

Sept. 24, 1929.

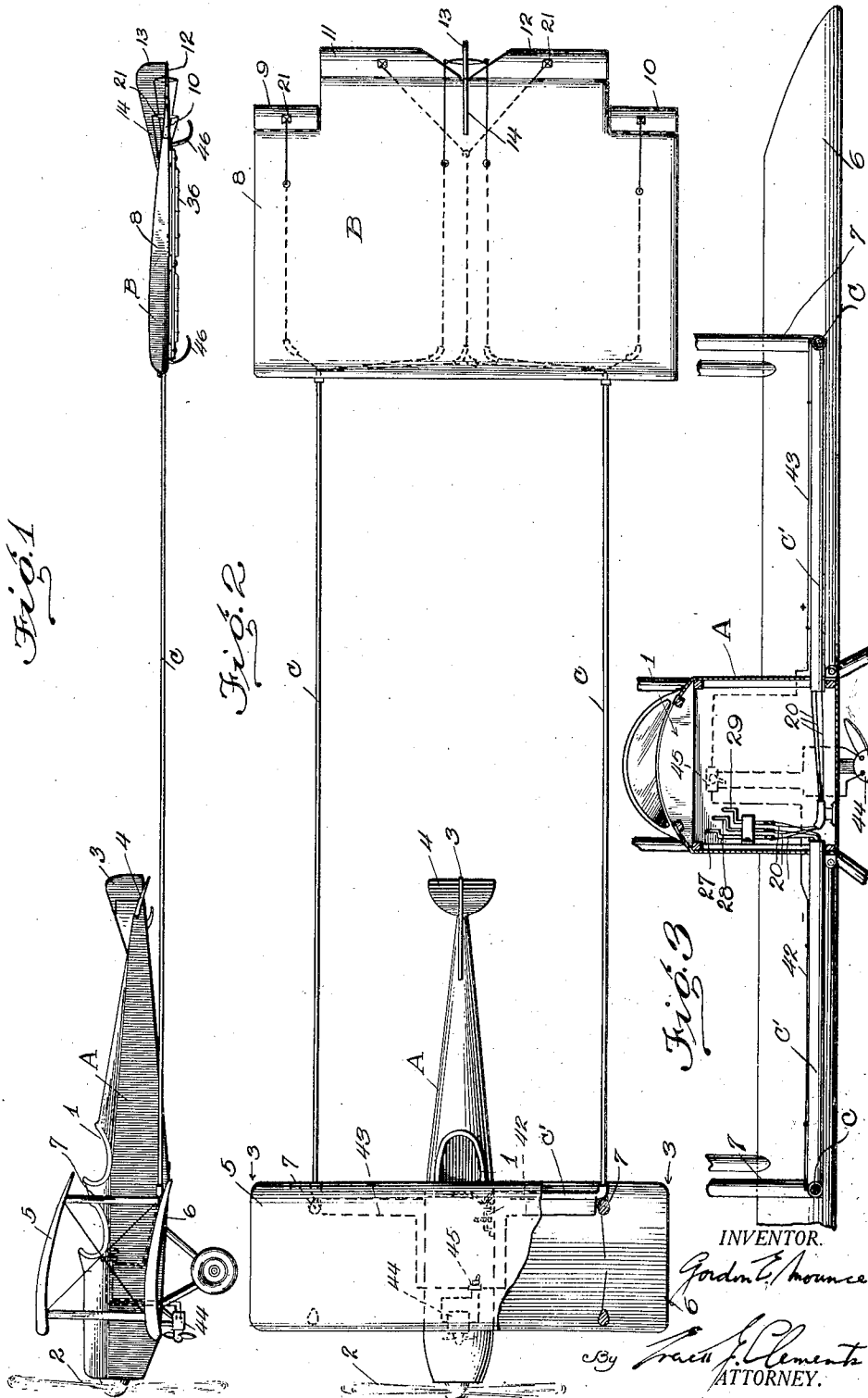
G. E. MOUNCE

1,729,354

AEROPLANE

Filed Nov. 25, 1927

2 Sheets-Sheet 1



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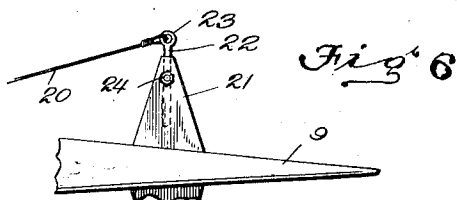
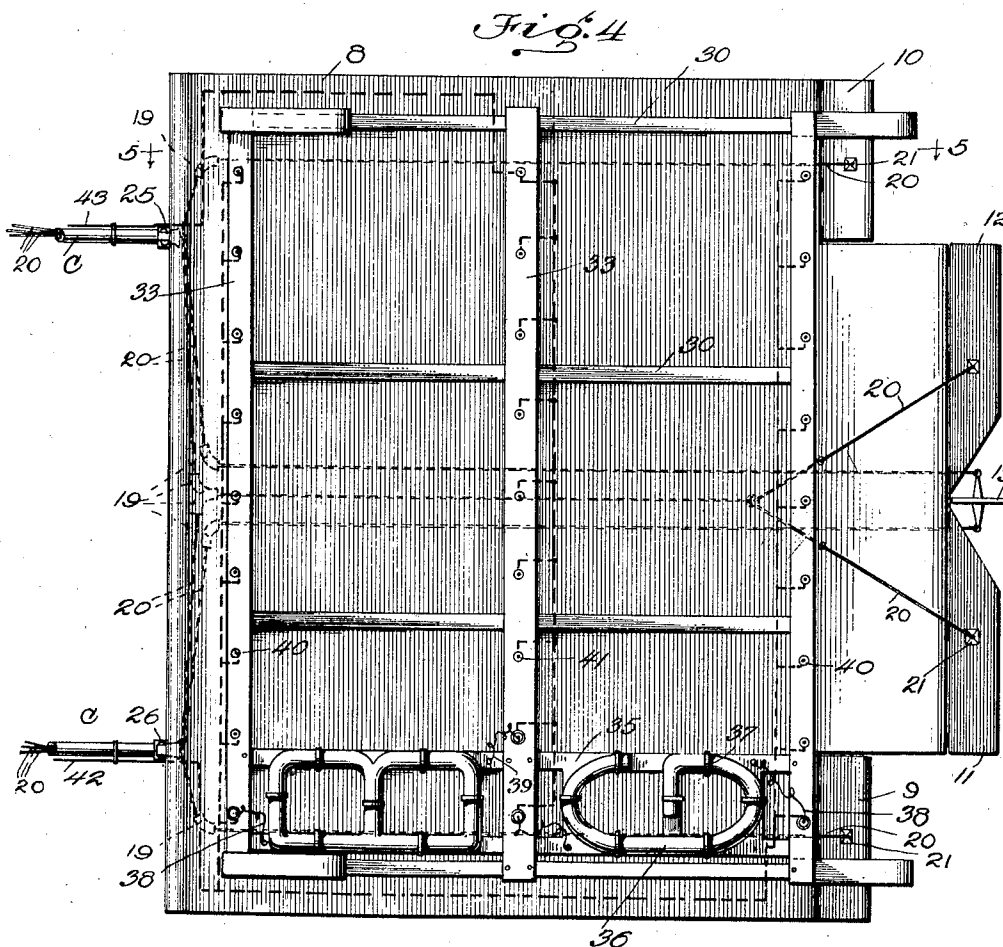
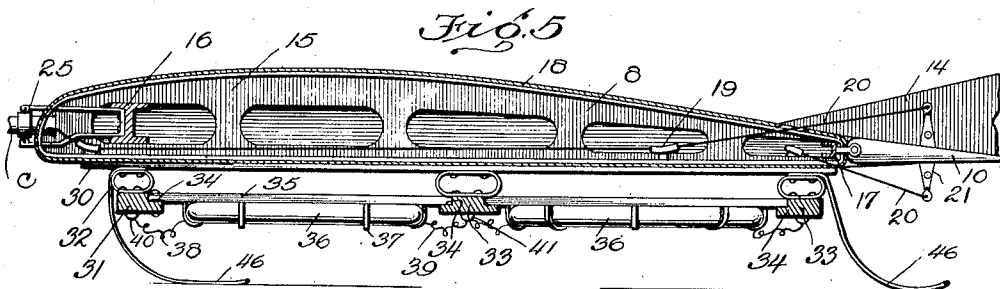
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2 Sheets-Sheet 2



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AEROPLANE

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My invention relates broadly to improvements in aeroplanes and more particularly to glider aeroplanes which are adapted to be flexibly towed by and controlled from a tractor aircraft.

My invention relates further to a towed aeroplane of this character which is particularly constructed and adapted for advertising and illuminated night display purposes while being towed through the air.

Due to the tremendous advertising circulation and attention-holding features which are possible with aeroplanes in flight, numerous attempts have made to adapt illuminated sign characters to the under-sides of aeroplane wings as a means of night display and attraction. Such attempts have been unsuccessful, however, due to the fact that aeroplanes, now in common use, do not lend themselves readily to such changes in wing construction as would be required to properly mount and carry illuminated characters of such size as could be readily distinguished from the ground when the plane is flying at safe altitudes.

Aside from the fact that numerous experiments have proven various methods of attaching illuminated characters to the under-surfaces of the wings to be impractical, due largely to interference with the proper operation, carrying capacity, and speed of the plane, it has also been found that illuminated characters of such size as could be used, blur and run together, when observed from the ground. This low visibility of illuminated characters, thus displayed, has been found to be due partly to their relative small size and the infeasibility of the plane to carry an electrical generating plant of sufficient current output to properly illuminate the characters.

It is therefore, the primary object of my invention to eliminate such faults and disadvantages as above pointed out and to provide a simple, efficient and reliable aircraft which is adapted particularly for advertising and illuminating display purposes.

It is well known that the red glow from neon lamps is not as readily diffused in a hazy atmosphere as the light from other illuminants, and it is accordingly an object of my

invention to provide an aerial sign which, for a given size, distance, etc., is more clearly legible than those heretofore used. This is important particularly in view of the fact that, over centres of population where such a sign is generally used, aeroplanes are not permitted to fly sufficiently close to the ground to render ordinary signs clearly decipherable in weather which is at all hazy, while fog or haze is quite common at night and renders an ordinary aerial electric-light sign practically useless.

Another object of my invention is to provide a motorless, towed aircraft with lateral, directional and longitudinal controls which are adapted to be operated from a tractor aircraft.

A further object of my invention is to provide flexible tow means for a glider of this character, adapted for attachment to a tractor aircraft, through which the controls of the towed glider may be operated from the tractor-aeroplane.

A still further object of my invention resides in means on the tractor aircraft for positively operating the controls of a glider when taking off, while in the air and during landing, whereby the controls of the glider may be moved to change the altitude or direction of the glider independently of or in conjunction with the operation of the tractor aircraft.

My invention also has for an object to provide means on a towed aeroplane for interchangeably securing advertising matter whereby the advertising matter will be visible from the ground while being towed through the air.

A further object of my invention is the provision of an aerial sign or advertisement that can be extended over a considerably larger area than that provided by the surfaces of an aeroplane, by the extension of the sign or advertisement over a plurality of such towed aeroplanes.

A further object of my invention is to decrease the fire-hazard incidental to the use of electric signs on aeroplanes, by the spreading of the sign over the trailer or towed aeroplanes which, even if they are ignited

through a short-circuit, or some such manner from a defect in the lighting system, do not particularly endanger either the tractor aeroplane or the pilot thereof.

- 5 A still further object of my invention is to provide illuminated characters secured to the under-side of a towed aeroplane, the electrical current for which is supplied from the tractor-aeroplane. It may be desired to still
10 further decrease the fire risk, in which case I may, within the scope of this invention, provide separate current-supplying means on the several "trailers", or even supply low-voltage current from the tractor plane and transform
15 it to high-voltage only in the several "trailers".

Further objects of my invention lie in the formation of a glider, adapted particularly for night advertising, having neon gas filled
20 tubes or lamps arranged in the form of characters, and the means for flexibly supporting the characters on the under-surface of the plane. Other objects and advantages of my invention will be more apparent from the following description and claims.

Referring now to the accompanying drawings, which are made a part hereof, and on which similar reference characters indicate similar parts;

- 30 Fig. 1 is an illustrative view in side elevation of my glider sign as it would appear when being towed through the air by a tractor aeroplane.

Fig. 2 is a top plan view of the assembly shown in Fig. 1 and illustrating diagrammatically the manner of towing and controlling the glider sign from the tractor aeroplane.

Fig. 3 is an enlarged fragmentary view taken on line 3—3 of Fig. 2 and illustrates the manner of connecting the towing means to the tractor aeroplane and the connections for the glider control wires to operating levers within the fuselage of the tractor aeroplane.

45 Fig. 4 is a bottom plan view of my glider sign showing the mounting for illuminated sign letters.

Fig. 5 is an enlarged fragmentary view taken on line 5—5 of Fig. 4 and illustrates a preferred construction of glider wing and the manner of attaching the sign mounting to the under surface thereof, and

Fig. 6 is an enlarged fragmentary view illustrating one of the leverage adjusting
55 horns on the glider controls.

In the drawings the portions indicated as A represent a motor propelled aeroplane of conventional design, hereinafter referred to as a tractor aircraft; B a glider aeroplane
60 which constitutes my improved aerial sign; and C the tow means by which the glider sign is flexibly towed by the tractor aircraft.

For the purpose of illustration I have shown a tractor aircraft A of the biplane
65 type having a fuselage 1, at the forward end

of which is mounted a motor driven propeller 2 and at the tail end a rudder 3 and elevators 4. A pair of vertically spaced wings or planes 5 and 6 are secured one above and the other below the forward portion of the fuselage 1 and are connected adjacent their outer ends by struts 7. It is from the base of these struts 7 that the glider sign B, now to be described, is towed through the medium of tow cables C.

The glider sign comprises preferably a single wing or air foil 8, of greater length than is usually provided in the construction of aeroplane wings, to the rear outer ends of which are hinged ailerons 9 and 10. The central portion of the wing 8 extends rearwardly beyond the ailerons and has hinged at its rear edge a pair of elevators 11 and 12 between which a rudder 13 is vertically hinged to the rear edge of a stabilizer 14.

The wing 8, of the glider B, may be formed and constructed in accordance with any well known or approved practice in aeroplane wing construction and for the purpose of illustration have shown in the longitudinal sectional view in Fig. 5 one of a series of ribs 15 which are transversely connected and supported on front and rear beams 16 and 17 respectively. A suitable covering 18 is secured to the ribs 15 and encloses the structural frame, thus providing the upper and lower wing surfaces.

Within the wing 8 and suitably secured to the ribs 15 is a series of guides 19 through which control wires 20 are threaded. The control wires 20 extend from the guides through suitable eyelets in the wing surfaces and are attached at their rear ends to longitudinally adjustable horns 21, which are mounted on the opposite surfaces of the ailerons 9 and 10, elevators 11 and 12 and rudder 13.

In Fig. 6 I have shown in detail one of the horns 21 which consists of a hollow casting in which is longitudinally adjustably mounted a lever 22 having an eye 23 at its outer end to which a control wire 20 is attached. A set screw or pin 24 passes through a side wall of the horn 21 and is adapted to engage and hold the lever 22 fixed relative to the casting when adjusted for proper leverage.

Near each end of the front beam 16, within the wing 8, is secured a pair of brackets 25 and 26 which extend through the forward edge of the wing covering 18 and serve as securing means for the rear ends of the tow cables C which also extend through the forward edge of the wing covering. As best shown in Figs. 4 and 5 the tow cables C are of tubular construction and serve as conduits for the control wires 20 which pass from the guides 19 into the tubular towing cables C and thence to the control levers 27, 28 and 29 within the fuselage 1 of the tractor air-
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craft A, see Figs. 2 and 3. By reference now to Fig. 3 I have illustrated diagrammatically a section through the rear cockpit of the fuselage 1, of the tractor aircraft A, in which the control levers 27, 28 and 29 are adjustably mounted and to which the glider control wires 20 are secured. The towing cables C carrying the control wires 20 extend from the glider B to the base of the struts 7 on the tractor aircraft A where they are detachably secured by means of tubular brackets C' and thence across the span of the lower wing and into the fuselage 1.

It will be readily understood that by manipulation of the levers the controls of the glider B may be adjusted from the cockpit of the tractor aircraft A in the same manner as the controls of the tractor aircraft are regulated, and if desired the control wires 20 may be connected to operate simultaneously with the controls of the tractor aircraft.

To the under surface of the glider B are secured two or more strips of wood or metal 30 which extend lengthwise of the wing and to which a sign supporting frame 31 is secured by intermediate spring members 32. The frame 31 consists of two or more rails 33 which extend transversely of the wing and in parallel spaced relation. By reference particularly to Fig. 5 it will be noted that the opposing edges of the rails 33 are channeled to provide stepped shelves 34 on which the ends of individual sign-letter carrying frames 35 are detachably and interchangeably secured.

As explained above, in the objects of the invention, the individual sign letters are formed from gas filled glass tubes. These tubes 36 are fashioned in representation of letters of the alphabet, numbers, etc., and are secured to the frames 35 by metal strips 37 through which electric current may be supplied to the tubes from conductors 38 and 39. The conductors 38 and 39 are each provided with a plug adapted for insertion in any one of the series of sockets 40 and 41 arranged in the rails 33. Current feeding conductors 42 and 43 are connected respectively with each of the series of sockets 40 and 41 and extend through the body of the glider B to points adjacent the brackets 25 and 26 where the conductors pass through the forward edge of the glider and extend to the tractor aircraft parallel with the tow cables C to which they are secured by straps. A generator 44 is shown mounted on the tractor aircraft A from which suitable conductors lead to a switch 45 in the cockpit of the fuselage and by reference particularly to Figs. 2 and 3 it will be noted that the conductors 42 and 43 carried by the tow cables C also enter the fuselage 1 and are connected to this switch 45. It will be understood that the generator 44 may be carried on the glider B and that suitable batteries for supplying cur-

rent for the illuminated sign characters may be substituted for the generator 44.

In the drawings I have shown a preferred form of glider sign and a means whereby it may be towed and controlled from a tractor aircraft, and landing and take off devices such as the skids 46 secured to the under surface of the glider B and extending below the sign. It will be understood that the construction shown may be varied to meet conditions under which such signs are to be used and operated and further that a plurality of such glider signs may be towed and controlled from a single tractor aircraft without departing from the spirit of my invention.

What I claim is:—

1. A glider aeroplane having means for displaying a sign thereon, and means for towing and controlling said glider from an aircraft.

2. A glider aeroplane having means for displaying a sign thereon, controls adjustably mounted on said glider, and means for towing and controlling said glider from an aircraft.

3. A glider aeroplane having means for displaying a sign thereon, controls adjustably mounted on said glider, means for towing said glider from an aircraft, and means for operating said controls from said aircraft.

4. A glider aeroplane having means for displaying an illuminated sign, means for towing said glider from an aircraft, means for controlling same glider from said aircraft, and means for supplying electric current to said illuminated sign on said glider.

5. A glider aeroplane having means on the under wing side for resiliently supporting an illuminated sign, and landing and take off devices secured to said wing and extending below said sign.

6. A glider sign comprising an air foil, control means adjustably mounted on said air foil, means on said air foil for detachably securing sign characters, towing means connected to said air foil, and means for operating said control means from said towing means.

7. A glider sign comprising an air foil, control means adjustably mounted on said air foil, means on said air foil for detachably securing sign characters, towing means secured to said air foil, and operating means for said control means extending through said air foil and supported by said towing means.

8. A glider aeroplane having adjustable controls, means for towing said glider from an aircraft, and means for operating said controls from said tractor aircraft.

9. A glider aeroplane having adjustable controls, towing means connected adjacent each side of said glider and means supported by one of said towing means for operating said controls.

10. In combination with an aircraft, a glider sign having adjustable controls, flexible tow means connecting said glider and aircraft, illuminated sign characters carried by
5 said glider, electric current supplying means carried by said aircraft, and current conducting means and control operating means carried by said tow means.

11. In combination with an aircraft, a
10 glider aeroplane, and spaced tow means connecting the wing of the aircraft and the glider.

In testimony whereof I affix my signature.
GORDON E. MOUNCE.

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