(No Model.)

F. S. SMITH.

ORGAN BELLOWS.

No. 440,375. Patented Nov. 11, 1890.

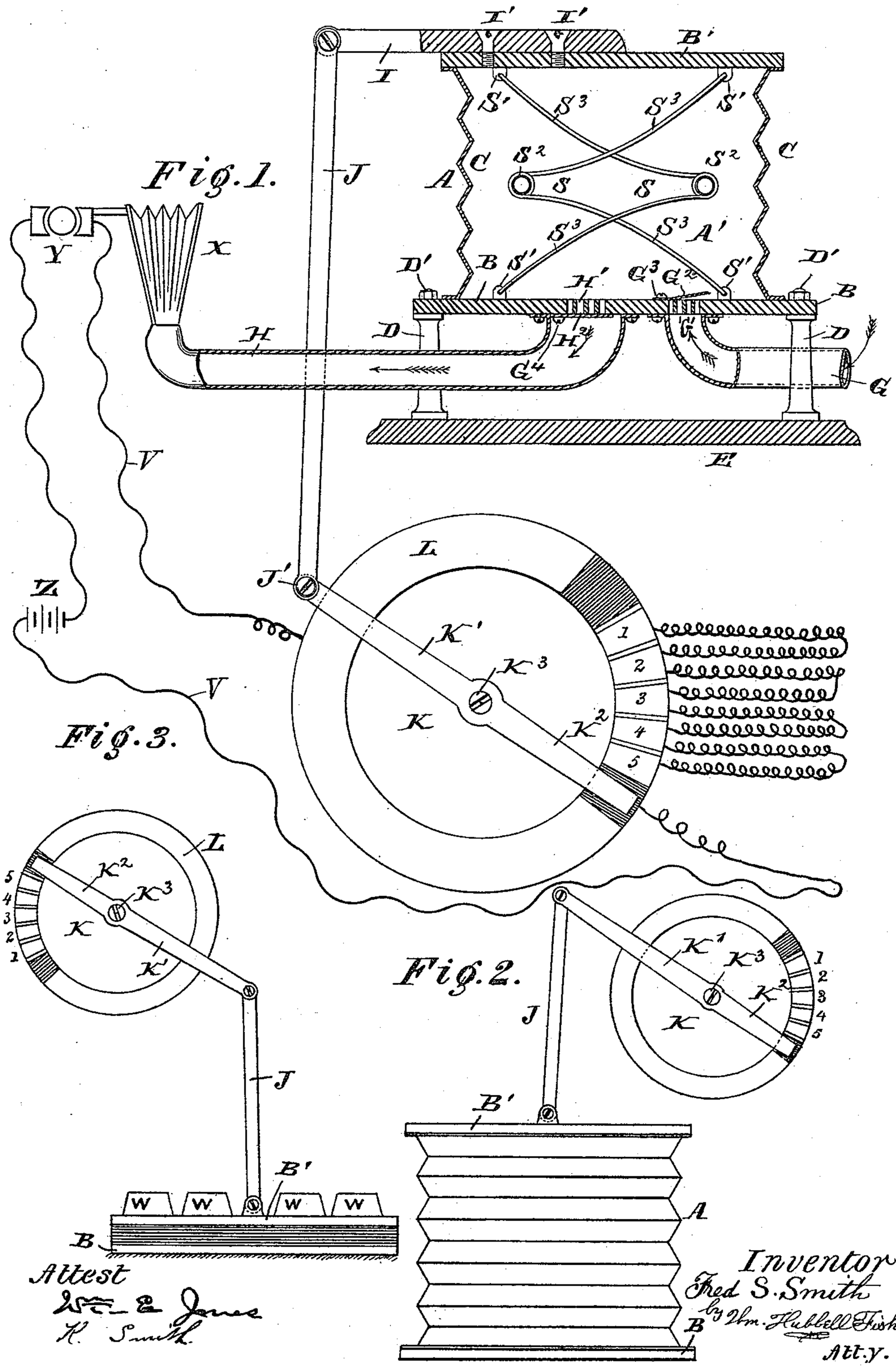

Fig. 1.

Fig. 3.

Fig. 2.

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ORGAN-BELLOWS.

SPECIFICATION forming part of Letters Patent No. 440,375, dated November 11, 1890.

Application filed July 17, 1890. Serial No. 359,038. (No model.)

To all whom it may concern:

Be it known that I, FRED S. SMITH, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Mechanism for Regulating the Action of the Bellows for Musical Wind-Instruments Operated by an Electric Motor, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of this specification, and to which reference is hereby made, Figure 1 is a part elevation and part section of an apparatus embodying my invention. Fig. 2 is an elevation of an apparatus illustrating my invention, and showing a different mode of connection between the rheostat and a bellows. Fig. 3 is an elevation of an apparatus, and showing one mode of applying my invention to a description of bellows different from that shown in Figs. 1 and 2.

In Fig. 1, A indicates the bellows, B indicates the bottom thereof, and B′ the top thereof. C C respectively indicate the respective sides, both of which fold after the well-known manner of a blacksmith's bellows or the sides of an accordion.

The bottom B of the bellows is suitably supported. In the present illustrative instance it is upheld on posts D, and it is secured to the tops of these posts by nuts D′, screwed to the said tops of these posts, one nut to each post. These posts in turn are secured to and are upheld by a basal support E.

The bellows A draw or suck air through the pipe or conduit G. This pipe G connects with the organ or other musical wind-instrument, and as the keys of the organ or other instrument are touched air is drawn through its pipes or equivalent music-making devices, and the musical sounds of the musical instrument are thereby caused. This pipe connects with opening or openings G′, leading through the base B into the space A′ within the bellows. This opening is guarded by a valve G^2, preferably a flat one, as shown, located on the inside of the bellows and against the openings G′, and secured in place by a screw G^3. All egress of air from the bellows through openings G′ and conduit G is thereby prevented. Any desired means may be employed to expand these bellows, and thus draw air through the reeds of the musical instrument. The preferred means for this purpose are shown in Fig. 1, and consist of the springs S, each having a central spiral S^2, uniting diverging lever-arms S^3. One arm of each spring is secured to the top of the bellows and the other arm thereof is secured to the bottom of the said bellows, the connection between the springs and the bellows being preferably of a pivotal character. The tendency of these arms is to force apart the parts B′ and B of the bellows. Air is withdrawn from the space within the bellows by means of a conduit H and air passage or passages H′ through and at the bottom of the base B of the bellows. The inflow of air into the bellows through pipe H is prevented by the valve H^2, preferably a flap-valve, secured at G^4 to the base B, as shown.

To a movable side, as B′, of the bellows is connected in any suitable manner an arm I. In the bellows shown in Fig. 1 the arm is secured flatwise on the side B by screws, as I′ I′. To the free end of this arm is pivoted one end of a connecting-rod J. The other end of this connecting-rod is pivotally connected at J′ to one end or arm K′ of the rheostat oscillatory bar K. This lever rotates on a pivot K^3. The other arm K^2 of this oscillatory bar K moves over and in connection with the face of a rheostat. The usual wires and electrical connections of the rheostat are well known and require neither description nor further illustration. The movement of the arm K from five toward one increases the resistance to the electrical current, and consequently diminishes the amount of electrical current furnished to the exhaust or motor bellows located at the end of conduit H. These motor-bellows are operated by an electrical engine or motor Y of suitable construction. This engine or motor receives power from a battery or other suitable source of electric power. The circuit-wire V connects with the engine or motor Y, rheostat L, and the source of electrical power

in any well-known manner. On the drawings in Fig. 1 I have shown the motor-bellows and the electrical engine or motor Y and electrical source of power Z in a conventional manner and on a diminished scale. When all the air in the bellows A is exhausted, the latter are ready for fullest operation. As the organ or other reed-instrument is played, the bellows continue to draw air through conduit G, and thereby fill with air until they attain the position shown in Fig. 1, at which time they are useless.

By my invention the bellows A cannot attain the position shown in Fig. 1, for the reason that as the top B′ rises the electrical current in greater force is allowed by the rheostat to reach and operate the suction-bellows operated by the electrical engine, and which exhaust the air from bellows A.

The bellows A will always be kept at an average working condition of exhaustion, and will always, therefore, be in working condition. In this way the organ or other reed-instrument to be played will never be without air.

A very marked advantageous result of my improvements is this, viz: The pressure or suction of air on the reeds will be always substantially the same, thus enabling the operating musician to depend upon his instrument and to elicit tones of the kind he desires. When the heavy swell is on, and air is rapidly drawn through the reeds and the bellows A rapidly filling, the rapid outward movement of the side B′ of the bellows will cause the rheostat to as quickly allow increased electrical force to the electrical engine or motor, and the motor-bellows will work with increased rapidity, and thus exhaust the air from bellows A. In this way a constant and equal pressure of air is present, and the musical instrument will operate evenly and with uniformity.

In Fig. 2 the upper or movable side B′ of the bellows is pivotally connected directly to one end of the connecting-rod J. The other end of this rod J is pivotally connected to the arm K′ of the oscillatory bar K of the rheostat.

In Fig. 3 the connecting-rod J is pivotally connected to the top B′ of a bellows connected to the musical instrument, but operated by pressing the air through the reeds instead of sucking it through. Thus when these bellows are closed down, as in Fig. 3, they are inoperative, whereas the bellows shown in Figs. 1 and 2 are in working condition when closed and inoperative when open. The motor-bellows X will therefore be constructed to force air into these bellows, (shown in Fig. 3,) and they will be connected to an inlet-conduit, as G, controlled by a valve, substantially as G^2. The wind-instrument will be connected to an air-conduit, as H, controlled by a valve, substantially as H^2. The automatic means for causing these bellows to contract are of any desirable kind. A very common and simple kind of such means is shown, and consists of weights (indicated by W) placed on the movable top piece or side B′ of the bellows. As these bellows operate in a direction the reverse of those shown in Figs. 1 and 2, the position of the rheostat in relation thereto will be reversed, and the relation of the resistance portions 1 2 3 4 5 will be successively located in a position in relation to the bar K the reverse of that which they occupy on the rheostat in Figs. 1 and 2.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The bellows of a musical wind-instrument and an electrical engine for operating them, and an electrical circuit and electrical source of supply, a rheostat, and a rheostat-bar connected to the bellows for regulating the amount of air in the bellows and the speed of the motor and the amount of the electrical current, substantially as and for the purposes specified.

2. The bellows of a musical wind-instrument and the air inlet and exit conduits and valves respectively controlling said conduits, and motor-bellows, and electrical engine or motor for operating the latter, rheostat, rheostat-bar K, connecting-rod J, pivotally connected to bar K and to a movable post, as B′, of the bellows, and electrical circuit and source of power, substantially as and for the purposes specified.

3. The bellows of a musical wind-instrument, air-inlet conduit and air-exit conduit, valves, a rheostat, the oscillatory bar of the rheostat being connected to and moving with a movable side of the bellows, also a motor-bellows, electrical engine or motor for operating the latter, electrical circuit, and electrical source of power, substantially as and for the purposes specified.

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