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FIREARM ACCESSORY

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This invention relates to an accessory for holding a barrel extension in its normal proper position within the breech casing of an automatic firearm while the barrel or tube is being attached to or detached from engagement with the barrel extension.

The invention is particularly applicable to firearms of the type basically illustrated and described in U. S. Patent 1,525,065 to Browning dated February 3, 1925. The details of the portions of the firearm immediately adjacent the barrel extension, such as the breech casing and feed box, with which the present invention is directly engageable, are shown to good advantage in the co-pending application of Frederick T. Moore, Serial No. 305,240, filed November 20, 1939. For a description of details of the firearm which are not illustrated and/or described in the present drawing and specification, attention is directed to said patent and co-pending application.

Automatic firearms of the type with which the present invention is to be used include a recuperator spring secured at one end to the lower portion of the barrel extension to move the barrel and barrel extension in counter-recoil direction following the recoil movement of the barrel and barrel extension. The recuperator spring is necessarily very strong in order to quickly return the relatively heavy barrel to forward position following the recoil of the same. The strength of the spring is such that the average person cannot manually move the barrel and barrel extension rearward against the force of the spring.

The barrel of such firearms is removable from the barrel extension and the means for securing the barrel and barrel extension together comprise very accurately and precisely formed threads provided on the adjacent ends of the barrel and barrel extension, the nature of the threads being such that when these members are assembled in operative relationship, they function substantially the same as an integral unit and no perceptible play takes place between the barrel and barrel extension. The barrel is provided with an end having a diameter smaller than the outer diameter of the barrel, said end being threaded for coengaging with a threaded aperture in the forward end of the barrel extension, the length of the coengaging threaded portions being of the order of several inches or more, whereby it will be apparent that the threaded aperture of the barrel extension must be accurately aligned with the threads of the barrel in order to permit the barrel to be readily threaded into the barrel ex-

tension. Even a relatively slight misalignment of the barrel extension with respect to the barrel will cause the threads to bind and possibly be injured if the threads are forced while securing the barrel to the barrel extension.

One end of the recuperator spring is secured to a depending member integral with the lower portion of the forward end of the barrel extension. The forward end of the barrel extension, when in forward or battery position, abuts the rear face of the barrel bearing in the trunnion block. The barrel extension is also provided with a pair of spaced arms projecting rearwardly into the breech casing in a direction substantially parallel with the axis of the barrel. When the barrel is removed from engagement with the barrel extension, it has been found that the force of the recuperator spring tends to urge the lower portion of the barrel extension forward, pivoting the lower portion of the forward end of the barrel extension against the rearward face of the barrel bearing in the trunnion block, with the result that the rearward ends of the projecting arms of the barrel extension are moved downward from their normal position and the axis of the threaded aperture in the barrel extension is tilted from its normal position whereby when a barrel is threaded into the barrel extension while the barrel extension is in said tilted position, binding between the threads of the barrel extension and barrel frequently takes place, and if turning of the barrel with respect to the barrel extension is forced, damage to the threads sometimes ensues.

It is therefore an object of the present invention to provide an accessory adapted to engage one of the rearward projecting arms of the barrel extension and maintain said ends against downward movement, whereby the threaded aperture of the barrel extension is maintained in proper alignment with respect to the breech casing and the axis of the barrel bearing in the trunnion block, notwithstanding the tendency of the force of the recuperator spring to tilt the barrel extension out of alignment.

It is another object of the invention to provide an accessory which will accomplish the foregoing and be engageable with conventional and unmodified portions of the firearm whereby the accessory may be used with not only newly manufactured firearms but previously manufactured firearms without modification of the existing structure in the same.

Other objects and details of the invention are

described in the following specification and illustrated in the accompanying drawing.

The accompanying drawing shows the embodiment of the invention which is deemed preferable, but it will be understood that the drawing is intended for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

In the drawing, Fig. 1 is a fragmentary side elevation of an automatic firearm showing the barrel extension and the accessory comprising the present invention in operative position with respect to the firearm.

Fig. 2 is a sectional end elevation of the firearm looking at the left hand end of the fragment of the firearm illustrated in Fig. 1, portions of the firearm illustrated in Fig. 1 being omitted from Fig. 2.

Referring to the drawing, the firearm 10 comprises a breech casing 12 having opposed side plates 14 and 16, the forward portions of said side plates being secured to a trunnion block 18 provided with a barrel bearing 20 in which the rear portion of a barrel or tube 22 is slidably disposed.

The rear portion of the barrel is provided with an end reduced in diameter from that of the exterior of the barrel, said reduced end having male threads 24 provided thereon for purposes to be described.

The barrel extension 26 is adapted to be secured to the barrel and is disposed within the breech casing for reciprocable movement in a direction longitudinally thereof. The forward portion or end 28 is provided with a lower portion or member 30 depending from the underside thereof. Said forward end is also provided with a cylindrical aperture 32 provided with internal or female threads adapted to receive the threads 24 of the barrel.

As stated above, the respective threads of the barrel and barrel extension are machined to a very high degree of precision and the fit between the threads is a very close one which permits no perceptible play between the barrel and barrel extension when connected, whereby when the adjacent ends of the barrel and barrel extension are in abutting relationship, the union between the barrel and barrel extension is substantially equivalent to that of two integral members. In order for the barrel to be properly and readily threaded within the threaded aperture of the barrel extension, the axis of the barrel and axis of the aperture of the barrel extension must be substantially perfectly parallel.

A shaft 34 is secured to the depending portion 30 of the barrel extension by a nut 36 and a plunger or piston, not shown, is secured to the forward end of said shaft and is adapted to abut against the forward end of recuperator spring 38, whereby the spring 38 may coact against said plunger to move the barrel extension forward at the completion of the recoil movement of the barrel extension.

The barrel extension 26 is also provided with a pair of spaced arms 40 and 42 extending rearward into the breech casing, the arm 40 being provided with a cylindrical aperture 44 extending transversely therethrough adjacent the rearward end of the same. Said aperture is normally provided in the arm of the barrel extension for purposes of engaging the barrel extension with a suitable supporting element during the heat treat-

ing of the barrel extension and is thus provided in the barrel extension in the standard construction thereof.

A feed box 46 is attached to the upper portion of the breech casing and comprises opposed side plates 48 and 50 respectively secured to the side plates 14 and 16 of the breech casing by suitable screws or bolts 52. The side plate 48 is provided with an exit opening 54 for permitting the exit of the empty feeder 56 therethrough. The side plate 50 is provided with a relatively long opening or slot 58 on the entrance side of the feed box for permitting the introduction of unfired cartridges or rounds and feeder to the feed box. It will be seen from Fig. 1 that the entrance slot 58 is much longer than the exit opening 54 and, as will be observed from the above mentioned figure, extends rearward past the end of the arms 40 and 42 and substantially the full length of the entrance side of the feed box.

The arms 40 and 42 are provided with wear plates 60 adjacent the rearward ends of the arms and the barrel extension 26 is provided with another wear plate 62 on the underside thereof just rearward of the depending portion 30. The wear plates 60 are adapted for sliding engagement with the lower surfaces of the inturned flanges 64 respectively provided at the upper edges of the side plates 14 and 16 of the breech casing. The wear plate 62 is adapted for sliding engagement with the upper surface of inturned flanges 66, one of which is not shown in Fig. 1, extending inward from the lower edges of the side plates 14 and 16. When the barrel extension is in proper alignment with the breech casing, the wear plates 60 are in engagement with the flanges 64 and the wear plate 62 is in engagement with the flanges 66. The axis of the aperture 32 is also parallel to the axis of the barrel bearing 20 in the trunnion block 18 when the barrel extension is in proper alignment with the breech casing and further, when the forward end of the barrel extension is in engagement with the rearward face of the barrel bearing 20, and is otherwise in the position just described, said position is regarded as the "normal" position and is so considered hereinafter in the claims.

When the barrel is removed from engagement with the barrel extension, the tension of the spring 38 is of such strength that it urges the lower or depending portion 30 of the barrel extension forward by pivoting the lower forward portion of the forward face of the barrel extension on the lower portion of the rear face of the trunnion block with the result that the rearward ends of the arms 40 and 42 of the barrel extension are moved downward a small fraction of an inch as indicated by the dot and dash line position of the rearward ends of the arms in Fig. 1. The position of the arms in dot and dash lines in Fig. 1 is slightly exaggerated to better illustrate and indicate the lowermost position to which the rearward ends of the arms are moved.

If the barrel is attempted to be threaded into the threaded aperture of the barrel extension while in such tilted or misaligned position, binding takes place between the respective threads of the barrel and barrel extension and threading of the barrel into the barrel extension under such conditions takes place only with great difficulty if it is at all possible to completely thread the barrel into proper position. To force the threads under such conditions results in various degrees of injury to the threads and such practice greatly

reduces the effective life of these respective parts of the firearm.

The foregoing description deals with only the elements and portions of the firearm necessary to afford an understanding of the operation of those parts of the firearm which are engaged by the accessory comprising the present invention. For a more complete understanding of the parts of the firearm illustrated on the drawing but not described in detail in the foregoing, attention is directed to the above mentioned Patent 1,525,065 to Browning in which a full and complete description of the operation of the entire firearm is set forth.

The present invention comprises an accessory adapted to engage the rearward portion of one of the arms of the barrel extension to hold the same in normal or uppermost position, against the action or force of the spring 38, whereby the axis of the threaded aperture of the barrel extension will be maintained in proper position and substantially parallel to the axis of the barrel bearing.

The accessory includes a bar forming a bridging member 68 having angularly related end portions, the angle between the two portions being substantially a right angle although the shape of the bridging member is not to be restricted to a right angle. One portion of the bridging member is provided with an aperture 70, said portion being adapted to be disposed on the upper edge of the side plate 48 of the feed box for support thereby. The other angularly related portion of the bridging member is adapted to abut the upper side of the flange 64 of the side plate 16 of the breech casing for support thereby.

A connecting member 72 in the form of a rod or shaft is disposed in the aperture 70 and the upper portion of the connecting member is threaded as indicated at 74. A wing nut 76 is mounted on the threaded portion of the connecting member and is secured against removal therefrom by any suitable means such as a cotter pin 78. The lower end of the connecting member is bent approximately at a right angle to the main portion of the connecting member 72 to form a barrel engaging member or portion 80 which might be defined as a hook-like member adapted to be disposed in the aperture 44 normally provided adjacent the rearward end of one of the arms 40 of the barrel extension.

The connecting member 72 is freely movable with respect to the bridging member 68, whereby after the portion 80 has been disposed in the aperture 44 and the end portions of the bridging member 68 are respectively placed in engagement with the upper edge of one side of the breech casing and one side of the feed box for support thereby, the wing nut 76 may be rotated to raise the rearward end of the arm 40 of the barrel extension and move the upper surfaces of the rearward ends of both of the arms of the barrel extension into engagement with the lower surfaces of the flanges 64 and thus maintain the barrel extension in said position which is the normal position thereof. The effect of the force of the spring 38 tending to tilt the barrel extension out of normal position is thereby overcome and the threaded aperture of the barrel extension is in proper position to receive the threads of the barrel and have the same freely engage the threads of the barrel extension.

It will also be seen that the arrangement of the various parts of the accessory is such that said parts may not be disassembled without re-

moving the cotter pin 78. The accessory is thus maintained in assembled relationship and free from accidental separation of the various parts thereof.

After the barrel has been threaded into proper engagement with the barrel extension, the accessory may be quickly removed by loosening the wing nut 76 and removing the portion 80 from the aperture 44, following which the accessory may be vertically removed from the interior of the breech casing and feed box.

The bridging member 68 is formed with angularly related portions, one of which portions extends downward to engage the upper portion of the edge of the side plate 16 of the breech casing in order to afford a rigid base for supporting said portion of the bridging member. Were the bridging member extended horizontally across both upper edges of the opposite sides of the feed box, in view of the slot 58 extending substantially the full length of the side 50 of the feed box, firm support for the left hand end of the bridging member, as viewed in Fig. 2, would not be afforded. In order that firm support for both ends of the bridging member may be provided, it is formed as described and illustrated.

The term "casing" as used in the claims is not to be restricted to either the feed box or the breech casing but may be considered in the broader sense of an enclosure comprising both the feed box and breech casing.

The descriptive terms of position such as "upward," "downward," "forward," "rearward" and the like are relative terms to be considered with respect to the position of the firearm shown in Figs. 1 and 2 and in which the normal position of the firearm is considered to be that in which the feed box is disposed above the breech casing and the barrel end of the firearm is considered the forward end. The position of the various elements and parts of the firearm and accessory are to be considered in this same relative sense regardless of the position in which the gun may be otherwise disposed.

It will thus be seen that the present invention provides a simply constructed accessory forming a durable and efficient supporting or clamping means for securing the barrel extension in its normal position within the breech casing and prevents displacement or movement of the barrel extension from said normal position in order to maintain the barrel extension in proper alignment to freely receive the threaded end of the barrel, notwithstanding the force of the recuperator spring tending to disalign the barrel extension and move it from its normal position. The accessory is quickly attached to and removed from the firearm and the various parts of the accessory are so assembled that they will not become readily separated from each other.

While the invention has been illustrated and described in its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways, falling within the scope of the invention as claimed.

What I claim is:

1. An accessory for use with a firearm having a barrel removably secured to a barrel extension reciprocally mounted in a casing and a recuperator spring secured to said barrel extension in such a manner that it tends to move the barrel extension out of proper alignment with the casing when the barrel is removed, said accessory

comprising supporting means adapted to engage said casing for support thereby and means adapted to connect said barrel extension and supporting means to secure said barrel extension in proper alignment with said casing and immovable against the force of said recuperator spring tending to disalign said barrel extension with respect to said casing while the barrel is being secured to or removed from said barrel extension.

2. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to said end of said barrel extension in such a manner that it tends to move the barrel extension out of proper alignment with the casing when the barrel is removed, said accessory comprising supporting means adapted to engage the casing for support thereby and means adapted to connect said supporting means and barrel extension adjacent the other end thereof to secure said barrel extension in proper axial alignment with said casing and immovable against the force of said recuperator spring tending to axially disalign said barrel extension with respect to the casing while the barrel is being secured to or removed from said barrel extension.

3. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent one side of said end whereby the spring tends to move the other end of the barrel extension from its normal position in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, a bridging member adapted to engage and be disposed across said casing, and connecting means engaging said bridging member and adapted to engage said other end of the barrel extension and secure said other end of the barrel extension against movement in a direction transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

4. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent one side of said end whereby the spring tends to move the other end of the barrel extension from its normal position in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, a bridging member adapted to extend across said casing and having portions respectively adapted to engage the edges of opposed walls of said casing, and connecting means engaging said bridging member and adapted to engage said other end of the barrel extension and secure said other end of the barrel extension against movement in a direction transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

5. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension provided with an aperture adjacent its other end and reciprocally mounted in a casing and the firearm also having a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent one side of said end whereby the spring tends to move the other end of the barrel extension from its normal position

in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, a bridging member adapted to extend across the casing and having portions adapted to respectively engage the edges of opposed walls of said casing, and connecting means having one end engaging said bridging member and the other end adapted to engage the aperture in said other end of the barrel extension to secure the other end of said barrel extension against movement in a direction transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

6. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent one side of said end whereby the spring tends to move the other end of the barrel extension from its normal position in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, bridging means adapted to extend across said casing and having portions respectively adapted to engage edges of opposed walls of said casing, and connecting means comprising a member movable with respect to and having one end engaging said bridging member and the other end adapted to engage the barrel extension adjacent said other end thereof to secure said other end of the barrel extension in its normal position in said casing and against movement in a direction transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

7. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent one side of said end whereby the spring tends to move the other end of the barrel extension from its normal position in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, an apertured bridging member adapted to extend across said casing and having portions respectively adapted to engage edges of opposed walls of said casing, connecting means movable with respect to said bridging member and having one end passing through the aperture of said bridging member and the other end adapted to engage the barrel extension adjacent said other end thereof, and means on said connecting means adapted to engage said bridging member to maintain said connecting means and said other end of the barrel extension against movement in a direction transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

8. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a casing and a recuperator spring secured to the lower portion of the same end of said barrel extension as said barrel whereby the spring tends to move the other end of the barrel extension downward from its normal position in the casing when the barrel is removed from the barrel extension, said accessory comprising in combination, a bridging member adapted to extend across said casing and having portions respectively adapted to engage the upper edges of opposed walls of said casing,

and a connecting member engaging said bridging member and adapted to engage said other end of the barrel extension to maintain it against downward movement transverse to the longitudinal axis of the firearm while the barrel is being secured to or removed from said barrel extension.

9. An accessory for use with a firearm having a barrel removably secured to one end of a barrel extension reciprocally mounted in a breech casing provided with a feed box and the firearm also having a recuperator spring secured to the same end of said barrel extension as said barrel and adjacent the lower side of said end whereby the spring tends to move the other end of the barrel extension in a direction downward and transverse to the longitudinal axis of the firearm when the barrel is removed from the barrel extension, said accessory comprising in combination, an irregularly shaped apertured bridging member adapted to extend across said casing and having portions respectively adapted to engage one wall of said breech casing and an opposed wall of said feed box, connecting means movable with respect to said bridging member and having one end passing through the aperture of said bridging member and the other end adapted to engage said barrel extension adjacent said other end thereof, and means on said connecting member adapted to engage said bridging member to maintain the connecting member and said other end of the barrel extension against movement in a direction transverse to the longitudinal axis of the firearm and downward from its normal position in the breech casing while the barrel is being secured to or removed from said barrel extension.

10. Clamping means for engaging one end of a firearm barrel extension and holding it in proper position in a firearm breech casing, said clamping means comprising in combination, a bar arranged

to engage said breech casing and be supported thereby, said bar having an aperture intermediate its ends, a rod disposed in said aperture, said rod being threaded on one end and provided on its other end with means arranged to engage said barrel extension, and threaded means on the threaded end of the rod adapted to maintain the rod in an adjustable position on said bar.

11. Clamping means for engaging one end of a firearm barrel extension and holding it in proper position in a firearm breech casing, said clamping means comprising in combination, a bar having angularly related portions arranged to engage said breech casing and be supported thereby, said bar also having an aperture intermediate its ends, a rod disposed in said aperture, said rod being threaded on one end and provided on its other end with a hook-like portion adapted to engage the barrel extension, and means on the threaded end of the rod adapted to maintain the rod in an adjustable position on said bar.

12. Clamping means for engaging one end of a firearm barrel extension and holding it in proper position in a firearm breech casing, said clamping means comprising in combination, a bar having angularly related portions arranged to engage said breech casing and be supported thereby, said bar also having an aperture intermediate its ends, a rod disposed in said aperture, said rod being threaded on one end and provided on its other end with a portion extending transversely thereto and adapted to engage the barrel extension, a nut disposed on the threaded end of said rod and adapted to maintain the rod in an adjustable position on said bar, and locking means on the outer portion of the threaded end of the rod to prevent removal of the nut from the threaded rod and maintain the clamping means assembled.

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