Dec. 7, 1948. C. H. BARNES 2,455,644

FIREARM RECEIVER

Original Filed June 13, 1944 2 Sheets-Sheet 1

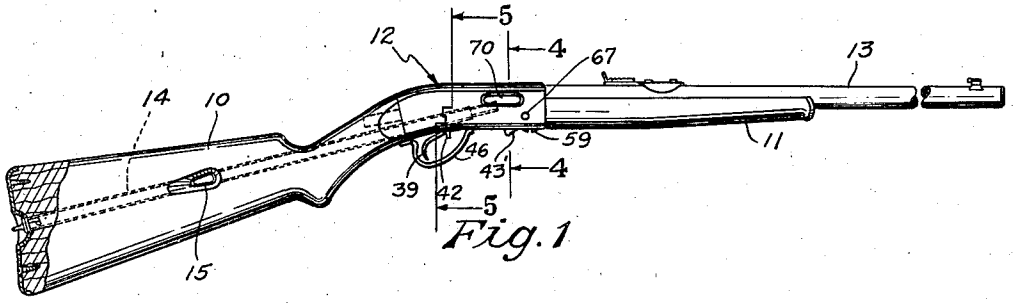


Fig. 1

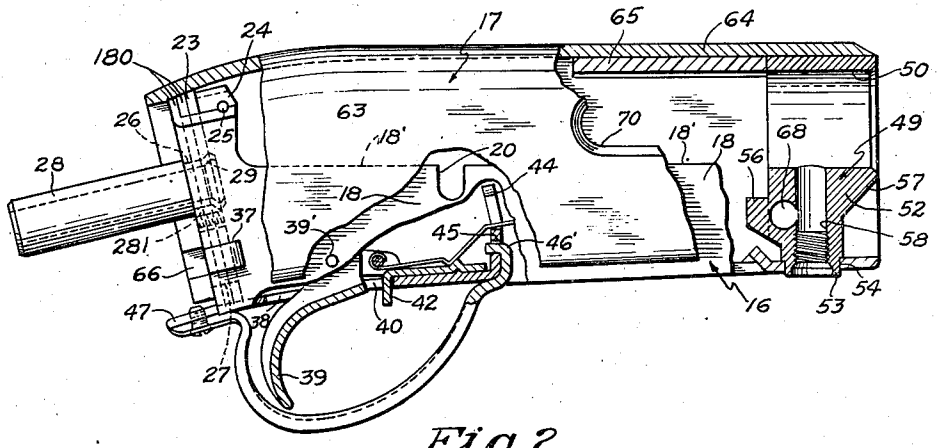


Fig. 2

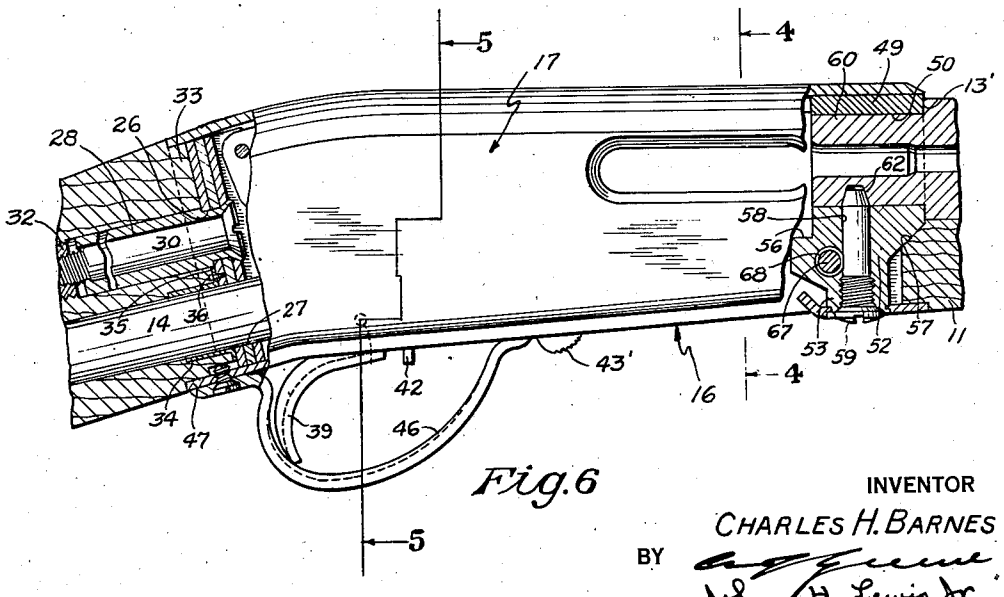


Fig. 6

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Dec. 7, 1948. C. H. BARNES 2,455,644

FIREARM RECEIVER

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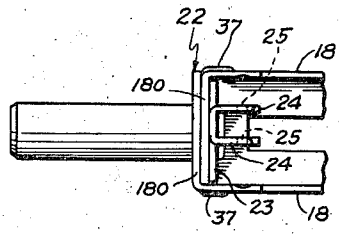


Fig. 3

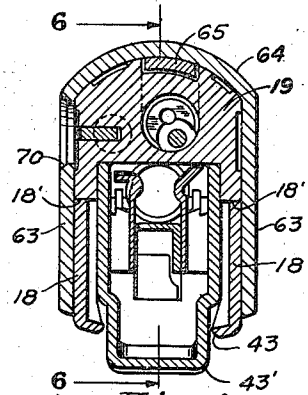


Fig. 4

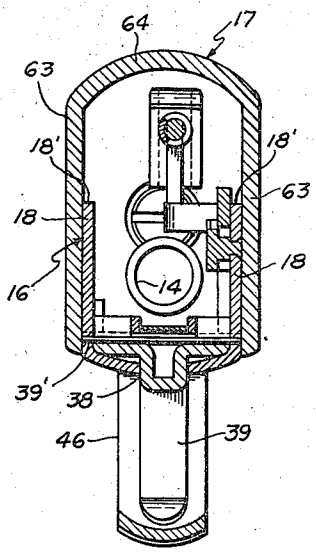


Fig. 5

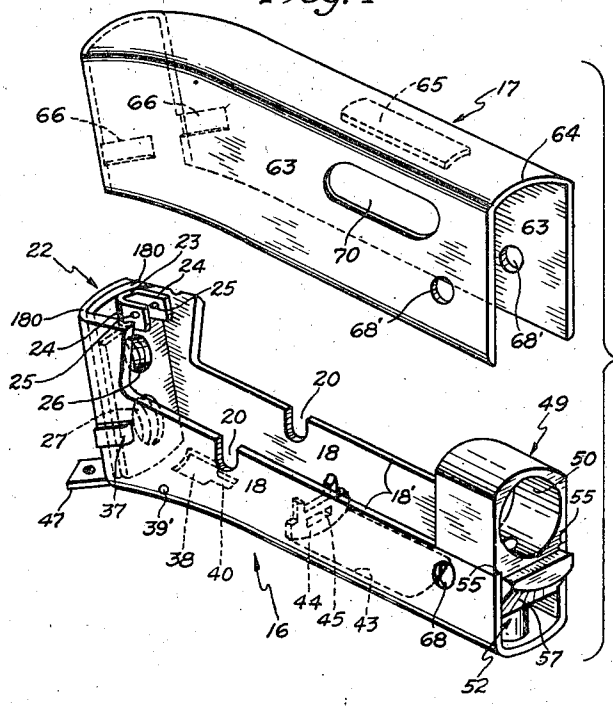


Fig. 7

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FIREARM RECEIVER

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Original application June 13, 1944, Serial No. 540,015. Divided and this application May 7, 1946, Serial No. 667,929

6 Claims. (Cl. 42—75)

1

The present invention relates, in general, to firearms and, in particular, to an improved receiver for small caliber rifles. This invention is a division of a copending application, Serial No. 540,015, filed June 13, 1944, and issued as Patent No. 2,425,412, August 12, 1947.

The usual practice in the construction of firearms is to shape the majority of the parts from bar stock or rough forgings by a series of machining operations. This is an expensive and time-consuming process requiring the use of highly skilled machine operators. The process is further wasteful of tools and cutter bits and results in converting the major part of the raw material used as a starting point into chips and other waste products. The limitations of this method have resulted in the design of firearms which were either ridiculously difficult to assemble or had major elements of their mechanism forming sub-assemblies secured almost as afterthoughts to the receiver or adjacent members.

An object of this invention is to provide an improved firearm construction which is inherently inexpensive to produce, simple to assemble, and of improved appearance.

It is contemplated that this object may be attained by the provision of a firearm having a composite receiver embodying a frame element and a cover element. Both of these members may be conveniently formed from sheet metal in the form of roughly U-shaped channels which, when telescoped together, form an enclosure for the working mechanism as well as providing for attachment of barrel and stock.

By the use of an open-topped channel for the main frame, the operations of assembly become very simple because of the accessibility of all portions of the frame. It is further unnecessary to use blind screws and similar expedients since the telescoping cover both hides fastening means from view and serves as a retainer for simple pivot pins pushed through aligned holes. These are a few of the advantages possessed by this construction over and above that of cost reduction in material and labor due to the elimination of dependence on milling machines, shapers, broaches, and the like for carving a firearm component out of solid bar stock.

The exact nature of the invention as well as other objects and advantages thereof will be described in more detail in the specification disclosing, for purposes of illustration, a small caliber autoloading rifle illustrated in the accompanying drawings in which:

Fig. 1 shows a side elevation partly in section of an autoloading rifle embodying the improved features of this invention.

Fig. 2 is a side elevation partly in section of

2

the assembled sheet metal cover and frame which comprise the receiver of the firearm, most of the working parts normally housed therein being omitted.

Fig. 3 is a fragmentary plan view of the rear end of the frame showing its laminated structure and including the butt stock fastening means.

Fig. 4 is a cross-section of the receiver in the direction of arrows 4—4 of Figs. 1 and 6.

Fig. 5 is a cross-section in the direction of arrows 5—5 of Figs. 1 and 6.

Fig. 6 is a partial side elevation of the assembled firearm in section at the ends of the receiver on line 6—6 of Fig. 4.

Fig. 7 is an exploded perspective view of the sheet metal cover and sheet metal frame which, together, comprise the receiver.

Referring to the drawings, Fig. 1 shows an autoloading rifle comprising, in general, a butt stock 10, forestock 11, receiver 12 and barrel 13, cartridges being automatically fed into the chamber of the barrel from a tubular magazine, indicated by the dotted lines 14, which is mounted in an aperture in the stock 10 and supplied with cartridges through a suitable aperture 15 in the stock. The magazine including the cartridge follower and bayonet fastening means for securing the magazine in the stock are of well-known construction and are illustrated in greater detail in the patent to Browning, No. 1,083,384, January 6, 1914.

The action for the firearm including the breech bolt, fire control mechanism, and cartridge feed do not form a part of the present invention and are shown in part and referred to herein only for the purpose of clarifying the description of the improved receiver, a more detailed showing and description of the action being embodied in the above-identified Patent No. 2,425,412, of which this application is a division.

The receiver of the firearm comprises a frame 16 and a cover plate 17 as shown in Figs. 2, 4, 5, and 7. Both the frame and cover are constructed from sheet metal stock by suitable bending and shaping operations. The frame 16 is a channel generally U-shaped in cross-section having substantially vertical sides 18 struck up from a substantially flat sheet of metal. The upper edge 18' of each side 18 comprises a guide rail for slidingly supporting the breech bolt, indicated generally at 19 in Fig. 4, and is provided with a U-shaped slot 20 for supporting the trunnions of a cartridge carrier (not shown).

The rear end of the frame 16 comprises a laminated wall 22 formed by folding the rearwardly extending end portion 180 of each side wall 18 inwardly in overlapping relationship as shown in Figs. 3 and 7 and welding or otherwise securing the overlapped portions together. The rear wall

22 also embodies a third member comprising a substantially rectangular sheet metal plate 23 firmly secured as by welding to the inner or forward face of the overlapped end portions 180. The upper end of the plate 23 is provided with a pair of forwardly extending spaced substantially parallel bracket members 24 provided with transverse axially aligned apertures 25 for pivotally supporting the sear (not shown) of the fire control mechanism. The aforementioned brackets 24 may be formed separately and fastened to the front of the plate 23 or, preferably, and as shown in the drawings, may be formed integrally therewith by making a transverse cut in opposite edges of the plate 23 below the upper edge thereof and bending the cut portions inwardly and forwardly at substantially right angles to the body of the plate.

The laminated rear wall 22 of the frame is provided with two apertures 26 and 27, one arranged above the other, as shown in Figs. 2, 6, and 7, the upper aperture 26 being adapted to receive a butt stock stud 28 and the lower aperture 27 to receive and support the magazine tube 14.

The tubular butt stock stud 28 comprises a substantially cylindrical sleeve reduced at its forward end 281 and provided with a counterbore 29. The stud 28 is fixedly secured in the laminated rear wall 22 of the frame by inserting the reduced end of the stud into the upper aperture 26, an then swaging over the end of the counterbored portion 29. The stock 10 is secured to the rear wall 22 of the receiver by means of the stock bolt 30 which is carried in the stud 28 and threadedly secured at its rear end in a tapped hole of a bushing 32 which, in turn, is threadedly or otherwise secured in a recess in the front end of the stock. The forward end of the stock is of reduced cross-section to provide a shouldered tenon 33 adapted to fit snugly into the substantially rectangular recess formed at the rear end of the receiver by the rearwardly extending sides of the cover plate 17 and the top and bottom wall portions of the cover plate and frame respectively.

The tubular magazine 14 extends through the lower aperture 27 in the rear wall 22 of the frame and is securely held in position therein by means of a self-locating bushing 34 which is mounted on the magazine 14 and has an arcuate flange 35 adapted to partially circumscribe the underside of the stud 28. A screw 36 is provided for securing the bushing 34 in self-adjusted position to the rear wall of the receiver.

At the rear end of each side 18 of the frame and adjacent the lower edge thereof is a substantially rectangular transversely disposed projection 37, the forward end of each being bevelled to blend into the side wall 18. These projections constitute fastening means adapted to cooperate with recesses in the cover plate as hereinafter described to lock the cover 17 to the frame in a unitary assembly.

The bottom of the channel-shaped frame is substantially flat and is provided with a relatively short rectangular aperture 38 to accommodate the trigger 39 of the fire control mechanism. The trigger is pivotally supported on a pin mounted in apertures 39' in the sides of the frame. It will be noted (Fig. 2) that when the cover plate is assembled on the frame, the sides of the cover plate overlie the ends of the trigger pivot pin so as to positively secure the pin in place. A relatively narrow slot 40 extends forwardly from the front edge of the trigger slot 38 and constitutes a guide slot for the trigger lock and safety, indicated generally at 42 in Fig. 2. A relatively wide and substantially rectangular aperture 43 is formed in the bottom wall of the frame forwardly of the slot 38 to accommodate a depending finger piece 43' which is provided for manually operating the action. A portion of the metal struck up from the aperture 43 is bent upwardly at substantially right angles to the bottom of the frame to provide a substantially vertical web 44 at the rear end of the aperture 43. The upper edge of the web 44 is made arcuate to support the forward end of the tubular magazine 14 and an aperture 45 is provided in the web adjacent the bottom edge thereof to receive the forward hooked end 46' of the trigger guard 46. The rear end of the guard 46 is shown secured to a tang 47 extending rearwardly from the bottom of the frame.

The forward end of the frame 16 is provided with a barrel lug insert 49 which comprises a relatively solid substantially rectangular metal block having a smooth barrel receiving aperture 50; and a stem portion 52 extending downwardly at substantially right angles to the longitudinal axis of the aperture 50, the stem being provided with a counterbored nipple 53. The latter is adapted to seat in an aperture 54 in the bottom wall of the frame adjacent the forward end thereof and to be secured therein by a swaging operation. In Fig. 2 the barrel lug stem 52 is shown in position in the aperture 54 prior to the performance of the swaging operation which secures it therein. Fig. 6 shows the cross-section through this same area after the swaging operation has been completed.

As shown in Fig. 7, the lower end of the stem portion 52 of the lug is narrower in a transverse direction than the upper portion of the lug by an amount equal to twice the thickness of the side walls 18 of the frame so as to form shoulders 55 adapted to fit over the upper edge 18' of the sides of the frame. The joints between these shoulders 55 and the upper edges of the sides of the trigger plate or frame 16 are brazed or welded so as to securely fasten the lug in the forward end of the frame. Referring to Fig. 2, a substantially horizontal ledge 56 is formed integrally on the back of the lug 52 below the barrel aperture to serve as a stop for a cartridge carrier shown in the copending application, now Patent No. 2,425,412. The front face of the lug embodies a bevelled or downwardly sloping surface 57 to cooperate with the forestock 11. The stem 52 is apertured and threaded, as shown at 58, for securing a barrel fastening bolt 59 therein.

The barrel 13 is adapted to be secured in the barrel lug 49 by the bolt 59 and to this end the breech end of the barrel is reduced to provide a smooth wrist portion 60 adapted to make a nice fit in the aperture 50 of the lug 49. A tapered recess 62 is formed in the bottom of the wrist portion 60 of the barrel and is adapted to be engaged by the frusto-conical end of the bolt 59. By turning up the bolt 59, the resulting camming action between the mutually engaging surfaces of the tapered recess and the frusto-conical end of the bolt serves to bring the barrel shoulder 13' tightly against the front face of the lug. When the barrel is thus secured to the front end of the frame, corresponding surfaces of the rear end of the forestock 11 will be brought into engaging relationship with the bevelled surface 57 of the barrel lug and with the front edge of the frame respectively, thus affording a rigid support for the rear end of the forestock.

The cover 17 is also a channel member formed

from sheet metal and comprises the depending substantially parallel sides **63** and a curved top wall **64**. The latter is provided with a tapered profile at its rear end to form a smooth unbroken curve with the pistol grip or the butt stock; and a bevelled front edge. Welded or otherwise fastened to the underside of the top wall **64** adjacent the forward end thereof is a receiver insert **65** comprising a substantially rectangular metal plate curved transversely to fit the contour of the top wall and having substantially square shoulders at its opposite ends. When the cover **17** is assembled on the frame **16**, the forward shoulder of the insert abuts the rear face of the barrel lug insert. The rear shoulder of the insert is adapted to form a stop to limit the initial forward movement of the firing pin as described more fully in the aforementioned Patent No. 2,425,412. A cartridge ejecting aperture **70** is shown in one side of the cover plate.

The cover plate **17** is assembled on the frame **16** to form the unitary receiver structure by slipping the sides **63** of the cover down over the sides **18** of the frame in a downward and rearward direction. Suitable means are provided for locking the cover to the frame and comprise rectangular recesses **66** formed on the inside wall of the sides **63** of the cover, the rear ends of the recesses intersecting the rear edges of the sides of the cover. By pushing the cover downwardly and rearwardly over the frame, these recesses **66** will engage over the substantially rectangular projections **37** on corresponding sides of the frame so as to effectively lock the rear end of the cover thereto. The forward end of the cover is securely fastened to the frame by a pin **67** which is adapted to pass through apertures **68'** in the sides of the cover and an axially aligned aperture **68** in the frame and barrel lug insert, which aperture, as shown in Fig. 2, breaks slightly into the wall of the bolt aperture **58** of the barrel lug stem. Normally, the receiver is assembled by securing the cover to the trigger plate as described above and then the barrel is mounted in the forward end of the receiver and secured therein by the bolt **59**. The shank of the latter is adapted, as shown, to engage in a recess milled or otherwise formed in the side of the transverse pin **67** between opposite ends thereof, thereby effectively locking the pin **67** in the receiver.

It will be understood that the invention is not limited to the exact embodiment shown but is applicable to firearms of other calibers and includes any and all modifications coming within the scope of the claims appended hereto.

What is claimed is:

1. In a firearm, a receiver comprising in combination a sheet metal frame channel substantially U-shaped in cross-section; a laminar rear wall for said frame including overlapping portions of the side walls of said channel; a barrel receiving lug secured between the side walls of said channel frame at the forward end thereof; a sheet metal cover having depending side walls telescoping over the side walls of said frame; and interlocking means for securing said cover in assembled relation to said frame.

2. In a firearm, a receiver comprising in combination a sheet metal frame channel having a bottom wall and spaced apart upwardly extending side walls; a laminar rear wall for said frame including inturned overlapping portions of said side walls; a barrel receiving lug received between the side walls of said frame overlying the upper edges thereof and rigidly secured to said side walls and to said bottom wall; a sheet metal cover having spaced depending side walls telescoping over the side walls of said frame; and interlocking means comprising projections of said frame arranged to be received in grooves in said cover for securing said cover in assembled relation to said frame.

3. In a firearm, a receiver comprising in combination a sheet metal frame channel having a bottom wall and spaced apart upwardly extending side walls; a laminar rear wall for said frame including inturned overlapping portions of said side walls; barrel receiving means secured to the front end of said frame; stock retaining means secured to said laminar rear wall; a rearward extension on said bottom wall constructed and arranged to engage a downwardly facing surface of a stock secured by the retaining means; and a cover having a closed top and spaced depending side walls telescoping over the side walls of said frame and releasably secured thereon, said cover extending rearwardly behind said frame and being constructed and arranged to partially enclose the top and side portions of a stock secured by the retaining means.

4. A firearm frame comprising an integral boxlike construction of sheet metal having a bottom wall; spaced apart, upwardly extending substantially parallel side walls disposed at substantially a right angle to said bottom wall; a rear end wall disposed at an angle to the bottom wall and at substantially a right angle to each of said side walls, said end wall including the extensions of the rearward end of each of said side walls, each extension being substantially coextensive in area with said end wall, said extensions being turned inwardly and secured to each other in laminar relationship; and a barrel receiving insert received between and secured to each of said side walls and to said bottom wall at the ends thereof opposite said end wall.

5. A firearm receiver comprising the frame described in claim 10 and a sheet metal cover having a closed top wall with spaced parallel side walls depending therefrom, said cover being constructed and arranged to telescope over and interlock with said frame to substantially completely enclose the top and sides thereof.

6. A firearm receiver as described in claim 11, said cover interlocking with said frame by means of tongues formed on the frame which are received in grooves in said cover and a transversely extending pin passing through both said cover and said frame.

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REFERENCES CITED

The following references are of record in the file of this patent:

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954,654	Smith	Apr. 12, 1910
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1,996,124	Rowley	Apr. 2, 1935
2,050,038	Browning	Aug. 4, 1936
2,108,648	Browning	Feb. 15, 1938

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Number	Country	Date
338,789	Germany	Oct. 10, 1919
428,784	Germany	Aug. 9, 1924

Certificate of Correction

Patent No. 2,455,644. December 7, 1948.

CHARLES H. BARNES

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 6, line 43, for the claim reference numeral "10" read *4*; line 49, for the claim reference numeral "11" read *5*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of March, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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