Nov. 29, 1927. 1,650,628

H. B. INGLIS

GUN SIGHT

Filed April 30, 1923 2 Sheets-Sheet 1

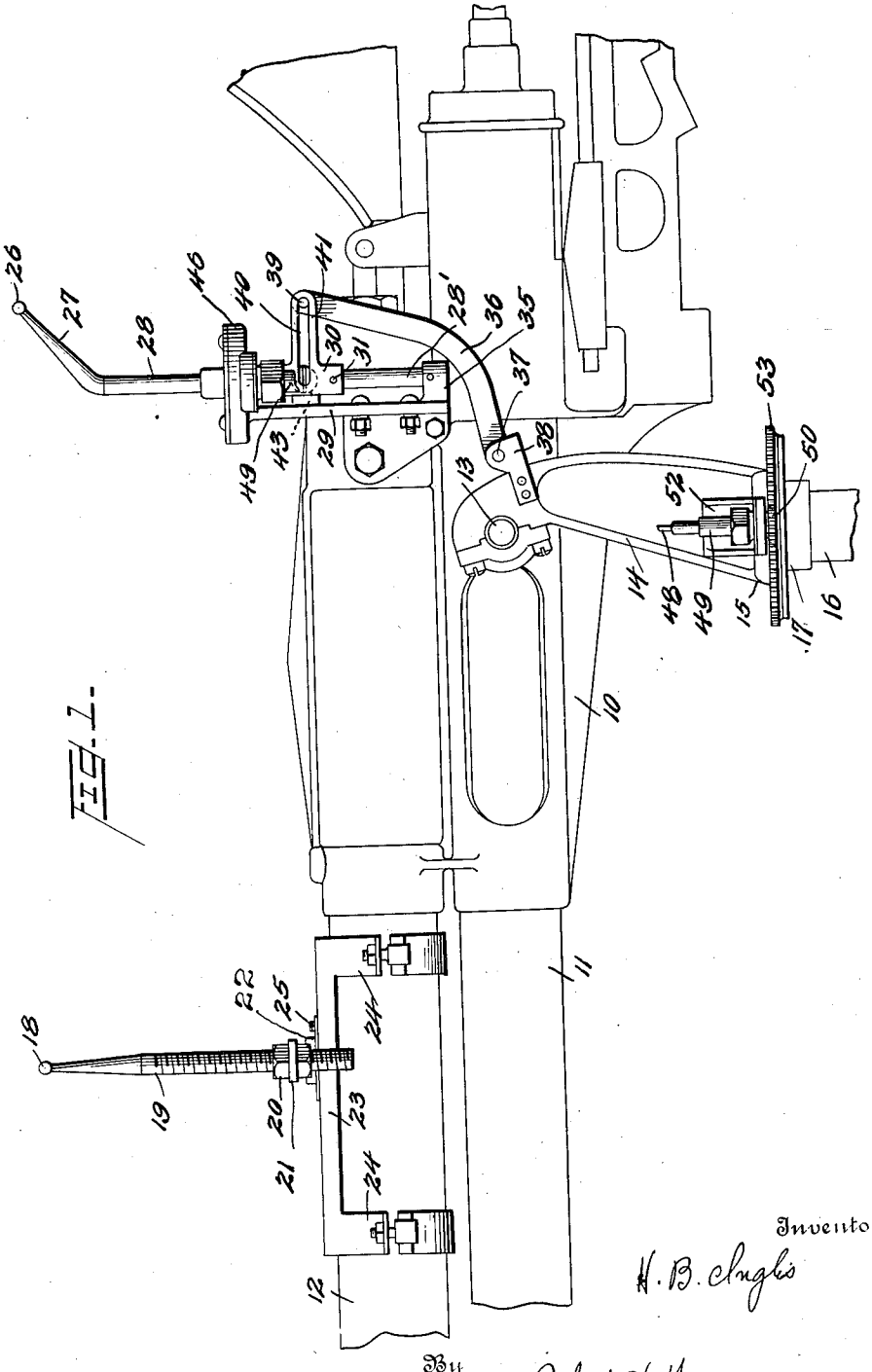


FIG. 1.

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FIG. 2.

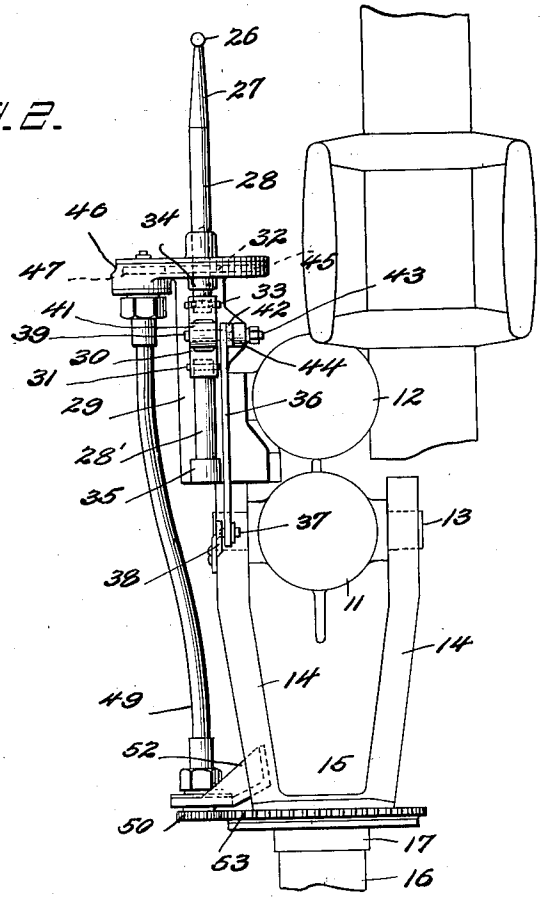
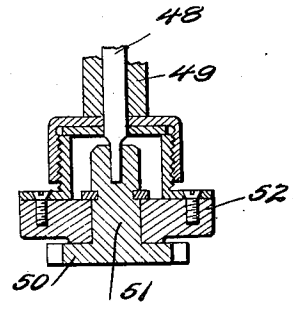


FIG. 3.



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UNITED STATES PATENT OFFICE.

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GUN SIGHT.

Application filed April 30, 1923. Serial No. 635,770.

This invention relates to sights for guns and particularly to sights for flexibly mounted machine guns.

The object of the invention is to produce a sight embodying a sighting member which is automatically shifted or adjusted whenever the gun is moved in elevation or laterally or in both directions simultaneously.

Another object in view is to shift the movable sighting member by positively acting means the operation of which is not dependent upon variable and uncertain direction of eddies where the gun may be mounted. The sight as a whole is designed to replace the commonly known wind vane sight which is dependent upon the uncertain air stream.

The principle upon which the sight operates is that the distance between the front sight (usually a bead) and the rear sight, (which may also be a bead) both mounted on the barrel of the gun and establishing a line of sight parallel to the gun barrel, represents assumed bullet velocity. A movable arm carrying the rear sight represents on the same scale the air speed of the craft. Such arm projects to the rear of the point about which it is movable in an arc so as to remain always parallel to the line of flight for any direction of gun fire. The line of sight between the bead on this arm and the fixed front sight then gives the resultant actual direction of the bullet, that is, the correct line of sight.

To the above ends the invention consists in the construction, combination and arrangement herein described, shown and claimed.

In the accompanying drawings:—

Fig. 1 is a side elevation of the sighting means, showing the relation thereof to a gun.

Fig. 2 is a rear elevation of the same.

Fig. 3 is a sectional view of a fragment of the flexible shaft and its driving satellite gear.

The gun 10, comprising the barrel 11 and recoil cylinder 12, is flexibly mounted for movement about a horizontal axis on trunnions 13 upon and between the fork arms 14 of a gun frame or yoke 15, the latter being mounted for movement about a vertical axis by means of a stem 16 journaled in a bearing 17 on a suitable support (not shown).

The front sight is shown as consisting of a bead 18 on the upper extremity of a post or standard 19 adjustably secured by nuts 20 to the laterally offset portion 21 of a bracket 22 on a mounting plate 23 held by clamping means 24 such as bands or hoops upon the recoil cylinder 12. The plate 23 has a scale on its upper surface and the bracket 22 is made adjustable in a fore and aft direction by a binding screw 25. In this way the front sight may be adjusted to accord with the known air speed of the craft.

The rear sighting member is shown as consisting of a bead 26 at the upper extremity of the trailing or rearwardly extending upper portion or arm 27 of a post 28. This post is mounted for up and down movement and also for rotative movement in a guide bracket 29 fastened to the side of the gun. The post 28 is made in two parts or sections the lower section 28′ being coupled to the upper section 28 by a vertically movable traveler 30 having a tubular or sleeve-like body in which the adjacent ends of the post section are fitted. The lower section 28′ is fixedly secured in the body 30 by a pin or key 31. The upper section 28 must be capable of rotative movement in the body 30 but be held against endwise movement in said body, this being accomplished by forming the lower end of the section 28 with an annular groove 32 which receives the inner ends of pins or keys 33 carried by the body 30. The post sections 28 and 28′ are slidable through guideways 34 and 35 in the bracket 29 and are raised and lowered by the traveler 30, the latter being actuated by a link 36, one end of which is fastened by a pivot 37 to a lug 38 on one of the fork arms 14 of the gun yoke 15. The other end of the link 36 has a laterally projecting stud 39 movable along a slot 40 in an arm 41 projecting from and rigid on the traveler 30. The stud 39 also serves as a pivot to connect the link 36 to a swinging guide arm or link 42, connected by a pivot 43 to an extension 44 of the bracket 29, as shown in Fig. 2. The arm 42 causes the stud 39 to move in an arc about the pivot 43 as a center. Now, as the gun is swung on the trunnions 13, the link 36 acts through the arm 41 to move the rear sighting member up and down.

The means for imparting rotative movement to the post 28 will now be described. A spur gear 45 feathered on the upper post section 28 is encased in a housing 46 on the upper end of the bracket 29. A pinion 47 journaled in the housing 46 meshes with and rotates the gear 45. One end of a flexible

drive shaft 48 is coupled to the pinion 47 and extends through a flexible housing 49. At its other end the flexible shaft 48 is coupled to a satellite gear or pinion 50 the shaft 51 of which is journaled in an arm 52 extending laterally from one of the fork arms 14 of the yoke 15. The pinion 50 meshes with and is adapted to roll around a stationary non-rotary gear 53 fastened to the non-rotary bearing 17 or to any stationary part of the gun mount. Now, as the gun is swung laterally the yoke 15 turns on a vertical axis and carries the satellite gear 50 with it around the gear 53. Rotary motion is thus imparted to the gear 50, the shaft 48, gears 47 and 45 and finally the upper section 28 of the sight post. This causes the arm 27 carrying the rear sight bead 26 to swing about the axis of the post 28.

From the above it will be seen that lateral shifting of the bead 26 is effected through geared correction by lateral rotation of the gun about the gun's vertical axis. The bead is moved in the opposite direction from the gun's movement and through an equal angle so that as the gun is swung to one side the arm which carries the bead 26 trails behind the axis of rotation and remains parallel to the line of flight for any angularity of the gun barrel off the line of flight. Shifting of the bead 26 in elevation is effected through the link 36 by rotation of the gun about its horizontal axis. As the gun is swung to aim above or below the line of flight the bead 26 is lowered or raised by the linkage described so that said bead trails behind an imaginary fixed point in a line which remains parallel to the line of flight for any given angularity of the gun barrel off the line of flight.

The two component motions above described are imparted to the rear bead independently or concurrently when the gun is moved laterally or in elevation or in some resultant of the two directions of movement. By adjusting the distance between the front and rear sights, the sighting means as a whole is adapted to different air speeds. This is accomplished by shifting the front bead further to the front or rear along the scale graduated in miles per hour, the front bead being so adjusted before flight according to the known air speed of the aircraft.

I claim:—

1. In combination with a flexible gun mount and gun, gun-sighting means embodying a front sight, a rear sighting element consisting of a rotatable member having the sight offset from the axis of rotation thereof, and linkage means between said sighting element and the gun mount to effect rotation of the sighting element as the gun is swung laterally.

2. In combination with a flexible gun mount and gun, a gun-sighting means embodying a front sight, a rear sighting element consisting of a rotatable member having the sight offset from the axis of rotation thereof, and linkage means between said sighting element and the gun mount to effect rotation of the sighting element as the gun is swung laterally, and additional means between said sight and mount for automatically raising and lowering said rear sighting member as the gun is adjusted in elevation.

3. In combination with a flexible gun mount and gun, a gun-sighting means embodying a front sight, a rear sighting member, and positively acting connecting means between said rear sighting member and a non-rotary part of the gun mount for effecting vertical movement of said rear sighting member when the gun is moved in elevation, and a horizontal movement of said rear sighting member when the gun is swung laterally.

4. In combination with a flexible gun mount and gun, a gun-sighting means embodying a front sight, a rear sighting member, and positively acting connecting means between said rear sighting member and a non-rotary part of the gun mount for effecting a vertical movement of said rear sighting member when the gun is moved in elevation, and a horizontal movement of said rear sighting member when the gun is swung laterally, said gearing means including a flexible shaft.

5. In combination with a flexible gun mount and gun, a gun-sighting means embodying a front sight, adjustable along the barrel of said gun, a rear sighting member, and positive means for shifting the latter vertically and horizontally with respect to said gun to either side as the gun is moved in elevation or swung laterally.

In testimony whereof I affix my signature.

HENRY B. INGLIS.