

No. 622,680.

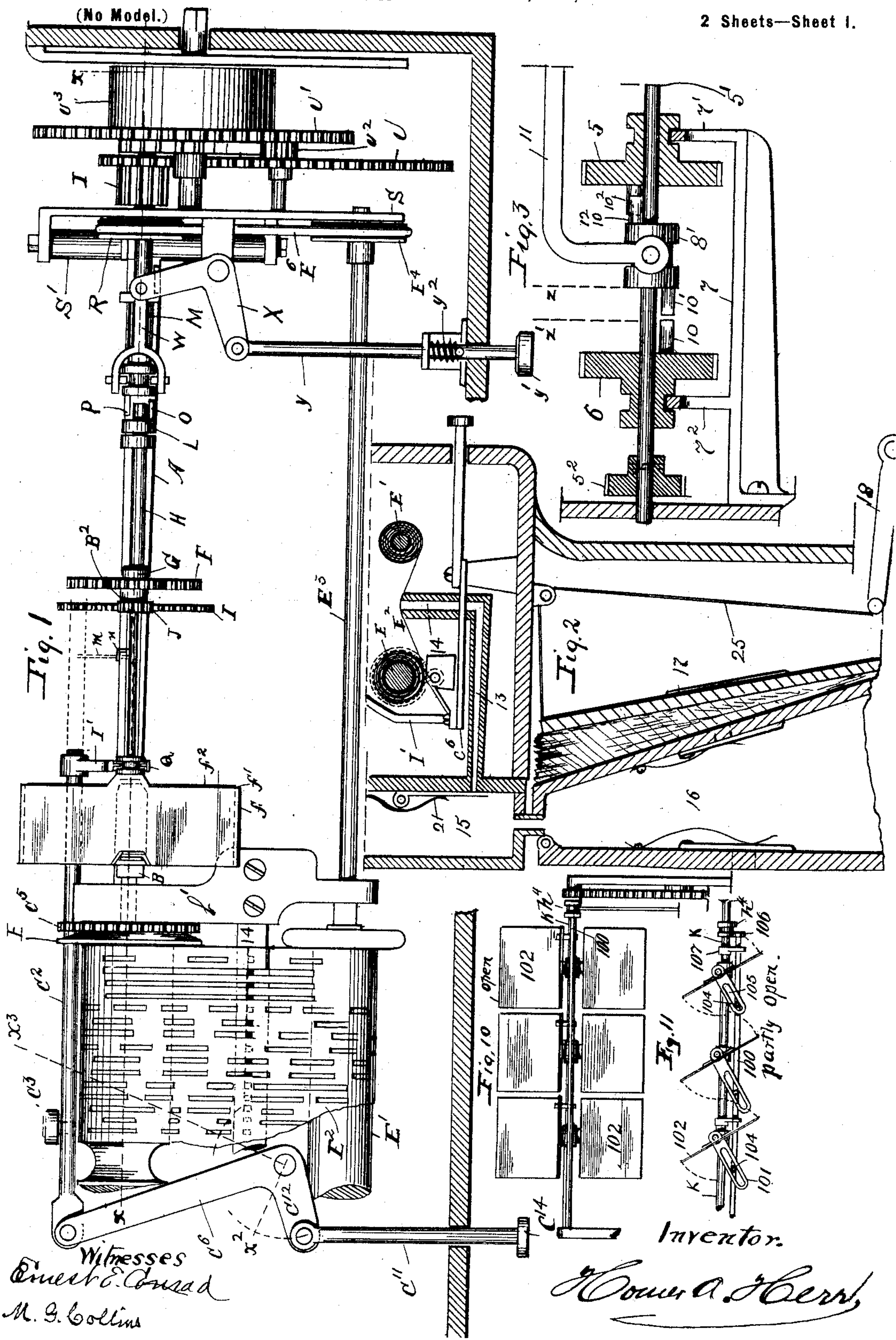
Patented Apr. 11, 1899.

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MUSIC ROLLING AND TEMPO REGULATING MECHANISM.

(Application filed Oct. 22, 1895.)

2 Sheets—Sheet 1.





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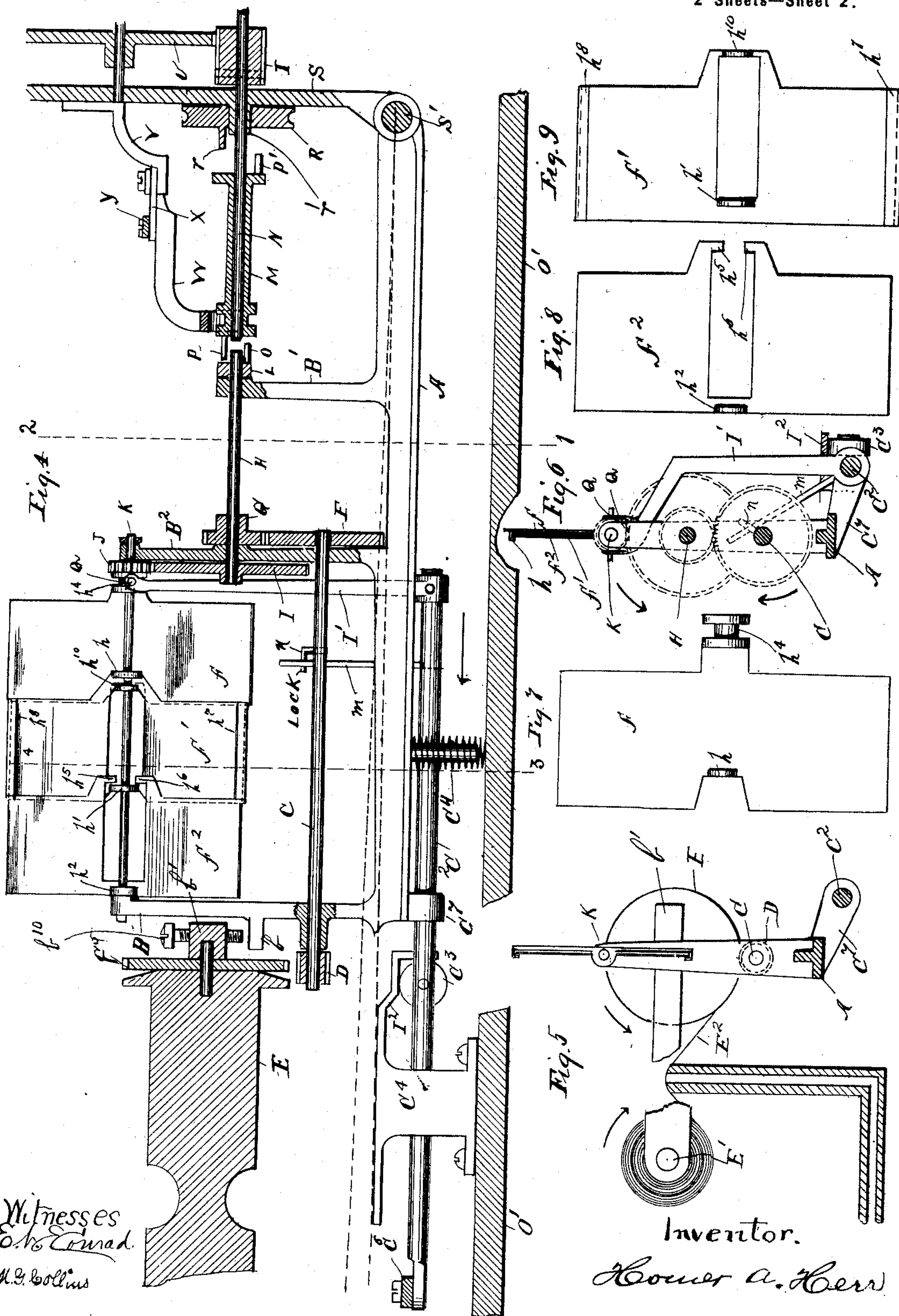
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(Application filed Oct. 22, 1895.)

(No Model.)

2 Sheets—Sheet 2.



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## MUSIC-ROLLING AND TEMPO-REGULATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 622,680, dated April 11, 1899.

Application filed October 22, 1895. Serial No. 566,535. (No model.)

*To all whom it may concern:*

Be it known that I, HOMER A. HERR, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in a Rolling, Rerolling, and Tempo-Regulating Mechanism for Mechanical Musical Instruments, of which the following is a specification.

My invention has reference to mechanical musical instruments; and it consists of certain features fully set forth in the following specification and the accompanying drawings, forming part thereof. It belongs more particularly to instruments of the pneumatic type wherein is employed a perforated music-sheet, the said sheet being drawn over a tracker board or range. The holes in the music-sheet in the passage of the sheet over this range correspond or coincide with the holes in the range. Air is thereby admitted through the holes in the said sheet and conducted by tubes carried in the tracker-range to the reed-controlling devices or primary pneumatics, whereby the note-producing reeds are actuated. The impelling force for the air is the external atmosphere pressure driving the air through the holes and tubes aforesaid to a partial vacuum-chamber, caused by the operation of the exhausters through the foot-treads as a primary source of power, and in its passage thereto the pneumatics and reeds are operated. It has been customary in instruments of this class to use wind-motors for the operation of the perforated music-sheet and to operate this motor by the foot-treads through suitable connections.

One of the objects of my invention is to relieve the foot-treads from the labor required to actuate the music-sheet, and thus render the operation of the musical instrument much less laborious. It is customary in musical instruments of this class to carry the music on reels or spools and as a musical composition is being rendered to transfer the sheet (by unwinding) from one reel, which in this specification I will term the "primary" reel, to a second reel, (by winding thereon,) which I will term the "secondary" reel, the said tracker board or range over which the sheet travels being placed between the reels.

The object of my invention collectively is to provide an improved means for transferring the music-sheet from the primary to the secondary reel.

It consists, in combination with a motor whose power is self-contained, of an improved and efficient tempo-regulator. This tempo-regulator is a variable resisting force to the normal power inherent in the motor and is controllable by the performer—that is, this resistance can be increased or decreased at will, and thereby the speed of the motor increased or decreased. As shown in the drawings, it consists of a variable friction device, and preferably I use air friction as being more gentle and uniform in its result as a resistance. I could also use a contact friction-brake. Hand-controlled means are provided for expanding or contracting this device or for increasing or decreasing the resisting pressure, as may be desired.

A further feature of my invention consists in a means for locking my regulator, and thereby locking the motor, when the motor is exerting its power on the secondary reel, and simultaneously with the performance of this locking function I disengage the motor from all operative connection with the secondary reel, thus leaving this reel free to be turned by hand. It is necessary to have this secondary reel disengaged while connecting the music-sheet thereto.

A still further feature of my invention consists in providing a means for disengaging the motor from the tempo-regulator and the connecting mechanism between the motor and the secondary reel, whether the said connecting mechanism is engaged or otherwise with the said secondary reel, and transferring the inherent power thereof to the primary reel, thus rewinding the music back thereon.

In the drawings like parts are referred to by marks or characters of a corresponding kind in the different views.

Figure 1 is a plan view of my invention. Fig. 2 is a transverse vertical section through music-reels, air-chamber, tracker-range, and exhausters. The motor, tempo-regulator, and hand operating parts are omitted from this view. Fig. 3 is a modified way of arranging my clutches. Fig. 4 is a longitudinal section



on line  $xx$  of Fig. 1. Fig. 5 is a transverse section on line 3 4 of Fig. 4, looking in direction of the arrow. Fig. 6 is a transverse section on line 1 2 of Fig. 4, likewise looking in direction of the arrow. Figs. 7, 8, and 9 are side elevations of my air fans or vanes. Figs. 10 and 11 show a modified way of constructing my tempo-regulator, the fans being pivoted.

A is a supporting-arm for the mechanism, forming the mechanical connection between the motor and the secondary reel. It also forms a support for the mechanism constituting my tempo-regulator. At  $S'$  it is pivotally held to the frame  $S$ , forming one of the standards of my motor.

$U^1$ ,  $U^2$ , and  $U$  are gears forming reducing-gears to transmit the power of the spring  $U^3$  to the shaft  $N$ . In practice these gears are calculated to give the proper power and time to actuate the music-sheet, and the spring must have sufficient power for the demands upon it to this end.

$I^2$  is a section of pinion-wire rigidly fixed to the shaft  $N$  and meshing with the last spur-gear  $U$  of the motor chain of gears.

$M$  is a sleeve carrying two clutch-pins  $p$  and  $p'$ , one on each end thereof.

$L$ , with the pin  $O$ , forms a clutch-jaw carried by the shaft  $H$ . The shafts  $H$  and  $N$  are coincident.  $B^2$  and  $B'$  form bearings for the shaft  $H$ . These bearing-carrying arms are integral with the arm  $A$ , though of course structurally this is not imperative.

$G$  is a pinion carried by the shaft  $H$ , and  $F$  a spur-gear carried by the shaft  $C$ . The said pinion actuates the aforesaid spur.

$D$  is a pinion also carried by the shaft  $C$ . It is now seen the shaft  $N$ , when the clutch-jaws  $o$  and  $p$  are engaged, will actuate the shaft  $H$ , and the shaft  $H$ , through the pinion  $G$  and spur  $F$ , will actuate the shaft  $C$ , and this shaft  $C$ , through the pinion  $D$  and spur  $C^5$ , which spur is rigid with the secondary music-reel  $E$ , will actuate the said secondary reel when the pinion  $D$  is engaged with the said spur  $C^5$ . Thus is motion communicated from the motor to the secondary reel. I of course could arrange my mechanism so that the shaft  $N$  could be extended to and support the pinion  $D$ , if I choose, thereby dispensing with the shafts  $H$  and  $C$  and their intermediate actuating-gears. This would require a change in the shape of the supporting-arm  $A$  and a spur  $I$  of almost impracticable size. Hence the choice of structure as shown in the drawings.

As power communicated directly from the motor to the secondary reel without some means to control the speed or resist this power, and thereby control the speed, would be impractical in musical instruments of this class, I provide a means to resist the power of the motor, thereby regulate its speed, this being under the control of the performer. This consists, as specifically shown in the drawings, of a series of longitudinally-movable or pivoted fans on a common supporting

rod or shaft  $K$ . As the volume of air displaced increases by rotating these fans the power to drive them increases. The speed is thereby decreased, and vice versa. Thus do I augment or decrease the speed of the said fan-supporting shaft  $K$ , thereby the pinion  $J$ , actuating-spur therefor,  $I$ , shaft  $H$ , pinion  $G$ , spur  $F$ , and shaft  $C$ , and finally secondary reel  $E$ . These vanes or fans could be arranged in various ways. I could arrange them radially on the end of a vertical shaft with a rotary motion and united with yielding joints similar to a lady's fan. I could, if using this structure, have the fans expand or contract by hand-controlled means extending beyond the case or cabinet inclosing the mechanism of the instrument. I could also weight these radial fans or arms, where greater resistance was desired, in the manner of steam-governors. I might also slide my vanes on a vertical shaft instead of horizontal. These specific modified structures are not material to my invention, broadly, and I do not limit myself to either or any of them. In practice I prefer them arranged as shown in the drawings, where  $k$  is the common supporting-shaft,  $f^2$  the prime fan fixed thereto, and  $f'$  interlinked with  $f^2$  by the lug  $h'$  and carried by said shaft and arrested by the lug  $h'$  striking the lugs  $h^5$  and  $h^6$  of the vane  $f^2$ . This vane  $f'$  also carries a lug  $h^{10}$ , which in like manner arrests the longitudinal sliding motion of the vane  $f$  beyond a limit predetermined by the position of this lug.

$h^7$  and  $h^8$  show end flanges which I could use and which are designed to serve as lateral guides for the following adjacent vane. I could use any number of vanes or fans on this arrangement, this being regulated entirely by the range of variability of the speed desired.

In Figs. 1, 2, 7, and 11,  $h^1$  shows my fan-expander. In the drawings it consists of a cylindrical lug having an annular groove, in which groove the pins in the forked head of the arm  $I'$  engage. This expander slides loosely on the shaft  $K$ , Figs. 1, 6, and 11. It is designed to control the expanding motion of the fans during the rotary motion thereof and acts entirely independent of the latter motion. This is an indispensable requisite in my mechanism, without which it would fail in practical utility if constructed as specifically shown. In the modification shown in Figs. 10 and 11 the arms 101 carry radial slots 105, in which actuating-pins therefor, 104, move during their variable radial lengths when considering the pivoted center of the fans 102 in its oscillating path from a closed to an open position. The sliding rod 100, held in guides 107, which guides are pinned or brazed to the central shaft  $K$ , carry the pins 104 aforesaid, and the projecting arm 106 of the fan-expander holds the rod 100 rigid therewith. Any movement, therefore, to the fan-expander  $h^1$  will move the rod 100 in its guides 107, and therefore oscillate the



fans 102 to any desirable degree from a longitudinal to a transverse position. The expander, as shown in Figs. 1, 2, and 7, is rigid with the fan *f*. It might also be connected therewith through a link or some other intermediary. I could also interpose between the contracting lateral faces of the vanes soft felt, rubber, or any antinoise-producing substance, relieving the tempo-regulator from a metallic sound it otherwise would have on being rapidly rotated and which metallic sound would interfere with the beauty of the music in soft passages.

B is the standard supporting the shaft K at one end, and B<sup>2</sup> the standard supporting the same at the other. The fan *f* carries a circumferentially-grooved fan-expander *h*<sup>4</sup>, wherein the pins Q play.

I' is an upward-extending rod fixed to the rod C<sup>2</sup>. The pin Q is carried by this arm. Therefore when the rod C<sup>2</sup> is moved the arm I' is moved and thereby the fan *f*.

C<sup>12</sup> and C<sup>6</sup> are arms forming a bell-crank lever connected with the rod C<sup>2</sup> at one end and at the other to the finger-button arm C<sup>11</sup>, which arm extends beyond the cabinet inclosing the mechanism of the machine.

By the mechanism just described I actuate my air-fans. When I wish to offer resistance to the power of the motor, and thus check my speed for the secondary reel, I press my finger on the head C<sup>14</sup> of the arms C<sup>11</sup>, thereby forcing the bell-crank to any desired position between that shown in the solid drawing, Fig. 1, and to that indicated by the dotted radial lines *x*<sup>2</sup> and *x*<sup>3</sup>, these being two extremes of position, the former contemplating a musical tempo for extreme allegro passages, the latter a tempo for the slowest adagio musical bars. Between these two extremes I can get any degree of tempo necessary for the correct rendering of any musical composition. The slowest adagio movement is obtained by the stopping short of the cam-shoulder 12.

In Fig. 4 I show a spring C<sup>14</sup>. This spring forces the oscillating arm A upward and holds the pinion D in engagement with the spur C<sup>5</sup> normally. In the same figure I show a thrust-lug *b* carried by the standard B. An adjusting-screw *b*<sup>10</sup> is carried by the fixed spool-bearing *b*'. In the same figure I<sup>2</sup> is a cam carried by the standard C<sup>4</sup>. The friction-roller C<sup>3</sup> plays on the cam I<sup>2</sup>. The rod C<sup>2</sup> slides freely in a hole in the lug C<sup>7</sup>, this lug being an integral part of the arm A.

The purpose of the mechanism described is to disengage the pinion D from the spur C<sup>5</sup> when I wish to render the secondary reel E free from its actuating-pinion for independent motion—that is, motion by hand independent of the means which actuates it automatically. Its operation is as follows: By pressing inwardly on the head C<sup>14</sup> the rod C<sup>2</sup>, through the connections shown in Fig. 1 and hereinbefore described, is forced toward the motor until the friction-roller C<sup>3</sup> strikes the cam I<sup>2</sup>, whereupon, following the shape of the

cam, it runs down to the position shown in Fig. 2. Now as the lug C<sup>7</sup> is a solid integral part of the supporting-arm A and the rod C<sup>2</sup> is held and guided in this hole it follows that when the roller C<sup>3</sup> runs to the lower part of the cam the entire mechanism carried by the arm A is also drawn down, and as the standards B and B<sup>2</sup>, which carry the shaft C, with the pinion D, are rigid with the said arm the pinion D becomes thereby disengaged from the secondary-reel spur C<sup>5</sup>. The bearing *b*', it will be remembered, is fixed against any movement whatever. When I wish to return the pinion D to engagement with its follower C<sup>5</sup>, I pull the rod C<sup>11</sup>, thereby running the friction-roller C<sup>3</sup> upon the high part of the cam I<sup>2</sup>, and the spring C<sup>4</sup> forces the arm A upward. This upward motion is extended until the lug *b*, fixed to the standard B, strikes the adjustable screw *b*<sup>10</sup>, which adjustment should be such in practice as to allow of proper working meshing of the teeth of pinion D with the spur C<sup>5</sup>. Simultaneously with the disengaging of the pinion D from its follower the rod *m* of the rod C<sup>2</sup> will have passed to and in the path of the hook N of the pinion-carrying shaft C. This serves as a lock to lock the motor and the mechanism against motion while this rod and hook are engaged. Of course it is evident that the moment I withdraw the rod C<sup>2</sup> in the manner and by the means described I disengage this lock, and the mechanism is thereafter again free to move.

I have now described how I regulate my tempo, how I lock and unlock my mechanism, how I engage and disengage my driving-pinion from the secondary reel, &c.

I will now describe how I transfer my power from my secondary to my primary reel and thus reroll the music back on the primary music-supporting reel. It may be well to note in this connection that the position of my tempo-regulator is a matter of some importance. It is seen that this mechanism is only in action when the secondary reel is moving, and as more power is consumed in driving my wind-brake than is used in operating the secondary reel I economize my power by entirely disconnecting this resistance from the motor when the primary reel is in action. This arrangement is entirely in the interest of economy of power, which gives working life to the motor. I do not confine myself, however, to this position of my tempo-regulator. The primary reel E' is operatively connected with the belt-wheel E<sup>4</sup>, Fig. 1 only, by the shaft E<sup>3</sup>, and the belt E<sup>6</sup> connects the wheel E<sup>4</sup> operatively with the belt-wheel R. This belt-wheel R (shown best in section, Fig. 4) carries a clutch pin or jaw *r*. The clutch-sleeve M also carries a clutch-pin *p*', as previously detailed. The mechanism as it stands in Fig. 4 is locked by the arm M engaging with the hook N, as has been described, and the motor is locked intermediately by the clutch-pin *p* engaging with the clutch-pin



O while in this position. For the sake of showing both these pins, however, in this view they are shown on opposite sides of their respective shafts. While in the position shown in this figure the clutch-pins  $r$  and  $p'$  are in different vertical planes; but when I press my finger on the head  $y'$  of the rod  $y$  I oscillate the bell-crank  $x$  and through the clutch-operating arm  $W$  thereby slide the sleeve  $M$  longitudinally on the shaft  $N$  toward the motor, thus disengaging the pin  $O$  from its contact with  $p$  and engage the pin  $r$  to the pin  $p'$ . The moment the pins  $p$  and  $o$  are disengaged my motor is free from the influence of the hook  $n$  and rod  $m$ ; but previous to this absolute disengagement the parts must be so arranged that the pins  $r$  and  $p'$  are engaged, and immediately thereafter the entire power of the motor through the belt  $E^6$  wheels  $R$  and  $E^4$  is transferred to the primary reel  $E$ , and thus rerolls the music-sheet  $E^2$  back into said reel. Upon releasing the finger from the head  $y'$  of the rod  $y$  the spring  $y^2$  automatically disengages the clutch-jaws  $r$  and  $p'$  and engages the jaws  $p$  and  $o$ . The motor is then again locked and so remains until I operate the rod  $C^2$  in the manner hereinbefore described.

In Fig. 3 is shown a modified way of disengaging the clutch, where 5 and 6 show two gear-wheels mounted loosely on the shaft  $5'$ . The pinion  $5^2$ , shown contracted in the drawings, is pinned to the said shaft, likewise the clutch  $8'$ . The pinion 6 actuates the secondary reel and tempo-regulating mechanism through suitable connections. The pinion  $5^2$ , which in practice should be a pinion-wire, is at all times under the power of the motor. The pinion 6 is also under the control of the lock, such as shown in Figs. 2 and 6, or one of similar function. Therefore when the jaws 10 and 10' are engaged, corresponding to  $p$  and  $o$ , the secondary reel is in position to receive the power of the motor, and when the jaws 10<sup>2</sup> and 10<sup>12</sup> are engaged, corresponding to the jaws  $r$  and  $p'$ , as they are shown to be in Fig. 3, the primary reel is in position to receive the power of the motor. The arm 11 controls the clutch  $8'$  and is equivalent to the arm  $y$ . 7 in this modification is a support for the wheel guides or retainers  $7'$  and  $7^2$ .  $Z$  and  $Z'$  are dotted lines indicating the traverse of the clutch-jaw.

In Fig. 2, 18 is the foot-tread, which through the belt 25 operates the exhausters 17, and through the equalizing-chamber 16 vacuumizes the reed-chamber 15, into which the air is admitted after passage through the perforations in the music-sheet by the ducts or channels 13, operating thereby the reed-controlling pneumatics, and thus the note-producing reeds 21. These pneumatics form no part of my invention and are not essential co-operating elements with it in a patentable sense, and they are therefore omitted from the drawings.

I do not limit or confine myself to the spe-

cific structures shown, but could make numerous modifications without departing from the spirit of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a mechanical musical instrument, of a motor whose power is self-contained, a music-receiving reel operated thereby, an operating-shaft for said reel, a speed-regulating mechanism intervening between the motor and the reel, consisting of a supporting-shaft, expandible fans mounted thereon arranged in longitudinal series and capable of longitudinal expansion, a common fan-expander for said fans, a mechanical connection between the motor and the said reel, and hand-controlled means for controlling said speed-regulating mechanism, whereby the said music-receiving reel can be operated fast or slow and thus the tempo of the music controlled.

2. The combination in a mechanical musical instrument of a motor whose power is self-contained, a music-sheet-receiving reel operated thereby, a variable-speed-regulating mechanism operated thereby also, consisting of a supporting-shaft, expandible fans carried thereby, said fans arranged in longitudinal series on the shaft and capable of longitudinal expansion, a common fan-expanding slide and hand-controlled mechanism for regulating the degree of resistance the said speed-regulator offers to the inherent power of the motor and adapted to coact with and on said slide, whereby the speed of the music-sheet is accelerated or retarded and the tempo of the music thus controlled.

3. The combination in a mechanical musical instrument of a motor whose power is self-contained, a music-receiving reel operated thereby, a mechanical connection between the motor and the said music-receiving reel, a variable-speed-regulating mechanism consisting of a supporting-shaft, expandible fans carried thereon and arranged lengthwise of the shaft in series and adapted to coact with said mechanical connection and thereby on the motor, means for controlling the operation of said speed-regulator, whereby the speed of the motor is accelerated or retarded and thus the tempo of the music controlled.

4. The combination in a mechanical musical instrument of a motor whose power is self-contained, a secondary music-receiving reel operated thereby, a mechanical connection between the motor and the reel, a variable-speed-controlling mechanism for said mechanical connection, consisting of a series of longitudinally-expandible fans, a supporting-shaft therefor, a fan-expanding regulator carried by said shaft and having an expanding motion independent of the rotary motion thereof, and said fans supported in longitudinal series on said shaft, means for operating said fan-expanding mechanism, and means



for disengaging the said reel from its connecting mechanism with the motor, whereby the said reel can be rotated on its journals independent of its normal source of power and disconnected therefrom.

5 5. The combination in a music rolling, re-rolling and tempo-regulating mechanism of a motor, a primary music-supporting reel, a secondary music-receiving reel, a mechanical  
10 connection between the motor and the primary reel, a mechanical connection between the motor and the secondary reel, a speed-regulating mechanism adapted to control the  
15 speed of the mechanical connection between the motor and the said secondary reel, consisting of a series of longitudinally-expandible fans, a supporting-shaft therefor, said  
20 fans mounted on said shaft in longitudinal series a fan-expander carried by said shaft and having an expanding motion independent of the rotary motion of the fans, and means for actuating said fans expansively  
25 during their rotary motion, whereby the speed of the secondary reel can be varied and thus the tempo of the music regulated and controlled.

6. The combination in a mechanical musical instrument for rolling, rerolling and regulating the tempo of the music, of a motor  
30 whose power is self-contained, a primary music-supporting reel, a secondary music-receiving reel, a mechanical connection between the motor and the said primary reel, a mechanical connection between the motor and  
35 the said secondary reel, an air-friction variable-speed-regulating mechanism, consisting of longitudinally-expandible air-fans arranged in longitudinal series, a common supporting means therefor a fan-expander, hand-  
40 controlled means for operating said fan-expander.

7. The combination in a music rolling, re-rolling and tempo-regulating mechanism of a motor whose power is self-contained, a primary  
45 music-supporting reel, a secondary music-receiving reel, a mechanical connection between the motor and the said primary reel, a mechanical connection between the motor and the said secondary reel, a hand-controlled  
50 motor-brake giving a variable resistance to the inherent power of the motor and adapted to coact with or on some moving element of the mechanism and consisting of a series of longitudinally-expandible air-vanes, a supporting-shaft therefor, said  
55 vanes arranged in longitudinal series on said shaft, means for actuating said fans expansively, carried by the shaft, during the rotary motion thereof.

8. The combination in a music rolling, re-rolling and tempo-regulating mechanism of a motor whose power is self-contained, a secondary music-receiving reel, a mechanical  
60 connection between the motor and said reel, a primary music-supporting reel, a mechanical connection between the motor and said  
65 reel, a hand-controlled motor-lock, a clutch mechanism interposed between the motor and

the said secondary reel, a clutch mechanism interposed between the motor and the said primary reel, a speed-regulating mechanism  
70 for said motor, consisting of air vanes or fans arranged in longitudinal series on a common support hand-controlled means adapted to disengage the clutch intervening between the motor and the secondary reel and simultaneously  
75 engage the motor with the primary reel, whereby the music can be rerolled back on said primary reel.

9. The combination in a music rolling, re-rolling and tempo-regulating mechanism of a  
80 motor whose power is self-contained, a secondary music-receiving reel, a mechanical connection between the motor and said reel, consisting of a shaft adapted to be engaged by some part of the motor at one end, oper-  
85 atively, through intermediates or otherwise and at the other carrying a pinion adapted to engage with a spur carried by the secondary reel, a variable-speed-regulating mechanism, consisting of a series of expandible air vanes  
90 or fans, a common supporting-shaft therefor, said fans arranged in longitudinal series on said shaft, a fan-expander carried by said shaft and means for actuating said fan-expander.  
95

10. The combination in a music rolling, re-rolling and tempo-regulating mechanism of a motor, a secondary music-receiving reel, a mechanical connection between the motor and  
100 the said reel, consisting of a shaft adapted to be operatively connected with the motor at one end, through suitable connections, a pinion carried by said shaft at the other and adapted to normally mesh with the said reel, means for disengaging said shaft from the  
105 said secondary reel a lock for said shaft, means for operating said lock and a tempo-regulator adapted to act on the motor consisting of air-vanes, a supporting-shaft therefor, said vanes  
110 arranged in longitudinal series on said shaft and means for expanding and contracting said vanes.

11. The combination in a tempo-regulator for a mechanical musical instrument of a motor, a secondary reel, a mechanical connection  
115 between the motor and the reel, a speed-arresting device adapted to act on this connecting mechanism, consisting of a series of longitudinally-expandible air-vanes arranged in longitudinal series on said shaft, hand-controlled means for expanding and contracting said air-vanes, as and for the purpose set out.  
120

12. The combination in a mechanical musical instrument of a motor whose power is  
125 self-contained, a secondary music-receiving reel, a mechanical connection between the motor and the said reel, a tempo-regulating mechanism adapted to be operated by said motor, a portable support for the connecting  
130 mechanism between the motor and the said secondary music-reel, consisting of a movable support, a spring maintaining said support in normal position, hand-controlled means ex-



tending beyond the case or cabinet inclosing the mechanism for actuating said support, consisting of an arm-actuating friction-roller, a depressing-cam I<sup>2</sup> therefor and the hand actuating-rod for said roller.

13. The combination in a mechanical musical instrument of a motor whose power is self-contained, a secondary music-reel, a mechanical connection between the motor and the said reel, a primary music-supporting reel, a mechanical connection between the motor and the said primary reel independent of and disconnected from the connecting mechanism between the motor and the said secondary reel, a lock for the connecting mechanism of the secondary reel, consisting of a hook N carried by the shaft C, coacting rod M carried by the hand-controlled rod C<sup>2</sup>, means for liberating the motor from the influence of this lock, means for transferring its power to the connecting mechanism of the primary reel whereby the music-sheet is rerolled on the said primary reel.

14. The combination in a mechanical musical instrument with the exhausters, air-chamber and air-ducts leading thereto of a motor whose power is self-contained and independent of the power which actuates the exhausters, means for actuating the music-sheet in one direction, operated by said motor, a speed-regulating mechanism actuated by the motor or connected therewith and adapted to accelerate or retard the motion of the music-sheet, consisting of air vanes or fans arranged in longitudinal series, a supporting means therefor, a fan-expander, hand-controlled means for actuating said expander and thus operating said fans expansively during their rotary motion, means for operating the music-sheet in a contrary direction also actuated by said motor and means for transferring the power of the motor from one end of the music-sheet to the other end thereof, consisting of a hand-controlled clutch mechanism and whereby the music-sheet is rewound and transferred from the secondary back onto the primary reel.

15. The combination in a mechanical musical instrument having exhausters, foot-treads therefor, an air-chamber and air-ducts leading thereto, of a motor whose power is self-contained and independent of the foot-treads, a music-sheet, a secondary receiving-reel for said music-sheet, a mechanical connection between the motor and said reel, a primary music-supporting reel, a variable-speed-regulating mechanism, adapted to resist to variable degrees the inherent power of the motor, consisting of a series of expandible air fans or vanes a supporting-shaft therefor, said fans arranged on said shaft in longitudinal series, a common fan-expander, means for operating said expander expansively independent of the rotary motion of the fans, and means for transferring the power of the motor

from the secondary to the primary reel at will, whereby during the playing of a musical composition the music-sheet is wound on the secondary reel and the tempo regulated, and at the conclusion thereof the music-sheet is rewound back on the primary reel.

16. The combination in a rolling, and rerolling device for a mechanical musical instrument of a motor whose power is self-contained, a secondary music-reel, a mechanical connection between the motor and said reel, a motor-lock adapted to operate on this connecting mechanism, means for disengaging the said reel from this mechanical connection; a primary reel, a mechanical connection between the motor and the said primary reel, a tempo-regulating mechanism adapted to give a variable resistance to the power of the motor, consisting of a series of air vanes or fans arranged in longitudinal series on a common support, means for expanding said fans, means for disengaging the motor from the said lock and means for simultaneously releasing the power of the motor to the tempo-regulator and the said secondary reel.

17. The combination in a tempo-regulating mechanism for a mechanical musical instrument of a motor whose power is self-contained, a music-sheet, primary and secondary supporting-reels therefor, both of said reels being adapted to be operated by said motor, but at different times, a changeable-speed-regulating mechanism, consisting of a series of air vanes or fans, a supporting-shaft therefor, said fans arranged in longitudinal series on said shaft, and a fan-expander whereby the speed of the secondary reel can be varied and controlled, the tempo of the music thereby regulated, and whereby the music-sheet can be rewound back on the said primary reel.

18. A speed-regulating mechanism for a self-contained power-motor consisting of a series of longitudinally-expandible air-fans, a support therefor rotatively operated by said motor, said support carrying said fans in longitudinal series and means for expanding or contracting said fans whereby the volume of air-displaced resistance can be increased or decreased and thereby the speed of the motor accelerated or retarded.

19. A speed-regulating mechanism for a self-contained power-motor combined with the motor and consisting of a series of longitudinally-expandible air vanes or fans, a rotating support therefor operated by the motor, means for supporting said fans on said shaft and means for expanding said fans whereby the longitudinal surface of the fans can be increased or decreased thus increasing or decreasing the resistance offered the inherent power of the motor, as set out.

20. A speed-regulating mechanism for a self-contained power-motor, combined with the motor and consisting of air vanes or fans arranged in longitudinal series, a rotating sup-



port therefor actuated by the motor and means for expanding said fans independent of their rotary motion.

21. A speed-regulating mechanism for a self-contained power-motor combined with the motor and consisting of air vanes or fans arranged in longitudinal series, a rotating support therefor actuated by the motor, said fans practically balanced on said support lateral to the longitudinal center therethrough, thereby maintaining uniformity in any of the

variable speeds of the motor as predetermined by the variably expanded or contracted position of the said fans.

In witness whereof I have hereunto set my hand, this 3d day of August, 1895, in the presence of two witnesses.

HOMER A. HERR.

Witnesses:

ERNEST E. CONRAD,  
JOSHUA R. MORGAN.