Oct. 15, 1946. J. M. BROWN 2,409,191

FIREARM BOLT TOOL

Filed Aug. 12, 1944 2 Sheets-Sheet 1

Fig. 1.

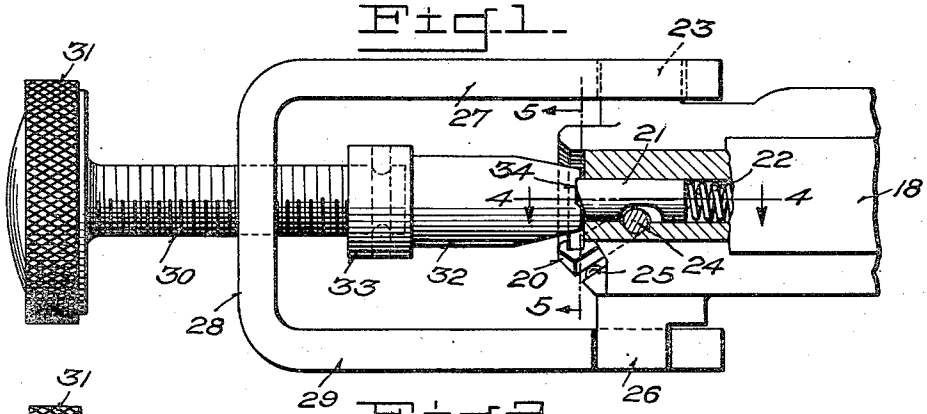


Fig. 2.

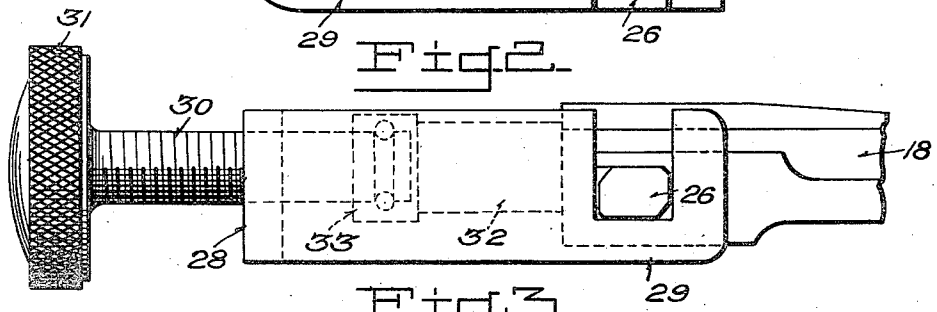


Fig. 3.

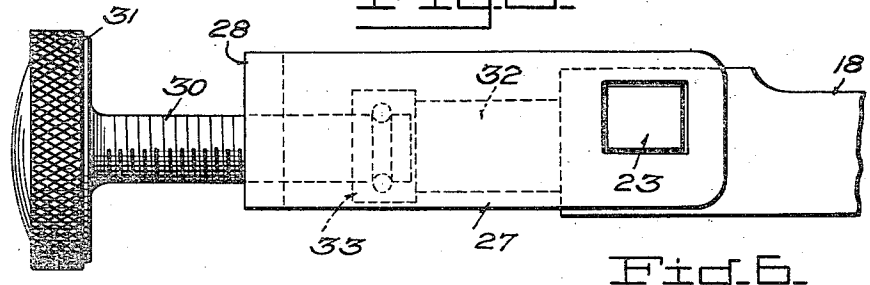


Fig. 6.

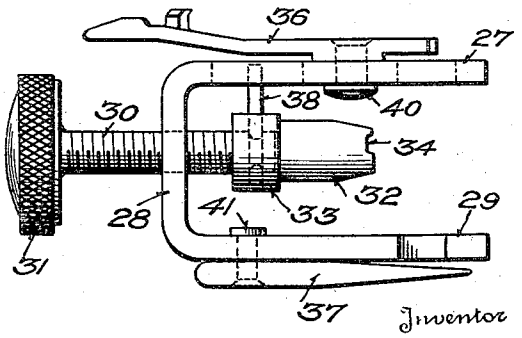


Fig. 4.

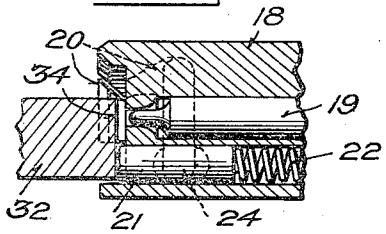
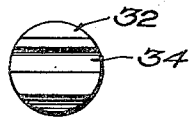


Fig. 5.



Inventor

JOSEPH M. BROWN,

By C. C. Herrstrom & H. E. Thibodeau

Attorneys

Oct. 15, 1946. J. M. BROWN 2,409,191

FIREARM BOLT TOOL

Filed Aug. 12, 1944 2 Sheets-Sheet 2

Fig. 7.

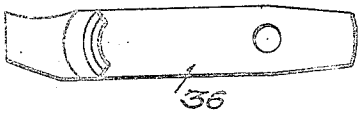


Fig. 8.

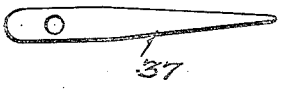


Fig. 9

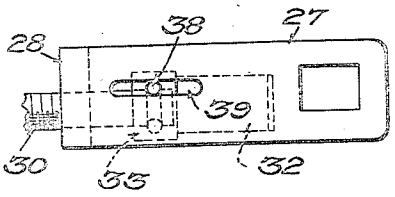


Fig. 10.

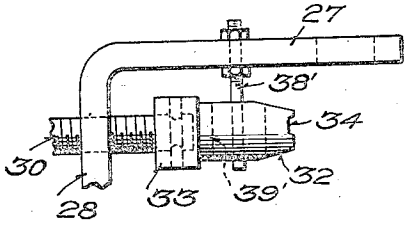


Fig. 11.

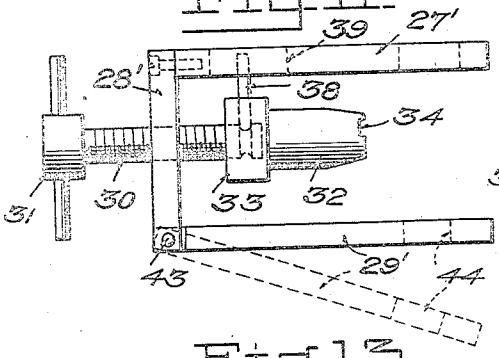


Fig. 12.

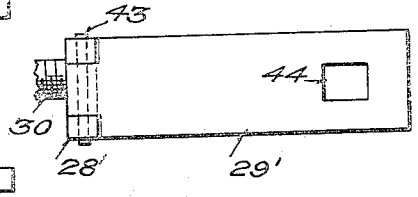


Fig. 13.

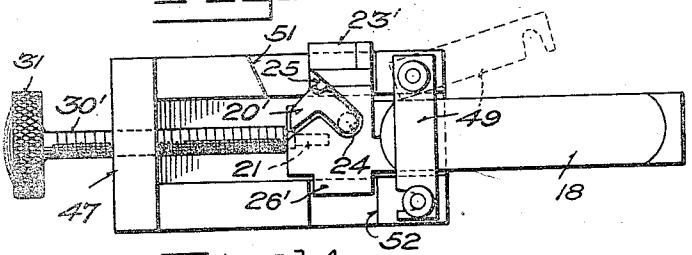


Fig. 15.

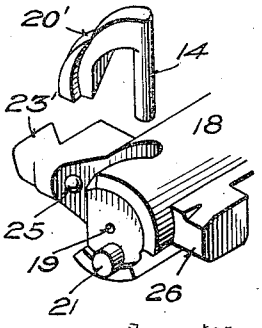
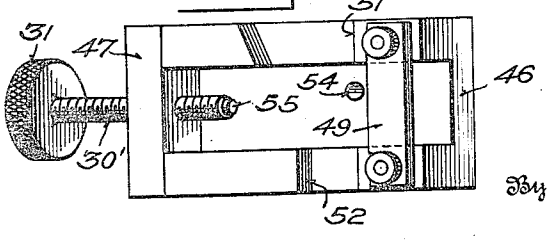


Fig. 14.



Inventor

JOSEPH M BROWN,

By C. E. Herrstrom & W. E. Thibodeau

Attorneys

Patented Oct. 15, 1946 2,409,191

UNITED STATES PATENT OFFICE

2,409,191

FIREARM BOLT TOOL

Joseph M. Brown, Philadelphia, Pa.

Application August 12, 1944, Serial No. 549,248

3 Claims. (Cl. 29—259)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

My invention relates to the disassembly and reassembly of firearms bolts and it has special reference to an improved tool for taking apart and putting together bolts that are constructed as in the caliber .30 Garand rifle M1 and in the military carbine.

Broadly stated, the object of my invention is to save time and labor in effecting such disassembly and reassembly.

A more specific object is to reduce the skill that is required for such operations and to assure their successful and rapid completion whenever attempted.

A further object is to provide a disassembly-reassembly tool which is light, compact and readily portable.

Other objects and advantages will become apparent from the following description of illustrative embodiments when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is an enlarged-scale showing of the improved tool of my invention engaged with the bolt of a caliber .30 Garand rifle M1;

Figs. 2 and 3 are elevation views showing the two sides of the tool of Fig. 1;

Fig. 4 is a section on line 4—4 through the ejector firing pin and certain other parts of the Fig. 1 bolt;

Fig. 5 shows the grooved end of the bolt tool's plunger as viewed from line 5—5 of Fig. 1;

Fig. 6 is an actual-size reproduction of the Fig. 1 bolt tool showing how extractor and drift pin fixtures may be attached to the sides thereof;

Figs. 7 and 8 are side-view showings of those two fixtures;

Fig. 9 illustrates one side of the Fig. 6 tool (with extractor fixture removed) and shows further details of the plunger's self-aligning pin;

Fig. 10 represents another arrangement for imparting self-alignment to the plunger;

Fig. 11 shows an alternative bolt tool construction wherein use is made of a hinge-mounted side member;

Fig. 12 is a side view of Fig. 11's hinged frame arm;

Fig. 13 is an actual-size showing of a carbine bolt tool incorporating my inventive improvements;

Fig. 14 is a perspective view of the Fig. 13 tool; and

Fig. 15 shows a carbine bolt of the Fig. 14 type with the extractor removed therefrom.

The firearm bolt to be acted on

My improved tool is useful for taking apart and putting together bolts that are constructed as in the caliber .30 Garand rifle M1 and in the military carbine. Showings of such bolts are respectively made by Figs. 1—2—3—4 and by Figs. 13 and 15.

2

Each of these bolts includes a body 18 of metal machined for proper interfitting with the weapon's chamber in which it is used; a firing pin 19 (see Fig. 4) centrally extending through this body from the rear (see right of Fig. 13) to the front (see Figs. 1—2—3—4 and 15) of the bolt; an extractor 20 carried by the bolt's forward end as shown in Figs. 1, 4, 13 and 15; an ejector 21 which is caused by a compression spring 22 (see Figs. 1 and 4) to protrude from the bolt's forward end as shown in Figs. 1, 4, 13 and 15; and lugs 23 and 26 extending from the two sides of the bolt body's forward portion.

Holding the extractor 20 in place and permitting limited rocking thereof during operation of the weapon is an extractor shaft 24 (see Figs. 1, 13, 15) which fits into a mating opening that passes transversely through the forward portion of the bolt. Urging the extractor lip towards the center of the bolt face is the tip 25 (see Figs. 1 and 13) of a second compression spring (not shown).

In each of the two bolts illustrated the extractor shaft 24 serves to limit the protruding movement of the ejector 21. This results from an interfitting relation of the two parts which is best illustrated by Fig. 1. There it is seen that substantially half of the extractor shaft's diameter extends into a mating notch in one side of the ejector 21. By reason of this extension lengthwise movement of the ejector is limited by the named notch's length.

Moreover, this same extractor shaft 24 engages with a similar notch (not shown) in one side of the firing pin 19 and further serves to restrain withdrawal of the firing pin rearwardly from the bolt.

As long, therefore, as the bolt parts are assembled (see Figs. 1 and 4) shaft 24 keeps the firing pin from moving rearwardly beyond a specified limit; and more important still, it also keeps compression spring 22 for pushing the ejector 21 forwardly (to the left) beyond the point where the right side of the represented notch bumps up against the shaft. When this happens, the full force of the spring 22 is blocked by that shaft.

In the M1 rifle bolt of Figs. 1—2—3—4 this force typically will be of the order of about 17 pounds; in the carbine bolt of Figs. 13 and 15 only slightly less. When exerted upon parts of the comparatively small sizes here involved, forces of this order are relatively intense and because of them the operations of disassembling and reassembling the bolt's extractor, ejector and firing pin are rendered inherently difficult.

The disassembly-reassembly tool of Figs. 1–5

By aid of a bolt tool of the improved type here disclosed, such operations may be performed quickly, easily, reliably and without need for special skill.

In the illustrative form shown by Figs. 1 to 5 the tool of my invention consists of a metal frame or yoke 27—28—29; a threaded shaft 30 extending through the yoke web 28 and carrying a turning knob or other hand grip 31; and a plunger 32 carried by the end of shaft 30 through a mounting 33 which keeps the plunger in proper axial alignment without requiring that it turn with the shaft.

Tool arms 27 and 29 are provided with openings respectively dimensioned to receive the bolt's side lugs 23 and 26. Arm 27's opening is closed on all four sides as shown in Fig. 3 and requires that lug 23 be inserted endwise therein; arm 29's cut away portion is open on one side, as shown in Fig. 2, and constitutes a notch into which lug 26 may be slid by sidewise movement.

The tool's plunger 32 has an end diameter somewhat less than the bolt's end rim (see Fig. 1) into which the plunger fits during use. It is provided with an end groove 34 which engages with the bolt's ejector 21 in the manner shown by Fig. 1 and which satisfactorily may extend all the way across the plunger face, as indicated by Fig. 5.

Use of the bolt tool

In applying this tool to the M1 rifle bolt 18, the following procedure may be employed. Insert the lugs 23—26 into the openings of the tool's yoke arms 27—29 and press firmly into the position shown by Figs. 1—2—3; turn the screw-down shaft 30 forwardly and thereby advance plunger 32 into contact with the bolt's ejector 21 with the groove 34 aligned as shown; screw the plunger down tight against the bolt face, pushing the ejector inwardly against the compressive force of spring 22; push the now released extractor 20 out of the bolt by exerting force on the end of shaft 24 (by a drift pin or other suitable tool); pull the now released firing pin 19 rearwardly from the bolt; retract the plunger 32 away from the bolt face (by a reverse turning of screw 30) allowing the ejector 21 to follow until all compressive force of spring 22 has been released; and pull the ejector 21 with its spring completely out of the bolt body.

To reassemble the bolt, reverse the steps outlined. Place the bolt in the tool as before with the plunger 32 retracted to its limit of withdrawn travel; insert the ejector 21 and its spring 22 into the bolt body; advance the plunger into contact with the ejector and, by a continued turning of screw knob 31, force the ejector against the spring's compression into the position shown by Figs. 1 and 4; from the opposite end of the bolt slide the firing pin 19 into the position of Fig. 4; insert the extractor shaft 24 into its now cleared mating opening in the bolt body; and finally, push the shaft to its limit of travel bringing the extractor 24 into the operative position shown by Figs. 1 and 4.

The bolt is now completely reassembled and may be removed from the tool by backing the plunger 32 away therefrom, sliding the bolt lug 26 out of the notch in the tool leg 29 and pulling bolt lug 23 out of the opening in leg 27. This completely frees the bolt.

The modified tool of Figs. 6 to 10

Representations of the improved bolt tool just described (along with the M1 rifle bolt 18) are made in Figs. 1 to 5 at approximately 1½ times actual size. In Fig. 6 this same tool is reproduced to actual-size scale, and no showings of the bolt to be acted upon are there made.

This Fig. 6 reproduction shows how a ruptured cartridge extractor 36 and a drift pin 37 may be attached to the tool arms 27 and 29 for convenient use in the field in supplement to the tool; Fig. 6 further shows how the tool's plunger 32 may be made self-aligning through use of a pin 38 extended from the plunger mounting.

Further showings of the extractor and drift pin fixtures 36—37 are made by Figs. 7 and 8. By means such as rivets 40 and 41 these two fixtures may be pivotally secured to the tool's two sides for ready and convenient availability at all times. Such affixing in no way interferes with the intended functioning of the tool itself and frequently is of practical help in dealing with ruptured cartridges or otherwise working on the weapon of which the bolt 18 forms a part.

Self-aligning plunger

For purposes of keeping the groove 34 of the tool plunger 32 at all times aligned for proper engagement with the bolt's ejector 21 (see Figs. 1 and 4), the basic tool of Figs. 1 to 5 may be supplemented by the aligning pin 38 of Figs. 6 and 9. This pin is shown as extending from the plunger mounting 33 into a mating tool arm slot 39 (see Fig. 9) lengthwise through which the pin is free to slide.

The plunger 32 and its mounting 33 are integral, and pin 38 thus keeps the plunger in a fixed rotative position without interfering with advancing and retractive movements imparted thereto by threaded shaft 30. Such rotative positioning assures that the plunger groove 34 at all times is aligned for proper engagement with the ejector 21 (see Fig. 1) of the bolt to be acted on.

Alternatively, the aligning pin 38' may be fixed to one of the two arms for extension into a mating slot 39' in the plunger 32. This arrangement is shown by Fig. 10. It affords all of the self-aligning advantages of the former and may be used interchangeably therewith.

The tool construction of Figs. 11–12

A second form of tool construction is shown by Figs. 11–12. Here the arm 27' is rigidly secured to (or integral with) the yoke web 28 as before, but the second arm 29' is joined with the yoke through a hinge connection which permits sidewise swinging to the position shown dotted in Fig. 11. This connection may take any one of a number of forms of which that represented as utilizing hinge pin 43 is merely illustrative.

Advantage of this construction is that tool arm 29's bolt lug receiving opening 44 may be closed on all four sides instead of taking the form of a notch as shown in the earlier figures. In engaging this Fig. 11–12 tool with the bolt to be acted on, bolt lug 23 is inserted into tool arm 27's opening as before; bolt lug 26 is then aligned with the opening 44 in the outwardly swung tool arm 29'; and this arm is then returned inwardly to engage lug 26.

Fig. 11 further illustrates how the tool's hand grip 31 of the earlier views may be replaced by a pronged type of turning member 31' secured to the end of threaded shaft 30; also that the construction details of the tool's yoke 27—28—29 may take any one of a wide variety of forms.

The carbine bolt tool of Figs. 13–14

The tools thus far described are designed for acting on bolts constructed as in the caliber .30 Garand rifle M1; tools incorporating my improved features may also be applied to the disassembly and reassembly of bolts constructed as in the military carbine.

One such application is shown in Figs. 13–14. The tool thereof is designed for action on a carbine bolt shown to actual size scale by Fig. 13 and reproduced at reduced-size scale by the perspective showing of Fig. 15. As to organization of parts and problems of disassembly and reassembly this carbine bolt is substantially the full equivalent of the M1 rifle bolt earlier discussed.

In the illustrative design of carbine tool shown, use is made of a channeled metal frame of the U-shaped cross section shown at 46 in Fig. 14; a web plate 47 secured to the end thereof by screws or other means (not shown); a threaded shaft 30′ extending through the web plate and carrying a turning knob 31; and a retainer link 49.

For engaging the bolt's side lugs 23′ and 26′ the tool body is provided with notches 51 and 52 cut into the upper faces of its two side walls. Depth of these notches is such that when the bolt lugs are placed therein as in Fig. 13, the bolt 18 fits down into the channeled tool body 46 sufficiently far that the upper side of the bolt will be cleared by the tool's retaining link 49 when swung into place as shown by the full lines of Fig. 13.

In this position the lower end of the bolt's extractor shaft 24 (see Fig. 15) is directly over a hole 54 through the tool's base. Through this hole a drift pin (see Fig. 8) or other suitable instrument may be extended from beneath the tool to push the extractor 20 from the bolt body when spring tension has been relieved from the extractor shaft.

Contact with the bolt's ejector 21 is made directly by the end 55 of the threaded shaft 30′. With the bolt positioned in the tool as shown in Fig. 13, such contact results when the shaft is advanced by a forward turning of its knob 31.

Use of the Figs. 13–14 tool

Use of this carbine bolt tool is very similar to that of the M1 rifle tools earlier described. The bolt to be disassembled is first engaged, as in Fig. 13, with the retainer link 49 secured thereover, and the tool's screw-down shaft 30′ is next advanced to force the ejector 21 inwardly against its compression spring (see Figs. 1 and 4) and thereby free the extractor shaft 24.

By the aid of a small screw driver (not shown) the pressure of spring tip 25 (see Fig. 13) is next removed from the extractor 20′ so that the extractor is no longer engaged by that spring. Manipulation of such a screw driver is made easier by the open-top design of the tool and by the widened notch 51 in the tool's extractor side. Unlike the M1 rifle bolt earlier considered, the carbine bolt's extractor 20′ is so formed that the spring tip 25 must be pushed out of contact therewith before the extractor can be withdrawn from the bolt.

Thus freed, the extractor 20 is now moved upwardly out of the bolt as by the aid of a pushing instrument inserted through the tool base hole 54; the thus freed firing pin 19 (see Fig. 4) is withdrawn from the opposite end of the bolt; the screw 30′ is backed away from the bolt allowing ejector 21 to follow until all spring pressure has been released; and the ejector and its spring are now completely withdrawn from the bolt.

Reassembly of the bolt involves a reversal of the foregoing steps. With the bolt in the tool the ejector 21 and spring 22 are reinserted into the bolt and forced into place by advancement of the screw down shaft 30′; the firing pin 19 is next slid from the opposite end of the bolt into a position corresponding to that of Fig. 4; the extractor shaft 24 is inserted into its now cleared mating opening in the bolt body and pushed into operative position (again using the screw driver when necessary); and the screw 30′ is now retracted and the bolt removed from the tool.

Summary

From the foregoing it will be seen that I have provided an improved tool for taking apart and putting together firearms bolts that are constructed as in the caliber .30 Garand rifle and in the military carbine; that I have made possible a marked reduction in the time and labor required to effect such disassembly and reassembly; that I have reduced the skill required for such operations and assured their successful and rapid completion whenever attempted; and that I have provided a disassembly-reassembly tool which is light, compact and readily portable.

My improvements are therefore extensive in their application and are not to be restricted to the specific form here shown by way of illustration.

I claim:

1. In a tool for aiding disassembly and reassembly of a firearms bolt which has opposing side lugs plus an ejector protruded from one end by an internal spring plus an extractor including a shaft transversely extended through said bolt to limit said ejector's protrusion by blocking the full force of said spring, the combination of a frame having a pair of side members one of which has an opening bounded by member material on all four sides whereby initially to engage one of said bolt lugs when same is inserted endwise thereinto and the other of which has a corresponding opening bounded by member material on three sides only whereby engagedly to receive the other of said bolt lugs when same is subsequently slid sidewise thereinto, an end web member securing said two side members to each other in fixed spaced apart relation whereby those members snugly accommodate said firearms bolt therebetween when said bolt lugs are engaged in the side member openings as aforesaid and having a web opening aligned substantially with the axis of said bolt's extractor when the bolt lugs are thus engaged, a screw-down shaft threaded into said web opening and having a hand grip through which rotation may be imparted thereto, and means on the inner end of said screw-down shaft engageable with said bolt's ejector whereby advance turning of the shaft pushes the ejector into the bolt against said spring and by thus removing all spring force from said extractor shaft frees same for removal from or reinsertion into the bolt.

2. In a tool for aiding disassembly and reassembly of a firearms bolt which has opposing side lugs plus an ejector protruded from one end by an internal spring plus an extractor including a shaft transversely extended through said bolt to limit said ejector's protrusion by blocking the full force of said spring, the combination of a frame having a pair of side members one of which has an opening bounded by member ma-

terial on all four sides whereby initially to engage one of said bolt lugs when same is inserted endwise thereinto and the other of which has a corresponding opening bounded by member material on three sides only whereby engagedly to receive the other of said bolt lugs when same is subsequently slid sidewise thereinto, an end web member securing said two side members to each other in fixedly spaced apart relation whereby those members snugly accommodate said firearms bolt therebetween when said bolt lugs are engaged in the side member openings as aforesaid and having a web opening aligned substantially with the axis of said bolt's extractor when the bolt lugs are thus engaged, a screw-down shaft threaded into said web opening and having a hand grip through which rotation may be imparted thereto, a plunger carried by the inner end of said screw-down shaft through a swivel connection which permits the plunger to stay rotatively stationary during reception of axial motion from the shaft, and means on the end of said plunger engageable with said bolt's ejector whereby advance turning of the shaft pushes the ejector into the bolt against said spring and by thus removing all spring force from said extractor shaft frees same for removal from or reinsertion into the bolt.

3. In a tool for aiding disassembly and reassembly of a firearms bolt which has opposing side lugs plus an ejector protruded from one end by an internal spring plus an extractor including a

shaft transversely extended through said bolt to limit said ejector's protrusion by blocking the full force of said spring, the combination of a frame having a pair of side members one of which has an opening bounded by member material on all four sides whereby initially to engage one of said bolt lugs when same is inserted endwise thereinto and the other of which has a corresponding opening bounded by member material on three sides only whereby engagedly to receive the other of said bolt lugs when same is subsequently slid sidewise thereinto, an end web member securing said two side members to each other in fixedly spaced apart relation whereby those members snugly accommodate said firearm's bolt therebetween when said bolt lugs are engaged in the side member openings as aforesaid and having a web opening aligned substantially with the axis of said bolt's extractor when the bolt lugs are thus engaged, a screw-down shaft threaded into said web opening and having a hand grip through which rotation may be imparted thereto, a plunger carried by the inner end of said screw-down shaft through a swivel connection and having an end which is grooved for mating engagement with said bolt's ejector upon advance turning of the screw-down shaft, and means for at all times keeping said plunger in proper rotative alignment with respect to said ejector while not interfering with axial travel by the plunger.

JOSEPH M. BROWN.