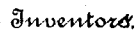


APPLICATION FILED JUNE 30, 1911.

Patented Oct. 29, 1912.

4 SHEETS—SHEET 1.



A. Gellingsworth

By

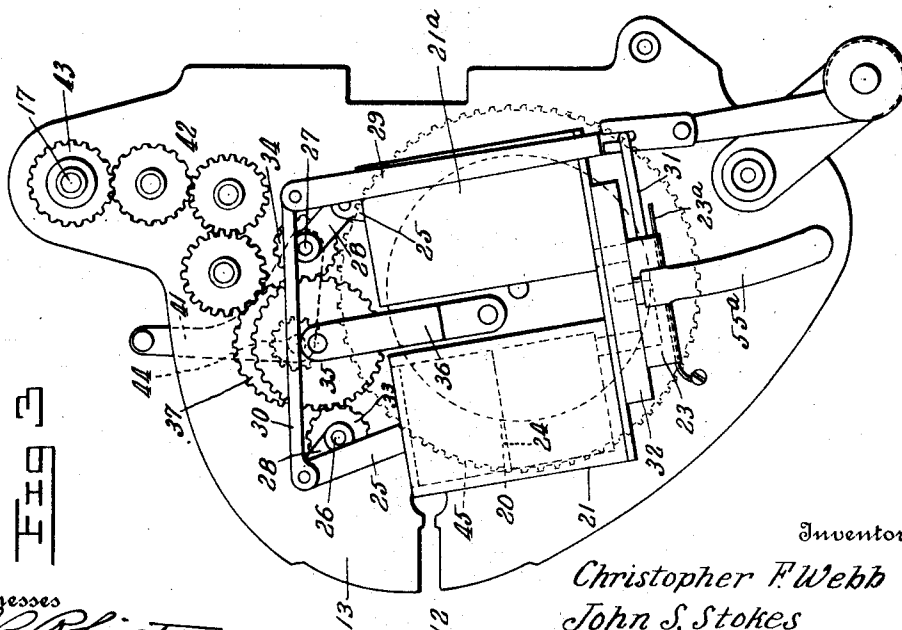
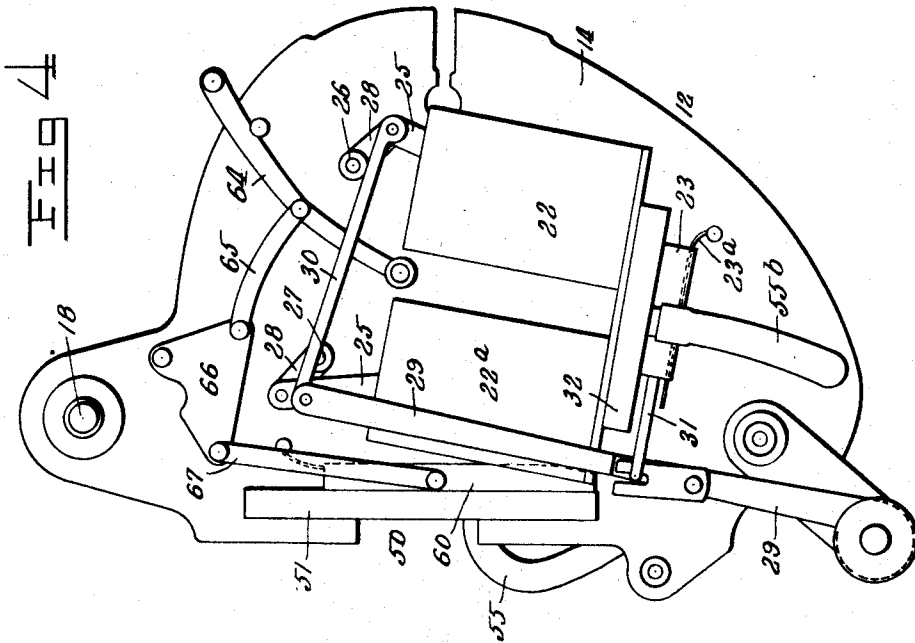
Surgeon, Cumberland River
Attorney &

C. F. WEBB & J. S. STOKES.
MUSIC ROLL HOLDER FOR AUTOMATIC PIANOS.
APPLICATION FILED JUNE 30, 1911.

1,042,858.

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4 SHEETS—SHEET 2.



Witnesses
H. C. Blinette
A. P. Hollingworth

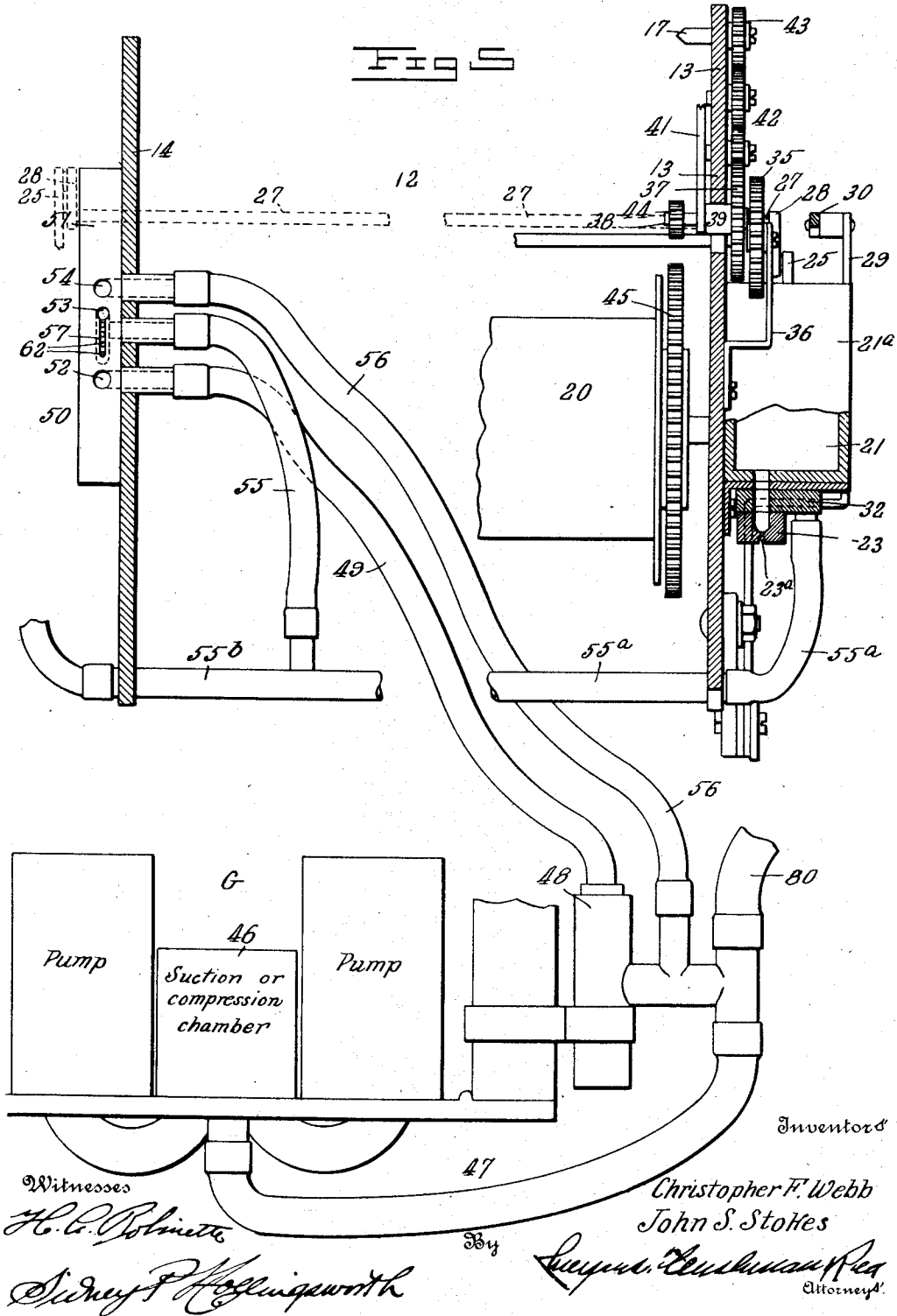
Inventors
Christopher F. Webb
John S. Stokes
By *Samuel Cushman & Co.*
Attorneys

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4 SHEETS-SHEET 3.



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4 SHEETS—SHEET 4.

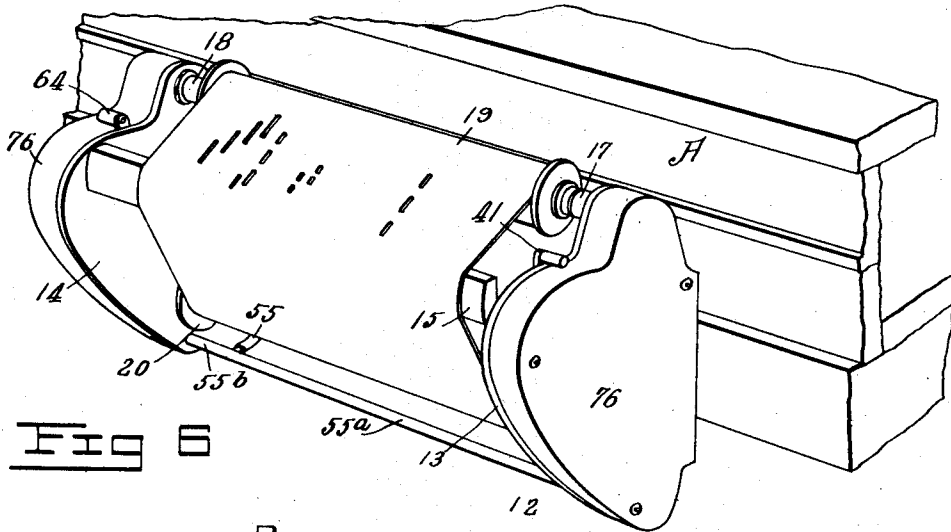


Fig 6

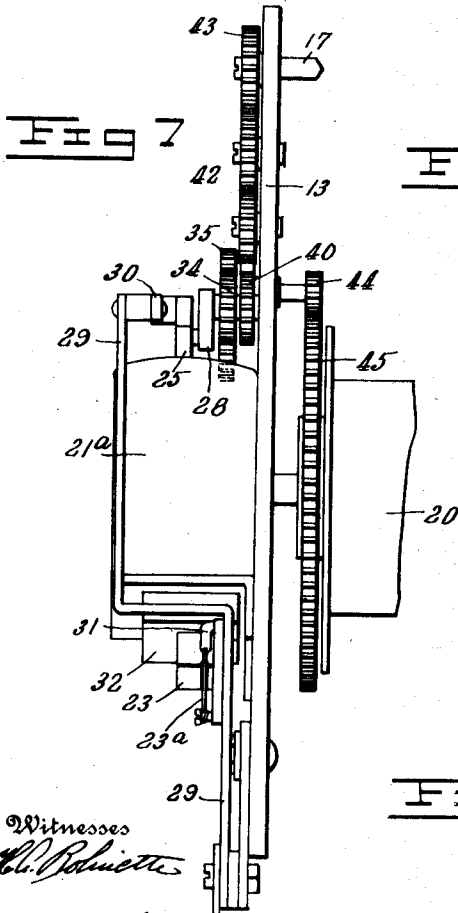


Fig 7

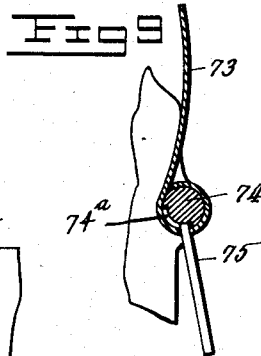


Fig 8

Fig 9

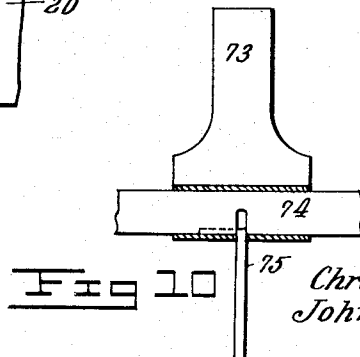
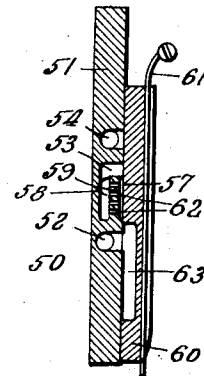


Fig 10

Witnesses

H. L. Smith

A. H. Smith

Inventors
Christopher F. Webb
John S. Stokes

By

Raymond C. Smith
Attorney

UNITED STATES PATENT OFFICE.

CHRISTOPHER F. WEBB, OF LONDON, ENGLAND, AND JOHN STOGDELL STOKES, OF MOORESTOWN, NEW JERSEY, ASSIGNORS TO STOKES & SMITH COMPANY, OF SUMMERDALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MUSIC-ROLL HOLDER FOR AUTOMATIC PIANOS.

1,042,858.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed June 30, 1911. Serial No. 636,290.

To all whom it may concern:

Be it known that we, CHRISTOPHER F. WEBB, a subject of Great Britain, residing at London, England, and JOHN STOGDELL STOKES, a citizen of the United States, residing at Moorestown, in the county of Burlington and State of New Jersey, have invented new and useful Improvements in Music-Roll Holders for Automatic Pianos, of which the following is a specification.

This invention relates generally to self-playing musical instruments, and more particularly to music roll-holders for player pianos, so called, or pianos in which hammers are actuated by automatic mechanism controlled in their operation through a movable sheet or web carried in a frame mounted beneath the key-bed and adapted to be moved from a position thereunder to a position forward thereof. When not in use, the music-roll-holder will be pushed under the key-bed out of the way and substantially out of sight, but whenever the playing mechanism is to be operated the roll-holder will be drawn forward and swung up in front of the key-bed just below the top of the manual keys and fastened in that position.

The principal object of the invention is to provide a music roll-holder with a motor, preferably a pneumatic motor, mounted thereon and movable with it from one position to another, for alternately rotating the take-up roll and the music spool whereby the music sheet is caused to be unwound from and rewound upon the spool.

A further object of the invention is directed to the mechanism for varying the rapidity with which the music sheet passes over the tracker when playing. This is accomplished by changing the speed of the motor through the intermediary of a novel pressure retarding valve, called a tempo device, introduced between the source of power and the motor slide valves, said valve or tempo device being so constructed that more or less air pressure may act on the motor when the music sheet is being unwound from the spool, and when being rewound thereon, full pressure of air will be admitted to the motor cylinders to increase the speed of the motor and cause a rapid rewinding of the music sheet.

With these and other objects in view the

invention consists of the novel construction, combination and arrangement of parts hereinafter described in detail and pointed out in the appended claims, reference being had to the accompanying drawing, in which—

Figure 1 is a vertical sectional view of an upright piano provided with the improved music roll-holder. Fig. 2 is a detail view showing the music-roll holder under the key-bed. Fig. 3 is a view of the right side of the roll-holder when looking at it from the front. Fig. 4 is a view of the left side of the roll-holder. Fig. 5 is a front elevation of the music roll-holder, a portion of the same being broken away. Fig. 6 is a perspective view of the music roll-holder in operative position. Fig. 7 is a rear elevation of the right end of the roll holder. Fig. 8 is a vertical sectional view through the regulating valve. Figs. 9 and 10 are detail views of the latch device for holding the roll-holder in playing position.

In the drawings, wherein like reference characters are used to designate the same parts in all the figures, A indicates a piano which may be an upright piano as shown, a grand, or a square piano, the invention being applicable to all forms. The manual keys B overlie the key-bed C and operate in the usual manner the action D to cause the hammers to strike the strings E.

The pneumatic mechanism for operating the action is indicated at F, the air pump, either compression or vacuum, at G and the pedals for operating the pump at H.

At the front of the piano, in the preferred form of construction, and below the key-bed C is a slide 10, which may be a plate or a skeleton frame, mounted in guides 11 fastened to the key-bed so that said plate can be slid horizontally thereunder. Pivally mounted on the slide 10, in a manner to be hereinafter described, is the music roll-holder 12 comprising two end plates 13 and 14 spaced from each other and connected by suitable rods, plates or other means to form a rigid frame. Between the plates 13 and 14 and fastened to them at its ends is a tracker 15 of the usual construction having transverse ducts therein, from each of which a flexible pipe 16 extends beneath the key-bed into the piano to the pneumatic mechanism F near the top thereof. Projecting inwardly from the end plates 13

and 14 above and to the rear of the tracker 15 are bearings 17 and 18, respectively, for the pintles of the music spool or delivery roll 19, while below the tracker is a take-up roll 20 journaled in any suitable or well known manner in the end plates 13 and 14.

The take-up roll 20 and music spool 19 are each positively rotated to unwind the music sheet from and rewind it on said spool by means of a pneumatic motor of simple construction and little weight mounted on the music roll-holder and movable with it when slid below the key-bed and swung up into operative position. The motor comprises a pair of cylinders mounted on each side plate 13 and 14 and numbered 21, 21^a and 22, 22^a, respectively. The cylinders are parallel to each other, open at their upper ends and closed at their lower ends through which suitable inlet and outlet ports are made for the passage of air, said ports being controlled by slide valves 23, one valve for each pair of cylinders. The valves 23 are similar to the ordinary D-valve of a steam engine and comprise each a block or plate having a cavity in its bearing face to coact with the cylinder ports, and is held in place by a spring 23^a affixed to the roll-holder and pressing against the underside of the valve. Within the cylinders are pistons 24 to which are attached connecting rods 25. Extending lengthwise of the music roll-holder are two shafts 26 and 27 parallel to each other and to the axes of the music spool and take-up roll. These shafts are journaled in end plates 13 and 14 and are provided on each of their ends with cranks 28 to each of which cranks a connecting rod 25 is pivoted. The cylinders are preferably single acting and to insure a steady, smooth and even running of the motor the four cranks 28 are placed at an angle of 90 degrees to each other. Pivotally mounted on the end plates 13 and 14 are valve operating arms 29 connected at their upper free ends by links 30 to the cranks 28 on the ends of the shaft 26. As the shaft carrying the cranks 28 rotates, the arms 29 will be vibrated, and by means of connections 31 between the said arms and the slide valves 23 the latter are moved across the valve seats 32 to open and close the ports leading into the cylinders. On one end of the shaft 26 is a gear wheel 33, a like gear 34 being fixed on the shaft 27. These gears mesh with an intermediate gear 35 which transmits the motion of the shaft 26 to the shaft 27, which latter is the main driving shaft for imparting motion to the take-up roll and the music spool. The gear 35 is journaled on a stud projecting from an arm 36 secured to the end plate 13, between which plate and the gear 35 is another gear wheel 37 on the end of a short shaft 38 mounted in a bearing 39 movable to a

limited extent in a slot in the plate 13, said gear wheel 37 being in continuous engagement with a gear wheel 40 fixed on the shaft 27 behind the gear 34. An elbow lever 41 is pivoted at one end on the shaft 27 and to the bearing 39 or the shaft 38, and provided with a short handle on its other end which, when operated in one direction, rocks the bearing 39, shaft 38 and gear wheel 37, about the axis of the shaft 27 to bring the gear wheel 37 into mesh with one end of a train of gears 42 that drives a gear 43 fixed on the outer end of the bearing 17 which supports one of the pintles of the music spool 19, thus rotating said spool. A pinion 44 is fastened on the inner end of the shaft 38 to engage a gear wheel 45 on the take-up roll 20 when the elbow lever is moved away from the gear train 42. The motor, as shown in the drawings, is arranged to operate by means of a vacuum or suction, but it will run equally as well with compressed air if the lead of the valves be changed, as, for instance, by connecting the valve operating lever 29 to the crank on the shaft 27 instead of the crank on shaft 26 as shown in Figs. 3 and 4.

The air pump G operated by the pedals H will exhaust air from a reservoir or chamber 46 from which latter a pipe 47 passes to a regulating or pressure reducing valve 48 and from said valve by a pipe 49 to a retarding valve 50 on the side plate 14, herein called the tempo-device because it governs the speed of travel of the music sheet and therefore the "time" in which the music is played. The tempo-device comprises a slide 60 movable over and held by a spring 61 in contact with a seat plate 51 in which are three passageways or ducts 52, 53 and 54, opening through its bearing face as shown in Fig. 5. The passage way 52 communicates with the pipe 49 from the reducing valve 48. From the passageway 52 a flexible pipe 55 extends a short distance and then divides into two branches to connect with the slide valves 23 below the cylinders. The third passageway or duct 54 in the seat plate 51 is connected by a pipe 56 to a branch from the pipe 47 before it enters the regulating valve 48 so that the full suction of the vacuum will be felt in said passageway. In the bearing face of the seat plate 51 is made a narrow, shallow groove 57 extending from the duct 53 nearly to the duct 52, and separated from a parallel chamber 58 in said plate by a thin diaphragm 59 containing a number of small perforations 62. In the underside of the slide 60 is a longitudinal channel 63 sufficiently long to extend over the ducts 52 and 53 or 54 and 53 but not over the three at one time. The tempo-device 50 is mounted on the plate 14 in a substantially vertical position, its slide 60 being operated by a hand lever 64 pivoted

on said plate and connected by a link 65 to a rocking arm 66 also pivoted on the plate 14 from which arm a second link 67 extends to the slide 60. When the slide 60 is in the position shown in Fig. 8, suction through the ducts 53 and 54 is prevented by the overlapping end of said slide, but when the hand lever 64 is operated to move the slide so that the channel 63 therein will extend over the groove 57 in the seat plate, communication between the ducts 52 and 53 will be established and the motor driven by the exhaustion of air from the motor cylinders and at a speed proportional to the size of the opening leading into the channel 63. From this it is clear that a slight rocking movement of the hand lever 64 will, with very simple mechanism, change the speed of the motor and, consequently, the "time" in which the piece of music is to be played. It has been found upon practical demonstration that much better musical effects are obtained when the small perforations 62 open into a shallow groove in the seat plate, such as 57, common to all of them, because the change of speed in the motor will be both gradual and smooth as the area of the passageway for air is increased or decreased by the movement of the slide, whereas if the small holes were flush with the bearing face of the seat plate, there would be a sudden increase or decrease of pressure as the slide is moved in one direction or the other and cause an unsteady, jerky operation of the motor. A further movement of the slide 60 will bring the channel 63 over the ducts 53 and 54, cutting off duct 52. The air will then flow from the motor cylinders through the branch pipes 55^a, 55^b, pipe 55 to duct 53, thence through the channel 63 and duct 54 to pipe 56 and thence direct to the suction or vacuum chamber 46 around the retarding valve 48. The full force of the vacuum is thereby exerted on the cylinders and the motor will run at increased speed. A pipe 80 extends from the pipe 47 to the pneumatic mechanism F at the top of the piano to assist its operation. The flexible pipes 16 running back from the tracker F, pass over a rod 70, extending lengthwise of the music roll holder 12, to keep said pipes away from the shafts 26, 27 and the take-up roll 20.

The music roll holder 12 is pivoted at a suitable point on the slide 10 and carries a latch hook 72 pivoted at 71 that engages over the front edge of said slide when the roll holder is in operative position and locks it in place. A finger piece 73 here shown as formed with a cylinder at one end is pivotally mounted on a fixed bar 74 which passes through the cylindrical end. Projecting from said cylindrical end is a claw 75, the inner end of which enters an arc-shaped groove 74^a in the bar 74 and thus

limits the movement of the finger piece and the claw. The projecting portion of the claw 75 is in position to engage the latch hook 72 so that when the roll holder is in playing position, as represented in Fig. 1, pressure of the finger on the finger-piece 73 will cause the projecting claw 75 to swing forward, carrying the latch hook 72 out of engagement with the plate 10, thus permitting the roll holder to be swung downwardly and moved beneath the key-board in the manner indicated in Fig. 2. When the roll holder is drawn forward and swung up into playing position the latch hook 72, automatically engages the plate 10 to hold said roll holder in position. A suitable spring may be employed if desired to assist in the automatic engagement of the latch with the plate.

Caps or covers 76 are employed to inclose the motor mechanism and gearing on the outside of the plates 13 and 14 so that it will be protected from injury and from injuring the operator. Furthermore, the covers give a finish to the ends of the music roll holder in harmony with the piano case.

A music roll holder constructed as described may be attached to any piano provided with a pneumatic playing device without trouble, as no cutting of the case or other parts of piano is necessary. The guides must be screwed on the underside of the key-bed and the flexible tubes attached to the tracker after the slide 10 has been fitted in the guides 11.

The motors are shown and described as driving the take up roll and the music spool through spur gearing. If desired, or found more satisfactory, chain, friction or other means of transmitting motion from the motor to said rolls may be substituted for the spur gearing.

What we claim is:

1. In combination with a piano key-bed, a music sheet roll holder including a take-up roll and a rotatable music spool bearing, mounted on the key-bed and adapted to be moved from a folded position thereunder to a playing position forward thereof, a motor mounted directly on each side of said roll holder and movable with it, and manually operative means on the roll holder for simultaneously coupling both motors to the take-up roll or to the rotatable music spool bearing for driving them at different speeds.

2. In combination with a piano key-bed, a music sheet roll holder including a take-up roll and a rotatable music spool bearing, mounted on the key-bed and adapted to be moved from an inoperative position thereunder to a playing position forward thereof, a two-part motor each part fixedly attached to one end of said roll holder and movable into and out of playing position therewith, and means interconnecting said

motor parts to cause them to operate in unison and optionally rotate the take-up roll and the music spool bearing.

3. In combination with a piano key-bed, 5 a music sheet roll holder including a take-up roll and a rotatable music spool bearing, mounted on the key-bed and adapted to be moved from a position thereunder to a position forward thereof, a two-part motor 10 each part fixedly attached to an end of said roll holder and movable into an out-of-playing position therewith, means connecting said motor parts to cause them to operate in unison, and a finger lever on the roll holder 15 for coupling the motor to the take-up roll or to the rotatable music spool bearing.

4. A music-sheet roll holder including a take-up roll and means for carrying and rotating a music-spool, in combination with 20 a pneumatic motor fixedly mounted on the roll holder for rotating either the takeup roll or the music-spool carrier, an automatic regulating valve, and a manually operated valve for varying the amount of exhaust 25 actuating the motor through said regulating valve when rotating the take-up roll and for giving the motor full pressure around said regulating valve when rotating the music spool.

5. A music-sheet roll-holder including a 30 take-up roll and means for carrying and rotating a music spool, in combination with a pneumatic motor fixedly mounted on the roll-holder, a single manually operated valve, 35 and two sources of exhaust governed by said valve, one of which exhausts controls the pressure and volume of air actuating the motor to vary its speed when rotating the take-up roll, the other exhaust permitting 40 full pressure to act on the motor when rotating the music spool to give it greater speed than the take-up roll when rewinding the music sheet.

6. A music-sheet roll-holder including a 45 take-up roll and means for carrying and rotating a music spool, in combination with a pneumatic motor fixedly mounted on the roll-holder, an automatic regulating valve, 50 and a single manually operated valve, and two sources of exhaust governed by said valve, one of which exhausts includes said regulating valve and controls the pressure and volume of air actuating the motor to 55 vary its speed when rotating the take-up roll, the other exhaust permitting full pressure to act on the motor when rotating the music spool to give it greater speed than the take-up roll when rewinding the music sheet.

7. A music-sheet roll holder including a 60 take-up roll and means for carrying and rotating a music-spool, in combination with a pneumatic motor fixedly mounted thereon for rotating either the take-up roll or the 65 music-spool carrier, a valve and valve seat

carried by the roll-holder, a conduit between the valve seat and the motor, two conduits between said valve seat and the source of air pressure, a regulating valve in one of said conduits, and a manually operative means 70 for moving the valve to connect the motor conduit to the conduit containing the regulating valve for optionally varying the quantity of air acting on the motor, or to connect said motor conduit to the other conduit thus 75 giving the motor full air pressure.

8. A music-sheet roll holder including a take-up roll and means for carrying and rotating a music spool, in combination with a pneumatic motor fixedly mounted on each 80 end of said roll holder and connected to a common driving shaft for operatively driving said take-up roll and said spool carrier, a regulating valve for varying the air pressure acting on said motors when rotating 85 the take-up roll, and means for supplying full pressure around said regulating valve when rotating the music spool.

9. A music-sheet roll-holder comprising a take-up roll and a music-sheet roll carrier 90 and rotator, a motor for rotating said roll and spool operated by pneumatic pressure, a retarding valve or tempo device comprising a seat plate having a plurality of ducts in its bearing face from one of which ducts a 95 superficial groove and a chamber below said groove extends toward an adjacent duct, small holes connecting said groove and chamber, and a channel slide fitted to said seat plate and coöperatively movable thereon. 100

10. A music-sheet roll holder including a take-up roll and means for carrying and rotating the music spool, parallel longitudinal shafts extending from end to end of the holder, a pneumatic motor cylinder contain- 105 ing a piston connected to each end of each shaft, and means for coupling the shafts together to rotate in the same direction, driving means for the take-up roll, separate driving means for the music spool, and 110 means for optionally connecting the motor to either of said driving means.

11. A music-sheet roll-holder including a take-up roll and means for carrying and rotating a music-spool, parallel longitudinal 115 shafts from end to end of the holder, a pneumatic motor cylinder containing a piston connected to each end of each shaft, and means for coupling the shafts together to rotate in the same direction, a driving means 120 for the take-up roll, driving means for the music-spool, and means for connecting one of said means at a time to the motor.

12. A sheet music roll holder including a take-up roll and means for carrying and rotating a music spool, parallel longitudinal 125 shafts extending from end to end of the holder, a pneumatic motor cylinder containing a piston connected to each end of each shaft, and means at one end of each of said 130

shafts for coupling them together to rotate in the same direction, driving means for the take-up roll, separate driving means for the music spool carrier, means for connecting said motor to either driving means, and manually operated means for directing air through a regulating valve for reducing the pneumatic pressure in the motor cylinder and changing its volume therein when driving the take-up roll to vary its speed of rotation.

13. A music sheet roll-holder including a take-up roll and means for carrying and rotating a music spool, parallel longitudinal shafts extending from end to end of the holder, a pneumatic motor cylinder containing a piston connected to each end of each shaft, means at one end of each of said shafts for coupling them together to rotate in the same direction, a single valve for controlling the flow of air from and to the group of cylinders at each end of the roll holder, said valves being operated by the same shaft, means for optionally connecting the motors to the take-up roll or the music spool carrier, an air conduit leading to said cylinders, a regulating pressure reducing valve in said conduit, and a manually operated valve for controlling and varying the reduced pneu-

matic pressure to the motors when driving the take-up roll and to give full pressure to the cylinders when driving the music spool carrier.

14. A music sheet roll holder including a take-up roll and means for carrying and rotating a music spool, a pair of single acting pneumatic motor cylinders attached to each end of said roll holder, a single valve controlling the flow of air to and from each pair of cylinders, a pair of parallel longitudinal shafts extending from end to end of the roll holder with a crank on each end, pistons in the cylinders each connected to a crank, coupling means between said shafts at one end, valve operating means connected to each end of one of said shafts, and means for optionally engaging said motors to the take-up roll or to the music spool carrier.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

CHRISTOPHER F. WEBB.
JOHN STOGDELL STOKES.

Witnesses:

C. E. SCHAFFER,
ESTELLA RADEMACHER.