

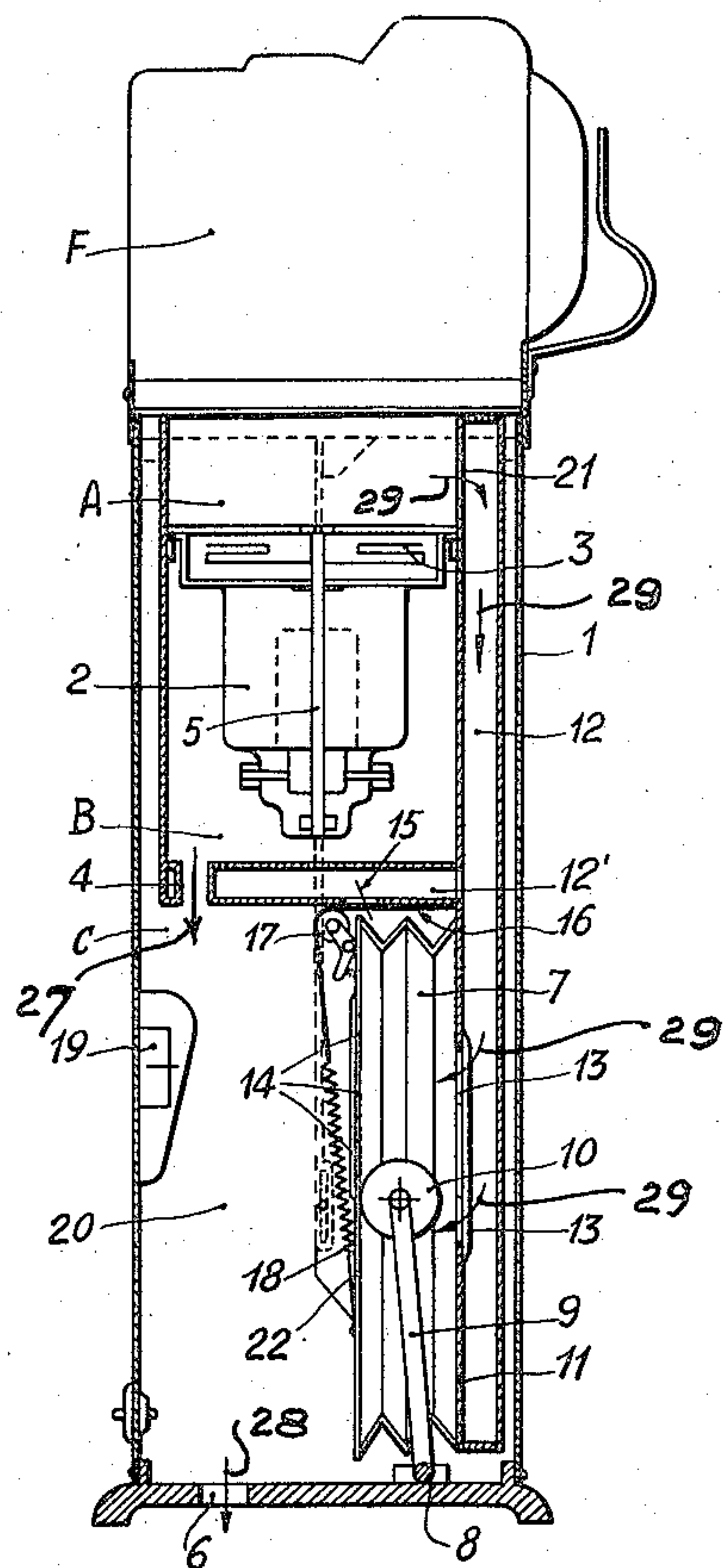
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ELECTRICALLY OPERATED MUSICAL INSTRUMENT

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ELECTRICALLY OPERATED MUSICAL INSTRUMENT

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2 Claims. (Cl. 84—355)

It is the object of the present invention to provide an electrically operated musical instrument, which combines the features of an accordion and those of a harmonium.

More precisely, in this instrument, the different parts concerned with the emission of the sound and the corresponding flow of air allow the functioning of the instrument by suction of outside air, and not by action of a flow of compressed air generated in the inside of the instrument as it is the case in other instruments of this kind already known.

This feature offers advantages, such as the following:

(1) A more agreeable voice tone, (2) a perfect re-closing of the valves even with very light springs.

In fact, the valves automatically close due to the air suction effect brought about inside the instrument by the depression.

(3) Higher sound volume and consequently a more sensible expression of the sounds.

(4) With the new system, there is prevented the entrance into the sound emitting members of the instrument of the warm air produced by the motor and its rheostat, as it happens with the earlier systems in which the instrument functions on compressed air. With the new system the air is discharged through the base of the column so that none of the delicate members of the instrument are impaired by any continuous exposure to the warm air.

The accompanying drawing illustrates schematically an instrument according to the invention that is an accordion mounted on a column enclosing all the operating members of the accordion, this column being shown in a vertical section.

As it is apparent from the drawing, the instrument comprises an accordion F positioned horizontally, that is in a very practical position for its use, its keys arranged on its upper surface, said accordion being carried by a column C whose shell 1 encloses in its inside an electric motor 2 driving the blades 3 of a blower, which are keyed on the shaft 5 of the motor.

The accordion does not present any structural difference in respect to a conventional accordion, except for the reversal of the position of the reeds. The members which are needed to generate the air flow needed for the production of the sounds are contained in the column 1, and are arranged and operated in a peculiar way.

The electric blower 3 operates so as to suck the air from the top, and to force it through the opening 4 into the underlying chamber 20, as indicated by an arrow 27, from where, through openings 6, it is discharged to the outside, as indicated by an arrow 28.

In the chamber 20 there is also assembled a bellows 7 having the purpose of regulating the intensity of the instantaneous air flow passing through the reeds in order to give to the sounds emitted by the reeds a higher coloratura. Said bellows however, instead of being normally extended and full of air, will be normally collapsed to that at the wanted time it may be more or less distended sucking air, as indicated by arrow 29, through the duct

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12, laterally to the motor chamber and communicating with the instrument F through the opening 21, and with the inside of the bellows through the openings or holes 13. In this way, the volume of air, which is sucked through the valves of the reeds of the instrument is increased so as to make louder the sound emitted by them.

At each side of the bellows 7 there is placed a roll 10 which carries a rod 9, hinged at its other end to a shaft 8 whose rotation is actuated by a usual pedal (not shown). Each of the two rolls 10 rests on a protruding edge 22 of the bellows 7 so that the displacement to the left (looking at the drawing) of the rolls 10 will cause the distending of the bellows, that is the coming apart of the movable wall of the bellows relative to the other stationary wall 11 of the bellows, and thus the air will be sucked through the duct 12, as shown by the arrows in solid lines, and will enter the bellows through the holes 13. Upon releasing the pedal, all the different members will return to their initial positions and the air which filled the bellows will discharge through openings 14 provided on the movable wall of the bellows.

In the upper wall of the chamber 20 there is formed a hole 15 which may be closed and through which some air can enter or discharge, or else it can be closed, and all this in order to help in the operation of imparting to the sound the wanted coloratura.

The pedal actuation will also control the more or less complete closure of the intake hole 15, which closure is effected by a movable lid 16 sliding on an apposite roll 17; said lid is fixed at one end and stretched at its other end by a spring 18, which is anchored on the bellows. Upon the extension of the bellows, the lid 16 covers the intake hole 15 so as to prevent that some air, from chamber 20, through the hole 15, reaches the duct 12 and through the holes 13 enters the bellows 7, sucked by the strong depression prevailing in said bellows, and thus all the air sucked by the bellows will be forced entirely through the musical instrument F. On the contrary, with the bellows collapsed the intake hole 15 remains upon thus bypassing the additional suction through the instrument. The more or less accentuated extension of the bellows by means of the pedal shaft 8, and consequently the more or less complete closure of the intake hole 15 determines the expression effects of the sound. The hole 15 and the lid 16 thus form a valve and, when this valve is opened, the negative pressure in said accordion F will be reduced.

In the drawing, with 19 there is indicated a rheostat for the motor control, which in this case may be arranged in the inside of the column 1, and preferably in such a position as to be invested by the air flow coming out of the hole 6, what constitutes a further advantage.

Zone A is the suction zone of the fan and it is intercommunicating with the inside of the bellows 7 through the opening 21, the conduit 12 and the opening 13. The conduit 12 also intercommunicates with the horizontal conduit 12' which, through the opening 15, intercommunicates with the chamber 20 outside of the bellows 7, when said bellows is fully compressed. The suction zone A of the fan, intercommunicates also with the interior of the instrument F for sucking the air producing the sound, when the air cannot reach the suction chamber A from another side more easily than through the instrument F. This matter will be better explained later on.

B shows the compression chamber that is the chamber into which goes out the air compressed by the fan, and said air is discharged from said chamber through the opening 4 into the chamber 20 and from here said air is discharged through the opening 6 to the outside.

The opening 15 is closed or opened by the lid 16 and thus when the bellows is closed the lid 16 does not cover

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the opening 15, which remains uncovered and allows the communication between the conduit 12' and chamber 20. The chamber 20 is always in communication with the outlet side B of the fan, through the opening 4, and the air of the chamber 20 is discharged to the outside through the opening 6. When the instrument is operated, the bellows 7 is more or less expanded, and thus the lid 16 covers and shuts more or less the opening 15 cutting off this passage. When the instrument is not operating, even if the motor 2 is working, the bellows 7 is completely closed and thus the opening 15 is opened and the air is sucked more easily through the opening 15 than through the instrument, which will give no sound, while the air flows through the closed circuit, from chamber 20 through opening 15, the conduit 12', the conduit 12, the opening 21, the chamber A, the fan 13, the chamber B, the opening 4, and the chamber 20.

The valve controlling the air circulation is that formed by the lid 16 and the opening 15. The movements of contraction and expansion of the bellows 7 are driven by the pedal, which forces the shaft 8 to rotate, on said shaft being keyed also lever 9, which through the roll 10 acts upon the wall 22 of the bellows.

When the fan 3 is moving and is sucking from the top, through the accordion F, will produce sound. In this case the bellows 7 is open while the opening 15 is shut. If the bellows 7 is closed through the pedal drive, the opening 15 opens and if the fan operates, the instrument does not sound because the air is sucked by the fan through the path 15—12'—12 and 21. Then by opening suddenly the bellows 7, the opening 15 is closed, the bellows sucks, by way of the opening 13 and the conduit 12, some air through the accordion, in addition to the suction effected by the fan, and thus there is obtained a sudden and high sound, which is even higher than the sound which could be given by the motor alone. Thus one can obtain effects of sonorous snatches and sudden dampings of sound. When the pedal is re-

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leased, the spring 18 will close said bellows 7, and the air flows out from the opening 14.

Of course the shapes, sizes and constructive details of the different members constituting this improved instrument may vary according to needs, without therefore departing from the spirit and scope of the present invention.

What I claim is:

1. In combination with air operated musical instrument, an air exhausting means operatively connected to said instrument, said means comprising a shell having an exhaust opening therein on the opposite side of said exhausting means from said instrument, means defining a duct operatively connected with said instrument, and a manually controlled valve in said duct, whereby when said valve is opened the negative pressure in said instrument will be reduced.

2. In combination with air operated musical instrument, an air exhausting means operatively connected to said instrument, said means comprising a shell having an exhaust opening therein on the opposite side of said exhausting means from said instrument, means defining a duct operatively connected with said instrument, and a valve in said duct controlled by the operator of the instrument, whereby when said valve is opened the negative pressure in said instrument will be reduced.

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