No. 855,046. PATENTED MAY 28, 1907.

L. B. COUSANS.

STARTER FOR BLOWERS.

APPLICATION FILED DEC. 17, 1904. RENEWED APR. 22, 1907.

2 SHEETS—SHEET 1.

FIG. 1.

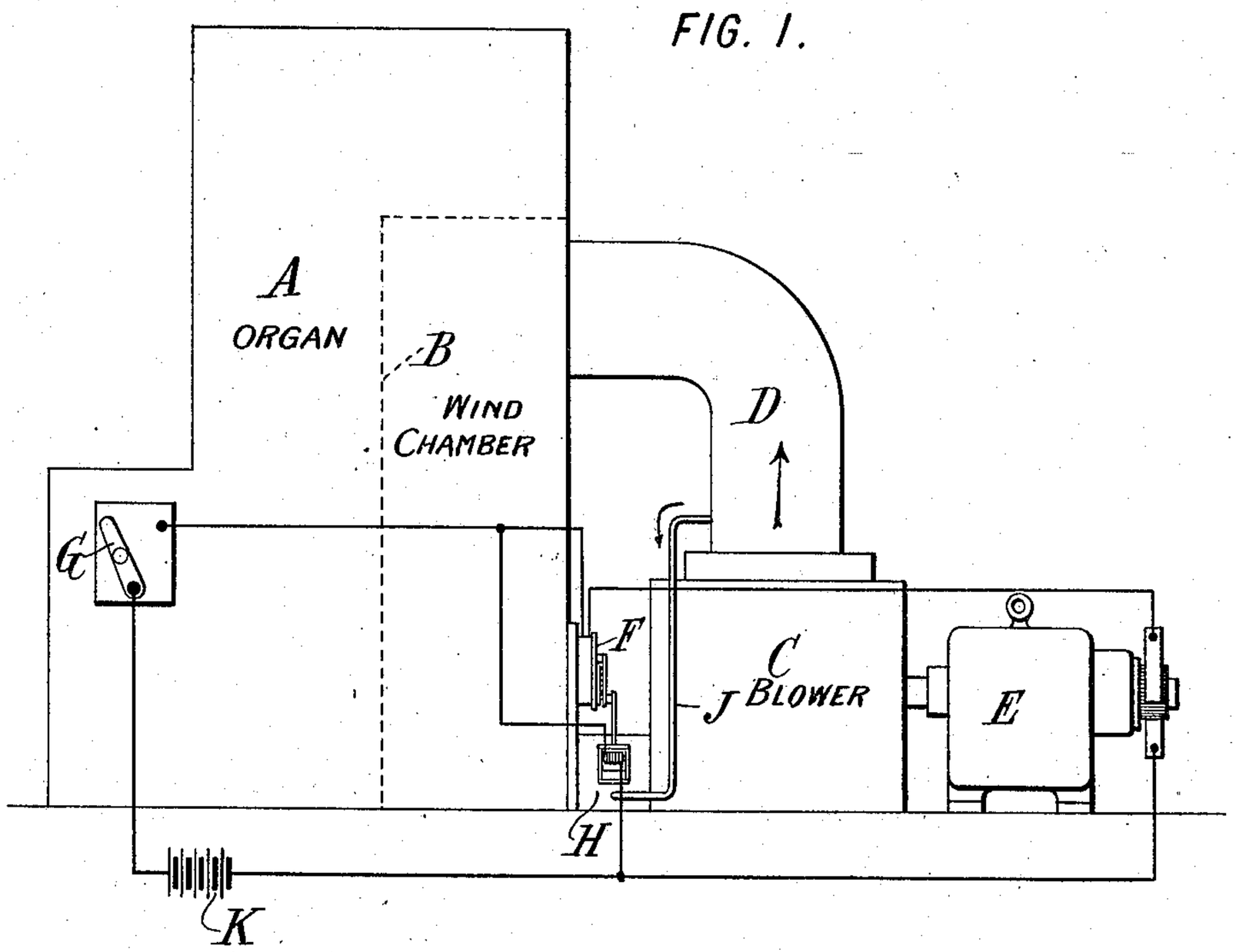
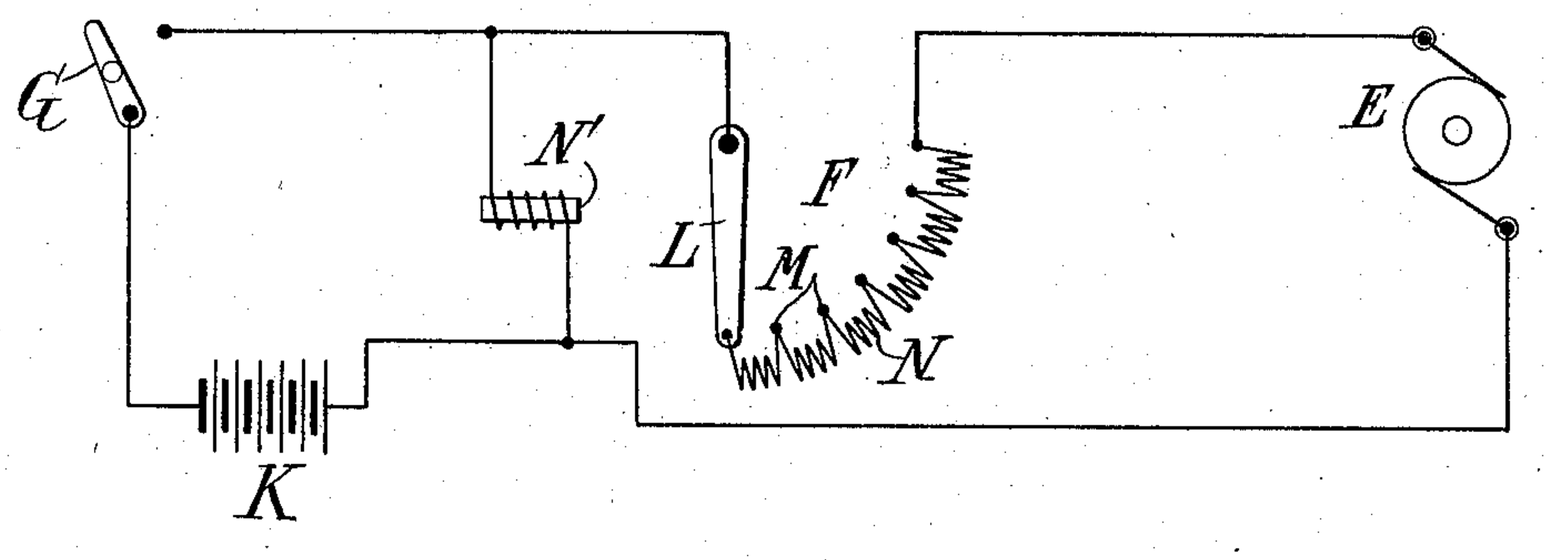


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

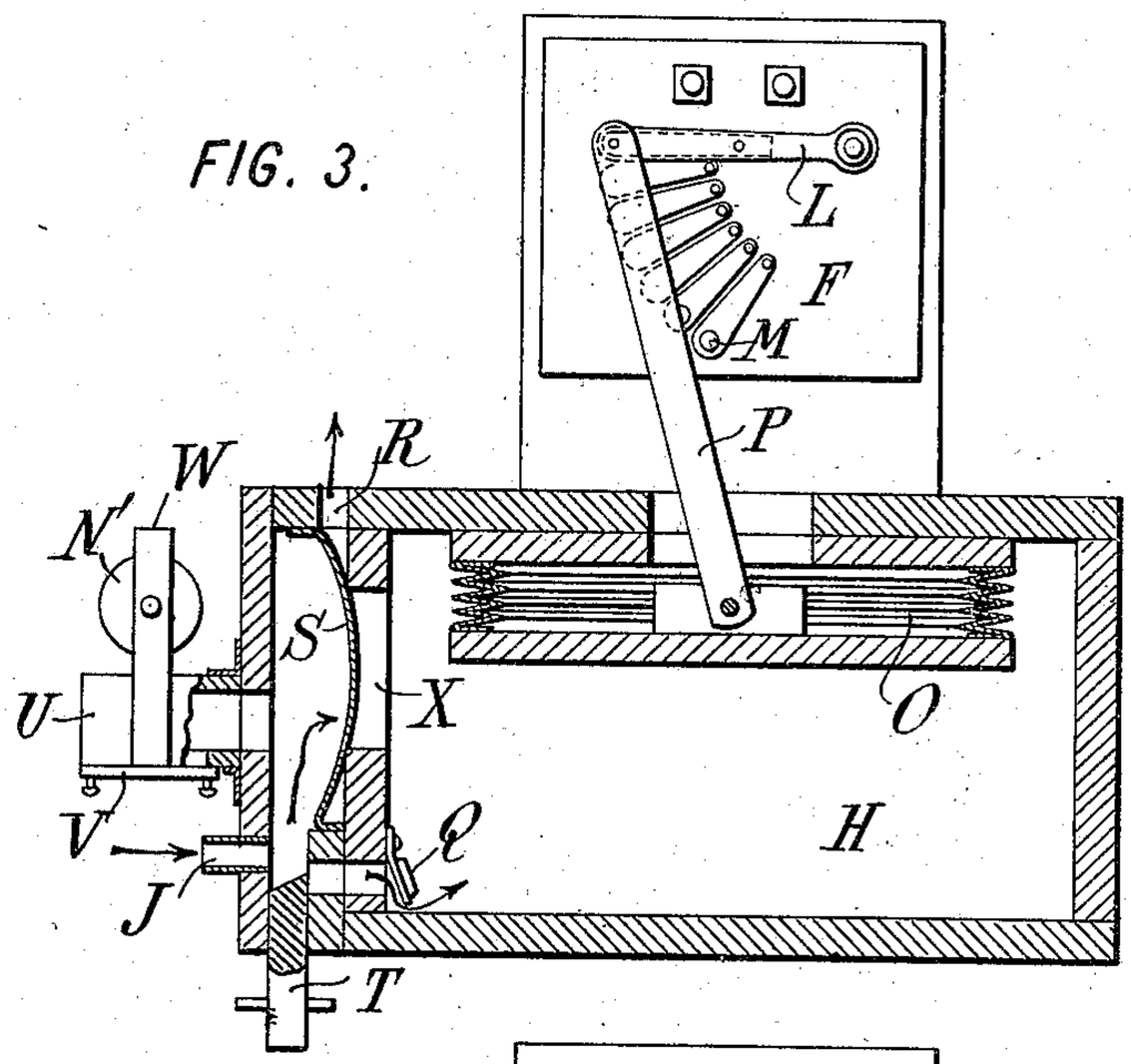


FIG. 4.

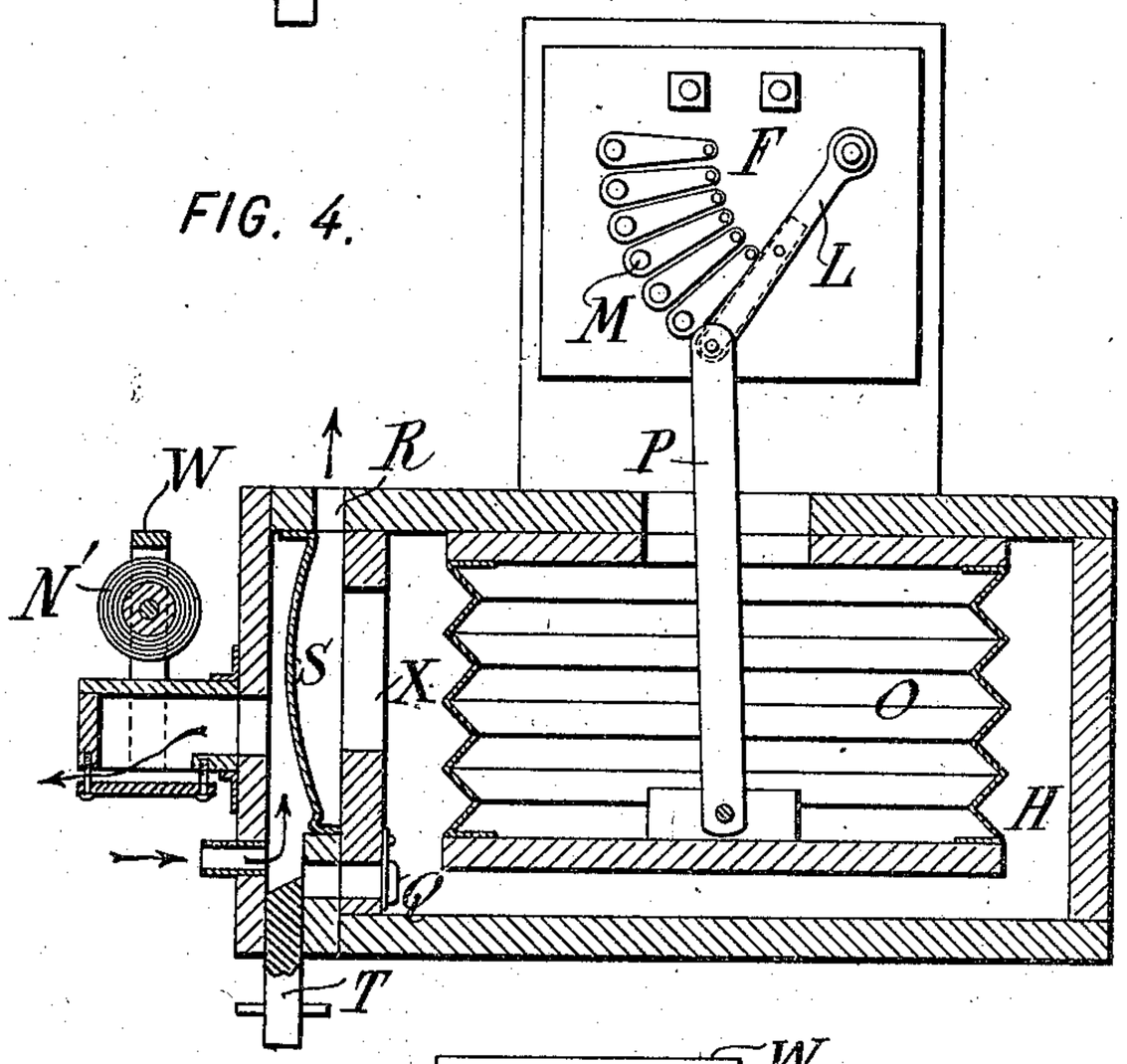
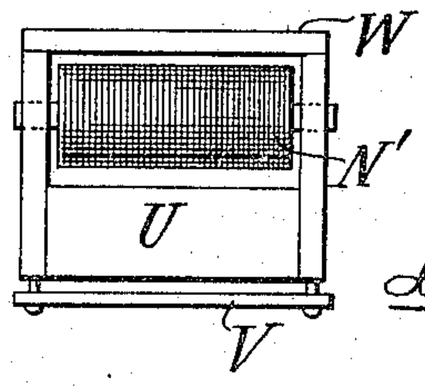


FIG. 5.



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UNITED STATES PATENT OFFICE.

LOUIS BERTRAM COUSANS, OF LINCOLN, ENGLAND.

STARTER FOR BLOWERS.

No. 855,046. Specification of Letters Patent. Patented May 28, 1907.

Application filed December 17, 1904. Renewed April 22, 1907. Serial No. 369,579.

To all whom it may concern:

Be it known that I, LOUIS BERTRAM COUSANS, a subject of the King of Great Britain and Ireland, residing in Lincoln, England, have invented certain new and useful Improvements in Starters for Blowers, of which the following is a specification.

In blowers operated by continuous-current motors, it is necessary to admit the current gradually to avoid burning out fuses or worse damage. This is usually accomplished by means of a rheostat which gradually cuts out certain resistances in the circuit in a well known way. The operator has to move the arm of the rheostat slowly from the cut-off point to the point of maximum current. When the blower is to be stopped the arm of the rheostat must be thrown back entirely to the zero position. For the purpose of organ blowing it is customary to place the motor at some distance from the organ, often in another room, chiefly to avoid any noise from the blower interfering with the music. Sometimes it is placed in such situations that the operator has not access to the rheostat directly, but only through a lever and cord or other transmission device. Again, organ players are often not sufficiently versed in machinery to appreciate the necessity of operating the rheostat slowly.

According to the present invention there is provided a starter for a blower in which the current is gradually increased automatically. It is only necessary for the operator to swing the lever of an ordinary switch. The switch may be located adjacent to the key-board of the organ, while the rheostat and blowing apparatus are located at any desired distance. Preferably also means are provided for suddenly shifting the rheostat to its position of maximum resistance from its ordinary working position, so that the motor must always start with a minimum flow of current. The rheostat is preferably controlled pneumatically, the blower providing the necessary air pressure.

Certain other improvements are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 illustrates a complete plant, the blower, motor and rheostat being arranged immediately in the rear of the organ for the sake of convenience in illustration. Fig. 2 is a diagram of the electric circuits. Fig. 3 is a central, vertical section through the pneumatic device for controlling the rheostat, showing the same in the running position. Fig. 4 is a view of the same mechanism in idle position. Fig. 5 is an end view of the relief valve.

Referring now to the embodiment illustrated, A represents an organ having at its back a wind chamber B.

C is a blower discharging into the wind chamber of the organ through the trunk D and operated by means of an electro motor E. The current to the electro motor is controlled by means of a rheostat F and a hand switch G adjacent to the key-board. The rheostat in turn is controlled by a pneumatic apparatus, indicated as a whole by the letter H, and which is supplied with air under pressure slowly through the branch J from the trunk D. The electric circuit passes from a source K through the switch G to the arm L of the rheostat, and thence to one or other of the contacts M, and through a corresponding number of resistance coils N to the brushes of the motor E, and thence back to the source of current. An electro magnet N′ is introduced into a branch circuit for suddenly releasing the rheostat arm in the manner hereinafter explained. The rheostat contains no cut-off point, and in that respect differs from the ordinary rheostat. When the motor is not running the rheostat is in the position to introduce the maximum number of resistance coils in the circuit. The only break in the circuit is at the switch G.

When the switch is closed a minimum current flows to the motor, and air is slowly pumped through the trunk D and through the branch J into the rheostat-controlling apparatus H. The pipe J is preferably made small to insure a slow admission of pressure to the apparatus H. The pressure then forces the arm L of the rheostat to the next contact point, which results in an increased speed of the motor and an increased pressure of air, which in turn results in moving the rheostat arm forward. Thus the action is continued until the maximum speed and pressure are obtained. When the switch G is opened the air in the apparatus H escapes, preferably by a special quick-escape mechanism, and the arm L of the rheostat drops to its original position.

The casing or box of the apparatus H carries within it a bellows O, the bottom of which is connected by means of a link P with

the arm L of the rheostat. Air enters the box H through a flap valve Q opening inward to force upward the bellows. The air from the box H escapes through the outlet R by way of a diaphragm valve S.

T is a hand-valve for regulating the opening of the inlet and determining the rapidity with which the rheostat is operated.

A pipe or box U is arranged in the rear of the diaphragm S, and has on its under side a large valve V which forms in effect the movable armature of an electro magnet whose coil is indicated at N'. A bar of iron W is arranged across the poles of the magnet at opposite ends to the armature V, for the purpose of weakening the strength of the pull upon the armature when it is desired to drop the latter.

As soon as the switch is closed the current passes through the electro magnet N' and closes the valve V. The motor operates at the same time, and air at a low pressure is introduced through the pipe J. This air presses against the back of the diaphragm S, where (as soon as the diaphragm closes) there is a greater area exposed than from the opposite side, and the diaphragm is thus held pressed against the seat X to close the opening therethrough. The first air entering the small chamber at the back of the diaphragm closes the latter, after which the entire back of the diaphragm remains exposed to at least as high a pressure per square inch as exists at the front, while the exposed area at the front is limited to the area of the opening X. The air at the same time passes through the flap valve Q into the box, and gradually lifts the bottom of the bellows. This operation continues, the pressure within the box H becoming greater until the maximum is reached, which is maintained as long as the switch is closed. As soon as the switch is opened the current is cut off from the electro magnet N', and the valve V drops, opening a large space. The pressure behind the diaphragm S is decreased, the opening of the valve V being such as to release the pressure faster than it can be admitted from the pipe J. The flap valve Q closes, and the pressure in H forces outward the diaphragm S in the manner indicated in Fig. 4, and the air escapes freely through the opening R, dropping the rheostat arm L to its lowest position suddenly. The usual magnet for holding the arm of the rheostat in its elevated position is not needed, the pressure in the box H serving this purpose. The non-return valve Q by its closing cuts off the box from any residual air pressure which might come from the pipe J, and which might retard the dropping of the rheostat R; at the same time it prevents a rush of air from the box H to the rear of the diaphragm S, which might resist the opening of the passage through X.

Though I have described with great particularity of detail certain embodiments of my invention, yet it is not to be understood that the invention is limited to the specific constructions illustrated. Various modifications thereof in detail and in the arrangement and combination of the parts may be made by those skilled in the art without departure from the invention.

What I claim is:—

1. The combination with an electrically-driven organ blower, of a switch for making and breaking the electric circuit, a rheostat controlling the current in use, and a pneumatic apparatus H controlling said rheostat, said apparatus having a main chamber receiving air from the blower, a diaphragm S closing the outlet of said chamber and held closed by air pressure on its rear face, and an electrically-operated valve V for releasing the pressure at the rear of said diaphragm when the current is cut off.

2. The combination with an electrically-driven organ blower, of a switch for making and breaking the electric circuit, a rheostat controlling the current in use, and a pneumatic apparatus H controlling said rheostat, said apparatus having a main chamber receiving air from the blower, a diaphragm S closing the outlet of said chamber and held closed by air pressure on its rear face, an electrically-operated valve V for releasing the pressure at the rear of said diaphragm when the current is cut off, and a check-valve Q opening inwardly into said chamber.

3. The combination with an organ having a wind chamber B, of an electrically-driven blower C therefor, a switch G for making and breaking the electric circuit, a rheostat G at a distance from said switch and controlling the current in use, and a pneumatic apparatus H controlling said rheostat, having a main chamber connected by a pipe J with the blower, an outlet diaphragm valve S from said chamber normally held closed by air pressure on its rear face, and a valve V for releasing the pressure of said valve S when the circuit is opened.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LOUIS BERTRAM COUSANS.

Witnesses:
RICHARD WESTACOTT,
H. D. JAMESON.