

Feb. 28, 1939.

J. G. TAYLOR

2,148,515

MACHINE GUN MOUNT

Filed Jan. 7, 1936

2 Sheets-Sheet 1

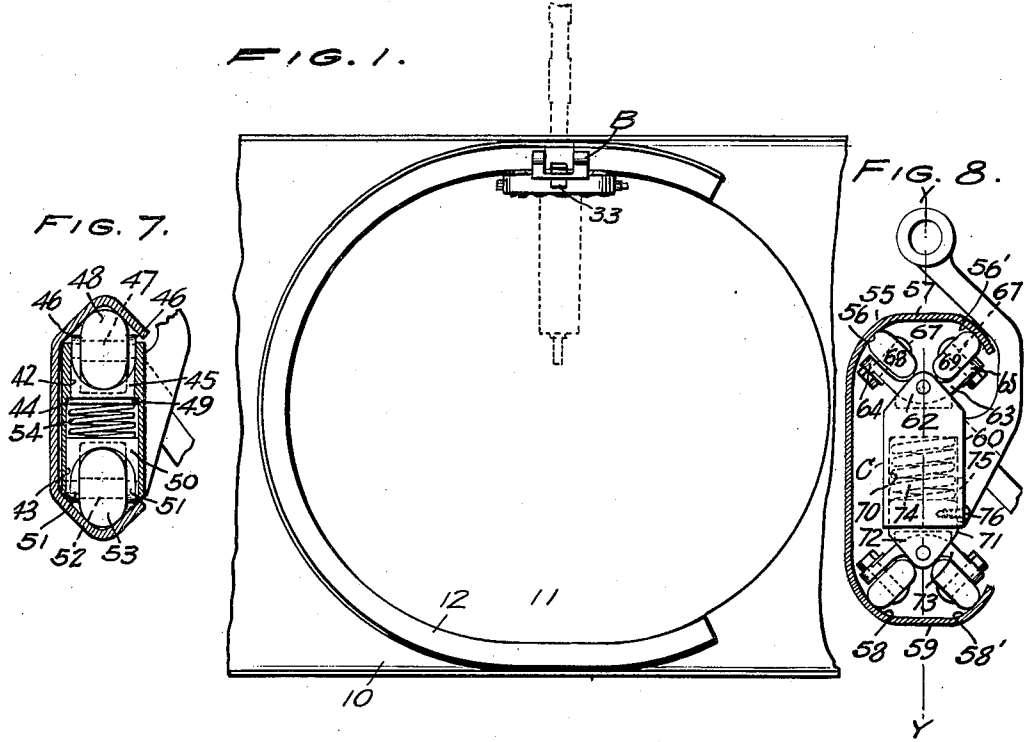
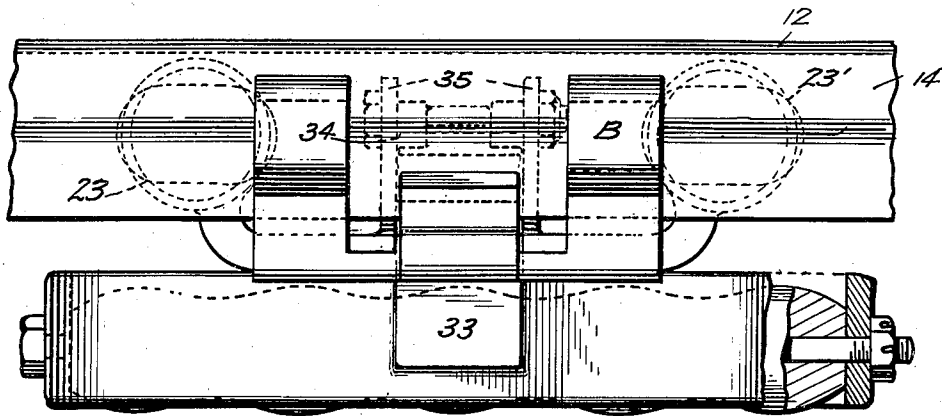


FIG. 2.



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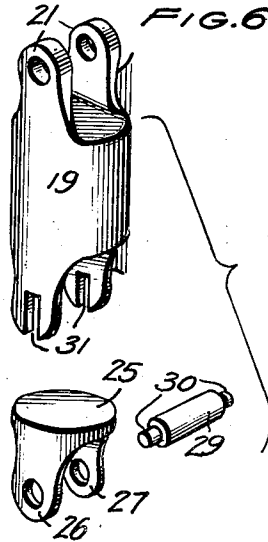
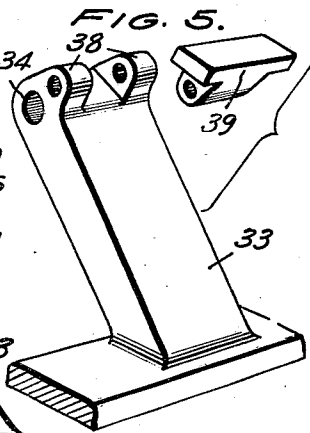
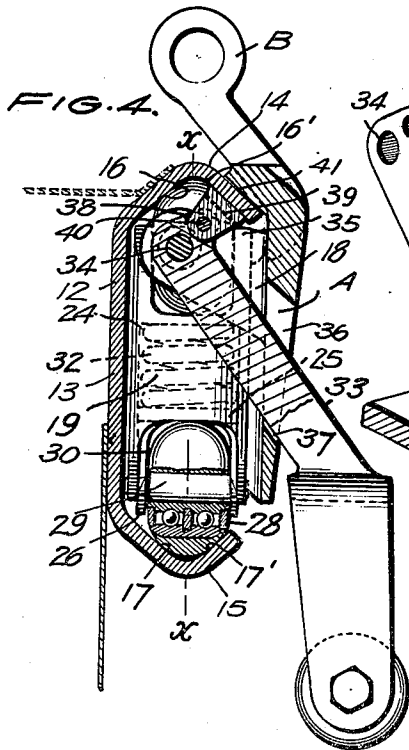
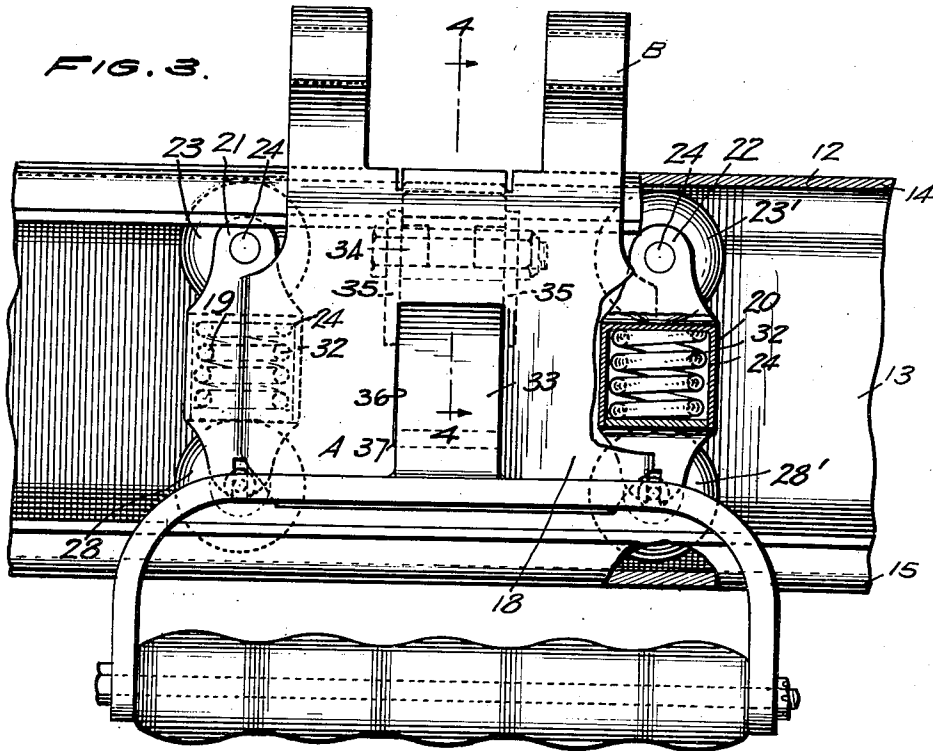
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MACHINE GUN MOUNT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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MACHINE GUN MOUNT

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Application January 7, 1936, Serial No. 57,927

6 Claims. (Cl. 89—37.5)

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

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.

5 The present invention relates generally to machine gun mounts and more particularly to gun mounts designed for use upon airplanes or similar vehicles and of the type comprising a post or arm upon which said gun is mounted and which is carried by a horizontally movable member.

10 One of the primary objects of the present invention is to provide a mounting arrangement including a supporting rail and a carriage movable along said rail, the construction of said supporting rail being such as to substantially completely protect the operative parts of the carriage from the elements.

15 A further object of the present invention is to provide in a mounting arrangement of this character a gun carriage incorporating a plurality of spring loaded rollers adapted for making continuous intimate rolling engagement with the supporting rail to thereby eliminate any looseness or lost motion between the carriage and its support.

20 A still further object of the present invention is to provide in a mounting arrangement of this character a supporting rail for the gun carriage so constructed and arranged as to not only guide the gun carriage in a definite path as it is being moved horizontally in training the gun, but, in addition thereto, permits of its use as a structural part of the fuselage of the aircraft without interfering with the operation of the gun carriage.

25 In accordance with the present invention, the aircraft gun mounting comprises upper and lower integral track portions, each having two rolling surfaces, upper and lower sets of rollers mounted to run along said track portions and make contact with said rolling surfaces, and a gun carriage supported by said rollers and movable therewith along said supporting rail with a minimum of friction.

30 A still further object of the present invention is to provide in a mounting arrangement of this character a gun carriage incorporating a plurality of spring loaded rollers adapted for yieldably supporting the carriage in predetermined relation with respect to its supporting rail and to dampen to a certain extent the shock of recoil of the gun during firing.

35 A still further object of the present invention is to provide in a mount of this character locking means for holding the carriage in any adjusted position along the length of the supporting rail,

said means including a single hand-operated control member, the operation of which moves said locking means into released position.

A still further important object of the present invention is to provide a gun mounting applicable to non-circular, as well as circular, tracks overcoming the difficulties which may arise from changes in curvature of different parts of the track with which the rollers make contact at different positions of adjustment of the carriage member. In accordance with this aim of the invention, I so mount the rollers such that they may orient themselves and maintain proper alignment with any change in curvature of the tracks without changing the normal upright position of the carriage.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 is a plan view of the gun mount;

Fig. 2 is an enlarged detail top plan view of the gun carriage;

Fig. 3 is a front elevation of Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is an exploded view in perspective of the locking mechanism for the gun carriage;

Fig. 6 is an exploded view in perspective of the roller mounting arrangement;

Fig. 7 is a modified form of the invention; and

Fig. 8 is a still further modified form of the invention.

Referring more particularly to the drawings 40 wherein corresponding parts are designated by like numerals throughout the several views, 10 designates the fuselage of an aircraft containing the usual gunner's cockpit 11 around which is placed a supporting ring or rail 12 for the gun 45 mount. This supporting rail, as shown in Fig. 4, is preferably of C-shaped construction and comprises an upright base or web portion 13 and upper and lower integral and opposing V-shaped track portions 14 and 15, each of said track portions having two rolling surfaces designated by the numerals 16, 16', 17 and 17' which are equally and oppositely angularly disposed with respect to the vertical axis $x-x$ of the supporting rail. This type of supporting rail is found particularly 55

advantageous by reason of the fact that its shape permits of its being readily utilized as a structural part of the airplane in shaping the cockpit and also permits suitable means for attaching the sheet metal skin of the fuselage thereto in a simple and efficient manner.

The gun mount comprises a gun carriage, designated generally at A, and a gun post or arm, designated generally at B, which, in the present instance, is formed as an integral part of the gun carriage.

The gun carriage A comprises a backing plate 18 provided at its opposite ends with housings for receiving rollers. The longitudinal axes of these housings, as best shown in Fig. 3, are arranged parallel to one another and disposed in vertical planes. Each housing is provided at its upper end with a pair of spaced upstanding ears or mounting members 21 and 22. Between the ears of each housing there is carried anti-friction rollers 23, 23' on journal pins 24, 24', the latter bearing in openings provided in the housing ears. The rollers 23, 23' are arranged with their axes of rotation normal to the axis $x-x$ and adapted to make simultaneous rolling contact with both rolling surfaces 16, 16' heretofore mentioned.

The lower end of the housings 19 and 20 are provided with internal bores adapted for slidably receiving therein piston-like yokes 25 for mounting the lower rollers. Each yoke incorporates ears 26 and 27 similar in shape to the upper housing ears for receiving anti-friction rollers 28 and 28' therebetween. Each roller is mounted on a journal pin 29, the outer ends of which are of reduced diameter, as shown at 30, and engageable within diametrically opposite slotted guideways 31 formed in the lower end of the roller housings. Each yoke is backed up by a coiled spring 32 which bears at its upper end against the upper end wall of the bore 24.

This spring arrangement is such that the upper and lower sets of rollers can be relatively retracted to enable them to be fitted in between the outer ends of the upper and lower track portions 14 and 15 and thereafter allowed to expand under the action of the springs 32 into intimate rolling engagement with the rolling surfaces of the track portions. The angular disposition of the rolling surfaces as aforementioned will tend to automatically maintain the carriage in centralized upright position between the said track portions, the yokes 25 being moved outwardly under the action of the springs 32 along the path of the guideways 31 until the rollers 28, 28' contact their respective rolling surfaces.

In order to hold the gun carriage stationary during firing, I make use of a clamping device more particularly illustrated in Figs. 4 and 5. This clamping device comprises a single hand-operated control member or handle 33 which is pivotally mounted at its upper end as at 34 between inwardly extending tabs 35 connected at their opposite ends to the backing plate 18. This control member normally depends downwardly, as shown in Fig. 4, and passes through a slotted opening formed in the backing plate, the bottom of said opening being suitably shaped as at 37 to accommodate the said control member and act as a stop limiting its downward movement. The upper pivoting portion of the control member is formed with projecting portions 38 which are eccentric with respect to the pivoting portion of the control member. A clamp pad 39 is pivotally mounted at 40 to the projecting portions.

This clamp pad is adapted to clampingly engage the one side of the upper track portions 14. The action of the clamping device is such that as the control handle moves downwardly, which same may be accomplished under the action of gravity, the clamping pad 39 moves into clamping engagement with the inner rolling surface of the upper track portion. The track portion, being relatively thin in cross-section, will yield outwardly until contact is made between its outer surface and the clamping surface 41 of the gun post B which is positioned adjacent the upper track surface.

From the foregoing description of the clamping device it will be apparent that movement of the control handle upwardly will operate to move the clamp pad away from its engaging surface and permit movement of the carriage along the supporting rail as desired by the operator.

Fig. 7 illustrates a modification of the invention. In this modification the clamping arrangement for locking the carriage against movement along the supporting rail is identical in construction with that shown in connection with Fig. 4 of the drawings.

The roller housings, however, are of somewhat different construction, that is to say, each housing is cylindrical in shape and provided with an upper bore 42 and a lower bore 43 of larger diameter than the diameter of the upper bore, the junction of said bores terminating in a shoulder 44. The upper bore 42 is adapted for slidably receiving a roller yoke 45 provided at its upper end with spaced ears 46 carrying a journal pin 47 for an anti-friction roller 48. The lower end of this yoke is provided with a flanged portion 49 adapted for engaging with the shoulder 44 when moved in an upper direction. The lower bore 43 of each housing is adapted for slidably receiving a second roller yoke 50, the lower end of which is provided with spaced ears 51 carrying a journal pin 52 for a lower anti-friction roller 53. Interposed between the upper and lower yokes I provide a coiled spring 54, the purpose of which is to maintain the upper and lower rollers in intimate rolling engagement with the upper and lower track portions of the supporting rail. Obviously, such an arrangement permits orientation of the rollers and all difficulties due to changes in curvature of the tracks are avoided by so mounting the rollers that they will accommodate themselves to any changes in curvature without effecting any change in the normal upright position of the gun carriage.

A still further modification of the present invention is illustrated in Fig. 8. In this modification the supporting rail for the carriage, designated generally by the numeral 55, is of somewhat different C-shaped construction than the construction of the supporting rail illustrated in connection with Figs. 4 and 7; that is to say, the rolling surfaces 56, 56' of the upper track portion 57 and the rolling surfaces 58 and 58' of the lower track portion 59 are struck upon arcs centering upon the vertical axis $y-y$ of the supporting rail. The gun carriage is indicated at C. This carriage is provided with housings at its opposite ends, one of which is indicated by the numeral 60. Each housing is provided at its upper end with ears 62 between which is pivotally mounted a carrier member 63. The pivotal axis of each carrier member is coincident with the center of radius of the upper rolling surfaces heretofore mentioned. This carrier member is provided with arms 64 and 65 carrying journal pins 66 and 67

upon which anti-friction rollers 68 and 69 are rotatably mounted. It should be noted that these rollers are so angularly arranged with respect to one another and with respect to the upper track portion 57 such that their axes of rotation are parallel to the tangent of the curve of the rolling surfaces at their point of contact with said surfaces so as to obtain true rolling action. By locating the pivotal axes of the carrier members coincident with the center of radius of the rolling surfaces 56 and 56', continuous rolling contact will be obtained between the rollers and their complementary rolling surfaces irrespective of the angular disposition of the carrier member 63 with respect to the gun carriage or the supporting rail.

The lower end of each housing is provided with an internal bore 70 adapted for slidably receiving therein a mounting yoke 71. This yoke is provided at its lower end with mounting ears 72 between which is pivotally mounted a lower carrier member 73. This lower carrier member is identical in construction with that of the upper carrier member 63 and for this reason the above detailed description of such member is believed to suffice for both members. The yoke 71 is backed up by a coiled spring 74, said spring bearing at its upper end against the inner end of the bore 70 and operating to permit not only the relative retraction of the rollers in assembling the gun carriage on the supporting rail, but, in addition thereto, to yieldingly urge the rollers into intimate rolling engagement with the rolling surfaces of their respective track portions.

To maintain the lower yoke in assembled relation with the gun carriage, I provide an elongated slotted opening 75 in the lower end of each housing within which is guided a pin 76 which is screwed into the body portion of the yoke 71.

From the foregoing detailed description taken in connection with Fig. 8, it will be observed that I have provided a mounting arrangement which positively maintains the rollers in intimate contact with the track portions of the supporting rail, thus permitting the use of large tolerances on the track without resulting in any loss motion between the carriage and supporting rail.

While the invention is disclosed and intended primarily as an ordnance or gun mount, it is to be understood that the mount can be employed for various other purposes as a support or mount for other devices and instrumentalities than ordnance and the term "gun" mount as employed in the appended claims is intended to cover and include such other uses and the mounting of other devices thereon.

It is also evident that various other changes, modifications, variations and substitutions may be resorted to without departing from the spirit and scope of my invention and hence I desire not to limit my invention to the exact and specific disclosures hereof.

What I claim is:

1. In a mounting for machine guns, a channeled supporting rail having upper and lower opposing track portions of V-shaped cross section, upper and lower sets of rollers disposed within the channeling of said rail and mounted to run around said track portions, means for mounting said rollers and said gun including a pair of telescoping members respectively supporting said sets of rollers, one of said members serving further to support said gun, and tensioning means between said members to yieldingly maintain said rollers in intimate contactual relation with said

track portions to prevent relative lateral displacement between said mounting means and said track portions, and means for locking said mounting means against movement along said supporting rail.

2. In a mounting for machine guns, a channeled supporting rail having upper and lower opposing track portions of V-shaped cross section, upper and lower sets of rollers disposed within the channeling of said rail and mounted to run around said track portions, individual devices mounting each set of rollers for relative vertical movement between the upper and lower track portions, one of said devices serving to support said gun, and spring means interposed between said devices for maintaining the rollers of each set in intimate rolling contact with said track portions and for yieldingly supporting said gun carrying device.

3. In a mounting for machine guns, a channeled supporting rail having integral upper and lower opposing V-shaped track portions, upper and lower sets of rollers mounted to run along said track portions, carrier members for each of said rollers, a support disposed within said channeled supporting rail for slidably receiving said carrier members, spring means interposed between each carrier and said support for maintaining said rollers in contact with said track portions and thereby preventing disengagement of said support from said tracks under normal operations, said carriers being relatively moveable with respect to said support to an extent sufficient to enable them to be fitted in between said track portions for removal or insertion of said support.

4. In a mounting for machine guns, a channeled supporting rail having integral upper and lower opposing V-shaped track portions, upper and lower sets of rollers mounted to run along said track portions, carrier members disposed within said channeled supporting rail for each set of rollers, spring means between said carrier members for maintaining said rollers in intimate rolling engagement with said track portions, said carrier members being mounted for relative movement with respect to one another to enable the contraction of said rollers against the spring tension for insertion of said carrier members between said track portions or the removal thereof therefrom, and brake means mounted independent of said rollers for locking said gun carriage against movement in any adjusted position along said supporting rail.

5. In a mounting for machine guns, a channeled supporting rail having upper and lower opposing V-shaped track portions, upper and lower sets of rollers mounted to run along said track portions, each set including a pair of upper and a pair of lower rollers having their relative axes of rotation arranged normal to one another, gun supporting means including carrier members for each set of rollers for slidably mounting one pair of rollers vertically relative to another pair, the pairs of rollers of each set being pivotally connected to a corresponding carrier member about a horizontal axis lying in a plane symmetrical with respect to the axes of said rollers, and tensioning means between said carriers for maintaining said rollers in intimate contactual relation with said track portions.

6. In a mounting for machine guns, a channeled supporting rail having upper and lower opposing V-shaped track portions, upper and lower sets of rollers mounted to run along said track

portions, each set including a pair of upper and a pair of lower rollers having their relative axes of rotation arranged normal to one another, gun supporting means including carrier members for each set of rollers for slidably mounting one pair of rollers vertically relative to another pair, the pairs of rollers of each set being pivotally connected to a corresponding carrier member about a horizontal axis lying in a plane symmetrical with respect to the axes of said rollers, and tensioning means between said carriers for maintaining said rollers in intimate contactual relation with said track portions, and means for locking said mounting means for movement along said supporting rail.

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