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P. H. E. D. DE GAVARDIE
 AEROPLANE PROVIDED WITH A FIRING TURRET
 MOUNTED ON A UNIVERSAL JOINT
 Filed May 14, 1940

Serial No.
 335,122

3 Sheets—Sheet 1

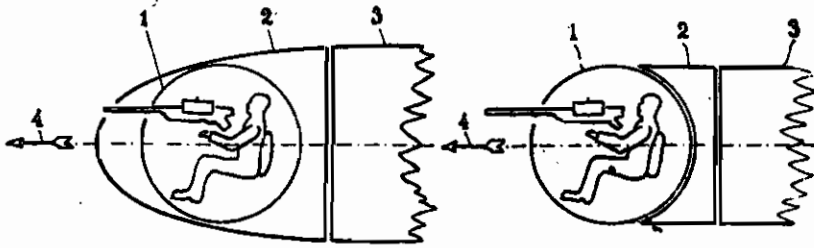


Fig. 1.

Fig. 2.

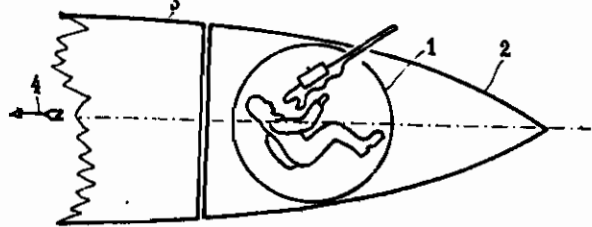


Fig. 3.

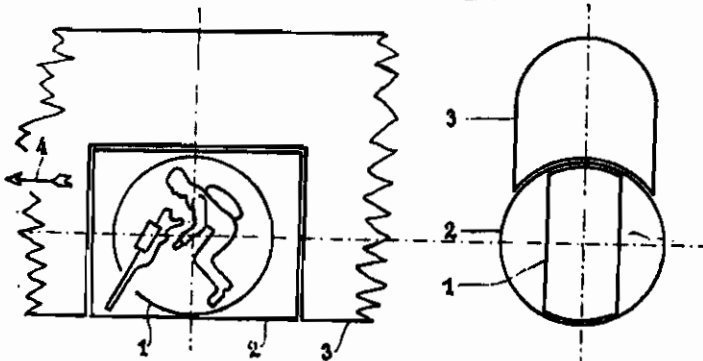


Fig. 4

Fig. 5.

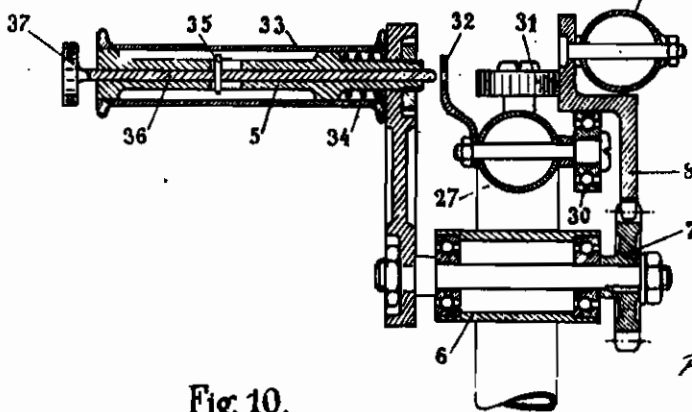


Fig. 10.

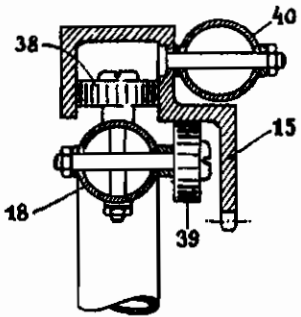


Fig. 11.

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3 Sheets-Sheet 2

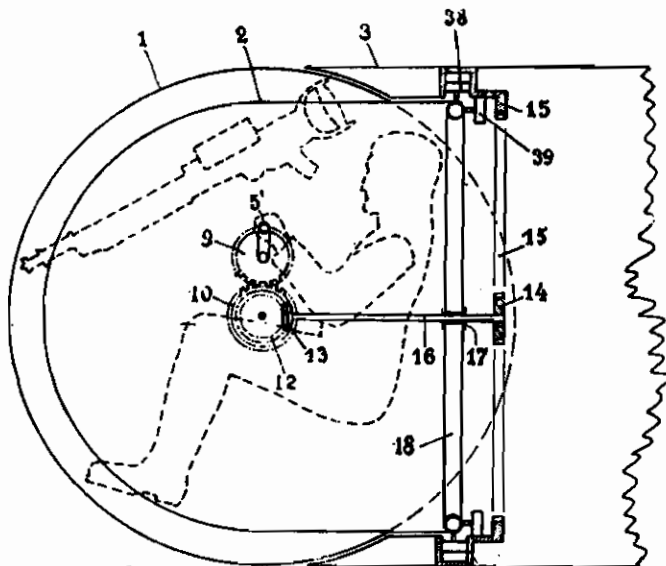


Fig. 6.

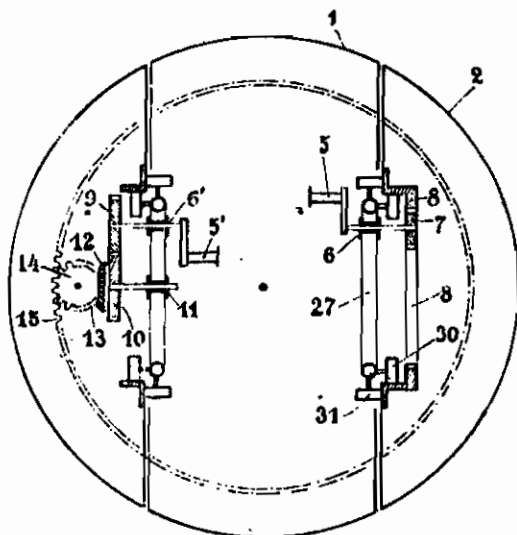


Fig. 7.

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3 Sheets—Sheet 3

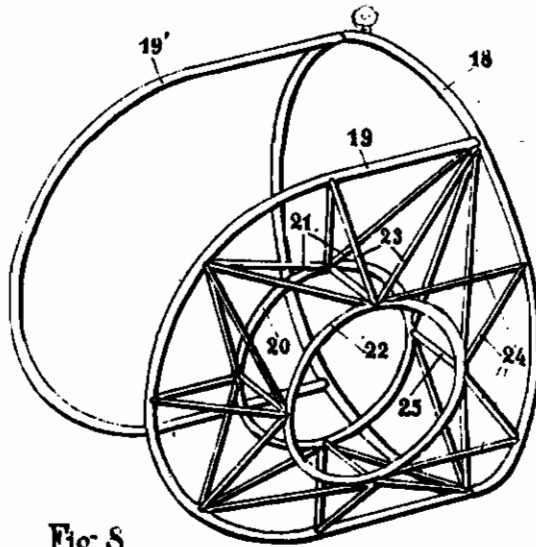


Fig. 8.

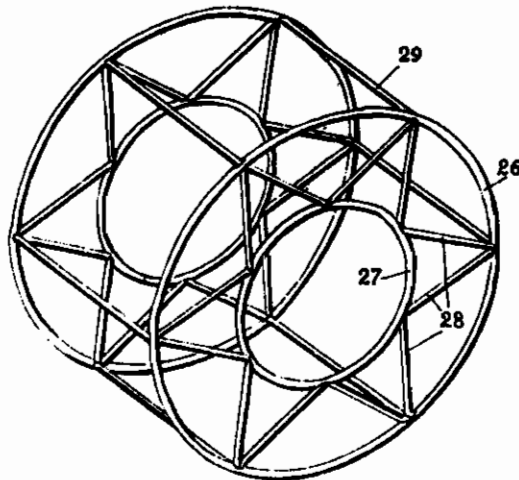


Fig. 9.

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ALIEN PROPERTY CUSTODIAN

AEROPLANE PROVIDED WITH A FIRING TURRET MOUNTED ON A UNIVERSAL JOINT

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France; vested in the Alien Property Custodian

Application filed May 14, 1940

The present invention relates to aeroplanes of the type provided with a firing turret mounted on a universal joint.

It has for its object a light and practical embodiment of such a turret and of its mounting on the aeroplane.

It is characterized by the fact that the firing chamber is formed by a squirrel cage and that said cage is rotatably mounted between two cheeks of a U-shaped support having a circular base rotatably mounted in the fuselage of the aeroplane.

By way of example, the preferred embodiment of this invention has been described hereinafter and illustrated in the accompanying drawings in which:

Figs. 1 and 2 show diagrammatically sectional elevations of two forms of construction of a turret arranged at the front of the fuselage.

Fig. 3 shows diagrammatically a sectional elevation of a turret arranged at the rear.

Figs. 4 and 4' respectively show a sectional elevation and a transverse section of a turret arranged at the centre of the fuselage.

Figs. 6 and 7 respectively show a sectional elevation and a transverse section of the turret with its suspension and controlling members.

Figs. 8 and 9 show perspective views of an embodiment of the drum or squirrel cage forming the firing chamber, and of its support.

Figs. 10 and 11 show, on a larger scale, certain details of the controlling and suspension mechanisms.

As shown diagrammatically in Figs. 1 to 5, the turret is formed by a drum 1 which forms the firing chamber and contains the gun and the gunner's seat, said drum being adapted to rotate about its axis, which is arranged transversely with respect to the aeroplane, in a support 2 which is itself adapted to rotate in the fuselage 3 about a longitudinal axis shown diagrammatically by the arrow 4 and parallel with the mean direction of flight of the aeroplane.

The turret according to the invention may be arranged at the front of the aeroplane, in which case the case 2 which surrounds and supports the squirrel-cage shaped drum 1 may, as shown in Fig. 1, be of streamline shape which extends forwards slightly beyond the drum 1. In the case of the embodiment shown in Fig. 2, the case 2 terminates at the front level with the drum 1 by two hemispherical caps which are arranged laterally on either side of the front half of the drum and merge into the contour of same so as to give the front of the fuselage a hemispherical shape

which offers a somewhat greater frontal resistance than that of the embodiment of Fig. 1, but is easier to construct. According to Fig. 3, the turret is arranged at the rear in a support 2 which tapers to a point, whereas in the case of Figs. 4 and 5, the turret is arranged at the middle of the fuselage and comprises a drum 1 mounted in a cylindrical support 2 which is held at both its ends in circular brackets secured to the fuselage 3.

As shown in Figs. 6 and 7, the control of the two rotary movements of the turret is effected by means of two cranks 5, 5' which are placed within reach of both hands of the gunner and are journaled in bearings 6, 6' secured to the drum 1 which contains the gun and the gunner's seat. The crank 5, which controls the rotation of the drum 1 about its transverse axis in the support 2, carries a pinion 7 meshing with the internal teeth of a ring gear 8 which is secured to the support 2 and is centered on the axis of the drum. The crank 5', which controls the rotation of the support 2 about the longitudinal axis of the universal joint suspension, actuates, by means of the pinions 9 and 10, a shaft 11 which is so arranged that it can rotate freely along the axis of the drum and which transmits its movement, by means of the two bevel pinions 12, 13, to a longitudinal shaft 16 which is supported in a bearing 17 secured to the support 2 and which carries at its end a pinion 14 meshing with the internal teeth of a ring gear 15 which is fixed on the fuselage and is centered on the axis of rotation of the case 2.

Figs. 8 and 9 show a particularly advantageous method of construction of the turret. The framework of the support (Fig. 8) is formed by a base circle 18 on which are fixed two lateral cheeks 19, 19' which are substantially semi-circular. Inside each cheek there is arranged a circle 20 which is fixed to the corresponding arch 19 and to the base circle 18 by means of spokes such as 21. The rigidity of the assembly is increased by the arrangement of a second circle 22 which is located in a plane parallel with the first and is connected to same by means of braces 25 and held by means of spokes 23, 24. For the sake of greater simplicity, only the two circles 20, 22 of one of the cheeks 19, 19' have been shown in the drawings. The circles, the cheeks and the braces forming this framework are preferably made of metal tubes.

The framework of the drum mounted in the support which has just been described is composed (Fig. 9) of two cheeks which are connected to each other by braces 29 and are each

formed by two concentric circles 26, 27 connected together by spokes 28.

As shown in Figs. 7 and 10, the inner circle 27 of each of the cheeks of the drum 1 carries two sets of rollers 30, 31, the first of which are mounted on spindles parallel with the axis of rotation of the drum, the others of which are mounted on radial spindles and bear against the ring gear 8 which is fixed on the support and is of Z-shaped cross-section, the peripheral part of which forms an angle and acts as the two orthogonal tracks for the two sets of rollers 30, 31, and the inner part of which is provided at its edge with the teeth with which meshes the pinion 7 of the mechanism for controlling the rotation of the drum.

Similarly, as shown in Figs. 6 and 11, the base circle 18 of the support carries two sets of rollers 38, 39 having respectively radial and longitudinal spindles, whereas the fuselage terminates in a circle 40 on which is fixed the ring gear 15, the U-shaped outer part of which acts as a track for the rollers 38, one of the sides of the U being bent over once at right angles in order to form the track for the rollers 39, then a second time to-

wards the inside of the fuselage in order to form the toothed flange with which the pinion 14 (Fig. 6) of the control mechanism meshes.

The control of the rotation of the drum 1 (or of its support) can be locked by means of the device shown in Fig. 10, which comprises a rod 36 forming a bolt which is provided with a push-button 37 and which slides with friction in the handle 5, which is apertured for this purpose, of the actuating crank. When the push-button is depressed, the free end of the rod 36 penetrates into one of the holes provided in the ring 32 which is secured to the drum, for example fixed on the circle 27, and locks the rotary movement. In order to unlock the control, there has been provided on the handle 5 of the crank a sliding sleeve 33 which is provided with a retracting spring 34 and the movement of which enables the rod 36 to be pushed back to its initial position by acting on the button 37. The stroke of the rod is limited in both directions by a pin 35 which is adapted to move in a longitudinal groove provided in the hollow handle 5.

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