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No. 651,788.

Patented June 12, 1900.

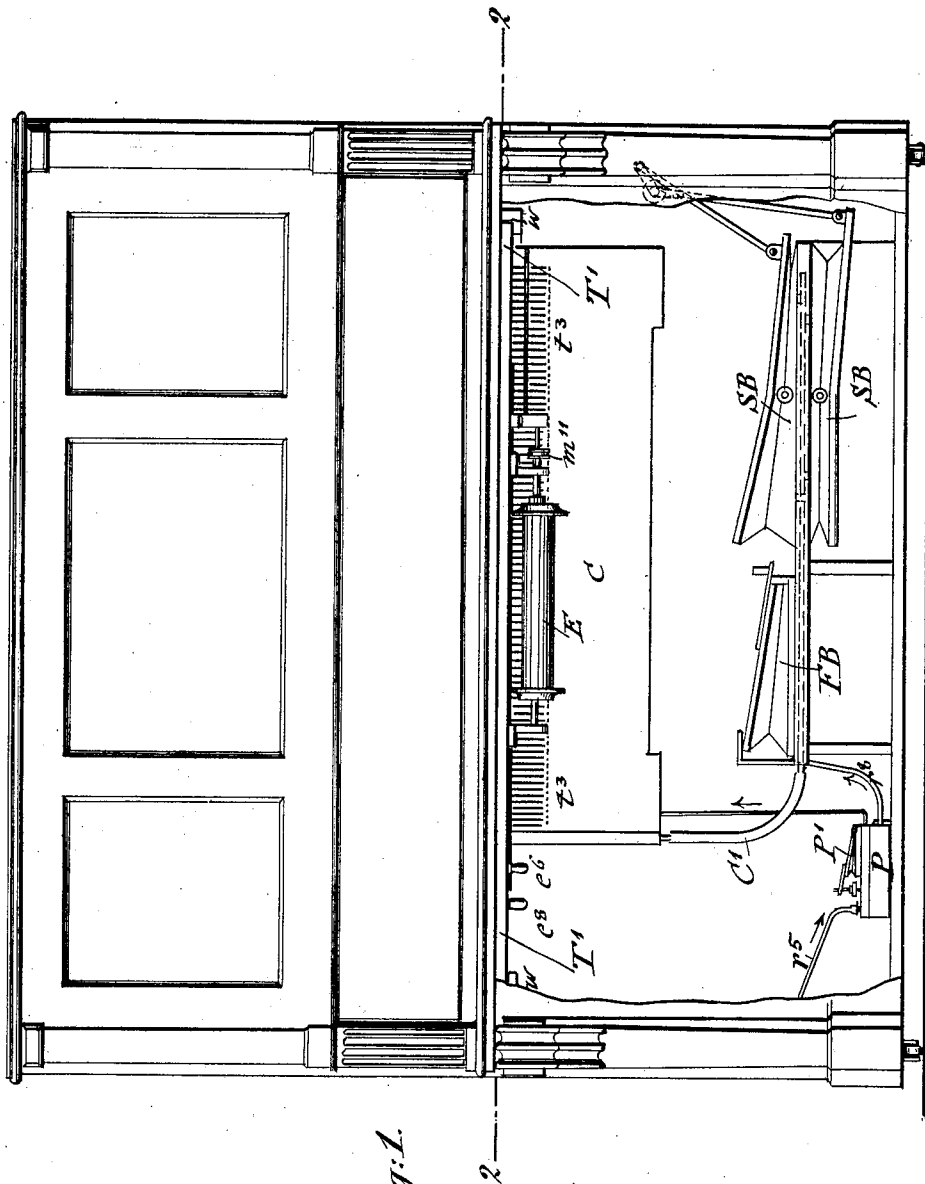
J. WIESER.

AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 1.



WITNESSES:

WITNESSES:
Geot. Jaesch
M. H. Wurtzel

INVENTOR

INVENTOR
Joseph Wieser
BY
G. H. Regner
ATTORNEYS.

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J. WIESER.

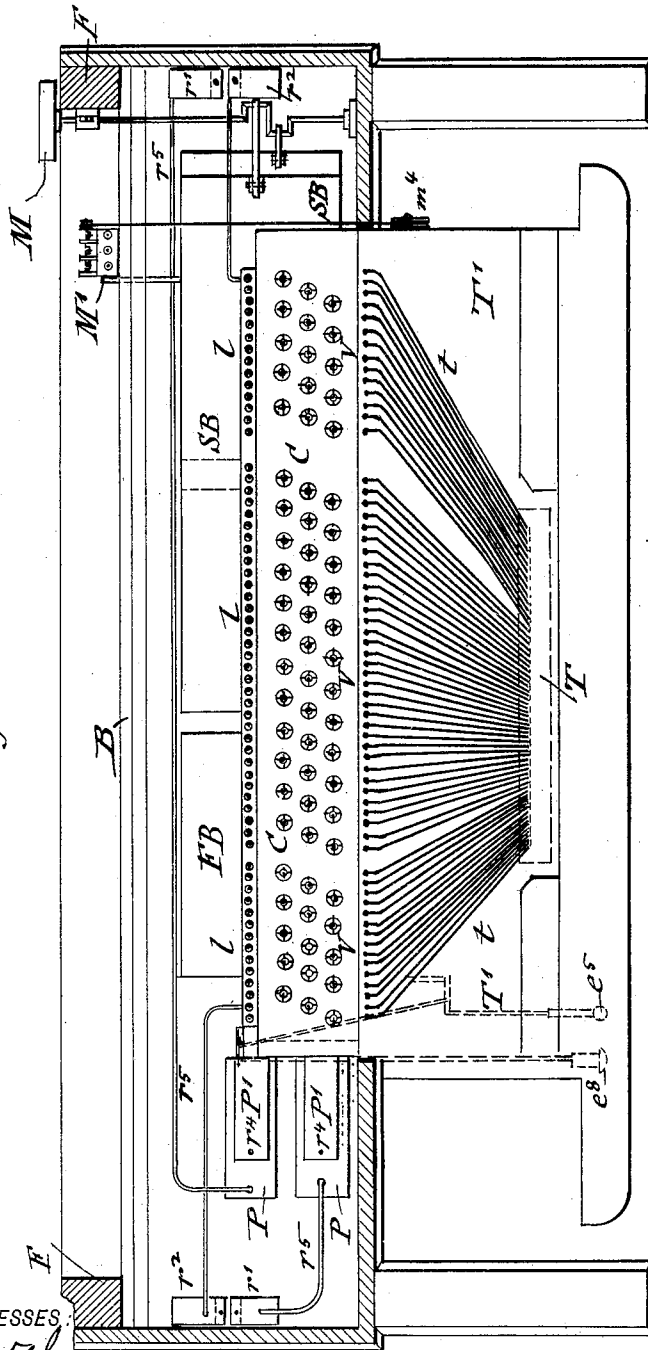
AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 2.

Fig. 2.



WITNESSES:
Geo. W. Jaeger
H. B. Wustzel

INVENTOR
Jacob Wieser
 BY
Charles R. Rogers
 ATTORNEYS.

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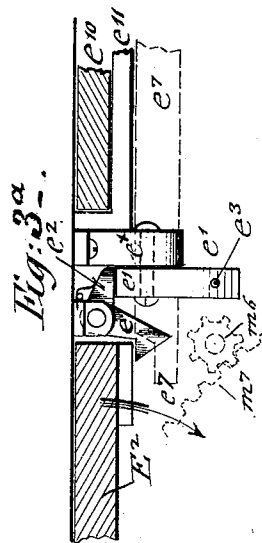
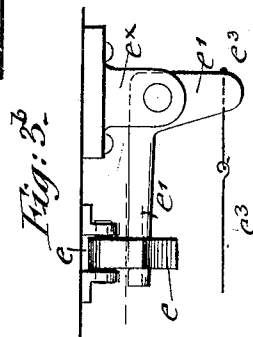
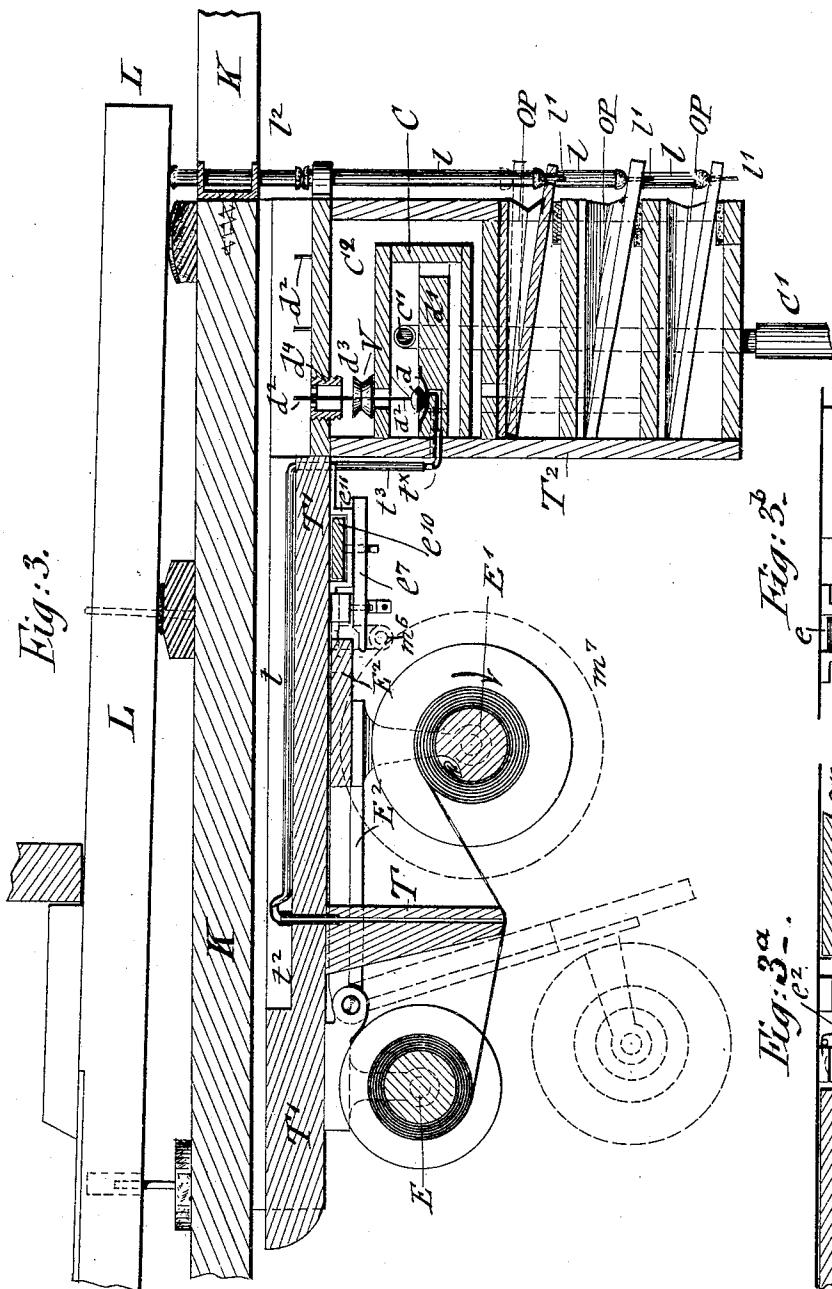
J. WIESER.

AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 3.



WITNESSES
Geo. Gaebel
M. H. Hutzyl

INVENTOR
Joseph Wieser
BY
Amos Paeguer
ATTORNEYS.

No. 651,788.

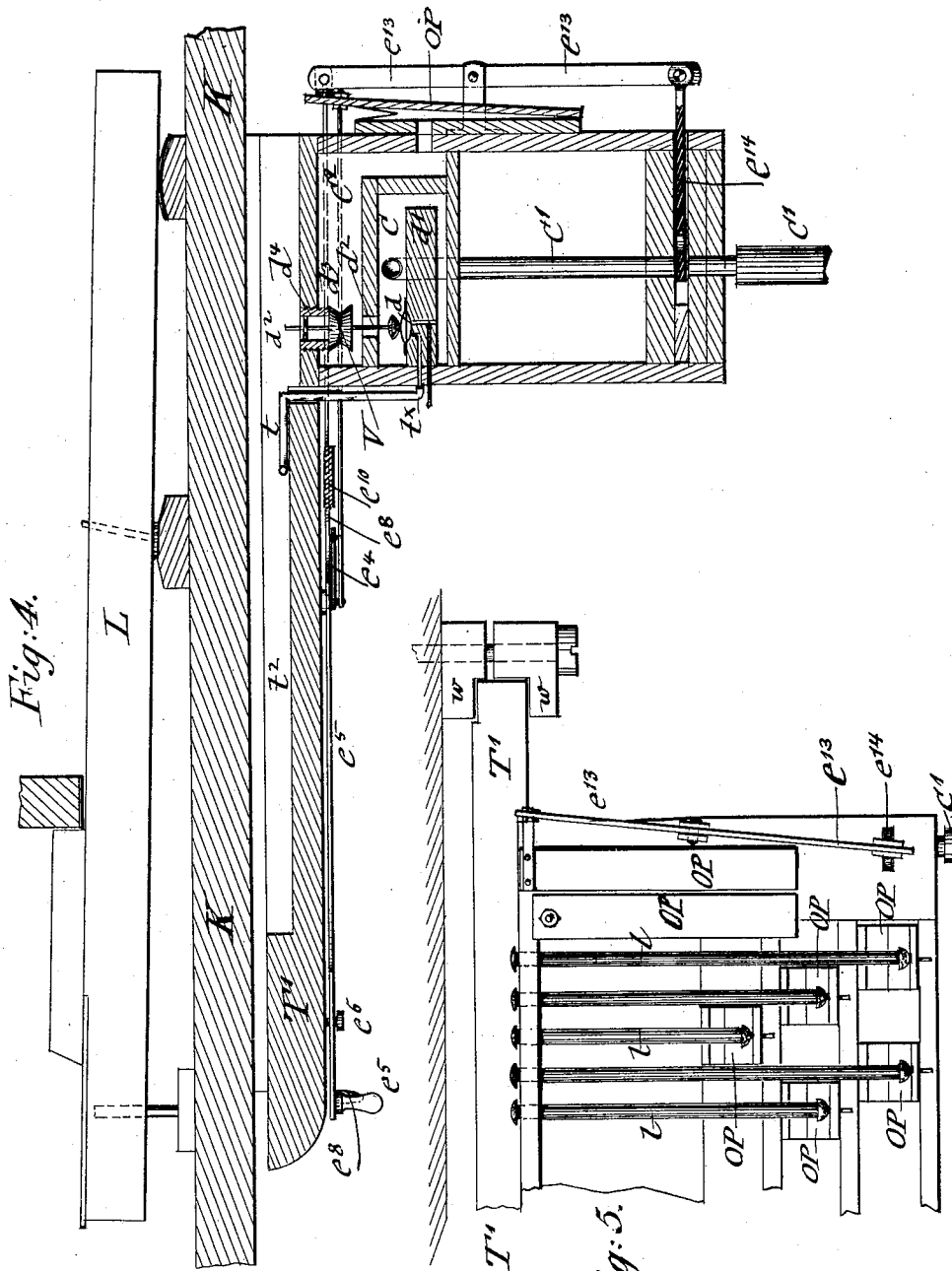
Patented June 12, 1900.

J. WIESER.
AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 4.



WITNESSES:
Geo. O. Jackel
M. H. Wirtzel

Fig. 5.
INVENTOR
Joseph Wieser
BY *August Regener*
ATTORNEYS.

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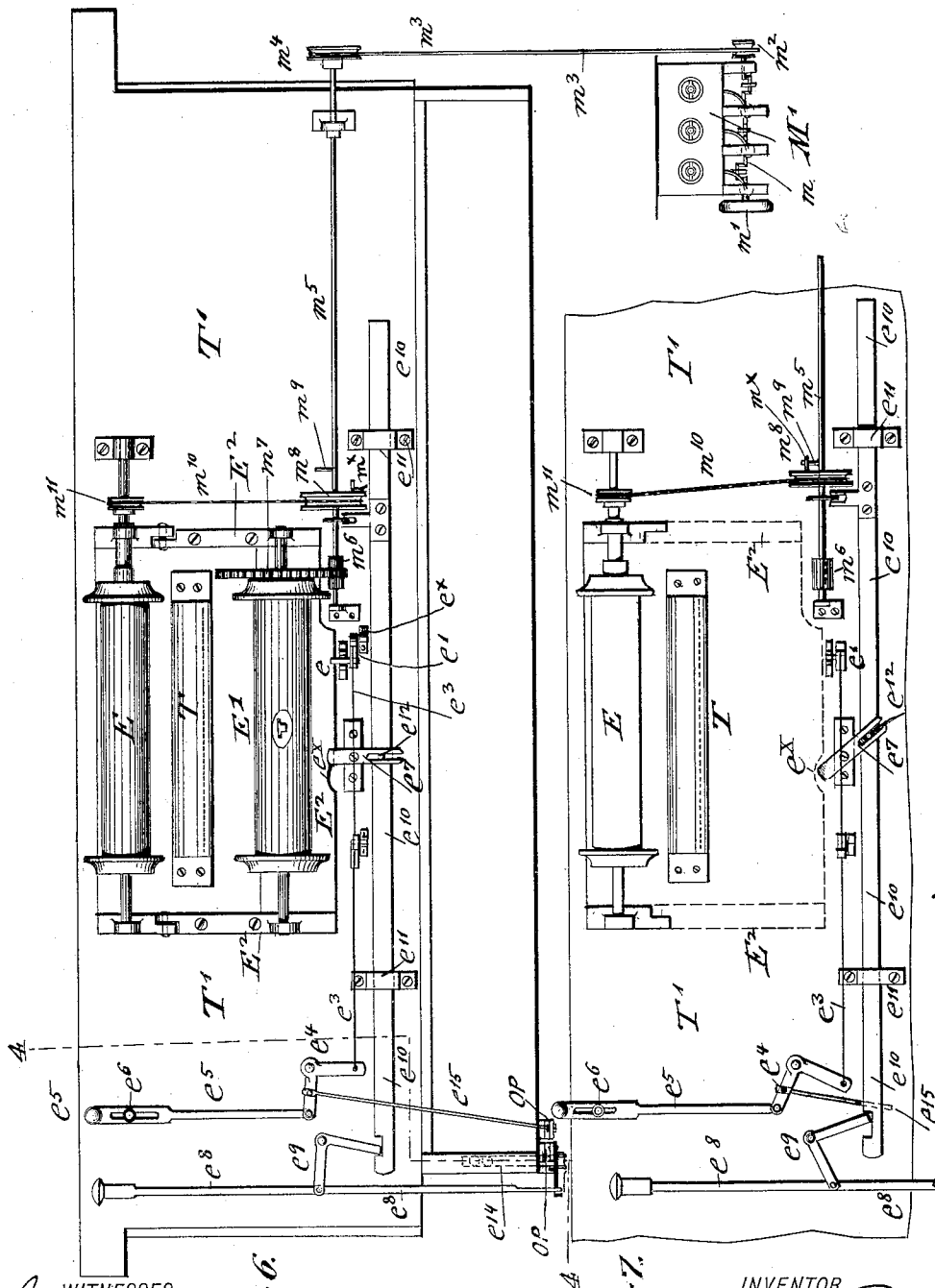
J. WIESER.

AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 5.



WITNESSES :

WITNESSES:
George J. Axel
N. H. Stutzel
 May 6.

Fig. 7.

INVENTOR

Joseph Wieser
BY *Samuel Wagner*
ATTORNEYS.

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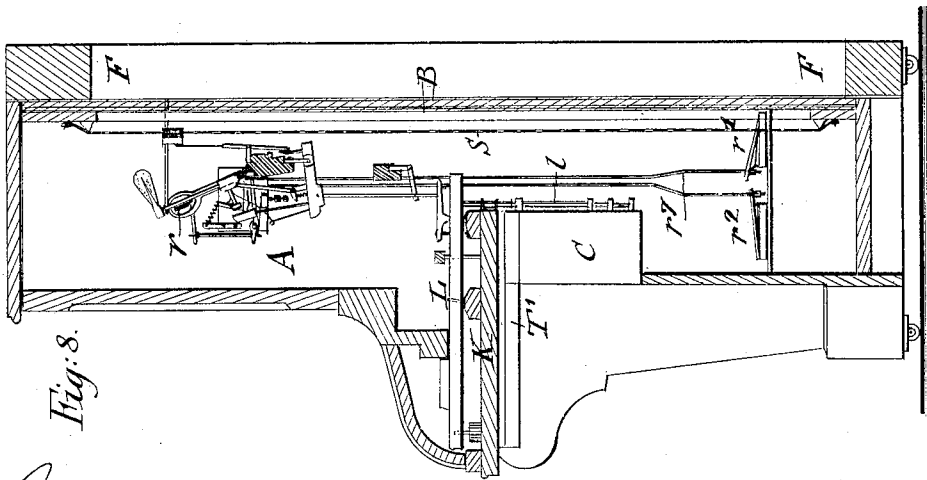
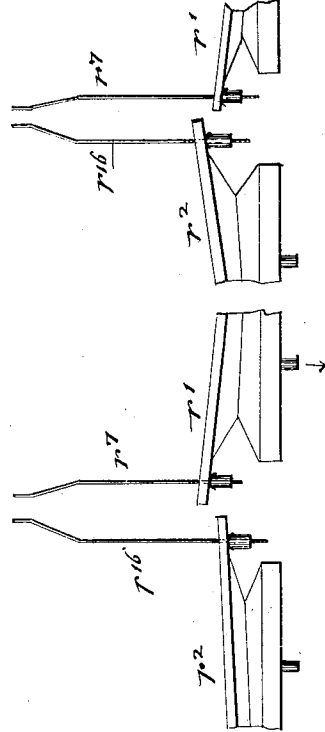
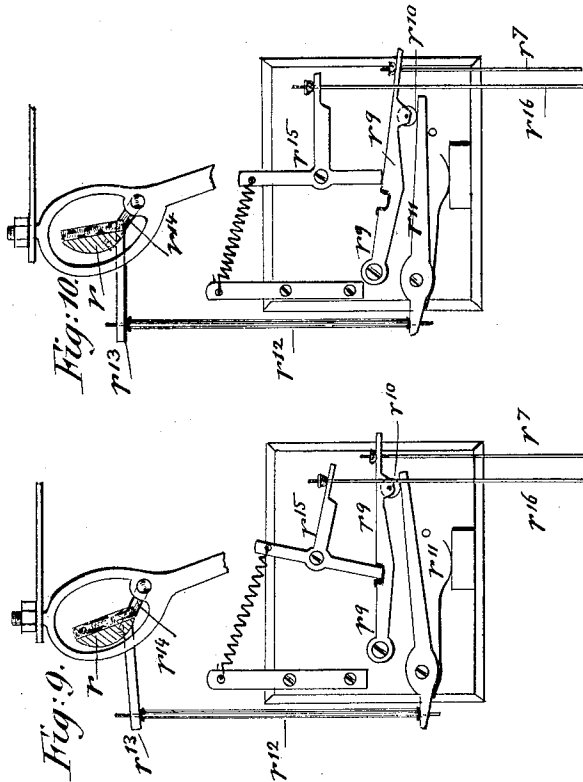
Patented June 12, 1900.

J. WIESER.
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(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 6.



WITNESSES:
Georg Faust
K. B. Kuntzel

INVENTOR
Joseph Wieser
BY
James H. Regner
ATTORNEYS.

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Patented June 12, 1900.

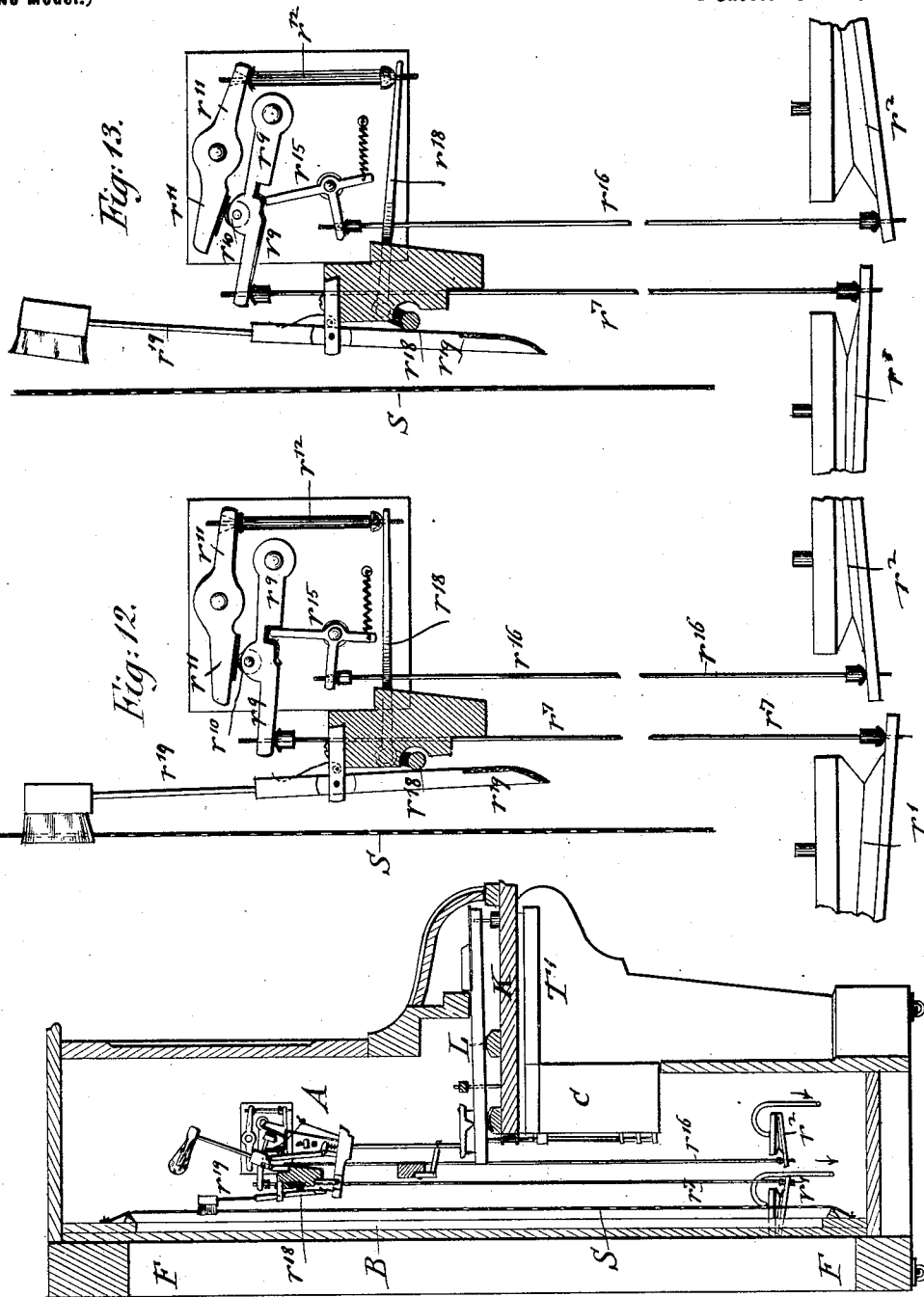
J. WIESER.

AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 7.



WITNESSES:
Geot. J. J. J.
H. H. H.

INVENTOR
Joseph Wieser
 BY *James H. H.*
 ATTORNEYS.

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No. 651,788.

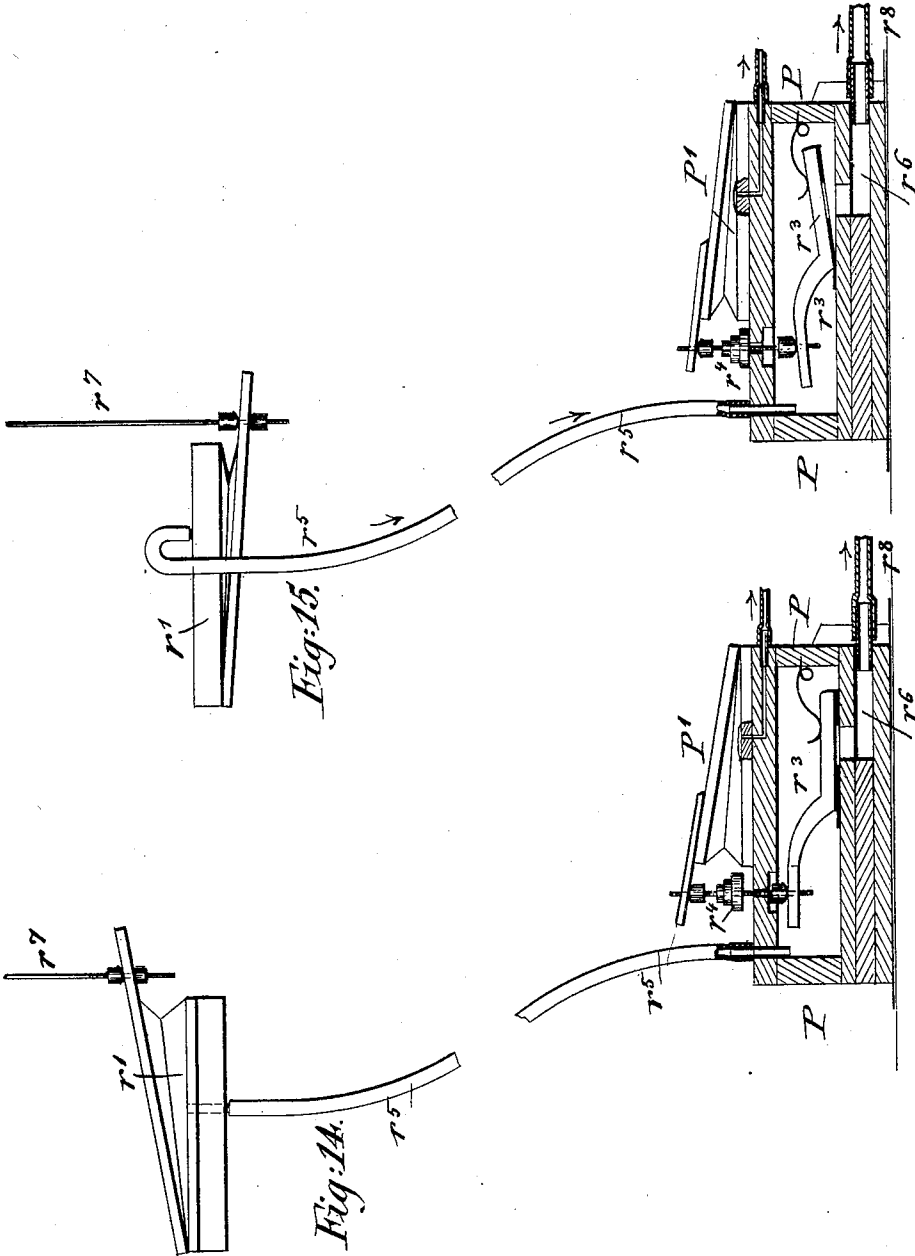
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J. WIESER.
AUTOMATIC PIANO.

(Application filed June 22, 1898. Renewed Dec. 6, 1899.)

(No Model.)

8 Sheets—Sheet 8.



WITNESSES:
Geo. J. Jaeschke
M. B. Huntzel

INVENTOR
Joseph Wieser
BY *Guiseppi Casaguer*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH WIESER, OF DOLGEVILLE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO HERMANN LEONARD, OF NEW YORK, N. Y.

AUTOMATIC PIANO.

SPECIFICATION forming part of Letters Patent No. 651,788, dated June 12, 1900.

Application filed June 22, 1898. Renewed December 6, 1899. Serial No. 739,437. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WIESER, a citizen of the United States, residing at Dolgeville, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Automatic Pianos, of which the following is a specification.

This invention relates to improvements in automatic pianos of that class which are adapted to be played at will, either manually or automatically, by means of a system of automatically-operated devices controlled by a perforated music-sheet, a pneumatic-motor, and a suitable wind-chest and suction apparatus and in which the expression is produced by the action of the pneumatic mechanism, likewise controlled by the perforated music-sheet, without requiring any personal exertion; and the invention consists of certain features of construction and combination of parts to be hereinafter described and then particularly claimed.

In the accompanying drawings, Figure 1 represents a front elevation of an upright piano in which the lower part of the case is broken off, so as to show the pneumatic-operating mechanisms. Fig. 2 is a horizontal section on line 2 2, Fig. 1, of my improved automatic piano, showing the different mechanisms, arranged partly inside and partly outside of the case, by which the piano-actions are operated. Fig. 3 is a vertical transverse section through the key-beds, music-sheet carrier, and wind-chest, drawn on a larger scale and showing the primary valve-action and pneumatics for operating the key-levers and piano-actions. Figs. 3^a and 3^b are details of the locking mechanism for the music-sheet carrier. Figs. 4 and 5 are respectively a detail vertical transverse section on line 4 4, Fig. 6, and a rear elevation of the key-lever-operating pneumatics and lifter-rods. Figs. 6 and 7 are bottom views of the music-sheet-winding-up mechanism shown, respectively, in its normal position for use and in position for rewinding. Fig. 8 is a vertical transverse section through the piano, showing the means for pneumatically actuating the hammer-rest rail. Figs. 9 and 10 are detail side views of the mechanisms for actuating the hammer-rest rail, showing the

same in normal position and in shifted position for reducing the strokes of the hammers. Fig. 11 is also a vertical transverse section through the piano, showing the mechanism for pneumatically actuating the dampers. Figs. 12 and 13 are detail views, drawn on a larger scale, of said damper-actuating mechanism, showing the damper respectively in normal position on the string and in position after being removed from the string; and Figs. 14 and 15 are details of the auxiliary valve-actions and pneumatics employed for setting the expression mechanisms.

Similar letters of reference indicate corresponding parts.

In my improved automatic piano any approved construction of upright piano may be employed, the pneumatic-operating mechanisms being arranged in connection with the key-levers of the piano-actions, said key-levers being actuated by means of operating-pneumatics, which are arranged outside of the regular wind-chest, and controlled by a series of primary valve-actions that are located in the wind-chest and connected with a tracker arranged below the key-bed of the piano. The piano is constructed with the usual piano-actions A, sounding-board B, strings S, and supporting-frame F. On the rear part of the frame F is supported an electric or other motor of any approved construction, by which motion is imparted to a pair of suction-bellows SB, which are arranged in the lower portion of the piano-case, respectively above and below a hollow shelf, as shown in Fig. 1. A pneumatic-motor M' is also arranged at the rear part of the frame F, said motor furnishing the power for driving the music-sheet and rewinding the same at the proper time. The suction-bellows SB are connected by ducts with an auxiliary bellows FB, which is again connected by a flexible tube C' with the wind-chest C, which is located below the key-bed K of the piano, and with the auxiliary pneumatics P, by which the expression devices are operated, said auxiliary pneumatics performing the function of the piano-pedals when the piano is played automatically. To these pneumatics the term "pedal-pneumatics" is given. The pedal-pneumatics are operated by the auxiliary

bellows, one for shifting the hammer-rest rail of the piano-actions and the other for operating the dampers, so that the required expression is obtained pneumatically in connection with the perforated music-sheet and tracker in the same manner as when the piano is played manually in connection with the pedal-operated expression devices. The wind-chest C is exhausted by the action of the auxiliary bellows FB and suction-bellows SB. Below the wind-chest C, outside of the same, are arranged, preferably, three rows or tiers of bellows, which form the operating-pneumatics OP for the lifter-rods l of the key-levers L, said lifter-rods being applied, by means of pins l' , to the movable projecting members of the pneumatics OP, as shown in Fig. 3. The upper ends of the lifter-rods engage shorter intermediate lifter-pins l^2 , which are guided in suitable keepers at the rear part of the key-bed, said intermediate lifter-pins being retained in their position, so as to permit the removing or replacing of the lifter-rods l . The operating-pneumatics OP are connected by suitable ducts and leader C² with the wind-chest, within which are arranged the primary or controlling valve-actions V, which are connected by flexible pipes t with the ducts of the tracker T, said tracker being arranged on the under side of a horizontal slide-frame T', that is guided in suitable ways w below the key-bed. To the slide-frame T' is attached, at right angles thereto, a partition T², which carries the wind-chest C and the operating-pneumatics OP, so that the tracker, wind-chest, operating-pneumatics, and lifter-rods can be moved in forward direction when the lower front wall of the piano-case is removed and detached bodily from the piano whenever it should be necessary for inspection and repair.

The primary or controlling pneumatic valve-actions V are arranged at the interior of the wind-chest C and are composed of flexible diaphragms d , arranged on a horizontal bed d' , the space below the same being connected by channels and flexible tubes t with the ducts of the tracker. On each diaphragm d is supported the enlarged lower end of a stem d^2 of a valve d^3 , by which the connection of the wind-chest with the leader C² is opened or closed. The valve-stem d^2 passes through an opening in the top of the wind-chest C and through a cap d^4 in the top of the leader C², that surrounds the wind-chest. The valve d^3 is located above the opening in the top of the wind-chest, the flushing of the diaphragm lifting the valve d^3 , so as to establish the connection between the wind-chest and the leader and close the cap d^4 , which serves to guide the upper end of the valve-stem. The cap d^4 is perforated, so as to permit the atmospheric air to enter into the leader C² as soon as the valve d^3 is returned to its normal position to close the opening in the top of the wind-chest. As soon as the diaphragm is flushed the connection of the wind-chest with

the leader is established, while the connection of the leader with the atmosphere is closed, and, vice versa, when the connection of the wind-chest and leader is interrupted by the valve the leader is connected with the atmosphere. Each valve d^3 can be adjusted on its stem so as to produce the reliable opening and closing of the openings or parts in the wind-chest and leader. The diaphragms, valves, and guide-caps are arranged in three rows, corresponding to the three rows of operating-pneumatics, one diaphragm, valve, and guide-cap forming the connection of the wind-chest by the leader with its corresponding pneumatic OP.

The action of the valve-actions V and of the pneumatics OP controlled thereby is governed by suitable perforations of the music-sheet passing over the ducts of the tracker. The flexible tubes t , by which the tracker-ducts are connected with the ducts in the diaphragm-bed d' of the wind-chest, are located in a recess t^2 of the slide-frame T', as shown in Figs. 2 and 3, conducted through holes in said frame, and connected with the channels or ducts below the flexible diaphragms. Each tracker-duct is thus connected with a controlling-diaphragm d and primary valve-action, so as to cause the flushing of said diaphragms and the actuation of the valves supported thereon and of the corresponding operating-pneumatic connected therewith. The operating-pneumatics OP when connected with the exhaust-chest C by means of leader C² are collapsed and actuate the lifter-rods l ; connected with their movable members, which lifter-rods operate the intermediate lifter-pins l^2 and actuate the key-levers L and by the same in the usual manner the piano-actions. The intermediate lifter-pins l^2 remain in position when the slide-frame T' is removed, with the wind-chest-operating pneumatics and lifter-rods, and resume their position on the lifter-rods when the slide-frame, with the wind-chest, is replaced, so as to operate the key-levers and piano-actions, as before described. The piano-actions are thus operated by the combined action of the music-sheet, tracker, flexible tubes, valve-actions, and operating-pneumatics in a reliable and effective manner, while all the parts can be bodily removed with the slide-frame T' from the piano-case for the convenient repairing and readjusting of the same.

The expression mechanisms.—The expression, which is ordinary produced in playing the piano by touch of the fingers on the keys, as well as by the dampers being removed from the strings by the damper-pedal, is in my improved pneumatic-piano imparted by auxiliary valve-actions and pneumatics which are actuated by special perforations arranged in the music-sheet and by primary valve-actions in the wind-chest. For this purpose two separate valve-actions and pneumatics P P' are required, one by which the hammer-rest rail

is set so that the strokes of the hammers are shortened and the striking force of the same diminished and the other corresponding to the damper-pedal by which the dampers are moved from or reapplied to the strings. By these auxiliary pneumatic devices the expression devices are operated in an entirely automatic manner without any special manual devices for producing the action of the same.

In other words, with the exception of the inserting of the music-sheet, locking or releasing its winding-up mechanism, and starting the motor, the playing of the piece of music is accomplished automatically and without requiring any manipulation of stops, swells, or other devices. As soon as the music-sheet has been inserted and started the entire piece is played automatically with all the forte, piano, and sostenuto expressions required, all being governed by corresponding perforations in the music-sheet and the auxiliary valve-actions and pneumatics which actuate or release the expression devices. The auxiliary valve-actions and the mechanism for regulating the forte and piano expression are shown in Figs. 8, 9, 10, and 14, and consist of a movable hammer-rest rail r and a pair of operating-pneumatics r' r'' , which are actuated at the proper time in connection with an auxiliary valve-action P' , arranged at the bottom of the case, as shown in Figs. 1 and 14. Above the auxiliary valve-action P' is arranged the pneumatic P , which is connected with a primary valve-action in the wind-chest, and thereby with the tracker. The pneumatic P operates a valve v^4 on the casing of the auxiliary valve-action, said valve v^4 being connected with the valve v^3 , so as to open the same and establish direct connection between the operating-pneumatics r' and the suction-bellows SB by the flexible tube r^5 , channel or duct r^6 , and tube r^3 . A direct powerful suction is thus exerted on the operating-pneumatic r' and the hammer-rest rail r , operated by the pull-rod r^7 and the intermediate mechanism shown in Figs. 9, 10, and 14. The pull-rod r^7 connects the operating-pneumatic r' with a pivoted lever r^9 , which acts by an antifriction-roller r^{10} on a second fulcrumed and spring-actuated lever r^{11} , that is connected by a lifter-rod r^{12} with a stationary arm r^{13} on the hammer-rest rail. The hammer-rest rail r is connected by pivot-links r^{14} with the action-supporting standard and moved by the action of its operating-pneumatic r' from its normal position (shown in Fig. 9) to a position closer to the strings, so as to shorten the stroke of the hammers, as shown in Fig. 10. As soon as the pivoted lever r^9 is moved in downward direction by the operating-pneumatic r' a fulcrumed and spring-actuated T-shaped lever r^{15} is moved out of a recess on said lever, so as to hold it in position for piano expression until the T-shaped lever r^{15} is returned again by the action of the pull-rod r^{16} and the operating-pneumatic r'' , which is operated either in the

same manner as the pneumatic r' , or, preferably, directly from a primary valve-action in the wind-chest, as the release and return of the hammer-rest-rail operating parts requires less power than the upward moving or shifting of the same for piano expression. As soon as the pneumatic r'' is operated the T-shaped lever r^{15} is moved back into the recess on the lever r^9 and the levers r^9 and r^{11} returned to their former positions, together with the hammer-rest rail, partly by gravity, partly by spring action, as shown in Fig. 1, so that the hammers then resume their former full strokes for the forte expression. The same actuating mechanism, but with the operating-pneumatics r' r'' in reversed position, is used for actuating the damper-levers of the piano-actions, so as to produce the removal of the dampers when sostenuto expression is required. This mechanism is shown in Figs. 11, 12, 13, and 15, and consists likewise of two operating-pneumatics r' r'' , which are actuated by the music-sheet, tracker, a primary valve-action in the wind-chest, and an auxiliary valve-action P and operating-pneumatic P' . In this case, however, the operating-pneumatics r' r'' are reversed—that is to say, they are so placed that their movable members are below the stationary members, so that in place of pull-rods push-rods are used, by which the pivoted lever r^9 , fulcrumed lever r^{11} , and push-rod r^{12} , a crank-lever r^{18} , and by the latter the damper-levers r^{19} are operated, and thereby the dampers removed from the strings, as shown in Fig. 13. When the dampers are to be returned to their normal positions, the intermediate levers are returned to their former position, as shown in Fig. 12, by the action of the second operating-pneumatic r'' and the T-shaped lever r^{15} in the same manner as before described in connection with the hammer-rest rail.

The music-sheet carrier.—The music-sheet is wound on a spool E , and the latter is supported on a carrier which consists of a stationary and a movable head for the spool, a winding-up roll E' , and a hinged frame E^2 . The music-sheet spool is located in front and the winding-up roll at the rear of the tracker T . Both the music-sheet spool and the winding-up roll E' are supported in suitable bearings, the bearings of the former being arranged in stationary brackets on the slide-frame T' and the bearings for the latter in brackets that are attached to the hinged U-shaped frame E , which extends around the tracker T . The frame E^2 is firmly locked in position at the under side of the slide-frame by means of a spring-catch e , that is clearly shown in detail in Figs. 3^a and 3^b. The spring-catch e is fulcrumed to the under side of the slide-frame and actuated by the longer arm of an elbow-lever e' , which engages a rearwardly-extending portion or heel e^2 of the spring-catch e . The elbow-lever e' is fulcrumed to an ear e^x at the under side of the slide-frame T' , its shorter arm being connected by a stout wire

or wire cord e^3 with a second elbow-lever e^4 , that is fulcrumed to the under side of the slide-frame, near one end of the same, said second elbow-lever being actuated by a slide-rod e^5 from the front of the instrument, as shown in Fig. 6. The slide-rod e^5 is guided by a slotted portion on a headed stud e^6 at the under side of the slide-frame T' , as shown in Fig. 6 and 7, so that when the slide-rod e^5 is pulled by taking hold of the knob or button at its front end the spring-catch e is withdrawn from the carrier-frame E^2 and the same dropped on the recessed end of a fulcrumed latch e^7 , (shown in full lines in Fig. 3 and in dotted lines in Fig. 3^a.) so as to be held in a slightly-inclined position. A second slide-rod e^8 is then pushed inwardly to operate by an intermediate elbow-lever e^9 a longitudinal slide-rod e^{10} , guided in keepers e^{11} at the under side of the slide-frame, said slide-rod engaging by a pin e^{12} the slotted rear end of the fulcrumed latch e^7 , so as to move it sidewise into a recess e^x at the edge of the carrier-frame and permit the latter to drop downward into inclined position, together with the winding-up roll, as shown in dotted lines in Fig. 3. When the winding-up roll is in this position, the loop at the end of the perforated music-sheet can be readily connected with the hook on the winding-up roll E' after the music-sheet spool has been inserted into the heads of the journal-bearings of the stationary brackets or hangers. The hinged carrier-frame E^2 is then returned into its normal position below the slide-frame and the music-sheet stretched thereby over the ducts in the face of the tracker. As the hinged carrier-frame is moved in backward and upward direction its edge presses the spring-catch e back, so as to permit it to pass beyond the same until it forms contact with the under side of the slide-frame T' , when the spring-catch will spring forward so as to reengage the rear edge of the carrier-frame and lock it into position. The slide-rod e^8 is then pulled back into its normal position, so that the latch e^7 extends over the rear edge of the carrier-frame, as shown in Fig. 6. The music-sheet is then gradually wound on the winding-up roll by the action of the pneumatic-motor M' , said motor being supplied with air from the auxiliary suction-bellows. The driving-shaft m of the pneumatic-motor M' is provided with a balance-wheel m' at one end and a drive-pulley m^2 at the opposite end, which latter is connected by a belt or cord m^3 with a pulley m^4 on an intermediate shaft m^5 , supported in bearings at the under side of the slide-frame, said shaft being provided with a pinion m^6 that meshes with a gear-wheel m^7 at one end of the winding-up roll E' . As soon as the winding-up roll E' is returned to its normal position and the music-sheet stretched over the tracker the electric or other motor M , by which the suction-bellows are operated, is started. By the action of the suction-bellows

the pneumatic-motor M' is set in motion, so as to impart by the belt-and-pulley transmission described rotary motion to the winding-up roll E' in the direction of the arrow shown in Fig. 3, so that the music-sheet is moved over the tracker until it is entirely transferred to the winding-up roll—that is to say, until the entire piece of music has been played. As soon as the music-sheet is entirely unwound from its spool a perforation at its end actuates a primary valve-action in the wind-chest and a corresponding operating-pneumatic OP, which latter operates the elbow-lever e^4 by a connecting-rod e^{15} and withdraws the locking-catch e from the carrier-frame, so as to permit it to drop on the recessed end of the latch e^7 . This slight drop motion of the carrier-frame due to the recessed latch moves the gear-wheel m^7 on the winding-up roll out of mesh with the motion-transmitting pinion m^6 , so that no further rotary motion is imparted to the winding-up roll. Another perforation near the end of the music-sheet actuates next a primary valve motion in the wind-chest and an operating-pneumatic OP connected thereto and operates the slide-rod e^{10} by its elbow-lever e^9 and rod e^8 , so as to shift the latch e^7 and drop the carrier-frame into inclined position. Simultaneously therewith the operating-pneumatic OP operates a fulcrumed lever e^{13} , connected with the elbow-lever e^9 and push-rod e^8 , so that a slide e^{14} in the suction-tube C' of the wind-chest is closed thereby, so that the action of the wind-chest and primary valve-action is automatically interrupted. Before a new piece can be played it is necessary to rewind the music-sheet just played on the spool, so as to permit the removing of the same and the replacing of the same by another music-sheet. This is accomplished while the hinged carrier-frame is in its inclined position below the music-sheet spool, as shown in dotted lines in Fig. 3. Simultaneously with the dropping of the carrier-frame the longitudinal slide-rod e^{10} moves a pin m^x on a clutch-pulley m^8 , splined to the intermediate shaft m^5 , into contact with a clutch-pin m^9 on the same, so as to impart rotary motion to the spool of the music-sheet by a belt m^{10} , which passes over the clutch-pulley and a pulley m^{11} on the shaft of the yielding head of the music-sheet spool, so that the music-sheet spool is turned in a direction opposite to its former unwinding motion, and thereby quickly rewound on the music-sheet roll. As soon as the winding of the music-sheet on the roll is accomplished the loop at its end is automatically detached from the hook on the winding-up roll. The music-sheet spool is then removed from its heads and replaced by a new music-sheet in case another piece is to be played. The loop at the end of this music-sheet is then connected with the hook on the winding-up roll and its carrier-frame returned into its locked position below the slide-frame in the manner before de-

scribed, it being then immediately ready for playing the next piece, as the hinged carrier-frame is not only relocked by its spring-catch, but also reengaged by the latch. The return of the latch into its locked position (shown in Fig. 6) moves the clutch-pulley out of engagement with the clutch-pin on the intermediate shaft and returns the gear-wheel n^7 on the winding-up roll into mesh with the driving-pinion m^6 , so that thereby the normal position of the parts is reestablished and the new music-sheet moved over the tracker. The latch-operating pull-rod e^8 reopens the slide e^{14} , by which the tube C^2 , leading to the wind-chest, is opened, so that the wind-chest can be exhausted and the primary valve-action and operating-pneumatics operated by the music-sheet and tracker. The rewinding of the music-sheet takes place automatically as soon as the piece of music has been played; while the pneumatics operated thereby, and consequently the piano-actions, are at rest. The resetting of the carrier-frame resets all the parts and starts the playing of the next piece.

Operation: The operation of my improved automatic piano is as follows: The hinged carrier-frame on which the winding-up roller is supported is first released from its spring-catch by the actuating-rod arranged for this purpose, so that the frame drops onto the recessed end of the latch. This latch is then released from the hinged carrier-frame by pulling the second actuating-rod, so that the carrier-frame is dropped into its inclined position. The music-sheet spool is then inserted into position in the heads of its brackets and the loop at the end of the music-sheet attached to the hook on the winding-up roll. When this is accomplished, the hinged carrier-frame is returned to its horizontal position below the slide-frame and automatically relocked by its spring-catch, after which the latch is returned into its former normal position. The return motion of the hinged carrier-frame brings the music-sheet across the face of the tracker, so that its perforations are passed over the tracker-ducts when the music-sheet is moved by the rotating motion of the winding-up roller. The motor is now started and the pneumatic-actions set in operation by the perforations of the music-sheet, so that the music is played by the actuation of the pneumatic key-levers and piano-actions. The speed of the movement of the music-sheet over the tracker is regulated by a proper adjustment of the air-admission slide of the pneumatic-motor, though in most cases this is hardly necessary. When the pneumatic-motor is properly adjusted, its motion is transmitted by means of the driving belts and pulleys to the rotating shaft and gear by which the winding-up roll is rotated. As the perforations of the music-sheet are brought over the tracker-ducts air is admitted, which

flushes the primary pneumatic valve-actions by which the corresponding pneumatics and their lifters are operated, the latter being forced against the rear ends of the key-levers, so as to force them upward, whereby the piano-actions are operated in the usual manner as though the front ends of the keys were depressed by the fingers. Thus as the various perforations of the music-sheet are brought over their tracker-ducts the corresponding pneumatics are operated and the various notes are sounded in accordance with the requirements of the piece of music to be played. The expression is likewise automatically controlled by perforations of the music-sheet and auxiliary pneumatics, so that either forte, piano, or sostenuto expression is produced, as required. The expression-pneumatics respond quickly as the perforations in the music-sheet are passed over the tracker-ducts, so that the faithful reproduction of the piece of music is obtained. When the music-sheet is entirely wound up on the winding-up roll, the carrier-frame is automatically released from the spring-catch by the action of the music-sheet, so that the carrier-frame drops on its latch, whereby its gear-wheel on the winding-up roll is disengaged from the driving-pinion and the motion of the winding-up roll immediately interrupted. The latch is then released and the carrier-frame dropped automatically into inclined position. Simultaneously the valve of the wind-chest is closed by the latch-actuating rod, so that the operating-pneumatics are set at rest. At the same time the clutch-pulley is placed by the latch-actuating slide-rod in engagement with the belt-and-pulley transmission of the pneumatic-motor, so that motion is imparted to the music-sheet spool, and the music-sheet is quickly unwound from the winding-up roll and rewound on the music-sheet spool, its loop end detaching itself automatically from the hook on the winding-up roll. The music-sheet, with its spool, is then removed and the winding-roll, with its carrier-frame, returned in its normal horizontal position below the slide-frame when the playing of the piano is to be discontinued. When the same or another piece is to be played, a new music-sheet is placed in position in and connected with the winding-up roll and moved with the carrier-frame into normal position. In the former case the driving-motor is stopped, while in the latter case the motion is kept up continuously, the next piece commencing to play as soon as the music-sheet is replaced in position over the tracker.

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

1. The combination, with the key-levers and piano-actions, of a key-bed, a wind-chest below said key-bed, primary valve-actions in said wind-chest, operating pneumatics sup-

ported outside of said wind-chest, a leader connecting said primary valve-actions with the operating-pneumatics, lifter-rods actuated by said pneumatics, and intermediate lifter-pins guided on the rear end of said key-bed in line with said lifter-rods, substantially as set forth.

2. The combination, with the key-levers and piano-actions operated by said key-levers, of a key-bed for said key-levers, having guideways, a slide-frame guided in said ways, a tracker attached to said slide-frame, a winding mechanism for moving the music-sheet over said tracker, a wind-chest supported on said slide-frame, primary valve-actions in said wind-chest, flexible tubes connecting the tracker-ducts with the inlet-channels of said primary valve-actions, operating-pneumatics supported at the rear part of the wind-chest, a leader connecting said primary valve-actions with the operating-pneumatics, a series of lifter-rods operated by said pneumatics and guided on said slide-frame, and lifter-pins guided on the key-bed, the slide-frame with its tracker, wind-chest, primary valve-actions, pneumatics and lifter-rods being adapted to be removed bodily from below the key-bed and replaced therein so as to resume its normal position, substantially as set forth.

3. The combination, with a stationary key-bed provided with guideways, of a detachable slide-frame supported by said ways, a tracker, a music-sheet-winding mechanism, a wind-chest, primary valve-actions in said wind-chest, operating-pneumatics, a leader between said primary valve-actions and operating-pneumatics, and lifter-rods operated by said pneumatics, all said parts being mounted on the slide-frame so as to permit the convenient removal of the same for repairs and reinserting of the same without interfering with the key-levers and piano-actions, substantially as set forth.

4. The combination, with the key-levers and piano-actions, of a key-bed for said levers, provided with guideways, a slide-frame guided in said ways, a wind-chest attached to said slide-frame, a tracker attached to said slide-frame in front of said wind-chest, primary valve-actions located in said wind-chest, flexible tubes for connecting the tracker-ducts with the inlet-channels in said primary valve-actions, said tubes being located in a recess or depression of the slide-frame, operating-pneumatics supported at the rear of the wind-chest, a leader connecting the primary valve-actions with said operating-pneumatics, lifting devices for transmitting motion to said key-levers from said operating-pneumatics, a perforated music-sheet passing over the tracker, and an exhaust-bellows connected with said wind-chest, substantially as set forth.

5. The combination, with the piano-actions and the key-levers for operating the same, of

a slide-frame guided below the key-bed for the key-levers, a tracker attached to the under side of the slide-frame, pneumatic-actions operated by said tracker, also supported on said slide-frame, and a music-sheet carrier, also applied to said slide-frame and composed of a music-sheet spool, a hinged carrier-frame, a winding-up roll on said carrier-frame, and means for rotating the winding-up roll, substantially as set forth.

6. The combination, with the music-sheet carrier supported below the key-bed, and consisting of a music-sheet spool, a hinged carrier-frame, a winding-up roll on said carrier-frame, a stationary tracker intermediate between the music-sheet spool and the winding-up roll, a spring-catch for locking said carrier-frame, a pivoted latch for said carrier-frame, means for releasing said spring-catch so that the carrier-frame drops on the latch, means for actuating said latch so as to permit the dropping of the carrier-frame with the winding-up roll, means for rotating the winding-up roll before its dropping with the carrier-frame, and means for rotating the music-sheet spool after the carrier-frame is dropped, so as to rewind the music-sheet on its spool, substantially as set forth.

7. The combination, with the slide-frame supported below the key-bed, of a tracker on the same, a music-sheet spool supported in front of said tracker, a hinged carrier-frame having its hinge-joint between the music-sheet spool and the winding-up roll, a winding-up roll supported on said carrier-frame back of said tracker, means for locking said carrier-frame in normal position, and means for rotating the winding-up roll so as to move the music-sheet over the tracker, substantially as set forth.

8. The combination, with a slide-frame located below the key-bed, of a tracker on said slide-frame, a music-sheet spool supported in front of said tracker, a hinged carrier-frame, a winding-up roll supported on the same back of said tracker, means for rotating the winding-up roll so as to move the music-sheet over the tracker, a spring-catch for locking the carrier-frame, a latch for said carrier-frame, means for releasing said spring-catch so as to drop the carrier-frame on the latch, and interrupt the winding-up motion of the sheet, and means for releasing the latch and producing the dropping of the carrier-frame with the winding-up roll into inclined position, substantially as set forth.

9. The combination, with a slide-frame located below the key-bed of the piano, of a tracker on said slide-frame, a music-spool supported in front of said tracker, a hinged carrier-frame, a winding-up roll supported on said frame back of the tracker, mechanism for imparting rotary motion to said winding-up roll, means for pneumatically releasing said carrier-frame and interrupting the mq-

tion of the winding-up roll, means for dropping the carrier-frame and winding-up roll into inclined position, and means for rotating the music-sheet spool after the carrier-frame is dropped so as to rewind the music-sheet on the spool, substantially as set forth.
5 In testimony that I claim the foregoing as

my invention I have signed my name in presence of two subscribing witnesses.

JOSEPH WIESER.

Witnesses:

PAUL GOEPEL,
GEO. W. JAEKEL.