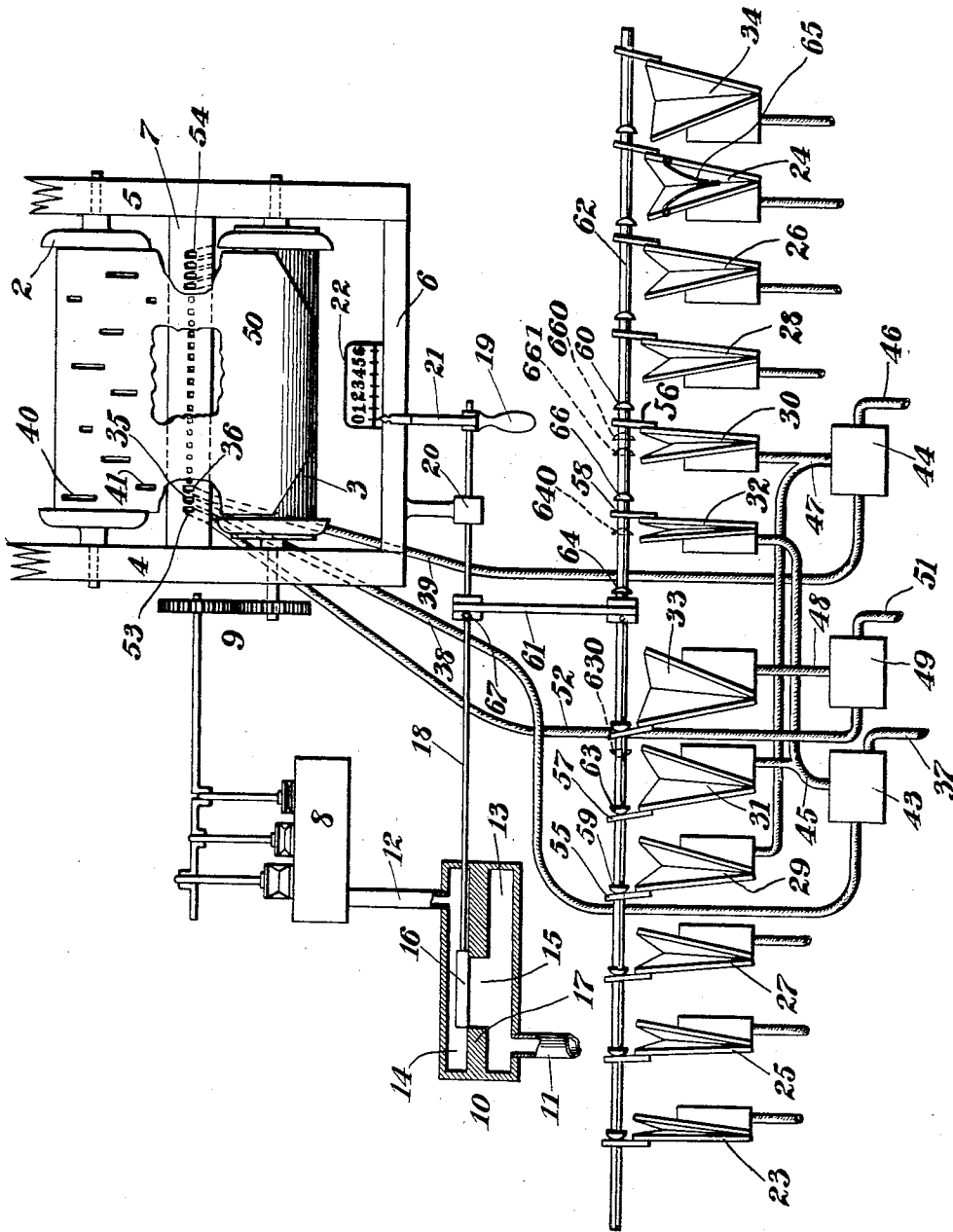


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 TEMPO REGULATOR.
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1,041,861.

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UNITED STATES PATENT OFFICE.

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TEMPO-REGULATOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES O'CONNOR, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Tempo-Regulators, of which the following is a specification.

This invention relates to pneumatically operated musical instruments such for instance as player-pianos and has for its object to provide a tempo regulator for such instruments governed automatically from perforations in the music sheet.

The preferred embodiment of my improvements is illustrated in elemental form in the drawing accompanying this specification. Therein the usual music rolls 2, 3 are mounted for rotation in side frames 4, 5 and lower roll 3 may be rotated from the usual pneumatic motor 8 through well known connecting means indicated in a general way by 9. Said pneumatic motor 8 may be actuated by exhaust from some suitable source, not shown, through pipe 11, valve box 10 and pipe 12.

Valve box 10 is of well known construction having compartment 13 connected by pipe 11 with the source of exhaust and compartment 14 connected by pipe 12 to motor 8. Compartments 13 and 14 are connected by port 15 through partition 17 and movable member or sliding valve 16 is efficient to open or close said port 15 to permit more or less suction as desired to act upon motor 8. Said valve may be actuated through stem 18 thereof by automatic means hereinafter described. It may also be operated manually by means of handle 19 when set screw 67 is loosened. Said stem 18 may be supported near that end remote from valve 16 by bracket 20 depending from base 6 of side frames 4, 5. Said stem may be provided with pointer 21 for visually indicating on scale 22 the position of valve 16 relative to port 15. Said scale may be graduated if desired as from 0 to 6 as shown, said graduations corresponding with the several incremental steps of movement of valve 16 when actuated by the automatic means. Said automatic means for moving valve 16 comprises a plurality of pairs of oppositely acting pneumatics as 23, 24 and 25, 26 the members of each pair of which act conjointly and which action is governed by perforations as 40, 41 provided therefor in note-sheet 50

in coaction with corresponding apertures as 35, 36 in tracker-bar 7. Said apertures 35, 36 in tracker-bar 7 are connected by pipes 38, 39 with the usual primary pneumatics 43, 44 all respectively. Primary pneumatic 43 is connected by pipe 37 with the source of exhaust and by branched pipe 45 with the pair of actuating pneumatics 31, 32. Primary pneumatic 44 is connected by pipe 46 with the source of exhaust and by branched pipe 47 with the pair of actuating pneumatics 29, 30. In some instances I supply an additional pair of oppositely acting pneumatics 33, 34 but the members of this pair act independently of each other, and are governed by separate apertures in the tracker-bar and separate perforations in the note-sheet. For instance pneumatic 33 is connected through pipe 48 with primary pneumatic 49 and which primary pneumatic is connected on the one hand by pipe 51 with the source of exhaust and on the other hand by pipe 52 with tracker-bar aperture 53. The other pneumatic 34 of said pair is similarly connected by similar means, not shown, with aperture 54 in tracker-bar 7. The peculiar functions of this pair of pneumatics will be described later herein.

For transmitting motion from the actuating pneumatics as 29, 30 to stem 18 and thence to valve 16 I preferably provide each of said pneumatics with an arm as 55, outstanding rigidly from the movable wall of said pneumatic as 29. Said arms as 55, 56, 57, 58 are arranged for coaction with a common rod 62 which passes freely through each thereof. Said rod has fixed thereon buttons as 59, 60 for engagement with said arms respectively. Stem 18 is preferably parallel to rod 62 and receives motion therefrom through arm 61 fixed to both of them.

I will now describe one characteristic operation of my improved mechanism. The several parts being in the positions shown in the drawing it is assumed that a perforation in note-sheet 50 is over aperture 35 in tracker-bar 7 and that the other additional duct apertures are covered by said note-sheet. Atmosphere is thus admitted through tube 38 to primary pneumatic 43 thereby operating said pneumatic to permit vacuum through branched pipe 45 to exhaust actuating pneumatics 31, 32. Said pneumatics which are the five-increment pneumatics thereupon collapse and rod 62 is driven to the right, by the engagement of arm 57 with

button 63 a distance equal to the predetermined stroke of pneumatic 31. Button 63 is thereby moved to dotted position 630, button 64 to dotted position 640 and arm 58 is moved to the left to meet button 64 in its dotted position 640. Any tendency of rod 62 and the parts connected therewith to overthrow in stroke is thus prevented. Stem 18 and valve 16, through arm 61, are also moved to the right thereby uncovering port 15 an amount equal to the stroke of rod 62 just described. Also pointer 21 is moved to the right to graduation 5. Note-sheet 50 then continues its downward movement over tracker-bar 7 and the imperforate portion of said sheet covers aperture 35, whereby the action of primary pneumatic 43 will be reversed and atmosphere admitted to actuating pneumatics 31, 32 which will thereupon be returned to their normal positions by the usual springs as 65 of pneumatic 24. Said return of pneumatics 31, 32 will not affect the position of rod 62 or parts connected therewith, as arms 57, 58 will move idly over said rod, there being no interfering buttons in the return path of said arms.

Another characteristic operation of my improved mechanism is as follows: Assuming the parts of the mechanism to be in the positions just described, with pointer 21 indicating 5, note-sheet 50 travels downwardly until perforation 41 in note-sheet 50 registers with aperture 36 in tracker-bar 7 thereby admitting atmosphere through tube 39 to primary pneumatic 44, thereby operating said pneumatic to permit vacuum through branched pipe 47 to exhaust actuating pneumatics 29, 30. Said pneumatics, which are the four-increment pneumatics, thereupon collapse, pneumatic 29 working idly as button 59 had been advanced to the right by the last described operation beyond the stroke of arm 55 of said pneumatic 29. But arm 56 of pneumatic 30 will engage button 66 which had been moved to position 660 by the last described operation and move it and rod 62 backwardly to the left one increment to position 661. Stem 18 and valve 16 will also be moved to the left an equal amount and pointer 21 will be opposite graduation 4.

A further feature of my improvements includes actuating pneumatics 33, 34. Pneumatic 33 is efficient to move valve 16 to its extreme right hand position thus affording the maximum opening of port 15, from any previous condition of partial opening or from its entirely closed condition. Pointer 21 will then be opposite graduation 6. Pneumatic 34 is efficient to move valve 16 to its extreme left hand position from any previous position thereof. Port 15 is thereby entirely closed and pointer 21 will indicate zero. As pneumatics 33, 34 are efficient to actuate valve 16 its extreme stroke in either

direction, respectively, they do not need and are not provided with coacting opposite pneumatics, but are each operated independently as by aperture 53 pipe 52, primary pneumatic 49 and pipe 48, for pneumatic 33.

I claim:—

1. A pneumatically operated musical instrument including in combination, a movable member for modifying the musical effect controlled by a perforation or group of perforations in a music sheet and a plurality of pairs of oppositely acting pneumatics the members of each pair of which act conjointly, all operatively connected with said movable member.

2. A pneumatically operated musical instrument including in combination, a movable member for modifying the musical effect controlled by a perforation or group of perforations in a music sheet, a plurality of pairs of oppositely acting pneumatics the members of each pair of which act conjointly and a pair of oppositely acting pneumatics the members of which pair act independently, all operatively connected with said movable member.

3. A pneumatically operated musical instrument including in combination, a movable member for modifying the musical effect controlled by a perforation or group of perforations in a music sheet, a plurality of pairs of oppositely acting pneumatics operatively connected with said movable member the movement of both members of any given pair being initiated from a common source, the first member of any given pair of said pneumatics being effective to move said movable member in one direction a distance equal to one or more of a plurality of predetermined increments and the other member of said pair of pneumatics being effective to move said movable member in the opposite direction to the same position to which it was moved by said first member of the given pair of pneumatics, after it has been moved a greater distance in the first direction by the first member of some other pair of pneumatics.

4. A pneumatically operated musical instrument including in combination, a movable member for modifying the musical effect controlled by a perforation or group of perforations in a music sheet, a plurality of pairs of oppositely acting pneumatics operatively connected with said movable member, the first member of any given pair of said pneumatics being effective to move said movable member in one direction a distance equal to one or more of a plurality of predetermined increments and the other member of said pair of pneumatics being effective to move said movable member in the opposite direction to the same position to which it was moved by said first member of the given pair of pneumatics, after it has

been moved a greater distance in the first direction by the first member of some other pair of pneumatics and means for actuating both members of any pair of pneumatics simultaneously.

5
10
15
20
5. A pneumatically operated musical instrument including in combination, a tracker having a plurality of ducts in addition to those connected with note sounding devices, a perforated music sheet having perforations adapted to admit air to said additional ducts, one at a time, a movable member for modifying the musical effect controlled by a note actuating perforation or group of perforations in said music sheet, a plurality of pairs of oppositely acting pneumatics operatively connected with said movable member, the first member of any given pair of said pneumatics being effective to move said movable member in one direction a distance equal to one or more of a plu-

ality of predetermined increments and the other member of said pair of pneumatics being effective to move said movable member in the opposite direction to the same position to which it was moved by said first member of the given pair of pneumatics, after it has been moved a greater distance in the first direction by the first member of some other pair of pneumatics, means whose operation is initiated from a single perforation in said music sheet and means for actuating both members of any given pair of pneumatics simultaneously.

Signed at New York, N. Y., this 1st day of November, 1911, before two subscribing witnesses.

JAMES O'CONNOR.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."