No. 848,207. PATENTED MAR. 26, 1907.

R. A. RODESCH.

AUTOMATIC PIANO.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.

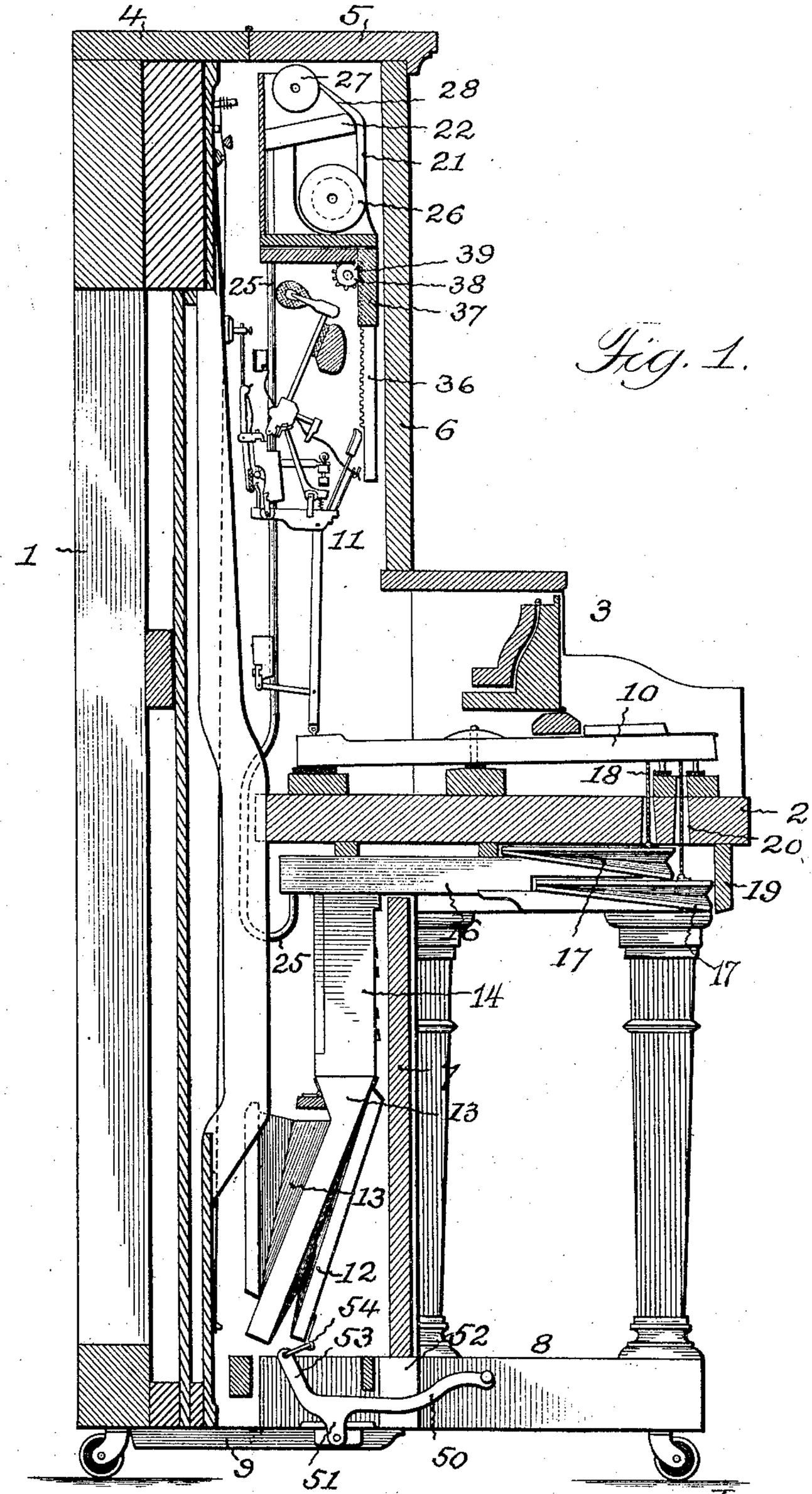

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

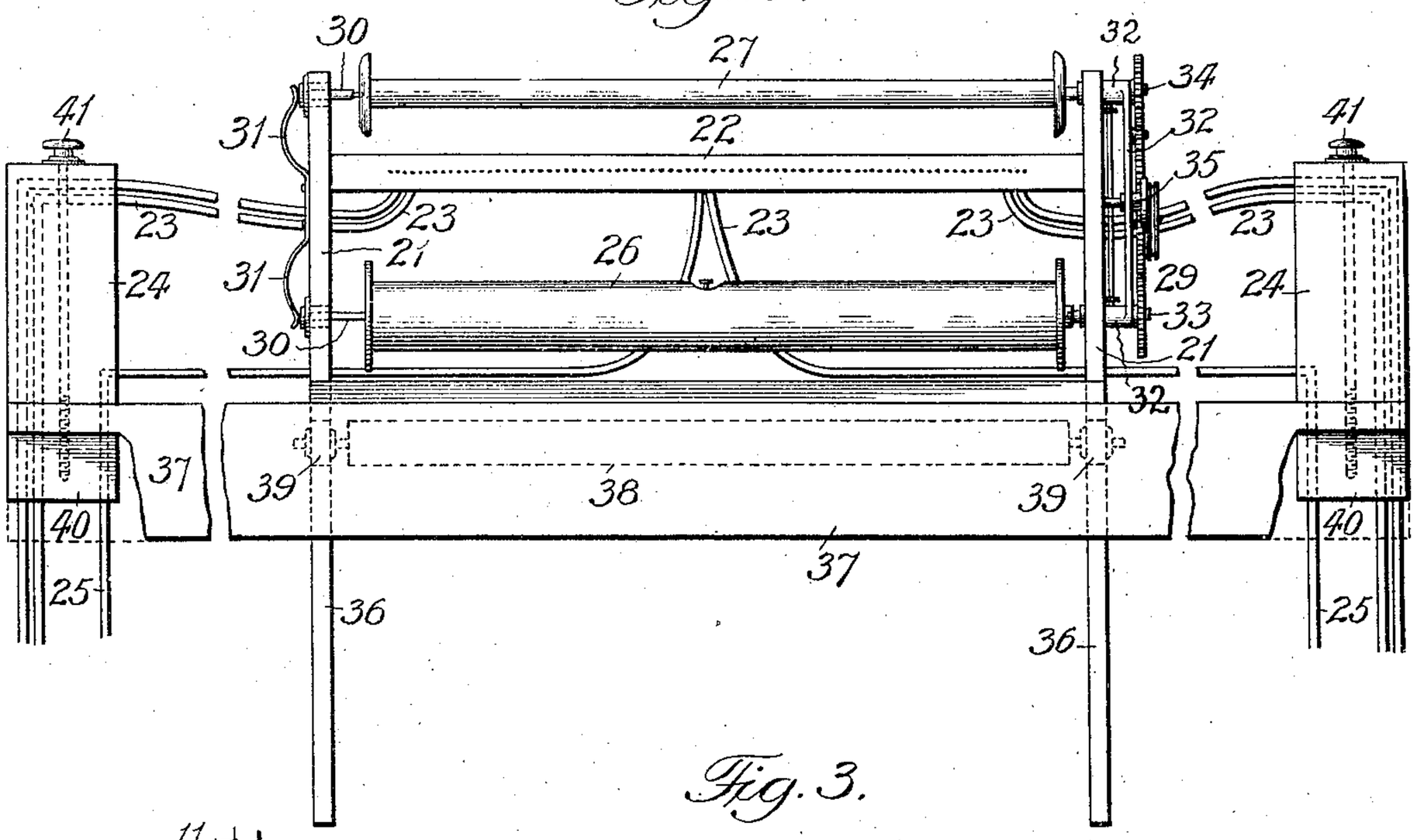

Fig. 3.

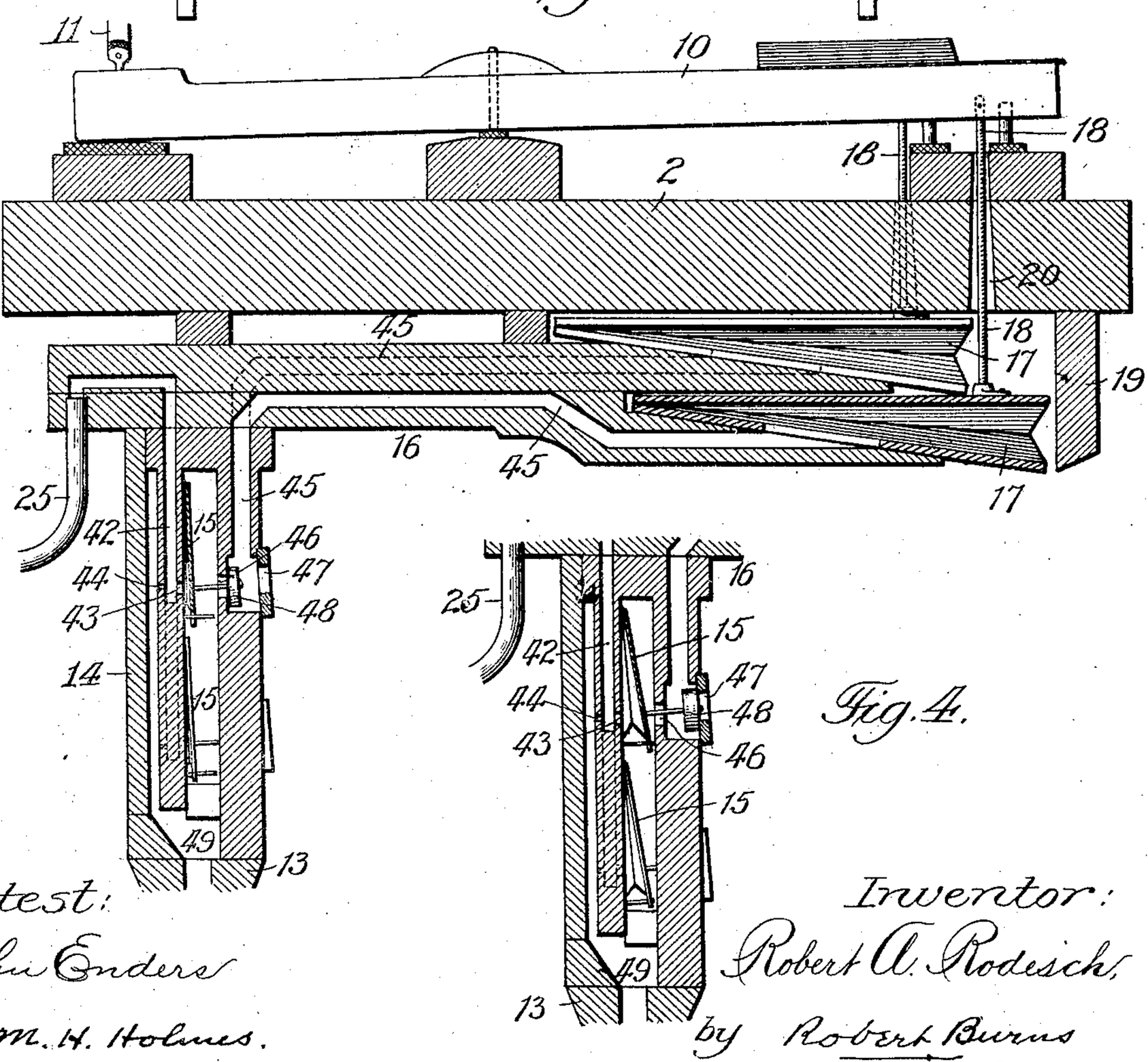

Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT A. RODESCH, OF DIXON, ILLINOIS, ASSIGNOR TO RODESCH PIANO AND PLAYER CO., A CORPORATION OF ILLINOIS.

AUTOMATIC PIANO.

No. 848,207. Specification of Letters Patent. Patented March 26, 1907.

Application filed September 11, 1905. Serial No. 277,814.

To all whom it may concern:

Be it known that I, ROBERT A. RODESCH, a citizen of the United States of America, and a resident of Dixon, in the county of Lee and State of Illinois, have invented certain new and useful Improvements in Automatic Pianos, of which the following is a specification.

This invention relates to that class of automatic piano-players in which a pneumatically-actuated playing mechanism is controlled by a traveling perforated music-sheet or like controlling means; and the present improvement has for its various objects, first, to provide a simple and effective arrangement and connection of the operating or motor pneumatics to the action-keys of the piano, adapted to afford a very direct and efficient actuation of said keys in the normal automatic operation of the instrument, and, second, to provide a simple and compact structural formation and combination of parts adapting the automatic playing mechanism for convenient application to an ordinary upright piano without requiring any change in the form, dimensions, or appearance of the same, all as will hereinafter more fully appear and be more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse sectional elevation of an upright piano having the present improvements applied. Fig. 2 is a fragmentary front elevation of the upper part of the piano, illustrating the arrangement of the tracker-board, music-sheet-carrying mechanism, &c. Fig. 3 is an enlarged detail vertical section illustrating the present arrangement of the action-keys and their operating or motor pneumatics and primary pneumatics. Fig. 4 is an enlarged fragmentary section illustrating the primary pneumatics in the position opposite to that illustrated in Fig. 3.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents the rear frame of an upright piano, upon which the sound-board and string-plate are mounted in the customary manner. Such rear frame is inclosed in the usual outer piano-casing, which in detail comprises the usual key-table 2 and its superposed desk-front 3, stationary cap-board 4, hinged cover 5, upper front board 6, screen-board 7, lower molding-rail 8, and bottom board 9, as well as the other minor parts usual to an upright piano.

10 are the action-keys, mounted in any usual manner on the key-table 2 and having operative connection with the usual piano-action 11, such action comprising the usual series of hammers, their throwing-jacks, rockers, back-catch springs, trip devices, martingales, and lift-bars, as well as the connecting-pivots for said parts.

12 is the manually-actuated exhaust-pump of the pneumatic playing mechanism, arranged in the lower part of the piano-casing immediately to the rear of the screen-board 7 of such casing, as shown in Fig. 1. Such pump may be of any usual construction, the bellows form shown being preferred in that it can be arranged for convenient actuation by the pedal-lever hereinafter described.

13 is the collapsible exhaust equalizing or accumulating chamber of any usual form, communicating with the exhaust-pump and adapted to equalize the exhaust action of such pump, or a pair of such pumps, when two are used to create the exhaust action of the playing mechanism. The upper end of this exhaust-equalizing chamber is shown at the lower part of Figs. 3 and 4 of the drawings.

14 is the exhaust chest or chamber of the playing mechanism, communicating with the upper end of the exhaust-equalizing chamber aforesaid and arranged in an upright position immediately above said chamber and behind the screen-board 7 in the preferred arrangement of parts illustrated in Fig. 1 of the drawings.

15 are the primary pneumatics arranged in the exhaust-chest 14 and adapted for actuation by the music or controlling sheet acting in conjunction with the individual openings of the tracker-bar, as hereinafter more fully described.

16 is a secondary exhaust chest or chamber extending forwardly from the upper end of exhaust chest or chamber 14. Such secondary exhaust-chest is arranged immediately beneath the key-table 2 and preferably attached to the underside of the same.

17 are the series of operating or motor pneumatics which actuate the action-keys 10 in the automatic operation of the piano. In the present construction such motor-pneu-

matics have their lower and fixed members mounted rigidly upon forward extensions at the front side of the secondary exhaust-chest 16, while the main bodies of their movable members are connected in a direct manner by vertical pull connections 18, preferably of a pliable material, such as leather, with the action-keys, and so that in the ordinary actuation of the action-keys by a player the pull connections are free to yield and not offer any impediment to the normal and free movement of said action-keys. By the aforesaid arrangement of parts the points at which the vertical pull connections 18 are attached to the action-keys correspond with the normal points at which the keys are struck by the player in the actuation of the instrument. The result of such arrangement is that the tone produced in the automatic operation of the instrument very closely approaches the tone produced in an ordinary actuation.

With a view to afford a compact arrangement of parts the fixed member of each motor-pneumatic is arranged in an inclined direction upon the forward extension of the secondary exhaust-chest 16, as shown in Figs. 1 and 3, so that when each movable member is in any expanded condition it will have a horizontal position immediately beneath the key-table 2, approximately parallel with the action-keys, so that the motor-pneumatic will occupy a minimum amount of vertical space beneath said key-table.

19 is a depending bar at the front end of the key-table adapted to conceal the forward ends of the motor-pneumatics from view and protect them.

20 are vertical orifices in the key-table for the passage of the vertical pull connections aforesaid.

21 is the carrying-frame of the tracker-board, take-up and rewind rolls, and their usual accessories. In the construction shown such frame is arranged in the upper portion of the piano-casing to the rear of the upper front board 6 of such casing and is made vertically adjustable, so that when the hinged cover 5 is thrown back the said frame can be raised above the top of the piano in a convenient position to display to the operator the music or controlling sheet as it passes over the tracker-board. The vertical adjustment of said frame is attained by mechanism hereinafter described.

22 is the tracker-board of any usual construction, carried by the frame 21. Such tracker-board will have the usual series of passages, which in the present construction are connected by a series of flexible pipes or ducts 23 with a corresponding series of passages in the end trunks 24, hereinafter described, the series of passages in said end trunks connecting in turn by pipes or ducts 25 with a corresponding series of passages in the exhaust-chest 14, which contains the series of primary pneumatics before referred to.

26 is the take-up roll, and 27 the rewind-roll for the controlling-sheet 28. Such rolls are arranged at opposite sides of the tracker-board and are adapted to guide and move the controlling-sheet 28 over the openings or passages in said tracker-board, as usual in the present type of self-playing pianos, and to this end a suitable spring or other usual motor (not shown) will be connected to a pulley 29, carried by the frame 21, and have operative connections with said rolls. In the preferred construction of the said rolls, as shown in Fig. 2 of the drawings, the holding-centers 30 at the inner ends of the rolls 26 and 27 are adapted to yield under the influence of the spring 31 to permit of a limited longitudinal adjustment of said rolls in effecting an adjustment of the controlling-sheet 28 with relation to the tracker-board.

32 is a yoke member having an adjustment in the frame 21 longitudinally with the rolls and adapted to afford bearings for the operating-shafts 33 and 34 of said rolls. Such yoke is adapted to have endwise bearing against the adjacent ends of the rolls, so as to resist the end thrust of the same due to the spring 31, before described.

35 is an adjusting screw and nut by which adjustment is imparted to the yoke 32 longitudinally with the rolls.

36 are depending rack-bars at the respective ends of the frame 21, moving in suitable guides formed in the board or rail 37, hereinafter referred to, so that said bars will guide said frame in a vertical direction.

38 is a spring-roll journaled on the board or rail 37 and provided with pinions 39, engaging the aforesaid rack-bars 36, the arrangement being such that the spring tension of the said roll will counterbalance the weight of the frame 21 and the parts mounted thereon, so that the said frame will remain in any vertical adjustment at which it may be placed by the operator.

The end trunks 24, before referred to, are located at opposite ends of the interior of the piano-casing and at opposite sides of the cheeks 40, fixed in the interior of the piano-casing, and provided with a series of passages corresponding with the series of passages in said end trunks, so that the passages in both parts will register when in proper relative position. The series of passages in said cheeks communicate in turn with the series of pipes or ducts 25, before referred to.

As illustrated in Fig. 2, the end trunks 24 are carried by the board or rail 37, heretofore referred to, and the arrangement is such that said trunks 24, the board 37, the tracker-board, the take-up and rewind rolls,

and the gearing with the pulley 29, which is connected to the motor, can be removed as an entirety from the piano for tuning and like purposes.

41 are vertical screws by which the trunks 24 are secured to the cheeks 40 in the detachable manner above set forth.

In the preferred construction and arrangement of parts shown in the drawings the exhaust-chest 14 is made separate from the equalizing-chamber 13 of the exhaust-pump and is attached to the top of said equalizing-chamber by a horizontal seam or joint, as shown. In like manner the secondary exhaust-chest 16 is made separate from the main exhaust-chest 14 and is attached to the top of said main chest by a horizontal seam or joint, as shown, such seam or joints being common to the pneumatic portions of automatic musical instruments of the present class.

The parts above referred to will be secured by the usual means to the piano-casing in the usual detachable manner in order that said parts, as well as the other parts of the self-playing mechanism, can be easily removed when desired without any change in the exterior appearance of the piano-casing to indicate that such change had been made, and in like manner the aforesaid parts can be applied to the piano-casing without any change in the exterior appearance of the same.

The combination and arrangement of the tracker-board, take-up and rewind rolls, and their accessories, just described, are claimed in my companion applications, Serial Nos. 328,401 and 328,402, filed July 30, 1906.

The primary pneumatics 15 and their containing-chest 14 are of the usual construction and in detail will comprise a structural formation of each individual pneumatic, as follows:

42 is a duct or passage connecting at one end with the pipe or duct 25, which is in communication with trunk 24 and tubes 23, leading to a passage of the tracker-board 22. Said duct 42 at its other end has communication with the interior of a primary pneumatic 15 by a large opening 43 and with the interior of the exhaust chamber or chest 14 by a restricted opening 44, as shown in Figs. 3 and 4.

45 is a duct or passage connecting the exhaust chest or chamber 14 with the motor-pneumatic 17.

46 is an opening or passage by which communication is had between the exhaust-chamber 14 and the duct 45 aforesaid, and 47 is an opposed opening or passage by which the duct 45 has communication with the atmosphere.

48 is a valve-head carried by the movable member of the primary pneumatic 15. Such valve-head is arranged between the respective openings 46 and 47 and in one position of said pneumatic is adapted to open the duct 45 of the motor-pneumatic to the exhaust-chamber 14 and in the other and normal position of the primary pneumatic to open said duct 45 to the atmosphere.

49 is a connecting duct or passage between the exhaust-chamber 14 and the exhaust-equalizing chamber 13 of the manually-actuated exhaust-pump of the mechanism.

The operation of the parts just described is as follows: With the passage or opening in the tracker-board closed by the controlling music-sheet 28, the air in the duct 42 and primary pneumatic 15 is exhausted into the exhaust-chamber 14 through the passages 43 and 44, so that said primary pneumatic will assume its normal collapsed condition. With said pneumatic so collapsed the valve-head 48 is in a position to close the opening or passage 46 between the exhaust-chamber 14 and the duct 45 of the motor-pneumatic 17 and open the passage 47 between said duct 45 and the atmosphere to permit the motor-pneumatic to assume its normal expanded condition. With the aforesaid passage in the tracker-board open to the atmosphere through a registering perforation in the controlling music-sheet air passes into the duct 42 and through the large opening 43 into the interior of the primary pneumatic 15 to expand the same. With a consequent movement of the movable member of said primary pneumatic the valve-head 48 is shifted from the position heretofore described into a position in which it closes communication between the duct 45 of the motor-pneumatic and the atmosphere through passage 47 and opens the passage 46 between the exhaust-chamber 14 and the duct 45 to cause a rapid collapse of the motor-pneumatic 17 and a corresponding movement of the action-key 10 to operate the piano-action to strike the piano-string. With a completion of such last-mentioned operations the parts are ready for a fresh cycle of the heretofore-described operations under the control of the perforations of the traveling controlling-sheet 28.

50 is the pedal-lever for actuating the exhaust-pump 12 of the pumping mechanism. In the present construction such lever is provided with a depending arm 51 intermediate of its length, by which it is pivoted to the bottom board 9 of the piano-casing by suitable pivot-brackets, as shown in Fig. 1. The forward end of said lever projects through the bottom front rail 52 of the piano-casing for operative engagement by the foot of the operator, while the rear end of such lever is formed with an upward and angular extension 53, the free end of which is operatively connected by a link 54 to the movable member of the exhaust-pump 12, as shown. Such

construction is adapted to afford a very compact and efficient arrangement of parts, whereby the operation of the exhaust-pump can be effected in a very easy and convenient manner.

The construction and arrangement of treadle-lever and exhaust-bellows just described are claimed in my companion application, Serial No. 328,403, filed July 30, 1906.

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

1. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

2. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

3. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

4. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

5. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

6. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

7. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

8. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

9. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

10. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the

main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

11. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

12. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, and means for automatically operating said motor-pneumatics.

13. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

14. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

15. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

16. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

17. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

18. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

19. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, and arranged below said table, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the in-

terior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

20. In an automatic piano the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics, having movable members approximately parallel with the action-keys, arranged below said table and attached to the under side of the same, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

21. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

22. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections extending in a direct manner between the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

23. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

24. In an automatic piano, the combination of a piano-casing, action-keys, a supporting key-table, motor-pneumatics arranged below said table and attached to the under side of the same, the movable members of said motor-pneumatics having a position approximately parallel with the action-keys, and the fixed members of said motor-pneumatics having an inclined position, pull connections of flexible material connecting in a direct manner the outer ends of the keys and the main bodies of the movable members of the motor-pneumatics, primary pneumatics arranged within the interior of the piano-casing and controlling the motor-pneumatics, and means for moving a traveling music-sheet controlling the primary pneumatics.

Signed at Chicago, Illinois, this 30th day of August, 1905.

ROBERT A. RODESCH.

Witnesses:
ROBERT BURNS,
M. H HOLMES.