Feb. 29, 1944. J. M. COLBY 2,342,644

GUN MOUNT

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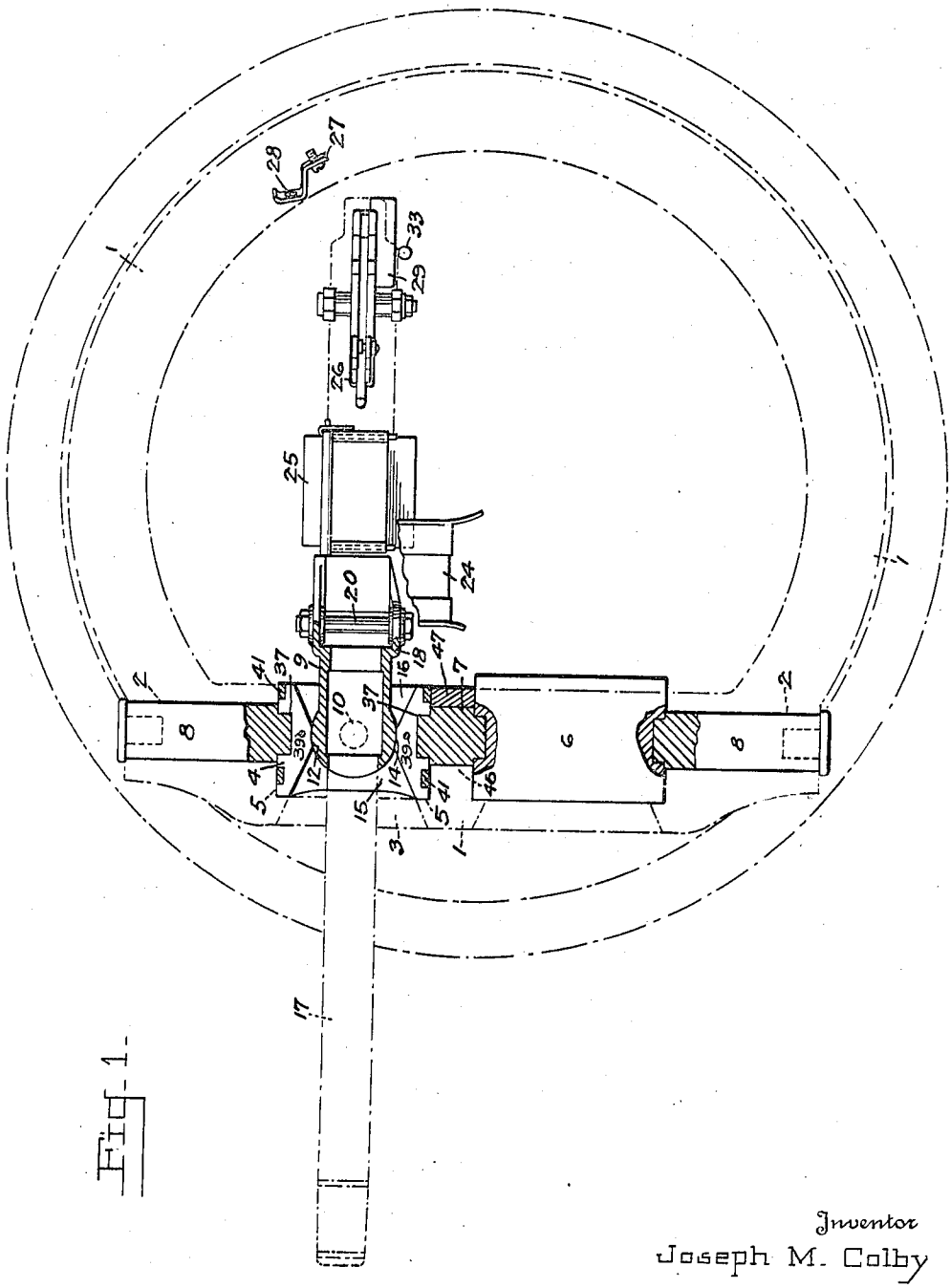


Fig. 1.

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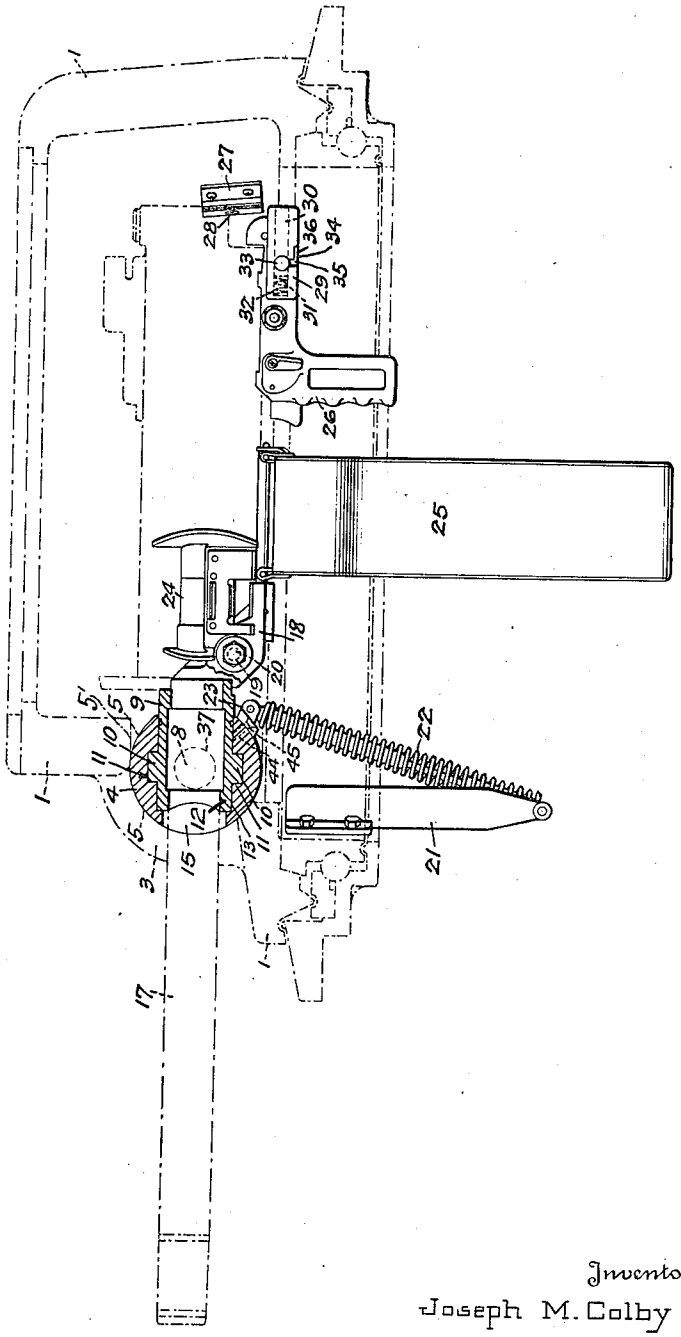
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Fig. 2.



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Fig. 3.

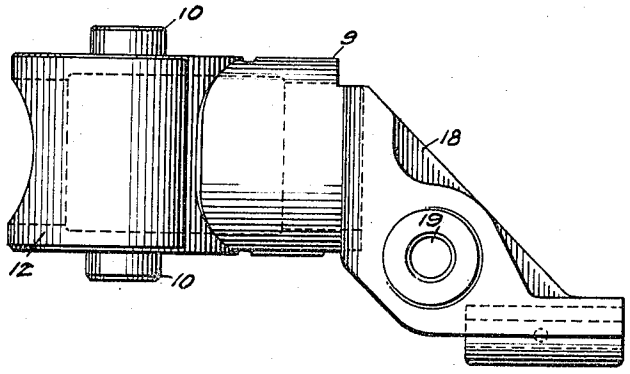


Fig. 4.

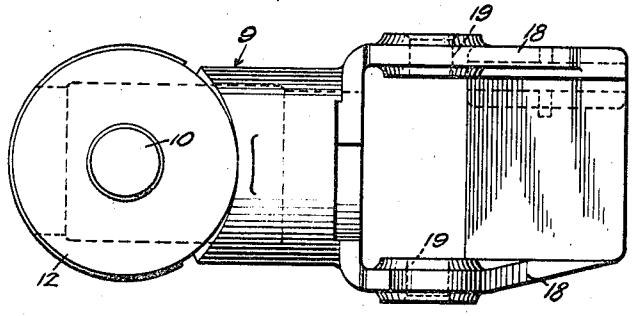


Fig. 5.

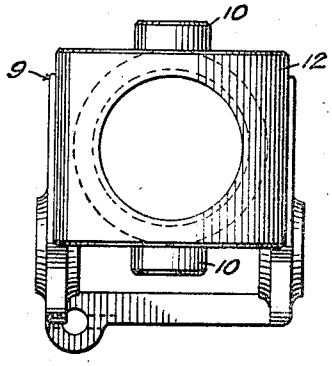
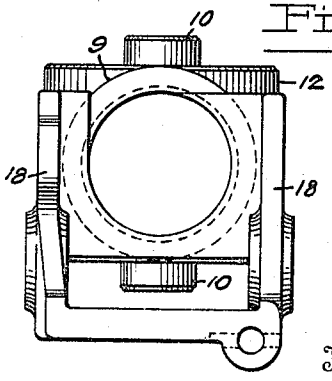


Fig. 6.



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Fig. 7.

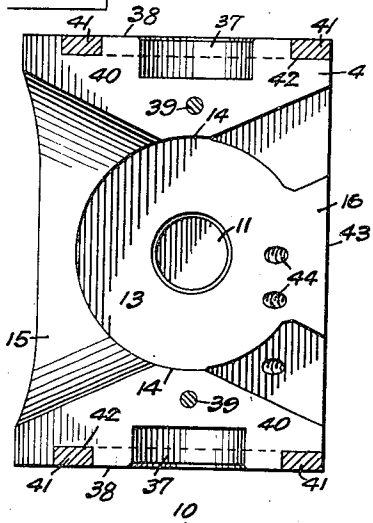


Fig. 10.

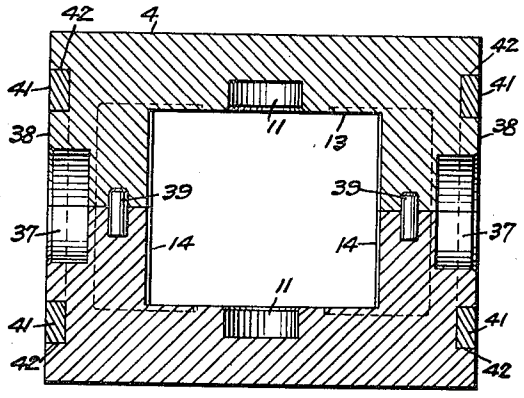


Fig. 8.

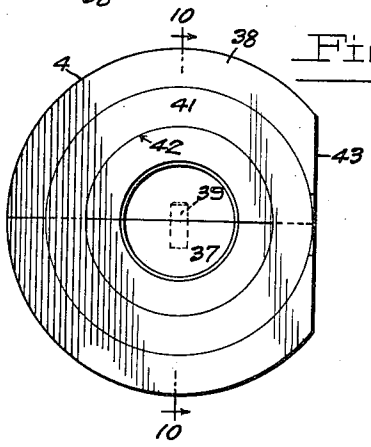


Fig. 11.

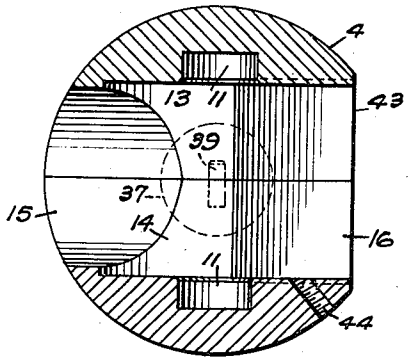
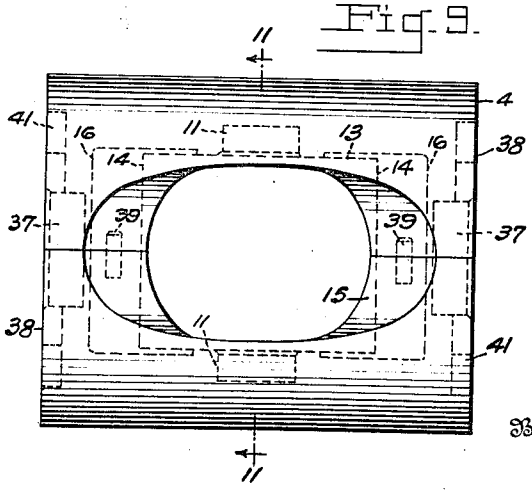


Fig. 9.



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UNITED STATES PATENT OFFICE

2,342,644

GUN MOUNT

Joseph M. Colby, United States Army,
Lake Mills, Iowa

Application July 1, 1942, Serial No. 449,303

3 Claims. (Cl. 89—37)

(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.

This invention relates to a gun mount and more particularly to a universal mounting for a gun in an armored device.

The purpose of the invention is to provide a universal mounting for a gun in an armored structure which will permit ample movement for aiming purposes and insure maximum protection to the operating personnel from enemy gunfire.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a plan view of a gun mounted in the turret of an armored device having its top removed, with parts of the mount in section, to show details of construction,

Fig. 2 is a view in side elevation and partly in section of the gun mount,

Figs. 3 and 4 are respectively side elevational and plan views of the gun cradle,

Figs. 5 and 6 are views of the gun cradle in front and rear elevation, respectively,

Fig. 7 is a plan view of the lower rotor segment,

Fig. 8 is a view in side elevation of the assembled rotor,

Fig. 9 is a front elevational view of the assembled rotor,

Fig. 10 is a sectional view along the line 10—10 of Fig. 8, and

Fig. 11 is a sectional view along the line 11—11 of Fig. 9.

Referring to Figs. 1 and 2, an armored structure such as a gun turret 1 is provided with a pair of aligned cylindrical journals 2 adjacent a gun port 3. A hollow rotor 4 mounted in a cylindrical journal 5 is interconnected with an indirect observation device 6 through a suitable trunnion coupling 7. The outer ends of the rotor and the observation device are carried by horizontal trunnions 8 which are rotatably mounted in the journals 2. A hollow gun cradle 9 provided with vertical trunnions 10 is conditioned to swing horizontally in spaced bearings 11 in the rotor 4. Cradle 9 has a cylindrical front end 12 which is adapted to oscillate in a chamber 13 in the rotor 4. Chamber 13 has arcuate vertical side walls 14 and flared front and rear openings 15 and 16 respectively. The front opening 15 communicates with the gun port 3 in the armor. The side walls 14 confine a portion of the front end 12 of the cradle 9 in a close sliding fit.

A gun barrel 17 is insertable and closely confined in the bore in the hollow cradle 9. Cradle 9 has a rearwardly extending bracket 18 which is conditioned to engage the gun and support it. A pair of aligned apertures 19 are provided in the bracket and receive a pin 20 which secures the gun to the cradle.

The upper end of a vertical bracket 21 is secured to the turret 1 and has an equilibrator spring 22 connected to its lower end. The upper end of the equilibrator spring is attached to a bracket 23 on the rotor 4. The equilibrator acts to compensate for the preponderance of weight at the rear of the gun.

The portion of the gun within the turret carries an ammunition tray 24 and an empty cartridge bag 25. In back of these is a firing grip 26 which facilitates movement of the gun and also controls its operation. Secured to the rear wall of turret 1 is a metal bracket 27 having an aperture 28. The rear end of the gun is provided with a grip extension 29 which houses a bolt 30 and a coiled spring 31 in a bore 32. Intermediate the ends of the bolt 30 is a control knob 33 which is adapted to move in an irregular slot 34. One channel 35 of the slot is approximately at right angles to the other channel 36. When the knob 33 is manually moved into channel 35 against the resistance of the spring 31, the bolt 30 is retracted. By swinging the bolt 90° the knob is urged into the channel 36 of the slot 34 thereby projecting the bolt 30 beyond the breech portion of the gun. When the bolt is thrust into the aperture 28 in bracket 27, the gun may be secured to the turret wall, in position for travelling. A simple manual movement unlocks the bolt and enables the gun to be placed in battery.

Referring to Figs. 7–11, there is shown a cast segmental rotor 4 which is adapted for mounting in the cylindrical journal 5 in the cast armor of the turret. Fig. 7 represents a plan view of the lower rotor segment and is provided with a pair of semi-circular recesses 37 on its flat side faces 38. These recesses are disposed on the axis of the rotor and are arranged to receive the trunnion coupling 7 and the trunnion 8. Dowel pins 39 in the flat top face 40 are employed to align the two rotor segments as illustrated in Figs. 8–11. A pair of flat rings 41 slip into annular recesses 42 and couple the segments together. The rear portion of each rotor segment has a flat face 43 to reduce weight and facilitate machining. Threaded angular bores 44 in the bottom of the lower rotor segment receive suitable fasteners 45 which secure the bracket 23 on the equilibrator spring 22 to the rotor, see Figs. 2, 7, and 11.

The device is assembled in the armor of the turret as follows: First the gun cradle 9 is inserted in the lower rotor segment so that its bottom trunnion 10 rests in the bearing 11. The

upper segment is placed so that its vertical bearing 11 receives the other trunnion 10 of the cradle. The dowel pins 39 are brought into alignment with their corresponding bores in the upper segment and then the flat rings 41 are slipped into the annular recesses 42, thus coupling the members together. The rotor is then placed in the cylindrical journal 5 in the armor which has an opening 5' at its inner side of sufficient size for this purpose. Next the bracket 23 of the equilibrator is secured to the rotor as shown in Fig. 2. Trunnion 8 is inserted in the bearing 2 from the outside of the turret and is forced into the axially disposed recess 37 on the rotor. Trunnion 7 is placed in bearing 46 and forced into the recess 37 in the rotor 4. The observation device 6 is slipped into its mounting adjacent an observation slit and coupled to the other end of trunnion 7. A bearing cap 47 employing conventional fasteners (not shown), retains the trunnion 7 in the armor 1, see Fig. 1. The second trunnion 8 is inserted in its bearing 2 and coupled to the other end of the observation device. This completes the mounting of the gun support. The horizontal bearing for the gun mount is comprised on the journals 2, trunnions 8 and 7 and cap 47. Next the gun barrel 17 is slipped into the hollow cradle 9 and the breech portion of the gun is secured to the bracket 18 by pin 20 thereby placing the gun in battery.

About 45° of traverse about trunnions 10 in the rotor 4 is provided. Additional traverse is secured by rotating the turret of the armored device. Movement of the gun mount in elevation turns the rotor 4 about its horizontal trunnions 8—7—8 and provides conjoint movement of the observation device 6. Approximately 70° of elevation is permitted.

Movement of the gun in its universal mount is accomplished by the action of but one of the operator's hands on the pistol grip 26. The gun is oscillatable with a minimum of effort and may be aimed and fired with speed and proficiency by a gunner stationed in the confined space in the turret or cupola.

With the advent of cast armor in armored vehicles and other devices, considerable saving in time and expense results since fabrication problems are materially simplified. The instant flexible mounting comprises cast components readily adapted for use in the cast armor of a tank or other device and its installation or removal consumes a minimum of time. Adequate protection is given the operating personnel and the danger from enemy gunfire is reduced since the external portions of the gun mount are arcuate thereby deflecting projectiles which strike the mount. The force of impact is transmitted to bearing surfaces almost entirely cast in the armor of the device. Excessive stress will not be imparted to the removable bearing cap 47 and its fasteners thus negativing breakage at this point. The employment of externally exposed bolts or rivets of prior art devices is unnecessary, thereby eliminating the previously existing danger to the operating personnel from flying fasteners and particles when a hard direct hit was received on those members so that they were pushed through the protective armor. Thus a rugged, durable, flexible mount which insures certainty and ease of operation and a maximum degree of protection to the gunner is provided.

I claim:

1. In a universal gun mounting, a support having a pair of spaced openings, aligned trunnion journals in said support adjacent said openings, a movable segmental member cradled in said support at one of said openings, a movable indirect observation device cradled in said support at the other of said openings, trunnions in said journals sustaining said member and said observation device, the intermediate of said trunnions coupling said member and said observation device for conjoint movement, a cradle closely confined and trunnioned in said member on an axis perpendicular to the axis of said member, means uniting said segmental member thereby securing said cradle against translation, said cradle having a bore which closely confines a gun barrel passing therethrough, means on the cradle for the attachment of a gun, and a bearing cap for securing said intermediate trunnion in its journal.

2. In a universal gun mounting, a support having a pair of spaced openings, aligned trunnion journals in said support adjacent said openings, a movable segmental member cradled in said support at one of said openings, a movable indirect observation device cradled in said support at the other of said openings, trunnions in said journals sustaining said member and said observation device, the intermediate of said trunnions coupling said members and said observation device for conjoint movement, said member having a bore perpendicular to the axis of said trunnions, said bore including a flared front mouth and a flared rear mouth with arcuate vertical surfaces intermediate said mouths, a cradle trunnioned in the bore of said member on an axis perpendicular to the axis of said member, said cradle having arcuate vertical surfaces adjoining the corresponding surfaces in said bore, the radii of the adjoining arcuate surfaces of said bore and said cradle being substantially the same, means uniting said segmental member thereby securing said cradle against translation, said cradle having a bore which closely confines a gun barrel passing therethrough, means on the cradle for the attachment of a gun, and a bearing cap for securing said intermediate trunnion in its journal.

3. A rotary support for a gun cradle provided with aligned trunnions comprising, a cylinder split and assembled on a plane substantially parallel to the axis of the completed cylinder, an annular groove in each end of the completed cylinder, annular means for insertion in the grooves to couple said half cylinders in abutting relationship, dowel means in said half cylinders, opposed trunnion means on the axis of said assembled cylinder, said cylinder having an irregular cradle receiving bore perpendicular to the axis of said cylinder, said bore including flared front and rear mouths with a pair of right cylindrical surfaces intermediate said mouths adapted to closely engage said cradle, and aligned trunnion journals in said half cylinders for said cradle on an axis perpendicular to the axis of said assembled cylinder and the axis of said bore.

JOSEPH M. COLBY.