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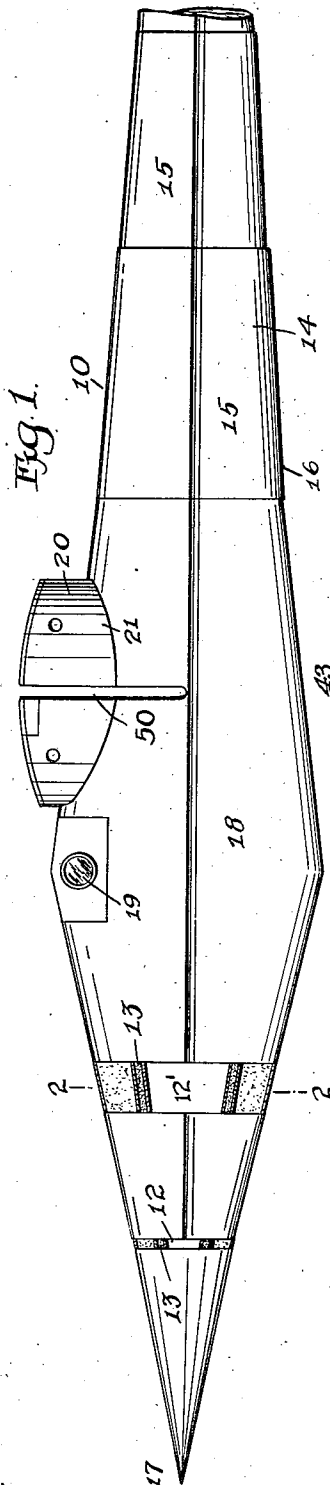
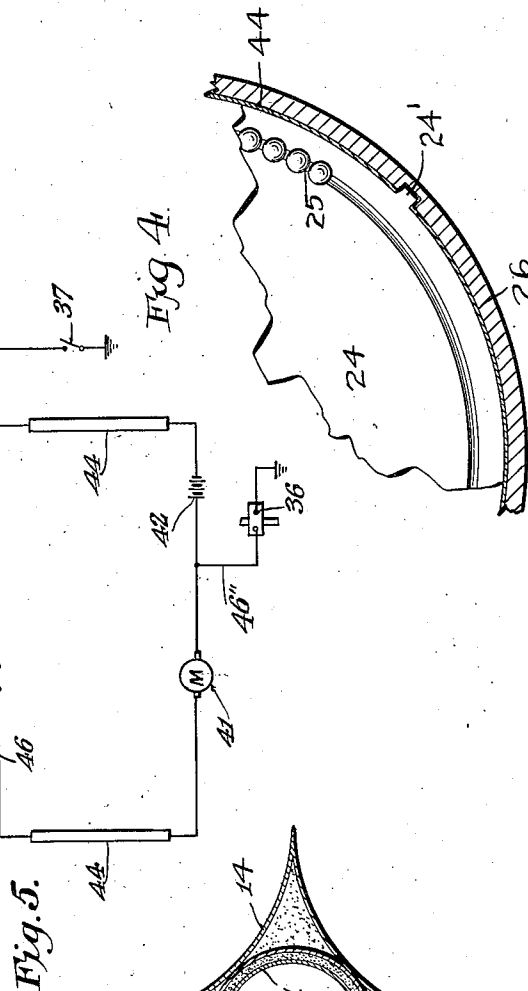
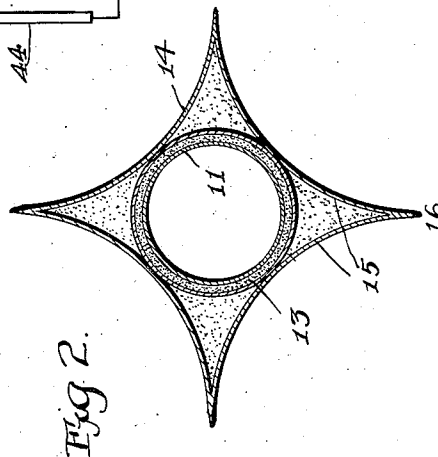
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1,481,469

BATTLE PLANE

Filed Aug. 6, 1917

2 Sheets-Sheet 1



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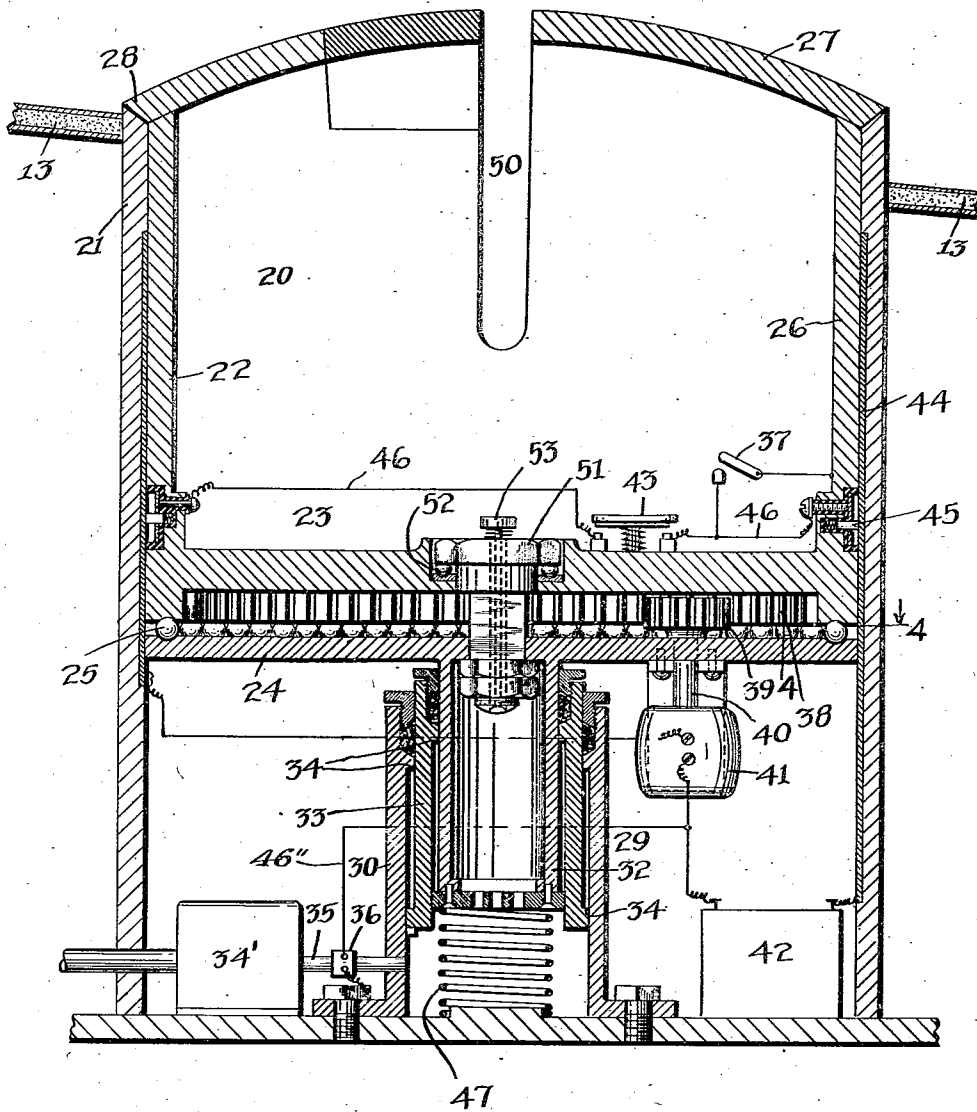
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Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY E. KRAMMER, OF NEW YORK, N. Y.

BATTLE PLANE.

Application filed August 6, 1917. Serial No. 184,604.

To all whom it may concern:

Be it known that I, HENRY E. KRAMMER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Battle Planes, of which the following is a specification.

My invention relates in general to an aeroplane construction and specifically relates to the fuselage and the gun carrying body portion of that type of aeroplane known as battle planes.

In such devices it is of course of primary importance first to protect the operator together with the vital propelling mechanisms of the machine and, to a relatively less extent, to protect the gunner and his gun from hostile rifle attack.

Accordingly, it has been known to enclose the propelling mechanism and the aviator within the fuselage outlines but to do this with the gunner and his sighting and firing arms would naturally restrict the firing area and materially restrict the offensive use of the battle plane and reduce its radius of fire control. Should the gunner and his gun be positioned exteriorly of the stream line outlines of the device, a severe head resistance to the propulsion of the battle plane would result, thus seriously affecting the speed of the machine at times when speed may be of vital importance.

Accordingly, one of the objects of the invention is to provide a simple form of battle plane which will preserve, as far as possible, the desired minimum head resistance to the machine while flight is of primary importance, and which is provided with a telescope type of gun turret arranged so as to be moved quickly out of the protecting outlines of the fuselage for the purpose of obtaining a wide firing range, even at the expense of loss of headway under those conditions when a firing action becomes of more importance than speed.

I attain this object broadly by normally confining a gun turret in part, or preferably, entirely within the outlines of a protecting fuselage and providing means for quickly elevating the turret with its gun, sighting mechanism and gunner out of the fuselage into position to operate the gun or sighting mechanism clear of any projecting aeroplane structure which might otherwise obstruct the gun or sight range.

A further object of the invention is to provide a form of outline to the fuselage which will maintain a stream line effect and at the same time tend to reflect projectiles striking the same.

I attain this object broadly by forming the fuselage of stream line plates, arranged to form a shell somewhat of conventional design from front to rear but of star-shaped form in cross-section and with the exposed outwardly facing surfaces slightly concaved and forming deflecting surfaces about the vital parts of the aeroplane.

A still further object of the invention is to provide a light form of encasing armor for protecting the vital parts of the machine disposed within the stream line outlines of the fuselage.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of mechanism embodying my invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

Figure 1 is a view in side elevation of part of a battle plane with parts such as wings and propelling mechanism omitted showing a preferred embodiment of my invention;

Figure 2 is a transverse sectional view through the fuselage and taken on the line 2-2 of Figure 1;

Figure 3 is an enlarged detailed vertical sectional view taken axially through the gun turret and in a plane parallel to the showing in Figure 1; and

Figure 4 is a fragmentary plan view of a portion of the plunger taken on the line 4-4 of Figure 3.

Fig. 5 is a wiring diagram.

In the drawings there is shown an aeroplane of conventional form with the wing structure and propelling mechanism omitted, as they form no particular part of the improvements herein described.

In the drawings there is shown a fuselage construction 10 including an internal bracing frame-work 11 formed of a plurality of ring structures 12, disposed in parallel planes and spaced apart longitudinally of the fuselage. These rings, adjacent the ends

of the fuselage, are of relatively small width but adjacent the vital parts of the machine are made relatively long to form, in effect, sleeves 12' possessing a strength sufficient to take up distorting strains. These rings are of double wall thickness as shown in Figures 1 and 2 with a packing material 13 disposed between the walls, so as to form a cushioning bed for receiving bullets or similar projectiles which might perforate the shell defining the outside of the wall and the outer shell, hereinafter described. This structure will tend to protect the navigator and the propelling mechanism and at the same time will provide a well braced support for the driving and other machine parts, usual with such devices. The internal frame-work is enclosed within a stream line shell 14 peculiarly designed, not only to present the least possible resistance to the head-long flight of the machine, but concaved in parts so as to deflect bullets and other projectiles which may strike the stream line shell. This shell is formed of plates 15 preferably of sheet metal and concaved intermediate their longitudinal edges and with the contiguous edges of the adjacent plates fastened together to form an enclosing tubular member such as the four pointed star construction in cross-section shown in Figure 2. It is obvious, however, that this showing is merely suggestive and the important feature is the concaved exterior surface of limited areas of a stream line shell. The plates are so arranged that one of the edges 16 constitute the lowermost line of the fuselage and thus provides a construction which will receive vertical hostile rifle fire practically edgewise of the fuselage construction.

The fuselage construction enlarges from the forward end 17 towards the waist 18 of the fuselage at which place is positioned the aviator and vital parts of the driving mechanism, as is usual in such constructions. The aviator is confined within the outlines of the fuselage which is provided with a sight opening 19 to permit the aviator to make observations.

Positioned directly in rear of the aviator and obviously in the large areaed portion of the fuselage is positioned a gun turret 20, so arranged that the stream line effect at the rear portion of the fuselage is maintained, as far as possible, but obviously is somewhat interrupted by the necessity of providing a relatively large gun turret to accommodate the long rifles recently mounted on aeroplanes. This gun turret is circular in internal configuration and has its outer side practically circular but preferably is slightly converging on its forward side, so as to provide, as far as possible, some stream line effect of its own.

The turret construction includes a cylin-

drical shell 21 constituting a well for containing the gun turret proper and its actuating mechanisms. This shell is preferably disposed so as to extend vertically in the aeroplane and projects but a short distance exteriorly of the outlines of the fuselage as shown in Figures 1 and 3. Slidably mounted within the shell and having a telescopically tight fit therein is a plunger 22 constituting a gun turret, designed to contain the gun, the gunner and any other mechanism usually mounted in a gun turret. The bottom of the plunger is formed of two platforms, a lower supporting platform 24 and an upper or gun platform 23, one mounted upon the other, with roller bearings 25 disposed therebetween whereby the gun platform may be rotated relative to the supporting platform 24. The supporting platform is free to move vertically in the well 21 but is held from rotating by lugs 24' projecting therefrom and working in slots recessed into the inner wall of the shell 21. The turret includes a cylindrical side wall 26 supporting a dome top 27. The dome top is outlined by a projecting flange 28 designed to fit on the bevelled top of the side wall when the parts are in telescoped position, as shown in Figure 3. By providing a snug fit between the plunger and the well shell containing the same, the gun platform is steadied relative to the fuselage construction and is thus substantially free of any shaking or jarring movement independent of the fuselage.

The turret is raised by means of a pneumatic jack 29 preferably of some quick acting type. This jack includes an outer pressure cylinder 30 and a plunger 32, depending from and rigidly fixed to the supporting platform 24 adjacent its center and working in the cylinder 30. While it is obvious that the plunger 32 may fit snugly within the cylinder 30, it is desirable in such devices to provide for a relatively long rising movement of the plunger and at the same time provide a compact form of pneumatic jack. For this reason an intermediate telescopic cylinder 33 is positioned between the cylinder 30 and plunger 32 so that the plunger may telescope within the intermediate cylinder 33 and the collapsed plunger and intermediate cylinder may both be substantially contained within the outer cylinder 30. Suitable stops 34 are provided to prevent the separation of the plunger and cylinders from each other as is usual with multiple cylinder pneumatic jacks. A reservoir 34' of compressed air is connected through the piping 35 with the cylinder 30 to supply the lifting power to the jack. An electromagnetically actuated valve 36 of any conventional form is positioned in the piping 35 to control the flow therethrough. This valve in turn is controlled by a circuit

closing switch 37 of any conventional form disposed convenient to the operator in the turret and is connected electrically to the valve 36 by conductors, hereinafter described in connection with the motor circuit for revolving the gun platform.

For the purpose of rotating the gun platform, and with it the turret walls and dome top construction, an internal gear 38 depends from the gun platform and constitutes the upper bearing for the rollers. The teeth of the gear are permanently in mesh with a pinion 39 carried on the armature shaft 40 of a motor 41 suspended from the underside of the supporting platform 24. The motor is supplied from a source of electric energy represented by a battery 42 contained in the space within the well and below the plunger. The motor is operatively connected so as to be controlled by a switch 43 positioned on the floor of the gun platform and convenient to the gun operator. This battery may also be utilized for supplying the energy to actuate the control valve 36 for controlling the flow of pneumatic power which effects rising movement of the gun turret.

For the purpose of maintaining an electric circuit between the switch 43 on the movable platform 23 and the relatively fixed battery while the platform is being elevated or depressed and while the same is rotated into any position, the inner side of the well is lined with a conducting lining 44 preferably in the form of spaced apart strips insulated from the wall of the well and which are shown extending vertically of the well to constitute conductors as shown. The conductors are continuously engaged by spring pressed plungers 45 carried by the turret and connected electrically with the switch 43 by means of conductors 46. Incidentally the metal shell 44 assists in protecting the gunner against projectiles which might penetrate the well shell and the turret wall. The circuit for the valve 36 comprises the battery 42, strip 44, plunger 45, conductor 46, switch 37, loose cable conductor 46', and return wire 46'' to battery. The plungers are wide enough to extend across the gap between two strips.

A strong spring 47 is positioned within the cylinder 40 and below the plunger so as to cushion the fall of the plunger and thus eliminate, as far as possible, shocks upon the fuselage when the gun turret is quickly dropped into its concealed position within the fuselage. It is understood, however, that when the turret is in its raised position supported by the compressed air in the pneumatic jack, this air will constitute a cushioning bed adapted to absorb shocks on the turret, such for instance as would be caused by the recoil of the gun. The wall

and dome top of the gun turret is provided with an opening 50 arranged to permit the protrusion of the gun when in firing position. In order to maintain a pivotal connection between the platforms, they may be connected centrally by means of a king pin 51, journaled in a roller bearing housing 52. This pin may also be formed into a release valve for reducing the pneumatic pressure in the jack in case it is desired to lower the turret. This release valve is normally held in closed position by a spring pressed pedal 53 positioned convenient to the operator.

In operation, it will be understood that normally the gun turret is in the collapsed position shown in Figures 1 and 3 so that the aeroplane may maintain its head-long flight practically free of any material resistance presented by the turret. While the projecting portion of the well structure necessarily offers some resistance, this resistance has been reduced to a minimum. The outlines are preferably stream lined, so as to reduce as far as possible, any resistance which may be offered by the portion of the well structure projecting beyond the outlines of the fuselage.

As the machine will ordinarily be in the position shown in Figure 1 while in flight, there will be presented a bottom pair of concaved reflecting surfaces to any possible hostile rifle fire from below the aeroplane. Ordinarily these reflecting surfaces which will preferably be formed of steel plate, will tend to reflect any projectiles which may strike the same and the curved sides of the turret will also tend to reflect any projectile which might strike the same. Even if a projectile should penetrate the curved surface of the outer shell, there is a material possibility that the projectile, even if it should penetrate the outer shell of the internal reinforcement, will be eventually stopped by the loose filling material between the two inner walls of the internal bracing. As the space between the internal structure and the outer shell may also be filled with a packing material, projectiles are almost sure to be stopped if they penetrate the shell adjacent the edges of its forming plates.

Should it be desired to operate the gun, the gunner closes the switch 37 until he has obtained the desired elevation of the turret, at which time he moves the switch into such a position as to shut off the supply of compressed fluid to the pneumatic jack and thus lock the jack and its turret in their elevated position. Should he then desire to swing the turret angularly about its center as an axis, he closes the switch 43 which causes the motor to turn the platform 24 thereby to obtain the desired angular posi-

tion of the gun. By suitably manipulating the two switches the gun can be maintained trained on its objective.

It is possible by means of the device disclosed to elevate and depress the turret during intermission in firing so that the device will act substantially as a disappearing gun. When collapsed within the fuselage the turret is protected thereby from hostile rifle fire, so that it is only necessary to expose the turret when it is desired to actually maintain a period of firing activity. A turret actuated in the manner described will have but little deteriorating effect upon the control of the battle plane and adds but little to the dead weight usually carried by such machines.

Primarily it provides a gun turret which, normally, will not interfere with the speed features of the aeroplane and yet at the same time can provide a wide angle of effective rifle range when elevated.

Variations within the spirit and scope of my invention are fully comprehended by the foregoing disclosure.

Having thus described my invention, I claim:

1. In an aeroplane, a fuselage including an internal bracing formed of a plurality of rings disposed in parallel planes and spaced apart longitudinally of the fuselage, a plurality of plates extending lengthwise of the fuselage and forming an enclosing structure surrounding the rings, said plates being each concaved and joined along adjacent edges in order to form a structure star-shaped in cross-section.

2. In an aeroplane, a fuselage including an internal bracing formed of a plurality of rings disposed in parallel planes and spaced apart longitudinally of the fuselage, a plurality of plates extending lengthwise of the fuselage and forming an enclosing structure surrounding the rings, said plates being each concaved and joined along adjacent edges in order to form a structure star-shaped in cross-section, certain of said rings being doubled walled with a packing filling the space between the walls.

3. In an aeroplane, a fuselage including an internal bracing formed of a plurality of rings disposed in parallel planes and spaced apart longitudinally of the fuselage, a plurality of plates extending lengthwise of the fuselage and forming an enclosing structure surrounding the rings, said plates being each concaved and joined along adjacent edges in order to form a structure star-shaped in cross-section, certain of said rings being doubled walled with a packing filling the space between the walls, the space within the rings constituting a compartment adapted to contain and protect certain elements of the aeroplane.

4. In an aeroplane, a fuselage including an internal structure and an outer shell braced in position by said structure, said outer shell formed of concave plates co-acting to form the shell star-shape in cross-section.

5. In an aeroplane, a fuselage including an internal structure, and an outer shell braced in position by said structure, said outer shell formed of concave plates co-acting to form the shell star-shape in cross-section, said plates extending longitudinally of the fuselage to form a stream line effect.

6. In an aeroplane, a fuselage including an internal structure and an outer shell braced in position by said structure, said outer shell formed of concave plates co-acting to form the shell star-shape in cross-section, said plates extending longitudinally of the fuselage to form a stream line effect, said plates being concaved and adapted to reflect projectiles striking the same.

7. In an aeroplane, the combination of a fuselage having a stream line effect and a turret carried by said fuselage adjacent its widest portion and having its forward portion slightly converging and normally disposed to offer a relatively small head resistance to the propulsion of the aeroplane and means for projecting the turret for a relatively great distance beyond the outlines of the stream line fuselage thereby to give the turret a relatively wide firing range clear of the fuselage.

8. In an aeroplane, the combination of a fuselage having a stream line effect and a turret carried by said fuselage and normally disposed to offer a relatively small head resistance to the propulsion of the aeroplane, means for projecting the turret for a relatively great distance beyond the outlines of the stream line fuselage thereby to give the turret a relatively wide firing range clear of the fuselage and minimizing the disturbing effect on the aeroplane incidental to the movement of the turret into its normal collapsed position in the fuselage.

9. In an aeroplane, the combination of a fuselage provided with a turret well, a turret telescopically mounted in said well, means engaging the turret for lifting the upper part of the same clear of the well and fuselage, said turret being free to fall back into the fuselage when the lifting means becomes inoperative and cushioning means for easing the fall of said turret thereby to minimize the effect of shock on the aeroplane while in flight.

10. In an aeroplane, the combination of a fuselage provided with a turret well substantially confined within the outlines of the fuselage, a plunger fitted in said well for telescopic movement therein, a lifting mechanism for the plunger mounted in said

well below the plunger, said plunger constituting a gun platform and means within the well and below the plunger for revolving said platform.

11. In an aeroplane, the combination of a cylindrical well having conducting material on the inside thereof, a plunger fitted in said well for telescopic movement, said plunger including a revolving platform, a motor carried by the plunger and operatively connected to the platform to revolve the same, a switch mounted on the revolving platform for controlling the motor and electric conductors including a sliding contact with said conducting material for electrically connecting said switch and motor.

12. In an aeroplane, a cylindrical well having conducting material on the inside thereof, a plunger fitted in said well for telescopic movement, means contained within the well for lifting said plunger to bring the upper portion thereof clear of the well, said plunger including a revolving platform, a motor carried by the plunger and operatively connected to the platform to revolve the same, a switch for controlling the motor and electric conductors including a sliding contact with said conducting material for electrically connecting said switch and motor.

13. In an aeroplane, the combination of a fuselage, a well within the fuselage, means for protecting the well against hostile rifle fire, a turret including a gun platform fitted within the well and a top, said top provided with an opening for permitting the protrusion of a gun, means for elevating the platform into a firing position and means for revolving the platform.

14. In an aeroplane, the combination of a fuselage, a well within the fuselage, a gun platform fitted within the well, a side wall surrounding said platform, said wall and said fuselage provided with an opening for permitting the protrusion of a gun when the platform is in lowered position, means for elevating the platform and wall into an upper firing position, means for revolving the platform while in its lowered position, and a manually actuated control on the platform for regulating the revolving means.

15. In an aeroplane, the combination of a fuselage, a well within the fuselage, means for protecting the well against hostile rifle fire, a turret including a gun platform fitted within the well and having a top provided with an opening for a rifle, means for elevating the platform into an upper firing position, means for revolving the platform while in both an upper and a lower position, and manually actuated control means on the platform operatively connected to said elevating means and to said revolving means thereby to control the position of the turret relative to the fuselage and permit the

firing of the gun at an objective above the aeroplane while the turret is protected by the fuselage.

16. In an aeroplane, the combination of a well, a plunger mounted in the well for vertical movement and fitted therein to maintain the plunger steady relative to the aeroplane in all positions of the aeroplane, said plunger including a top platform mounted to revolve and adapted to constitute a gun platform and a supporting platform fixed against rotary movement and means for controlling the movements of said gun platform.

17. In an aeroplane, a closed fuselage including a pair of concentrically disposed shells circular in cross section and providing a space within their outline for accommodating the aviator and parts of the driving mechanism of the aeroplane an outer star shaped shell, and packing positioned between said pair of concentrically disposed shells and the outer star shaped shell adapted to intercept projectiles which might penetrate said shell.

18. In an aeroplane, a fuselage, a well mounted in said fuselage, a metallic member outlining the inner wall of said well, a gun turret mounted in said well and movable relative thereto, electrically actuated means for moving said turret, a control switch carried by the movable turret, a resilient contact carried by the turret, permanently in bearing engagement with said metallic outlining member, conductors connecting said switch with said resilient contact and other conductors connecting said metallic outlining member with said electrically actuated means.

19. In an aeroplane, a fuselage, a well mounted in said fuselage, a plurality of metallic members outlining the inner wall of said well, a gun turret mounted in said well and movable relative thereto, electrically actuated means including said metallic members for moving said turret and means controlled from the movable turret in any position thereof for controlling said electrically actuated means.

20. An aircraft whose fuselage is provided with circularly disposed packing, and concaved armor extended from the packing in star-like, cross-sectional contour.

21. An aircraft having a gun containing covered compartment provided with a vertical slot which extends through its walls and across its cover, to permit angling of the gun therethrough.

22. A craft having a turret provided with a slot through its walls and across its top to permit angling of a contained gun.

Signed at New York city, in the county of New York and State of New York, this 3rd day of August, A. D. 1917.

HENRY E. KRAMMER.