

No. 820,079.

PATENTED MAY 8, 1906.

P. WUEST, JR.
MUSICAL INSTRUMENT.
APPLICATION FILED JULY 15, 1903.

FIG. I.

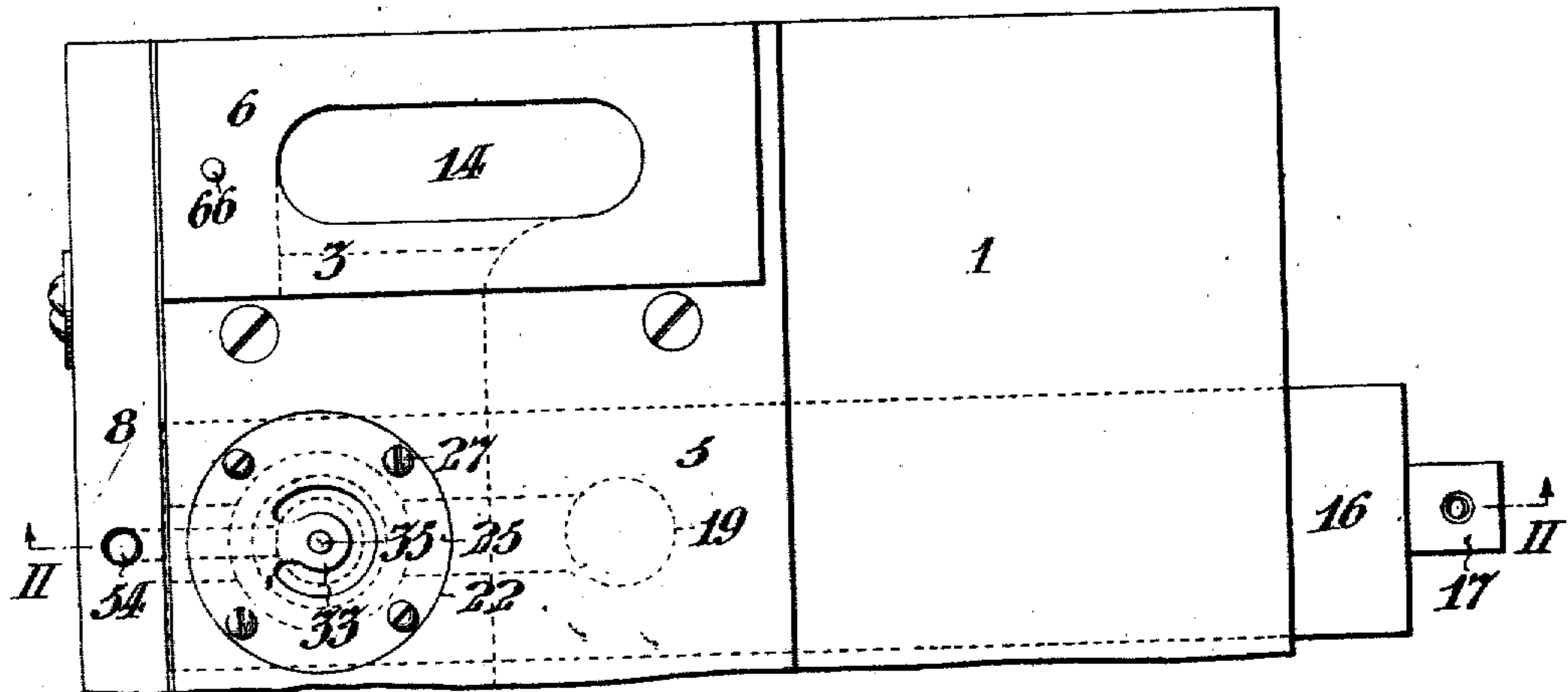


FIG. II.

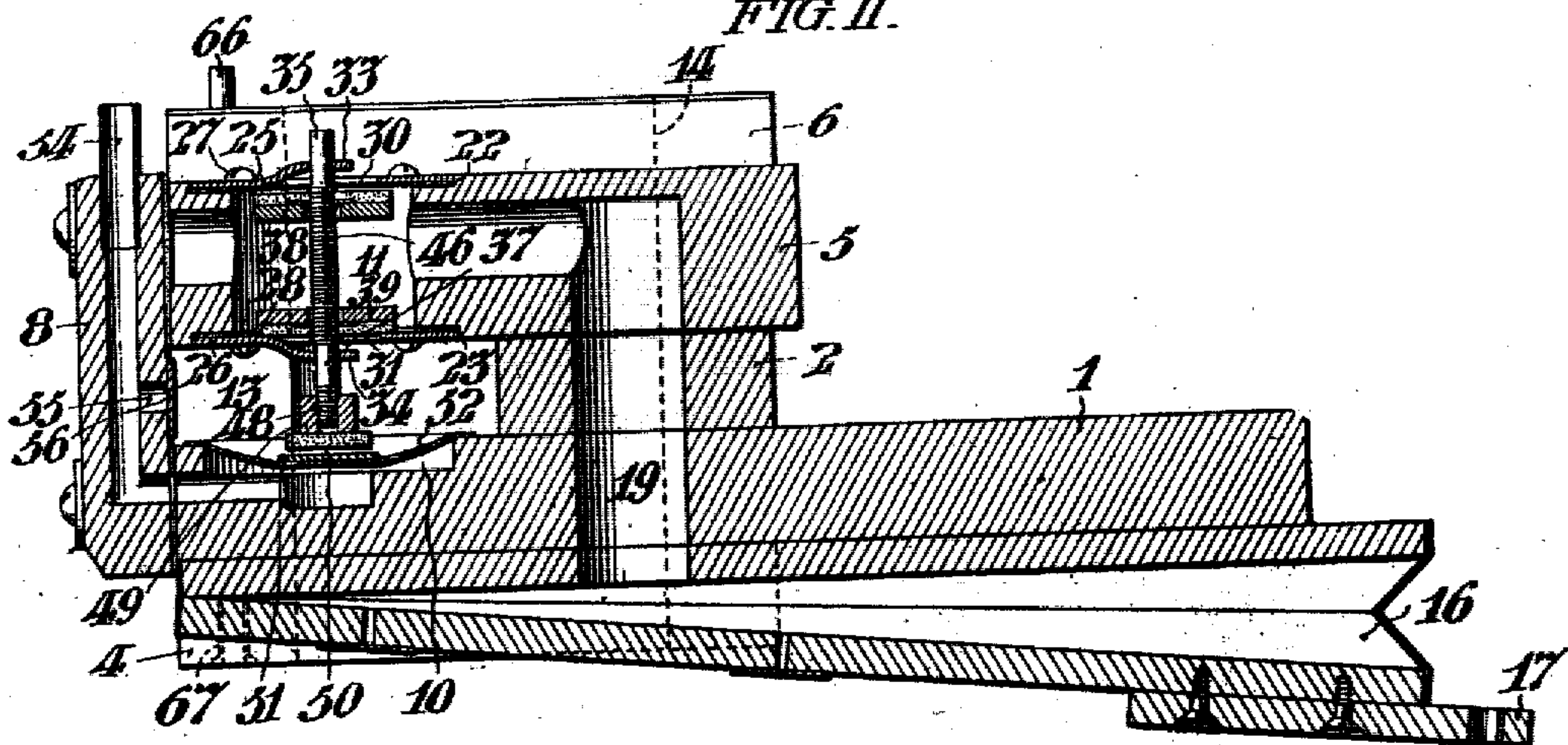


FIG. III.

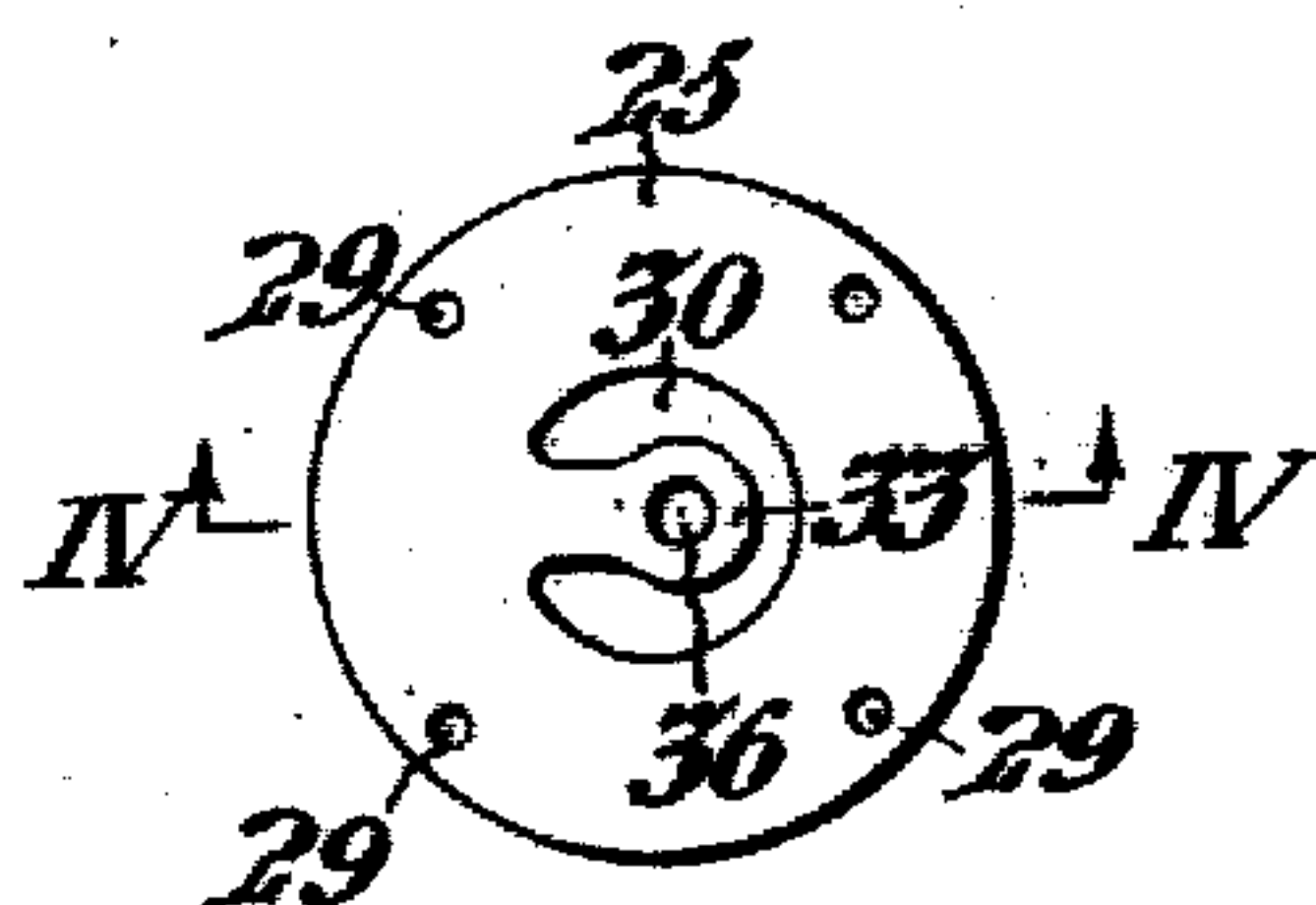


FIG. VI.

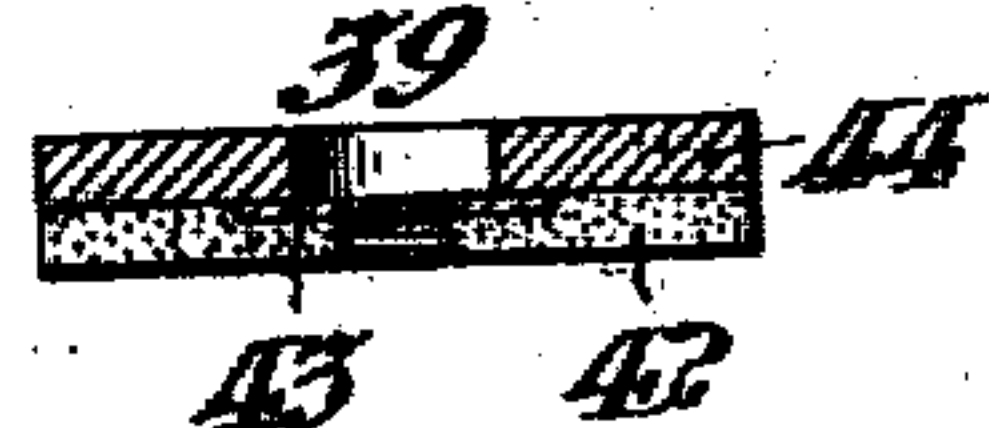


FIG. V.

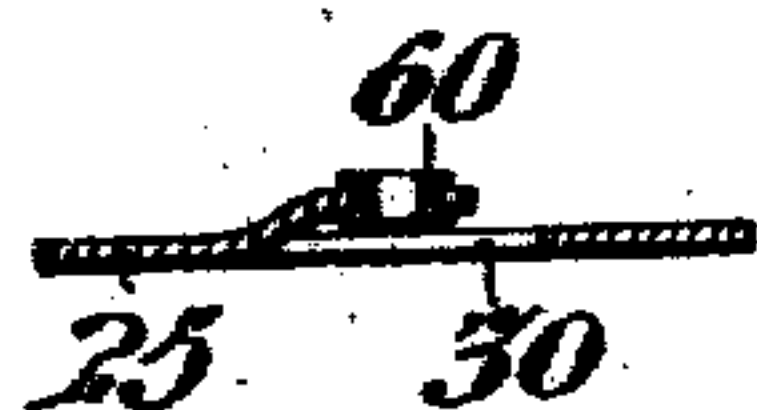
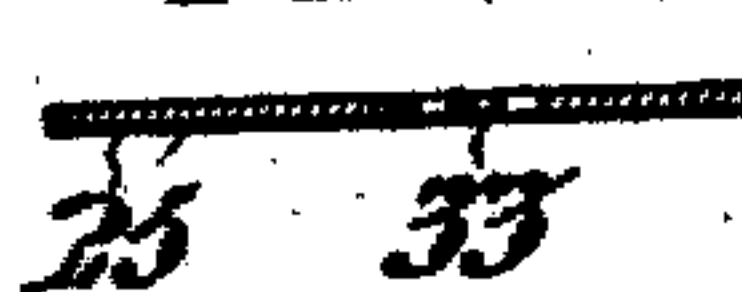


FIG. IV.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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MUSICAL INSTRUMENT.

No. 820,079.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed July 15, 1903. Serial No. 185,550.

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 an instrument of the class contemplated in Letters Patent of the United States No. 731,262, granted to me June 16, 1903—to wit, a piano-player comprising 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.

My present improvements relate specifically to the construction and arrangement of said valve mechanisms. As shown in said Letters Patent, the stems of the valves in said valve mechanisms are supported in wooden brackets separately attached to the valve-casing adjacent to flat metallic plates which are separately attached to the valve-casing to form seats for the valves carried by said stems, and said brackets being entirely separate from said valve-seat plates considerable time is necessarily expended in accurately adjusting them in proper relation.

Therefore it is an object of my present invention to provide fittings for said valve mechanisms comprising bearings for the valve-stems in fixed relation with the valve-seat plates, so as to avoid the necessity for the relative adjustment heretofore required, as aforesaid. As hereinafter described, said individual bearings and seats are preferably formed in integral relation from a single sheet-metal stamping, and the assembly of said stampings in proper relation to the respective individual valve-chambers is facilitated by having countersunk recesses in the valve-casing for said stampings, so that

merely placing them in their respective recesses serves to accurately locate them in proper relation.

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

In the accompanying drawings, Figure I is a fragmentary plan view of a unit valve casing or shelf, several of which may be embodied in an instrument of the class specified. Fig. II is a transverse sectional view of said shelf, taken on the line II II in Fig. I. Fig. III is a plan view of a flat blank plate from which the improved valve-fitting is stamped to the form shown in Fig. II. Fig. IV is a sectional view of said blank plate, taken on the line IV IV in Fig. III. Fig. V shows one of said fittings with a bushing in its valve-stem-bearing aperture. Fig. VI is an enlarged sectional view of one of the valves indicated in Fig. II.

As shown in Fig. II, said valve shelf or casing comprises a bottom board 1, a duct-bar 2, comprising the wind-port 3, a spacing-block 4, fixed to said board 1, a removable top cover-board 5, a spacing-block 6 of the same configuration as the block 4 and fixed to said board 5, and a removable front cover-board 8. It is to be understood that said valve-casing shelf comprises a series of the individual valve mechanisms, only one of which is shown, and that each mechanism is provided with a diaphragm-seat 10 in said bottom board 1 in registry with a valve-chamber 11 in the top cover-board 5 and that the vacuum-chamber 13 is common to all of said diaphragm-seats and in communication through the wind passage-way 14 with suitable means for maintaining a partial vacuum in said chamber 13. The pneumatic bellows-motor 16 comprises the lever 17 for operative connection with a corresponding finger-lever and is mounted upon the bottom of said board 1 in communication with the duct 19, extending through said board 1, duct-bar 2, and cover-board 5 into the valve-chamber 11. Countersunk recesses 22 23 are respectively provided at the top and bottom of said board 5 in registry with said chamber 11 to receive the plates 25 26, which are secured therein by screws 27 28, entered through suitable apertures 29. Said plates are re-

spectively provided with central valve-ports 30 31 and offset bearing-lugs 33 34, in which lugs the opposite ends of the valve-stem 35 are entered and adapted to reciprocate. Said stem 35 carries two valves 38 39, respectively, in operative relation to said ports 30 31 and adapted to alternately seat against the annular plane portions of said plates 25 26, surrounding said ports. Each of said valves 38 39 comprises three pieces arranged as indicated in Fig. VI—to wit, a soft-leather facing 42, a pressboard nut 43, and a pressboard ring 44. The screw-thread 46 of said valve-stem 35 is engaged by both the facing 42 and the nut 43, the ring 44 serving to stiffen the outer edge of said facing 42, but permitting oscillation of the valve to insure its proper contact with its seat. Said stem 35 is conveniently formed of a metal rod primarily of the same diameter throughout its length; but the thread 46 is formed of larger diameter than said rod by a rolling operation. The lower end of said stem is conveniently provided with a cut screw-thread 48, upon which is mounted the nut 49, provided with a soft-leather or felt facing 50, opposed to the disk 51 upon the diaphragm 52, which latter is mounted over the seat 10 in operative relation to said valve-stem 35. As shown in Fig. II, said diaphragm-seat 10 is in communication with the inlet 54, and the latter is provided with the branch 55, terminating in a small aperture 56, opening into the vacuum-chamber 13. Said inlet 54 being directly connected with an aperture in the tracker-bar or with another pneumatic valve which is in operative connection with an aperture in the tracker-bar, the mechanism above described operates as follows: When the tracker-bar aperture corresponding with said inlet 54 is closed by the perforated paper web traversing it, the pneumatic motor 16 is distended by atmospheric pressure in the position shown in Fig. II, being in communication with the atmosphere through the duct 19 and valve-port 30. When, however, said tracker-bar aperture is opened to the atmosphere, the diaphragm 52 is uplifted by atmospheric pressure admitted through the inlet 54, opposed to the partial vacuum within the chamber 13, and the valve-stem 35 being thereby uplifted closes the valve-port 30 by the valve 38 and opens the valve-port 31, normally closed by the valve 39, thereby placing the motor-bellows 16 in communication with the partial vacuum in the chamber 13 through the duct 19, valve-chamber 11, and valve-port 31, collapsing said bellows 16 and causing the corresponding finger-lever to impinge upon its respective digital.

Referring to Figs. III and IV, it is to be noted that in the flat blank form the plates 25 26 each comprise a bearing-lug 33 or 34, whose bearing-aperture 36 or 37 is in such eccentric relation to the plate and the port 30

or 31 therein that when said lugs are stamped into the offset position shown in Fig. II said apertures are in concentric relation to the perimeters of said plates.

Referring to Fig. V, the lug 33 in the plate 25 is provided with a bushing 60, which may be formed of felt or any other convenient material, frictionally engaged with said lug or cemented or otherwise secured therein.

It being noted that the levers 17 on the motor-bellows 16 are intended to register with means connecting them with the finger-levers, I provide the upper spacing-block 6 with a pin 66 and the lower spacing-block 4 with a socket-thimble 67, so that the pins and thimbles of each shelf engage with the thimbles and pins of the adjoining shelves and insure the accurate location of each of the shelves in its proper relative position.

It is to be understood that the construction and arrangement of the valve mechanisms as above described not only facilitates the assembling of the parts in proper relation with less labor than has been hitherto required, but said parts cannot become displaced accidentally by any use to which an instrument of this class may be subjected, and their removal and replacement in repair work may be accomplished with a minimum expenditure of time and labor.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is to be understood 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 pneumatic bellows-motor; of a valve mechanism arranged to control said motor, comprising a metal plate having a plane portion arranged as a valve-seat and an offset portion comprising a bearing for a valve-stem; a valve-stem entered in said bearing; and, a valve on said stem arranged to seat against said plate, substantially as set forth.

2. In a piano-player, the combination with a pneumatic bellows-motor; of a valve mechanism arranged to control said motor, comprising a stamped sheet-metal plate having a portion arranged as a valve-seat and an offset portion arranged as a bearing for a valve-stem; a port in said plate adjacent to said bearing; a stem entered in said bearing; and, a valve on said stem arranged to seat against said plate in operative relation to said port, substantially as set forth.

3. In a musical instrument, the combination with a pneumatic motor; of a valve mechanism arranged to control said motor, comprising a metal plate having an annular rim provided with screw-apertures; a port through said plate surrounded by a valve-seat; a lug on said plate stamped from said port and provided with a bearing for a valve-

stem; a valve-stem entered in said bearing; and, a valve on said stem arranged to contact with said seat, substantially as set forth.

4. In a piano-player, a plurality of separable valve-shelves each comprising a series of pneumatic motors, a series of valve-chambers, a series of individual valve mechanisms, respectively mounted in said chambers and arranged to control said motors; and pins and thimbles on said shelves adapted to engage each other and insure the accurate location of said shelves in relative position, substantially as set forth.

5. In automatic playing mechanism, the

combination with a valve mechanism comprising a metal plate having a plane portion arranged as a valve-seat, and an offset portion comprising a bearing for a valve-stem; of a valve-stem entered in said bearing; and, a valve on said stem arranged to seat against said plate, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, in the State of Pennsylvania, this 13th day of July, 1903.

PHILIP WUEST, JR.

Witnesses:

ARTHUR E. PAIGE,
E. L. FULLERTON.