

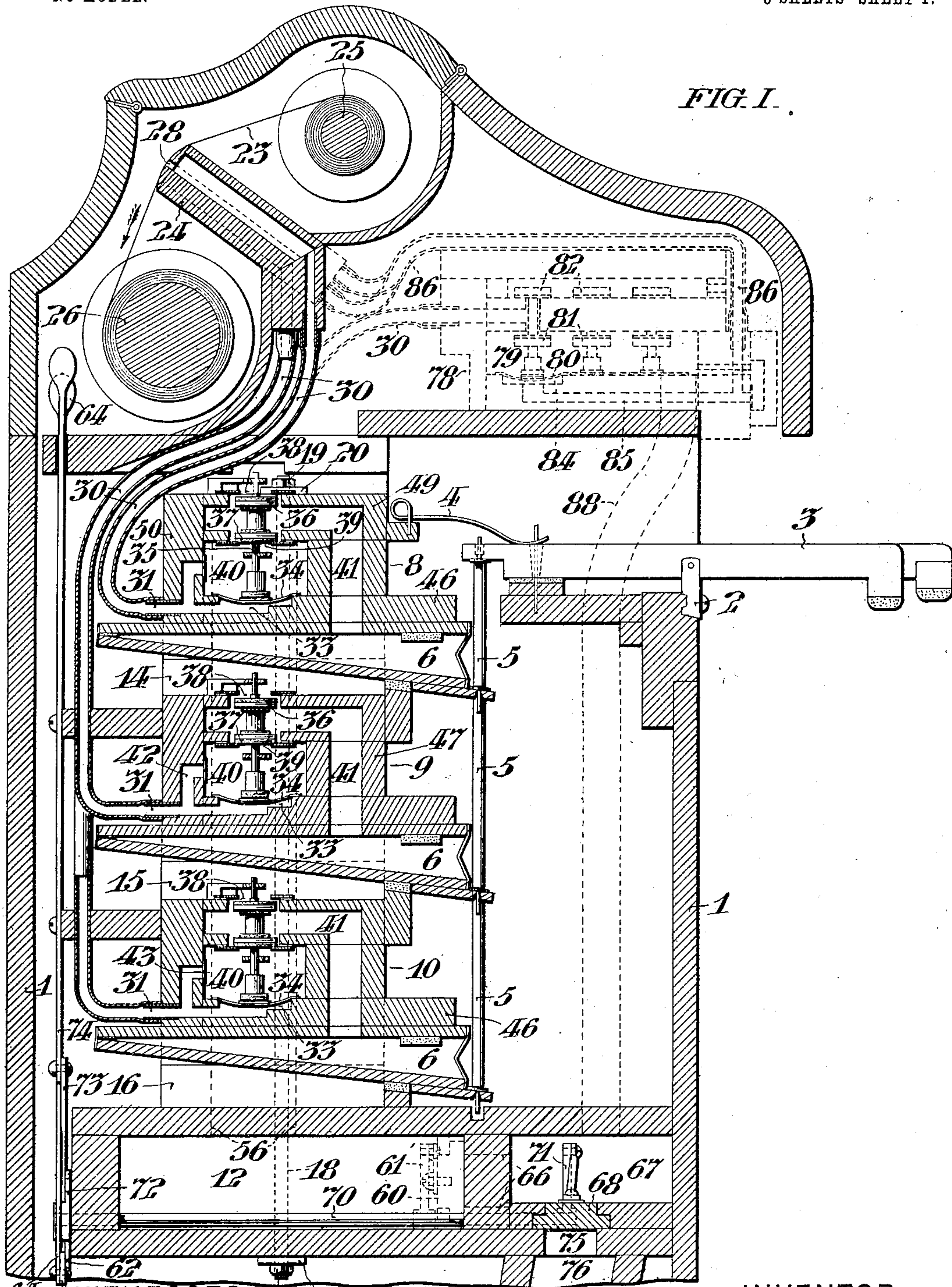
No. 731,262.

PATENTED JUNE 16, 1903.

P. WUEST, JR.  
MUSICAL INSTRUMENT.  
APPLICATION FILED MAR. 6, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES: 19 21,  
Clifton C. Halliwell  
John C. Burquier.

INVENTOR:  
PHILIP WUEST JR.,  
by Arthur E. Paige,  
Atty.

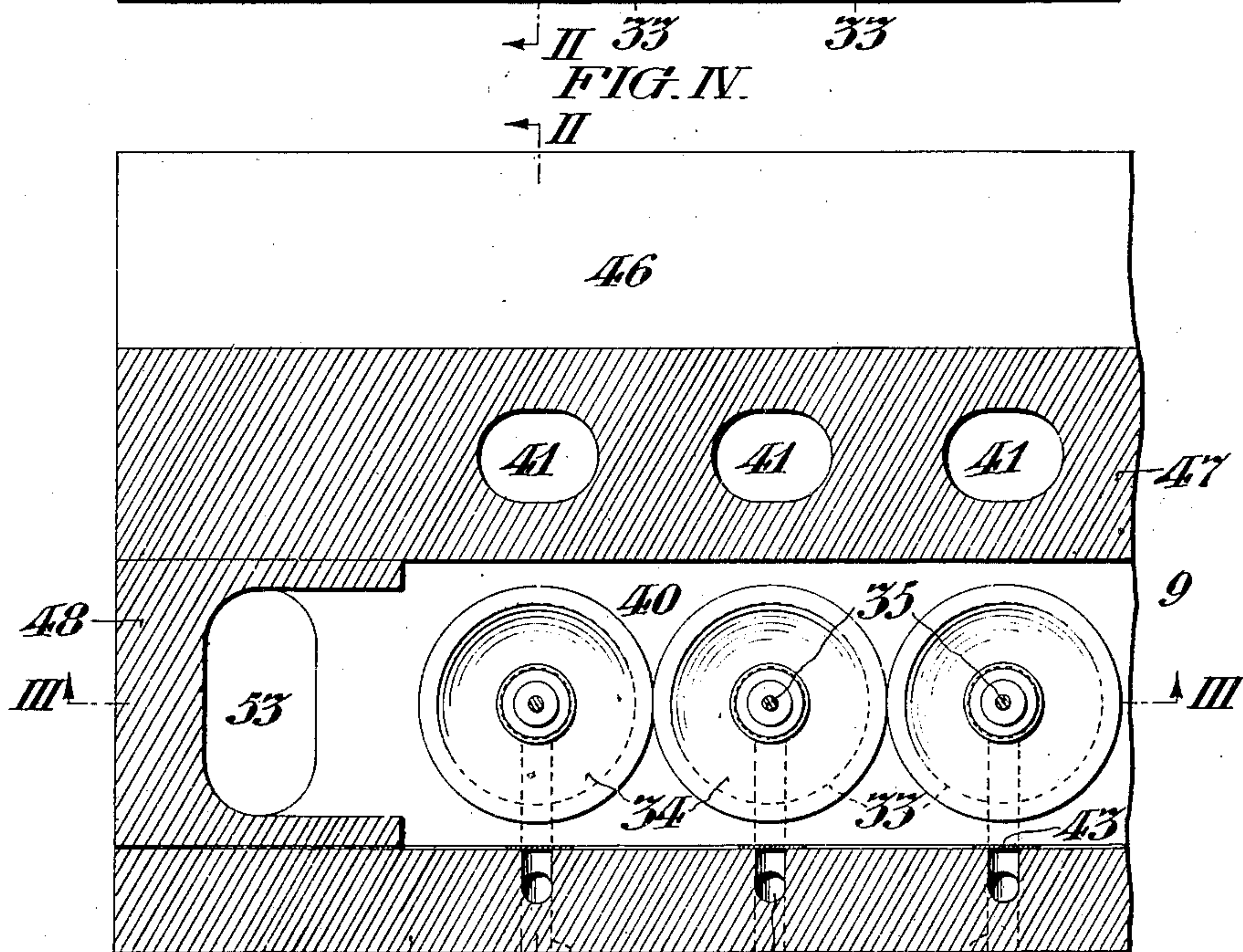
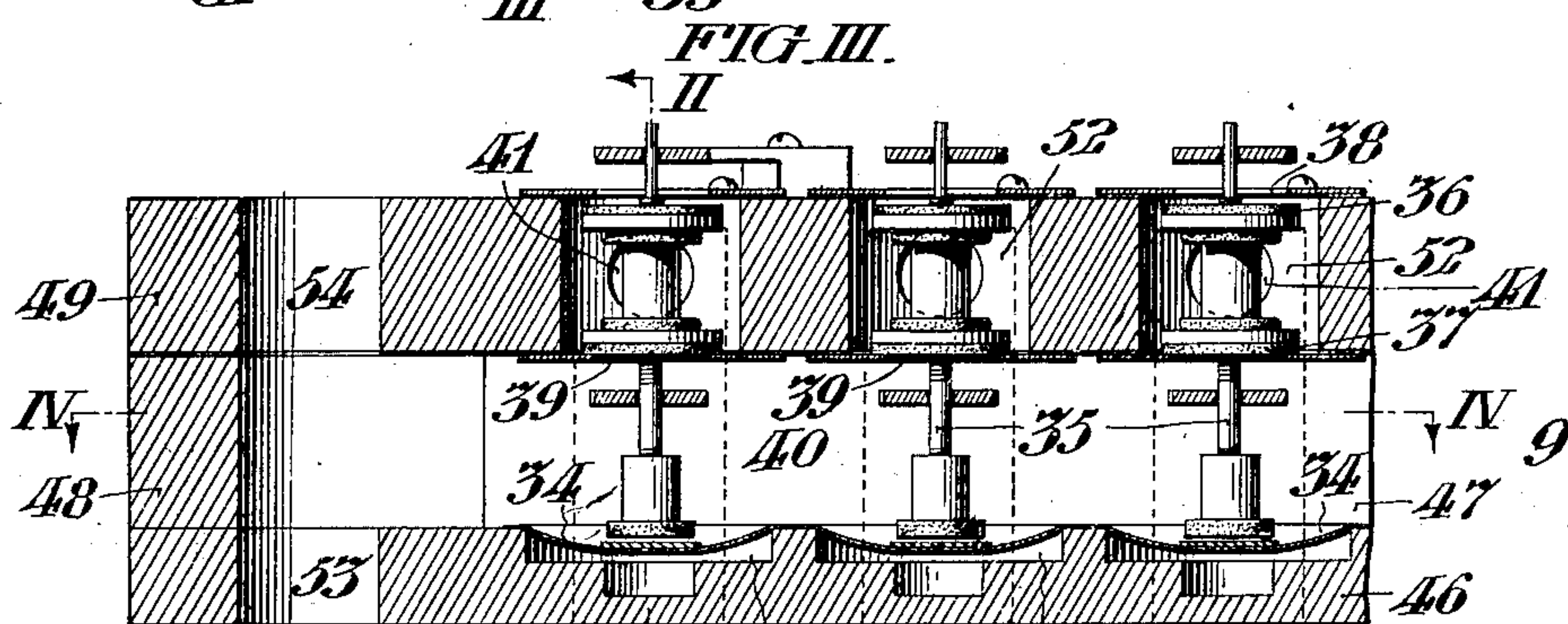
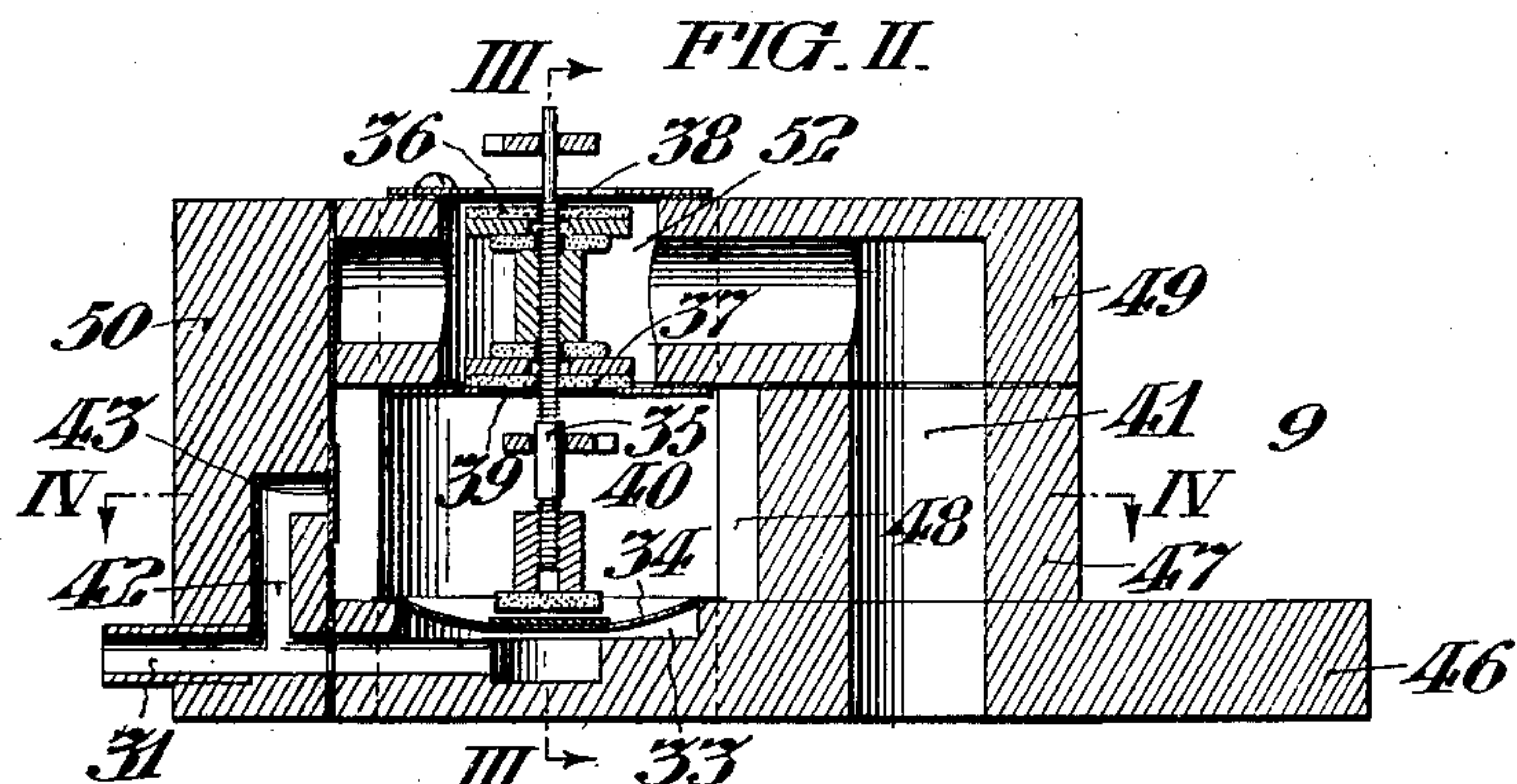


P. WUEST, JR.  
MUSICAL INSTRUMENT.

APPLICATION FILED MAR. 6, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



WITNESSES:

50

31

II

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APPLICATION FILED MAR. 6, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

FIG. V.  
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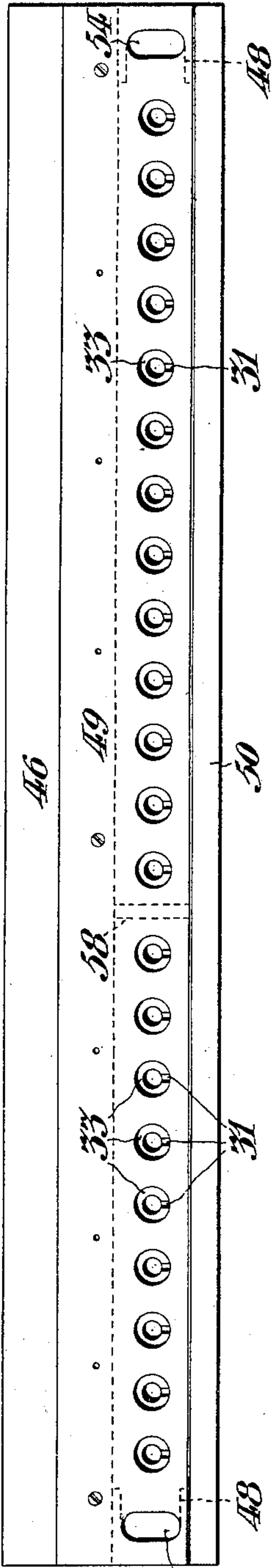


FIG. VI.  
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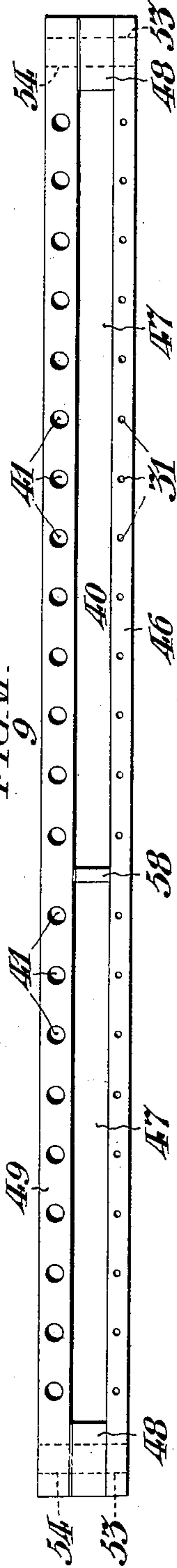
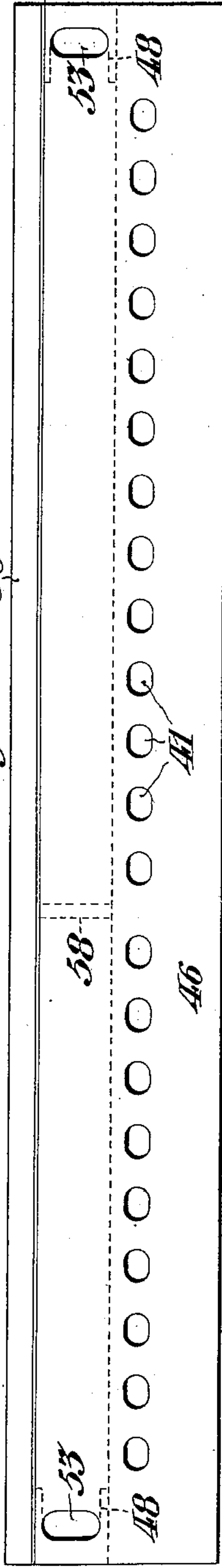


FIG. VII.  
9



WITNESSES:

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# UNITED STATES PATENT OFFICE.

PHILIP WUEST, JR., OF PHILADELPHIA, PENNSYLVANIA.

## MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 731,262, dated June 16, 1903.

Application filed March 6, 1903. Serial No. 146,485. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP WUEST, Jr., of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Musical Instruments, whereof the following is a specification, reference being had to the accompanying drawings.

My improvements are particularly applicable to instruments of the class known as "piano-players." Such an instrument usually comprises a series of finger-levers, which are arranged to impinge upon the digitals of a piano or similar instrument and are automatically actuated in a predetermined sequence by a similar series of pneumatic motors. Said motors are primarily controlled by a web of perforated paper which is progressed with respect to a pneumatic tracker-bar provided with a series of apertures leading to the respective lever-motors through suitable pneumatic conduits, such control being effected indirectly through individual valve mechanisms corresponding with the respective motors.

Heretofore the motor-controlling valve mechanisms aforesaid have been mounted in a single group in a chest common to all of them and consisting of a number of partition-boards grooved, fitted, and glued together to form valve-chambers and wind-ducts leading to and from the same. All of the valve-chambers being rigidly related in said ordinary chest the contraction and expansion in different parts thereof ultimately cause accidental communication between the pneumatic ducts, which should be separate. Moreover, such construction necessitates the manipulation of the entire valve-chest when it is necessary to repair or remove any one valve.

It is one object of my invention to dispense with said single-chest arrangement by providing a sufficient number of substantially counterpart valve casings or shelves each containing a limited number of said valve mechanisms and conveniently supporting the motors connected therewith, said shelves being fitted for independent contraction and expansion in relation to each other, but readily separable and interchangeable. The advantages of such construction and arrangement are manifold. For instance, the manufacture of such instruments is materially sim-

plified and facilitated, the inevitable contraction and expansion are permitted without disturbing the proper relation or connection of the valve-chambers and air-ducts, and the adjustment or repair of any valve mechanism or motor is facilitated by limiting the number and extent of the parts which must be removed to afford access thereto.

As heretofore constructed the valve-chambers have been connected with the exhaust-bellows by means of a wind-box separate from and exterior to said common valve-chest, with the disadvantage that the unequal expansion and contraction of said box and chest open crevices between them, and thus materially affect the operation of the instrument.

A further object of my invention is to dispense with such a separate wind-box by providing corresponding wind-ports in the several valve-shelves, which are placed in communication directly therethrough.

My invention also comprehends the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings, Figure I is a vertical sectional view of a piano-player, showing a convenient embodiment of my invention. Fig. II is a vertical transverse sectional view of one of the unit valve casings or shelves, taken on the line II II in Figs. III and IV. Fig. III is a vertical longitudinal sectional view of said shelf, taken on the line III III in Figs. II and IV. Fig. IV is a horizontal longitudinal sectional view of said shelf, taken on the line IV IV in Figs. II and III. Fig. V is a top plan view of said shelf with the valve-fittings and motors removed. Fig. VI is a front edge view of said shelf shown in Fig. V, but with the front cover-board removed. Fig. VII is an inverted plan view of the shelf shown in Figs. V and VI.

Referring to Fig. I, the instrument-casing 1 is provided with the rail 2, on which is mounted the series of finger-levers 3, arranged to impinge upon the digitals of the piano or similar instrument. Said finger-levers 3 are respectively provided with springs 4 and operatively connected by rods 5 with respectively independent pneumatic motors 6, arranged in three distinct groups of twenty-



two each, which groups are independently inclosed and supported by the separable shelves 8, 9, and 10, mounted within said casing 1 upon the wind-chest 12. I have shown the details of construction of the shelf 9 in Figs. II to VII, inclusive, and it is to be understood that the construction of the other shelves 8 and 10 is substantially similar thereto.

As indicated in Fig. I, the filling-blocks 14, 15, and 16 are interposed beneath the respective shelves 8, 9, and 10, and the latter are clamped upon the wind-chest 12 in proper relation with each other by means of the bolts 18, provided with nuts 19 and extending through brackets 20 21, the latter being respectively secured to the top of the shelf 8 and to the bottom of said wind-chest and projecting beyond the same to engage said bolts.

The operation of each pneumatic motor 6 is controlled by the traverse of the perforated paper web 23 with respect to the pneumatic tracker-bar 24. Said web being initially wound upon the roller 25 and being in the operation of the instrument unwound therefrom and wound upon the roller 26 opens and closes the tracker-bar apertures 28, which are arranged in a series corresponding with the series of finger-levers 3. Said tracker-bar apertures 28 are operatively connected with corresponding motors 6 by conduits, including flexible tubes 30, extending from the rear of the tracker-bar and through corresponding inlets 31 in the shelves 8, 9, and 10. Said conduits terminate in respective diaphragm-seats 33 beneath diaphragms 34, which in distinct series of twenty-two each are respectively mounted in said valve-shelves. Each of said diaphragms 34 is in registry with a valve-plunger 35, provided with a vent-valve 36 and an exhaust-valve 37, the former controlling an opening 38, leading to the atmosphere, and the latter controlling an opening 39 in the vacuum-chamber 40, a partial vacuum being maintained in the latter during the operation of the instrument. Said valves 36 and 37 control the ducts 41, which open into the pneumatic-motor bellows 6, and the arrangement of the parts above described is such that when one of the tracker-bar apertures 28 is closed by the web 23 the pneumatic motor 6 corresponding therewith is distended by atmospheric pressure in the position shown in Fig. I, being in connection with the atmosphere through the duct 41 and vent-openings 38. When, however, any tracker-bar aperture 28 is opened to the atmosphere by the traverse of the web 23, its respective diaphragm 34 is uplifted by atmospheric pressure opposed to the partial vacuum within the chamber 40, and the vent-valve 36 closes the vent-opening 38 and the exhaust-valve 37 opens the exhaust-opening 39, thereby placing the corresponding bellows 6 in communication with the partial vacuum in the chamber 40 through

the duct 41 and exhaust-opening 39, collapsing said bellows 6 and causing the corresponding finger-lever 3 to impinge upon its respective digital.

It is to be noted that each of the inlets 31 for the diaphragm-seats 33 is provided with a branch 42, terminating in a small aperture 43, opening into the vacuum-chamber 40, so that after each operation above described the pressure may be equalized upon the opposite sides of the diaphragms 34 and the parts be automatically restored to the position shown in Figs. I, II, and III.

The valve-shelves 8, 9, and 10 each comprise a bottom board 46, a duct-bar 47, and wind-port blocks 48, rigidly connected therewith, a removable top cover-board 49, and a removable front cover-board 50. The diaphragm-seats 33, formed in said bottom board 46, are in registry with the valve-chambers 52, formed in said top cover-board 49, and communication is established between the vacuum-chambers 40 directly through the wind-ports 53 and 54, formed, respectively, in said bottom board 46 and said top board 49, in registry in the respective shelves 8, 9, and 10 and in registry with the wind-port 56 in the top of the wind-chest 12.

In order to separately control and operate the treble and bass pneumatics at different pressures, if desired, they are conveniently separated in each shelf by a partition 58, extending across each vacuum-chamber 40, so that its two divisions are respectively in connection with the wind-ports at the opposite ends of its shelf. Similarly the wind-chest 12 is divided intermediate of its length, and its respective divisions are provided with slide-valves 60, independently controlled by rock-shafts provided with lever-arms 61 62, operatively connected by links 63 with hand-levers 64, so that the pressure (or degrees of vacuum) in respective communication with the treble pneumatics and with the bass pneumatics may be separately determined at the will of the operator by the manipulation of the hand-levers 64, only one of said levers and its connections being illustrated in Fig. I.

The valves 60 control respective openings 66, extending from said divisions of the wind-chest 12 into the wind-box 67, and the latter is provided with the valve 68, connected by the rock-shaft 70, lever-arms 71 72, and link 73 with the hand-lever 74. Said valve 68 controls the opening 75, leading to the wind-conduit 76, which is in operative communication with the main exhaust-bellows.

By the arrangement shown in full lines in Fig. I the operation of each motor 6 is effected directly by its single pneumatic diaphragms 34 and the valves connected therewith. However, I find it convenient to effect such operation by two sets of pneumatic diaphragms, valves, &c., under some circumstances—for instance, if the apertures in the web 23 are very small. I have indicated by dotted lines



in Fig. I a convenient arrangement wherein the diaphragms 34 become secondary, their conduits 30 being extended to an independent shelf 78, inclosing a vacuum-chamber 79 and controlled by primary diaphragms 80 and valves 81 82, the seats 84 of said diaphragm 80 being connected with the tracker-bar 24 by ducts 85 and conduits 86. As indicated, the shelf 78 is provided with an independent wind-conduit 88, extending from the wind-box 67 to its vacuum-chamber 79; but it is to be understood that said shelf may be stacked with the shelves 8, 9, and 10 and be similarly connected with the wind-chest 12.

Although the construction chosen for illustration comprises three separable valve-shelves stacked together, it is to be understood that a greater or less number may be employed, as described.

I do not desire to limit myself to the precise details of construction herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a piano-player, the combination with a series of finger-levers; of a plurality of pneumatic motors respectively connected with said finger-levers; a valve mechanism for each of said motors; and, a plurality of separable valve-shelves, each inclosing a definite group of said valves, substantially as set forth.

2. In a piano-player, the combination with a series of finger-levers; of a plurality of pneumatic motors respectively connected with said finger-levers; a valve mechanism for each of said motors; and, a plurality of separable valve-shelves, each inclosing a definite group of said valves; said motors being mounted upon said shelves independently of each other

and in registry with their respective valve mechanisms, substantially as set forth.

3. In a piano-player, the combination with a series of finger-levers; of a plurality of separable valve-shelves each containing a distinct series of valves respectively in operative relation with corresponding finger-levers, substantially as set forth.

4. In a piano-player, the combination with a series of finger-levers each operatively connected with a motor and an individual valve mechanism for controlling the same; of a plurality of separable valve-shelves, each inclosing a definite number of said valves and each comprising a vacuum-chamber common to the valves which it incloses; and, registered wind-ports in the respective valve-shelves, for direct communication between said vacuum-chambers, substantially as set forth.

5. A separable valve-shelf for a piano-player, comprising a bottom board provided with a series of pneumatic diaphragm-seats; a duct-bar fixed to said bottom board; a top cover-board fixed to said duct-bar and provided with a series of valve-chambers, respectively in registry with the diaphragm-seats in said bottom board; and, a front cover-board connecting said bottom board and said top board and provided with a series of inlets respectively in registry with said diaphragm-seats, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 4th day of March, 1903.

PHILIP WUEST, JR.

Witnesses:

ARTHUR E. PAIGE,

CLIFTON C. HALLOWELL.