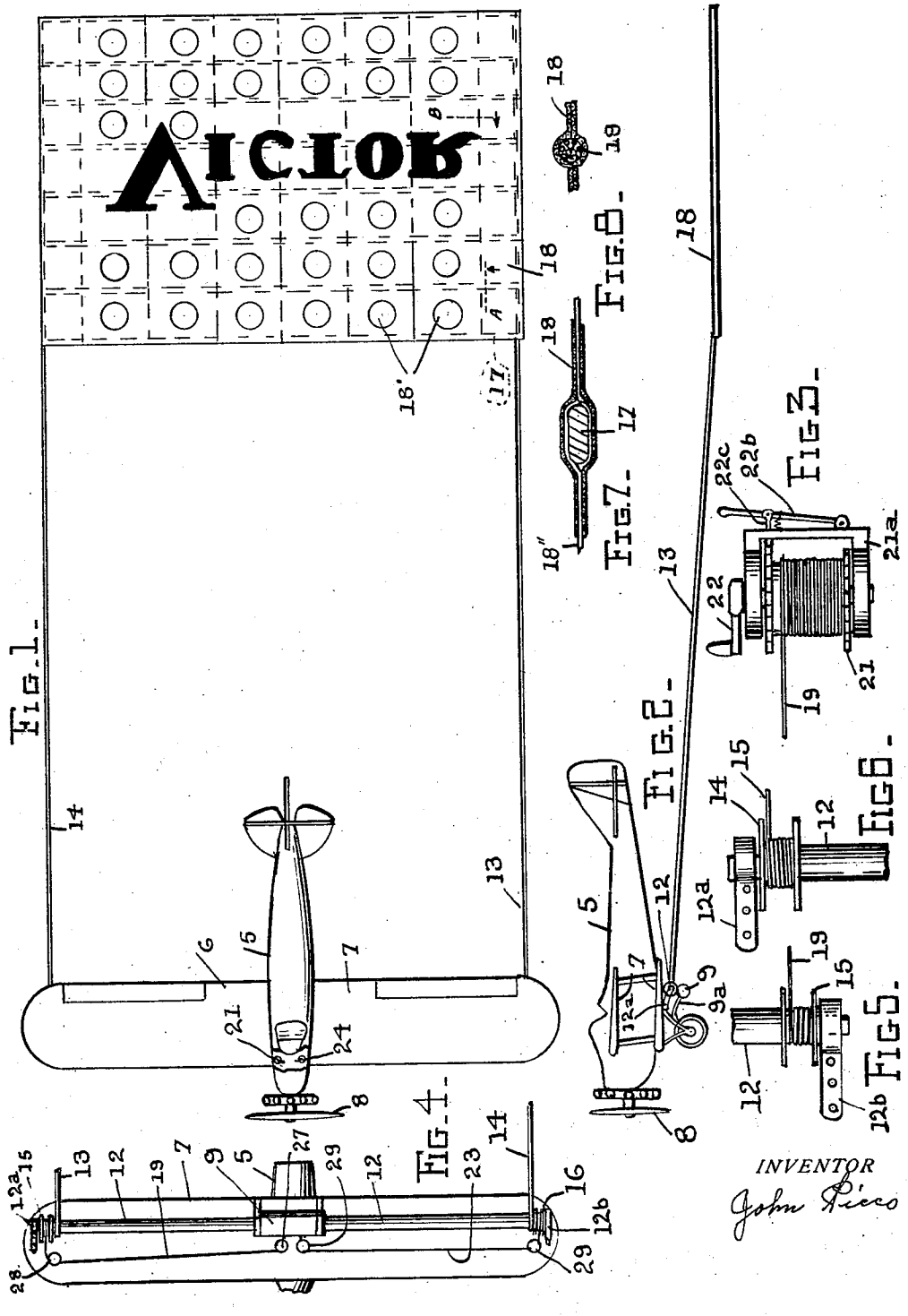
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AERIAL ADVERTISING DEVICE

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AERIAL ADVERTISING DEVICE

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This invention relates to improvements in devices for displaying advertising matter from moving aeroplanes, and its leading object is to provide a device consisting of a flexible advertising sheet, means for extending it from the rear of an aeroplane, means for rolling and unrolling it, and means for operating the whole device, whereby an aeroplane can release at will the advertising sheet, at a safe distance from the aeroplane, and can wind the device up to an inoperative and unexposed position.

The invention is embodied in a rollable sheet of flexible material, which is reinforced by transverse stiffening members, and by longitudinal cords or webs, which are connected with the stiffening members, the rollable sheet being also connected by cables or flexible members with a roller, mounted to turn against the rear side of an aeroplane, and controlled by manually operated means for actuating the roller in both directions, to permit of an unwinding movement, or to cause a winding movement of the roller.

With the above and other objects in view the invention embraces certain new and useful combinations, constructions, and arrangements of parts, clearly described in the following specification, and fully illustrated in the accompanying drawing, in which:

Fig. 1 is a plan view of the device in extended position from an aeroplane.

Fig. 2 is a side elevation thereof.

Fig. 3 is a detail side elevation of one of the winding drums.

Fig. 4 is a bottom plan view of the aeroplane, with portions thereof broken away for convenience.

Fig. 5 is a detail end view of the winding roller, showing one of the winding drums thereof.

Fig. 6 is a similar view of the opposite end of the roller.

Fig. 7 is a detail sectional view through the display sheet, taken on line A of Fig. 1.

Fig. 8 is a similar view taken on line B of Fig. 1.

Referring to the accompanying drawing illustrating the practical embodiment of the invention, 5 designates the body of an aeroplane, 6 the right wings and 7 the left wings. The aeroplane or vehicle is provided with the usual propeller 8, driven by a suitable engine.

Against the aerial vehicle or aeroplane the winding roller 12 is mounted by the end bearings 12*a* and 12*b*. This roller preferably extends across the maximum width of the wings, to points near their outer ends, where the bearings 12*a* and 12*b* are fixed. The intermediate portion of the roller is engaged by a spring pressed roller 9, mounted on the spring bracket 9*a*, and arranged to press upwardly against the roller 12.

To the roller 12 the flexible supporting cables 13 and 14 are fixed, and the outer ends of these cables are rigidly connected to the sides of the flexible display sheet 18, and to the ends of the stiffening strips or bars 17, which are secured between the layers or plies of the sheet 18, as shown in Fig. 7 in detail section. The sheet 18 is further reinforced by cords or flexible reinforcing members 19, which extend across the stiffening members 17, and are preferably twisted around them, as shown in Fig. 7. These cords are also secured between the layers or plies of the display sheet 18. The sheet 18 is further provided with air holes 18′, so that the pressure on opposite sides of the display sheet, when in flight while trailing an aeroplane, will be fairly equalized, within the safe supporting requirements for maintaining the device in an approximately horizontal plane, while in flight.

The roller 12 is provided on one end with a winding drum 15 and on the opposite end with a winding drum 16. To the winding drum 15 the flexible cable 19 is connected, and this is trained over the winding drum 21, which is located in the body 5 of the aerial vehicle, near the pilot. This winding drum 21 is rotated by hand by means of the handle 22, and is retained in position by means of the clutch 22*c*, operated by the spring pressed lever 22*b*, which is pivoted to the frame 21*a* of the winding drum. This drum is arranged to wind the roller 12 in one direction. The winding drum 16 is connected to the cable 23, which is connected to the winding drum 24, located in the body 5, and arranged to be rotated

by hand. The winding drum 24 is similar in construction to the winding drum 21, and need not be described in detail. It is arranged to turn the roller 12 in the opposite direction that it is turned by the action of the winding drum 21.

The cable 19 is wound in one direction on the winding drum 15, and the cable 23 is wound in the opposite direction upon the winding drum 16. Both of these winding drums are carried by the ends of the roller 12. When a pulling action is developed by the movement of the cable 19 the roller will be turned in one direction, thus unwinding the cable 19 from the drum 15, and at the same time winding the cable 23 on the drum 16. When a pulling action is developed on the cable 23 the cable will be unwound from the drum 16, thus turning the roller 12, and causing the drum 15 to wind the cable 19. This action requires the winding drum 21 to be always operated by hand in a direction opposite to the turning movement of the winding drum 24. To release the display sheet holding cables 13 and 14 as well as the display sheet, the winding drum 21 is operated by hand in one direction, so as to develop a pull upon the cable 19, and at the same time the winding drum 24 is operated in a reverse direction to allow the cable 23 to unwind from the drum 24 and wind on the drum 16, on the end of the roller 12. When the display sheet is in extended position, the drum 24 is wound in a winding direction, and the drum 21 is wound in an unwinding direction, thus causing the roller to wind the cables 13 and 14 and the display sheet connected thereto.

The flexible display sheet may be made of silk, aeroplane fabric, or any combination of textile or other materials. Upon it the desired advertising matter is painted in large letters, or otherwise attached, as by sewing of cut letters of a contrasting color to the sheet itself. In Fig. 1 I show an arrangement for displaying a single word, which is shown in negative or reversed form, so that it will be readable from the ground.

The pilot operates the winding drums 21 and 24 so that the flexible sheet is allowed to float in the air, while the aeroplane or aerial vehicle is moving at a fast speed through the air. The velocity or speed of the aeroplane will cause the display sheet to fly at an approximately horizontal position, while trailing the aeroplane or vehicle. The length of the connecting cables or ropes 13 and 14 will determine the distance in the rear of the aeroplane, which the display sheet will be allowed to move to.

The force of the air and the pull of the cables 13 and 14 on the opposite ends of the display sheet will keep it extended, or in approximately flat condition. Normally the device will move in a level lower than the level in which the aeroplane or vehicle itself is moving. The display sheet will not interfere in any way with the operation of the aeroplane, or its turning, if the turning is made in a sufficiently large radius.

When it is desired to pull in the device the winding drums 21 and 24 are manually operated so that the device or display sheet will be wound upon the roller 12, and thus withdrawn completely from observation.

By repeatedly releasing and withdrawing the display sheet from advertising position, novel aerial effects can be produced, which will attract attention and compel interest.

It is understood that any other form of winding means may be employed for turning the winding roller in both directions.

The stiffening members 17 of the display sheet are held against shifting from these fixed positions by means of the flexible reinforcing cords which are twisted around them and which extend in the direction of travel of the advertising sheet. The device is capable when attached to an aeroplane of adequate capacity, of traveling through the air with the aeroplane in any direction or plane of flight taken by the aeroplane. The air openings of the sheet tend to maintain balanced air pressures from the opposite sides of the advertising sheet and together with the transverse stiffening members, to make it possible for the advertising display sheet to travel through the air with a minimum of fluttering.

Various changes may be made in the detail construction and combination of the parts shown, without departing from the spirit of the invention, as defined in the claims annexed hereto.

Having described my invention I claim:—

1. The combination with an aeroplane having oppositely extending wings and a body, of a roller mounted near its ends on the wings and extending across the body, cables connected to the ends of the roller, a flexible sheet connected to the cables and provided with transverse stiffening members spaced longitudinally from each other, and further provided with longitudinal reinforcing flexible members, winding means for rotating the roller in a winding direction, and unwinding means for rotating the roller in the opposite direction.

2. An aerial advertising device consisting of a rollable advertising display sheet having transverse stiffening elements and longitudinal reinforcing flexible cords interlocked with the stiffening elements, flexible cords attached to the end portions of the display sheet, a roller adapted to be mounted against an aerial vehicle to which the flexible cords may be connected, a winding drum on each end of the roller, a winding drum adapted to be mounted in the body of the aerial vehicle for winding the roller, a cable connecting said winding drum to one of the winding drums

of the roller, a similar winding drum adapted to be placed in the body of the vehicle, and a cable connecting said last named winding drum to the other winding drum of the roller, whereby the roller may be wound by one of said body installable winding drums or unwound by the other.

3. An aerial display device consisting of a rollable advertising display sheet, flexible cables connecting the outer end portions of the sheet, a roller, means for attaching the roller to an aerial vehicle, a winding device for turning the roller in one direction, a winding device for turning the roller in the other direction, the flexible cables being connected with the roller so that they and the advertising display sheet may be wound and unwound by the roller, the display sheet being provided with air openings therein, to permit of the free flow of air through the same, while the sheet is being trailed by an aerial vehicle in flight through the air.

4. The combination with an aerial vehicle having a body, of a roller mounted on the body, winding drums on the ends of the roller, cables trained over the winding drums, means for winding one of said cables and unwinding the other cable, a display sheet constructed to display an advertisement carried thereby, cables connected to the ends of the display sheet and connected to the roller, and stiffening means extending across the display sheet.

5. The combination with an aerial vehicle having a body, of a roller mounted to turn on the body, winding means for turning the roller in both directions of rotation, cables connected with the roller, a display sheet connected at its opposite ends to the cables and windable with the cables on the roller, stiffening strips carried by the display sheet and extending across the same transverse to the direction of the cables, and reinforcing cords extending across the strips.

6. An aerial advertising sheet consisting of a sheet of flexible material having air openings and provided with parallel reinforcing members extending across the sheet for stiffening the sheet in flight behind an aerial vehicle through the air, and means for connecting the advertising sheet to an aerial vehicle.

7. An aerial adverising sheet adapted to be rolled up consisting of a flexible sheet having air openings therein, parallel stiffening members carried by the sheet and extending transversely thereof to permit the sheet to be rolled up, the stiffening members being longitudinally spaced apart, and a flexible connection for attaching the sheet to an aerial vehicle, whereby the sheet will be drawn behind the aerial vehicle through the air to display the opposite face of the sheet.

8. An aerial advertising sheet adapted to be attached to an aerial vehicle and carried in flight through the air, consisting of a fabric sheet of flexible material constructed with air openings and adapted to carry and display advertising matter, the sheet being stiffened by transverse stiffening members attached to the sheet, flexible cords twisted around said stiffening members to hold the same in a non-shifting placed relation to each other and cables connected to said sheet and connectable to an aerial vehicle for supporting the same in flight through the air.

Signed at the city, county and State of New York, this 13th day of April, in the year 1931.

JOHN PICCO.