June 16, 1953 J. M. DIAL 2,641,860

SUBCALIBER ATTACHMENT FOR BARRELS OF GUNS

Filed Oct. 24, 1949

Fig 1.

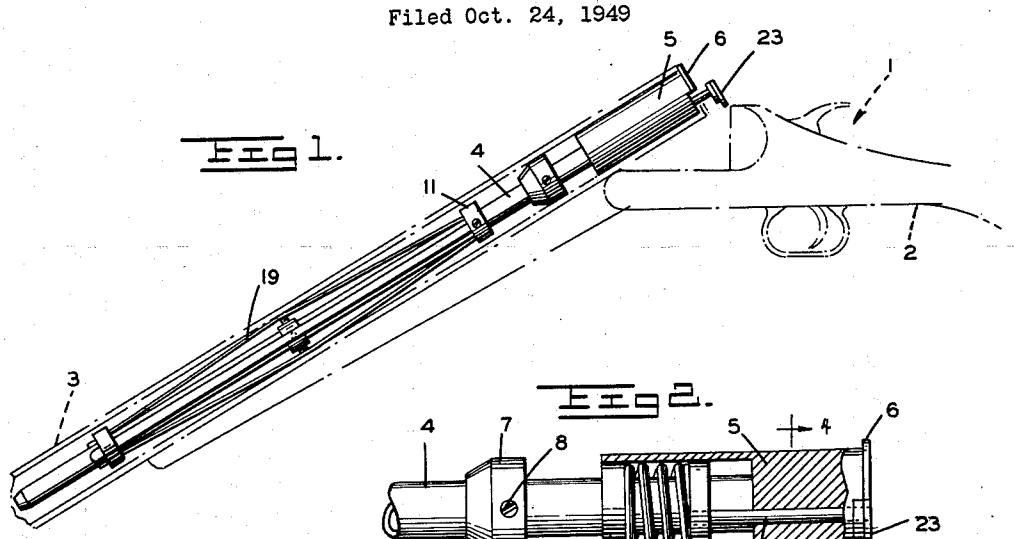


Fig 2.

Fig 4.

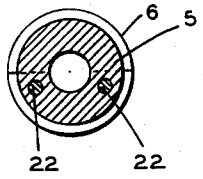


Fig 3.

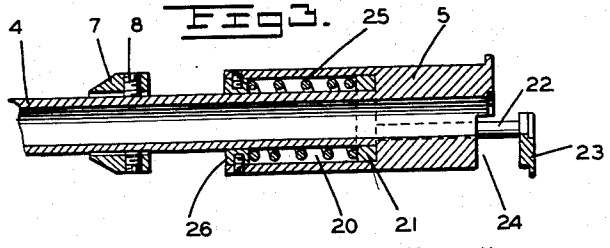


Fig 5.

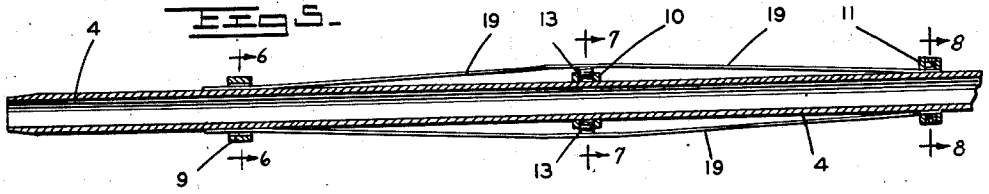


Fig 6.

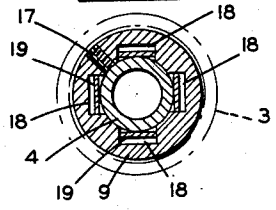


Fig 7.

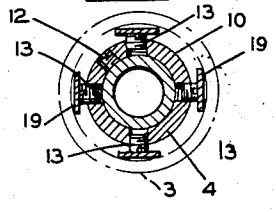


Fig 8.

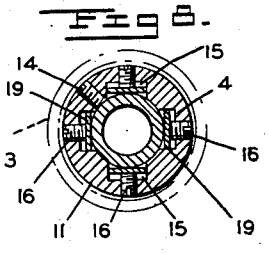
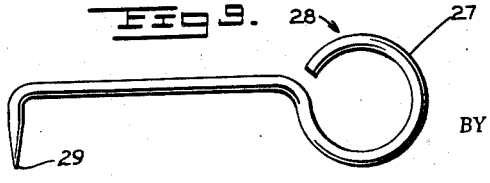


Fig 9.



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SUBCALIBER ATTACHMENT FOR BARRELS OF GUNS

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4 Claims. (Cl. 42—77)

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The present invention relates to firearms of the shotgun and small bore rifle classes and more particularly to a subcaliber attachment for converting a normally large caliber weapon such as a shotgun into a small bore rifle or the like.

The principal object of the invention is to provide improvements in the device which forms the subject of U. S. Patent No. 2,457,354 issued to me December 28, 1948.

General objects of the present invention, like those of the patented device, are to provide an attachment of the type indicated which will be simple and inexpensive to make, which will be capable of being installed and removed instantly and easily, which will be rugged in construction and durable and foolproof in use, which will be applicable to a wide range of shotgun types and kinds, which will unfailingly eject low caliber cartridge shells independently of any ejector provided for shotgun shells, which will be securely maintained in operative and predetermined adjusted aligned position in the shotgun barrel, which can be adjusted through a wide range of relative positions in the shotgun barrel to compensate for wear, misalignment of the bore and sights, etc., and which will have numerous other and further advantages as will be evident from the present description and illustrations of an embodiment of the invention which I have made and tested in actual practice and which I therefore prefer and have selected to illustrate the principles of the invention.

An important specific object of the present invention is to facilitate adjustment of the attachment for installation in a shotgun barrel by enabling the adjustment to be made more accurately and quickly, and to be maintained more permanently, than is possible in use of the patented device.

In the accompanying drawing, which illustrates the preferred embodiment:

Fig. 1 is a side elevational view of a shotgun in opened position showing the subcaliber attachment in place with its ejector block extended, the shotgun parts, which form no part of the present invention, being shown in broken lines;

Fig. 2 is a side elevational detail view on a relatively enlarged scale of the rear portion of the device, shown partly in longitudinal section, with the ejector closed, in the position that it occupies when the device is closed in the shotgun;

Fig. 3 is a longitudinal sectional view of the rear portion of the device with the ejector extended;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 2;

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Fig. 5 is a longitudinal sectional view, on a relatively reduced scale, of the forward and intermediate portions of the device;

Figs. 6, 7 and 8 are cross sectional views taken respectively on the lines 6—6, 7—7 and 8—8 of Fig. 5; and

Fig. 9 is a side elevational view of a tool used for several purposes in operating the device, as will be explained hereinafter.

Generally speaking, the principles of the invention include a small bore barrel having an enlarged breech portion at its rear end, insertible as a unit in the barrel and firing chamber of a shotgun or other relatively large bore firearm for adapting the same to receive and fire small caliber cartridges, with means for readily and permanently aligning the bore of the attachment in readily adjusted relationship to the barrel and sights of the weapon. The present improvement over the patented device consists principally in the means for effecting and maintaining the adjustment.

In the drawing, the reference numeral 1 designates any more or less conventional type of shotgun having a stock 2 and a barrel 3 provided at its rear with the usual firing chamber of a diameter appropriate for receiving a particular size of shotgun shell.

The present attachment, comprising all the parts shown assembled in Fig. 1 and including the details shown in Figs. 2–8, comprises essentially a barrel element 4 of appropriate diameter, rifled if desired, for accommodating a small caliber projectile of any predetermined size and kind. The barrel 4 terminates at its rear end in an enlarged cylindrical portion 5 which may be integral with the barrel element as shown in the drawing or may be fabricated so as to be effectively integral therewith by being separately made and permanently united thereto. This cylindrical portion 5 has a diameter for fitting snugly into the shotgun firing chamber and has a terminal flange or bead 6 like that provided on the shell which the shotgun is adapted to fire so as to limit the position of the portion 5 in the chamber.

A sleeve or bushing 7 is mounted on the barrel element for lengthwise adjustment and is adapted to be fixed in position by a set screw 8 or a plurality of set screws arranged radially about the sleeve and adapted to be turned in tightly against the barrel element outer surface. The forward end of the sleeve 7 is bevelled to abut the front end of the firing chamber. The attachment is installed in the gun barrel by inserting it from the rear, with the sleeve 7 fairly loose and slid-

able on the barrel element 4. This seats the bevelled forward edge of the firing chamber, whereupon the attachment is carefully removed and the set screws 8 tightened to fix the sleeve in a position such that the combination of the sleeve and the cylindrical portion 5 will completely occupy the firing chamber.

The barrel element 4 is provided with three longitudinally spaced sleeves designated 9, 10 and 11 and best shown in their spaced relationship in Fig. 5.

The intermediate sleeve 10 is a small collar which fits around the barrel element 4 and is adapted to be held tightly in longitudinally adjusted position by a single set screw 12. The sleeve is tapped also at four equidistantly spaced radial points for the reception of as many set screws 13, all of which can be individually adjusted between one terminal position in which they are seated down substantially flush with the outer periphery of the barrel element 4 to another terminal position of which they project considerably therefrom.

The rear sleeve 11 is a small collar having a single set screw 14 for fixing the collar in longitudinally adjusted position on the barrel element 4 and having pockets 15 opening into the collar from its forward edge, provided in the same number as there are set screws 13 in the intermediate sleeve 10. A tapped opening radiates from each of these pockets and contains a set screw 16, all as best shown in Fig. 8.

The forward sleeve 9 is likewise a collar which is fixable on the barrel element 4 by a set screw 17 that is provided with as many openings 18, each completely penetrating the sleeve in an axial direction, as there are set screws 13 in the sleeve 10 and pockets 15 in the sleeve 11.

A plurality of leaf springs 19, one for each aligned pair of pockets 15 and 18, extend from the sleeve 9 to the sleeve 11, spanning the sleeve 10. Each of these springs is firmly held in one of the pockets 15 by turning down the adjacent set screw 16, and has its other end mounted for free sliding movement in one of the pockets 18. The intermediate portion of each spring is bowed outwardly more or less by, and is freely slidable over, one of the set screws 13 in the intermediate sleeve 10.

It will be apparent that with the parts arranged in this manner the effective diameter of the attachment in the transverse plane 7—7 of Fig. 5 can be predetermined by adjusting the set screws 13, and the alignment of the axis of the barrel element 4 relatively to the axis of the circular or substantially circular figure defined by the four leaf springs 19 in the plane 7—7 can be adjusted by turning one or more of the set screws 13 more or less in or out.

The cylindrical portion 5 is counterbored from its forward end to provide a deep cylindrical socket 20. A plunger ring 21 is seated in the base of this socket and has a pair of rods 22 extending rearwardly therefrom through two bores in the portion 5. An ejector block 23 is carried by the rear ends of these rods and is movable in and out of a cut-out seat 24 so as to be complemental with the rest of the periphery of the portion 5 when the plunger ring is moved to its forward limit, as shown in Fig. 2, or to extend well to the rear thereof when the ring is seated in the rear of the socket 20, as shown in Fig. 3. A coil spring 25 is positioned in the socket 20, being held in compression by a filler ring 26 in the front end of the socket, thus normally urging the ejector 23 to extended position, as shown in Fig. 3, but permitting the ejector to move to retracted or closed position, as shown in Fig. 2, upon compression of the spring.

It will be understood that the spring becomes compressed and ejector 23 moved to forward position automatically when the gun is closed, and the spring expands, forcing the ejector to extended position as shown in Figs. 1 and 3, when the gun is opened. In this way a small caliber cartridge can be inserted in the firing chamber which constitutes the bore of the cylindrical portion 5 and will be moved to proper position in this firing chamber automatically when the gun is closed, and the shell will be ejected by rearward movement of the ejector 23 automatically when the gun is opened.

The preliminary adjustment of the sleeve 7 preparatory to installing the device has already been explained. After such adjustment has been made, the set screws 13 are turned out to give the circular or substantially circular figure defined by the springs 19 in the plane 7—7 the approximate diameter of the shotgun bore. This is readily accomplished by slipping the ring shaped end portion 27 of the tool 28, which has an inner diameter equal to that of the shotgun bore, over the assembled springs 19 at the location of the sleeve 10. The device thus fits properly in the shotgun barrel 3. A trial shot or two is taken, and any deviation from the target which is attributable to misalignment of the device is corrected by removing the device, loosening the set screw 17, slipping the sleeve 9 forwardly to free the forward ends of the springs 19, then exposing one or more of the set screws 13 and turning the same in or out as much as may seem to be required. The sleeve 9 is then slipped back into place, the set screw 17 tightened, the device reinstalled and further trial shots made.

By such a process of trial and error the device can readily be aligned to compensate for any inaccuracies, wear, misalignment of sights or other source of error. The adjustment is permanent, being maintained by all the parts during any amount of removal of the device and replacement.

The tool 28 is conveniently provided with a blade 29 fitting the slots in the various set screws. This blade is best turned down rightangularly to the shank of the tool, so that it forms a hook by which the entire attachment can be pulled from the breech of the shotgun.

The bowed deformation of the springs 19 by the support given them by the set screws 13 is found in actual practice to provide a very substantial support for and fixing of the attachment in the shotgun barrel, which holds the placement of the barrel element 4 very steadily, securely and permanently. In this connection it is to be noted that it is preferable to make the springs 19 out of relatively thin spring steel stock which is slightly deformable transversely as well as lengthwise. The degree of this transverse deformation is very slight, being scarcely visible in Fig. 7, but it is sufficient to provide good frictional binding effect in the shotgun barrel which is proof against relative rotation of the device therein.

I claim:

1. A subcaliber attachment for the barrel of a gun comprising a barrel member receivable in the gun barrel, a pair of sleeves spaced apart along the barrel member and provided with openings, a plurality of leaf springs having their end portions engaged in said openings, and independently adjustable means intermediate said

sleeves underlying the mid-portions of the springs for holding them selectively adjustably expanded into direct engagement with a gun barrel containing the attachment.

2. A subcaliber attachment for the barrel of a gun comprising a barrel member receivable in the gun barrel, means spaced apart along the barrel member, a plurality of leaf springs having their end portions held by said means, and independently adjustable means intermediate the first named means underlying the mid-portions of the springs for holding them selectively adjustably expanded into direct engagement with a gun barrel containing the attachment.

3. A subcaliber attachment for the barrel of a gun comprising a barrel member receivable in the gun barrel, a pair of sleeves spaced apart along the barrel member and provided with openings, a plurality of leaf springs having their end portions engaged in said openings, and a sleeve intermediate the first named sleeves and provided with a set screw underlying the mid-portion of each of the springs for holding the same adjustably expanded into direct engagement with a gun barrel containing the attachment.

4. A subcaliber attachment for the barrel of a gun comprising a barrel member receivable in the gun barrel, an element disposed around an intermediate portion of the barrel member, elongated leaf springs held bowed over said element, and means provided in said element for independent radial adjustment to separately vary the degree of bowing of each of said springs into direct engagement with a gun barrel containing the attachment.

JAMES M. DIAL.

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