

W. R. BOWKER.

AERONAUTICAL APPLIANCE FOR TRANSPORTING AND FIRING EXPLOSIVES.

APPLICATION FILED JAN. 6, 1921.

1,400,261.

Patented Dec. 13, 1921.

3 SHEETS—SHEET 1.

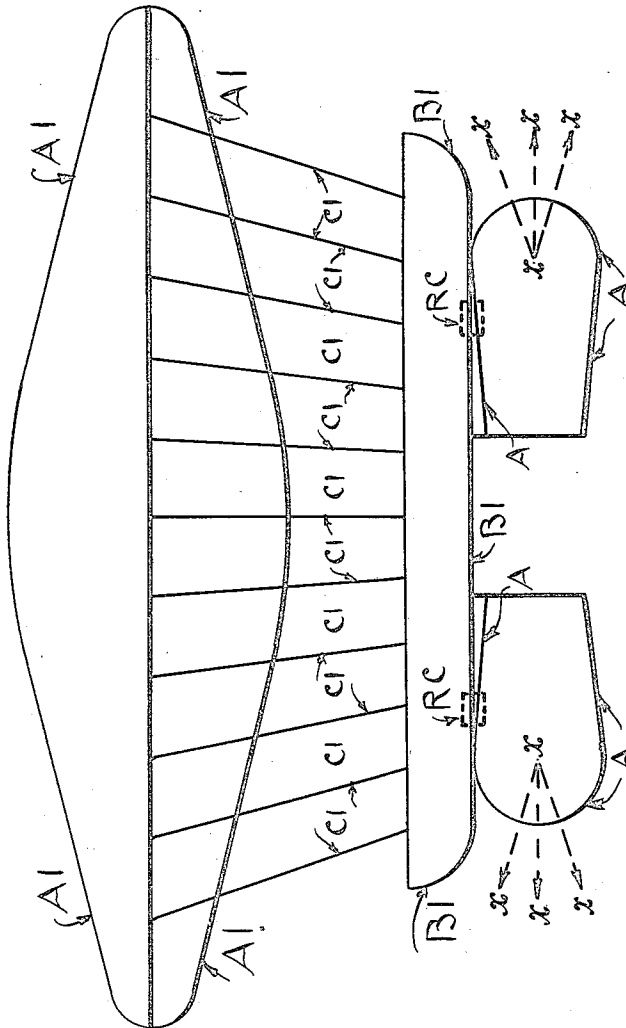


Fig. 1

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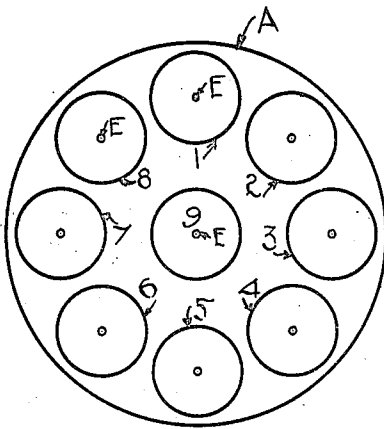


Fig. 2

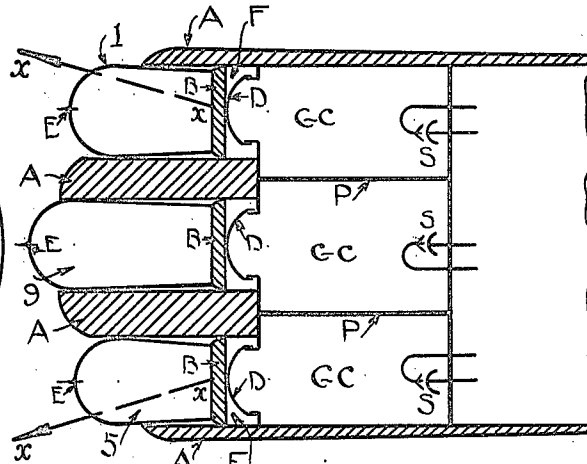


Fig. 3

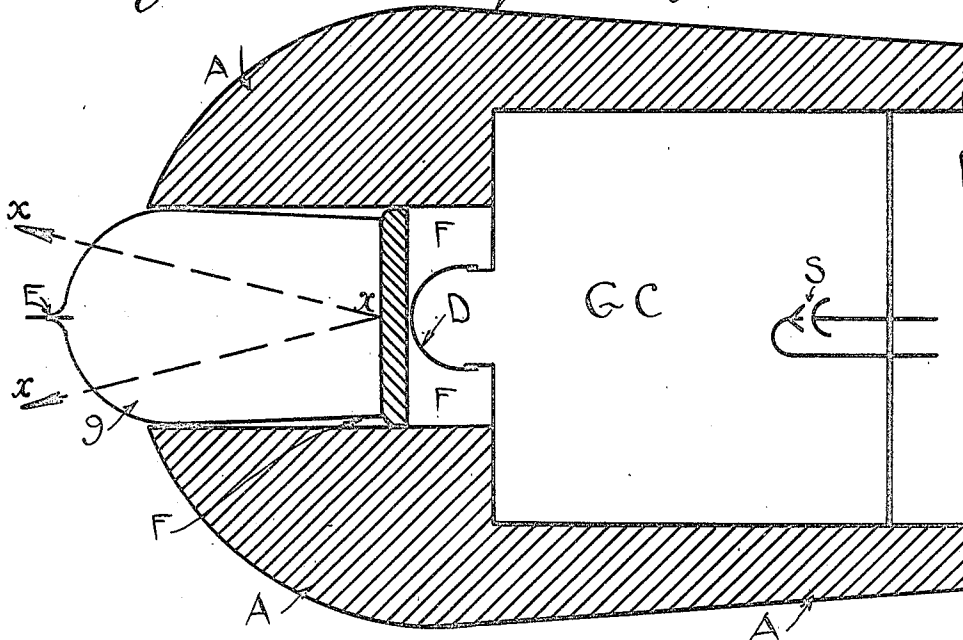


Fig. 4

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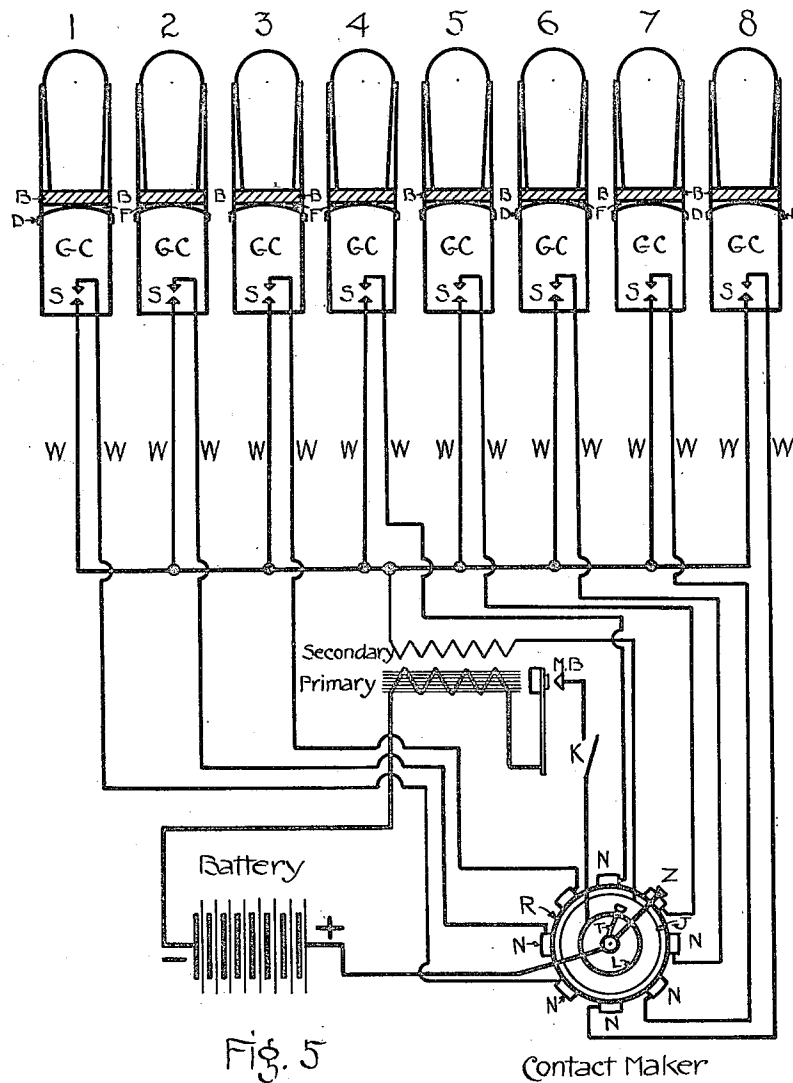
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UNITED STATES PATENT OFFICE.

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AERONAUTICAL APPLIANCE FOR TRANSPORTING AND FIRING EXPLOSIVES.

1,400,261.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM RUSHTON BOWKER, a citizen of the United States, residing at Coronado, in the county of San Diego, State of California, have invented a new and useful Aeronautical Appliance for Transporting and Firing Explosives, of which the following is a specification.

My invention relates to improvements in the destructiveness of aeronautical warfare apparatus by utilizing very powerful explosive charges contained in suitable containers or receptacles and transported by aeronautical appliances, such as hydro-aeroplanes, monoplanes, biplanes, aeroplanes, observation balloons, captive balloons, dirigible air-craft, airships, flying machines and air-craft in general.

The air-craft at present in use are utilized in warfare for observation and signaling purposes and also to transport guns, bombs, explosive charges and a single aerial torpedo, the object of these appliances being devices to cause destruction when exploded close to or in contact with the object to be damaged or destroyed.

The object of my invention is to increase both the efficiency and destructiveness of said aeronautical appliances and explosive devices by providing the said transporting air-craft appliances with one or a plurality of detachable explosive chambers, containers, receptacles, or vessels, aerial torpedoes or suitable marine torpedoes which can be automatically released either simultaneously or at short intervals of time by means of gas pressure or compressed air of sufficient power to impart to the ejected explosive container a sufficient motive power or momentum for the said explosive vessel, receptacle, aerial torpedo, or marine torpedo to continue its journey to the object of destruction after having been ejected, released or fired from the aeronautical transport appliance.

The purpose of the aeronautical appliance is to transport one or a plurality of explosive containers or receptacles, aerial torpedoes or marine torpedoes along only a part of the intervening space that lies between the object to be destroyed and the said aeronautical appliance, so that the said air-craft can be controlled and operated to travel or continue in the air or on the surface of the water, and keep at a safe distance from enemy apparatus or appliances that desire to destroy or damage the said aeronautical ap-

pliance, which can be refitted or recharged with additional detachable explosive containers, receptacles, or vessels, or aerial or marine torpedoes, and so provide for efficient service and operation, the said aeronautical appliances being utilized many times for transporting and releasing the said detachable explosive container or containers, the said aeronautical appliance not being destroyed or lost when in warfare action, thus increasing its efficiency as an appliance of destructiveness for war purposes.

The object of the invention is to increase the efficiency and destructiveness of aeronautical appliances and to provide said hydro-aeroplanes, monoplanes, biplanes, aeroplanes, observation balloons, dirigible air-craft, flying machines and air-craft in general with one or a plurality of detachable explosive vessels or containers, aerial torpedoes or marine torpedoes, which can be ejected, fired or released so as to increase several fold the chance of hitting or striking the object to be destroyed, because the said explosive containers or agents can be set along the axis at different angular degree displacements in relation to the main axis of the aeronautical appliance so that said detachable explosive containers or aerial or marine torpedoes can fan or spread out and travel in divergent directions toward the target, or object to be hit, damaged or destroyed.

I attain these objects by the apparatus, appliances, mechanism, devices or contrivance shown in the accompanying drawings in which Figure 1 is an outline diagram of the air-craft. Fig. 2 is an end view of the multiple torpedo. Fig. 3 is a longitudinal cross section showing the torpedo head or nose and three of the detachable explosive containers. Fig. 4 is an enlarged longitudinal view in section showing one of the detachable explosive containers, its gas chamber and torpedo nose or head. Fig. 5 is a schematic diagram showing the plurality of detachable explosive containers and their sealed gas chambers with sparking devices and electrical circuits.

Similar letters and numerals refer to similar parts throughout the several views. Referring to Fig. 1, A¹ is the balloon or buoyancy vessel of the air-craft, B¹ the suspended car, C¹ the suspension frame or fuselage and A the multiple torpedo appliance. In Figs. 1—2—3 and 4 A represents the nose or

war head of the multiple torpedo appliance. In Fig. 2, Nos. 1—2—3—4—5—6—7—8 and 9 represent nine detachable explosive vessels, chambers, receptacles, containers, aerial torpedoes or marine torpedoes, and 9 in Fig. 4 represents one of the nine multiple explosive containers, aerial or marine torpedoes; and in Fig. 5 Nos. 1—2—3—4—5—6—7 and 8 represent a plurality of eight of the nine explosive vessels, containers, or aerial or marine torpedoes.

In Figs. 3—4 and 5 GC represent the gas chambers, and S the spark gaps of said gas chambers which are provided with renewable sealed gas tight puncture caps D, or in lieu thereof with opening and closing valves. In Fig. 3 P represents the partition which separates the multiple gas chambers GC so that each acts independently from the others. The dotted lines XX in Fig. 1 and along 1 and 5 in Fig. 3, and along 9 in Fig. 4 represent axis along which the several explosive containers, aerial or marine torpedoes may be set or assembled at desirable angular displacements so as to provide for travel along divergent paths or directions after having been ejected or forced out by the released gas pressure when ignited by the sparking device. In Figs. 3—4 and 5, F represents a vacant space between the base or rear end of the explosive containers or torpedoes and the gas exit end of the gas chambers. In Figs. 3—4 and 5, B represents a leather or metal washer or piston ring which permits of free movement and guidance in the cylindrical bore or space that retains the assembled explosive containers or torpedoes; previous to being fired, ejected or released by gas pressure from the transporting body of the aeronautical appliance. In Figs. 3—4 and 5, E represents the percussion, firing or detonating cap or device which explodes the charge when it hits or strikes any object.

In Fig. 5 primary and secondary represent the primary and secondary windings of an induction or spark coil supplied with electrical energy derived from a battery. In lieu of this a "magneto" sparking device can be utilized if it is more convenient, reliable or efficient. W are the wires that form the conducting path so as to complete the electrical circuit for sparking purposes. MB is the make and break of the induction or spark coil and K is an opening or closing switch in the primary circuit. The contact maker is provided along its periphery or circumference with multiple contact N, each one of which is connected in the secondary circuit to one of the terminals of the spark plug S, located in the gas ignition chamber GC. A contact arm or finger Z rotates around the contact maker and engages successively into metallic contact with each of the multiple contacts N, closing the sparking gaps of the secondary circuits by metallic

contact with the terminal annular ring J to which one end of the secondary circuit is connected, and the multiple contacts N supported on an insulating ring R. The said contact lever or arm Z is entirely insulated from every part of the contact maker excepting that it makes a permanent continuous metallic sliding contact with terminal ring J and an intermittent contact with terminals N, the said lever or arm Z being rotated at a pre-determined rate of speed by means of a clock mechanism the combination forming what is technically called a "time contactor." The annular metallic ring L is connected in the primary circuit which includes the battery, induction coil primary, key K and the contact arm or lever T which is metallically connected to one of the battery terminals, which contact arm T and metallic ring L completes the primary circuit connections; the said contact arm T being insulated from all and every part of the contact maker excepting the battery terminal and the annular metallic ring L with which it makes a continuous sliding contact, the said contact lever or arm T, being rotated simultaneously with contact arm Z by means of the clock mechanism. If it is desired to fire or release all the explosive charges simultaneously the contact maker as shown in Fig. 5 can be simplified by substituting an annular terminal ring to replace the contact studs or terminals N and by substituting a common return wire from one side of all the spark plug terminals to replace the several separate and distinct circuit lines or wires that connect to each separate multiple contact post stud or terminal N.

As previously herein stated a "magneto" sparking device can be substituted in lieu of the induction coil and battery combination, the choice of either being determined by operating conditions such as reliability, efficiency, and simplicity. In lieu of the automatic control and operation of the "time contactor" combination, a simple arrangement of hand operated switches can be substituted, so as to be controlled and operated by the human factor, the choice of which arrangement is determined by operative conditions such as efficiency, reliability, etc., and furthermore if desirable and essential the two arrangements can be utilized namely: the said "automatic time contactor" combination, and the "human factor" hand controlled and operated combination, it merely being a simple problem to interchange from one combination to the other by switching the electrical circuit connections, the combination of both methods having the advantage of providing for continuity of service and emergency by means of a change-over-switch, with the ideal object of "efficiency."

Referring to Figs. 1—3—4, the lines XX

represent the setting of the axis of the detachable torpedoes or explosive charges at different angular degree displacements, which may be an angular deflection in either a horizontal or vertical plane as compared with the main axis of the air-craft. In the typical instance shown in Fig. 1, there are two separate and independent multiple chamber torpedo appliances, one "forward" and one "after" so as to provide for the firing or releasing of the explosive charges either when traveling toward or away from any object. Obviously the two said separate distinct and independent torpedo appliances can be merged into one combination appliance capable of firing or releasing the multiple explosive charges either in a straight line of direction "fore" and "aft" or at suitable controllable pre-determined and adjustable angular degree deflections in either a vertical or horizontal plane or both.

With the object of providing for greater flexibility of action and thus attain greater efficiency, the said multiple torpedo appliance A can be efficiently supported and assembled in relation to the suspended car B which transports it so that it can be rotated in a horizontal plane similar to a turn table by means of a rotating device RC; the center of rotation being preferably in the center of the assembled mass of the torpedo appliance unit; so as to minimize stresses and strains due to any unbalanced leverage weight, the said rotating device RC may be one of a simple, positive action such as gear wheels, sprocket and chain, or rotating lever considered as mechanically operated; or an electric motor rotating device if electrical operation is desired; the object of said increased flexibility of service being due to the fact that rotation through or around a part or whole of a 360 circular degree movement in a horizontal plane provides for a broadside "salvo" of the fired or released explosive charges as well as for an end on "fore" and "aft" firing; and also permits of the firing or releasing of explosives at any desired horizontal plane angular degree deflection throughout a 360 circular degree movement. In addition to this the explosive charges or torpedoes can be released or fired from divergent directions in the vertical plane as hereinbefore stated; the chief idea in view being to provide for maximum flexibility and efficiency of service.

The multiple torpedo in action can be considered from two practically operated view points, one of which is to fire or release the detachable explosive charge or torpedo as a "projectile;" propelled by the great energy due to an ignited gas explosion taking place in the gas chambers, which imparts a sufficient motive power to the torpedo to provide the necessary essential momentum for it to carry or travel along its path of de-

struction to the object to be destroyed; or secondly, to utilize the said multiple torpedo appliance simply as an efficient transport and provide an ejecting or releasing force or pressure sufficient only to release the detachable explosive charges or torpedoes from said multiple transporting receptacles; which said explosive charges or torpedoes would be of such a type as to be capable of traveling by a momentum created by some energy or motive power carried in its own tangible assembly, such for instance as compressed air or carbonic acid gas that would be released from itself after it had been fired or detached from the multiple torpedo appliance; in which case the said multiple torpedo appliance would be considered in operation as being a transporting and releasing device in contra-distinction to the aforesaid first case; in which, from a practical operative view point the said multiple torpedo appliance would function both as a transporting agent as well as a propelling agent for projectile purposes. Obviously the said multiple torpedo appliance can be utilized to perform both functions either separately or in combination, namely either as a transport "projectile device" or as a transport "releasing device," in which latter case the detachable "self propelled" explosive charge could be released either by gas pressure or compressed air, the choice of which would be determined by practical operative conditions, so that the said multiple torpedo appliance can be designed, constructed and assembled either with gas explosive chambers or compressed air chambers or both, and the invention is intended to cover this broad combination both singly and collectively.

The type of detachable explosive charge or torpedo can be either the "projectile" or "self propelled" type. If of the "projectile" type the ejected torpedo whether "aerial" or "marine" would obviously have a momentum derived only from the enormous motive power imparted to it by the explosion and expansion of the gas ignited in the gas chamber by sparking devices.

If the ejected torpedo was of the "self propelled" type a comparatively small energy pressure either by gas or compressed air would release it from the transporting agent after which, whether of the "rocket," or "aerial" or "marine" torpedo type, it would be "self propelled" by mechanism operated by compressed air or carbonic acid gas. In the case of a released rocket torpedo it could be propelled by the reaction of gas escaping from the rear end of the torpedo. The said multiple torpedo appliance can be designed, constructed and assembled to transport, release, eject, fire and detach any or all of said different types of torpedo, and the intention of the invention is to provide for the control and operation in practical war-

fare of said classes, kind of types of explosive agents of destruction.

In action the multiple torpedo appliance transports the detachable plurality of explosive containers each one of which is charged with the necessary explosive material for destructive purposes. A clockwork mechanism is calibrated or set to act at a pre-determined interval of time, the function of said clockwork mechanism or time contactor being first to release and close the primary circuit key K, which closes and completes the primary circuit which causes the induction or spark coil to become energized, the primary circuit of which induces a current or energizes the secondary circuit to be successively and intermittently closed when each contact terminal or stud N becomes metallically connected with the rotating contact arm Z. A spark passes between the spark gap terminals S located in the gas chamber GC which spark ignites and explodes the gas mixture in the gas chamber. The said gas explosion results in an enormous expansive force and pressure which punctures and disrupts the cap seal D, or opens a valve; which force is free to act and press out, eject or release the explosive head, container or vessel or torpedo, imparting to it sufficient momentum to cause it to travel in a predetermined direction so as to hit or strike any desired object aimed at; which object when struck, forces into action the percussion cap or detonating device which explodes the inclosed charge with destructive results. At short intervals of time, each of the plurality of explosive containers are successively forced out, ejected and released from the main torpedo body and travel along their path of destruction. As hereinbefore stated the sparking mechanism to produce the gas explosion can be controlled and operated by the "human factor" in lieu of the "time contactor" combination.

The method of procedure to reload for action, is to clean out and drain the gas chambers GC and supply to each gas chamber a sufficient quantity of an explosive agent, either solid, liquid or gas, which when inclosed in the gas chamber by attaching a new gas seal, or closing the valve, evaporates or mixes and becomes diffused combines with the air to form an explosive admixture, which when ignited or fired will result in a maximum explosibility for energy propelling purposes. After filling and sealing the gas chambers, the explosive cartridges or containers or torpedoes, can be assembled in the torpedo body. The clock mechanism time contactor can then be set for action, the torpedo released from the air-craft and its practical operation repeated by releasing or ejecting the explosive cartridges along their path of destruction. The time contactor and contact maker act automatically by the con-

troller clock mechanism which can be regulated or calibrated to act at a pre-determined interval of time. The fluid, liquid, gas, chemical or explosive agent that is necessary to form the gas explosion that occurs in the gas chambers for propelling purposes, may be gasoline, a hydro-carbon or any suitable agent either solid, liquid or gas to produce the desired result. The explosive agent utilized in the detachable explosive containers or cartridges may be trinitrotoluol, nitroglycerin, gun cotton or any suitable agent to produce the desired results.

While I have confined my description to a typical appliance, contrivance, mechanism or device, I do not limit myself to any particular number, form, shape or construction detail of the gas chamber, or of the sparking device, or to any particular number, shape, form or size of explosive containers or cartridges, or class, kind or type of torpedo, or to any material, metal or alloy or matter of which it is composed, or assembled, or to any particular explosive agent contained or inclosed or transported by said explosive container, or to any particular liquid, chemical, fluid, gas, solid, or explosive agent necessary to produce the desired propelling force or energy in the said gas chamber, or to any method, way or means of refilling or placing the said explosive agent in said gas chamber, or to any particular sparking device or spark plug, or to any particular kind of induction or spark coil or magneto to energize the sparking device, or method of wiring the electrical circuits, or to any particular type of clock mechanism for timing or rotating or operating the contact maker or time contactor; or any particular type of hand controlled electrical circuit, or limit the assembly of the detachable explosive heads, either with their axis horizontal or vertical or at any definite numerical angular or degree displacement or location either from the horizontal or vertical line or to any particular method, way or means of refitting, recharging or assembling the said explosive containers in said transporting torpedo body, or to any kind of material or materials used in constructive details, or to any particular type or class of aeronautical appliance or air-craft or hydro-aeroplane. The herein stated principles of action, constructive details, assembly, design and equipment; and the application and functioning in practical operation must be such as to produce the most efficient results to meet circumstances and conditions.

I am fully aware that prior to my invention there are different kinds or types of air-craft or aeronautical appliances that are equipped with guns and a torpedo, but they function in a different manner to my assembled warfare appliance, and my in-

vention differs in the design, structure, details and assembly as a combination appliance, and also differs in the operation, control and functioning thereof; and my invention provides for increased efficiency due to the detachable explosive charges or torpedoes. I therefore do not claim such a combination air-craft that is in present day use, but I claim:

1. The combination in an aeronautical appliance of a transporting air-craft to which is affixed a multiple torpedo device, consisting of an efficient shaped receptacle containing a plurality of recesses, the said recesses being adapted to receive a detachable explosive container; a plurality of gas explosive chambers each said gas chamber being separate and distinct from the adjoining gas chamber, each gas chamber acting independently, so as to eject the said detachable explosive container with which it is alined, each said explosive gas chamber being provided with an explosive agent, a gas sealing cap, spark plug device, a sparking ignition device, conducting wires, a time contactor and electrical circuit connecting wires all substantially as set forth.

2. The combination in an aeronautical appliance of a transporting air-craft to which is efficiently attached a multiple torpedo device consisting of a suitably designed structure provided with a plurality of recesses, the said recesses being adapted to receive and retain a detachable explosive container, which contains an explosive agent, each said detachable explosive container being provided with a detonating firing device, a plurality of gas explosive chambers, each gas chamber acting independently of the others with which is alined a detachable explosive container, each said gas explosive chamber containing an explosive propelling agent, a gas tight valve and a sparking device; a sparking ignition device, a time operated contactor and electrical circuit conducting wires, all substantially as set forth and described.

3. The combination in an aeronautical appliance of a transporting air-craft to which is efficiently attached a controllable assembled device of a cellular structure which said structure can be rotated in a horizontal plane through any desired range of angular degrees, the said structure being provided with a plurality of recesses, each recess being adapted to receive a detachable explosive vessel which contains a destructive explosive agent, and provided with a detonating device, the axis of several of the detachable torpedoes being adjusted at suitable pre-determined angular degree displacement in relation to the main axis of the assembled torpedo appliance, so as to provide for the releasing of the said detachable explosive vessels in divergent di-

rections so as to be deflected in desirable vertical and horizontal planes of travel; a plurality of gas explosive chambers each of which is controllable and acts independently of the others, each said gas chamber of which is alined with a detachable explosive torpedo, each said gas explosive chamber being provided with an explosive propelling agent, a gas tight seal and a sparking device; a sparking ignition device, a timing contactor, and electrical conducting wires that complete the electrical circuit which includes the sparking device, the spark ignition device and the timing contactor, all substantially as set forth.

4. In an aeronautical appliance the combination of an air-craft transporting an assembled structure provided with multiple compartments, the said compartments each receiving and retaining a detachable explosive vessel provided with a detonating device and containing an explosive agent, the said plurality of detachable explosive torpedoes being detachable from the main body of the assembled multiple torpedo appliance, a plurality of gas explosive chambers, each unit chamber being provided with a sparking device and a gas tight valve, each said gas explosive chamber being filled with an energy propelling explosive agent, an electrical ignition sparking device, an adjustable timing contactor, and electrical conducting wires that complete the electrical circuit including switches, the spark plug, the ignition sparking device and timing contactor, all substantially as set forth.

5. An air-craft having an assembled multiple explosive vessel appliance attached thereto, which can be rotated in a horizontal plane and provided with a plurality of recesses, containing a plurality of detachable explosive torpedoes provided with detonating devices and a destructive explosive agent; the said detachable explosive torpedoes being assembled with axes at different angular degrees of displacement, a plurality of gas explosive chambers provided with spark gaps and a gas seal, an electrical ignition sparking device, an adjustable multiple point timing contactor, switches, and electrical conducting wires that complete the electrical circuit consisting of the spark plug, electrical ignition sparking device, switches, and timing contactor, all substantially as set forth.

6. An aeronautical appliance provided with an assembled, practically operative multiple torpedo device, containing a plurality of recesses, which is adapted to be rotated in a horizontal plane; the said multiple device transporting a plurality of detachable explosive vessels adapted to be detached and ejected from said recesses, a plurality of explosive gas chambers containing an explosive gas which when ig-

nited expands and exerts a propelling force; and provided with spark plugs and gas seals, an electrical ignition sparking device, a timing contactor, switches, and electrical conducting wires that complete an efficient operative, electrical circuit, all substantially as described.

7. The combination in an aeronautical appliance of a transporting air-craft to which is efficiently attached a multiple torpedo device consisting of a suitably designed structure provided with a plurality of recesses, which receive and retain a detachable explosive vessel which contains a destructive explosive agent, each said detachable explosive vessel being provided with a detonating firing device; a plurality of gas explosive chambers, each gas chamber acting independently of the others with which is alined a detachable explosive vessel, each said gas explosive chamber containing an explosive propelling agent, a gas tight valve which operates when the inclosed gas is ignited, and expands, and a sparking device; an electrical sparking ignition device consisting of an induction coil and battery, a hand operated switching device and electrical conducting wires that completes an efficient operating electrical circuit, which includes the spark plug, induction coil, battery, and hand operated switches, all substantially as described.

8. An aeronautical appliance provided with an assembled practically operative multiple torpedo device, containing a plurality of recesses, which is adapted to be rotated in a horizontal plane, the said multiple device transporting a plurality of detachable

explosive vessels adapted to be detached and ejected from said recesses, the said explosive vessels containing a destructive explosive agent and provided with a detonating device for firing said explosive; a plurality of gas explosive chambers, containing an explosive gas which when ignited expands and exerts a propelling force causing the ejection of said explosive torpedo from said retaining recess, and provided with a sparking device and gas valve which opens and permits the exit of said ignited explosive gas, an electrical ignition sparking device consisting of a "magneto generator," a controllable electrical operative circuit consisting of an adjustable "timing contactor" and "hand operated switches" which can be alternately switched into the sparking device circuit by means of a change-over-switch, and electrical conducting wires that complete an efficient operative electrical circuit all substantially as described.

9. The combination in an aeronautical appliance of a transporting air-craft to which is efficiently attached a multiple torpedo device consisting of a suitably designed structure provided with a plurality of recesses, the said recesses being adapted to receive and retain a torpedo, a plurality of compressed air chambers provided with an opening and closing valve, each said air chamber being separate and distinct from the other chambers and so connected that it acts alone and independent of the others so as to exert a releasing pressure on the torpedo with which it is alined, all substantially as set forth.

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