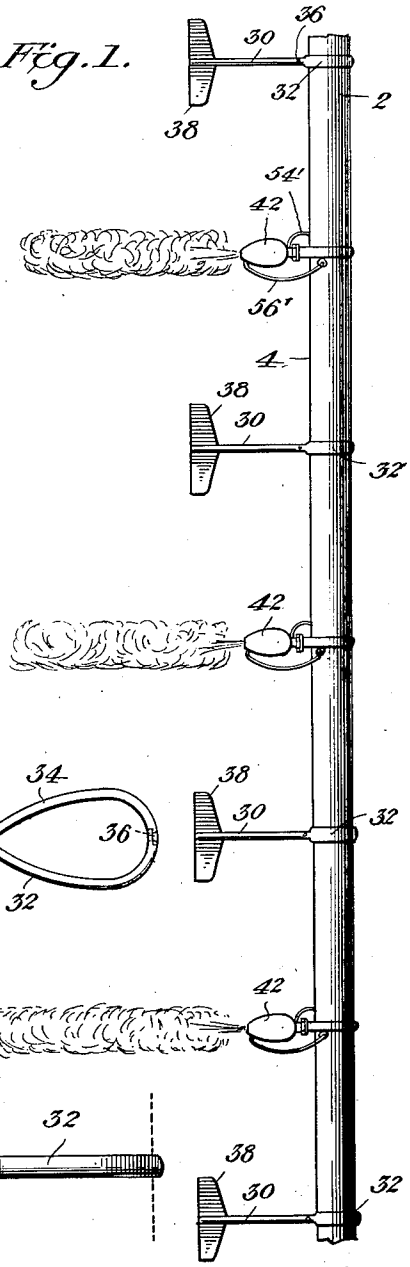
Dec. 22, 1936. J. T. REMEY 2,065,024

COLUMN FOR SKY WRITING

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Fig. 1.



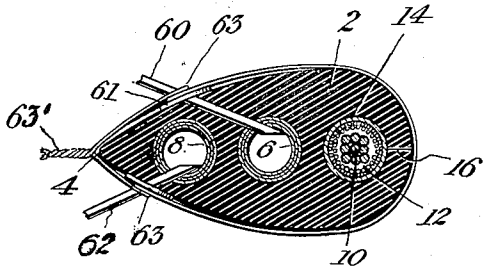


Fig. 2.

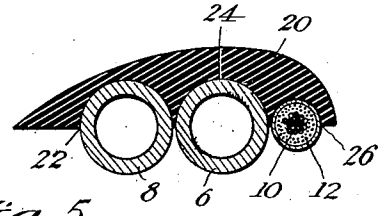


Fig. 5.

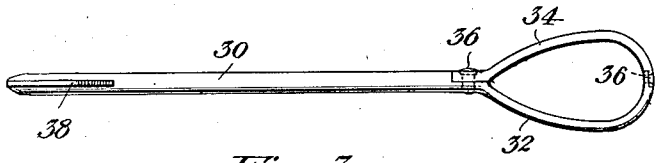


Fig. 3.

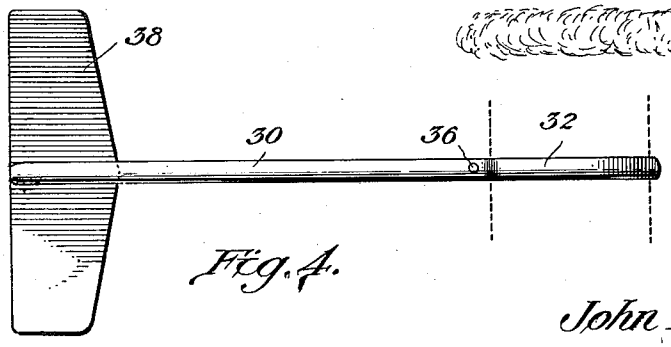


Fig. 4.

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COLUMN FOR SKY WRITING

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Fig. 6.

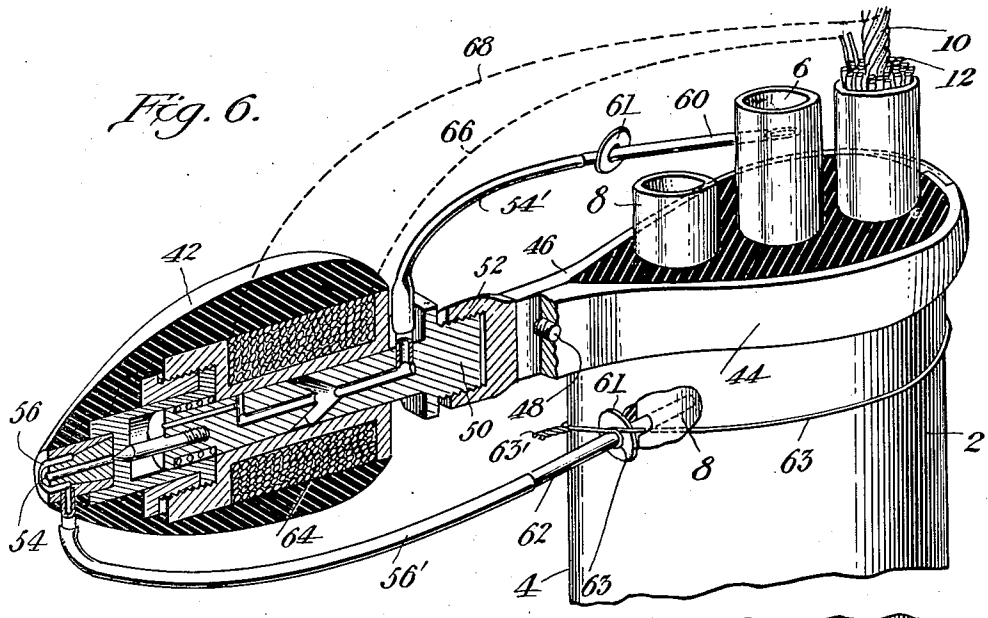


Fig. 7.

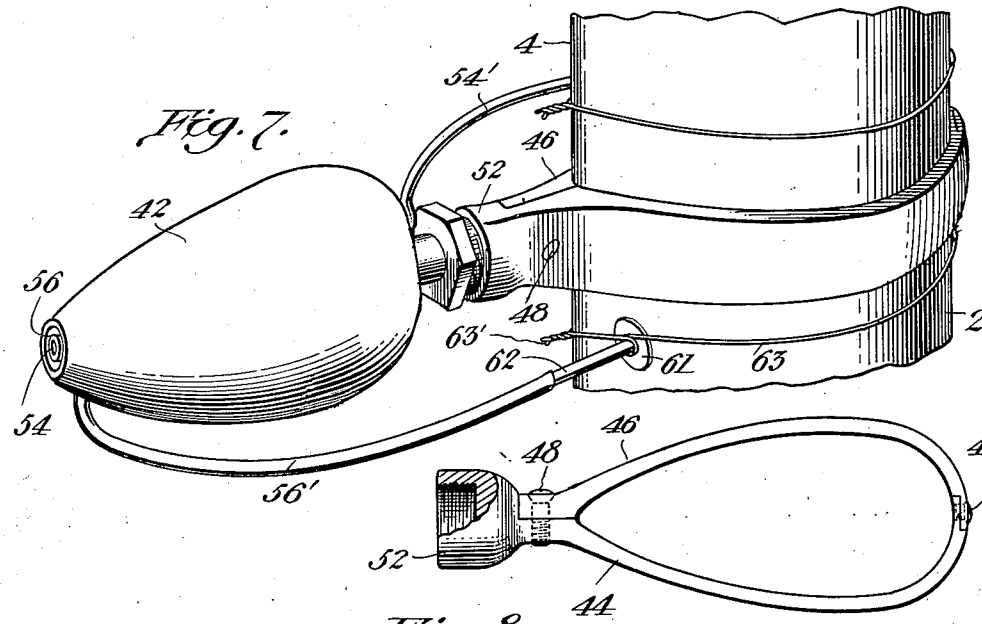


Fig. 8.

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Patented Dec. 22, 1936

2,065,024

UNITED STATES PATENT OFFICE

2,065,024

COLUMN FOR SKY WRITING

John T. Remey, New York, N. Y.

Application April 22, 1932, Serial No. 606,951

17 Claims. (Cl. 40—127)

This invention is a column for use in sky writing, and is an improvement over the column shown in my prior Patent No. 1,716,794, dated June 11, 1929.

The principal objects of the invention are:

1. To provide a stream lined column.
2. To lessen the wind resistance of the column.
3. To provide a flexible column which can be wound up on a drum in the aircraft.
4. To provide a column which will carry fluid and cable conduits and adequately support a plurality of smoke emitting valves.
5. To provide a column which will be stable, and not flutter or swing.
6. To provide a column which is susceptible of manufacture at reasonable cost.

A column of the type involved in this invention is used in the manner described in my prior patent, that is to say, it hangs downwardly from an aircraft in flight, although it might be placed in a stationary position, as on a building, and relative movement between the column and the air effected by the movement of air past the column.

This type of column is provided with a number of smoke emitting valves which can be accurately controlled, so as to form a plurality of smoke trails, the length and position of each of which is controlled by its corresponding valve in the column.

As fully explained in my prior patent, such smoke trails are substantially parallel and more or less contiguous and when properly placed, will cooperate in delineating and building up a finished letter, symbol, picture or other design.

Such a column is provided with a conduit for carrying a smoke forming fluid. The term "smoke" or "smoke forming fluid" is used in this specification in a broad sense, meaning any substance that when projected into the air will form a visible cloud or trail; accordingly, the term "smoke" is used in an illustrative sense only and is not to be limited to products of combustion.

The preferred smoke forming fluid is titanium tetrachloride, a heavy liquid which has the well known property of hydrolyzing upon coming in contact with the moisture in the air, to form a dense white cloud, commonly called "smoke".

The column of this invention, therefore, is provided with a conduit for carrying the smoke forming fluid.

Titanium tetrachloride, when projected from an ordinary nozzle, tends, after a time, to clog up the nozzle. In order to overcome this, I have patented a special type of nozzle, fully described in my prior Patent No. 1,792,929, granted February 17, 1931, where a small stream of titanium tetrachloride is projected from an opening, such opening, however, being surrounded by a continually issuing annular envelope of dry air, which air envelope insulates the titanium tetrachloride from contact with the surrounding air until it has traveled some distance from the nozzle, thereby preventing clogging of the valve.

The column of the present invention, therefore, is provided with a second conduit for carrying dry compressed air for the use just described.

The column of this invention is also provided with a cable, preferably metallic, of substantial strength for sustaining the weight of the entire column.

The several smoke emitting valves above mentioned are electrically controlled, and the column is accordingly provided with individual wires leading to each valve.

An important aspect of this invention is that the column is stream-lined; that is to say, the supporting cable, the two conduits and the wires, are enclosed in a stream-lined housing. The general principles of stream-lining are well understood in the aeronautic art. A good design is one in which the maximum width of the stream-lined housing is from a half to a third of the distance from the leading edge to the trailing edge.

A column of the type contemplated by this invention is intended to be wound up on a winch in the aircraft; the entire column is, therefore, flexible. The fluid conduits of the column are made of braided fabric, or fabric and rubber, so that they will not tend to twist when subjected to pressure. The stream-lined body of the column is preferably made of rubber or suitable resilient material so as to be readily flexible.

Suitable smoke emitting valves of the type shown generally in my Patent 1,792,929 are carried by the column and smoke forming fluid and dry air are tapped off from the conduits in the column to supply these fluids to each valve.

In order to prevent fluttering of the column and in general to stabilize it, there is provided a plurality of wind vanes provided with stabilizing fins for maintaining the column steady while the aircraft is in flight.

The lower end of the column may be provided with a stream-lined weight in order to hold the column as nearly vertical as possible.

The general features of the improved column having been thus outlined, reference will now be made to the accompanying drawings illustrating the present preferred constructions for the column. It should be understood, however, that these drawings are illustrative but not restrictive of the invention and that it is not to be limited to the precise details shown in these drawings.

In the drawings:—

Fig. 1 is a side view of a part of the column;

Fig. 2 is a horizontal cross section on a more enlarged scale;

Fig. 3 is a top or plan view of one of the stabilizing fins;

Fig. 4 is a side view of one of the stabilizing fins;

Fig. 5 is a cross section of a modified form of column;

Fig. 6 is a perspective view, much enlarged, and broken away, of a part of a column and a smoke emitting valve;

Fig. 7 is a perspective view of a part of a column and a smoke emitting valve; and

Fig. 8 is a plan view of a collar used with a smoke emitting valve.

Referring now to these drawings, in which similar reference characters indicate similar parts, the column comprises a stream-lined body portion 2, rounded at the leading edge, at the right, and tapering to a trailing edge 4, the maximum width being approximately one half of the distance from the leading to the trailing edge.

The body portion 2 is preferably made of rubber. Within the body portion 2, there are two fluid carrying conduits 6 and 8, molded in place in the rubber, these conduits being of a braided or other construction such that they will be flexible and will not twist when subjected to pressure. One conduit, as 6, is for the smoke forming fluid, and the other, as 8, is for the dry compressed air. Both these fluids are under considerable pressure and the conduits are designed to take care of this pressure.

Also placed in the body portion 2 is a strong weight sustaining cable 10, and in the same compartment with the cable 10 are individually insulated electric wires 12, one for each of the valves on the column.

In making such a column, the two fluid carrying conduits are molded in place in the rubber body portion 2, and at the same time a longitudinally extending passage 14 is also molded in the column. The column is then split along the surface 16 to open up this passage, the cable 10 and wires 12 then put in place in the passage 14 and cemented in place if necessary. The cut surfaces at 16 are cemented or otherwise secured together for sealing up passage 14 and its wires and cable.

Another way of making the column is shown in Fig. 5. In this case, the column is molded in complementary halves 20 of identical shape, semi-circular recesses 22, 24 and 26 being molded in each half. Conduits 6 and 8 are placed in recesses 24 and 22 respectively and cable 10 and wires 12 are placed in recess 26, then the other half of the column, identical with half 20 and provided with similar recesses, is put in position for completing the stream-lined shape, the two halves of the column being cemented together or held together in any suitable way, as by wires, or by collars extending around the column.

In order to stabilize the column, it is provided at suitable intervals with stabilizing fins, comprising a body portion 30 and complementary collar portions 32 and 34, one of which, as 32, may be integral with 30, while the other, as 34, is detachably held, by screws 36. Parts 32 and 34 are arranged to fit snugly around the column, and together form a snugly-fitting collar useful in holding together the two complementary halves 20 of the column.

The trailing end of the fin is provided with a vertical fin 38. A horizontal fin could be provided, if desired, but it is not usually necessary. All of the parts of the stabilizing fin are preferably die-cast at one operation in light metal.

At suitable intervals, the column is provided with smoke emitting valves, indicated generally at 42, which may be stream-lined if desired. These valves may be secured to the column by complementary collar members 44 and 46 which fit snugly around the column, part 46 being detachably held by screws 48.

The body portion of the valve 42 may be provided with a plug 50 which fits into a suitable socket 52 of member 44 so as to hold the valve in position.

The detailed construction of the valve 42 forms no part of this invention and is already fully described in my prior Patent No. 1,792,929. Such valve is arranged to project a stream of smoke-forming fluid from a central orifice 54, and to project an annular insulating envelope of dry air from an annular orifice 56 surrounding orifice 54. Smoke forming fluid is supplied to orifice or nozzle 54 from a pipe 54', while dry air is supplied to the annular nozzle 56 from a pipe 56'.

Pipes 54' and 56' are tapped into the conduits 6 and 8 respectively by puncturing the column and conduits with a hypodermic needle or the like, 60 and 62, as shown in Figs. 2 and 6, pipes 54' and 56' being connected to the needles. In order to hold the needles firmly in place and to prevent them from pulling out, small disks 61 may surround each needle just at the surface of the column; such disks could be soldered to the needles, and additionally a wire 63 could be placed around the column making a turn or two around each needle, the ends of the wire being secured to each other as at 63'.

The additional pressure in the conduit for the smoke forming fluid at its lower end, due to head of liquid, is compensated for by the design of the valve 42.

It will be understood that the described valve is also provided with an electro-magnet 64, one of the wires, as 66, for the magnet coming from one of the bundle of control wires 12, while the other wire 68 may be grounded on the cable 10.

The mechanism for controlling the opening and closing of the valves is in the aircraft and forms no part of this invention and is illustrated generally in my prior Patent 1,716,794, while an improved construction for such control mechanism is shown in my pending application filed March 22, 1932, Serial No. 600,523, now Patent No. 1,986,942, dated January 8, 1935. In brief, such control mechanism comprises a control sheet provided with perforations placed according to the pattern of the letter, symbol, or picture that it is desired to reproduce in smoke, and pick-up or feeler mechanism, controlled by the perforations in the control sheet, which mechanism in turn controls the smoke-emitting valves.

While the invention has been illustrated in some detail, it should be understood that the invention is not to be limited to the precise details herein illustrated but may be carried out in other ways, as falling within the scope of the invention as claimed.

I claim as my invention:—

1. A column for sky writing, comprising an elongated stream-lined body which is flexible throughout, said column having at least one passage therein extending for substantially its entire length, a pressure-resisting, fluid-carrying conduit, also flexible for its entire length, positioned in said passage, and extending for substantially the entire length of the column, a plurality of electrically-controlled, fluid-emitting valves regularly spaced along said conduit, and

means operatively connecting said valves with said fluid-carrying conduit.

2. A column for sky writing, comprising an elongated stream-lined body composed of a substantially solid mass of flexible material, whereby the column is flexible throughout, said body having at least one passage therein extending for the entire length thereof, this passage being adapted to carry a smoke-forming substance, a plurality of electrically-controlled, smoke-emitting valves at regularly spaced points along the column, and means operatively connecting said valves with the smoke-carrying passage.

3. A column for sky writing, comprising an elongated, flexible, stream-lined body made of rubber and having a plurality of passages therein extending for the entire length thereof, one of the passages being adapted to carry a smoke forming material, and valved means at spaced points along the column and in operative communication with the smoke carrying passage, for emitting smoke trails of controlled lengths.

4. A column for sky writing, comprising an elongated, flexible, stream-lined body having a plurality of passages therein extending for the entire length thereof, a supporting cable in one of said passages, a smoke conduit in another of said passages, and valved means at spaced points along the column, in operative communication with the smoke conduit, for emitting smoke trails of controlled lengths.

5. A column for sky writing, comprising an elongated, flexible, stream-lined body having a plurality of passages therein extending for the entire length thereof, a supporting cable in one of said passages, a smoke conduit in another of said passages, and a plurality of electrically controlled smoke-emitting valves along the column, in operative communication with the smoke conduit.

6. A column for sky writing, comprising an elongated, flexible, stream-lined body having three passages therein extending longitudinally thereof, one of said passages serving to house a supporting cable, while the other two serve respectively for carrying smoke and a compressed gas, and valved means in operative communication with the smoke and gas carrying passages, for emitting smoke trails of controllable lengths.

7. A column for sky writing, comprising an elongated, flexible, stream-lined body having three passages therein extending longitudinally thereof, one of said passages serving to house a supporting cable, while the other two serve respectively for carrying smoke and a compressed gas, and a plurality of smoke emitting valves at spaced points along the column, in communication with the smoke and gas carrying passages.

8. A column for sky writing, comprising in combination a supporting cable, electric control wires, fluid carrying means, a stream-lined housing enclosing said cable, wires and fluid carrying means, and valved means connected to the electric control wires respectively, in operative communication with the fluid carrying means, said valved means being placed at spaced intervals along the conduit, for making smoke trails of controlled lengths.

9. A column for sky writing, comprising in combination a supporting cable, electric control wires, conduits for carrying air and smoke forming material respectively, a molded, stream-lined housing enclosing said cable, wires and fluid carrying means, a plurality of fluid emitting valves carried by the column, and valved means connected to the electric control wires respectively, said valved means being in operative communication with the fluid carrying conduits and serving to emit smoke trails of controlled lengths.

10. A column for sky writing, comprising in combination a supporting cable, two fluid conduits, one for dry air and the other for titanium tetrachloride, a flexible, stream-lined housing enclosing the cable and conduits, and valved means at spaced points along the column in operative communication with the two fluid conduits for emitting smoke trails of controlled lengths.

11. A column for sky writing, comprising in combination a supporting cable, two fluid conduits for smoke and a compressed gas, respectively, a flexible, molded, stream-lined housing enclosing the cable and conduits, and a plurality of electromagnetically operated valves in fluid communication with each of said fluid conduits.

12. A column for sky writing, comprising in combination a supporting cable, an air conduit, a smoke conduit, a molded, stream-lined housing made of rubber, enclosing the cable and conduits, and valved means at spaced points along the column, in operative communication with the two conduits, for emitting smoke trails of controlled lengths.

13. A column for sky writing, comprising in combination a supporting cable, an air conduit, a smoke conduit, a molded, stream-lined housing made of rubber, enclosing the cable and conduits, and a plurality of electrically controlled and intermittently operable air and smoke emitting valves carried by the column at regularly spaced points therealong, the valves being in fluid communication with the air and smoke conduits.

14. In combination with a column for sky writing purposes, a plurality of controllable and intermittently operable smoke emitting valves spaced at intervals along the column, and wind vanes secured to the column, between certain of said valves, for stabilizing said column.

15. In combination, a flexible column for sky writing purposes, a plurality of controllable and intermittently operable smoke emitting valves carried at regular intervals along the column, and rearwardly extending wind vanes between certain of said valves, for stabilizing said column.

16. The method of making a column for use in sky writing, comprising the steps of molding a body portion around a fluid carrying conduit, said body portion having simultaneously formed therein a longitudinally extending passage for a supporting cable, then placing and securing a supporting cable in said longitudinal passage.

17. The method of making a column for use in sky writing, comprising the steps of molding a body portion around a fluid carrying conduit, said body portion having simultaneously formed therein a longitudinally extending passage for a supporting cable, placing and securing a supporting cable in said passage, mounting fluid emitting valves on said body portion and establishing fluid connection between the valves and fluid conduit by puncturing through the body portion into said conduit.

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