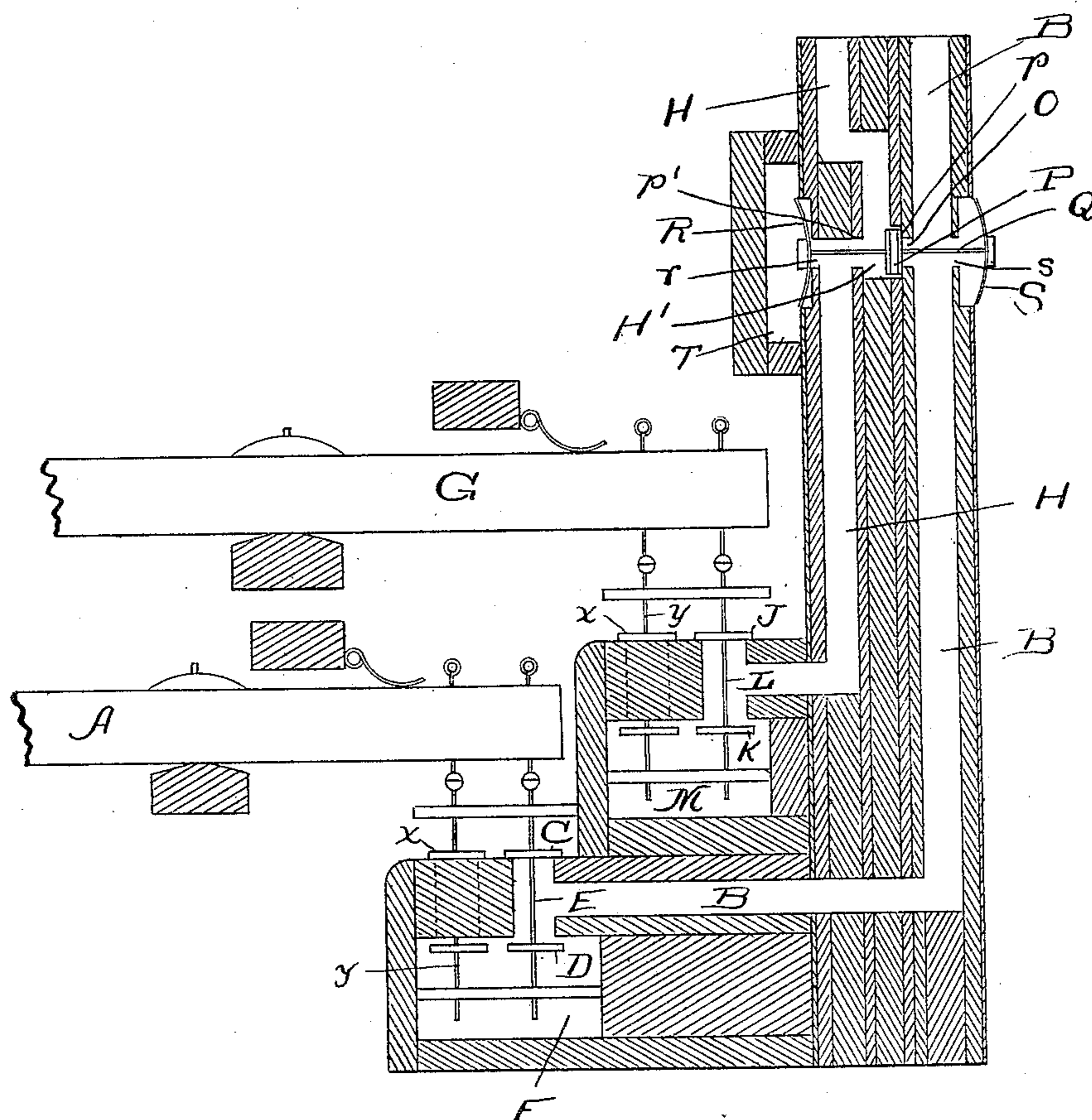


(No Model.)

F. W. HEDGELAND.
COUPLER FOR PNEUMATIC ACTIONS.

No. 566,314.

Patented Aug. 25, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK W. HEDGELAND, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE W. W. KIMBALL COMPANY, OF SAME PLACE.

COUPLER FOR PNEUMATIC ACTIONS.

SPECIFICATION forming part of Letters Patent No. 566,314, dated August 25, 1896.

Application filed July 31, 1895. Serial No. 557,719. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. HEDGELAND, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Couplers for Pneumatic Actions, of which the following is a specification.

This invention relates to pneumatic actions for organs, and especially to the means employed for controlling the connecting passage or opening between two channels supplying air under pressure to the various pneumatics or other operating devices of the organ-action.

The objects of the invention are to provide the valve controlling the connecting passage or opening with operating or motor devices, whereby it will be shifted quickly and with certainty in both directions; to so support the valve as to render it uniform in its operation; to free it from the friction to which other constructions are subject, and to nullify the evil effects due to the swelling or shrinking of the wood employed in the construction of the channels under varying atmospheric conditions. The valve is automatic in its action and serves to open the connection between two air-supply channels whenever the manual key controlling one of the channels is operated, thus giving the single key control over both channels for the time being, and it is closed so as to shut off the connection upon the operating of the key belonging to the other channel. It may also be closed independently of the keys by its pneumatic motor. These objects are accomplished as follows: I form an opening or passage between the two channels, and in this passage place a valve adapted in one position to close the passage and in another position to open it. This valve is mounted upon a rod arranged transversely of the channels and having its ends supported in flexible membranes attached at their margins to the margin of openings in the outer walls of the channels. These membranes permit the shifting of the valve by the air-pressure acting upon them. They are equal in surface area, but their surface is considerably greater in extent than that of the valve operated by them, so that they readily overcome the resistance afforded by the air

acting upon the valve. The rod does not bear at any point against the wood, and consequently there is no friction exerted upon it. An air-box is also arranged outside the channels and the air therein when compressed acts upon the outer surface of one of the membranes, and operates the valve-rod in the direction which causes the closing of the connecting-passage, and also acts to normally retain the valve in the closed position.

The invention consists in the novel construction of the valve and its supports and motor devices, and also in the novel arrangement of the valve, the air-channels, and the connecting-passage, and in the novel combinations of parts and devices hereinafter described, and pointed out in the claims.

In the drawing I show a vertical section of that part of the organ-action which embraces my invention.

In said drawing, A represents one of the keys in the great organ series, and B the air-channel controlled by it through the medium of valves C and D, mounted upon the stem E, connected to the key.

F is the air-supply chamber through which the channel B is furnished with its compressed air.

The valve C is the exhaust-valve and is normally closed, and the valve D shuts off the passage of air from the chamber F when the key is operated, but is normally open.

G is one of the keys of the swell-organ series, and H is its corresponding action-channel, controlled by it through the valves J and K, mounted upon the stem L. Of these valves, the one marked J is the exhaust-valve and the one marked K is the supply-valve, and like the valves C and D one is normally open and the other normally closed.

M is the chamber supplying compressed air to the channel H.

Between the channels B and H, I form the connecting or coupling passage O, and this connection is controlled by the valve P, mounted upon the stem or rod Q, arranged transversely of the channels, as shown. In one of its positions the valve is seated at *p* and closes the passage O, and in order that it may also serve to shut off the lower end of the channel H, and thus prevent a waste of

air from the supply-chamber of that channel when the passage O is open, I divert the channel H from a straight line, as shown at H', so that the valve P may be provided with another seat at p' , which will enable it to close the channel H, as stated.

The shifting of valve P is accomplished by pneumatic pressure, as follows: Openings in the outer walls of both channels B and H are provided opposite the valve, as shown at r and s , and over these openings are secured the flexible membranes R and S. The membranes must be secured so as to render the openings over which they are placed air-tight, and they are adapted to be moved by air-pressure acting upon their surfaces. They also serve to support the valve-rod Q, one end of which is secured in each of them. The valve-rod does not come in contact with the wood at any point, and there is consequently no rubbing or friction upon it. The surface or area of the membranes is considerably greater than that of the valve, so that they readily overcome the resistance caused by the air-pressure upon the face of the valve. Outside the channel H and over the membrane R is placed a compressed-air box or trunk T, which may cover the series of said membranes and be controlled by a stop. (Not shown.) The pressure in this box tends to force the membranes and valve to the position shown in the drawing, and normally to retain them in that position.

The operation of the invention is as follows: The normal position of the various parts being those given in the drawing, it will be seen that if the player desires to couple the great and swell organs, so that he can sound both by playing the keys of one, he relieves the pressure in box T, so that when he strikes the key A the valve will be shifted from seat p to seat p' by the pressure in channel H acting against the inside of membrane R, the pressure in channel B having been withdrawn by the striking of the key and the consequent opening of exhaust-valve C. The passages B and H are now coupled, so that their pipes will sound together, and they remain so until key A is released, when the valve assumes a neutral position as to the seats p and p' . Should the key G be now struck, the air-pressure present in duct B will throw the valve over to seat p by means of the membrane S, thus closing the opening between the ducts B and H. Of course the valve will also be moved to the position just described whenever the pressure in box T is restored, but this is not done until the player desires to cease using the coupler.

While I have shown the invention as applied to channels from which the air is exhausted upon the striking of the key, it will be readily understood that it may also be used with channels operated by the admission of air-pressure instead of exhausting it.

My invention is adapted to be used for

coupling octaves or pedals, and it may be employed in place of any of the pneumatic couplers now used. The valves x and their stems y belong to the keys next beyond those shown.

I claim—

1. The combination with the action-motor channels and the passage or opening connecting them, of a single valve adapted both to control said connecting passage or opening, and to shut off the air supply of one of the channels when it opens said connecting passage or opening, substantially as specified.

2. The combination with the action-motor channels and the passage or opening connecting them, of a single valve adapted both to control said connecting passage or opening, and to shut off the air supply of one of the channels when it opens said connecting passage or opening, the channel which is thus cut off being diverted or bent, substantially as set forth.

3. The combination with the action-motor channels and the passage or opening connecting them, of a single valve adapted both to control said connecting passage or opening, and to shut off the air supply of one of the channels when it opens said connecting passage or opening, the channel which is thus cut off having a seat for the valve when in the open position, substantially as specified.

4. The combination with the pneumatic-motor channels, of a pneumatic coupler consisting of the connecting-passage, the single valve having two positions, in one of which it closes said connection and opens the air supply of one of the channels, and in the other of which it opens the connection and cuts off said air supply, and pneumatic devices for shifting said valve, substantially as specified.

5. The combination with the pneumatic-motor channels, of a pneumatic coupler consisting of the connecting-passage between the channels to be coupled, and a valve and pneumatic motors adapted to shift the valve in both directions, substantially as specified.

6. The combination with the action-motor channels and the connecting passage or opening between said channels, of the valve controlling said passage or opening, and flexible membranes supporting the valve at both ends and shifting it in both directions, substantially as specified.

7. The combination with the action-motor channels and the connecting passage or opening between said channels, of the valve controlling said passage or opening, and flexible membranes supporting and shifting said valve, said membranes being located over openings in the outer walls of the channels where they will receive the pressure existing in the channels, substantially as specified.

8. The combination with the action-motor channels and the connecting-passage between them, of the valve controlling said passage, flexible membranes located over openings in the outer walls of the channels and support-

ing and operating the valve, and an air-box outside of one of said membranes, substantially as specified.

5 9. The combination with the pneumatic-motor channels, of the coupler for uniting said channels consisting of a single double-acting valve, mounted on a stem supported at both ends by flexible membranes or dia-

phragms which pneumatically operate it in either direction, said valve controlling said 10 channels, substantially as specified.

FREDERICK W. HEDGELAND.

Witnesses:

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