July 1, 1930. J. P. BUCKLEY 1,769,203

HELICOPTER

Filed April 30, 1929 3 Sheets-Sheet 1

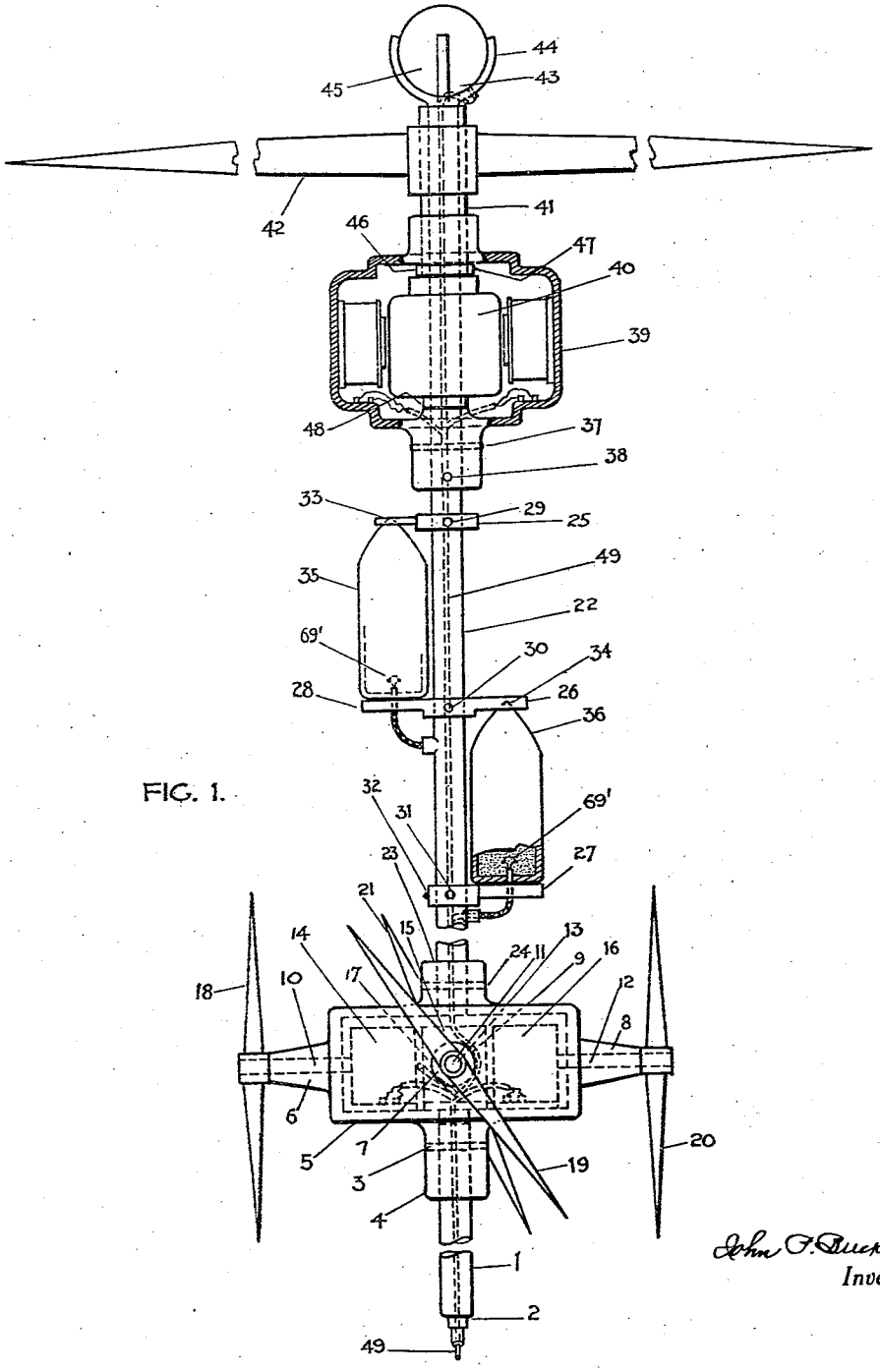


FIG. 1.

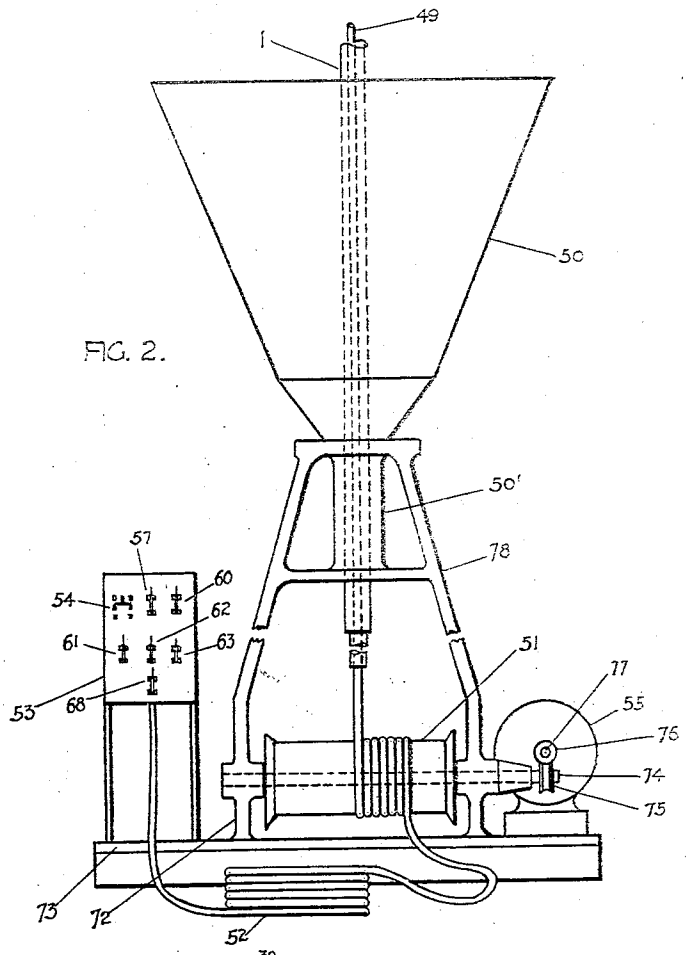
John P. Buckley
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HELICOPTER

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FIG. 2.



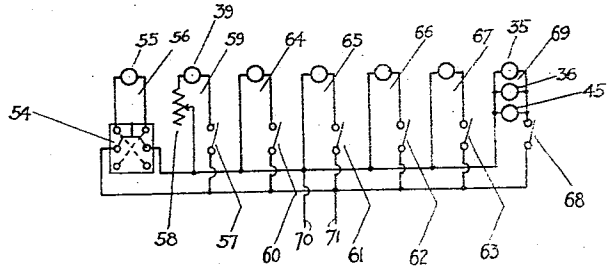


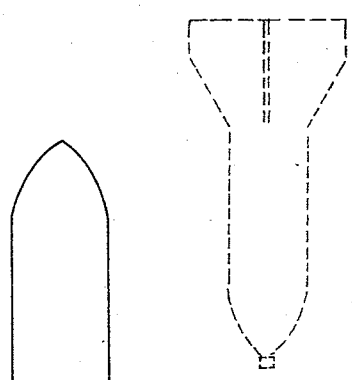
FIG. 3

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HELICOPTER

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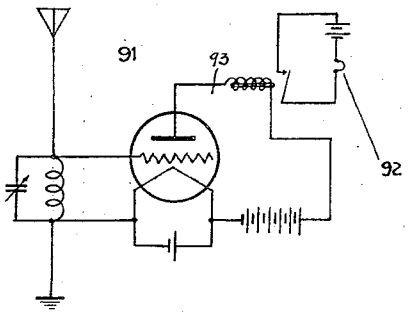


FIG. 6.

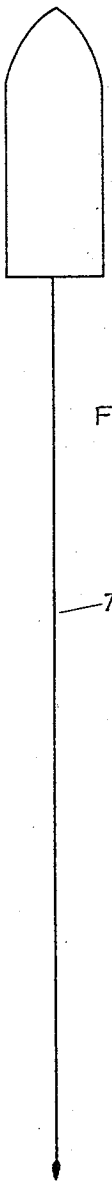
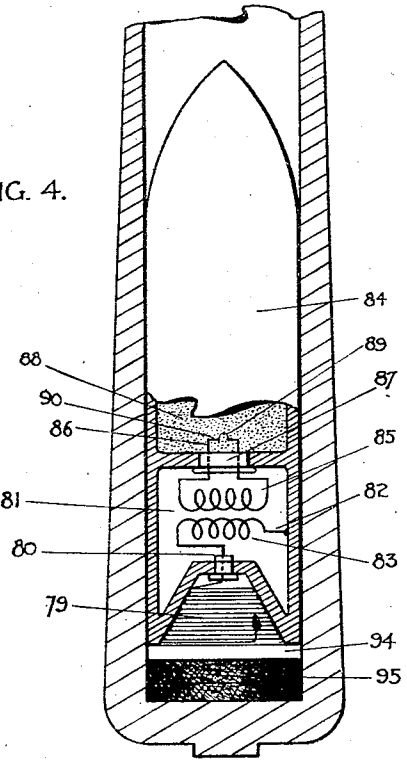


FIG. 5.

FIG. 4.



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Patented July 1, 1930 1,769,203

UNITED STATES PATENT OFFICE

JOHN P. BUCKLEY, OF WASHINGTON, DISTRICT OF COLUMBIA

HELICOPTER

Application filed April 30, 1929. Serial No. 359,290.

This invention relates to aerial carriers of the helicopter type and has for its novel feature the means of being controlled from the ground by a connecting cable composed of insulated wires through which electrical energy is imparted to the several parts composing the whole.

The main object of the device is to direct one or more shells upwardly against a falling bomb as might be dropped from an airplane over a fort or battleship.

A further object is to provide suitable controlling means on the ground for exploding the shells coincidentally with the falling bomb and thus either cause the bomb to explode prematurely or to be directed from its intended target.

Still another object is to provide one or more small steering propellers for swiftly directing the whole to a new position as a descending bomb might indicate.

Other features might be cited such as, for instance, elevating an observer for observation purposes—in this particular case a parachute, not shown, is attached to the head immediately above the propeller for safety means; a camera, also, may be employed and operated at a height advantageously, smoke bombs, too, may be set off from a high elevation as to make them more effective, and a most effective radio system at an unusually high elevation may be obtained.

The antenna of the sending and receiving sets may swing from the lower stem while the metallic structure of the device may answer for a ground, or a screened ground wire may be directed to the earth through the cable if desired.

While I have shown the controlling and operating means fast to the ground as it would appear in a fort or on a battleship, such means may be suitably housed on a small truck as a fixture and transported to various points.

With these and other objects in view the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawings, in which drawings,

Fig. 1 is an elevation of the improved apparatus, showing in assembly form the lifting propeller, motor, shells, and steering propellers.

Fig. 2 shows the funnel, and neck of same, through which the cable passes to the drum and thence to the control panel.

Fig. 3 is a circuit diagram.

Fig. 4 is a modified form of the invention showing an explosive shell and the manner in which it is projected through the air, as well as the trailing antenna and the firing means thereto attached.

Fig. 5 illustrates the shell paralleling a bomb and the full length of the antenna as they would appear in flight.

Fig. 6 shows a tuned radio circuit which may be used instead of the single transformer as shown.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views the numeral 1, designates the lower stem, having an outlet 2, and a taper pin 3, at its upper end for the purpose of being made fast to the hub 4, of casting 5.

Outwardly protruding from the casting and forming a part of it are hubs 6, 7, 8 and 9, through which the armature shafts 10, 11, 12 and 13, of motors 14, 15, 16 and 17, are journalled and by which means the fixed propellers 18, 19, 20 and 21, are carried by the said shaft and are made to revalve.

The long stem 22 is made fast to hub 23, by pin 24. Supported upwardly along the length of the stem are bracket arms 25, 26, 27 and 28, made fast thereto by set screws 29, 30, 31, and 32. Spaced within these brackets and held securely by recesses 33 and 34 are the shells 35 and 36. Above the brackets and secured to the stem by pins 37 and 38, is the motor 39, having an armature 40, with a cylindrical shaft 41, to which the lifting propeller 42 is rigidly attached and through which cylindrical shaft the stem passes on up to the head 43. Fixed to the head is the cradle 44, for supporting the top-

most shell 45, or when the device is used for observation purposes, a parachute may apply.

The armature 40 is held within the magnetic field by collar 46, having pin 47 and the motor casing as at point 48.

Electrically connecting the motors 14, 15, 16 and 17, and the shells 35 and 36, is cable 49, as shown passing through outlet 2, sheet 1, and through funnel 50, sheet 2, thence through the neck 50′ and thence around the drum 51, from which the end of the cable is led from coil 52, to the panel 53, where the proper distribution of the various leads terminate to their respective switches or controls, as for instance, the double-pole switch 54 controls the motor 55, through circuit 56, which in turn controls the movement of the drum. The switch 57, together with the variable resistance 58, of circuit 59, controls the propeller motor 39, while the switches 60, 61, 62 and 63 of circuits 64, 65, 66 and 67 energizes the motors 14, 15, 16 and 17, leaving in this instance, the switch 68 of circuit 69, having fuse wire 69′, for exploding the shells 35, 36, and 45.

The main feed wires 70 and 71 are shown properly connected in the diagram, Fig. 3.

The standards 72, fixed to the base 73, supports and journals the drum shaft 74, the outer end of which is provided with a gear 75, as might mesh with the worm gear 76, on shaft of motor 77.

Leading up from the standards is the supporting frame 78 for the funnel 50.

In practice the apparatus is normally at rest in the funnel, the neck of which serves to steady and support it in a vertical position.

On receiving a signal for flight the operator closes the switch 54, of circuit 56 and through means of the rheostat 58, of circuit 59, regulates the current through the motor 39 up to its flight speed.

At this instant, the switch 57 is closed. This action feeds the cable from the coil 52 to the drum and thereby lengthens the cable between the drum and apparatus as the apparatus ascends to its height.

Having attained such height the operator may steady the apparatus or cause it to dart in any direction by closing either one of the switches 60, 61, 62, and 63. If a sudden dart to the right is desired, the lefthand motor 14 is energized, or if a 45° course is wanted the two motors 14 and 15, are switched into circuit.

These movements cause the apparatus to move from a vertical position to a position as would indicate an alignment with a falling bomb, at which instant, as the two bodies parallel each other, the switch 68 is closed and the shells through fuse wire 69′ is exploded—the resultant force of the explosion will either explode the bomb in mid-air or redirect its course away from the spot for which it was intended, as would appear in the saving of a battleship, fort, large guns and the like.

I do not confine myself to the use of an electric motor for the propulsion of the lifting propeller as any other form of power might be used advantageously, such as compressed air or gas, all of which may be conveniently controlled through the electric cable 49 as herein described.

A modified form of the invention is expressed on Sheet 3, wherein an explosion shell is projected upward from any suitable means such as a gun or the like, and is provided with means whereby the shell may be exploded when desired. In this instance, the shell is fired when in close touch with the falling bomb, as depicted in Fig. 5.

It consists essentially of the antenna 79, the upper end of which is held tight and passed through the insulation 80, and thence to a suitably designed transformer 81, the terminals 82 of the primary coil 83 being grounded to the shell, as shown. The secondary coil 85, inductively coupled to the primary coil has the closed circuit 86, a part of which circuit passes through the insulation block 87 to the powder chamber 88; the fuse wire 89 bridging across the secondary wires as at point 90.

On receiving the required amount of current the transformer, through the antenna, energizes the secondary circuit 86, to a degree as will instantly burn the fuse wire and through such burning out of the said fuse wire the shell is made to explode.

Other kind of circuits may be used for receiving the electrical energy from the station such as a tuned circuit 91, as shown in Fig. 7, the fuse wire 92, showing in the plate circuit 93.

In firing the gun to project the shell I have provided the loose disc 94, as a protection from the powder blast 95, when ignited.

I claim—

1. In an apparatus described, the combination of a supporting stem, an electric motor attached thereto, an armature free to revolve around said stem and having a lifting propeller at one of its ends, brackets fixed to the stem for supporting one or more explosive shells, steering propellers disposed around the stem, the driving motors of which may be separately or wholly energized, a cable carrying electric wires to the various motors, a funnel guide for the cable, a drum for controlling the upward and downward movements of the cable and means for electrically operating and controlling the apparatus when in flight.

2. The combination of a supporting stem, a lifting propeller, means for operating and controlling the propelling power of said lifting propeller, explosive shells carried by

said supporting stem, means for firing said explosive shells, steering means carried by the stem, means for operating and controlling the power of said steering means, a cable for transmitting electrical energy to the various actuating members, and means for controlling their movements during flight of the apparatus.

3. In an apparatus described, the combination of an electric motor the frame of which is fixed to a stem, an armature free to revolve around said stem and having a propeller fixed to one of its ends, brackets fixed to the stem for supporting explosive shells, steering propellers disposed around the stem whose driving motors may be separately or wholly energized, a cable carrying electric wires to the various motors supported by the stem, a funnel guide for the cable to the drum and means for electrically operating and controlling the drum and apparatus when in flight.

4. The combination of a supporting frame, an electric motor having an armature with a cylindrical shaft, a propeller rigidly attached to said shaft, means for energizing said motor from a remote control, explosive shells supported by the frame, means for firing the shells from a remote point, steering propellers for changing the position of the apparatus when desired, means for providing and controlling the driving power of said propellers and means for housing the whole when at rest.

5. The combination of an explosive shell, a powder chamber, a second chamber isolated from the first chamber by a partition carrying an insulated block through which a part of a circuit may enter to the first chamber, radio receiving means, an antenna electrically insulated from the shell and connected to the radio means, a recess in the abuttment of the shell for housing the antenna, and means remotely controlled for firing the shell.

In testimony whereof I affix my signature.

JOHN P. BUCKLEY.