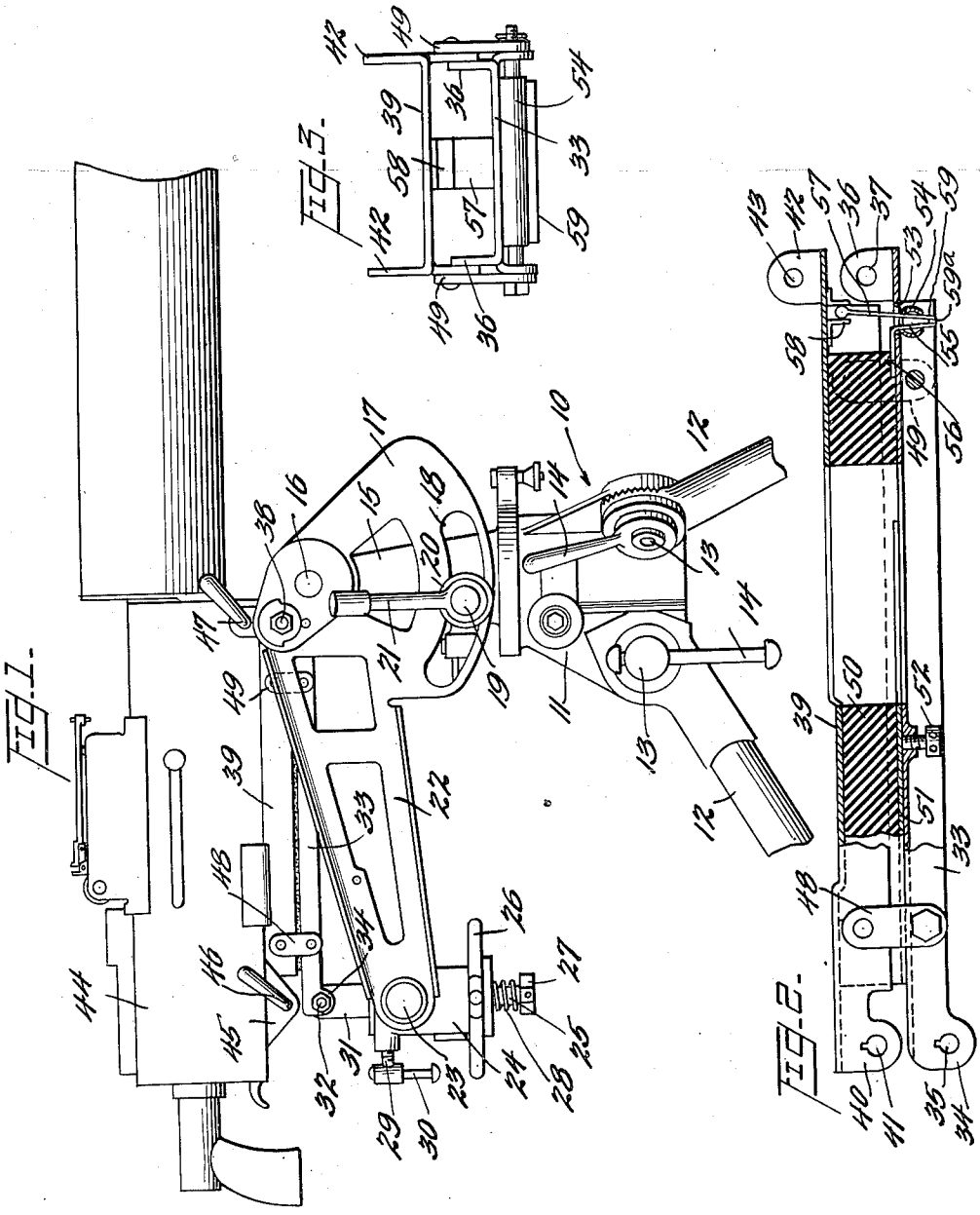
Jan. 22, 1946. G. MAURY, JR 2,393,257

GUN SEAT

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FIG-4-

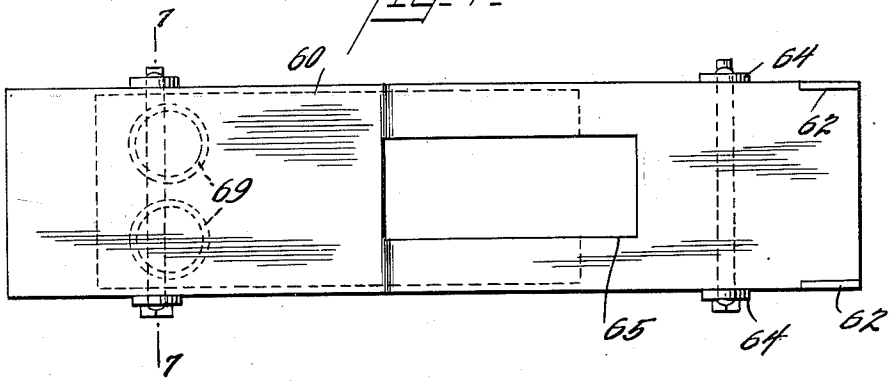


FIG-5-

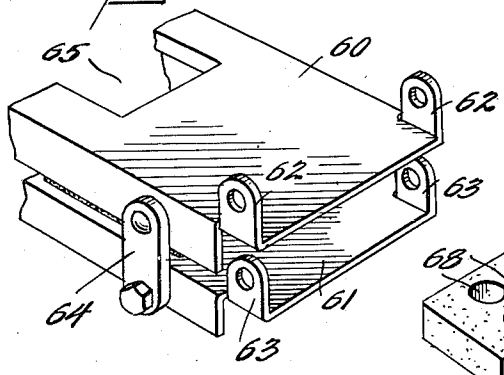


FIG-6-

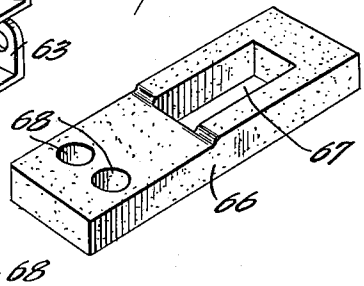


FIG-7-

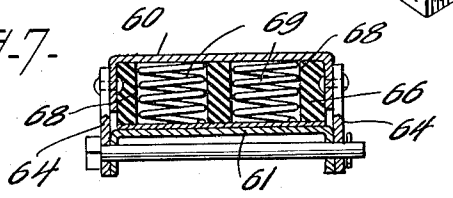


FIG-8-

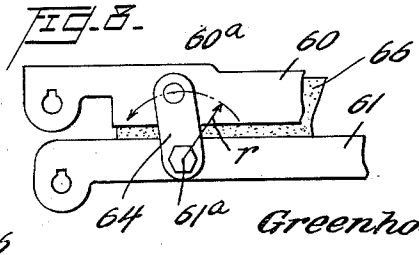
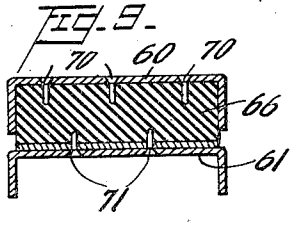


FIG-9-



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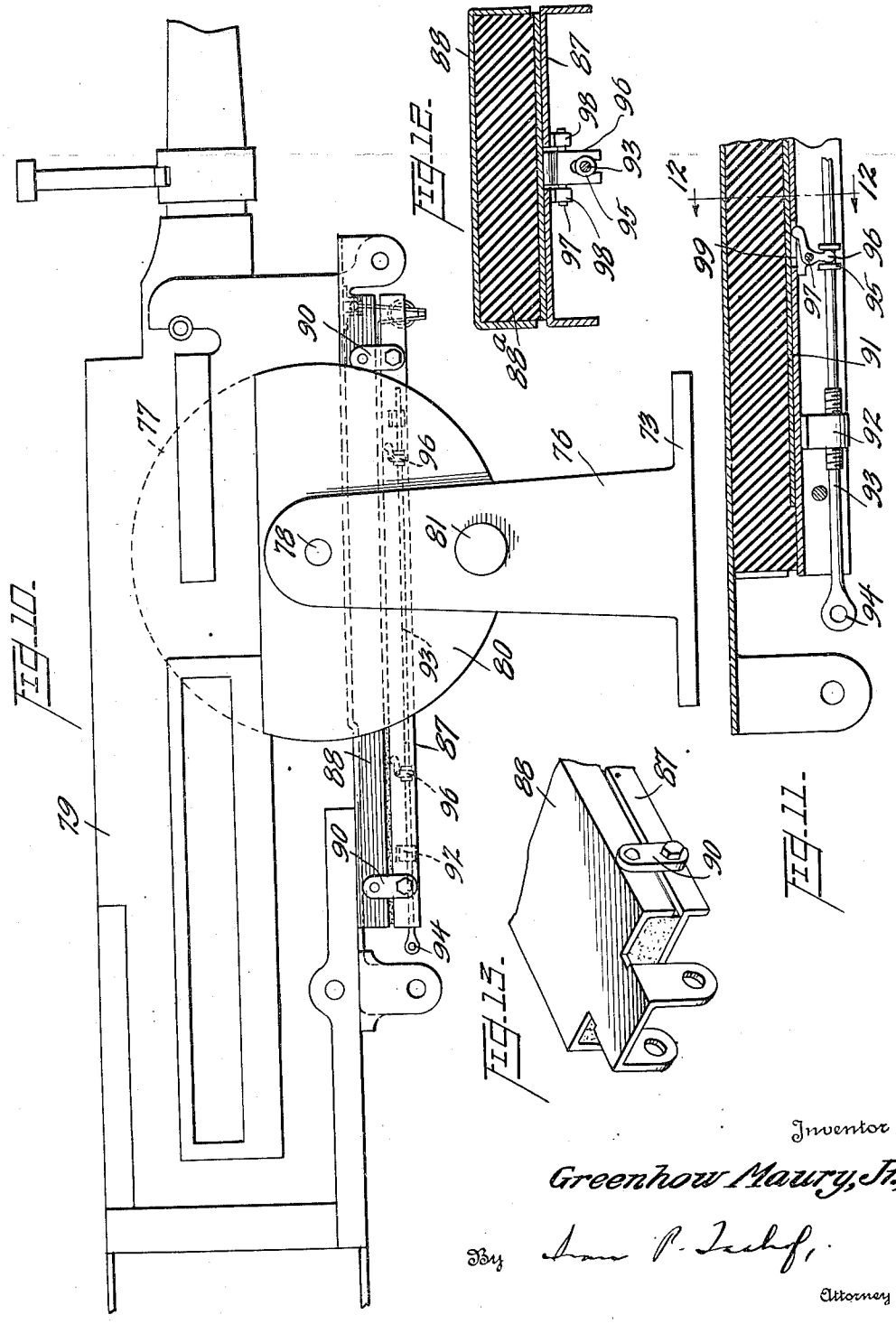
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GUN SEAT

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GUN SEAT

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FIG. 14.

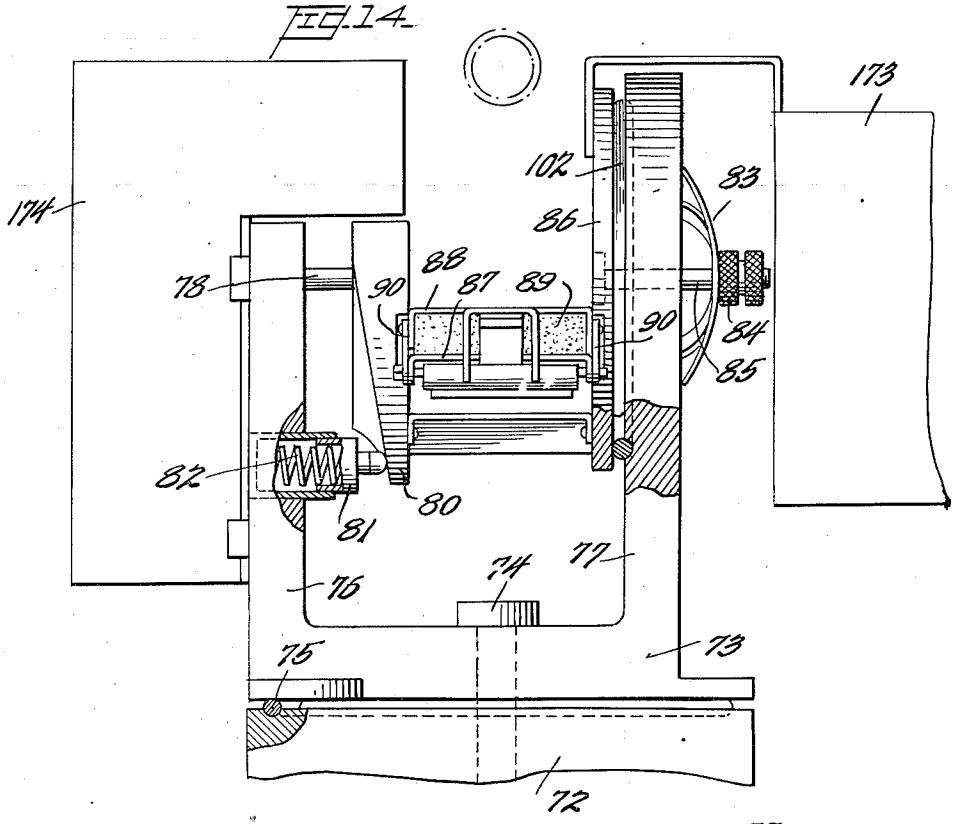


FIG. 15.

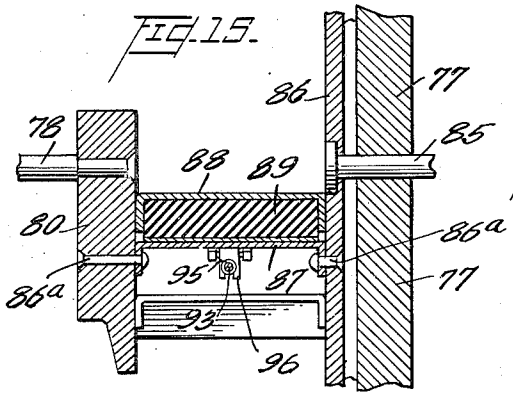
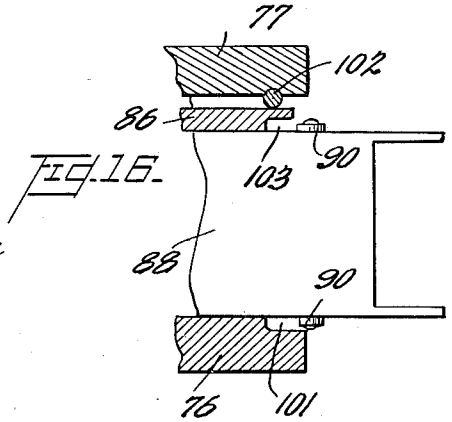


FIG. 16.



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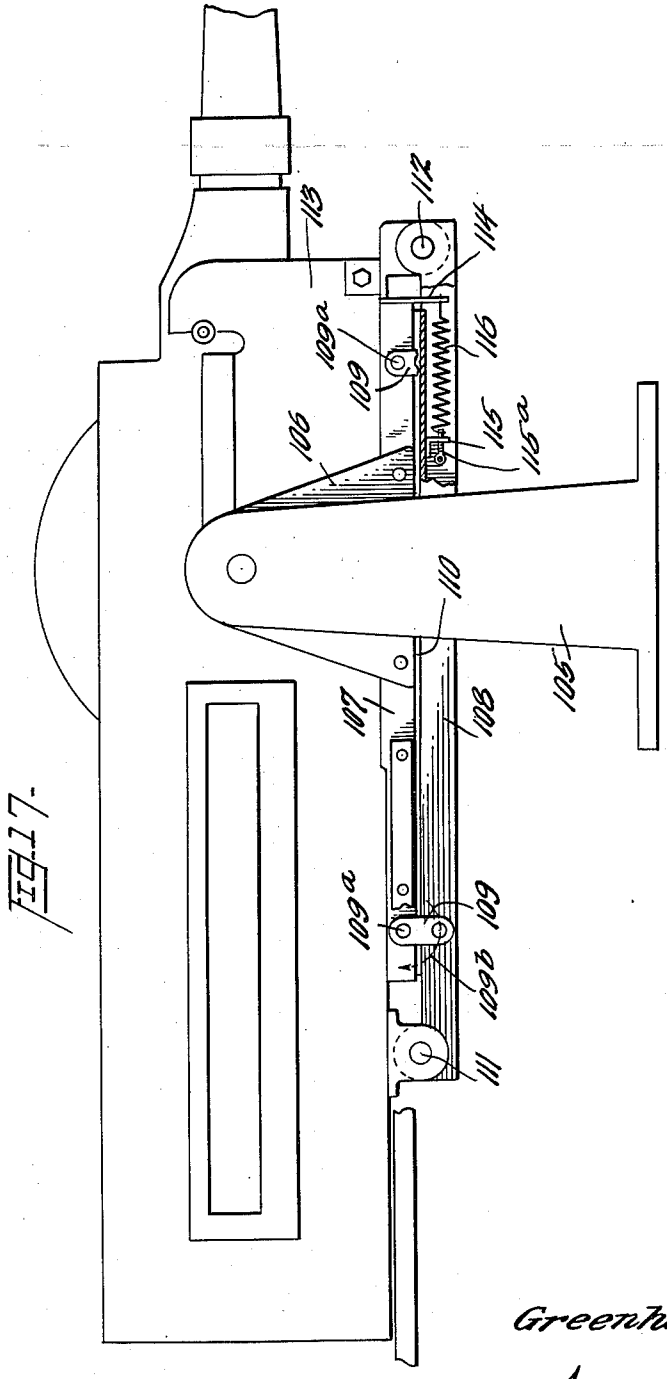


FIG. 17.

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GUN SEAT

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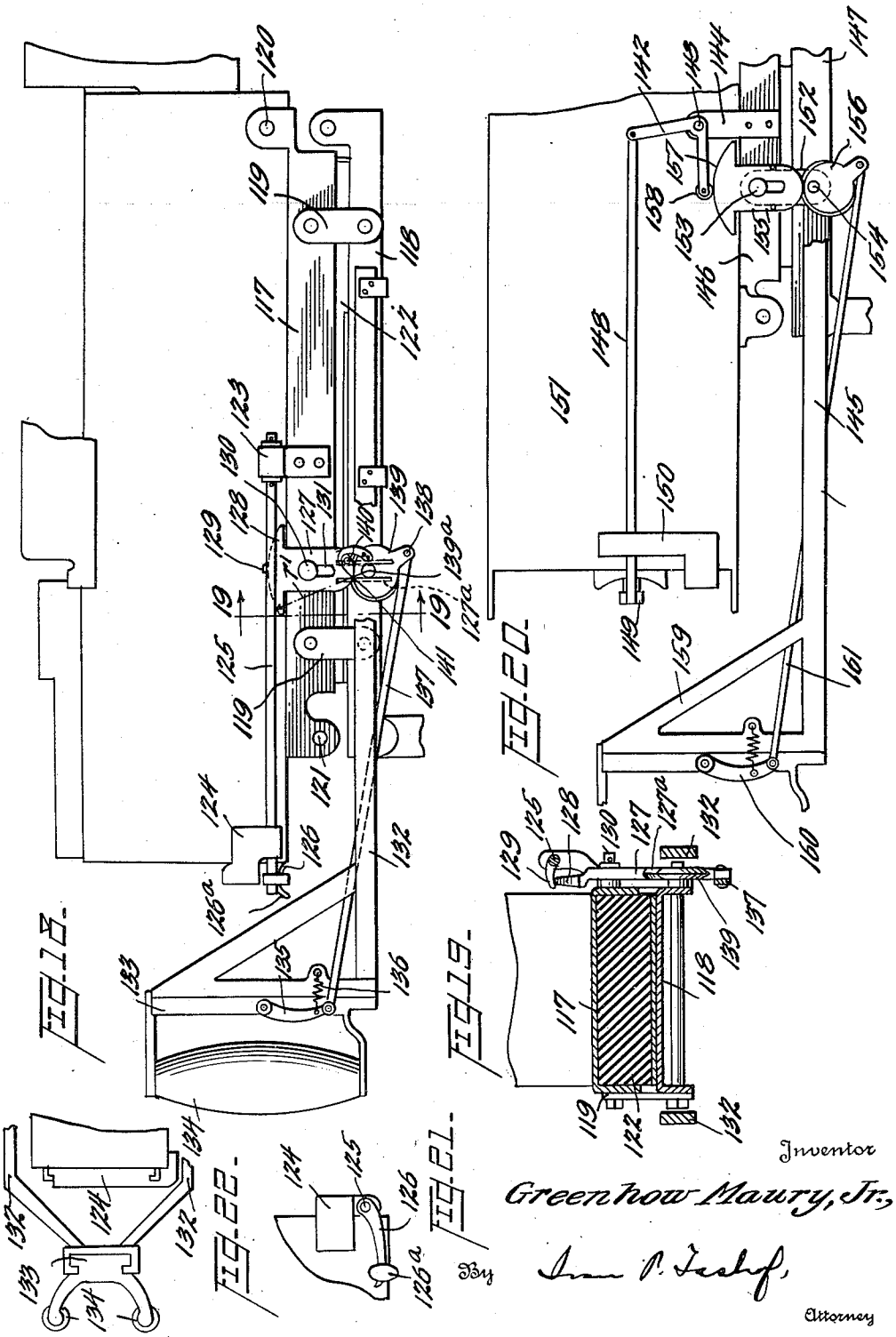


Fig. 18.

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

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GUN SEAT

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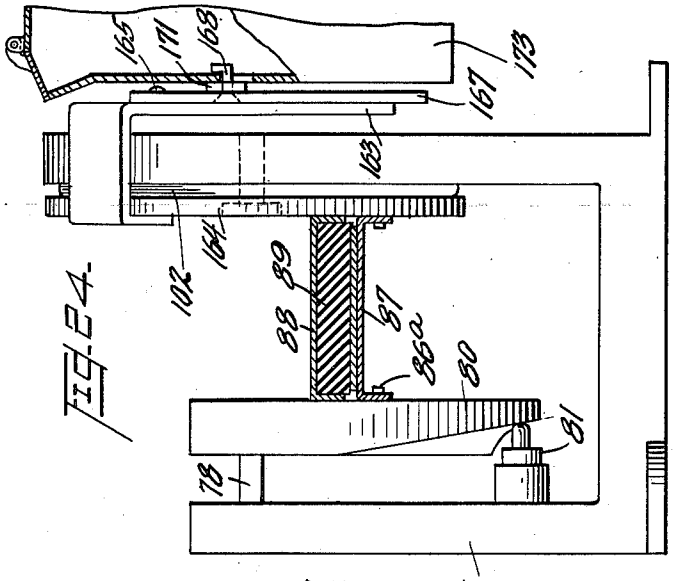


FIG. 24.

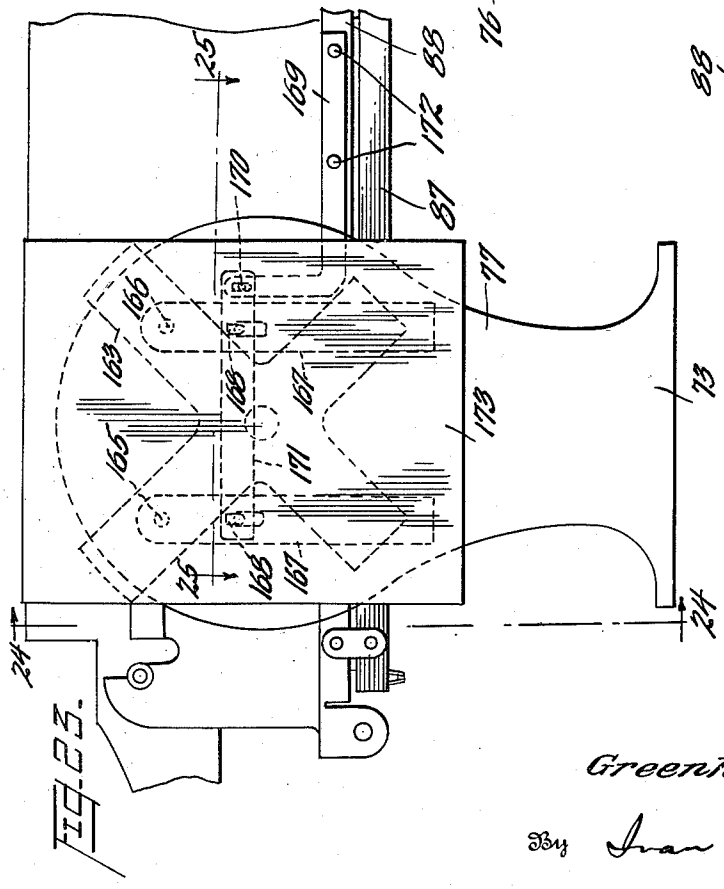


FIG. 23.

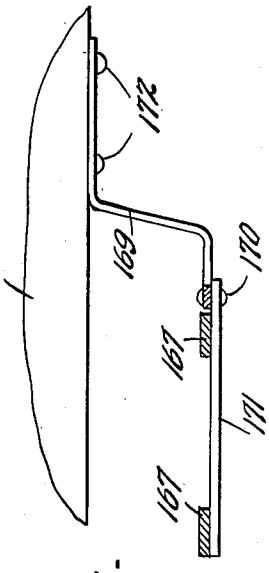


FIG. 25.

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Patented Jan. 22, 1946 2,393,257

UNITED STATES PATENT OFFICE

2,393,257

GUN SEAT

Greenhow Maury, Jr., Richmond, Va.

Application June 6, 1940, Serial No. 339,171

17 Claims. (Cl. 89—27)

This invention relates to gun seats or gun and mount adapters.

In rapid fire of machine guns, heavy recoils occur at closely spaced time intervals, so that it is necessary, in order to retain the axis of the gun in its aimed position, to overcome these recoils at correspondingly spaced time intervals and restore the gun to its normal position with relation to its support or carriage.

One important object of the invention is to provide novel and improved means whereby the recoil effects of the gun will be absorbed as quickly as they occur and the gun correspondingly restored to its normal position.

A second important object of the invention is to accomplish this result by means of an adjustable mounting which will not interfere with the aiming of the gun through a depression or elevation.

A third important object of the invention is to provide a mount of this character from which the gun may be readily detached, and to which the gun may be readily attached.

A fourth important object of the invention is to provide a mount of this description wherein the recoil element includes an absorbing element not liable to fracture or displacement.

A fifth important object of the invention is to provide a gun mount of this description wherein the firing handle may be carried by the mount in a position free from excessive vibration, thus avoiding shock to the hand and arm of the operator of the gun.

A sixth important object of the invention is to provide a mount of this description which may be attached to any of a number of the carriages or supports now in use without materially changing the character of the mount.

A seventh important object of the invention is to provide for adjusting the flexibility of the cushioning member and recoiling springs to thereby control the build up of recoil force caused by successive shots.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the appended claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views; and

Figure 1 is a side elevation of a rapid fire gun mounted on the improved recoil shock absorbing gun seat, the gun in the present instance being illustrated as a Browning 30 calibre M–1917 water cooled gun, and the support being that commonly known as a Stanley machine gun tripod mount;

Fig. 2 is a side view, partly in section, of the recoil shock absorbing gun seat, means being shown for adjustment of the shock absorbing member;

Fig. 3 is a front or forward end view thereof;

Fig. 4 is a plan view of a modified gun seat for what is known as the M–17 machine gun (water cooled infantry gun) which discharges spent cartridges through the bottom of the gun, the gun seat being provided with an opening on the median line for permitting the used cartridges to drop through the seat;

Fig. 5 is a perspective view of the front part of the type of gun seat shown in Fig. 4;

Fig. 6 is a perspective view of a recoil absorbing element, suitable for use in connection with the gun seat of Fig. 4;

Fig. 7 is a detail section on the line 7—7 of Fig. 4;

Fig. 8 is a fragmentary view of the gun seats shown in Figs. 2 and 4 with the upper seat in recoil position;

Fig. 9 is a cross sectional view of a modified form of the gun seat showing one means of securing the recoil absorbing element in the gun seat, the means there shown being used where the recoil absorbing element lacks sufficient elastacity, said means also preventing the recoil elements from slipping between the seat member on movement of one of them;

Fig. 10 is a view of a similar mount having a seat suitable for use with an airplane gun or other gun, feeding and exhausting from the side, and employing such a mount as is shown in the patent to Johnston, No. 1,953,080 of June 29, 1937;

Fig. 11 is a detail longitudinal section through the rear portion of the seat shown in Fig. 10;

Fig. 12 is a section on the line 12—12 of Fig. 11;

Fig. 13 is a perspective view of the rear part of the gun seat shown in Fig. 10;

Fig. 14 is a front view of the device as applied to a Johnston gun mount;

Fig. 15 is a transverse median section through such device showing means for attaching the lower gun seat member to the gun carrying head;

Fig. 16 is a plan view, showing the arc face and the wedge face of the Johnston mount cut out to allow space for the guide plates to move on recoil;

Fig. 17 illustrates another modification of the Johnston gun mount wherein the lower member is attached to the gun, while the upper member is attached to the upper part of the mount;

Fig. 18 is a side elevation of one form of the invention, wherein the gun handle and trigger are mounted on an immovable part of the gun seat assembly;

Fig. 19 is a section on the line 19—19 of Fig. 18;

Fig. 20 is a modification of the arrangement shown in Fig. 18;

Fig. 21 is a detail of the apparatus shown in Fig. 18;

Fig. 22 is a plan view showing details of the gun spade grip and brace member;

Fig. 23 is a side elevation showing means for carrying the ammunition case on the gun mount;

Fig. 24 is a section approximately on the line 24—24 of Fig. 23;

Fig. 25 is a horizontal section on the line 25—25 of Fig. 23.

In the form of the invention shown in Fig. 1, the Stanley mount is indicated in general at 10, this mount having a head 11 and tripod legs 12 secured in inclined positions by means of bolts 13 which not only pivot the legs to the head 11, but also are provided with handles 14 by which the bolts may be tightened and thus clamp the legs to the head. Extending upwardly from the head is a pair of standards 15 which carry at their upper ends a pivot bolt 16, and on these standards is mounted a cradle member consisting of a pair of side members 17, having arcuate slots 18 concentric to the bolts 16 and through the standards 15 and slots 18 passes a clamping bolt 19 which has on one end a nut 20 provided with a handle 21 by which the clamping bolt may be used to clamp the member 17 in any desired adjusted position of vertical angularity. Extending rearwardly from the cradle members 17 is a pair of arms 22, which are connected by a pivot bolt 23, whereon swings a sleeve 24 through which passes a screw 25. A nut 26 engages with the screw 25 to raise and lower the screw in the sleeve 24. At the lower end of the screw is a collar 27 between which and the nut is a spring 28 which urges the screw downwardly in the sleeve. A clamping screw 29 is provided with handle 30 which serves to clamp the screw 25 in adjusted position in the nut. The screw 25 extends upwardly above the nut or sleeve as at 31, and carries on its upper end a bolt 32. The gun seat includes a lower plate member 33, having at its rear end downwardly extending lugs 34, provided with alined openings 35, wherethrough passes the bolt 32. At its forward end this lower gun seat member is provided with upturned lugs 36, having alined openings 37, and through these openings 37 and the members 17 passes a pivot bolt 38. Thus the lower gun seat member is connected at its forward end to the member 17, and at its rear end to the post 31, so that this lower member may be adjusted tiltably with respect to the arms 22 by manipulation of the nut 26 when the screw 29 is released by means of the handle 30. The upper or gun carrying member is similarly provided with a plate body 39, having at its rear end down-turned lugs 40, provided with bolt receiving openings 41, and at its forward end with upturned lugs 42, provided with bolt receiving openings 43. The gun is indicated in general at 44, and at its rear end has a laterally spaced pair of lugs 45, wherethrough passes a handle bolt 46 which also extends through the openings 41. At the forward end of the breech of the gun there is provided a handle bolt 47 which extends through the lower forward part of the breech and also through the openings 43. By this means the upper plate is attached to the gun. The upper and lower recoil members are connected by short links 48 and 49 which are of the same length, and are pivoted with equally spaced pivots. Normally, the links 48 extend vertically, and the upper and lower plate members are sufficiently spaced to permit the upper member upon firing of the gun, to move rearwardly and downwardly through equal arcs at both ends.

In order to retain the two members 33 and 39 in normally spaced relation, there is provided at each end of the seat an elastic member 50, of which the rear portion is carried on a longitudinally adjustable plate 51, secured in position by a locking screw 52 so that this rear portion may be moved toward and against the upper plate 39.

The above provides means for increasing the compression of the elastic member 50. If for any reason the compression member 50 becomes fatigued and loses some of its elastic properties, then by utilization of the means above set forth the elastic member may be put under greater compression to thereby restore its elastic properties.

It is further desired to point out that for different types of machine guns, the recoil force is different, and therefore it is desirable to vary the compression under which the elastic member functions, and this may be done by the adjusting means above set forth. Stated differently, one of the novel aspects of the present invention resides in the conditioning of the elastic member, that is controlling the compression thereof to take care of various recoiling effects.

At the front of the member 33 there is provided a slot 53, and below this slot there is a spring shaft 54 which is slotted to receive a rear angular spring member 55 which turns back over the plate 33 and is riveted thereto as at 56. Also there is carried by this spring shaft 54 an upstanding second spring member 57 which engages between a pair of angle plates 58, carried by the upper member 39. Suitable elastic means such as rubber 59a or the like, are provided between the lower and downwardly projecting ends 59 of these two spring members. Thus when the recoil takes place in this form of the invention, the upper plate 39 swings on the links 48 and 49, compresses the member 50, and tensions the springs just mentioned, but the instant after firing the elastic member 50 tends to expand, while at the same time the springs tend to throw the upper plate forwardly and restore it to its normal position.

The spring assembly above described functions in two ways. When the gun is in action, there is a tendency for the gun, due to its recoil movement, to not return quickly to its normal position. The spring assembly elements 54, 55, 57 and 59a act as a booster and insure positive action. The spring is so regulated or tensioned that when the gun ceases firing, the upper plate is automatically returned to its normal position. The packing member 50 will prevent any recoil rebound action which will tend to throw the links 48 and 49 to a forward position, that is to the right of their normal position, as shown in Fig. 2. The rubber member 59a functions as a cushioning member for spring member 57 when the spring rebounds from its recoil position.

It is also desired to point out that when the gun is not in action and the barrel thereof is elevated, there is a natural tendency, due to gravitation, for the weight of the gun to pull the upper plate 39 rearwardly and away from its

normal position, that is to pull the plate to the left of its normal position, as shown in Fig. 2 of the drawings. The spring assembly above set forth functions to hold the upper gun seat plate and the gun carried thereby in normal position as related to the lower plate member 33.

For the purposes of this invention the material 50 will be termed rubber, but it is to be understood that this term rubber is not to be restricted to the material usually known as rubber, but may be in the form of a soft or hard rubber, synthetic rubber, or other plastic material capable of being compressed and returning after compression to substantially its original form. Instead of using rubber, there may be substituted therefor a spring arrangement, although in the best form of the invention it is desired to use the naturally occurring rubber products or synthetic products known under the name of buna. This may be buna itself which is a straight butadiene polymer; Buna S which is a copolymer of butadiene and styrene; Perbunan also referred to as Buna N which is a copolymer of butadiene and acrylonitrile; Perbunan extra which is of the same type as Perbunan but has a higher content of acrylonitrile; and neoprene which is a polymer of chloroprene.

Instead of using the above compounds which may be vulcanized, intermediate products may be used which, although they possess definite elastic properties, do not lend themselves to complete vulcanization. These compounds are Koroseal, a polymer of vinyl chloride; Thiokol, a condensation product of aliphatic chlorine-containing compounds and sodium polysulfide; and Vistanex Polybutene, a linear polymer of isobutylene.

Referring to the bunas and their related compounds, and particularly those which contain styrene or acrylonitrile, it may be stated that said products are characterized by superior heat resistance and aging properties, as compared to ordinary soft or hard rubber, and further have a greater resistance to abrasion. Rubber known as Buna S has better electrical properties than natural rubber.

Instead of using rubber alone as the shock absorbing medium, the rubber may have incorporated springs, as shown in Fig. 7, it being obvious that the arrangement of the springs in the rubber is merely illustrative and is not by way of limitation. The springs may be incorporated in the rubber in various ways. Instead of rubber, any elastic, natural or synthetic material may be used.

Instead of using a solid elastic medium, there may be substituted therefor a fluid medium, as for example air, nitrogen gas, or any other relatively inert gas. Further, the shock absorbing medium may comprise an elastic medium which is hollow in the center portion, said cavity being provided with a fluid medium such as air, nitrogen, or the like.

In Figs. 1 to 3, inclusive, there is shown in general one form of gun mount adapter which is especially adapted for attachment to a Stanley gun mount. In Figs. 4 to 8, inclusive, there is shown in detail a similar gun seat assembly and adapter which is modified in some details from that shown in Figs. 1 to 3, inclusive.

In the form of the invention shown in Figs. 4 to 8 inclusive, there is provided an upper plate 60 and a lower plate 61, similar to the plates 39 and 33 of the previously described form. In this form, the plate 60 has upstanding ears 62, and the plate 61 has upstanding ears 63 at its forward end.

Referring specifically to Figs. 4 to 8, it is to be noted that the bolt 47 passes through the ears 62 to connect the mount to the gun proper, while the bolt 38, as shown in Fig. 1, passes through the ears 63. Also these upper and lower plates are connected by links 64, corresponding in structure and function to the links 49 of Fig. 1. However, beneath the loading chamber of the gun in each of these plates is provided an opening or slot 65, the upper plate being suitably positioned relative to the bottom of the gun so that when the shell of the cartridge is discharged it will drop through these openings downwardly. In order to provide a compression member which coacts with these upper and lower plates, there is shown in Fig. 6 a compression member 66 of rubber, it being understood that the term rubber includes the various compression elements, previously described. This compression element has in its body a slot 67 which registers with and is of substantially equal size to the slot 65. Furthermore, in either this form or the form previously described, the rear end of the compression element may be provided with vertically extending openings 68 wherein may be mounted springs 69 which coact with the compression element or elements to urge the upper and lower plates apart.

As shown in Fig. 8, whenever the gun recoils at the instant of rapid fire, the upper member, indicated in general at 60, moves rearwardly and, by the influence of the links 64, downwardly to compress the compression elements.

Furthermore, as shown in Fig. 9, the upper element 60 in this case, as well as in the other cases previously described and to presently be described, is provided with pins 70, while the lower element 61 is provided with pins 71 which engage in the compression element 66 and thereby prevent this compression element from shifting longitudinally between the upper and lower members.

Considering now the form shown in Figs. 10 to 16, inclusive, there is indicated a gun mount of what is known as the Johnston class, wherein there is a lower rigid member 72 on top of which is supported an upper member 73, which is pivoted to the member 72 for rotation by a bolt or pin 74. Shock absorbing packing 75 is provided to prevent excessive vibrations. This upper member is provided with a pair of spaced arms 76 and 77. Through the arm 76 extends a pivot bolt 78. Pivoted on the bolt 78 is a cam member 80, and in the arm 76 is supported a spring pressed member 81 which bears against the cam member and thereby resists rotation thereof, since any movement of the cam member 80 from its normal position causes compression of the spring 82, so that deflection from the normal or central point of the cam is resisted, as shown in the patent to Johnston, No. 1,990,491. Also, the arm 77 carries a frictional resisting clamp 83, adjustable by nuts 84, and having an axle or shaft 85. On this shaft is mounted a plate or disc 86, and between this plate and the cam 80 is mounted a lower plate member 87, secured to the parts 80 and 86 by bolts 86a, so that this member can not move longitudinally with respect to the members 80 and 86. This member 87 corresponds to the lower members 33 and 61 of the previously described forms. Above this member 87 is an upper member 88, and between these members is located the compression block or member 89 of the same character as before described. The members 88

and 87 are connected as before respectively to the gun 79 and, as before described, to the parts carried by the upper mount member 73. Furthermore, these parts are connected by links 90, corresponding to links previously described.

In order to regulate the stress of compression of the member 89, there is provided a plate 91 which rests on the lower member, and projecting downwardly from the lower member 87 is a lug 92, wherethrough passes a screw threaded rod 93, provided at one end with a turning eye 94, and having a pair of washers 95 spaced to engage a bell crank lever 96, which is pivoted at 97 to lugs 98, extending downwardly from the member 87. The member 87 has a slot 99 wherethrough one arm of the bell crank lever 96 operates to engage and press upwardly the plate 91, which rests on the member 87 beneath the elastic member 89. Obviously, by turning the threaded rod 93, the bell crank lever will be moved to compress or release the member 89.

In Fig. 16, the members 76 and 77 are shown in horizontal section, and it will be noted that the member 80 is rabbeted at 101 to provide space for the link 90 in recoil, while the member 86 is rabbeted at 103 to provide space on recoil for the other link 90. Friction means 102 is provided between arms 77 and plate 86.

In the form of the invention shown in Fig. 17, the upper part of the Johnston gun mount is indicated at 105, and this upper part carries a pair of oppositely disposed plates 106, one only being shown, to which are connected the sides of the upper gun seat member 107. The lower gun seat member 108 is connected to the upper member by the usual links 109, and between these two members is the compression member 110. The lower member 108 is connected by bolts 111 and 112 to the gun 113. The upper member 107 is provided with a spring seat 114, while the lower member is provided with a spring seat 115, and between these spring seats is arranged a coil booster spring 116, which constantly urges the gun forwardly to its normal position for each firing.

It is to be noted that using the above arrangement, the lower member 108 is suspended from the links 109 and moves rearwardly, that is to the left of the position shown in Fig. 17, upon the recoil of the gun, the spring 116 first expanding and then contracting to return the gun seat to its normal position. Suitable means may be provided for adjusting the operating tension under which the spring 116 operates. As shown in Fig. 17, the screw 115a is operatively connected to the spring 116, said screw being mounted in the spring seat 115.

It is desired to point out that in the form of the invention shown in Fig. 17, the upper plate is stationary relative to the lower plate, and the lower plate swings by parallel motion on the surface of arcs, the radius of which is the pivot point 109a, the arc itself being shown in dotted lines 109b. It is to be noted that in this form of the invention the gun is attached to the lower member 108, the latter being suspended from the upper member 107 by links 109. It is also noted that the upper plate 107 is attached to the machine gun mount, whereas in the form of the invention shown in Figs. 10 and 14, the lower member is attached to the machine gun mount. The weight of the gun does not rest upon the shock absorbing element 50 or 66, thereby avoiding excessive fatigue of the shock absorbing medium. It will be noted in this arrangement shown in Fig. 17 that when the gun returns from the extreme movement of the recoil, the action of the recoil is on a down swing rather than on an upward swing, as occurs in the arrangement shown in Figs. 1, 10 and 14. The distance of the recoil, however, in either case may be only the very small fraction of an inch. The links 109 are each pivoted at 103a to swing on arcs, one of which is shown at 109b.

To further explain the difference in the recoil of the gun seat assembly in Fig. 17 from the recoil taking place in that form of the invention shown in Figs. 1 and 10, reference is made to Fig. 8, which shows the pivot point 61a from which the radius r of the arc extends toward the point 60a. The top plate 60 recoils in a counterclockwise position, as shown by the arrow. Referring further to Fig. 17, it will be noted that the pivot point 109a extends through the top plate 107, and when the gun is in recoil the bottom plate 108 recoils in parallelism on the arcs in the direction indicated by the arrow, the links 109 swinging on arcs whose centers are the pivot points 109a.

In the form of the invention shown in Fig. 18, there is indicated a method of controlling the firing from the lower or stationary plate of the gun seat. In this form there is shown an upper gun seat 117 and a lower plate 118, connected in the usual manner by the links 119, the upper plate being connected with the gun at 120 and 121. In the present instance, no attempt is made to explain the cushioning pads further than to say that between the upper member 117 and the lower member 118 there is provided cushioning means 122. Secured to the upper plate 117 is a bracket 123, and on the gun is secured a similar bracket 124. In these brackets is rotatively mounted a firing shaft 125, controlling the trigger mechanism 126. It will be noted that the arcuate form of the member 128 corresponds to the radius r' emanating from the eccentric point 139a and terminating in said arc. When the upper gun plate 117 is in recoil, the plate 127 is carried vertically, and moves back and forth, sliding underneath the pin 129. The plate 127 is held to the member 117 by means of a bolt 130, passing through a vertical slot 131. On the rear end of the member 118 is mounted a bracket 132, carrying a frame 133, whereon is mounted the handles 134, which may be utilized by the gunner for aiming the gun. The bracket 132 encompasses the left and right side of the gun, as shown in Fig. 22. Pivoted to the bracket 133 is a trigger 135 in position to be engaged by the forefinger of the operator, and this trigger is normally held forward by a spring 136. On the lower or free end of the trigger 135 is pivoted a rod 137 having a forward end pivoted at 138 to a cam member 139 which, upon the trigger being drawn backwardly rotates and lifts the member 127, and thereby operates the rod 125.

More specifically, the firing of the gun is initiated by the drawing of the trigger and this, as stated, results in rotation of the cam 139, the latter functioning to lift the member 127, which in turn engages the pin 129 and causes the shaft 125 to rotate. Upon rotation of the rod 125, the trigger mechanism 126 will be actuated to thereby cause the trigger 126a of the machine gun to be actuated. The trigger 135 remains drawn during the entire firing operation, and during this same period the member 127 remains in its elevated position, and the pin 129 remains in its elevated position. During this firing period the gun seat member 117 repeatedly recoils and returns to its normal position, and during said pe-

riod the arcuate surface of the member 127 slides beneath and against the pin 129 which remains in its elevated position. This insures the trigger 126a being maintained in its firing position during the time the operator holds backwardly the trigger mechanism 135. The member 127 is grooved at 127a to receive the pointed upper surface of the cam member 139, as shown in Fig. 19. This arrangement, whereby the upper surface portion of the cam member is nested into the lower portion of the member 127, functions to assist in keeping these two members in alinement. Also, to prevent accidental lifting of the plate 127, there is provided on this plate a pin 140 which is normally engaged by a hook 141, fixed on the plate 139, and this pin can only be released upon the trigger 135 being pulled. It will be noted on referring to Fig. 18 that the arcuate portion 128 is extended on each side beyond the rim of the plate 127 and that the arcuate portion and extensions have a rounded upper surface conforming to a circle having its center at the pivot point 139a.

In the form of the invention shown in Fig. 20, there is indicated as applied to an M2 aircraft machine gun a different method of controlling the firing from the lower or stationary plate of the gun seat than shown in Fig. 18, wherein an M 17 water cooled gun is illustrated. Referring to Fig. 20, the various parts are more or less similar, except that in place of the pin 129 and the shaft 125 there is provided a bell crank lever 142 pivoted at 143, the pivot member being mounted on a post 144, the latter being attached to the top gun seat plate 146. The bell crank lever 142 has connected by a shaft 148 with a trigger 149, adapted to fire the gun, it being noted that the shaft 148 passes through the bracket or guide block 150 and extends around the rear of the gun 151 in a manner which adapts it to operate the trigger 149 of the machine gun 151. The upper gun seat plate 146 is connected to the lower gun seat plate 147 by means of links 152, as shown in dotted lines, which are the same length on opposite sides of the gun plate members, and are pivoted with equally spaced pivots, the connection being such that the plate 146 can move in a manner similar to the upper plate illustrated in Figs. 1, 2 and 10. The pivot members are indicated at 153 and 154 respectively. Pivoted on the pivot bolt 153 is the member 155, said member being adapted to slide vertically when actuated by the cam member 156. The cam member is carried by the pivot bolt 154. From the above, it is clear that the pivot bolts 153 and 154, respectively, not only function to carry the link members 152 but also to carry the vertical slidable member 155 and the cam member 156. The upper arcuate surface 157 of the slidable member 155 contacts with a roller 158 on the end of the bell crank lever 142. On the rear portion of the lower gun plate member 147 there is mounted a bracket 145, which carries a frame 159 in which is mounted a handle (not shown) by means of which the aiming of the gun may be obtained. Pivoted on the back at 159 is a trigger 160, said trigger being shown in a position to be engaged by the forefinger of the operator. This trigger is normally held by a spring member such as described in connection with that form of the invention shown in Fig. 18. On the lower end of the trigger member 160 there is pivoted a rod 161 which is connected at its forward end to the cam member 156.

Referring back to Fig. 14, it will be seen that on one side of the device there is provided a cartridge case 173, while there is provided on the other side a case 174 for empty shells. Now in order to have these cartridge cases and the shell receivers move with the device, the apparatus shown in Figs. 23 to 25 is used, and in this apparatus it is necessary that the ammunition box be mounted in such a manner that it can move with the gun, both as regards the recoil and the pivoting of the gun to aim the same. An X-shaped member 163 is, therefore, secured to member 164 in Fig. 24, this member corresponding to disc 86 as shown particularly in Figs. 10, 14 and 15. The X-shaped member will therefore rotate with the gun when the latter is aimed. Pivoted to the X-shaped member on pivots 165 and 166 are the arms 167 on which the ammunition case is secured by the pins 168. It is to be noted that the rod 169 is pivoted at 170 to the link 171. The rod 169 is secured by bolts 172 to the side of the recoil shock absorbing upper plate 88, and it will therefore be seen that when the gun recoils, the rod 169 will move with the gun, thereby causing link 171 to actuate the arms 167, suspended at points 165 and 166. These arms in turn carry the ammunition box 173, and when the arms 167 are moved during the recoiling movement, the ammunition box likewise moves.

It is to be noted that the firing mechanism for the gun, both as shown in Fig. 18 and in Fig. 20 is so arranged that no vibratory motion is given to the trigger or spade handle through the recoil of the gun. It will be seen that in Fig. 18 the member 127 is free to move backward and forward with relation to the cam 139 irrespective of any direct connection, and that it is only the movement of the cam that produces the firing action. The same thing is true with relation to the sliding member 155 in Fig. 20 and the cam 156 in the trigger. This prevents any vibration of the gun recoil being carried back to the trigger and is especially valuable when guns of large calibre are used and where a large amount of vibration is produced.

It is desired to point out that although a specific machine gun is set to fire a certain number of times per minute, due to weakening of the bolt spring of the gun, the speed of firing may be changed and when this occurs the speed of the recoil packing 50 may have its elasticity or tension or compression changed to conform with the new operating conditions. In most cases, the elastic backing may be put under greater tension, but it is obvious that under some circumstances the elastic tension may be reduced. It is therefore clear that in one aspect of the present invention means are provided for increasing or decreasing the elastic tension of the vibratory absorbing member 50, all in accordance with the operating conditions. In other words, not only is a medium provided for absorbing vibrations and reducing the vibratory effect due to the recoil, but such medium may have its vibratory absorbing characteristics changed in accordance with the firing characteristics of the gun.

Instead of having the gun seat adapter recoil at the same speed of recoil as the gun, under some conditions, it may be advantageous to slow down the number of gun seat adapter recoils. In other words, the gun seat adapter would not recoil every time the gun recoils, but it would only recoil for example once for every three or four shots. While various means may be provided

to accomplish the above, it may be very economically and efficiently accomplished by providing a packing or shock absorbing material 50 which may be made of exceedingly soft or shock absorbent material, so that the elastic strength of the shock absorbing material is insufficient to return the gun seat to normal position after each shot. In other words, the packing or shock absorbing material is conditioned so that it can only act to return the gun seat recoiling member when there has been a build up of pressure by successive rapid shots which will be sufficient to cause the recoiling member of the gun seat to rebound to its normal position. As stated, the shock absorbing material which may be any of the materials herein set forth, including a solid or fluid material or mixture of the same, may be adjusted so that it will return the recoiling member of the gun seat adapter to its normal position, not upon every gun shot, but only upon a plurality of gun shots which may be 3, 4, 5 or even a considerably greater number, depending on circumstances. A plurality of shots will build up or create a sufficient pressure to cause the recoiling member of the gun seat to rebound.

It is to be remembered that the firearm, as for example a machine gun, is fired at a relatively high speed, ranging from 1200 to 1500 shots per minute or 20 to 25 shots per second. When the compressible member is made of hard rubber or its equivalent, the tendency will be to return the gun to or almost to its normal position after the vibrations have been absorbed by the hard rubber and the rubber has been released from compression on the rebound movement. Using a softer rubber, the rebound movement of the recoling member is slower, and the shock absorbing member will only expand to bring the gun almost to or to its normal position on the firing of a plurality of shots. By conditioning the shock absorbing member 50, as above set forth, so that it only returns the gun to or towards its normal position upon the firing of a plurality of shots, the aiming of the gun is greatly improved.

While the basic objects of the present invention have been disclosed and explained by reference to the accompanying drawings, it is to be understood that these are illustratively presented and not by way of limitation, and that the invention is susceptible of various changes in construction, all of which may be made within the scope of the accompanying claims without departing from the spirit of the present invention.

While the present invention has been set forth in connection with guns of .30 calibre, it is to be understood that the invention may be used for both automatic and stationary guns of unlimited size or calibre, including machine guns. It is to be understood that the term gun mount, as used in the specification and the claims, includes any suitable support upon which the gun seat assembly may be mounted, as for example a tank, an airplane, a naval vessel, or stationary walls, plates, shields, and objects of similar character.

The mount for the gun may be considered a gun mount adapter, since the arrangement herein set forth adapts the gun or other firearm to be mounted either on a tripod or upon any other movable object such as a tank or plane, or upon a stationary object such as a post, a well, or steel or similar plates of various forms.

While the invention has been illustrated in connection with Johnston and Stanley mounts, it is clear in view of the above that these mounts are set forth for purposes of illustration and are not to be considered a limitation as to the character of the mount to which the present invention may be applied.

It is desired to point out that the upper and lower members of the gun seat move in parallel with one another and the motion means connecting the same move in parallel with one another. Therefore, the gun seat members maintain the form of a parallelogram when the gun seat is in its recoil position, and maintain the form of an oblong when the gun seat is in its normal position.

In accordance with the present invention, there has been provided a gun seat for connecting a gun and a mount for said gun, including a pair of members, one of which is fixed to the gun and the other of which is attached to the gun mount, together with motion means connecting said members whereby one of them may move with respect to the other. Compressible means are interposed between said members and are adapted to absorb the vibrations due to the recoil movement of the gun and to assist on release from compression to return the gun completely to its normal position, or partially towards the normal position, said return occurring during the rebound movement. Means are also broadly provided for varying the elastic tension of the compressible means.

The gun is capable of having its firing characteristics changed by repeated firing, and, therefore, there may be provided means for varying the elastic tension of the compressible means in accordance with the firing characteristics of the gun.

Means are also connected to the gun seat to assist the compressible member in quickly returning the gun to or towards its normal position. The gun trigger means is preferably so connected and mounted as to inhibit shock to the gun operator, and for this purpose the trigger means is attached to a member connected to the mount and loosely connected to the firing mechanism. In other words, the trigger and firing mechanism are loosely connected to inhibit or minimize the recoil of the gun from producing vibration of the trigger means.

From a method standpoint, the invention resides in conditioning the shock absorbing member in accordance with the recoil force generated by the firing of the gun. In other words, the shock absorbing member is maintained in a condition to completely return the gun to its normal position or to partly return the gun to its normal position, or to operate as above set forth upon the firing of a plurality of shots, all as set forth.

The above features and others have been fully described in the specification and claimed in the appended claims.

What is claimed is:

1. A gun seat for connecting a gun and a mount for said gun including a spaced pair of members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, and compressible elastic means having a relatively large area bearing on said opposed surfaces and interposed between said members urging them into separated positions.

2. A gun seat for connecting a gun and a

mount for said gun including a spaced pair of members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during decoil and firing of said gun, compressible elastic means having a relatively large area bearing on said opposed surfaces and interposed between said members urging them into separated positions, said members having a normal longitudinal relation, and spring means connecting said members and resisting displacement from such normal longitudinal relation relative to one another and displaceable therefrom during recoil movement of the gun.

3. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, at least one elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, and means carried by said members holding said pad against longitudinal displacement relative thereto.

4. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, at least one elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, means carried by said members holding said pad against longitudinal displacement relative thereto, said members having a normal longitudinal relation relative to one another and displaceable therefrom during recoil movement of the gun, and spring means connecting said members and resisting displacement from such normal longitudinal relation.

5. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, and an elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, said pad and members having registering openings for shell discharge on their median lines between their ends.

6. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun and the other of which is attached to the gun mount, means connecting the said members for generally parallel movement toward and away from one another during recoil and firing of said gun, and an elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, said pad and members having registering openings for shell discharge on their median lines between their ends, and means to hold said pad against longitudinal slipping with reference to said members.

7. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, an elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, said pad and members having registering openings for shell discharge on their median lines between their ends, said members having a normal longitudinal relation relative to one another and displaceable therefrom during recoil movement of the gun, and spring means connecting said members and resisting displacement from such normal longitudinal relation so as to normally maintain said openings in registry.

8. A gun seat for connecting a gun and a mount for said gun including a pair of vertically spaced members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun and the other of which is attached to the gun mount, means connecting the said members for generally parallel movement toward and away from one another during recoil and firing of said gun, and an elastic pad having a relatively large area bearing on said opposed surfaces and interposed between said members and urging them apart, said pad and members having registering openings for shell discharge on their median lines between their ends, means to hold said pad against longitudinal slipping with reference to said members, said members having a normal longitudinal relation relative to one another and displaceable therefrom during recoil movement of the gun, and spring means connecting said members and resisting displacement from such normal longitudinal relation so as to normally maintain said openings in registry.

9. A gun seat for connecting a gun and a mount for said gun including a pair of members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun and the other of which is attached to the gun mount, means connecting said members for generally parallel movement toward and away from one another during recoil and firing of said gun, and compressible elastic means having a relatively large area bearing on said opposed surfaces and interposed between said members urging them into separated positions, said parallel motion means consisting of a pair of spaced parallel links each having one end pivoted to one member and its other end pivoted to the other member.

10. A gun seat for connecting a gun and a mount for said gun including a pair of members, one of which is connected to the gun and the other of which is connected to the gun mount, motion means connecting said members whereby

one of them may move with respect to the other, compressible means interposed between said members adapted to absorb vibration due to the recoil of the gun and to assist on release of compression to return the gun to its normal position, spring means operatively connected to the gun seat to assist said compressible member in quickly returning the gun to its normal position, said spring means including a slotted spring shaft extending across one of said members, and a leaf spring mounted in said slotted shaft and having one end fixed to one of the members and the other end held to move with the other member.

11. A gun seat for connecting a gun and a mount for said gun including a pair of members in general alinement with the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is connected to the gun and the other of which is connected to the gun mount, means movably connecting said members whereby one of them may move with respect to the other, compressible means having a relatively large area bearing on said opposed surfaces and interposed between said members adapted to absorb vibration due to the recoil of the gun and to assist on release of compression to return the gun to its normal position, spring means operatively connected to the gun seat to assist said compressible member in quickly returning the gun to its normal position, said spring means including a pair of spring seats extending in spaced opposition from said members and a coiled compression spring having its ends mounted on said seats.

12. The combination of a gun having a firing mechanism and its mount with a gun seat including a pair of members one of which is fixed to the gun and the other of which is supported by the mount, parallel motion means connecting said members, compressible elastic means interposed between said members and urging them into separated positions, trigger means carried by the member attached to the mount, and an operative connection between said trigger means and firing mechanism, including a cam mounted on the seat member carried by the mount, a trigger pivotally supported from said member, a link connecting the cam and trigger, a pusher member mounted for vertical sliding movement on the seat member carrying the gun, a rock shaft for actuating the firing mechanism and rotatably supported on the gun and the seat member attached thereto, and a lug projecting from the rock shaft and resting on the vertically slidable member.

13. The combination of a gun having a firing mechanism and its mount with a gun seat including a pair of members one of which is fixed to the gun and the other of which is supported by the mount, parallel motion means connecting said members, compressible elastic means interposed between said members and urging them into separated positions, trigger means carried by the member attached to the mount, and an operative connection between said trigger means and firing mechanism, including a cam mounted on the seat member carried by the mount, a trigger pivotally supported from said member, a link connecting the cam and trigger, a pusher member mounted for vertical sliding movement on the seat member carrying the gun, a bell crank pivotally supported from the gun carrying seat member and leaving one arm resting on the vertically slidable member, and a link connecting the other arm of the bell crank with the firing mechanism.

14. A gun seat for suspending a gun from a mount including a pair of relatively long members having opposed surfaces spaced from each other, motion means suspending one of said members from the other for moving one member substantially parallel with respect to the other, means to connect the suspended member to the gun, means to support the other of said members from the mount, and adjustable, compressible and stretchable means interposed between said members and having a relatively large area of contact with said opposed surfaces so that the recoil of the gun exerts a uniformly distributed pressure on the last mentioned means to thereby effect absorption of recoil vibration and return the gun to its normal position on release from compression.

15. A gun seat for suspending a gun from a mount including a pair of relatively long members having opposed surfaces spaced from each other, motion means suspending one of said members from the other for moving one member substantially parallel with respect to the other, means to connect the suspended member to the gun, means to support the other of said members from the mount, adjustable, compressible and stretchable means interposed between said members and having a relatively large area of contact with said opposed surfaces so that the recoil of the gun exerts a uniformly distributed pressure on the last mentioned means to thereby effect absorption of recoil vibration and return the gun to its normal position on release from compression, and additional adjustable means operatively connected to the gun seat to help resist force causing compression and to assist said compressible member in quickly returning the gun to its normal position.

16. A gun seat for connecting a gun and a mount for said gun including a spaced pair of members generally parallel to the longitudinal axis of the gun and having relatively large opposed surfaces, one of which is fixed to the gun, and the other of which is attached to the gun mount, means connecting said members for generally parallel movement towards and away from one another during recoil and firing of said gun, compressible elastic means interposed between said members urging them into separated positions, and additional means operatively connected to the gun seat to assist said compressible member in quickly returning the gun to its normal position.

17. A gun seat for connecting a gun and a mount for said gun including a pair of spaced members generally parallel to the longitudinal axis of the gun and having relatively large opposed surfaces one of which is fixed to the gun and the other of which is attached to the gun mount, means movably connecting said members for generally parallel movement towards and away from each other during the recoil and firing of the gun, and compressible means having a relatively large area bearing on said opposed surfaces and interposed between said members to urge them into separated positions, said compressible means being adapted to absorb vibrations due to the recoil movement of the gun and to assist on release from compression to return the gun to its normal position, said compressible means being conditioned to absorb the energy of successive recoils and return the gun towards its normal position a distance equivalent to the movement accompanying each recoil only upon the firing of a plurality of shots.

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