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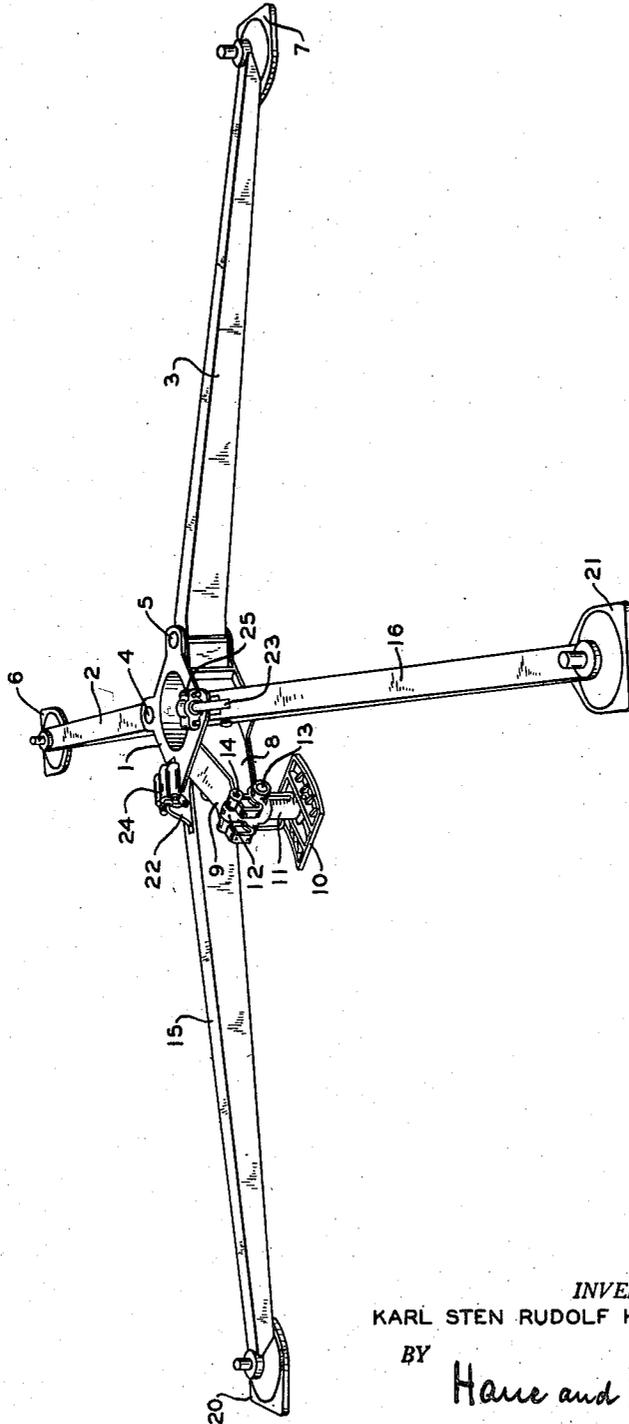
K. S. R. HULTGREN
UNDERCARRIAGE FOR A FIREARM

2,821,117

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3 Sheets-Sheet 1

Fig. 1



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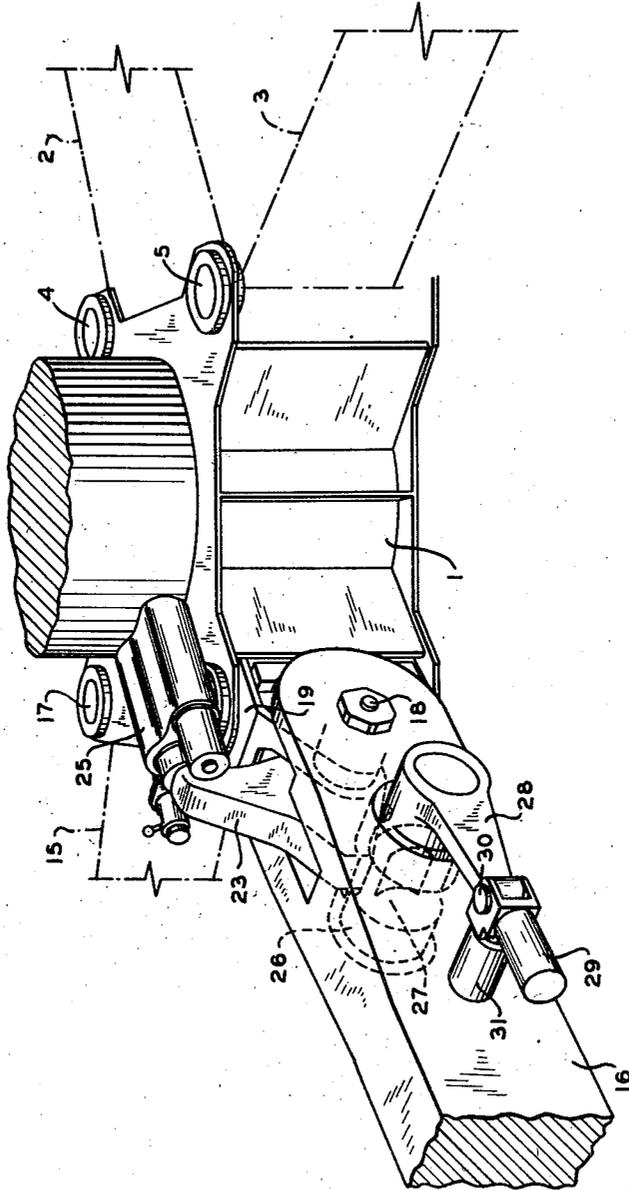
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Fig. 2



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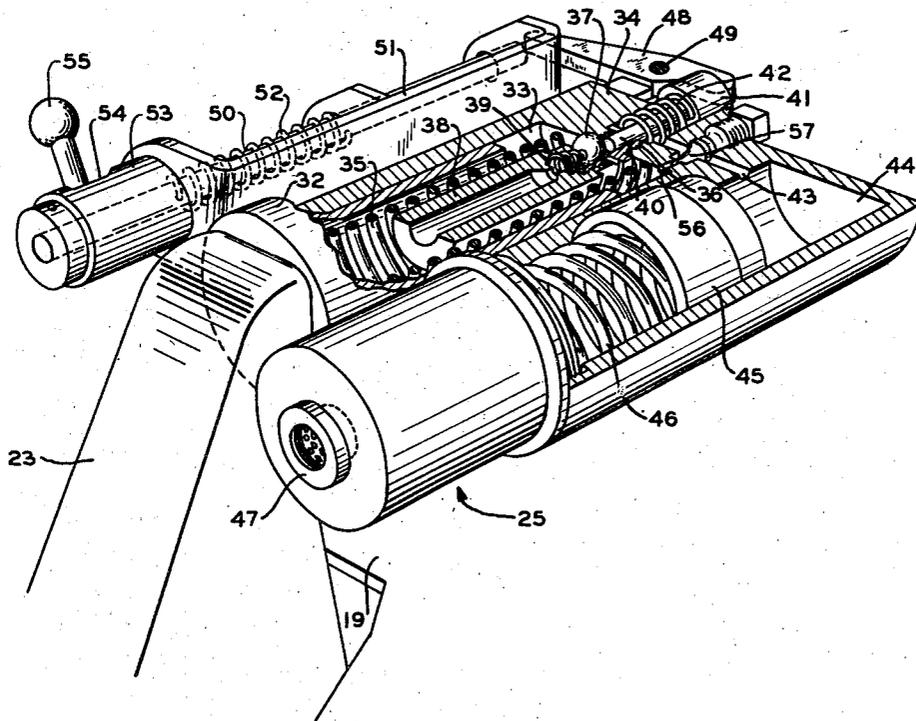
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Fig. 2



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UNDERCARRIAGE FOR A FIREARM

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13 Claims. (Cl. 89—37)

The present invention relates to the undercarriage for a firearm, and more particularly to an undercarriage having arms or spokes radially extending from a center base disposed in the axis about which the firearm traverses when trained upon a target.

There are known undercarriages or mounts for firearms especially portable guns, which rest upon a pair of arms and a base to form a stable three-point support. Undercarriages as heretofore known, are reasonably light but limit traversing of the firearm to the sector defined by the angle between said arms. An attempt to traverse the firearm beyond said sector may cause tipping of the firearm. Accordingly, when it becomes necessary to traverse the firearm through a wider angle than defined by the supporting arms, the undercarriage itself must be moved. This is rather inconvenient and sometimes difficult.

To traverse the firearm through an angle wider than safely possible with undercarriages of the afore-described design, it has been proposed to equip the undercarriage with four arms which form a cross when the undercarriage is set up. Undercarriages of this design accomplish the purpose, but have the disadvantage that they are so heavy and cumbersome that manipulation of the firearm becomes very difficult. Furthermore, safe resting places for all four arms must be found, which are not always readily available.

Accordingly, the principal object of the invention is to provide a novel and improved undercarriage for firearms of the general kind above referred to, which combines the advantages of the afore-described designs without having the disadvantages thereof.

More specifically, one object of the invention is to provide a novel and improved undercarriage which combines safe traversing through a wide angle with reasonably light weight and a convenient three-point support.

Another object of the invention is to provide a novel and improved undercarriage of a design such that the firearm is supported by two arms and the center base of the carriage which constitute a three-point support and that the carriage is stabilized in any traversing position of the firearm by two freely adjustable auxiliary arms which do not or very little participate in the support of the firearm.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and set forth in the appended claims forming part of the application.

In the accompanying drawing, a preferred embodiment of the invention is shown by way of illustration and not by way of limitation.

In the drawing:

Fig. 1 is an isometric view of an undercarriage according to the invention in its set-up condition.

Fig. 2 is a fragmentary isometric view of part of the undercarriage on an enlarged scale, and

Fig. 3 is a fragmentary isometric view, partly in sec-

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tion, of a detail of the undercarriage on a further enlarged scale.

Referring now to the figures in detail, the undercarriage as shown in the figures, comprises a central base 1, including an axial bore in which is fitted the shaft or other member about which the gun (not shown) traverses. Two support arms 2 and 3 are pivoted to base 1 by means of pins 4 and 5. The free ends of arms 2 and 3 each support a groundplate or foot 6 and 7, respectively.

A bracket or arm formed by plates 8 and 9 is fixedly secured to base 1 or integral therewith and extends radially from the base. A ground plate or foot 10 is pivoted to bracket or arm 8, 9 by means of telescoped parts 11 and 12 and pins 13 and 14.

As is apparent, foot plates 6, 7 and 10 constitute a three-point support for the center base 1, the suspension of foot plate 10 permitting an adjustment of the support to the available ground.

The undercarriage further comprises two auxiliary or stabilizing arms 15 and 16. Each of these arms is pivoted to base 1 by a pin or axle 17 as can best be seen in Fig. 2. Pins 17 which are disposed substantially parallel to the traversing axis of the gun, permit pivoting of stabilizing arms 15 and 16 between a spread-out position, such as shown in Fig. 1, into a position in which the two arms are substantially parallel including bracket 8, 9 therebetween.

Each of the stabilizing arms is further pivotal about a pin or axle 18 transversely of the traversing axis of the gun so that arms 15 and 16 can be lowered or raised.

Fig. 2 shows the mounting of arm 16. The mounting of arm 15 should be visualized as being identical. Each pin 18 is mounted in a part 19 which, in turn, can pivot about pin 17 thereby permitting the afore-described pivotal movements of arms 15 and 16 about an axis parallel to the transversing axis.

The free end of each stabilizing arm supports a groundplate or foot 20 and 21 similar to groundplate 6 and 7.

The mounting of each arm 15 and 16 further includes a lug 22 and 23, respectively. As is shown for lug 23 in Fig. 2, each lug is pivotal about pin 18. The lugs coact with buffer means 24 and 25, respectively mounted on a platform of center base 1.

Each lug is retainable by means of a rotatable cam shaft 26 either in the position shown in Fig. 2 in which it coacts with the respective buffer means, or in a position disengaged from the buffer means. The cam shaft 26 has a deep recess 27 which, when facing lug 23, permits disengagement of the lug from buffer means 25. The shaft is operated by a lever 28 to which is pivoted a handle 29 by means of a pin 30. Handle 29 can either be turned into its operating position in which it forms a right angle with lever 28, or into the aligned position shown in Fig. 2. A catch 31 extending from arm 16 serves to retain lever 28 in the illustrated position. It releases the lever when handle 29 is turned into its operative position. Catch means of this kind are well-known in the art.

Turning now to Fig. 3, buffer means 25 shown in this figure comprise a tubular member 32 closed at one end for engagement by lug 23. In this connection, it may be mentioned that buffer means 24 coacting with lug 22 are identical with buffer means 25. Member 32, which forms a plunger, is slidably fitted in a cylindrical chamber 33, formed in a casing 34. A spring 35 abutting on one end against the closed end of plunger 32 and on the other end against the bottom wall of casing 34 biases plunger 32 toward lug 23.

A generally cylindrical member 38 is mounted within chamber 33 by means of an insert 36, which, in turn, is screwed into the casing. Insert 36 has a bore, one rim of which forms a valve seat. The bore communicates

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with the interior of cylindrical member 38 which, in turn, issues into chamber 33. Member 38 serves to fill part of the free space within the chamber 33 for a purpose which will be more fully explained hereinafter, and also as a guide for a spring 39 acting upon a sphere-shaped valve member 37 by biasing the same away from its seat in insert 36. To control the position of sphere 37, and with it the flow of fluid into and out of chamber 33, the axial bores of member 38 and insert 36 are extended through the respective wall portion of casing 34 and a valve rod 40 is fitted in this extension with sufficient play to permit passage of fluid alongside rod 40. A piston-like head 41 is fitted upon the respective end of rod 40 and slideably inserted in a corresponding bore in casing 34. A loaded spring 42 abutting against head 41 and a suitable shoulder in the bore for rod 40 biases the rod into a position disengaged from sphere 37.

The bore in which rod 40 and spring 42 are disposed communicates with a cylinder chamber 44 through a conduit or bore 43. Chamber 44 is filled with a suitable pressure fluid such as oil. A piston or plunger 45 is urged by a loaded spring 46 toward bore 43 thereby maintaining the oil in chamber 44 under pressure. A vent 47 at the opposite end of chamber 44 permits the escape of air when spring 46 is compressed by the pressure of oil in chamber 44.

The position of valve rod 40, and with it the admission of oil into chamber 33, is controlled by means of a two-arm lever 48 pivotal about a pivot 49. One arm of lever 48 coacts with head 41 and the other with a rod 50 which is mounted axially slidable and rotatable in a bracket 51. A loaded spring 52 biases rod 51 in the direction away from engagement with the respective arm of lever 48. The end of rod 51 opposite lever 48 is preferably enlarged and guided in a sleeve 53. This sleeve is longitudinally slotted to provide space for a handle 55 extending from rod 50. By displacing handle 55 in its slot, lever 48 can be moved into a position in which rod 40 lifts sphere 37 from its seat against the action of spring 39, thereby opening a communication between oil chamber 44 and chamber 33. A detent 54 permits to retain handle 55 in its position holding the valve open.

The buffer means further comprise a check or bleeder valve 56, 57 disposed in parallel with the valve controlled by sphere 37 and forming a by-pass into chamber 33.

The undercarriage as herein described, operates as follows:

Let it be assumed that the main support arms 2 and 3 and foot plate 10 are adjusted as shown in Fig. 1. The carriage will then safely rest upon a three-point support.

Let it be further assumed that auxiliary or stabilizing arms 15 and 16 are in a non-bearing position substantially parallel to each other and levers 28 are so set that lugs 22 and 23 are disengaged from the respective buffer means. Then, arms 15 and 16 can freely swing about pivots 17 and also be lowered and raised. To set up the carriage, stabilizing arms are now pivoted into suitable positions such as shown in Fig. 1 and the arms are lowered until foot plates 20 and 21 rest upon the ground or any other available base. Handles 55 are set so that valve spheres 37 are lifted from their respective seats thereby permitting inward yielding of plungers 32 in response to pressure exerted thereupon. Then, cam shafts 26 are turned into the fixed positions in which they are shown in Fig. 2. Plungers 32 will abut against lugs 22 and 23 by the action of springs 35. After the setting of the cam shafts, handles 29 are secured in position by means of catches 31. The pressure exerted by spring 46 upon piston 45 will force oil into chamber 33 thereby filling the same. As a result, both spring pressure and oil pressure will act upon each plunger 32 and press the same toward the respective lug 22 or 23. Finally, handle 55 of each buffer is released whereby springs 42 move rod 40 into the position in which each sphere 37 closes the respective

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valve. As a result, chamber 33 is closed, the possible flow through check valve 56, 57 being negligible.

As is apparent, plunger 32 has become, for all practical purposes, a stationary part in response to pressure inwardly directed against the same by lug 22 or 23. Similarly, stabilizing arms 15 and 16, which coact with the respective buffers through lugs 22 and 23, are in effect rigidly connected to base 1. As a result, the gun can be traversed through any desired angle during firing without the risk of tipping.

The purpose of check valve 56 and 57 is to permit a small flow of oil between chambers 33 and 34 as, after the firing of a round, the impact of the recoil against the sector defined by arms 2 and 3, can subject base 1 to certain bending stresses as a result of which, the bearing pressure between lugs 22 and 23 and plungers 32, is temporarily reduced. Oil is supplied to chamber 33 through the valve including sphere 37. This additionally supplied oil can leave chamber 33 through the check valve when base 1 returns to its original position.

As is apparent, member 38 reduces the quantity of oil required to fill chamber 33 thereby making the device more economical and also more sensitive.

While the invention has been described in detail with respect to a certain now preferred example and embodiment of the invention it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What is claimed as new and desired to be secured by Letters Patent, is:

I claim:

1. An undercarriage for a traversing firearm, comprising a center base having an axis defining a traversing axis of a firearm, a fixed support member on said base, two adjustable support members pivoted to said base, the free ends of said pivotal members and said fixed member constituting a three-point support for the carriage, two stabilizing arms, a mounting means for each stabilizing arm, each of said mounting means linking the respective arm to the base for pivotal movement about an axis of rotation substantially parallel with said traversing axis and also for pivotal movement about a transverse rotational axis that is transverse of said traversing axis, said stabilizing arms being linked to the base at points located to include said fixed support member therebetween, and a locking means for each of said stabilizing arms coacting with the respective mounting means for independently locking each arm in a selected pivotal position on its transverse axis.

2. An undercarriage according to claim 1, wherein said fixed support member comprises an arm radially extending from and fixedly secured to said base, and a foot pivoted to said arm.

3. An undercarriage according to claim 1, wherein each of said mounting means comprises a buffer means moving jointly with the respective arm about the rotational axis thereof in a plan parallel to said traversing axis and yieldably damping said pivotal movement of the arm about the transverse rotational axis thereof, and wherein each of said locking means coacts with the respective buffer means for rendering the latter substantially rigid in the selected pivotal position of the respective arm.

4. An undercarriage according to claim 3, wherein each of said buffer means comprises two coacting components disengageable from each other to render ineffective the respective buffer means whereby the respective arm is freely pivotal about its transverse rotational axis.

5. An undercarriage according to claim 4, wherein one of said coacting components comprises a yieldable means pivotally mounted on said base and the other component is mounted on the respective arm, said latter component

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being movable between a position of engagement and a position of disengagement with said yieldable means.

6. An undercarriage according to claim 5 and further comprising actuating means for moving said movable component into either one of said positions and retaining the same therein.

7. An undercarriage according to claim 1, wherein each of said mounting means comprises a buffer means moving jointly with the respective arm about the rotational axis thereof parallel to the traversing axis and yieldably damping said pivotal movement of the arm about the transverse rotational axis thereof, said buffer means including a yieldable means loaded by spring means and pressure fluid means.

8. An undercarriage according to claim 7 wherein said yieldable means comprise a casing including a cylindrical chamber, a plunger forming an abutment member slidable in said chamber, a loaded spring coacting with said plunger, and conduit means for admitting pressure fluid into said chamber, and wherein said buffer means further comprise a member pivotal on the respective arm and engageable with said plunger.

9. An undercarriage according to claim 8 and further comprising control valve means for controlling the flow of fluid through said conduit means, closing of said conduit means rendering the position of the plunger in the chamber substantially stationary.

10. An undercarriage according to claim 9 and additionally comprising check valve means included in said

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conduit means in parallel with said control valve means, said check valve means being yieldably biased into the closing position and adjusted to open temporarily in response to an impact upon said base thereby permitting a limited flow of pressure fluid through said conduit means.

11. An undercarriage according to claim 10, wherein said control valve means comprise a movable valve member coacting with a valve seat formed in a wall portion of the casing, and spring means biasing said valve member away from its seat.

12. An undercarriage according to claim 11, wherein said control valve means further comprise actuating means for moving said valve member into its closing position on the valve seat against the action of said spring means and retaining the valve member in said closing position.

13. An undercarriage according to claim 12, wherein said wall portion of the casing is extended into said cylindrical chamber to fill part of said chamber thereby correspondingly reducing the required quantity of pressure fluid.

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