

No. 871,918.

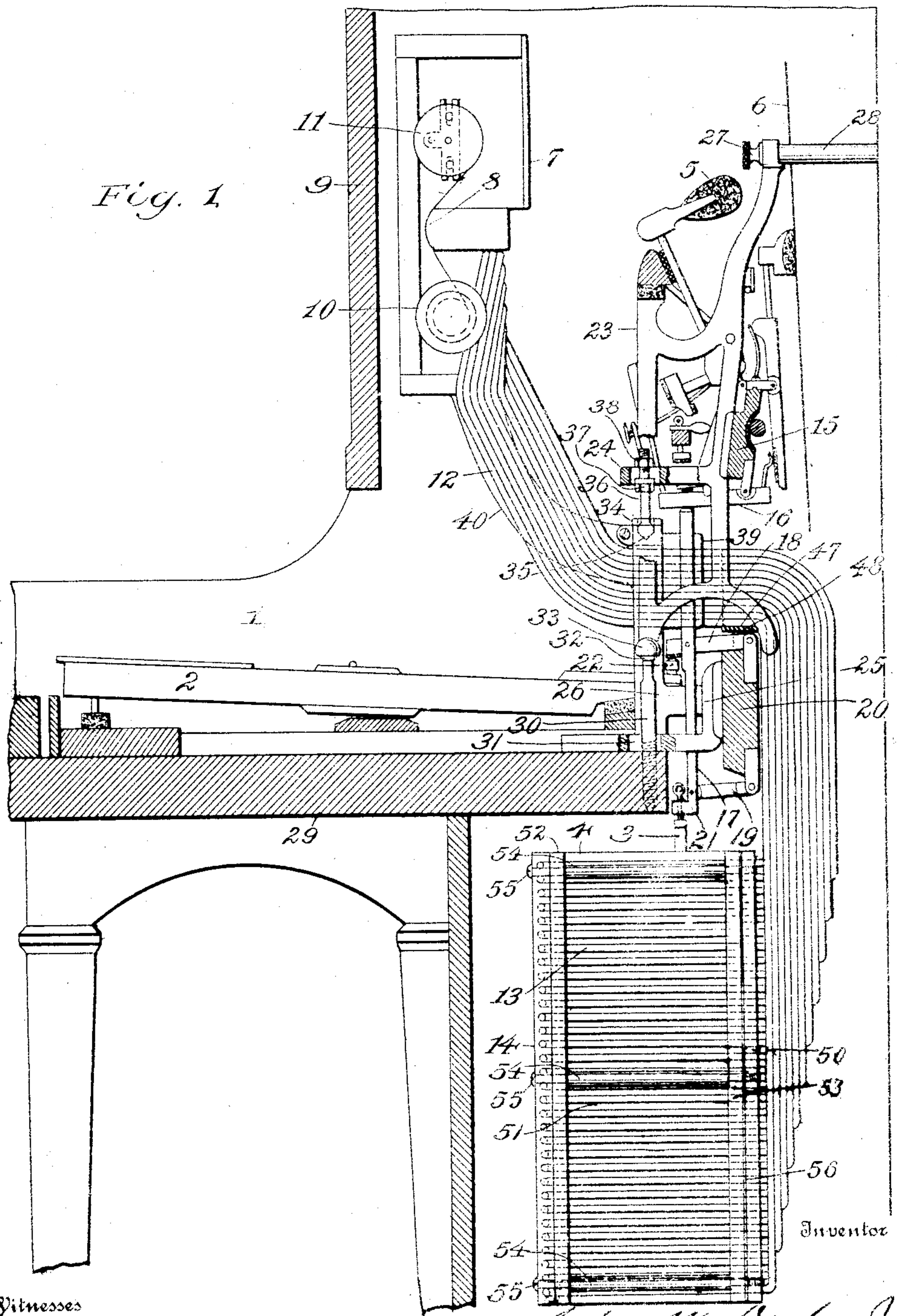
PATENTED NOV. 26, 1907.

J. W. DARLEY, JR.

COMBINED MANUALLY AND MECHANICALLY OPERATED PIANO.

APPLICATION FILED DEC. 7, 1905.

3 SHEETS--SHEET 1.



Witnesses

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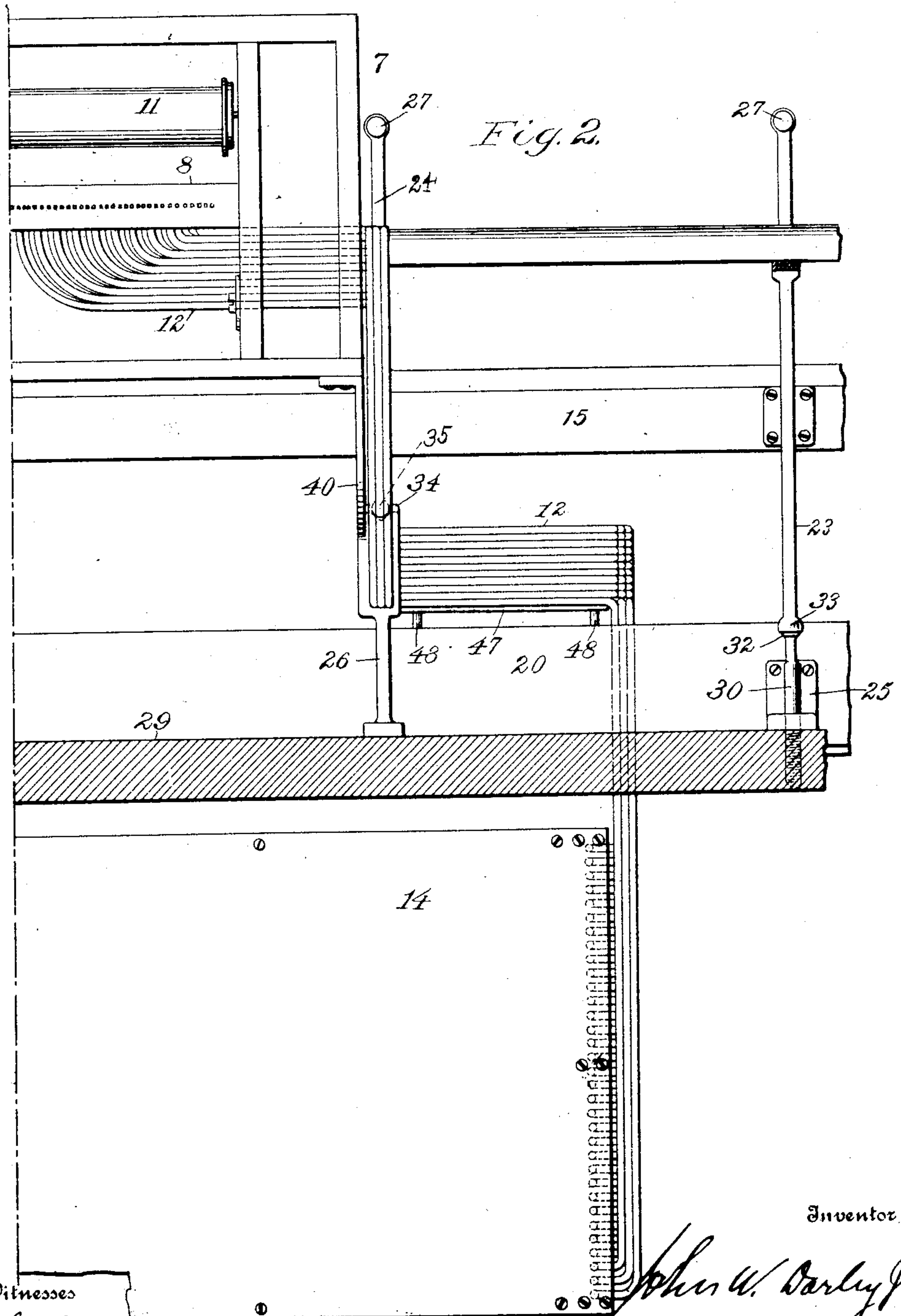
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3 SHEETS—SHEET 2.



Witnesses

W. B. Budine,
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UNITED STATES PATENT OFFICE.

JOHN W. DARLEY, JR., OF BALTIMORE, MARYLAND, ASSIGNOR TO THE WM. KNABE & CO. MANUFACTURING COMPANY OF BALTIMORE CITY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

COMBINED MANUALLY AND MECHANICALLY OPERATED PIANO.

No. 871,918.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed December 7, 1905. Serial No. 290,794.

To all whom it may concern:

Be it known that I, JOHN W. DARLEY, Jr., a citizen of the United States, residing at Baltimore city, and State of Maryland, have invented certain new and useful Improvements in Combined Manually and Mechanically Operated Pianos; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of musical instruments in which a piano-action and autopneumatic player are combined in one organization, whereby the instrument can be played either manually by fingering the keys or mechanically by operation of the pneumatics upon the parts which control the hammers of the piano-action.

The invention is more particularly an improvement upon instruments of the type illustrated and described in my co-pending application for patent Serial No. 277989, filed September 11, 1905, and provides:

(1st) simplification and general improvement in the structure and mechanical organization of the instrument; (2nd) improved means for adjustment of the action with respect to the key and with respect to the pneumatic striker or actuator, from either of which the piano-action is operative for producing the stroke of the hammer upon the string and effecting the recoil of the hammer; (3rd) improved structure and arrangement of the tracker-bar pipes or pneumatic tubes in such manner as to facilitate the construction and assemblage of the instrument, permit the introduction or removal of the whole series of pipes in mass, without affecting their relation and without requiring separation, removal or derangement of other mechanisms of the instrument, and also afford exposure of practically the entire front of the piano-action, leaving the same conveniently accessible for adjustments and the like, and disassociating the tracker-bar pipes from the keys or key-levers; (4th) improved means for connection of the said tracker-bar pipes with the wind-chest or suction-box containing the series of pneumatics, in such manner as to simplify the matter of introducing or removing this part of the instrument and to afford convenient means for disassociating the tracker-bar pipes therefrom

and allow access to the wind-chest for adjustment of the pneumatics; (5th) improved structure and arrangement of the several mechanisms composing the piano organization, particularly the mechanism of the action, in such manner as to facilitate the construction, assemblage and adjustment of the instrument, and permit removal of the mechanisms or groups of instrumentalities without dismantling the entire mechanism or deranging the respective mechanisms or groups of instrumentalities, also permitting the introduction or withdrawal of the whole series of tracker-bar pipes between adjacent elements of the action; together with various incidental features of improvement as hereinafter explained.

One preferred form or embodiment of my invention is represented in the accompanying drawings, which form a part of this specification. Without essential limitation to the specific illustrated structure, the invention will hereinafter be fully described with reference to said drawings, and then more particularly pointed out and defined in the appended claims.

In said drawings, Figure 1 is a vertical cross-section of the instrument, taken at the right of the wind-chest or suction-box and looking toward the opposite or left-hand end of the instrument, and showing parts of the interior construction in elevation. Fig. 2 is a fragmentary front view of the interior construction of the instrument, the front portion of the piano case being removed and the bed of the keyboard being in vertical section, showing approximately the right-hand half-portion of the music-roll frame, tracker-bar, pneumatic tubes or tracker-bar pipes, wind-chest or suction-box, and action-rails and supporting brackets therefor, but not showing the keys nor the mechanism of the piano-action proper. Fig. 3 is a top plan view of the wind-chest together with the grids or frames at its opposite ends which support the lower lengths of the tracker-bar pipes. Fig. 4 is a top plan view of the removable front of the wind-chest, together with the said grids or frames which are rigid with said front, and which as aforesaid support the lower lengths of the tracker-bar pipes which communicate directly with the pneumatics inside the wind-chest. Fig. 5 is a side elevation of one of the lower action

brackets, together with a removable piece which is shown detached. Fig. 6 is a front view of said action-bracket, without its said removable piece. Fig. 7 is an enlarged perspective of a fragment of said action-bracket, showing its said removable piece secured in place.

A particular explanation of the illustrated construction is as follows: The piano-action is arranged as usual in the case 1 and is adapted to be actuated either by the keys 2 or by the strikers or lifters 3, the latter being operated from the pneumatics (not shown) contained in the wind-chest or vacuum-box 4; whereby, through either agency, the hammers 5 are caused to strike upon and recoil from the strings 6. The said strikers 3 are represented as the ordinary puppets or studs arranged in a longitudinal row and vertically movable in guide-openings therefor in the top of the wind-chest 4, containing the aforesaid pneumatics for elevating said strikers when the instrument is being played mechanically. In the upper part of the case is the automatic pneumatic-controlling or note-selective instrumentality or music-sheet mechanism, mounted in the frame 7 and having the well-known characteristics of the tracker-bar 8 and perforated web or music-sheet 9 adapted to traverse the tracker-bar for controlling the admission of air to the ducts thereof; the music-sheet being rolled upon the removable music-spool 10 and adapted in operation to wind on to the take-up roll 11. From the tracker-bar 8 the pneumatic tubes or tracker-bar pipes 12 and 13 extend down to the wind-chest 4, containing the series of pneumatics which operate the corresponding strikers 3 and which are respectively connected with the corresponding ducts in the tracker-bar. It is understood of course that the wind-chest or vacuum-box 4 is in connection with any suitable wind-inducing apparatus such as the usual bellows operated by the performer's feet, which also furnishes power for running the music-sheet through the agency of an appropriate motor; all of which is so well-known that specific representation and further explanation thereof are deemed unnecessary.

Referring to the action, the same comprises two correlated mechanisms supported respectively by the upper and lower action rails 15 and 20. The upper mechanism comprises the hammer 5, its wippen or rocker 16, and associated controlling devices, for effecting the stroke and the recover of the hammer. The lower mechanism comprises the abstract or wippen-actuating rod 17, which by means of the guide-links or levers 18 and 19 is pivotally attached to and supported in position by the lower action-rail 20. Said abstract or wippen-actuating rod 17, whose upper end bears under the wippen,

is vertically disposed close behind the rear end of the key-lever 2, and is independently operative from or liftable by either the key-lever or the pneumatic striker or elevator 3. For this purpose, the lower end of the rod is supported by the striker, by means of an adjusting screw 21 tapped through the L-shaped foot or toe of the abstract and having a bottom cap resting on the striker; while the rear end of the key-lever 2 carries an upstanding adjustable capstan-screw 22, shown taking under a forward extension of the upper link or lever 18, whereby the abstract is supportable and liftable thereby; or in lieu of this extension 18, the abstract may be provided with a front projection supported on said capstan-screw 22. Thus the piano-action can be actuated either manually from the keys or mechanically from the pneumatics when brought into play by the wind-inducing apparatus controlled by travel of the music-sheet 9 over the tracker-bar 8; and it is observed that these actuating agencies are independent of each other, since the abstract is supportable and liftable both by the rear end of the key-lever and by the pneumatic striker, but without positive connection with either, and preferably also without positive connection with the wippen; the advantages of which construction are well understood. The capstan-screw 22 allows regulation of the operative length of the abstract between the key-lever and the wippen; while the adjusting screw 21 at the foot of the abstract allows regulation of the length-acting between the wippen and striker; and by proper manipulation of these independent adjusting means the accurate dispositions of parts necessary to perfect action are attainable.

The construction for supporting and adjusting the two divisions or mechanisms of the action is substantially similar to that set forth in my aforesaid application, Serial No. 277989, except in one particular, as herein after explained. The lower action-rail 20 is supported by its outer or end brackets 25 and intermediate brackets 26, which are secured upon the bed 29 of the keyboard. Upper action-rail 15 is supported by superimposed upper brackets, namely its outer or end brackets 23 and intermediate brackets 24. The upper ends of the several upper brackets are attached to the back frame of the instrument by means of the usual headed screws 27 entered into the projecting studs or posts 28. The upper outside or end brackets 23 are supported on posts or bolsters 30, which are screwed into bed 29 of the keyboard and projected up through longitudinal slots 31 in the feet of the lower outside brackets 25, permitting adjustment of the latter transversely of the keyboard and action-rails. Said posts or bolsters 30 are shown surmounted by balls 32 engaged in

cups or sockets 33 at the lower parts of the superimposed brackets 23; the bolsters being adapted to screw up and down in the bed 29 of the keyboard to provide an adjustable support for the upper brackets. The means thus far described for supporting and adjusting the brackets are similar to those shown and described in my aforesaid application, as before stated. But the upper intermediate brackets 24 are adjustably supported on the subjacent lower intermediate brackets 26, by a different construction, now to be described.

As shown in Figs. 1, 5, 6 and 7, the lower intermediate brackets 26 have removable or detachable top pieces 34, secured in the upper ends of the narrow vertically-disposed boxings 39 of said brackets 26. It is understood of course that the intermediate brackets 24 and 26 are arranged in the usual widened spaces between the adjacent elements of the piano-action left to accommodate such brackets, and the said boxings 39, which provide narrow vertically-disposed openings therethrough transverse to the keyboard and action, are intended for the passage of the tracker-bar pipes, as will be referred to later. One of said removable top pieces 34 is shown in detail in Fig. 7. It comprises a block fitted between the sides of the boxing 39, supported therein by lugs 34^a resting on the upper ends of said sides of the boxing and fastened by screw 34^b. The function of said removable pieces 34 is to provide supports for the upper intermediate brackets 24, and yet permit detachment of the tops of the boxings 39, so that the groups or clusters of the tracker-bar pipes 12 can be placed directly in the boxings 39 or removed therefrom, without derangement of the pipes or necessity of introducing them through the transverse openings or passages therefor in the boxings. Said detachable top pieces 34 are shown formed with cups or sockets which receive balls 35 adjustably attached to the upper brackets 24, so as to accommodate adjustment of the subjacent brackets 26 transversely of the keyboard, corresponding to the similar adjustments of the lower end brackets 25. Said balls 35 are shown at the lower ends of threaded stems or bolts 36 which are tapped through non-rotatable nuts 37, adjustable transversely of the keyboard along slots therefor in the lower arms of said upper brackets 24, for the purpose explained in the specification of my aforesaid application. Said bolts 36 are secured by the nuts 38. From the lower intermediate brackets 26, arms or extension brackets 40 project forwardly and upwardly, and support the music-roll frame 7, which is detachably-mounted thereon.

The air-tubes or tracker-bar pipes 12, affixed to and communicating with the respective ducts of the tracker-bar 8, extend or fan

out therefrom in two laterally diverging groups or divisions, the pipes of each group being brought closely together and arranged in a narrow compact cluster. Fig. 2 shows only the right-hand group or division of the tracker-bar pipes, it being understood that the left-hand group is similar, except that it extends in the opposite direction in a symmetrical fashion. The said groups or clusters of tracker-bar pipes extend to opposite sides of the music-roll frame 7, and are then bent or carried directly downward and at the same time rearwardly, in front of the intermediate brackets 24 and 26, and they are then carried directly back through the narrow passages in the boxings 39, passing thus through the action over and behind the lower action-rail 20. They are then bent laterally outward (to the right in Fig. 2 and to the left at the opposite unshown side of the piano), and extend out horizontally or longitudinally of the action-rail 20 to positions approximately above or just past the opposite ends of the subjacent wind-box 4, the horizontal runs of the pipes above the action-rail 20 being supported by the plates or boards 47 mounted on said action-rail by the pins or wires 48. The pipes are then carried directly downward just past the opposite ends of the wind-chest 4, and behind the same; and the lowermost ends of the pipes are then distributed to the rows or series of ducts in the vertical boards, strips or elongated blocks 50, which are arranged at and vertically alongside the opposite ends of the wind-chest, approximately at the back thereof. The said pipes 12, which may be termed primary pipe lengths, terminate in the ducts of said vertical boards 50, which ducts register or communicate with corresponding groups of secondary pipe lengths 13, as now to be explained, the said secondary pipe lengths 13 being continuations of the primary pipe lengths 12, and leading to the respective pneumatics contained in the wind-chest 4, thereby connecting the ducts of the tracker-bar with their corresponding pneumatics.

The wind-chest or vacuum-box 4, as before mentioned, has a removable front plate or cover 14, detachably secured to the front of the box to permit access thereto for adjustment of the pneumatics, &c., when the lower front panel of the piano case is removed. Said front plate 14 projects beyond the opposite ends of the wind-box, and has affixed thereto, at the ends of its back side, grids or frames 51, extending back beside the ends of the wind-chest. See Figs. 1, 3 and 4. Said grids or frames 51 each consists of a vertical front strip or board 52, and a parallel back strip or board 53, spaced and connected by hollow or slotted rods 54. The secondary pipe lengths 13 of the tracker-bar pipes have their ends cemented in or otherwise connected to the ducts in the back

boards 53 of the grids, which ducts register with those in the boards 50, in which the ends of the primary pipe lengths 12 are cemented or affixed. Said secondary pipe lengths 13 are supported by the grids or frames 51 as shown in Figs. 1, 3 and 4, the pipes passing through the front boards 52 and along the back side of the front plate 14 of the wind-chest, which front plate is channeled or recessed to receive said pipes; and inside the wind-chest the pipes connect respectively with the pneumatics corresponding to the respective ducts of the tracker-bar, which construction being well understood is not represented. The grids or frames 51 are clamped to the front 14 by the screws 55, which also bind the boards 50 to the grids; said screws being inserted through holes in the front plate 14, boards 52 and 53, and preferably passing through the hollow or slotted rods 54, and the ends of said screws screwing into the boards 50; there being flat packings 56 interposed between the flush faces of the boards 50 and 53. By this construction, not only are the tracker-bar pipes grouped and disposed in such a manner as to expose practically the entire front of the piano-action, leaving the same conveniently accessible for adjustments, but moreover said tracker-bar pipes are as a whole divided into distinct upper and lower divisions, each of which comprises a unitary organization. The upper division comprises both the right-hand and left-hand groups of the primary pipe lengths 12, together with the tracker-bar 8, attached to their upper ends, and the vertical boards 50 attached to their lower ends. The lower division comprises the secondary pipe lengths 13, together with their supporting grids 51 and front plate or cover 14 of the wind-chest to which said grids or frames are attached.

In constructing and assembling the instrument, the wind-chest being properly located, and its front plate 14 together with the grids 51 and secondary lengths 13 of the tracker-bar pipes being properly connected to the wind-chest, the upper division of the tracker-bar pipes comprising said primary pipe lengths 12 is then introduced, the two compact groups or clusters of such pipe lengths being let down into the open-topped boxings 39 of brackets 26 of the lower mechanism of the piano-action; after which the top pieces 34 are secured to the tops of said boxings 39, and the upper mechanism of the piano-action is then mounted and adjusted in its place. The said primary lengths 12 of the tracker-bar pipes, grouped as described, are preferably formed by a suitable molding method into the desirable shape, the several pipes of each group being assembled together and preferably cemented or otherwise joined, so that the whole set of primary pipe lengths 12 may as a complete unitary

structure be introduced into or taken from the instrument. It is noted that the lower ends of the primary pipe lengths 12 terminate in the boards 50 which are attached flatwise against the rear boards 53 of the grids 51. Said boards 50 are thus disposed behind the rear end of the keyboard bed 29, and behind the abstract 17, being shown in Fig. 1 disposed beneath the action-rail 20. Hence, when the boards 50 are released from the grids 51, the whole set of tracker-bar pipes 12, comprising the opposite right-hand and left-hand groups connected to the tracker-bar 8, can be simply lifted out without obstruction, as would not be the case were the primary lengths 12 of the tracker-bar pipes continued around to the front of the wind-chest, and without necessitating the bending of the pipes and without in any wise deranging the organization of this mechanism. The mode of correlating the secondary pipe lengths 13 with the pneumatics in the wind-chest 4 is also of exceeding simplicity, since the removable front plate 14 is simply attached to the wind-box, and the said secondary pipe lengths are supported thereby and by the end grids 51 which are arranged at the ends of the wind-chest and include the same between them.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination of a key-lever, a wippen-actuating rod adjustably supported thereon and liftable thereby, said rod having an adjustable foot, and a mechanical striker arranged to operate on said foot.
2. The combination of a key-lever, a capstan-screw thereon, a wippen-actuating rod supported by said screw, said rod extending below the key-lever, a vertically adjustable screw carried by the lower end of said rod, and a mechanical striker arranged to operate on the last-mentioned screw, said screw adapted for adjusting the operative length of said rod with respect to said striker.
3. In a combined manually and mechanically operated instrument, the combination of a piano-action, a key-lever, a mechanical striker, a motion-transmitting rod for actuating the piano-action vertically-disposed behind the rear end of the key-lever, said rod having means adjustably supported by the rear end of the key-lever for lifting said rod, and an adjustable foot supportable on the striker.
4. In a combined manually and mechanically operated instrument, the combination of a piano-action, a vertically movable actuating-rod therefor, a key lever carrying at its rear end an adjustable capstan-screw, and a mechanical striker or lifter, the said actuating-rod being located behind the rear end of the key-lever and having means whereby it is supportable by said capstan-screw and

liftable by the key-lever, and said rod having an adjustable foot supportable on the striker, whereby the rod is liftable by the striker.

5. In a combined manually and mechanically operated instrument, the combination of an action-bracket having a boxing or passageway extending therethrough transversely of the keyboard, said boxing having a removable top piece, and a group of pneumatic tubes or pipes extending through said boxing and adapted to be placed therein or removed therefrom by removing said top piece.

6. In a combined manually and mechanically operated instrument, the combination of a piano-action composed of upper and lower mechanisms supported respectively by superimposed brackets, a lower bracket having a boxing therein extending transversely of the keyboard, said boxing having a removable top, the superimposed upper bracket being mounted upon said top, and a group of tracker-bar pipes extending through said boxing, whereby the group of pipes can be introduced into or removed from the boxing by removing the top piece thereof.

7. In a combined manually and mechanically operated instrument, the combination of a bracket having a passageway therein, said bracket having a removable cap, and a group of pneumatic tubes or pipes arranged in said passage in said bracket and adapted to be placed therein or removed therefrom by removing said cap.

8. In an autopneumatic instrument, the combination of a piano-action, a pneumatic selective mechanism in front of the action, and a set of pneumatic pipes arranged in two diverging groups extending from the selective mechanism and clustered together and carried back through the action, a pneumatic playing apparatus connected to said pipes, action-brackets having bifurcated supports or open-topped pockets providing passages therethrough transversely of the keyboard, and the said groups of pipes resting in said supports or pockets.

9. In an autopneumatic instrument, the combination of a piano-action, a wind-chest containing a pneumatic playing apparatus below the action, a pneumatic selective mechanism in front of the action, and a set of pneumatic pipes leading from said selective mechanism to the pneumatic playing apparatus, said pipes being arranged in two diverging groups which are carried in compact clusters through the action and down behind the same to the opposite ends of the wind-chest, whence the pipes lead to the pneumatics within the wind-box.

10. In an autopneumatic instrument, the combination of a piano-action, a wind-chest containing a pneumatic playing apparatus below the action, a pneumatic selective

mechanism in front of the action, and a set of pneumatic pipes leading from said selective mechanism to the pneumatic playing apparatus, said pipes being arranged in two diverging groups which are carried in compact clusters through the action and down behind the same to the opposite ends of the wind-chest, vertically-disposed strips or boards having ducts in which the lower ends of said pipes are affixed, said boards being disposed at opposite ends of the wind-chest and approximately at the back thereof, secondary pipe lengths connected with the respective pneumatics within the wind-chest and forming continuations of the said tracker-bar pipes, the ends of said secondary pipe lengths being affixed in ducts in strips or boards detachably clamped to the first mentioned strips or boards, whereby the whole series of primary tracker-bar pipe lengths can be detached from the pneumatic playing apparatus and lifted up from behind the same to the action.

11. In an autopneumatic instrument, the combination of the piano-action and keyboard, a wind-chest or box containing a pneumatic playing apparatus below the keyboard, said wind-chest having a removable front, a series of pneumatic pipes supported in association with said removable front and leading therefrom along opposite ends of the wind-chest to the back thereof, and a continuing series of pipes detachably-connected therewith and arranged in two compact clusters in front of the action, and a tracker-bar connected with the upper ends of said pipes.

12. In an autopneumatic instrument, the combination of the piano-action and keyboard, a wind-chest below the keyboard containing the pneumatic playing apparatus, said wind-chest having a removable front, grids or frames attached to said front beside the opposite ends of the wind-chest, a series of pneumatic pipes supported by said grids or frames and removable front and leading from the back of the wind-chest at opposite ends thereof to the front and to the pneumatics within the wind-chest, a pneumatic selective mechanism in front of the action, and a series of pneumatic pipes leading therefrom to the first mentioned series of pipes and arranged in two diverging groups which are carried in compact clusters through the action, strips or blocks having ducts in which the lower ends of said groups of pipes are affixed, said ducts registering with the ends of the pipes carried by said grids or frames.

13. The combination of supports having open-topped boxings or passages, tracker-bar pipes therein, detachable covers thereon, and action-supporting brackets mounted on said covers.

14. The combination with the key-board

bed, of a piano-action comprising upper and lower mechanisms, supports for the lower mechanism mounted on said bed, and groups or clusters of pneumatic pipes arranged transversely of the action, said supports having sockets or seats for holding said groups or clusters of pneumatic-pipes and adapted to receive such groups of pipes through the tops of said sockets, and the upper mechanism being mounted upon said supports and removable as a whole, the groups of pipes being liftable out of said sockets when the upper mechanism is removed.

15. The combination with the key-board, of a tracker-bar above the same, pipes connected therewith and arranged in two diverging groups or clusters, supports mounted on the key-board bed, said supports having sockets which hold said groups of pipes, an action-mechanism mounted on said supports, the said groups of pipes being let down into said sockets before mounting said action-mechanism, and pneumatics connected with said pipes.

16. The combination with the piano-action and key-board, of a box containing a

pneumatic-playing apparatus below the key-board, said box having a removable front, a series of pipes supported in association with said front and leading from opposite ends thereof backwardly along opposite ends of said box, a continuing series of pipes detachably connected therewith, and a tracker-bar connected with the latter.

17. The combination with the piano-action and key-board, of a box containing a pneumatic-playing apparatus below the key-board, said box having a removable front, grids extending backwardly from said front beside the opposite ends of said box, pipes supported by said grids and arranged for connection with the pneumatic apparatus within said box, and a tracker-bar and pipes leading therefrom and detachably connected with the ends of said first-mentioned pipes.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN W. DARLEY, JR.

Witnesses:

CHARLES R. BOETTGER,
E. A. DOLLE.