J. MEANS.

SIGNALING SYSTEM.

APPLICATION FILED JULY 1, 1908.

922,709.

Patented May 25, 1909.

2 SHEETS—SHEET 1.

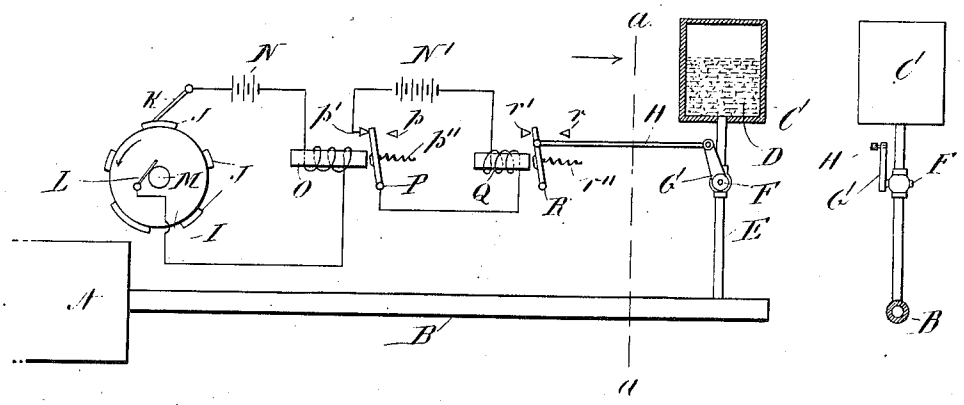


Fig. 1.

Fig. 1a

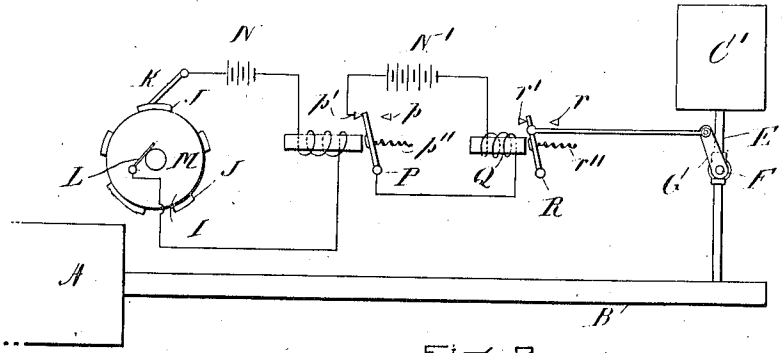


Fig. 2.

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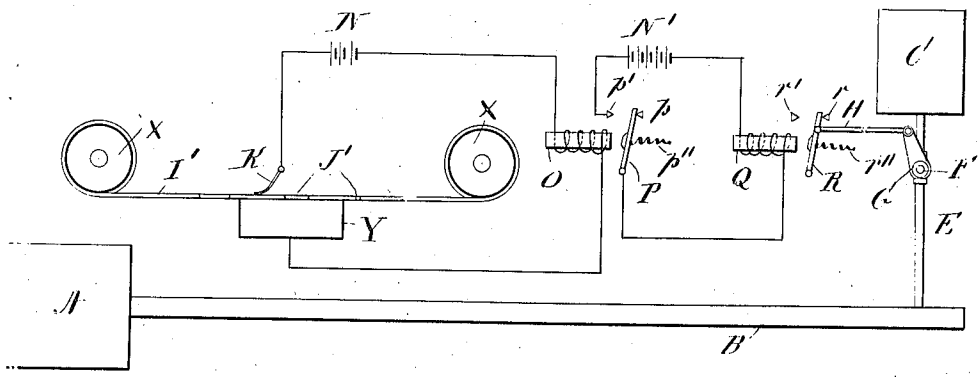


Fig. 3.

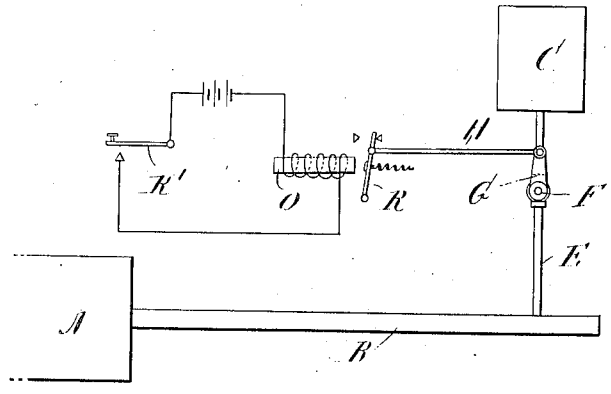


Fig. 4.

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JAMES MEANS, OF BOSTON, MASSACHUSETTS.

SIGNALING SYSTEM.

No. 922,709. Specification of Letters Patent. Patented May 25, 1909.

Application filed July 1, 1908. Serial No. 441,313.

To all whom it may concern:

Be it known that I, JAMES MEANS, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Signaling Systems, of which the following is a specification.

My invention relates to signaling systems, and its object is to provide a system whereby signals may be transmitted automatically or otherwise from a motor-propelled or other aerial machine.

With this object in view my invention consists in the novel combination and arrangement of parts set forth in the appended claims.

The drawings which accompany and form a part of this specification illustrate partly in diagram several embodiments of my invention; but it will be understood that many modifications may be made by those skilled in the art in the apparatus and circuit arrangements therein illustrated without departing from the principle of my invention.

In the drawings, Figure 1 is an elevation, partly in diagram and partly in section, of one embodiment of my invention whereby a distinctive color is imparted to the exhaust of the motor of a flying machine to produce intelligible signals. Fig. 1[a] is a section taken on the line *a*—*a* of Fig. 1. Fig. 2 represents a modification whereby pyrotechnic material may be injected into the exhaust of the motor of an aerial machine to produce intelligible signals. Fig. 3 represents a modification of the system shown in Fig. 1, whereby the signaling apparatus is controlled by a perforated tape. Fig. 4 is a modification of the system shown in Figs. 1 and 3 whereby an ordinary telegraph key is employed to control the signaling apparatus.

In the figures, A represents the cylinder of an explosive or other engine such as employed in motor-propelled aerial machines, and B is the exhaust pipe of said motor. Communicating with said exhaust pipe by means of a tube E, provided with a valve F, is a vessel C which may contain any suitable coloring material D such as carbon particles suspended in a liquid for imparting to the exhaust of the motor a dark or other distinctive color. In order to produce intelligible signals, such as the signals of the Morse or other telegraph code, I may provide means for controlling the valve F in accordance with the signal to be transmitted. For this purpose I have shown an automatic transmitter such as the ordinary disk transmitter I, provided on its periphery in the present instance with long and short contact pieces J and arranged to open and close the circuit of the battery N through the electromagnet O by means of the brushes K and L which contact respectively with the members J and ring M. It will be understood, however that any other suitable type of automatic transmitter may be used in place of the disk transmitter shown in Fig. 1. For example, in Fig. 3 I have represented another type of automatic transmitter consisting of the tape I′ carried by the rolls X X and provided in the present case with long and short perforations J′ whereby the circuit of the battery N may be closed through the electromagnet O by means of the brush K and contact plate Y. It is, however, unnecessary to employ an automatic transmitter for controlling any of the signaling systems shown herein, because as illustrated in Fig. 4, an ordinary Morse key K′ may be used to control the energization of the electromagnet O which in turn, directly or indirectly, controls the signaling apparatus.

In Figs. 1, 2, and 3, the magnet O controls the signaling apparatus through the intermediary of the magnet Q which is energized by the battery N′, the circuit of which is opened and closed by the operation of the armature P of the magnet O. The said armature P normally is held against its back-stop *p* by the spring *p*″ and closes the circuit of the battery N′ at its front contact *p*′ when the magnet O is energized. It will be understood, however, as shown in Fig. 4, that it is sometimes unnecessary to employ the intermediate magnet Q inasmuch as the armature R may be operated directly by the magnet O.

The armature R, shown in Figs. 1, 2, and 3, as actuated by the magnet Q, may be connected with the signaling apparatus in any suitable manner, and as shown in Fig. 1, it is arranged to open and close the valve F by means of a rod H pivotally connected to said armature and to the crank G, which is rigidly secured to the plug of the valve F. The armature R is normally held against its back contact *r* by the spring *r*″, and when the magnet Q is energized, said armature is drawn over to its front stop *r*′ and by means of the rod H opens the valve in the pipe E for a period of time equal to the duration of the contact between the brush K and one of

the contact pieces J. When the contact between the members J and K is broken, the spring r'' will effect the closure of the valve F.

It will be obvious from the foregoing description that any predetermined signal may be transmitted automatically by darkening the exhaust from the motor of an aerial machine for long or short periods corresponding to the dashes and dots of a telegraphic code and that the signals so produced in the wake of the aerial machine will be outlined against the sky and will be readable by means of a field glass at a distance.

To provide for transmitting signals from an aerial machine at night when the signals produced by darkening the exhaust would not be visible, I may use the apparatus shown in Fig. 2. In Fig. 2 the vessel C′ may contain strontium or other pyrotechnic material, which may be suspended in a suitable liquid, so that the operation of the valve F by the automatic transmitter will deliver to the exhaust pipe B for varying intervals of time corresponding with the elements of a telegraph code a substance readily ignitible by the hot gases of the exhaust of the motor to produce thereby flashes of colored or other light. The signals produced by the apparatus shown in Fig. 2 may be read at night by the naked eye or a telescope by a receiving operator at a distance from the flying machine.

It will be understood of course that a flying machine equipped with the apparatus hereinbefore described would carry a number of disks such as shown at I constructed to send such messages as desired, and that a disk could be readily removed and replaced by another on the usual clock-work-driven apparatus well known in automatic wire-telegraphy. It is not necessary, however, to design such disks to send messages in telegraph code characters, such as dots and dashes, inasmuch as it may be desirable to arrange said disks to send numerical visible or audible signals such as the numerical flash signals sometimes employed by light-houses. It will be understood that a number of rolls X provided with tape I′ perforated to send different messages would be carried by the aerial machine and that such rolls could be readily removed and replaced by others on the driving apparatus which causes the tape to travel over the contact block Y.

As will be obvious, the several forms of signaling apparatus hereinbefore described may all be operated by a manual key such as shown at K′.

By means of the present invention the operator of a flying machine will be enabled automatically or otherwise to transmit signals to other machines or to earth. One of the chief advantages of said invention resides in the facility with which an aerial scout in time of war can furnish his commander with information of the enemy's position and movements, etc., and in the readiness with which a given order or piece of information may be prepared on the disk or tape and the latter inserted in the driving apparatus.

Although I have shown electrical means for controlling the signaling apparatus to produce long and short signals, it will be understood of course that such control may be effected in any other suitable manner.

I claim:

1. In a motor-propelled aerial machine, the combination with a motor exhaust pipe of means for introducing into said exhaust pipe matter for imparting a distinctive color to the exhaust and a transmitter for controlling said means.

2. In a motor-propelled aerial machine, the combination with a motor exhaust pipe of means for introducing into said exhaust pipe matter for darkening the exhaust and a transmitter for controlling said means.

3. In a motor-propelled aerial machine, the combination with a motor exhaust pipe of a vessel containing means for darkening the exhaust, a tube connecting said vessel with said exhaust pipe, a valve in said tube and a transmitter for controlling said valve.

4. In an aerial machine, a signaling system comprising in combination a vessel containing coloring matter, an outlet from said vessel, a valve for controlling said outlet and a transmitter for controlling said valve.

5. In an aerial machine, a signaling system comprising in combination a vessel containing coloring matter, a conduit through which a current of gas is adapted to pass, an outlet from said vessel communicating with said conduit, a valve for controlling said outlet and a transmitter for controlling said valve.

In testimony whereof, I have hereunto subscribed my name this 30th day of June 1908.

JAMES MEANS.

Witnesses:
CHARLES C. KURTZ,
GEO. K. WOODWORTH.