

J. T. AUSTIN.

PNEUMATIC ACTION AND COUPLER FOR ORGANS.

No. 585,946.

Patented July 6, 1897.

Fig. 1

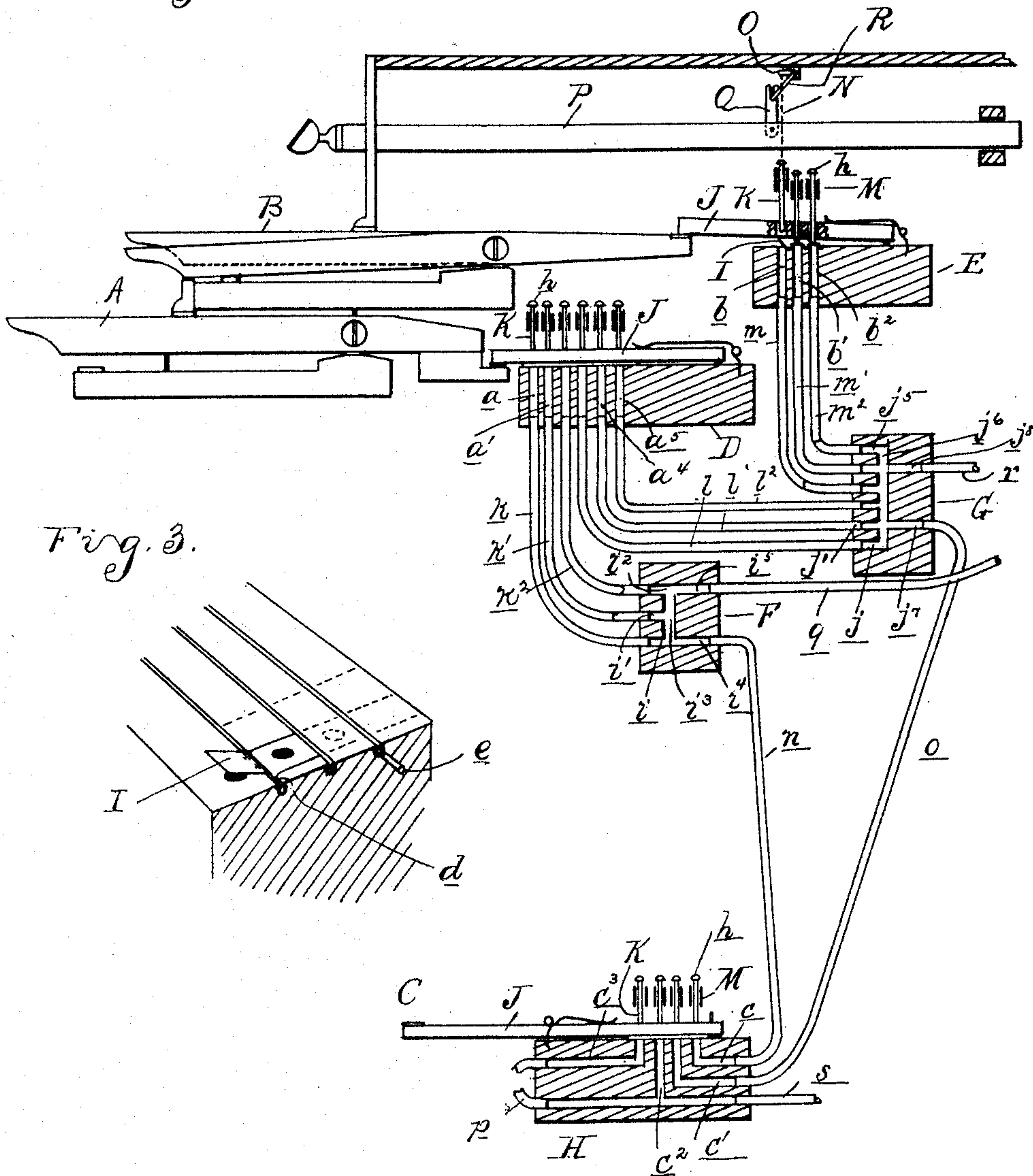


Fig. 3.

Witnesses  
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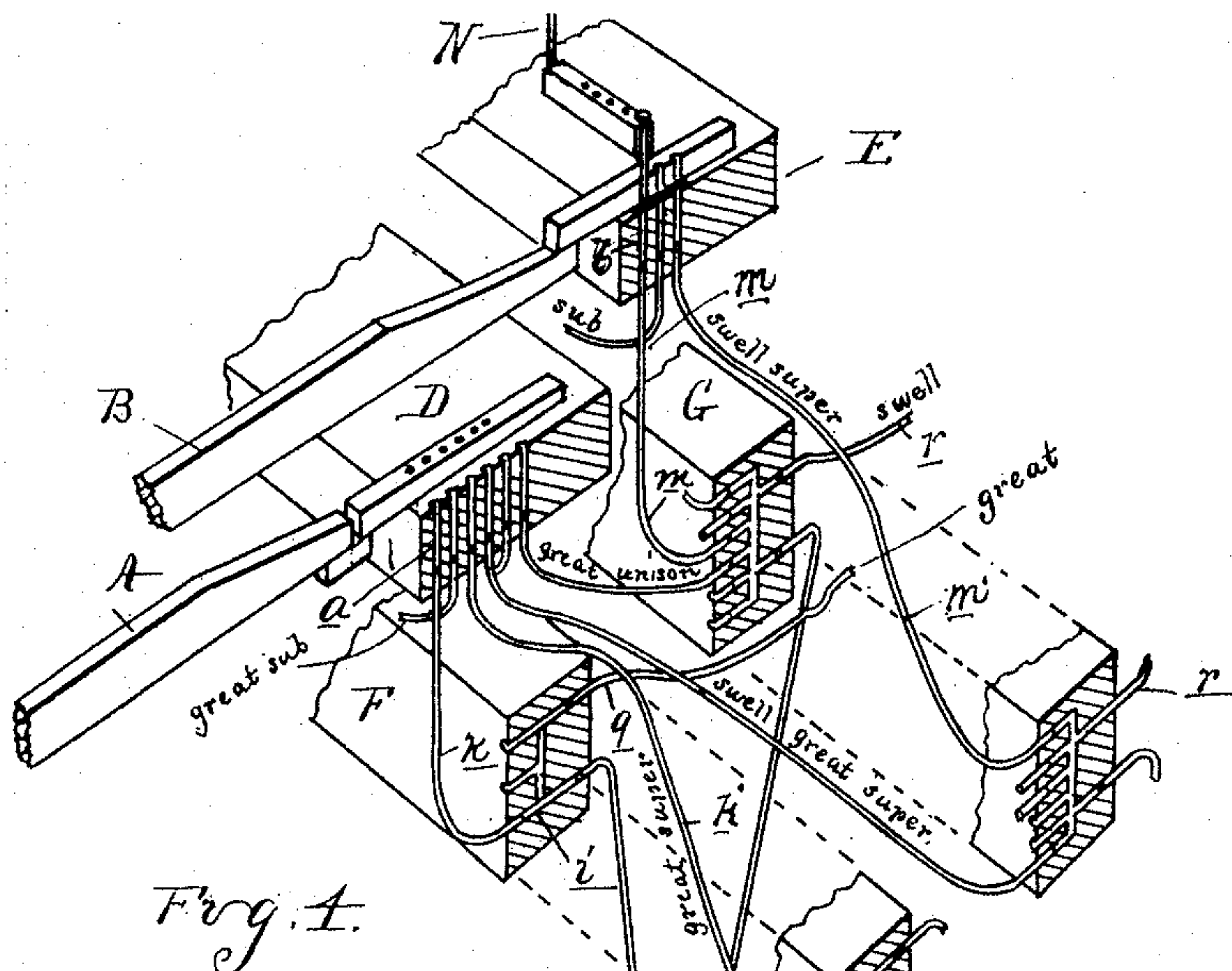


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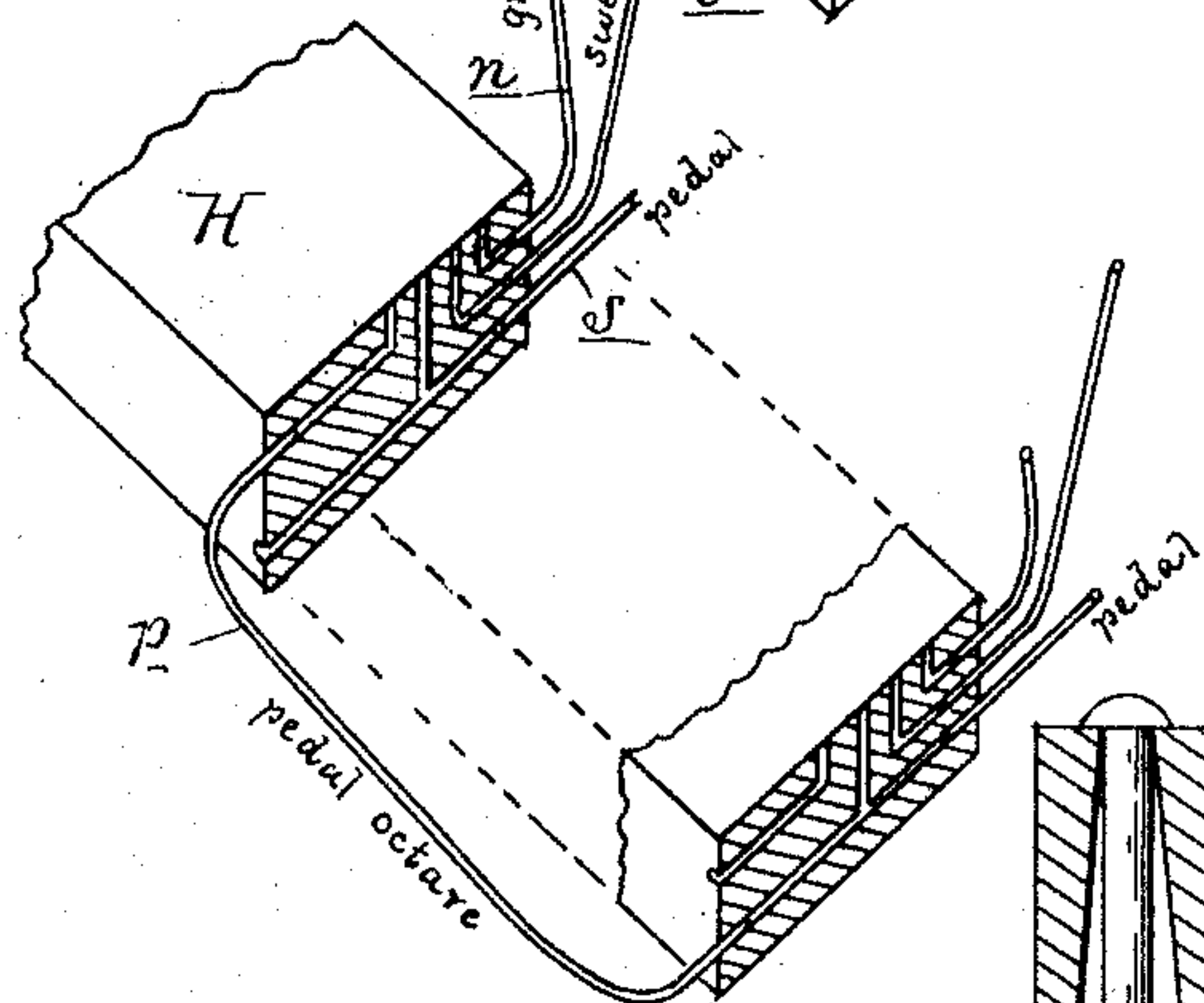
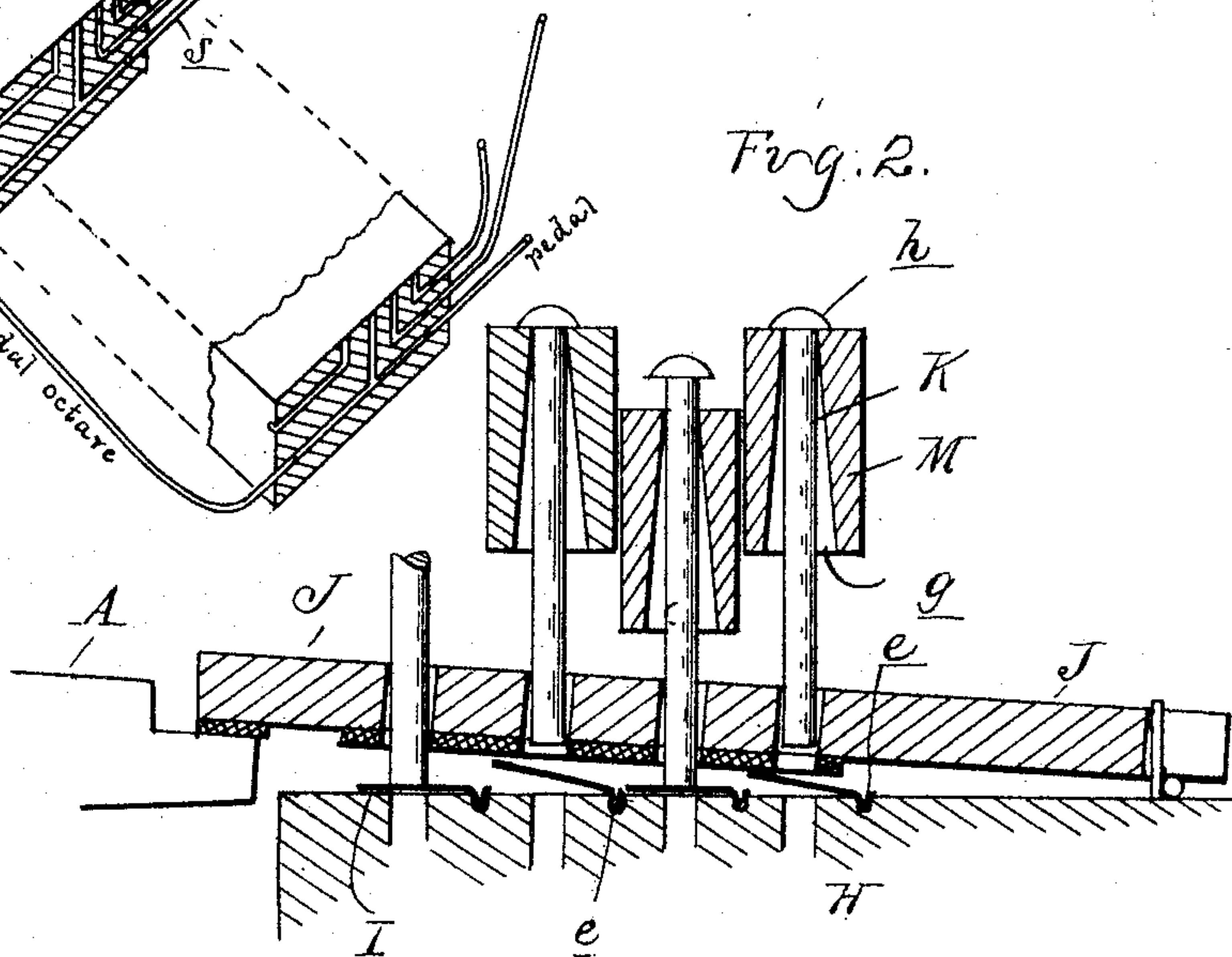


Fig. 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN T. AUSTIN, OF DETROIT, MICHIGAN.

## PNEUMATIC ACTION AND COUPLER FOR ORGANS.

SPECIFICATION forming part of Letters Patent No. 585,946, dated July 6, 1897.

Application filed December 26, 1896. Serial No. 616,968. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. AUSTIN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Pneumatic Actions and Couplers for Organs, of which the following is a specification, reference being had therein to the accompanying drawings.

It is the object of my invention to obtain a simple construction of pneumatic action and coupler for organs which is more positive in its operation than those heretofore devised, and one in which the leakage of air, unavoidable in many constructions, is entirely overcome.

In the construction of pneumatic action for pipe-organs it is usual to control each motor-current by two valves, one connected with the key and the other with the stop mechanism. The most common construction of stop-valve is a register-slide adapted when moved to simultaneously open or close all of the ports of one register. This construction is objectionable on account of the leakage which always occurs.

My invention consists in a construction in which each motor-current is controlled by a single automatically-opening valve, said valve being held normally closed independently by the key and stop, both of which must be actuated before the valve can open.

My invention further consists in the peculiar construction, combination, and arrangement of parts, all as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a vertical longitudinal section through a portion of an organ, showing my improved action. Fig. 2 is an enlarged view of a portion of Fig. 1. Fig. 3 is a detail view showing the manner of constructing the valves, and Fig. 4 is a diagram sectional perspective view showing the coupler connection.

A A are the keys belonging to the lower bank or "great organ."

B B are the keys of the upper bank or "swell organ," and C are the pedals.

D, E, F, G, and H are bars, preferably of wood, extending across the organ in rear of the keyboard and pedals, in which are formed the valve-ports and coupling connections for the action.

The upper face of the bars D, E, and H form valve-seats, in which are formed a series of ports  $a a' a^2$ ,  $b b' b^2$ ,  $c c' c^2$  respectively opposite each key and pedal A, B, and C. Each of these ports is controlled by an outwardly-opening valve I, preferably formed of a flap of leather or similar substance, and all of the valves of each series are closed by a single lever J, which I shall call the "damper."

The manner in which the valves I are formed and secured to the bars is illustrated in Figs. 2 and 3 of the drawings and is as follows: Each of the bars is first provided with a series of saw-kerfs  $d$  midway between the ports. The whole surface of the bar is then covered with the leather from which the valves are formed, after which wires or narrow strips  $e$  are driven into the kerfs, carrying down the leather with them and firmly securing it to the bars. The individual valves are next cut from the leather and each is turned back to cover the port in rear of the place from which it is cut, thus giving it a tendency to spring away from its seat.

The dampers J are preferably formed of strips of wood felted on their under faces and hinged at their rear ends, their forward ends being in engagement with the keys or pedals. These dampers are provided with apertures opposite each of the ports in the seats, adapted to receive the pins K, which latter rest upon the valve-flaps and are adapted to hold them to their seats when the dampers are raised.

The pins K for each row of corresponding valves are adapted to be simultaneously raised by a bar M, which has apertures  $g$  for each of the pins, the latter being provided with heads  $h$ , adapted when the bar is raised to rest upon its upper face and lift the pins.

The mechanism for lifting the bars M comprises links N at each end connected to rock-arms O, which are adapted to be actuated by the stop-rod P through the medium of the slotted arm Q and rock-arm R.

The bars F and G are provided with connected ports or passages which form the various coupling connections. In the drawings I have shown the bar F provided in the plane of each key with three ports  $i i' i^2$  on its forward side, connected together by a central port  $i^3$ , and also to the rear ports  $i^4$  and  $i^5$ . The bar G is correspondingly provided with six ports on the forward side  $j, j', j^2, j^3,$



$j^4$ , and  $j^5$ , connected together by the central port  $j^6$  and to the rear ports  $j^7$  and  $j^8$ . The connection between these ports in the various bars is formed by suitable conduit-pipes, preferably formed of lead and arranged as follows: The port  $a$  is connected by the pipe  $k$  to the corresponding port  $i$ , the port  $a'$  by the pipe  $k'$  to the port  $i'$ , one octave lower in the scale, and the port  $a^2$  by the pipe  $k^2$  to the port  $i^2$ , one octave higher. In a like manner the ports  $a^3$ ,  $a^4$ , and  $a^5$ , are connected by pipes  $l$ ,  $l'$ , and  $l^2$  with the ports  $j$ ,  $j'$ ,  $j^2$ , the ports  $a'$  and  $j$  being connected in unison, the ports  $a^4$  being connected with the port  $j'$ , one octave higher, and the port  $a^5$  being connected with the port  $j^2$ , one octave lower. The ports  $b$ ,  $b'$ , and  $b^2$  are also connected by the pipes  $m$ ,  $m'$ , and  $m^2$  with ports  $j^3$ ,  $j^4$ , and  $j^5$  in unison, one octave higher and one octave lower. The ports  $i^4$  and  $j^7$  are connected by pipes  $n$  and  $o$  with the corresponding ports  $c$  and  $c'$  in the bar H, while the ports  $c^3$  in said bar are connected by pipe P to ports  $c^2$ , one octave higher. Finally the ports  $i^5$  and  $j^8$  and  $c^2$  are connected by pipes  $q$ ,  $r$ , and  $s$  to suitable pneumatic devices, (not shown,) which control the air-currents employed for sounding the pipes, these motors being of any suitable construction adapted to be operated by exhausting the air through the pipes  $q$ ,  $r$ , and  $s$ .

The parts being constructed as shown and described, the operation of the device is as follows: The valves I are automatically opening—that is, the pressure of the air in the ports which each one closes will force it open whenever it is free to move. In the normal position of the parts, however, these valves are held closed, first by the damper J, which bears upon the margin of the flap around the port, and second by the pins K, which rest on the valves immediately above the ports. Thus neither the lifting of the damper nor the lifting of the pin alone will allow the valve to open, but both must be lifted. When, however, one or more of the bars M have been raised by the pulling of the corresponding stops, the pins K, controlled thereby, will be lifted. If then one of the keys is depressed, it will lift its corresponding damper, allowing such of the valves controlled thereby as are relieved from the pressure of the pins K to automatically open, the remaining valves being still held closed by the unlifted pins.

It will be readily understood by following the connection before described that by the drawing of the proper stops the great swell and pedal organs may be coupled either in unison or in sub or super octave, and this may be accomplished without placing any additional resistance on the keys.

Although I have shown and described my action as employing flap-valves adapted to be opened by the pressure of air and to exhaust the air from the pneumatic motors, I do not wish to be limited to this precise con-

struction, as any suitable construction of automatically-opening valve which controls the motor-current comes within the spirit of my invention.

What I claim as my invention is—

1. The combination with a key, a stop, and an automatically-opening valve controlling a motor-current, of two independent mechanical means for holding said valve normally closed, the one adapted to be released by the operation of the key and the other by the stop.

2. The combination with a key, a stop, and a series of automatically-opening valves, each controlling a motor-current of mechanical means for holding said valves normally closed adapted to be released by the operation of the key, and independent mechanical means for holding said valves closed adapted to be individually released by said stops.

3. The combination with a key, stop and a valve-seat having a series of ports therein, each forming an exhaust-passage for a motor-current, of a flap-valve covering each of said ports adapted to be automatically opened by the pressure of air in the port, a damper holding said valves normally to their seats apertured opposite each of said ports, and adapted to be raised by the operation of said key, pins projecting through said apertures and resting on said valve, and means for separately lifting said pins operated by said stops.

4. The combination with a series of keys, stops, and a valve-seat having ports formed thereon arranged in longitudinal and transverse series and forming exhaust-passages for motor-currents, of a flap-valve for each port adapted to be opened automatically by the pressure in said port, key-actuated dampers normally closing said valves apertured opposite each port, pins passing through said apertures, resting on said valves, and a lifting-bar for each longitudinal series of pins actuated by a stop.

5. In an organ, the combination of a bar forming a valve-seat, having a series of ports therein and a saw-kerf beside said port, of flap-valves for said ports formed of a flexible sheet covering the ports and wedged into said saw-kerf, being cut to form individual valves.

6. In an organ the combination with a bar forming a valve-seat having ports therein arranged in longitudinal and transverse series and saw-kerfs between said longitudinal series of flap-valves for said ports formed of a flexible sheet covering said ports and wedged into said saw-kerfs, the individual valves being cut from said sheet and turned back to cover the ports in the adjoining series.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. AUSTIN.

Witnesses:

M. B. O'DOHERTY,  
OTTO F. BARTHEL.