P. A. BAYLESS.

AUTOMATIC MUSICAL INSTRUMENT.

APPLICATION FILED JULY 11, 1908.

943,909. Patented Dec. 21, 1909.

Fig. 1.

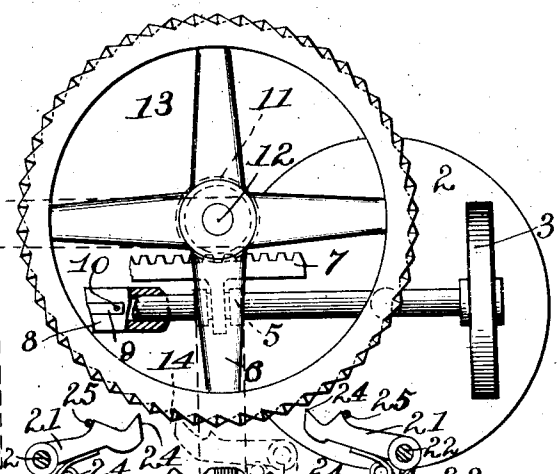



Fig. 4.

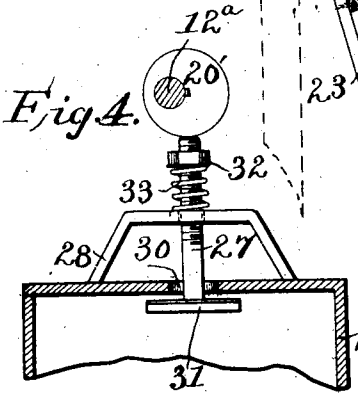



Fig. 3.

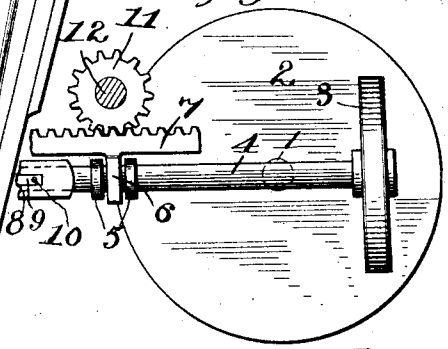
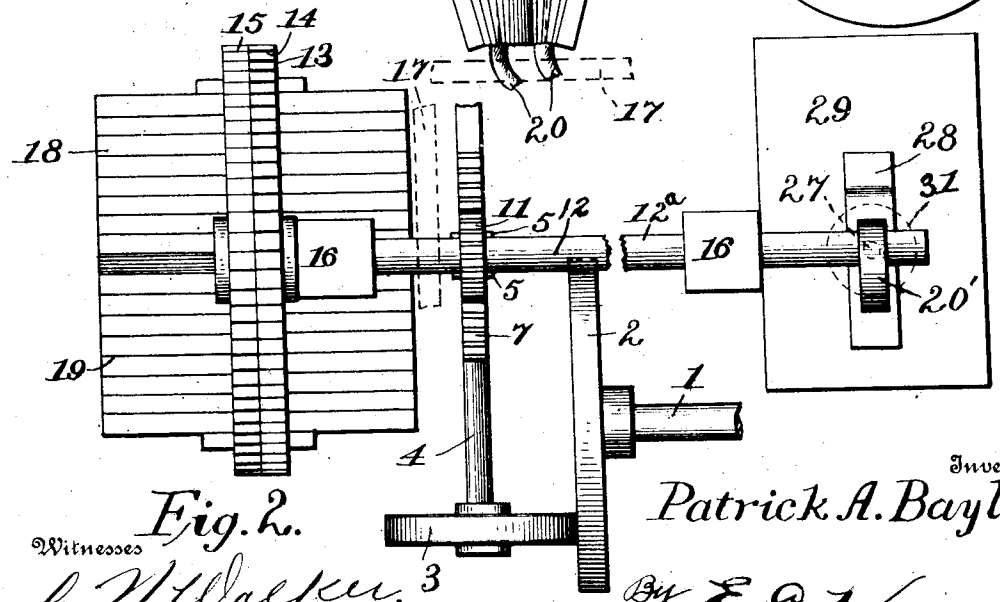



Fig. 2.




Witnesses

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC MUSICAL INSTRUMENT.

943,909. Specification of Letters Patent. Patented Dec. 21, 1909.

Application filed July 11, 1908. Serial No. 443,027.

*To all whom it may concern:*

Be it known that I, PATRICK A. BAYLESS, a citizen of the United States, residing at Oklahoma City, in the county of Oklahoma and State of Oklahoma, have invented certain new and useful Improvements in Automatic Musical Instruments, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in musical instruments, and particularly to an automatic tempo and tone interpreter for automatic musical instruments.

The object of this invention is the provision of means for facilitating the changing of the speed of the music roll across the tracker bar, and thereby giving the music any tempo desired, and also changing the tone of the music any degree either very soft or extremely loud.

Another object of the invention is the provision of means for facilitating or enabling the instrument to interpret the music as played by the world's most famous musicians, note by note, phrase by phrase, tone and tempo.

It is to be understood that my device or mechanism is operated from perforations in the sheet or roll music. Furthermore, my invention changes the tempo automatically.

With these and other objects in view, the invention consists of certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the drawings: Figure 1 is an elevation of a mechanism constructed in accordance with the present invention. Fig. 2 is a top plan view of the mechanism depicted in Fig. 1. Fig. 3 is a fragmentary, sectional view of the mechanism depicted in Fig. 1. Fig. 4 is a fragmentary, sectional view of the mechanism depicted in Fig. 2, and showing particularly the device for controlling the tone.

Referring to the drawings by numerals, 1 designates the drive-shaft, to which is secured a primary friction disk 2, which disk is engaged by the auxiliary friction disk or wheel 3, that is fixedly secured to the auxiliary drive-shaft 4. The auxiliary drive-shaft 4 is provided, preferably, with a pair of extensions or collars 5, between which extends an extension 6 formed on the bottom of a toothed or gear rack 7. The inner end of the auxiliary shaft 4 is slidably mounted in a sleeve 8, which sleeve is provided with an elongated slot or opening 9, within which is positioned a pin 10; the pin 10 is secured to shaft 4, so that while the shaft may be slid back and forth in sleeve 8, still the sleeve 8 and shaft 4 will be locked against independent rotary movement. The sleeve 8 carries or is attached to the roll of music, so that it enables disks 2 and 3 to control the travel of the music across the tracker-bar. Meshing with the rack 7 is a cog-wheel 11, which wheel is fixedly secured to a main shaft 12. Secured near one end of shaft 12 is a ratchet-wheel 13, which ratchet-wheel is provided with right and left peripherally-arranged gear-teeth 14 and 15, respectively. The shaft 12 is journaled upon suitable bearings or supports 16 and the entire mechanism is supported by any suitable framework as indicated by dotted lines, at 17, which framework 17 can be attached to any suitable part of the instrument in which the apparatus or mechanism is placed.

Bellows or pneumatics 18 and 19 are secured together, and hollow tubes or pipes 20 place the same in communication with the air trunk, so that when a pneumatic is controlled by a perforation of the sheet music passing across the tracker-bar, one of the bellows or pneumatics 18 and 19 will be operated, for causing one of the pawls 21 to engage a ratchet-tooth on wheel 13, and thereby rotate the wheel in one direction. Each pawl or dog 21 is pivotally mounted, at 22, upon a supporting-plate or member 23, which is attached to a bellows or pneumatic. A spring 24 slidably engages, near one end, the under face of a dog, and is secured near its opposite end to a supporting-plate or member 23, whereby an upward pressure is exerted upon each dog sufficiently to place the inner end 24 in engagement with a ratchet-tooth on double-toothed wheel 13 when the bellows is collapsed. Consequently, by means of the bellows or pneumatics 18 and 19 being connected to the air-chest or trunk, as the sheet-music passes over the tracker-bar, the ratchet-wheel 13 will be operated for causing the rack 7 to pass back and forth under the cog-wheel 11, and gage or control the position of the auxiliary frictional wheel or disk 3 upon the frictional disk 2, relative to shaft 1 and the outer edge of said disk 2, whereby the speed of the sleeve 8 carrying the music, will be automatically controlled, for it will be obvious that when the frictional disk 3 is

near the outer edge of disk 2, the speed will be greatly increased, whereas the speed will decrease as the frictional disk 3 is moved toward the center of disk 2. Pins or rods 25 are so arranged as to disengage the pawls or dogs 21, when the bellows or pneumatics are not working.

An eccentric or cam 20′ is fixedly secured to the main shaft 12ª, near one end, and said eccentric is placed in engagement with the upper or inner end of the threaded member or bolt 27, which threaded member is slidably mounted in an aperture of the inverted, substantially V-shaped bracket 28, which bracket is carried by the wind-chest 29. The chest 29 is provided with an opening or inlet 30, which is normally closed by the valve-member 31, which is fixed to the inner or lower end of the threaded member 27. A nut or locking-member 32 is threaded upon the stem or member 27, and between the nut 23 and the bracket 28 is positioned a yieldable member, as for instance, spring 33, which normally holds the valve 31 closed, but the valve can be quickly opened by the cam or eccentric 26 being rotated through the medium of the shaft 12ª, whereby the tone of the instrument is controlled, by varying the vacuum tension in the govern bellows or air-trunk, and, consequently, causing the music or tones to be varied in accordance with the music or perforations of the sheet that is passing across the tracker-bar. It will, therefore, be obvious that through the medium of this structure, the tone of the music will be synchronously regulated with the time or tempo of the music which is being played, thereby producing the desired result as set forth in one of the foregoing stated objects of my invention.

The object of the nut or threaded member 32 is to control the tension of the spring 33, which acts as a safety device to keep the pumps from imperfectly performing their function. The movement of the valve member 31 depends entirely upon the amount which the eccentric or cam 26 is rotated, and it will, therefore, be seen that as a result of the amount of movement of wheel 13, the valve-member 31 will be moved, resulting in a large and continuous opening, for the farther the valve-member 31 is moved from the outlet valve or port 30, the greater the amount of air permitted to pass through said outlet and port or valve-opening.

It is to be understood that the bellows or pneumatics 18 or 19 are so arranged that when the air is pumped out of the same, they collapse, causing the dogs or pawls carried thereby to engage the ratchet of wheel 13, resulting in the movement of said wheel, either to the right or left, according to the bellows or pneumatic that is in action.

From the foregoing description, it is to be understood that the ratchet-wheel is provided with right and left teeth, which are engaged by pneumatic or bellows-actuated dogs or pawls and that the bellows or pneumatics are connected, through the medium of pipes or tubes to the air trunks, so that as each is operated, the particular bellows or pneumatic will also be operated for changing the time and tone of the note. Through the medium of the eccentric or cam, the tension in the wind-chest is increased or lowered, by closing or opening the valve-member according to the tone required by the music that is being played by the instrument.

The operation is as follows: When the instrument is in action, there is a vacuum in the wind-chest at the time the sheet or roll music is traveling across the tracker-bar. As pneumatics or bellows 18 and 19 operate or close, they move ratchet or toothed wheel 13 in the direction according to the pneumatic or bellows that is in operation, whether to the right or left, resulting in the rotating of shaft 12 and the moving of the toothed rack 7, and, consequently, through the medium of the frictional disk 3, changing the speed of the sheet as it travels across the tracker-bar.

It is to be understood that in the foregoing specification, when I refer to the member 13 as ratchet-wheel I mean a rotatable member, for it will be obvious that a solid disk with the ratchet-teeth upon its periphery perform the same function, and besides, when I refer to the member 3 as a disk, it will also be obvious that a spoked wheel performs the same function as a disk, and, consequently, I do not wish it to be understood that I limit my invention to the specific element ordinarily contemplated when these words or terms are used.

When the device is working as a tone regulator or interpreter, it always returns to its normal position, or where it started from by having perforations, at the end of each piece of music.

What I claim is:

1. In an automatic musical instrument, the combination with a music sheet, and a tracker bar, of sheet-music driving means, a shaft, a cog-wheel secured to said shaft, means adjustably connecting the driving-means to said cog-wheel, whereby when said cog-wheel is rotated, the speed of travel of said driving-means will be varied, and means for automatically rotating said cog-wheel, as a sheet of music is passed by the tracker-bar.

2. In an automatic musical instrument, the combination of sheet-music driving means, a gear-wheel, a ratchet wheel positioned contiguous to said gear wheel, means connecting said gear-wheel to said sheet-music driving means, means associated with said sheet music driving-means, whereby

when said gear-wheel is rotated, the speed of travel of the sheet-music driving means will be varied, a bellows or pneumatic, and a dog or pawl carried by said bellows and capable of engaging the ratchet of said wheel for imparting rotary movement thereto.

3. In an automatic musical instrument, the combination with sheet-driving means, of a ratchet-wheel, means connecting said ratchet-wheel to said sheet-driving means, means associated with said sheet driving means whereby when said ratchet-wheel is rotated, the speed of the sheet-driving means will be varied, and means for rotating said ratchet wheel in opposite directions.

4. In an automatic musical instrument, the combination with movable sheet-driving means, of a wheel provided with peripherally-arranged right and left ratchet-teeth, means connecting said wheel to the sheet-driving means, means associated with said sheet-driving means, whereby when said wheel is rotated, the speed of movement of the sheet-driving means will be varied, bellows or pneumatics positioned contiguous to said wheel, and means carried by each bellows for engaging some of the teeth of the ratchet-wheel.

5. In an automatic musical instrument, the combination of movable sheet-driving means, a ratchet-wheel, means connecting said ratchet-wheel to said sheet-driving means, means associated with said sheet-driving means, whereby when said ratchet-wheel is rotated, the speed of movement of said driving means will be varied, a bellows or pneumatic positioned contiguous to said wheel, a spring-pressed pawl or dog pivotally mounted upon said bellows and adapted to engage a tooth of said ratchet-wheel when said bellows is collapsed.

6. In an automatic musical instrument, the combination with movable sheet-driving means, of a ratchet-wheel provided with right and left arranged teeth, a plurality of bellows positioned contiguous to said ratchet-wheel, each bellows provided with a supporting-member or plate, a dog or pawl pivotally mounted upon each plate, means exerting an upward or outward pressure upon each dog, and means associated with said sheet-driving means, whereby when a bellows is collapsed, a dog will engage a tooth of the ratchet-wheel and thereby rotate the same for varying the speed of travel of the sheet-driving means.

7. In an automatic musical instrument, the combination with sheet-driving means, of a ratchet-wheel, means connecting said ratchet-wheel and sheet-driving means, means associated with said sheet-driving means, whereby when the ratchet-wheel is rotated, the speed of travel of the sheet-driving means will be varied, a pair of bellows positioned together, and placed contiguous to the ratchet-wheel, each bellows provided upon its outer side with a supporting-member, a dog pivotally connected to the supporting-member, a spring secured at one end to the supporting-member and slidably engaging near its outer or opposite end the dog, whereby when a bellows is collapsed, the dog will engage a tooth or teeth of the ratchet-wheel and rotate the same in one direction.

8. In an automatic musical instrument, the combination with sheet-music driving means, a tracker bar, of tempo means cooperating with said sheet-driving means for automatically and synchronously changing the tone and time of the music as a sheet of music carried or driven by said driving means travels over said tracker-bar.

9. In an automatic musical instrument, the combination with sheet-music driving-means, of automatic tone modifying means coöperating with said driving means and adapted to be actuated as a sheet driven by said driving-means passes by the tracker-bar.

10. In an automatic musical instrument, the combination with a tracker bar, of sheet-driving means, bellows or pneumatic means adapted to be actuated when a sheet passes by said tracker bar, and means coöperating with said sheet-supporting means and adapted to be actuated by said bellows, for regulating the time and tempo of the music to be played.

11. In an automatic musical instrument the combination with a tracker bar, of a sheet music driving means, bellows or pneumatic means adapted to be actuated when a sheet passes by said tracker bar, rotatable means coöperating with said sheet-driving means and provided with a plurality of right and left extending ratchet teeth formed upon the periphery thereof, and means carried by said bellows and adapted to engage said ratchet teeth for rotating said rotatable means in opposite directions and thereby regulating the tone and tempo of the music to be played.

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

PATRICK A. BAYLESS.

Witnesses:
J. A. BRANIFF,
ARTHUR C. HERN.