

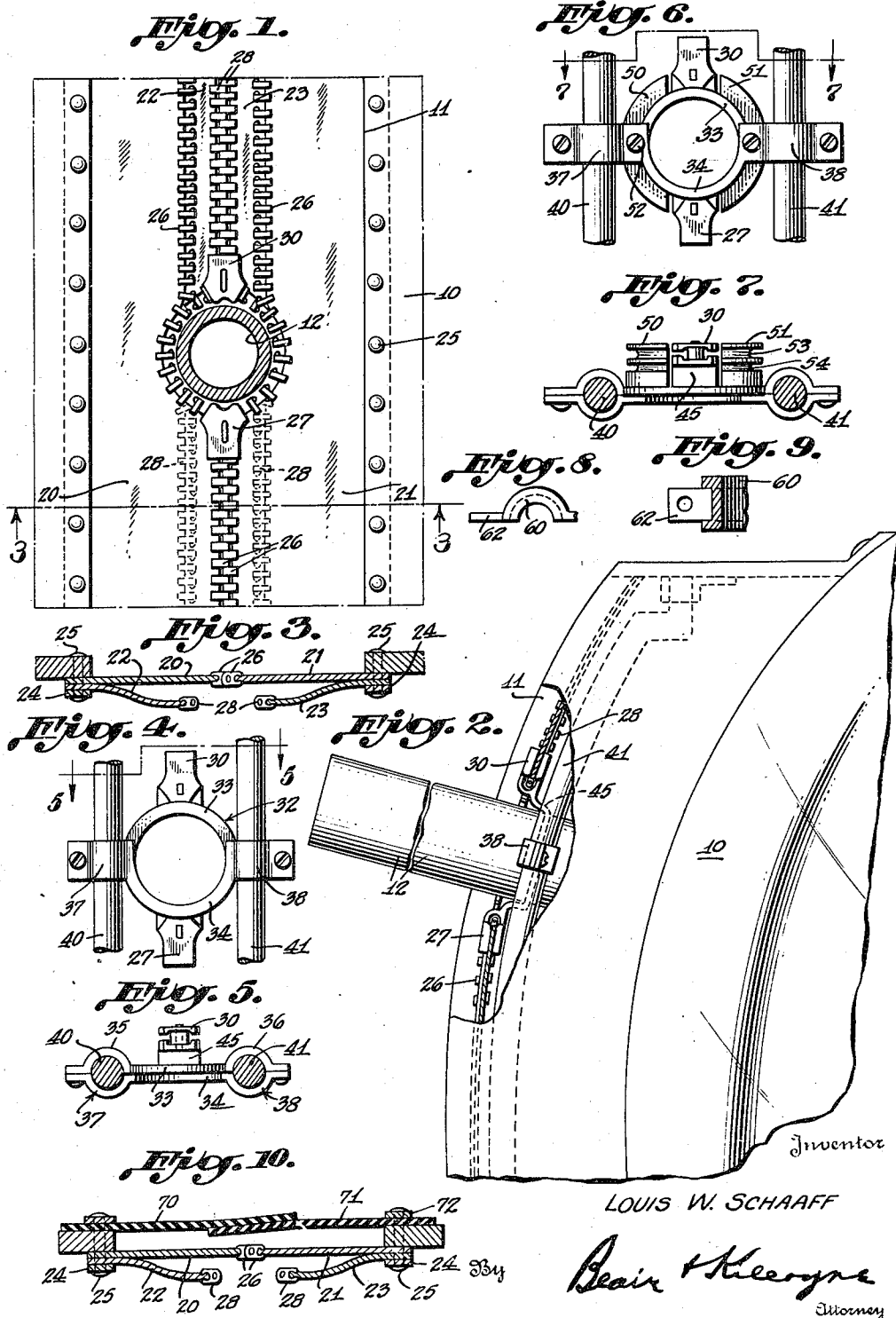
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CLOSURE FOR SLOT-LIKE APERTURES

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CLOSURE FOR SLOTLIKE APERTURES

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3 Claims. (Cl. 89—36)

This invention relates to closures for slot-like apertures and more particularly to a closure for the slot-like aperture of a machine gun turret.

As set forth in my copending application, Serial No. 418,083 filed under even date and which has matured into Patent No. 2,331,048 issued October 5, 1943, prior closures for the gun barrel apertures of machine gun turrets, while operating satisfactorily at low plane speeds, have the disadvantage that the great air flow pressures encountered at high plane speeds tend to cause their collapse and/or movement to a position in which they retard the free movement of the barrel along the aperture. In my application aforesaid I have disclosed and claimed a slide fastener closure for the gun barrel aperture of a machine gun turret which overcomes the disadvantages of the prior closures and which otherwise satisfies the requirements for an effective closure of the type under consideration.

The present invention contemplates and provides another improved form of slide fastener closure for slot-like apertures such as the gun barrel aperture of a machine gun turret. More specifically, the present invention provides a closure consisting of an assembly of two oppositely disposed and operating slide fasteners, one of which is always closed below the gun barrel and the other of which is always closed above the barrel, together with slider means movable with the gun barrel of a character as to effect opposite operation of the fasteners. By such an improved arrangement the aperture is always closed by either one or both of the fasteners irrespective of the position of the gun barrel along the aperture and/or its angle of elevation. A further object is to provide an assembly of slide fasteners for the stated purpose which are of conventional construction and of known and proven worth. Accordingly effective operation of the slider assembly is assured.

The present invention also contemplates the provision of a slide fastener closure for slot-like apertures which is of simple and durable construction, which is capable of production in quantity, which may be readily assembled and disassembled, and which is sure and certain in its operation.

Other objects will be in part obvious and in part hereinafter pointed out in connection with the following analysis of this invention wherein is illustrated an embodiment of the invention in detail.

In the drawing—

Fig. 1 is a partial front elevation of the closure

means of the present invention as applied to the gun barrel aperture of a machine gun turret;

Fig. 2 is a broken-away side elevation of the turret and closure means therefor as illustrated in Fig. 1;

Fig. 3 is a section along line 3—3, Fig. 1, illustrating the overlying relation of fasteners and the preferred manner of securing the fastener flaps to the turret casing;

Fig. 4 is a broken-away elevation of the slider carriage and its guiding means;

Fig. 5 is a section along line 5—5 of Fig. 4;

Fig. 6 is a view similar to Fig. 4 illustrating a somewhat modified slider carriage;

Fig. 7 is a section along lines 7—7 of Fig. 6;

Figs. 8 and 9 are detail views illustrating a modified form of guide collar; and

Fig. 10 is a section through a slide fastener closure as illustrated in Fig. 3, provided with means for protecting the fastener from the weather.

Referring to the drawing, wherein like reference characters designate like parts throughout the several views, reference character 10 generally designates a machine gun turret of approved construction, the details of which will not be here described as the turret per se forms no part of the present invention except as it enters into the combinations hereinafter claimed. The turret partially shown is of dome or shell form having a curved side wall, but it may be shaped otherwise to conform to particular design requirements. The turret is provided with a vertical slot or aperture 11 through which the barrel 12 of a machine gun mounted within the turret 10 is adapted to project and along which the barrel is moved as it is elevated and lowered. Due to the curvature of the turret side wall, the aperture extends along a vertical arc or curvature which may correspond to the side wall curvature, the length of the aperture being sufficient to accommodate for the desired vertical or elevational movement of the barrel, and its width being somewhat greater than the diameter of the gun barrel projecting therethrough, thus to insure free movement of the barrel along the aperture.

According to the present invention, closure means of the slide fastener type is employed to close the aperture 11 while permitting the gun barrel to extend therethrough and providing for free movement of the gun barrel along the aperture. As shown, the improved closure means comprises an assembly of two overlying and oppositely operating slide fasteners which are so

organized with the gun barrel that as one slide fastener is engaged to close the aperture below the barrel in response to movement of the gun barrel in upward direction, for example, the other slide fastener is disengaged to open the aperture above the barrel. The reverse operation results upon movement of the barrel in downward direction. Thus, regardless of the position of the gun barrel, the improved closure functions to close the aperture both above and below the barrel, and also to maintain the aperture closed directly around the gun barrel due to the tendency of the disengaged fastener elements to follow the curvature of the barrel.

Such an assembly of slide fasteners is indicated in Figs. 1 and 3 wherein reference characters 20 and 21 designate the flap-like stringers of one slide fastener arranged to form a closure below the gun barrel and which is disposed to the front of the flap-like stringers 22, 23 of the second slide fastener disposed just to the rear of the first slide fastener and arranged to close the aperture above the barrel. Preferably, the flap-like stringers are constructed from heavy waterproof canvas and are each secured to the under face of the turret casing by a metal strip 24 secured to the turret casing along the aperture edges by rivets 25 as indicated in Fig. 3. The flap-like stringers 20, 21 are provided along their adjacent edges with chains of fastener elements 26 which are adapted to be embraced by a slider 27 and engaged or brought into interlocking relation upon upward movement of the latter. The stringers 22, 23 of the relatively inner slide fastener are provided along their adjacent edges with a chain of fastener elements 28 which are adapted to be embraced by an oppositely disposed slider 30 which engages the fastener elements when moved downwardly. The sliders are maintained in vertical alignment by their fixed mounting on a carriage to be described, and are spaced a fixed distance which is slightly greater than the diameter of the gun barrel 12.

By reference to Figs. 4 and 5, sliders 27, 30 are carried by the slider carriage generally designated 32, the latter preferably being constituted by an upper ring-like half section 33, and a lower ring-like half section 34. Each ring half section carries the sidewardly directed straps 35, 36 shaped to provide semi-circular recesses which complement like strap formations on the related ring section to form spaced guide collars 37, 38 adapted to slide on the laterally spaced guide rods 40, 41. The guide rods extend vertically along the edges of the turret aperture, as indicated in Fig. 2, and are curved to correspond to the curvature of the turret side wall, thus to guide the carriage in its vertical movement.

Upon assembly of the ring-like sections 33, 34 about the gun barrel in the manner indicated in Fig. 4, they form a ring or ferrule through which the gun barrel 12 projects. Accordingly, any movement of the gun barrel along the slot is transmitted to the carriage 32, and throughout this movement the carriage is guided by the guide rods 40, 41.

The sliders 27, 30 are fixedly secured to the slider carriage for movement therewith, and to this end each slider is formed with a rearward extension 45 which is secured as by welding to the ring section from which it extends. Other means for securing the sliders to the ring sections of the carriage may be substituted.

With the construction so far illustrated, it will be seen that the slider carriage follows the gun

barrel in any movement of the latter. If moved upwardly, the lower slider 27 progressively engages the fastener elements 26 of the frontwardly disposed slide fastener so that the flap-like stringers 20, 21 form a closure for the portion of the aperture below the gun barrel. The aperture above the gun barrel is maintained closed by the flap-like stringers 22, 23 of the inwardly disposed fastener but, as the gun barrel and hence the carriage 32 is moved upwardly, the fastener elements 28 are progressively disengaged. Thus, regardless of the position of the gun barrel along the slot, either the forwardly or the rearwardly disposed slide fastener, or both, effect a closure of the aperture.

It is an important feature of the present invention that the closure means as illustrated maintains the aperture closed around the gun barrel. This improved functioning results from the diametrical disposition of the sliders 27 and 30 on a circle whose radius is only slightly greater than that of the gun barrel. Hence, the disengaged fastener elements upon their exit from the sliders tend to bear against the gun barrel in the manner indicated in Fig. 1. With the fastener elements of the forwardly disposed fastener curving around the lower half and the fastener elements of the rearwardly disposed fastener curving around the upper half of the gun barrel, a 360° closure of the fastener around the gun barrel results, and the aperture is effectively closed.

To insure ease of operation and to preclude the possibility of interference between the fastener elements of the two slide fasteners, slider 30 may be disposed in a plane somewhat to the rear of the slider 27. Thus, with slider 27 operating in its own plane and slider 30 operating in a plane to the rear thereof, proper operation of the overlying fasteners is assured.

Referring to Figs. 6 and 7 wherein a modified form of slider carriage is illustrated, a slider carriage constructed as heretofore is additionally provided with arcuate fastener tracks 50, 51 arranged to guide the fastener elements as they curve around the gun barrel. These arcuate tracks are preferably formed from non-metallic anti-friction and heat-resisting material, such as vulcanized fiber, and may be secured to the carriage by screws 52 or equivalent means. As indicated in Fig. 7, each track section curves around one side of the barrel and is provided with two channels, of which channel 53 disposed in the relatively forward plane of the slider 27 is adapted to receive fastener elements 26 of the frontwardly disposed slide fastener as said elements are disengaged by slider 27; and the relatively rearwardly disposed channel 54 which is lined up with slider 30 receiving the fastener elements 28 of the rearwardly disposed fastener as the fastener elements are disengaged thereby.

In addition to providing definite guidance for the disengaged fastener elements around the barrel as aforesaid, the track provides non-metallic contact surfaces serving to prevent undue wear on the fastener elements, which is likely if the fastener elements bear directly on the gun barrel. Moreover, the non-metallic tracks insulate the fastener elements from the heat of the gun barrel generated on rapid firing of the gun and thus tend to increase the life of the fastener.

To insure easy riding of the slider carriage on the guide rods 40, 41, the guide collars may carry separate wear bushings of oilless non-metallic bearing material such as vulcanized fiber. A half

section of such a wear bushing is indicated at 60, Figs. 8 and 9, the half section of the bushing and its companion half section being secured about the guide rods 40, 41 by a strap 62 corresponding to the collar forming straps 35, 36 shown in Fig. 5.

Supplementary closure means of the character shown in Fig. 10 may be employed to insure free working of the slide fastener assembly under adverse weather conditions, when such is deemed necessary or advisable. The supplementary closure means may take the form of flexible rubber flaps 70, 71 disposed outwardly of the slider fastener, each secured to the front face of the turret casing and along the aperture edge as by metal strips 72 which may be secured in place by the rivets 25. The width of the flaps is such that their inner edges overlap substantially as shown and thus provide protection for the slide fastener. Due to their flexibility, the flaps open about the gun barrel as the latter moves along the turret aperture. While the rubber flaps tend to push inwardly under high air flow pressures, they are backed up by the closed slide fasteners and hence held against collapse.

It will be seen from the above description that the present invention provides an improved closure of the slide fastener type for the gun barrel aperture of a machine gun turret. Such a closure insures that the aperture is at all times maintained closed both above and below the machine gun barrel, regardless of its position or inclination of the aperture. Moreover, a closure as described is unaffected by the high air flow pressures incident to the high speed of the plane on which the turret is mounted and thus provides protection to the gunner from the blast of air otherwise entering the turret or from inclement weather, regardless of the speed of the plane. It is a further important feature of the invention that the slide fastener assembly is adapted for operation by the gun barrel and thus opens and closes as required in response to movement of the barrel.

While in the foregoing description and drawing the invention has been described in its application to the closing of the gun barrel aperture of a turret along which a projecting gun barrel is to be freely movable, it will be understood that the invention has wider application to the closing of any slot-like aperture through which a member projects and along which the member is movable.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that a matter contained in the above description and shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A closure for a slot-like aperture through which projects a member mounted for free movement therealong, comprising, in combination with said member, a slide fastener closure for said aperture arranged to provide a shiftable opening for said member, and a supplementary closure arranged in a plane to the front of and closed adjacent the first closure whereby the latter provides a backing for the supplementary closure said supplementary closure comprising flexible closure flaps whose free edges are disposed in overlapping relation and are unsecured whereby the flaps may open about the member.

2. A closure for the slot-like gun barrel aperture of a machine gun turret comprising, in combination with a gun barrel arranged to project through said aperture, a slide fastener closure arranged to maintain the aperture closed about the barrel both during movement thereof and when the barrel is at rest, and a supplementary closure for said aperture arranged outwardly of said slide fastener closure and positioned so as to be backed up by the latter when subjected to air flow pressures, said supplementary closure comprising closure flaps whose free edges are disposed in overlapping relation and are unsecured whereby the flaps may flex as required to provide an opening about the gun barrel.

3. A closure for a slot-like gun barrel aperture of a gun turret comprising, in combination with a gun barrel arranged to project through said aperture, two slide fasteners arranged one in front of the other, of which one fastener is adapted to effect a closure of the aperture portion above and the other adapted to effect a closure of the aperture portion below the gun barrel, a carriage movable with the gun barrel and being provided with an opening through which the gun barrel extends, means for guiding the carriage along the aperture and a slider for each fastener mounted on said carriage, said sliders being oppositely arranged.

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