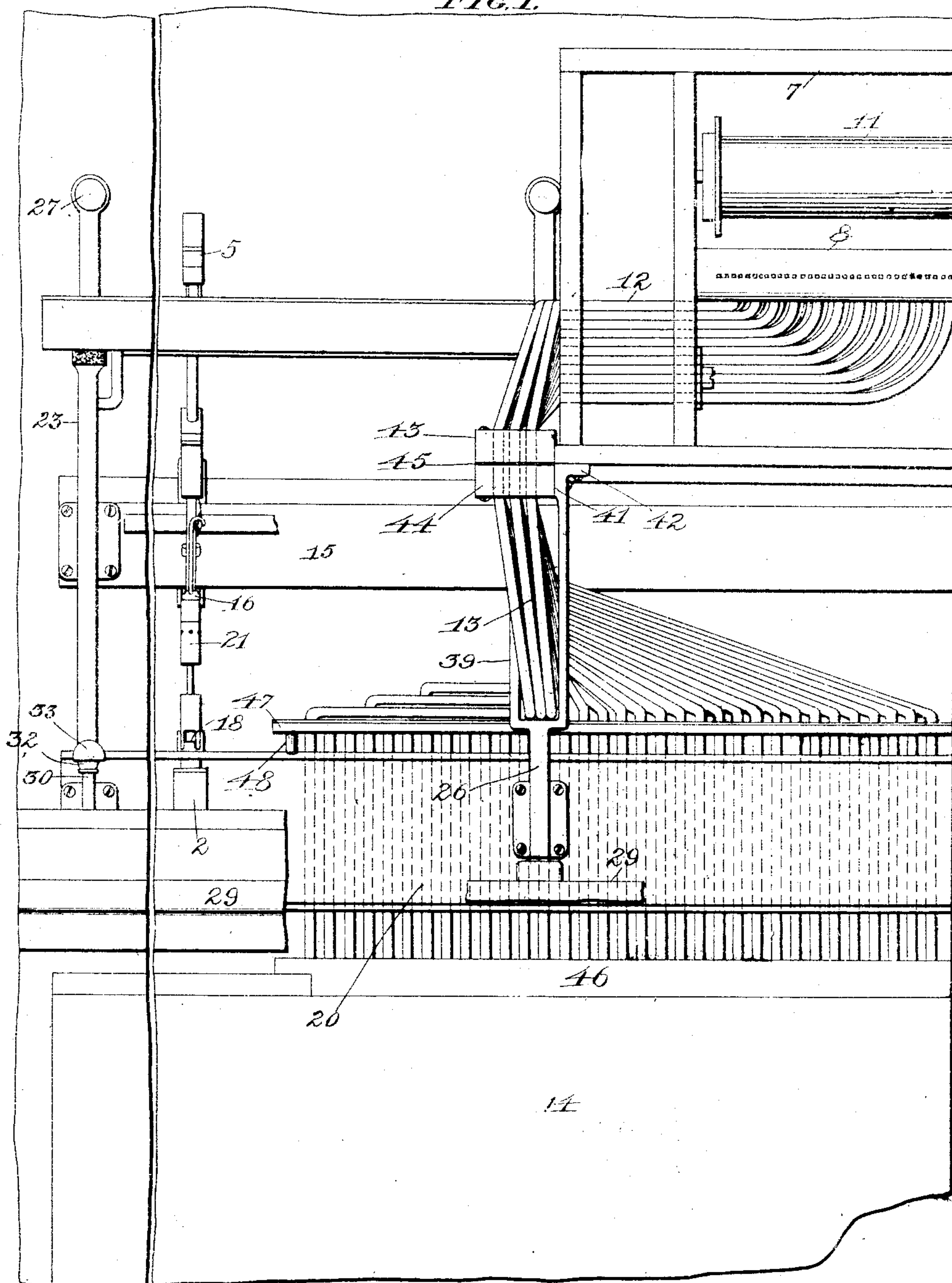


PATENTED NOV. 26, 1907.

APPLICATION FILED SEPT. 11, 1905.

6 SHEETS--SHEET 1.

FIG. 1.



Witnesses

Albendone.
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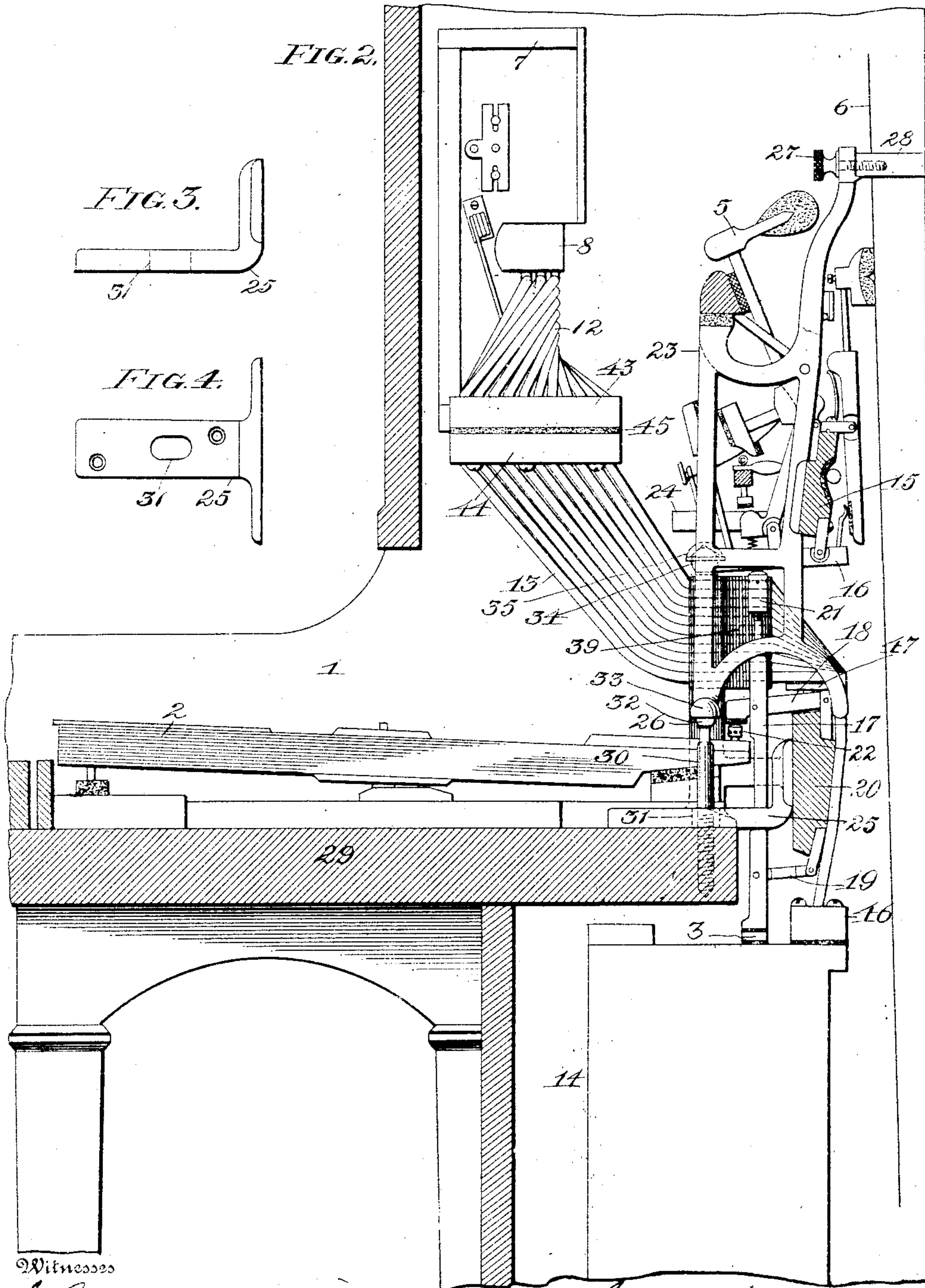
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J. W. DARLEY, JR.

COMBINED MANUALLY AND MECHANICALLY OPERATED PIANO.

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5 SHEETS—SHEET 2.



Witnesses

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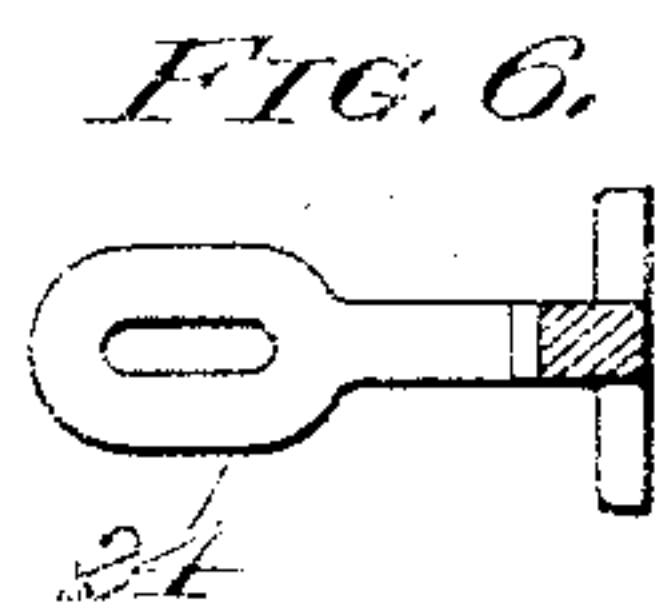
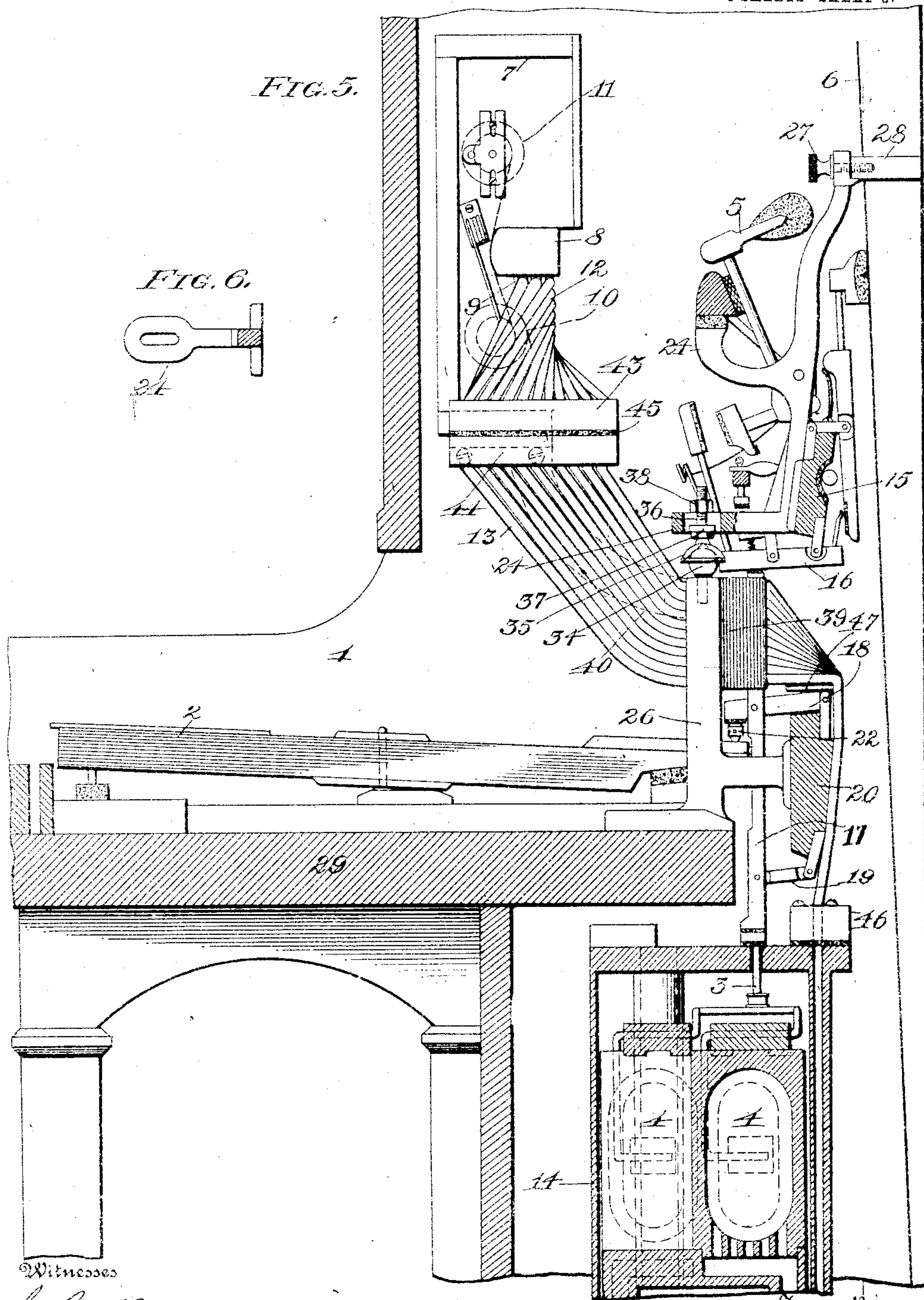
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6 SHEETS--SHEET 3.



Witnesses

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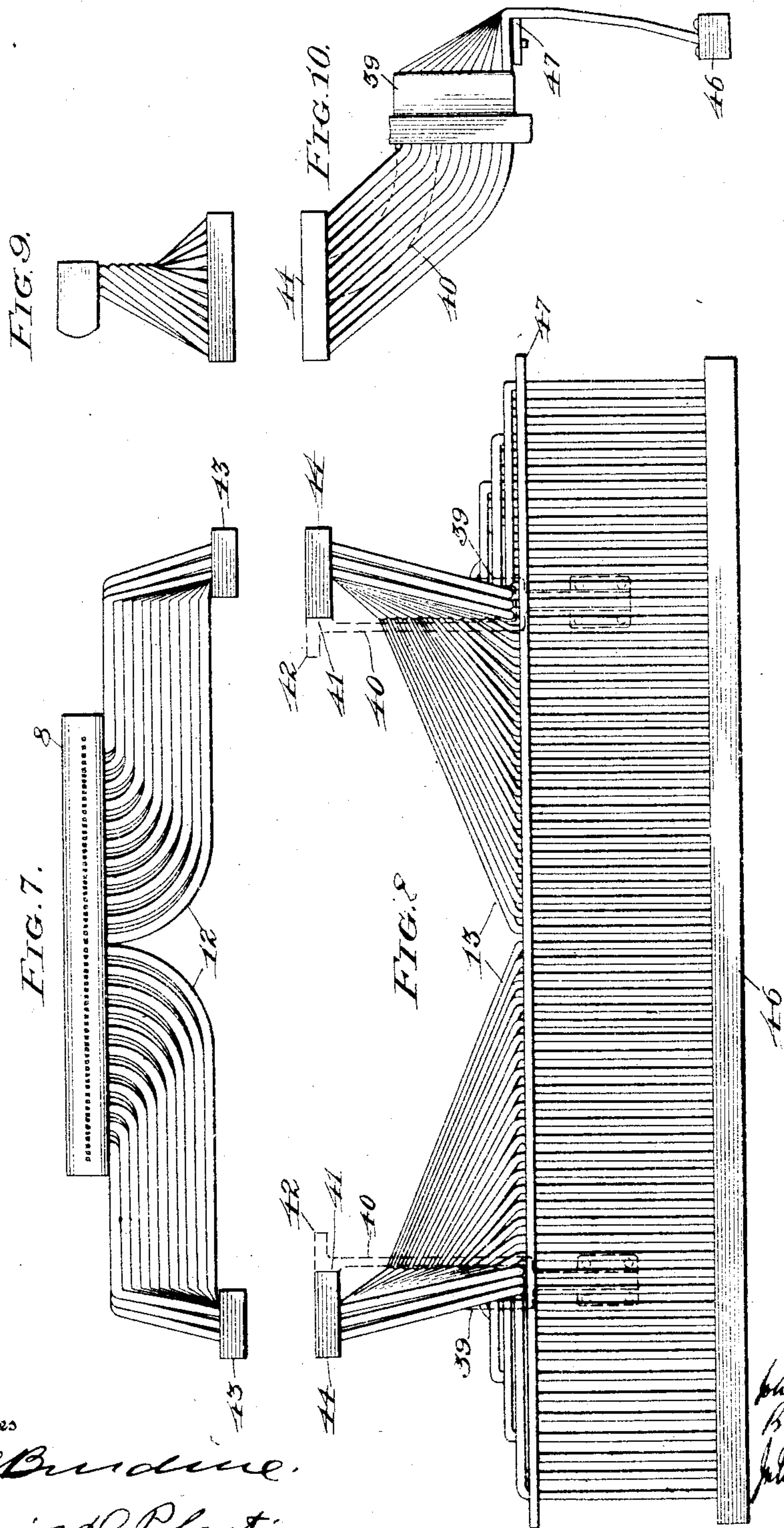
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COMBINED MANUALLY AND MECHANICALLY OPERATED PIANO.

APPLICATION FILED SEPT. 11, 1905.

5 SHEETS—SHEET 4.



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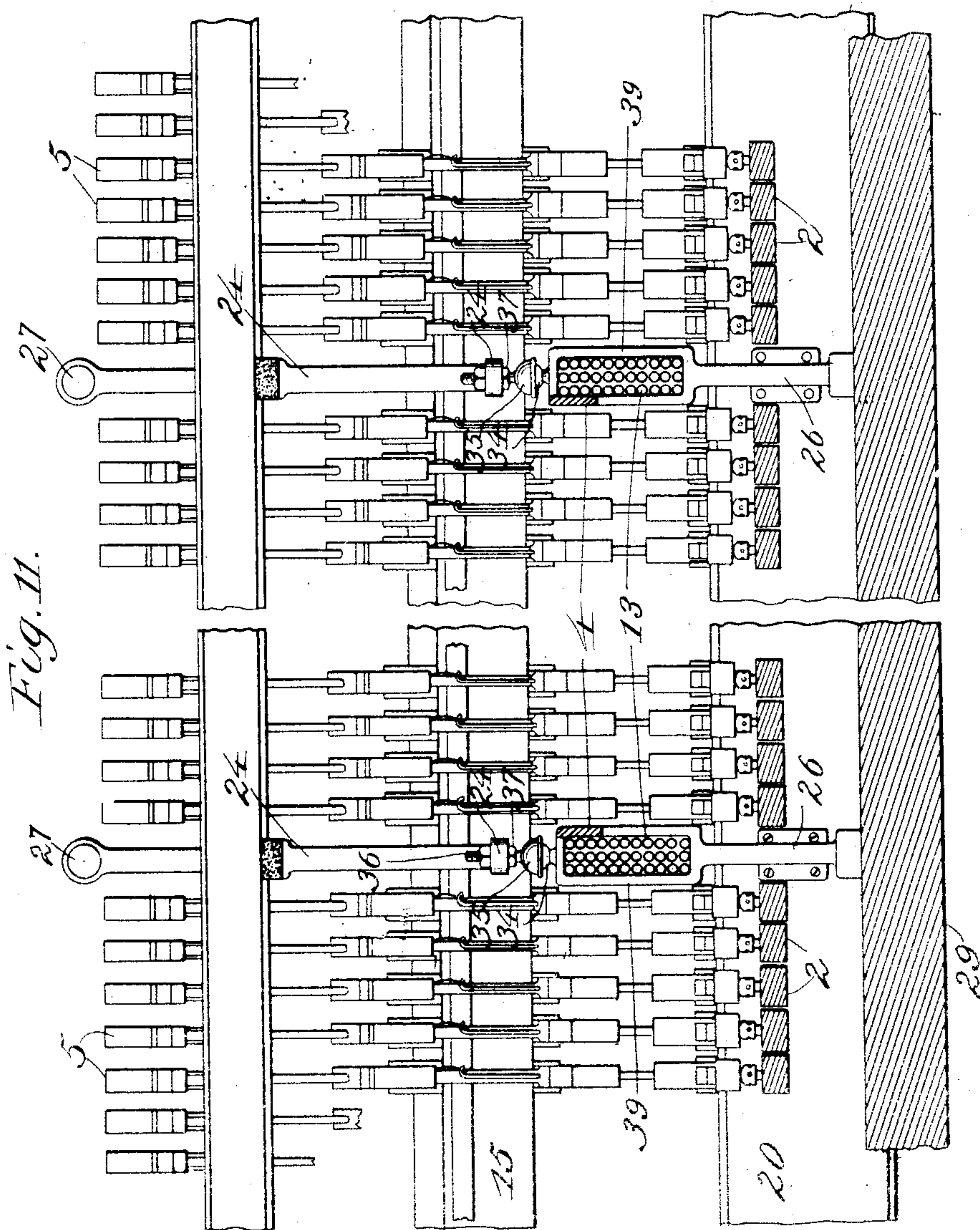
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APPLICATION FILED SEPT. 11, 1905.

5 SHEETS--SHEET 5



Inventor

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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. 871,916.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed September 11, 1905. Serial No. 277,989.

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, in the 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.

The main object of this invention is to improve the general construction and mechanical organization of combined manually-and-pneumatically-operated pianos, having the appearance of ordinary uprights and played manually by fingering the key-board, but containing an automatic player or pneumatic action-operating apparatus which is controlled by admission of air through a tracker-bar transversed by a perforated web or music-sheet located in the upper front of the case.

These improvements attain the following important effects: (1) a general simplification and increased efficiency of construction and operation of the combination of actions involved in the manual and pneumatic players, together with provision for independent adjustment in the action with respect to the key and with respect to the pneumatic striker or actuator; (2) structure and arrangement of the mechanisms which compose the piano organization in distinct divisions or groups of instrumentalities properly united and combined, in such manner as to facilitate the initial construction, assemblage and adjustment of the instrument, and permit removal or separation of parts without dismantling the entire instrument or derangement of the respective mechanisms or groups of instrumentalities; (3) exposure of the pianoforte action at the front, and consequent convenience of access thereto, for adjustment, repairs, or other purposes, without the usual interference or obstruction from the tracker-bar tubes or pipes; also disassociation of these pipes from the keys, with resultant freedom of action and exemption from accidental contact between the tubes and key-levers, as well as increased facilities for adjustment or other manipulations of the mechanism; and compact grouping or bank-

ing of the tubes in a perfectly unobjectionable arrangement; together with various incidental benefits and advantages hereinafter appearing.

Without limitation to the particular illustrated construction, representing one preferred form or embodiment of my invention, which however is susceptible of modifications in respect to details, the said invention will hereinafter be first fully described with reference to the accompanying drawings, forming a part of this specification, and will then be more particularly pointed out and defined in the annexed claims.

Figure 1 is a fragmentary front view of the interior construction of an instrument embodying my invention, the front portion of the piano case being removed, showing approximately the left-end half-portion of the music-roll frame, tracker-bar, pneumatic tubes or tracker-bar pipes, and action-rails and supporting brackets therefor, but not showing the piano-action back of the tracker-bar pipes, excepting one element of the action associated with one key represented near the left of the figure. Fig. 2 is a vertical cross-section through the instrument, showing parts in elevation, this section being taken near the right-hand end of the case and looking toward the left or opposite end. Fig. 3 is a detail side view of one of the lower outer action-rail brackets shown in Fig. 2. Fig. 4 is a top plan view thereof. Fig. 5 is a vertical cross-section through the instrument, looking in the same direction as in Fig. 2, but taken through the case between the end and intermediate action-brackets at the right of the music-roll frame. Fig. 6 is a detail plan view of the lower arm of the upper intermediate action-rail bracket shown in Fig. 5. Fig. 7 is a detached view showing in front elevation the tracker-bar and upper group of air tubes or primary lengths of the tracker-bar pipes associated therewith. Fig. 8 is a detached view showing in front elevation the lower group of air tubes or secondary lengths of the tracker-bar pipes, this figure showing the proper juxtaposition of the said secondary lengths of the pipes to the primary lengths shown in the preceding figure. Fig. 9 is a side view of the subject-matter of Fig. 7. Fig. 10 is a side view of the subject-matter of Fig. 8. Fig. 11 is a sectional front view taken behind the music-roll frame and

showing a portion of the action in front elevation.

A particular explanation of the illustrated construction is as follows:—

5 The pianoforte-action is arranged as usual in the case 1 and is adapted to be actuated, as hereinafter explained, either by the keys 2 or by the strikers 3 of the pneumatics 4 to cause the hammers 5 to impinge upon and
10 recoil from the strings 6. In the upper part of the case, preferably behind an opening or movable door or panel in the front, is the pneumatic-controlling or music-sheet mechanism, mounted in a frame 7, and having the
15 well-known characteristics of the tracker-bar 8 and a perforated web or music-sheet 9 adapted to traverse the same for controlling admission of air to the ducts of the tracker-bar (Figs. 2 and 5), the music-sheet being
20 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—13, extend down to the wind-chest or chamber
25 14, containing the primary or controlling pneumatics (not shown) and the secondary or operating pneumatics 4, which latter, when the instrument is played mechanically, are controlled by the primary or controlling
30 pneumatics from the impulses of air admitted by the passage of the music-sheet over the tracker-bar. It is understood of course that the wind-chest or chamber 14 is in communication with any suitable wind-inducing
35 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 appropriate mechanism; all of which is so well known that specific representation and further explanation
40 thereof are deemed unnecessary.

In view of the joint facilities for manual and mechanical playing, the pianoforte-action (one complete element of which is represented in each of Figs. 1, 2 and 5) is as a
45 whole composed preferably of two correlated but distinct mechanisms, or what may be termed two separate actions, an upper and a lower one. These will be described in order.

50 The upper mechanism is the conventional piano-action, including the group of operative parts actuated by the key (or by the pneumatic striker) for producing the stroke upon the string and effecting recoil of
55 the hammer. It comprises the hammer 5 and its associated devices, supported by the action-rail 15, and actuated as usual by its wippen, rocker or under-lever 16, which is pivotally-attached to the lower side of the
60 action-rail and receives its movements, transmitted from the key or pneumatic striker, through the medium of its actuating-rod 17.

The lower mechanism comprises principally the said actuating-rod 17 of the wip-

pen, which corresponds to the abstract in ordinary upright pianos. Said actuating-rod 17 is vertically-disposed close behind the rear end of the key or key-lever 2, and is pivotally-connected to and supported by levers 70 or links 18 and 19, which are themselves pivotally-attached to and supported by a lower action-rail 20; the positions and lineal proportions of said links 18 and 19 being designed to maintain an approximately vertical
75 up and down motion of the abstract or wippen-actuating rod while conforming or adapting it to the movements of those parts (the key-lever, pneumatic striker and wippen) which affect or are affected by it. At
80 its upper end said actuating-rod has an adjustable head 21, shown screwed upon a threaded stem and provided with an annular series of small perforations to receive an adjusting wire or rod which can be inserted
85 between adjacent elements of the action. This head 21 is preferably rounded at its top and bears or is adapted to bear against the under side of the wippen, preferably in a cushioned seat or recess in the wippen. The
90 foot or lower end of the actuating-rod rests upon or is adapted to rest upon the pneumatic striker, so as to be lifted or actuated thereby when the instrument is played mechanically; and said rod or abstract may rest
95 directly upon the striker, as shown, without the necessity of interposing an intermediary device or connection as in certain prior constructions. The key-lever 2 carries at its
100 rear end an upstanding adjustable capstan-screw 22, likewise shown provided with perforations to permit of adjustment by means of a wire or rod. Said capstan-screw takes
under the front end of the upper link or lever 18, being preferably rounded and bearing
105 against a cushion on the lower side of said lever, which extends slightly beyond its pivotal connection with the actuating-rod 17. By this means the actuating-rod is lifted or
110 actuated by the rear end of the key-lever when the front end of the key is depressed by the performer's finger. Thus the piano-action may 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
115 the music-sheet over the tracker-bar. These two actuating agencies are entirely independent of each other, it being observed that the actuating-rod 17 of the wippen is supported both by the rear end of the key-lever and by the striker, but without positive connection with either, and also without positive connection with the wippen. When the key-board or manual is fingered, the operation of
125 the instrument is practically the same as in regular pianos, the wippen-actuating rod 17 performing the function of the common abstract; there being no positive connection between the key-lever and the pneumatic
130

striker nor other dragging or heavy devices connected with the wippen-actuating rod to impede its free response to the key, so that the same ease and quality of touch and brilliancy of effect may be attained as in standard manually-operated pianos. On the other hand, by reason of absence of positive connection between the key-lever and wippen-actuating rod, or between the key-lever and the striker, the operation of the piano-action by the pneumatic strikers is effected without movement or bobbing up and down of the keys, as occurs in many combined manually and mechanically played instruments to the distraction of the performer; therefore the mechanism here described is well adapted for incorporation therewith of any suitable key-locking means, for maintaining the front ends of the keys in their normal elevated position during the operation of the piano by the pneumatic apparatus, such for example as the device illustrated and described in the application of Messrs. Knabe & Mallabre, Serial No. 263566.

The upper adjustable head 21 of the abstract or actuating-rod of the wippen allows regulation of the operative length of the actuating-rod between the wippen and the pneumatic striker, while the capstan-screw 22 allows regulation of the operative length between the key and the wippen, it being observed that independent adjusting means are thus provided, by the proper manipulation of both of which the accurate dispositions of parts necessary for perfect action is readily attainable. A further feature of advantage in the mechanism described is that the entire connection between the piano action or its actuating-rod and the pneumatic playing apparatus is situated at the rear end of the key, while all the parts are of simple construction and easily capable of adjustment.

As before explained, the upper and lower mechanisms or divisions of the pianoforte-action are separately supported by their respective action-rails 15 and 20, which in turn are independently mounted one above the other and longitudinally of the piano case by means of their attached brackets. Each action-rail has of course two outside or end brackets, and preferably two intermediate brackets. They are distinguished as follows: The upper action-rail is supported by its outer or end brackets 23 and intermediate brackets 24; the lower action-rail by its outer or end brackets 25 and intermediate brackets 26. The lower brackets 25 and 26 rest upon the bed 29 of the key-board. The several upper brackets 23 and 24 are attached at their upper parts to the back-frame of the instrument by means of the usual headed screws 27 entered through the upper ends of said brackets and into the projecting studs or posts 30. The upper outside or end brackets 23 are further supported by bol-

sters or posts 30, shown screwed into and projecting up from the bed 29 of the key-board. Said posts or bolsters pass through slots or openings 31 in the lower outside or end brackets 25, to permit free adjustment of the latter transversely of the key-board and said action-rails, it being well understood that such provision for adjustment is practically essential in view of slight possible inaccuracies in the castings of the metal brackets. The posts or bolsters 30 are surmounted by balls 32, and said balls engage in cups or sockets 33 formed or provided at the lower parts of the brackets 23, providing adjustable bearings therefor, the vertical adjustment being obtained by screwing the bolsters up or down in the wood bottom below the key-board, the lower portions of the bolsters being threaded for that purpose. Proper disposition of the upper outside or end brackets 23 is thus afforded by adjusting the bolsters and with the balls 32 at their lower parts and the screws 27 at their upper parts. The upper inside or intermediate brackets 24, which it is remembered are attached to the back-frame by their upper screws 27, are further supported at their lower parts by the subjacent lower intermediate brackets 26, whose tops are surmounted by balls 34, said balls engaging in cups or sockets 35 adjustably-attached to the upper brackets 24 so as to accommodate adjustment of said subjacent brackets 26 transversely of the key-board, corresponding to the similar adjustment of the lower outer or end brackets 25 before mentioned. Said cups 35 are shown formed at the lower ends of threaded stems or bolts 36 tapped or screwed through non-rotatable nuts 37, adjustable along the lower arms of the upper brackets, and provided also with jam-nuts 38. The said non-rotatable nuts 37 are adjustable along slots therefor in the lower arms of the brackets 24, said slots extending transversely of the key-board and action-rails. As shown specifically, said nuts 37 have reduced polygonal portions slidable in their aforesaid slots. Thus it is observed that the cups 35 are capable of both vertical adjustment and horizontal adjustment transversely of the key-board and action-rails. Proper disposition of the upper intermediate brackets is thus afforded by adjustment of their upper screws 27 and their lower cups 35.

The foregoing explains the manner of mounting the upper and lower parts of the action. In constructing the piano, the lower action, whose rail 20 is attached to its outer and intermediate brackets 25 and 26, is first mounted in the instrument, its brackets being fastened on bed 29 of the key-board in such position as to locate the actuating-rods 17 of the wippens in correct position relative to the keys. The upper action, whose rail 15 is likewise attached to its brack-

ets 23 and 24, is then mounted in the instrument, its outer brackets 23 being placed upon the bolsters 30, and its intermediate brackets 24 upon the intermediate lower brackets 26, and the upper screws 27 and also the balls and cups 32 and 35 being properly adjusted, to bring the mechanism of the upper division of the action into proper relation with the key and correlated mechanism of the lower division.

A feature of this invention is the arrangement of the pneumatic tubes or tracker-bar pipes which connect the tracker-bar with the automatic playing apparatus below the piano-action. These pipes and tubes are grouped and disposed in such manner as to expose practically the entire front of the piano-action, providing ample access for adjustment, repairs, &c., and disassociating the pipes from the keys, without however incurring the objection of extending the pipes to the sides of the instrument before carrying them down to the pneumatics, with the consequent increase of materials and complications of such an arrangement. The pipes and associated mechanisms are further arranged in separate and detachably-connected groups or divisions, permitting the ready removal of parts without necessitating dismantling the instrument, interfering with other mechanisms, or derangement of the particular mechanism taken out. The means by which these effects are attained will now be described.

The lower intermediate action-brackets 26 have box-like portions 39 therein, above the lower action-rail 20, said boxings providing narrow vertically-disposed openings therethrough transverse to the key-board and piano-action for passage of the pipes. From said brackets 26 arms or extension-brackets 40 project forwardly and upwardly and are formed at their upper ends with angle-portions providing the vertical flanges 41 and horizontal flanges 42 shown in Figs. 1, 2 and 5.

The music-roll supporting-frame 7 in the upper front of the case carries the take-up roll 11, the bearings for the spindles of the removable music-spool 10, and the tracker-bar 8. Said frame rests upon the horizontal flanges 42 of the arms 40, to which the frame is screwed or otherwise rigidly but detachably secured. The whole series of tracker-bar pipes are divided into right-hand and left-hand groups or divisions, and further they are composed of upper and lower sections, or primary and secondary lengths, the secondary lengths 13 being continuations of the primary lengths 12. The primary lengths 12 of the pipes, extending from the tracker-bar and communicating with the respective ducts therein, are arranged or divided into two laterally diverging branches, which are carried in banks to the opposite

sides of the frame 7, and they are then turned or deflected downward to blocks 43 having openings therethrough, in which the lower ends of said pipes are cemented or otherwise affixed by air-tight joints. These blocks 43 are detachably clamped to subjacent blocks 44, the counterparts thereof, flat packings 45 being preferably interposed to insure non-leakage of air. In the latter blocks 44, the upper ends of the two lower groups of tubes or secondary lengths of pipes 13 are cemented or otherwise affixed, the openings in the blocks 43 and 44 registering, so that the secondary pipes 13 constitute continuations of the primary pipes 12. To accommodate the number of pipes, the blocks 43 and 44 are preferably oblong or elongated, arranged transversely of the keyboard, the pipes 12 being twisted from their points of emergence from the frame 7 and flared or spread along the lengths of the blocks 43. The blocks 44 are screwed or otherwise detachably but rigidly affixed to the vertical flanges 41 of the arms 40. The secondary lengths of the pipes 13 are carried from the blocks 44 downwardly and rearwardly in compact clusters through the narrow boxings 39 in the brackets 26, passing thus through the usual widened spaces left between adjacent elements of the piano-action to accommodate the action-brackets, and they are thence carried downward behind the lower action-rail 20 to a lower block 46, the lower vertical portions of the pipes being also spread out horizontally along the action in order to connect said pipes with the line of pneumatics extending longitudinally of the case.

In order to avoid interference of the pipes with the mechanism of the lower action, a horizontal rail 47 is shown supported above the action-rail 20, resting thereupon by means of the lugs or legs 48, and the pipes are carried over and behind this rail and then vertically downward behind the action-rail 20 to the elongated longitudinally-disposed block 46, in whose ducts or openings the lower ends of said pipes are cemented or otherwise affixed. Said block 46 is detachably fastened to the wind-chest 14, the ducts therein registering with suitable conduits leading to the controlling pneumatics, operation of which under impulses of air admitted through the tracker-bar by the traveling music-sheet actuates the secondary pneumatics 4 which in turn operate by the strikers 3 the piano-action mechanically, when the wind-inducing apparatus is worked. The air-pipes being of lead or other stiff flexible material, as is usual in instruments of this character, the bending or twisting of the pipes necessary to this arrangement is easily effected. Thus by reference to Figs. 1, 7 and 8, it is apparent that practically the entire front of the piano-action is exposed, when

the front panel of the piano case is removed, so that access for adjusting instruments and the like may easily be had. It is also observable that the mechanisms in front of the piano-action are arranged in separable elements, the upper one of which comprises the frame 7 with the tracker-bar and other parts carried thereby and the pipes 12 and their connected blocks 43, while the lower element comprises the blocks 44 with their connected pipes and lower longitudinally-arranged block 46. The construction described also allows the piano-action proper, that is the upper group of parts carried by the upper action-brackets and rail, to be removed without disturbing the pneumatic arrangement.

In constructing the instrument, the whole action, comprising the lower and upper groups of devices, are first mounted in the case as hereinbefore explained, whereupon the lower section of pneumatic tubes 13 are placed in position, bolting or fixing their upper blocks 44 to the vertical flanges of the arms 40 of brackets 26, and then the music-roll frame 7 with the tracker-bar and upper section of pipes 12 are located, screwing the frame 7 to the horizontal flanges 42 of the arms 40 and bolting the apertured blocks 43 upon the subjacent blocks 44.

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

1. In a combined manually and mechanically operated instrument, the combination of a piano-action including the wippen thereof, a key-lever, a wippen-actuating rod vertically disposed immediately behind the rear end of the key-lever and supported thereby, a pneumatic below the key-lever, and a striker or lifter actuated thereby and arranged to operate on the foot of said rod below the key-lever.

2. In a combined manually and mechanically operated instrument, the combination of a piano-action including the wippen thereof, a key-lever, a wippen-actuating rod adjustable in length supported by said key-lever and operated thereby, and a mechanically operated striker arranged to operate on said rod.

3. In a combined manually-and-mechanically-operated instrument, the combination of a key-lever, a mechanical striker, and wippen-actuating rod adapted to be moved either by the key-lever or by the striker, means for adjusting the length of said rod, and independent means for adjustment of the point of engagement between the key-lever and said rod.

4. In a combined manually-and-mechanically-operated instrument, the combination of the rocker or wippen of a piano-action, a vertically-movable actuating-rod therefor, a key-lever, a mechanical striker, said actu-

ating-rod supported by said key-lever and operated either by the key-lever or by the striker, and a vertically-adjustable head at the upper end of said actuating-rod bearing under the wippen.

5. In a combined manually-and-mechanically-operated instrument, the combination of the rocker or wippen of a piano-action, a vertically-movable actuating-rod therefor, a key-lever, a mechanical striker, said actuating-rod operated either by the key-lever or by the striker, and a vertically-adjustable cap or head at the upper end of said actuating-rod bearing under the wippen and laterally provided with an annular series of apertures to receive adjusting tools.

6. In a combined manually-and-mechanically-operated instrument, the combination of a rocker or wippen of a piano-action, a vertically-movable actuating-rod therefor, a key-lever having an adjustable capstan screw carried thereby, a mechanical striker, said actuating-rod being operated from either said screw or the striker, and means independent of said capstan-screw for adjusting the length of said rod.

7. In a combined manually-and-mechanically-operated instrument, the combination of a piano-action including the hammer and its wippen with their associated devices, the same being supported by an action-rail therefor, a secondary lower action-rail, a vertically-movable wippen-actuating rod and guiding links therefor pivotally-connecting said rod with the lower action-rail, the upper link being extended in front of its pivotal connection to said rod, a key-lever having its rear end adapted to support the front end or extension of said upper link and thereby actuate said rod, and a mechanical striker operating on the lower end of said rod.

8. In a combined manually-and-mechanically-operated instrument, the combination of a piano-action including the hammer and its wippen with their associated devices, the same being supported by an action-rail therefor, a secondary lower action-rail, a vertically-movable wippen-actuating rod and guiding links therefor pivotally-connecting said rod with the lower action-rail, the upper link being extended in front of its pivotal connection to said rod, a key-lever carrying at its rear end an adjustable screw which takes under the front end or extension of said upper link, a mechanical striker operating on the lower end of said rod, there being no positive connection between said rod and the key-lever or striker, and an adjustable head or cap at the upper end of said rod bearing under the wippen.

9. In a combined manually and mechanically operated instrument, the combination of a key-lever, an adjustable capstan-screw carried thereby, a wippen-actuating rod supported by said screw, whereby said rod is

liftable by the key-lever, a mechanically-operated striker operating on said rod, and an adjustable head on the upper end of said rod.

10. In a combined manually and mechanically operated instrument, the combination of a key-lever, a wippen-actuating rod vertically-disposed behind the rear end thereof, a lever connected to said rod and supported by said key-lever, whereby the said rod is operable by said key-lever, and a mechanically-operated striker operating on said rod.

11. In a combined manually and mechanically operated instrument, the combination of a key-lever, a wippen-actuating rod vertically-disposed behind the rear end thereof, a supporting rail behind said rod, a link or lever pivotally connecting said rod and rail, the forward end of said lever extending as a tongue past said rod and supported by said key-lever, and a mechanically-operated striker operating on the lower end of said rod below the key-lever.

12. In a combined manually and mechanically operated instrument, the combination of a piano-action, including two action-rails mounted one above the other and a hammer and wippen carried by the upper rail and a wippen-actuating rod connected to the lower rail, there being no positive connection between said rod and wippen, a key-lever, means whereby said rod is supported and liftable by the rear end of the key-lever, and a mechanically-operated striker operating on said rod.

13. In a combined manually and mechanically operated instrument, the combination of an action comprising two superimposed mechanisms and action-rails therefor, the lower mechanism comprising a vertically-disposed actuating rod and links pivotally-connecting the same with the lower rail, the upper mechanism comprising the hammer and wippen actuated by said rod, a key-lever supporting said rod and operating thereon, and a mechanically-operated striker operating on said rod; there being no positive connection between said rod and the wippen, key-lever or striker.

14. In a combined manually and mechanically operated instrument, the combination of an action, comprising a plurality of adjacent elements or units, an action supporting bracket, there being a relatively widened space between adjacent elements or units of the action at the bracket, a tracker bar, a pneumatic playing apparatus and a group of tracker bar pipes connecting said tracker bar and apparatus, said group of pipes being arranged in a narrow compact cluster and carried through said relatively widened space.

15. In a combined manually-and-pneumatically-operated instrument, the combination of a piano-action, an action-supporting bracket interposed between adjacent elements of the action and having a boxing or

passageway extending therethrough, a pneumatic playing apparatus, a selective or pneumatic controlling mechanism in front of the action, and pneumatic tubes or pipes extending therefrom through said boxing or passage in the bracket and thence to the pneumatic playing apparatus.

16. In a combined manually-and-pneumatically-operated instrument, the combination of a piano-action, an action-supporting bracket interposed between adjacent elements of the action and having a boxing or passageway extending therethrough and a forwardly and upwardly projecting arm, a pneumatic playing apparatus below the keys and the action, a selective or pneumatic controlling mechanism in front of the action supported by said arm, and pneumatic tubes or pipes extending therefrom in a cluster through said boxing or passage in the bracket and thence to the pneumatic playing apparatus.

17. In a combined manually-and-pneumatically-operated instrument, the combination of a piano-action, action-brackets having passages therein through the action, the manual keys, the pneumatic playing apparatus, a selective or pneumatic controlling mechanism in front of the action, and a plurality of pneumatic tubes or pipes extending therefrom to the pneumatics, said pipes being arranged in diverging or oppositely extending groups clustered and carried through said passages in said action-brackets to the pneumatics.

18. In a combined manually-and-pneumatically-operated instrument, the combination of a piano-action, the manual keys and pneumatics, action-brackets having boxings or passages extending therethrough, and arms extending forwardly from said brackets, a music-sheet apparatus or pneumatic selective mechanism supported by said arms and having a plurality of pneumatic tubes extending in opposite groups which are clustered and carried through the boxings in said brackets and thence to the pneumatics, said tubes being divided into upper and lower or primary and secondary lengths whose contiguous ends are affixed in detachably-connected blocks with registering ducts or apertures, the blocks of one set of pipes being detachably-connected to the arms extending from said brackets.

19. In a combined manually-and-pneumatically-operated instrument, the combination of a piano-action, the manual keys and pneumatics, action-brackets having boxings or passages extending therethrough, and arms extending upwardly and forwardly from said brackets, a music-roll frame detachably-connected to said arms, a tracker-bar carried thereby, a series of tracker-bar pipes extending from the tracker-bar in opposite or diverging groups to the pneumatics, and said pipes being also divided into upper

and lower or primary and secondary lengths whose contiguous ends are joined to detachably-connected blocks or members having registering ducts, the blocks of one set of pipe lengths being detachably-connected to said arms extending from the action-brackets, and the groups of secondary lengths of pipes being carried in clusters through the boxings in said brackets and thence to the pneumatics.

20. The combination of a piano-action, a longitudinal action-rail, an intermediate rail-supporting bracket having a passage or boxing, and a group of tracker-bar pipes extending through said passage in the bracket.

21. The combination of the key-levers and action, there being a relatively widened space between two adjacent elements thereof, a pneumatic-controlling apparatus, a support therefor located in said widened space, a group of pneumatic pipes leading from said apparatus and carried in a compact cluster through said space, and pneumatics connected with the respective pipes.

22. The combination of the manual keys and action, there being relative widened spaces therein at intermediate points, a pneumatic-controlling apparatus above the key-board, supports therefor located in said spaces, pneumatics below the key-board, and pipes connecting said apparatus and pneumatics, said pipes being carried in compact groups through said spaces.

23. The combination of a tracker-bar frame, a tracker-bar carried thereby, supporting standards for said frame, said standards having passages therein, and tracker-bar pipes extending from the tracker-bar through said passages.

24. The combination of a tracker-bar frame, a tracker-bar carried thereby, supporting standards for said frame having passages therein, said frame being detachably mounted on said standards, primary lengths of tracker-bar pipes extending from said tracker-bar, and secondary lengths of tracker-bar pipes arranged in said standards, the contiguous ends of the primary and secondary pipe-lengths being detachably-connected together.

25. The combination with the key-levers and action, there being relatively widened spaces therein, standards in said spaces mounted on the bottom below the key-board, a pneumatic-controlling mechanism supported by said standards, pneumatic pipes extending therefrom in groups through said spaces, and pneumatics connected with the respective pipes.

26. The combination with the key-levers and action, there being relatively widened spaces therein, standards in said spaces mounted on the bottom below the key-board, said standards having passages therein, a pneumatic-controlling apparatus supported

by said standards, pipes leading therefrom through the standards, and pneumatics connected with said pipes.

27. The combination with the key-levers and action, there being relatively widened spaces therein, standards in said spaces mounted on the bottom below the key-board, said standards having passages therein, a pneumatic-controlling apparatus detachably mounted on said standards, primary pipe-lengths leading therefrom in diverging groups, secondary pipe-lengths arranged in said standards, the contiguous ends of said pipe-lengths being detachably connected, and pneumatics with which said secondary pipe lengths are respectively connected.

28. The combination of a piano-action comprising two superimposed mechanisms carried by separate action-rails and mounted one upon the other, a tracker-bar in front of said action, and tracker-pipes diverging therefrom in two groups which are carried in compact clusters over the lower action-rail through the lower mechanism of the action, the upper mechanism being detachable as a whole from the lower mechanism and being mounted thereon after assembling of the pipes.

29. The combination of a piano-action, a longitudinal action-rail, a supporting bracket therefor having a boxing or passage, and a group of tracker-bar pipes extending through said passage in the bracket.

30. The combination of a piano-action, a keyboard bed, a bracket mounted on said bed having a passage, and a group of tracker-bar pipes extending through said passage in said bracket.

31. In an autopneumatic instrument, the combination of the action comprising a series of closely adjacent units, there being an intermediate widened space therein between two adjacent units, a tracker-bar in front of the action, a series of air-pipes connected to said tracker-bar and carried in a narrow compact cluster through said widened space, and a pneumatic playing apparatus with which said pipes are connected.

32. In an autopneumatic instrument, the combination of the action comprising a series of closely adjacent units, a tracker-bar in front of the action, a series of pipes connected with said tracker-bar and extending therefrom in two diverging groups, there being intermediate widened spaces in the action between adjacent elements thereof to afford passages for said groups of pipes, each group of pipes being arranged in a narrow compact cluster and as a whole carried through one of said widened spaces, and a pneumatic playing apparatus with which said pipes are connected after passing through said spaces.

33. In an autopneumatic instrument, the combination with the series of adjacent units

of the action, including the key-levers thereof,
of a pneumatic playing apparatus below the
key-levers, a pneumatic-controlling appara-
tus in front of the action, there being
5 widened spaces between adjacent key-levers
and units of the action at intermediate
points of the series, and air-pipes connected
with and extending in diverging groups to
opposite sides of said controlling apparatus,
10 said groups of pipes being respectively ar-

ranged in narrow compact clusters extending
downwardly in front of the action and car-
ried through said widened spaces to the said
playing apparatus.

In testimony whereof I affix my signature, 15
in presence of two witnesses.

JOHN W. DARLEY, JR.

Witnesses:

E. A. DOLB,
CHARLES R. BOETTGER.