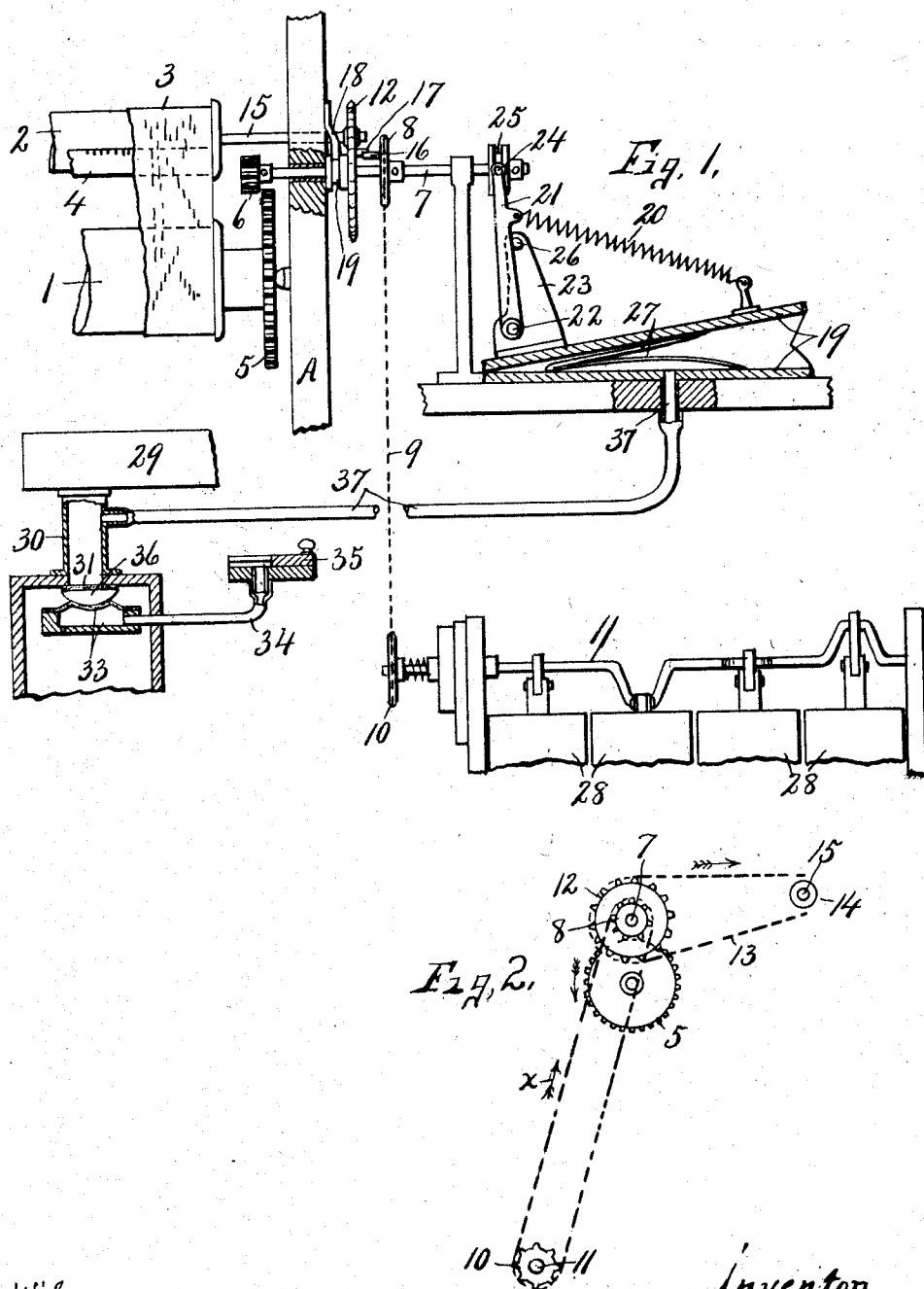


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 SELF PLAYING MUSICAL INSTRUMENT.  
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1,038,498.

Patented Sept. 10, 1912.



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# UNITED STATES PATENT OFFICE.

LEWIS B. DOMAN, OF ELBRIDGE, NEW YORK.

## SELF-PLAYING MUSICAL INSTRUMENT.

1,038,498.

Specification of Letters Patent. Patented Sept. 10, 1912.

Application filed March 13, 1906. Serial No. 305,764.

*To all whom it may concern:*

Be it known that I, LEWIS B. DOMAN, of Elbridge, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Self-Playing Musical Instruments, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in self-playing musical instruments, having special reference to a clutch-operating mechanism for controlling the roll and re-roll of the music-sheet. In this class of instruments it is necessary to provide a positive drive for the winding and rewinding of the rollers of the music-sheet involving the use of intermeshing gears, one of which is usually thrown into mesh with the other during the winding of the music-sheet upon the take-up roller, and is thrown out of action during the re-winding of the music-sheet upon the other roller.

Heretofore it has been customary to shift the pinion or sliding intermeshing gear into and out of action by means of a lever, in which case the engagement of the pinion with the gear on the take-up roller is very abrupt, and it some times happens that the momentum of the take-up roller at the end of the rewind keeps it revolving for some time after the music-sheet has been wound entirely upon the re-winding roller, and therefore, any sudden intermeshing of the pinion with the gear is more or less liable to damage the teeth of the intermeshing parts.

In my present invention I have sought to overcome this difficulty through the medium of a pneumatic which is yieldingly connected to throw the pinion into mesh with the gear of the take-up roll, and is also employed to throw the pinion out of mesh with said gear and to simultaneously operate the clutch member for driving the rewinding roller.

Another object is to simultaneously cut off the pneumatic key-action from the wind-inducing device when the clutch operating pneumatic is operated to connect the motor with the rewinding roller, whereby the entire force of the wind-inducing device is diverted to the pneumatic motor during the rewind.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a sectional

view of a pneumatic self-playing musical instrument embodying the features of my invention. Fig. 2 is a detail view of the connections between the motor shaft and rollers for winding and re-winding the music-sheet.

In demonstrating the practicability of my invention, I have shown a take-up or winding roller —1— and a rewinding roller —2—, upon which is mounted a music-sheet —3— to travel in the usual manner across the ducts of a suitable tracker —4—.

The take-up roller —1— is journaled in suitable bearings in the supporting frame, as —A—, and is provided with a gear —5— of comparatively large diameter adapted to mesh with the pinion —6— of comparatively small diameter. This pinion —6— is secured to one end of an axially movable rotary shaft —7—, which is also journaled in the frame —A— and is provided with a sprocket-wheel —8— rigid thereon and connected by a chain or similar power-transmitting device —9— to a sprocket-wheel —10— on a motor-shaft —11—, the latter constituting the main driving shaft.

Loosely mounted upon the shaft —7— is a second sprocket-wheel —12— which is connected by a belt —13— to a somewhat smaller sprocket-wheel —14— on the re-winding roller shaft —15—, which is also journaled in the frame —A—.

The sprocket —8— is provided with a laterally projecting clutch member —16— which is movable with the shaft —7— into and out of interlocking engagement with a similar clutch-member —17— on the sprocket-wheel —12—. This latter sprocket-wheel —12— is held from axial movement by a shoulder —18— entering an annular groove —19— in the hub of the wheel —12— so that the latter is free to rotate when the clutch members —16— and —17— are interlocked. These clutch members —16— and —17— are so arranged relatively to each other and to the pinion —6— as to interlock with each other as soon as the pinion —6— is thrown out of mesh with the gear —5—, but when the shaft —7— is shifted in the opposite direction, or to the right of Fig. 1, the clutch-member —16— is withdrawn from interlocking engagement with the clutch member —17— as soon as the pinion —6— intermeshes with the gear —5—.

The means for shifting the shaft —7— endwise constitutes the basis of my present

invention, and consists essentially of a pneumatic —19— which is connected by a spring —20— to a lever —21—. This lever is fulcrumed at its lower end at —22— upon an arm —23— on the movable part of the pneumatic —19— and has its upper end provided with a pin —24— riding in the grooved collar —25— which is fixed to the shaft —7— so that as the lever —21— is oscillated back and forth, similar motion is transmitted to the shaft —7—.

The arm —23— is provided with a pin —26— projecting into the path of movement of the lever —21— and against which said lever is normally held by the spring —20—, that is, the pin —26— is on the same side of the lever as the connection of the spring —20— with the movable side of the pneumatic —19— so that the end of the lever which is connected to the grooved collar —25— is free to move away from the pin —26— against the action of the spring —20— when the pneumatic —19— is deflated in a manner hereinafter described.

The pneumatic —19— may be distended by the admission thereto of atmospheric air or by a suitable distending spring, as —27—, and in this distended position serves to shift the shaft —7— axially through the medium of the pin —26— and lever —21— to engage the clutch members —16— and —17— and to simultaneously disengage the pinion —6— from the gear —5— while the motor shaft —11— is in action. This motor shaft is always driven in the same direction and transmits similar motion in the direction indicated by arrows —X— to the shafts —7— and —15— when the clutch-members —16— and 17— are interlocked, but as soon as these clutch-members are disengaged by the axial shifting of the shaft —7— through the medium of the pneumatic —19—, when deflated, the pinion —6— is immediately engaged with the gear —5— to rotate the roller —1— and wind the music-sheet in the opposite direction.

The shaft —11— is driven by pneumatic motors —28— similar to those set forth in my pending application No. 249,250, filed March 9, 1905, but so far as my present application is concerned, any suitable mechanism may be employed for rotating the shaft —7—, and I have shown the motors —28— and shaft —11— for the purpose of producing an operative combination of elements.

As in my pending application 249,250 previously referred to I provide means for cutting off connection between the wind inducing device and sound producing devices during the rewind of the music-sheet, and for this purpose I have shown one of the valve shelves —29— of the sound-producing devices as connected by a conduit —30— and

valved port —31— to an exhaust chamber —32— in which a partial vacuum is maintained by a suitable wind inducing device; not shown. Within this chamber —32— is a pneumatic —33— having an air inlet duct —34— adapted to be opened and closed to atmosphere by a sliding valve —35—.

The valve —36— is actuated by inflation of the pneumatic —33— when the valve —35— is opened to close the port —31— and cut off communication between the exhaust chamber —32— or wind inducing device and valve chamber —29— of the sound producing devices.

The clutch operating pneumatic —19— may be connected in any desired manner to any of the wind ways leading from the sound producing devices to the wind inducing device, but I preferably establish communication between this pneumatic —19— and the wind way between the valved port —31— and valve-shelf —29— through a suitable conduit —37—, so that when the valve —36— is open for establishing communication between the wind inducing device and sound producing devices some communication is established with the pneumatic —19— for deflating the latter, thereby throwing the rewinding mechanism out of action and simultaneously connecting the winding mechanism with the take-up roller —1—, said pneumatic —19— being held in this deflated condition as long as the valve —36— is held open by the closing of the valve —35— or during the rendition of the musical selection.

When it is desired to shift the driving mechanism from the take-up roller to the rewinding roller it is simply necessary to open the valve —35— and thereby admitting atmospheric air into and inflating the pneumatic —33— which closes the valve —36— thereby cutting off communication between the pneumatic —19— and wind inducing device, thus relieving the air-tension in said pneumatic —19— and allowing the spring —27— to distend the same suitable provision being made for the admission of air to aid the spring in expanding the pneumatic.

This distention of the pneumatic —19— causes the pin —26— to engage and rock and lever —21— to move the shaft —7— endwise thereby throwing the pinion —6— out of mesh with the gear —5— of the take-up roller and simultaneously locking the clutch members —16— and —17— to connect the driving mechanism with the rewinding roller. It is now clear that the action of the pneumatic —19— is controlled primarily by making and breaking connection or communication between it and the wind inducing device, that is, it is deflated by partially exhausting the air therefrom to throw the winding mechanism into action and the rewinding mechanism out of action, but is

preferably distended by the spring —27— when communication with the wind inducing device is cut off. When this pneumatic —19— is in communication with the wind inducing device through the medium of the conduit —37— during which time the pneumatic —33— is cut off from communication with atmosphere by closing the valve —35—, the shaft —7— is drawn axially by the spring —20— and lever —21— to disengage the clutch members —16— and —17— and to simultaneously throw the pinion —6— into mesh with the take-up roller-gear —5— for winding the music-sheet —3— upon the take-up roller —1— during the rendition of a musical selection. If, however, the pinion —6— should not immediately intermesh with the gear —5— by reason of the engagement of the adjacent faces of the gears, it would not interfere with the complete collapse of the pneumatic —19—, because the spring —20— would allow such collapse and still maintain a tension upon the lever —21— tending to draw the shaft —7— endwise to cause the pinion —6— to intermesh with the gear —5— as soon as the teeth came into registration. It is now clear that the valve —35— controls the action of the pneumatics —19— and —33— to connect the pneumatic —19— with the wind inducing device and thereby throw the driving mechanism into connection with the take-up roller, or when the valve —35— is opened the pneumatic —33— is immediately inflated to close the valve —36—, by which operation the pneumatic —19— and wind-chest —29— are simultaneously cut off from communication with the wind inducing device, thus removing the air tension from the pneumatic —19— and allowing the spring —27— to distend it and thereby throw the rewinding mechanism into action and the winding mechanism out of action.

45 What I claim:

1. In a self-playing musical instrument a music sheet, actuating mechanism including a clutch, an actuating member connected to the clutch, a pneumatic yieldingly connected to said member to actuate the same, and means for controlling the action of said pneumatic.

2. In combination with winding and rewinding rollers for a traveling music sheet, a driving mechanism for said rollers includ-

ing an axially moving shaft, a pneumatic and operating means therefor and connections between the pneumatic and shaft including a spring for moving the shaft endwise in one direction.

3. In combination with winding and rewinding rollers for a traveling music sheet, a driving mechanism for said rollers including an axially moving shaft, a pneumatic and operating means therefor and connections between the pneumatic and shaft including a spring for moving the shaft endwise in one direction, and additional means actuated by the pneumatic for positively moving the shaft in the opposite direction.

4. In combination with winding and rewinding rollers for a traveling music sheet, driving mechanism for said rollers including a clutch, a pneumatic and operating means therefor, connections between said pneumatic and clutch including a spring for shifting the clutch in one direction.

5. In combination with winding and rewinding rollers for a traveling music sheet, driving mechanism for said rollers including a clutch, a pneumatic and operating means therefor, connections between said pneumatic and clutch including a spring for shifting the clutch in one direction, and additional means actuated by the pneumatic for positively shifting the clutch in the opposite direction.

6. In music sheet roller mechanisms, a roller adapted to wind thereon a music sheet, roller driving means for rotating the roller, a pneumatic, and means, including a spring and connecting the pneumatic and driving means, through which the roller driving mechanism is controlled by the pneumatic.

7. In music sheet roller mechanisms, a roller adapted to wind thereon a music sheet, a rotary driving shaft, means for rotating the roller when the shaft is moved to a predetermined position, a pneumatic, and means, including a spring and connecting the shaft and pneumatic, by which the pneumatic moves the shaft to said predetermined position.

In witness whereof I have, hereunto set my hand this 1st day of March 1906.

LEWIS B. DOMAN.

Witnesses:

NETTIE A. BIBBENS,  
M. E. ELLIOTT.