No. 814,521. PATENTED MAR. 6, 1906.

W. D. MOSES.

(BY JUDICIAL CHANGE OF NAME NOW W. M. DAVIS.)

MEANS FOR GOVERNING THE TEMPO IN MECHANICAL MUSICAL INSTRUMENTS.

APPLICATION FILED MAY 19, 1904. 2 SHEETS—SHEET 1.

Fig. 1.

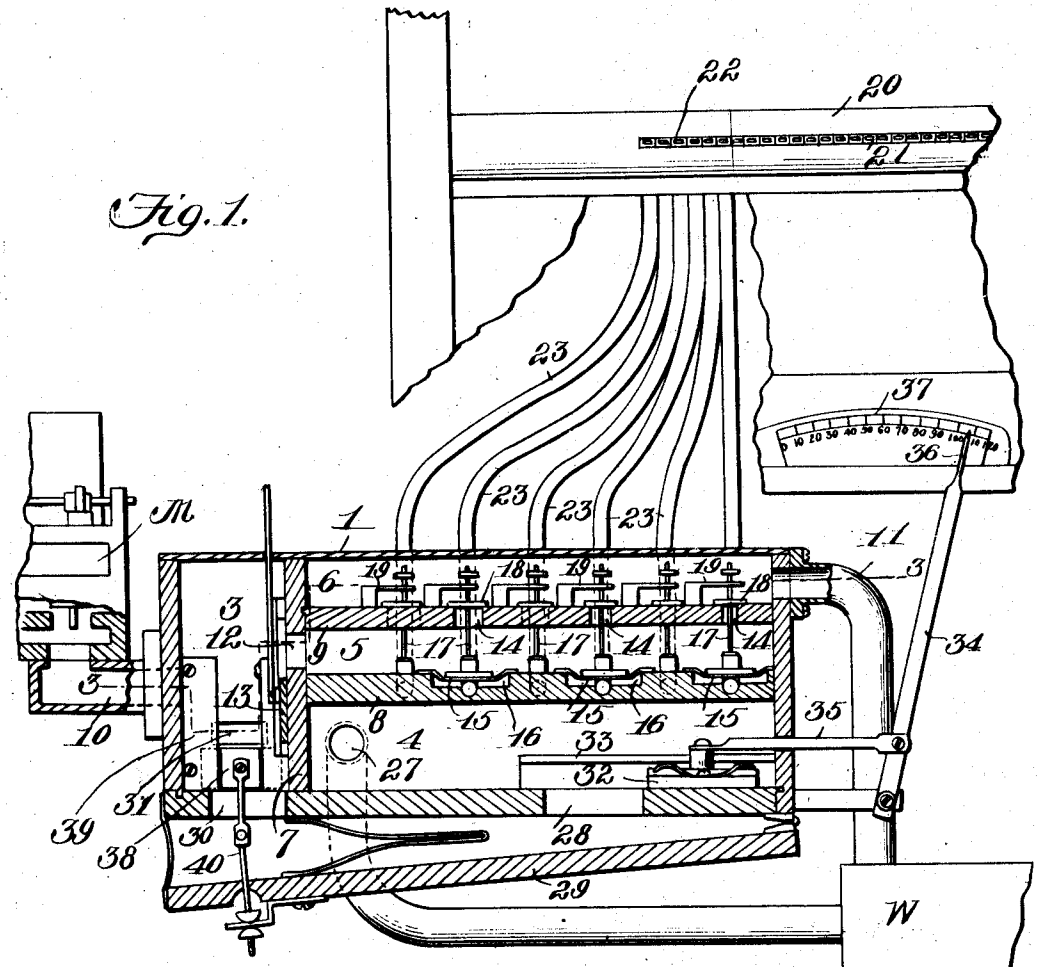
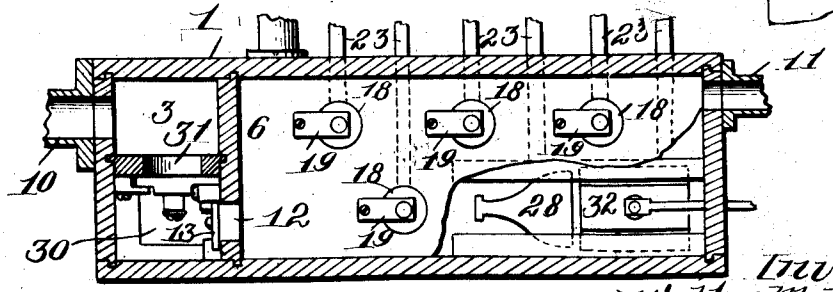


Fig. 3.



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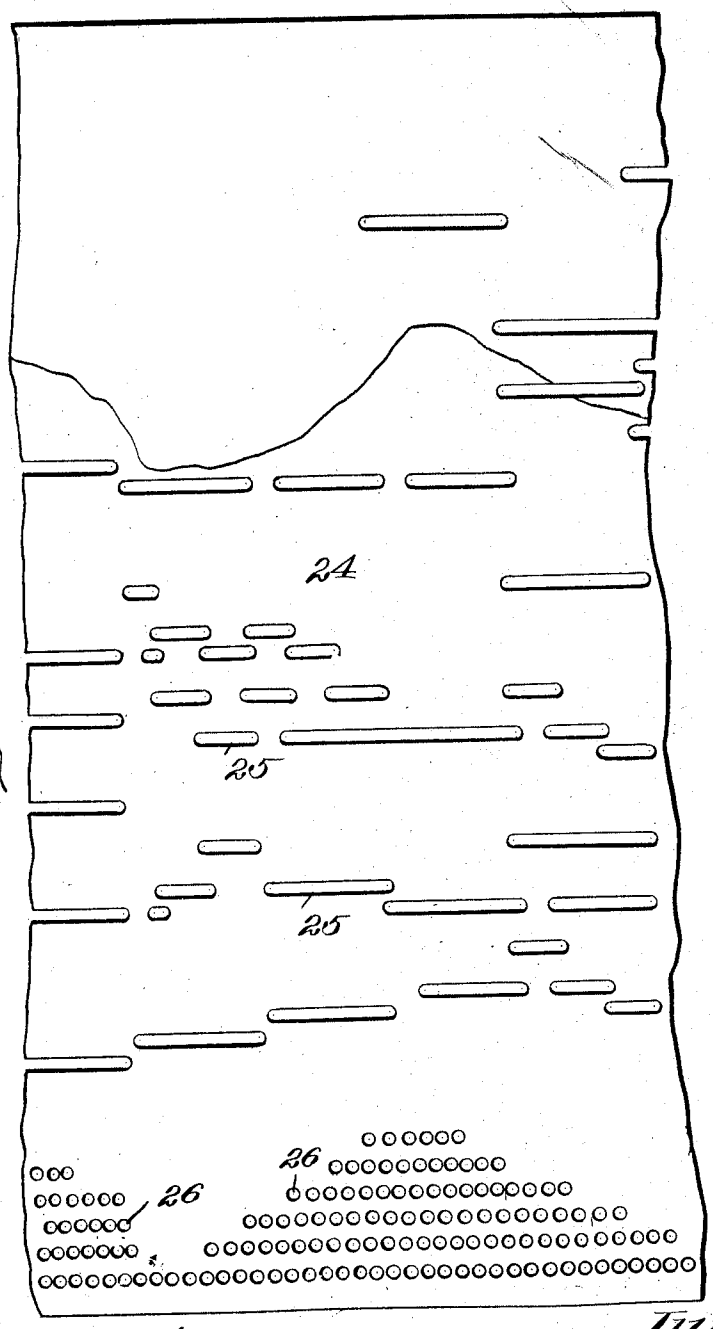
MEANS FOR GOVERNING THE TEMPO IN MECHANICAL MUSICAL INSTRUMENTS.

APPLICATION FILED MAY 19, 1904. 2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WALTER D. MOSES, (BY JUDICIAL CHANGE OF NAME NOW WALTER MOSES DAVIS,) OF NEW YORK, N. Y.

MEANS FOR GOVERNING THE TEMPO IN MECHANICAL MUSICAL INSTRUMENTS.

No. 814,521. Specification of Letters Patent. Patented March 6, 1906.

Application filed May 19, 1904. Serial No. 208,751.

To all whom it may concern:

Be it known that I, WALTER MOSES DAVIS, (formerly WALTER D. MOSES,) a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented new and useful Improvements in Means for Governing the Tempo or Speed of Travel of a Music-Sheet in Mechanical Musical Instruments, of which the following is a specification.

This invention relates to improved means for governing the tempo or speed of travel of a music-sheet in mechanical musical instruments, and has for its objects mainly to provide means whereby the speed of a music-sheet may be controlled by means the operation of which is caused by supplemental perforations in the music-sheet coöperating with auxiliary ducts in the tracker-board.

Secondarily, it has for its object to combine such means of control with manually-operable means for controlling the tempo and means to compensate for variations in treadle action in connection with appropriate means whereby either description of controlling means may be utilized.

With these objects in view the invention consists in mechanism embodying the combination, arrangement, and mode of operation of parts, as hereinafter set forth. That which is regarded as new will be set forth in the appended claim.

In the accompanying drawings, illustrating the preferred and best-known embodiment of my invention, to which, however, the invention in its broader aspects is not limited, Figure 1 is a view, partly in elevation and partly in section, illustrating my invention. Fig. 2 is a view of a section or portion of an appropriate music-sheet. Fig. 3 is a sectional view on the line 3 3 of Fig. 1.

In the said drawings, the reference-numeral 1 designates a valve-casing divided into a series of chambers 3, 4, 5, and 6 by means of vertical and horizontal partitions 7, 8, and 9. The compartment 3 has communication by means of a windway 10 with the motor for driving the music-sheet. This motor may be of any usual or known type, and since my invention does not concern same it is shown conventionally and designated M. The chamber 6 has communication by means of a windway 11 with the main wind-chest of the mechanism, which wind-chest is illustrated conventionally and designated W, because its relative location and coöperative relation to the motor is well known to the art and may be varied without affecting my invention, which does not concern this detail. The chamber 5 has communication with the chamber 3 through a port 12, which may be opened and closed by any suitable type of cut-off 13. Said chamber 5 has communication with the chamber 6 by way of a series of ports 14, which may be and preferably are of different graded area to permit passage therethrough of a predetermined volume of air. These ports are opened or closed by means of pneumatically-actuated valves, a suitable type and arrangement thereof being illustrated in the drawings, wherein 15 designates diaphragms covering air-pockets 16, formed in the partition 8, to which diaphragms valve-stems 17 are connected, and upon these valve-stems in position to open and close the ports 14 are arranged the valves 18.

19 designates guides for the valve-stems.

The numeral 20 designates a tracker-board of any suitable type in detail of construction, over which the perforated music-sheet travels. The range of note-ducts of the tracker-board is designated by the numeral 21. In addition to the note-ducts the tracker-board is provided with a series of supplemental ducts 22, communicating, respectively, with the air-pockets 16 by means of conduits 23 of any suitable type.

For purposes of illustration a section of perforated music-paper is shown in Fig. 2 of the drawings, wherein it is designated by the reference-numeral 24. This music-sheet is provided with the usual or any known or suitable type of note-perforations 25 and along one margin thereof with a series of lines of auxiliary perforations 26, adapted to coöperate with the supplemental ducts 22 of the tracker-board. It is designed according to my invention that when an auxiliary perforation 26 of the music-sheet opens a supplemental duct or ducts 22 the coöperatively-arranged pneumatically-actuated valve or valves 18 will be opened, establishing communication from the motor through the windway 10, chamber 3, port 12, chamber 5,

port or ports 14 appropriate to the actuated valve or valves, chamber 6, and windway 11 to the main wind-chest, whereby, according to the number or value or number and value of the port or ports 14, the motor-actuating pneumatics are exhausted with the predetermined speed. As hereinbefore stated, there are a series of the auxiliary perforations in the music sheet coöperating with a series of supplemental ducts in the tracker-board having communication with the series of valve-ports. All of the ports may be opened at once or one or any intermediate number, according to the disposition of the auxiliary holes in the music-sheet, which will be arranged according to the tempo of the music perforated in the sheet. The current of air from the motor to the main wind-chest may be thus increased or diminished, according to the number of valves or the value of the valve or valves opened. This increase or diminution of air-current from the motor to the wind-chest operates to control the speed of the motor, and therefore the speed of travel of the music-sheet, as will be understood by the skilled in the art. By the arrangement and mode of operation set forth the speed of travel of the music-sheet will be automatically controlled according to the requirements of different passages therein. Accelerando or diminuendo or any intermediate tempo may be secured—accelerando for one passage and diminuendo or other tempo for other passages. This is a very desirable feature. As hereinbefore stated, it is a secondary object of my invention to combine with this self-control a manually-operable control. To this end the chamber 4 has communication through a windway 27 with the main wind-chest and with the motor by way of passage 28, through equalizer-bellows 29, passage 30, port 31, and windway 10. The passage 28 may be opened or closed or partly opened manually by means of a suitable slide-valve 32, moving in guideways 33 and manipulated by means of an operating-handle 34, connected thereto by a link 35. This operating-handle has a pointer 36, which moves in front of a scale 37, provided with suitable indications. The passage through the port 31 is automatically governed by a valve 38, moving in guideways 39 and having a link connection 40 with the movable member of the equalizer-bellows, and this valve is designed to automatically compensate for variations in the ac n of the pedals by the operator. Assuming that the tempo is moderate, the operator will move the operating-handle until its pointer is opposite the designation 50, for example, in which position the valve 32 will have moved to half close the passage 28. In this position the speed of the motor and the travel of the music-sheet will not be varied or disturbed by varying action on the pedals, such as quick or slow movement thereof, because in the event of an undesirable quick manipulation of the pedals the equalizer-bellows will be more or less collapsed, and in collapsing the valve 38 will more or less throttle the passage 31, reducing the volume of current of air from the motor sufficiently to compensate for the rapid action of the pedals. This compensating action will take place in any position of adjustment of the valve 32. The equalizer-bellows is provided with a spring of the requisite tension of power proportionately to the area of the bellows to cause the bellows to nicely adjust itself to the varying pressures of the main bellows. (Not shown.)

It will be understood, of course, that when the speed is to be controlled by the auxiliary perforations in the music-sheet operating through the supplemental ducts and connections described of the tracker-board the operator will move the valve 32 to entirely close the passage 28, thus cutting off communication between the motor and the main wind-chest along this line of communication. When it is desired to utilize the manual control described, the series of supplemental ducts 22 of the tracker-board may be closed by an imperforate margin of the music-sheet where a sheet is being used not provided with the series of auxiliary openings 26. In the event a sheet having such series of auxiliary openings is being utilized and yet the operator desires to manually control the speed the port 12 may be closed by the valve 13.

By my invention I provide means whereby the speed of travel of the music-sheet proportionate to the requirements of the piece being played may be accomplished automatically; furthermore, means wherein such method of control is combined with a manually-operable control whereby the operator may exercise his artistic sense or be guided by given standards indicated upon the perforated music-sheet in manner well known.

Having thus described the invention, what I claim is—

In combination with a perforated music-sheet having note-perforations and a series of auxiliary perforations, a tracker-board having a range of note-ducts, and a series of supplemental ducts arranged to coöperate with the auxiliary perforations in the music-sheet, a valve-casing, a vertical and two horizontal partitions dividing said casing, in connection with the walls thereof, into an end chamber 3, an upper chamber 6, a lower chamber 4, and an intermediate chamber 5, said end and intermediate chambers communicating through said vertical partition, a motor communicating with said end chamber, a wind-chest communicating with said upper chamber, a series of wind-pockets

formed in the lowermost partition, diaphragms covering said wind-pockets, a series of valve-openings of graded area in the upper partition, valve-stems connected to said diaphragms and having valves located in the upper chamber and covering said valve-openings, and a series of conduits leading from the said supplemental ducts to said air-pockets, the combination operating as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WALTER MOSES DAVIS,
(*Formerly Walter D. Moses.*)

Witnesses:
E. C. THOMPSON,
W. C. MANSFIELD.