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GUN CARRIAGE FOR TURRET GUN SLOT CLOSURES

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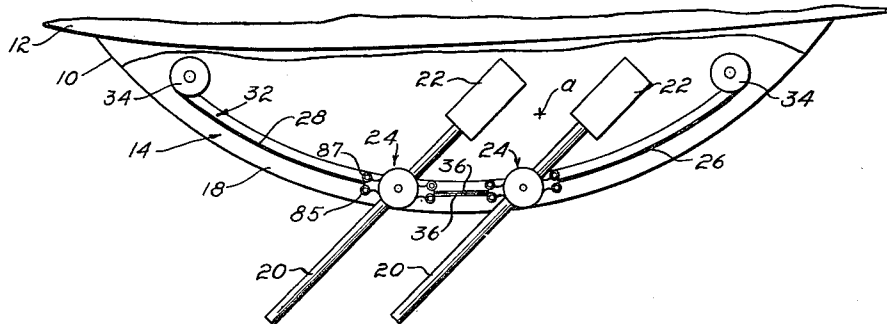


Fig. 1

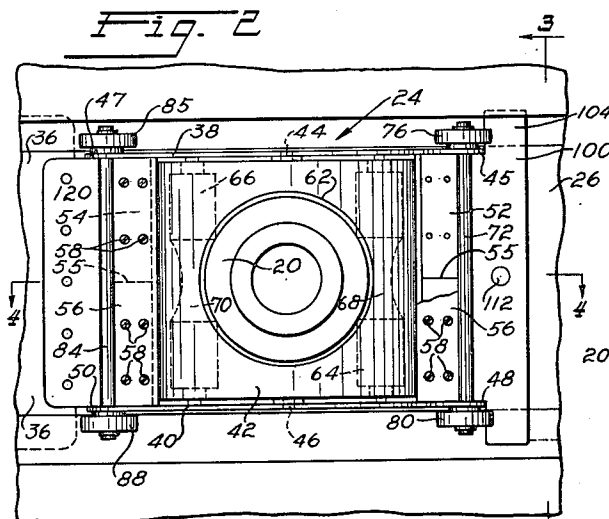


Fig. 2

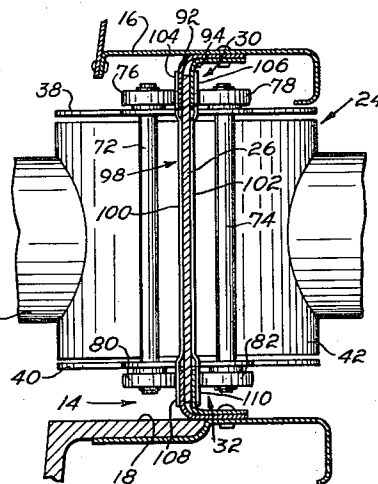


Fig. 3

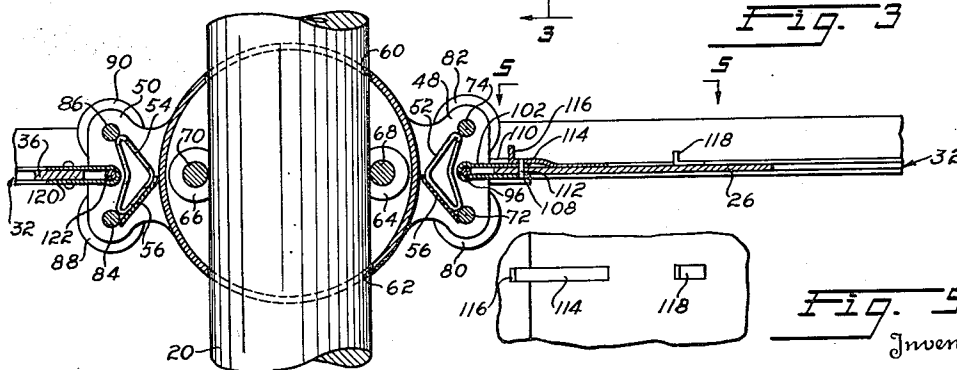


Fig. 4

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GUN CARRIAGE FOR TURRET GUN
SLOT CLOSURES

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3 Claims. (Cl. 89—36)

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This invention relates to closures for gun slots of turrets and the like and more particularly to a new and improved type of closure which is adapted to be moved with the gun as the latter is moved for aiming, and which closure is adapted to prevent the entrance into the turret, of wind, rain, snow, dirt, etc.

It has heretofore been proposed to provide a gun slot in the wall of a turret structure, such as those utilized on aircraft, for example, through which the gun is projected, the construction being such that the gun moves from one end of the slot to the other, as it swivels about a pivotal mounting within the turret. It is highly desirable in such types of installations to provide a slot closure carriage cooperating with the gun together with some arrangement for completely closing the slot during movement of the gun and carriage, in order to prevent the entrance into the turret of wind, snow, rain, dirt, etc. Devices for this purpose, heretofore utilized have not been entirely satisfactory since they have not allowed free and easy movement of the gun under all conditions, and especially where the friction, due to wind pressure and air load is high.

It is accordingly one of the objects of the present invention to provide a gun slot closure embodying a novel construction and arrangement of parts, so constituted as to enable free and easy movement of the gun at all times, notwithstanding the increased loads thereon due to high wind pressure.

Another object of the invention is to provide a closure for a gun slot which is so constituted as to accommodate a plurality of guns which may be projected through the slot and which are movable in unison about a pivotal mounting within the turret.

A further object is to provide a combined carriage and gun slot closure of the above type wherein freedom of movement of the guns is secured notwithstanding that the carriages may be moved relative to each other as the guns are swiveled.

A further object is to provide in a device of the foregoing character, a novel arrangement whereby the carriages for the guns are capable of relative movement, and the closure members are so guided that the gun slot remains closed at all times.

A still further object includes the provision of a novel arrangement whereby a metal band forms a part of the closure and is readily detachable from the gun carriage, whereby the slot may be quickly opened if desired.

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Still another object is to provide a novel gun barrel receiving device or carriage for a slot closure structure of the above type, which is readily demountable.

A further object resides in the provision of a novel construction whereby the carriages for the guns and the metal bands are guided throughout their movement in the slot, in an efficient and substantially frictionless manner, whereby the gun slot closure construction offers substantially no resistance to the swiveling of the guns, thereby greatly facilitating the efficient operation of the latter.

A still further object is to provide a device of the above character which will be extremely efficient in its operation and which comprises relatively few parts, which may be economically manufactured and assembled.

Other objects and novel features of the invention will appear more fully hereinafter, from a consideration of the following detailed description when taken in connection with the accompanying drawing, which is illustrative of one form of the invention. It is to be expressly understood, however, that the drawing is for purposes of illustration only, and is not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing, wherein similar reference characters refer to like parts throughout the several views:

Fig. 1 is a fragmentary view of a portion of an airplane turret, the upper part of the turret being broken away to more clearly illustrate the gun carriages and gun-slot closure of the present invention;

Fig. 2 is a front view of one of the gun carriages, with a portion of the closure bands secured to opposite sides thereof;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2 and looking in the direction of the arrows;

Fig. 4 is a sectional view taken along lines 4—4 of Fig. 2, and

Fig. 5 is a side view of the quick-detachable connection between the closure band and the gun carriage.

Referring to the drawing, a gun-slot closure constructed in accordance with the principles of the present invention is illustrated therein as being associated with a turret 10 positioned on an aircraft 12 and projecting outwardly therefrom, the upper portion of the turret being broken away for purposes of clarification. The turret is provided with a gun slot 14 in the wall thereof

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having a top 16 and a bottom 18, and through which the barrels 20 of a pair of guns 22 are projected. The guns are adapted to be simultaneously moved by any suitable mechanism, not shown, about a common pivotal mounting α , and when so moved, the barrels may move in the slot. While two guns have been illustrated, it will be understood that the invention may be used with one or more guns, as will appear more fully hereinafter.

In order to prevent the entrance of wind, snow, rain, dirt, etc. into the turret through the gun slot, means are provided by the present invention for effecting a closure of the slot, the construction being arranged in such a manner that the closure is operative at all times regardless of movement of the guns in the slot. As shown, such closure includes a carriage 24, through which the barrels 20 of each of the guns project, opposite sides of each carriage being connected with flexible or bendable, metallic ribbons or bands 26 and 28. Each of the latter has its opposite edges guided by upper and lower tracks 30 and 32 respectively, and the free ends of the bands are associated with spring roller drums 34, mounted within the turret and adjacent each end of the slot 14. The drums 34 may be of any suitable construction and serve to wind and unwind the bands as they move along the tracks during movement of the guns. As illustrated in Fig. 1, the lower track 32 extends throughout the entire length of the slot 14, and the upper track 30 is similarly arranged, such construction ensuring a firm support for the bands.

In installations where a pair of guns are employed, as shown in Fig. 1, it will be readily appreciated that as the guns swivel about the pivot α , the carriages 24 will be moved relatively to each other. In order therefore to effectively close that portion of the slot 14 between the carriages 24 under these conditions, each of the carriages has secured to its adjacent sides, a relatively short flexible metallic tape or band 36, the bands being guided in the tracks 30 and 32 and arranged in overlapping relation. It will be understood that each band 36 is of sufficient length, that it will remain in overlapped relation with the other and close that portion of the slot between the carriages throughout the entire extent of travel of the carriages in the slot.

Each of the carriages 24 is similar in construction, and the arrangement is such that they will be guided along the tracks 30 and 32 as the guns swivel. One of the carriages 24 is illustrated in detail in Figs. 2, 3 and 4, and includes top and bottom plates 38 and 40 respectively, between which a cylindrical member 42 is positioned, the said member being rotatably mounted, as by means of stub shafts 44 and 46 projecting through suitable openings in the plates. The top plate 38 is provided with laterally extending ears 45 and 47 while the bottom plate has corresponding ears 48 and 50. As shown, hollow connecting members 52 and 54 have their opposite ends respectively secured, as by welding for example, to the ears 45, 48 and 47, 50. Each of the members 52 and 54 is preferably split intermediate its ends, as at 55, in order that the parts of the carriage may be readily assembled and disassembled, although it will be understood that they may be made in one piece if desired. The two parts of each respective member are secured together, as illustrated in Fig. 2 as by means of thin metal plates 56, the

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latter being attached to the members as by means of screws 58, and being of sufficient width as to close any space which may exist between the members 52 and 54 and the cylindrical member 42. From this construction, it will be readily perceived that when the plates 56 are secured to the two parts of each of the members 52 and 54, the carriage assembly will be rigidly held together.

The cylindrical member 42 is provided with a pair of aligned openings 60 and 62 through which the gun barrel 20 projects and the entire carriage assembly thus engages the barrel as by means of rollers 64 and 66, suitably rotatably mounted in the member 42 and having respective concave portions 68 and 70 engaging the barrel. Thus, the rollers 64 and 66 enable substantially frictionless relative movement between the carriage 24 and the barrel 20 as the gun swivels about its mounting.

In order to guide the carriage 24 along the tracks 30 and 32, a plurality of pairs of cooperating rollers are provided and preferably, such rollers are mounted on the carriage 24 in such a manner as to be readily removable therefrom. As shown, shafts 72 and 74 extend between ears 45 and 48 on opposite sides of the band 26, Fig. 3, the opposite ends of the shafts being provided with upper and lower rollers 76, 78 and 80, 82, respectively. The ears 47 and 50 likewise support a pair of shafts 84, 86 which carry upper and lower rollers 88, 90 and 92, 94 respectively. Each of the foregoing rollers is removably mounted on the respective shafts in any suitable manner, as for example, by using the well-known type of C-shaped washer adapted to engage a slot in the end of the shaft. Moreover, the rollers of each upper and lower pair respectively engage opposite sides of the tracks 30 and 32, the latter being constituted by angle strips or guides 92 and 94 between which the edges of the bands 26, 28 and 36 are received, see Fig. 3.

Means are provided for attaching the bands 26 and 28 to the carriages 24 and since such means is identical in each case, one only will be described. As shown, a shaft 96 is supported by the ears 45 and 48 and carries a clip 98, the end of the band 26 extending between walls 100 and 102 of the clip and being detachably secured thereto in a manner which will appear more fully hereinafter. The upper and lower portions of each of the walls 100 and 102 are respectively extended upwardly and downwardly and bent outwardly in order to form pairs of ears 104, 106 and 108, 110, which embrace and bear against the outer surfaces of the tracks 30 and 32.

In order to detachably connect the band 26 to the clip 98, the walls of the latter and the end of the band are provided with aligned openings through which a pin 112 is projected. The pin 112 is carried by a spring strip 114, one end of which is secured to the band in any suitable manner, and the other end of which is bent outwardly, as shown at 116 in Fig. 4. An angle piece 118 is secured to the band 26 at a distance from strip 114 such that the thumb and forefinger may be engaged with the part 116 and piece 118 and the spring strip 114 flexed in order to withdraw the pin 112 and disconnect the band 26 from the clip 100. The band will then be rolled up by the spring roller 34 and thus opens the gun slot.

In the event that only one carriage is em-

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ployed, the band 28 is connected to the opposite side of the carriage 24 in the same manner as that above described. In the construction illustrated, however, the ends of the tapes 36 are preferably connected to the adjacent sides of the carriages 24 as by being riveted or otherwise secured between the side walls of a clip 120 carried by shaft 122, although it will be understood that the detachable pin connection heretofore described with reference to clip 100 may be employed if desired.

In operation, the various parts are assembled as illustrated, the carriages 24 receiving the barrels 20 of the guns and the tracks 30 and 32 receiving the upper and lower edges of the bands 26, 28 and 36. With the rollers 76, 80, 85 and 88 contacting the outside surface of the tracks and rollers 78, 82, 87 and 90 engaging the inside surface of the tracks, it will be seen that a rigid structure is provided which may be readily moved along the gun slot with a minimum of friction. During such movement, the overlapping bands 36 shift with respect to each other in accordance with relative movement between the carriages 24. Both carriage structures are actuated by the gun barrels and it will be readily appreciated that since the cylindrical member 42 is rotatably mounted on the plates 38 and 40, and the rollers 64 and 66 are also rotatably supported on said plates, these parts of the carriage will have free and easy movement with respect to each other during movement along the slot. Hence, resistance to movement of the gun has been practically eliminated by the construction employed, so that more rapid and efficient aiming of the guns will result.

There has thus been provided by the present invention, a novel and improved gun slot closure which closes the gun slot throughout all movements of the guns and offers substantially no resistance to such movements. The provision of the overlapping bands 36 secures closing of the slot between the spaced carriages 24 notwithstanding the fact that relative movement between these carriages occurs by reason of the pivotal mounting for the guns and the shape of the turret. A further important feature resides in the demountable construction of the carriage and the use of the plates 56 secured to the members 52 and 54 for securing the assembly together and for closing any opening between the cylindrical member 42 and the members 52 and 54. The quick detachable connection afforded by the

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pin 112 is highly desirable in enabling the gunner to quickly open the gun slot, and it is to be understood that this connection may be utilized, if desired, between the ends of all of the bands and one or more carriages.

While one form of the invention has been shown and described herein, it will be readily understood that various changes may be made therein, by those skilled in the art, without departing from the spirit of the invention. Reference will therefore be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A gun carriage for a turret gun slot closure of the type in which the carriage is movable along the slot and bands are attached respectively to each side of the carriage and extend along the slot to close the same, comprising a pair of spaced connected plates, a substantially hollow cylinder rotatably mounted on said plates and disposed between them and having an opening therethrough through which the barrel of a gun is adapted to project, and a pair of rollers rotatably supported within the cylinder and adapted to engage opposite sides of the barrel.

2. A gun carriage according to claim 1 comprising, in addition, a plurality of pairs of rollers rotatably carried by said plates and adapted to engage parts of the turret to guide the movement of the carriage along the slot therein.

3. A gun carriage according to claim 1, comprising in addition ears extending from each plate laterally beyond the cylinder on each side thereof, and means connected between the ears on each side of the cylinder for attachment to one of the slot-closing bands.

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