set screw 12 passes into a tapped hole in holder 6 so that, by tightening the set screw, the guide may be held in angularly adjusted position.

The guide 10 has a central splined bore 13. The splines extend helically with the same pitch as the splines or engraving upon the projectiles which pitch is, of course, the same as the rifling of the barrel of the gun from which the cartridges are to be fired. The helical channels in the bore 13, identified at 14, Fig. 6, are shown as four in number, are equally circumferentially spaced and have an angular extent equal to the lands or splines. Thus, each spline and channel has an angular or circumferential extent of 45° in the model illustrated.

This model is intended for use with projectiles having four equal, equally-circumferentially-spaced splines, one of which is identified at S, Figs. 2 and 3, where it will be noted that the splines are chamfered or tapered at their forward ends whereby only a small area of the forward ends remain. The rearward ends of the lands of the rifling of the gun barrel as correspondingly tapered so that the splines on the projectile will mesh with or enter between the lands of the barrel rifling with a minimum likelihood of interference when the cartridge is rammed.

The necessary position of angular adjustment of index guide 10 can easily be determined by trial and after having been set by screw 12, may be made permanent by dowels 15 and 16, Fig. 4, passing with a snug or driven fit into holes drilled through flange 10a into case holder 6.

The use of the bullet seater will be apparent from the foregoing description. The final angular setting or adjustment of guide 10 will be determined by the characteristics or construction of the gun from which the cartridges are to be fired. That is, in the gun, the ramming or loading mechanism has a lug or key which has generally the same dimensions as lug or key 3 and which reciprocates only, during loading and extracting movements. The cartridges are so loaded into the clip or belt that the lug or key of the gun loading mechanism will engage and fit within the notch of each cartridge case as the cartridge is rammed into the barrel. This lug or key of the gun loading mechanism has a predetermined fixed angular relation with respect to the lands and grooves of the gun barrel and it is this predetermined relation which is controlled and determined by the present tool or assembly device. This relation of course may have any angular value and will be determined by the design and construction of the gun itself. It is only necessary that such relation be reproduced in the assembly of the projectile into its casing. Then, when the cartridge is properly engaged with the loading or ramming mechanism of the gun, the projectile will be so angularly related with respect to the rearward terminals of the barrel rifling that each spline S will enter and fit smoothly the corresponding channel between adjacent lands of the barrel whereby the advantages of pre-engraving, as previously described, are realized to the maximum extent.

With the index guide 10 angularly adjusted so as to give the aforementioned angular relation of the cartridge case and projectile when the

projectile is fully seated within its case, holder 6 is removed from recess 2 and a loaded case C is inserted therein with the notch in its head aligned with, and forming a continuation of radial channel 5 in the holder. The holder and casing are now inserted into recess 2 and, if necessary, rotated until key 3 seats within the keyway or channel conjointly formed by the holder and case. A bullet is then inserted into the guide 10 and the base 1 positioned on the platen of any suitable press having a plunger 17 apertured in its lower end to receive the nose of the projectile. The plunger is then moved downwardly as indicated in Fig. 2, to the final position of Fig. 3 wherein the base of the bullet is firmly seated in and gripped by, the forward end of the casing. Any suitable means such as stop surfaces (not shown) between plunger 17 or other part of the press and holder 6, may be employed to limit and determine the proper seating of the projectile as by such surfaces coming into contact when the bullet is in final position of assembly. Since the splines in guide 10 are helically disposed about the central longitudinal axis, the projectile rotates through a small angle as it is pressed downwardly into the case. This slight rotation assists the movement of the bullet into final assembled position. It is, of course, this final position which determines the adjusted position of guide 10 with respect to case holder 6.

While I have described the preferred form of the invention as now known to me, various modifications and substitutions will occur to those skilled in the art after a study of the foregoing disclosure. Thus the disclosure should be taken in an illustrative rather than a limiting sense and it is my desire and intention to reserve all such changes as fall within the scope of the subjoined claim.

Having now fully disclosed the invention, what I claim and desire to secure by Letters Patent is:

In a tool for assembling a pre-engraved bullet within a cartridge case, a base having a cylindrical recess, a cartridge case holder having a central axial bore within which a cartridge case fits when inserted from the bottom of the bore, said holder being counterbored at its upper end and having its lower end shaped to smoothly rotatably fit the recess in said base, said holder having a channel in its lower end radially of the bore axis, a key fixed in the recess of the base to fit said channel and a peripheral notch in the head of the cartridge case when the two are inserted into said recess in predetermined angular relation, a bullet guide rotatably fitting the counterbore in said holder, said guide having a splined bore to slideably receive and guide a bullet into assembled position within the cartridge case, a flange integral with said guide and having an arcuate slot therein and a screw passing through said slot and threaded into said holder to secure the guide in fixed position of rotational adjustment with respect to said holder.

FRANK R. SIMPSON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
118,849	Ferriss	Sept. 12, 1871
683,384	Cole	Sept. 24, 1901