

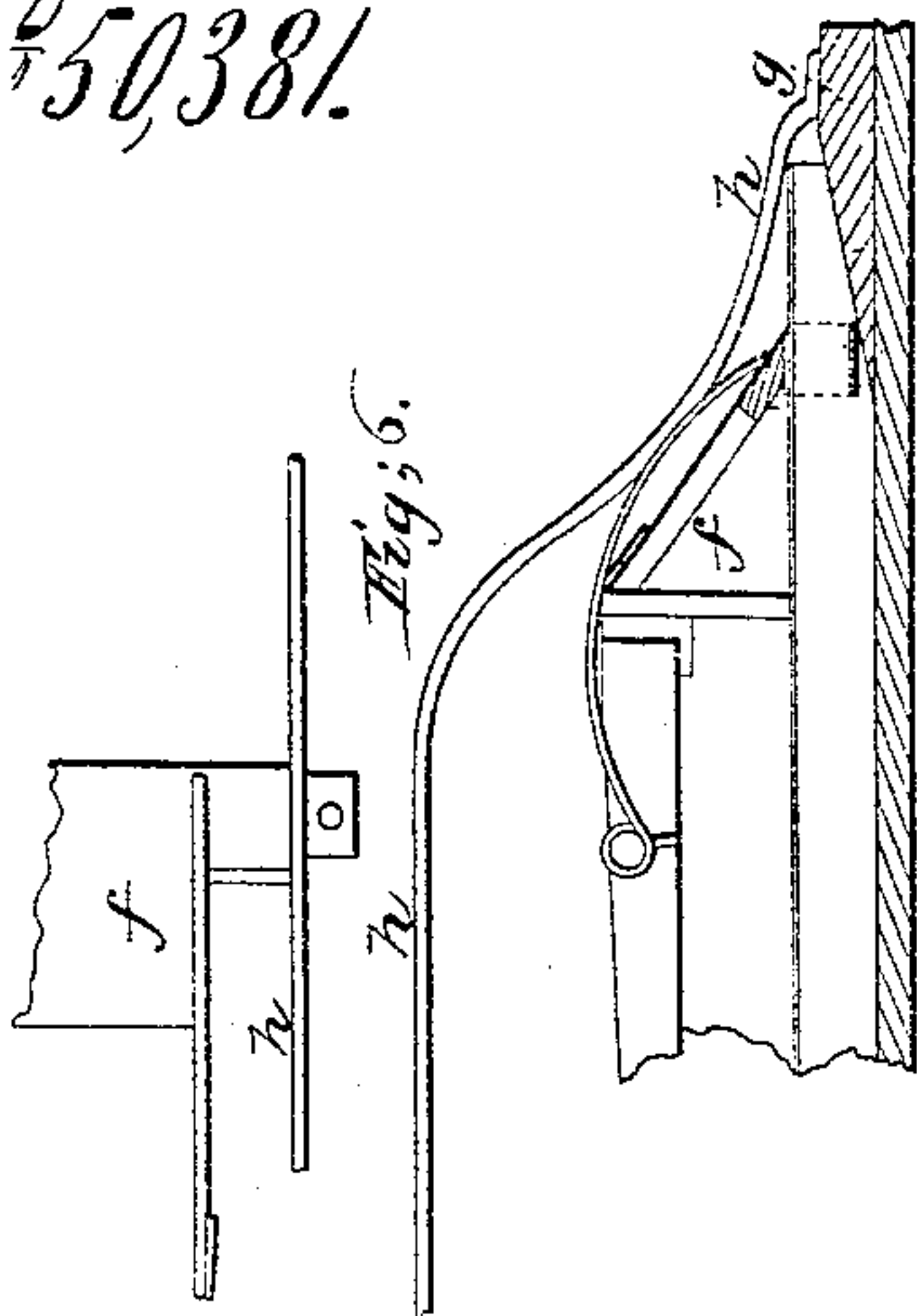
*F. Penbody*

*Reed Organ.*

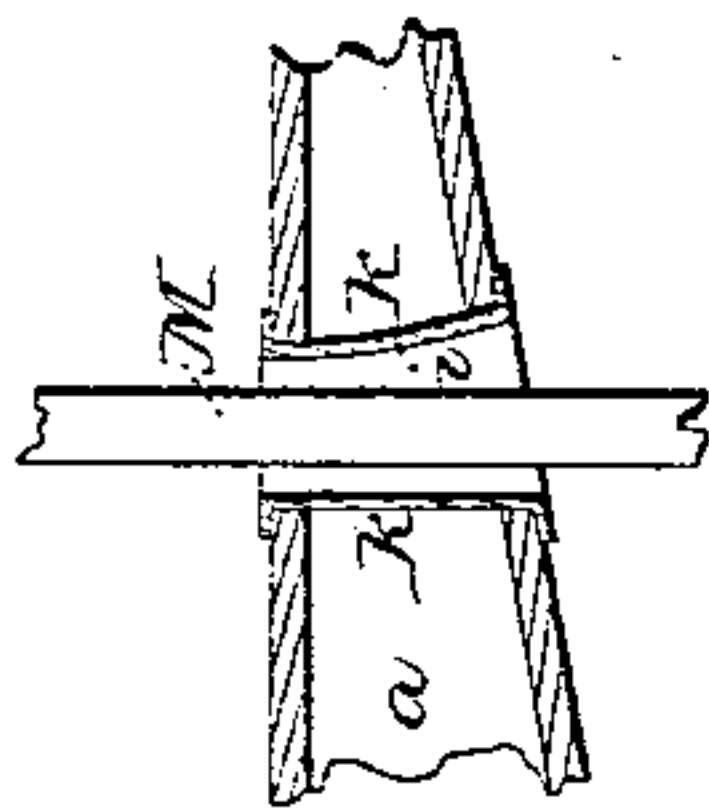
*N<sup>o</sup> 50381.*

*Patented Oct. 10, 1865.*

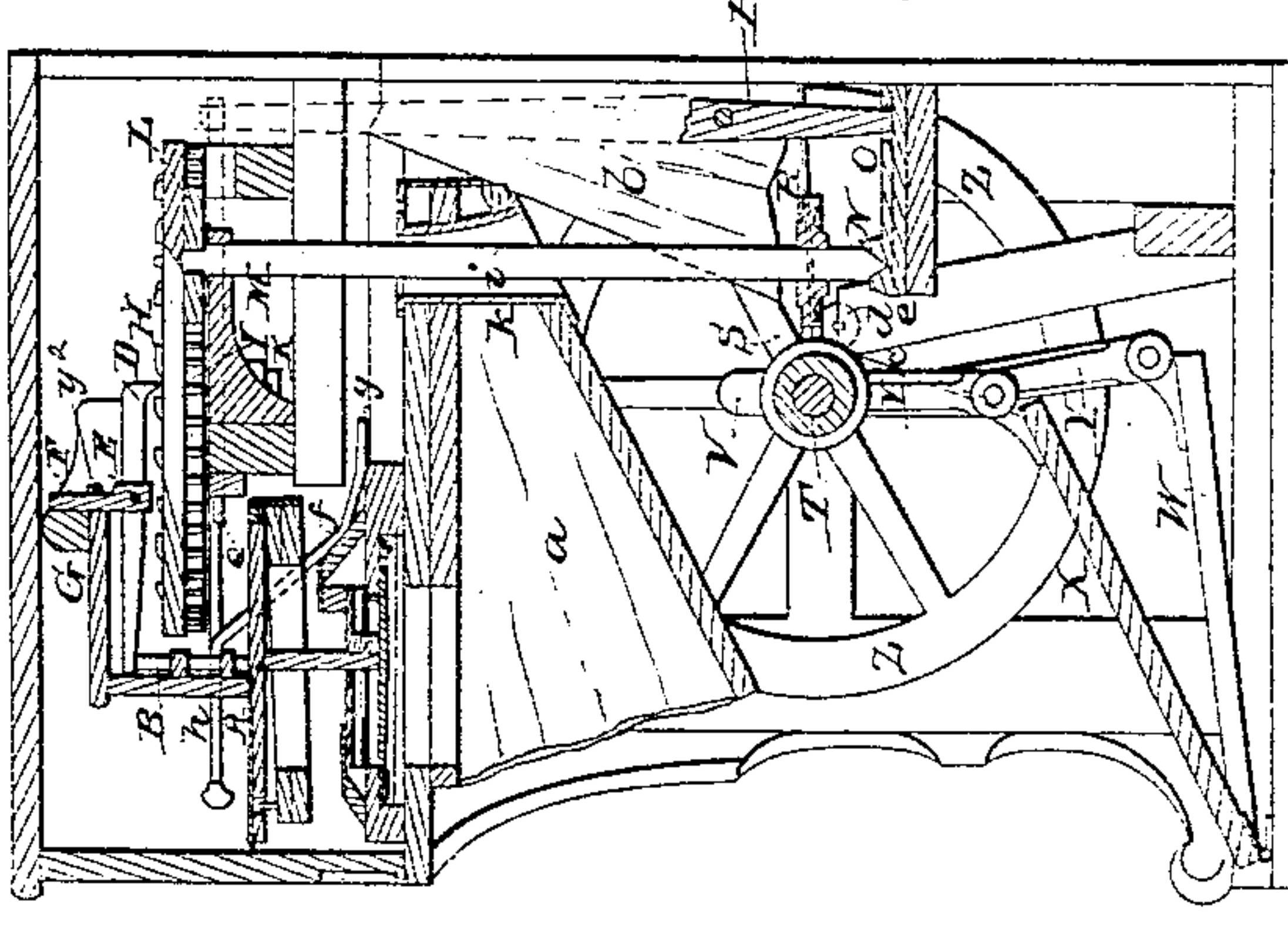
*Fig. 1.*



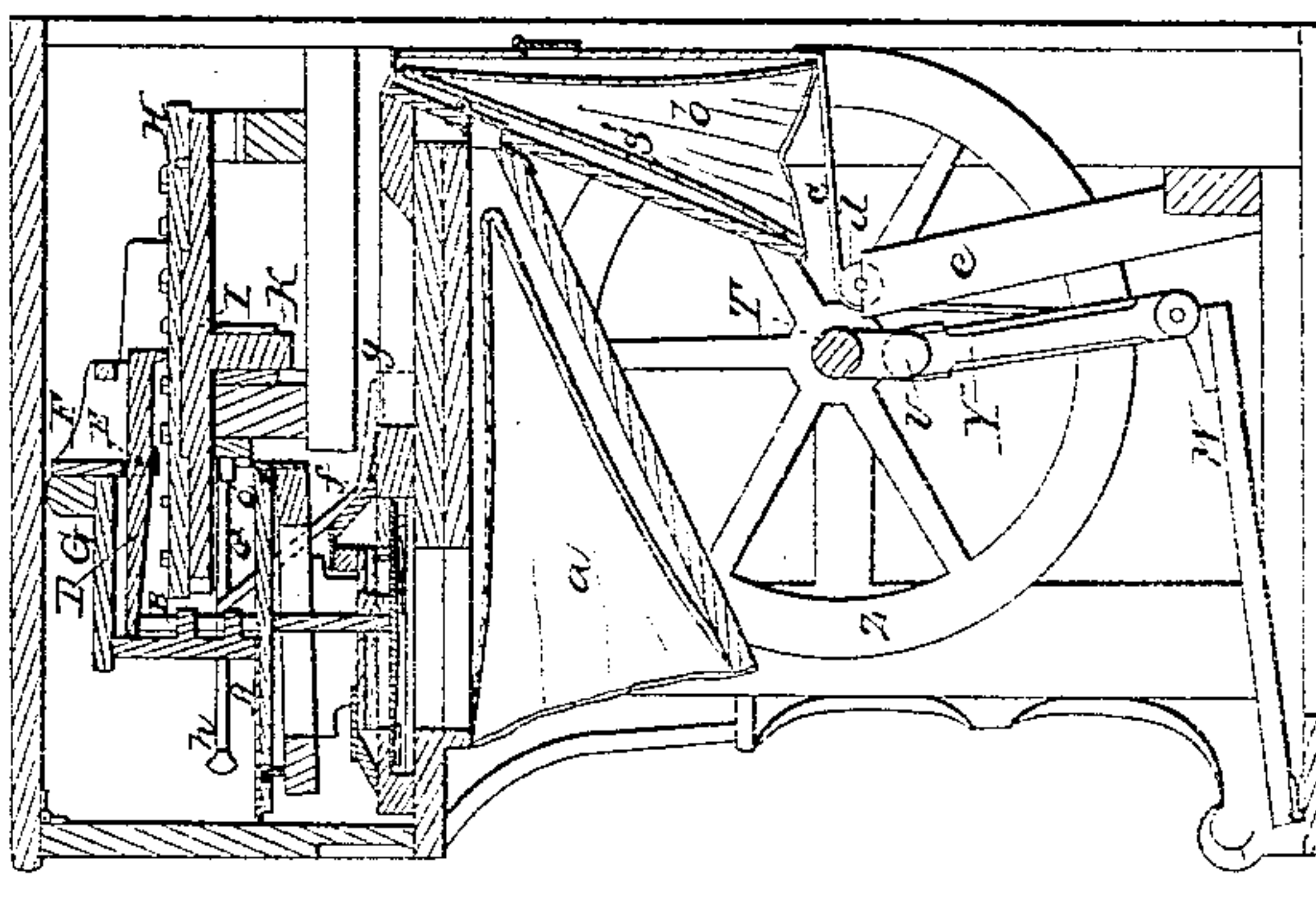
*Fig. 4.*



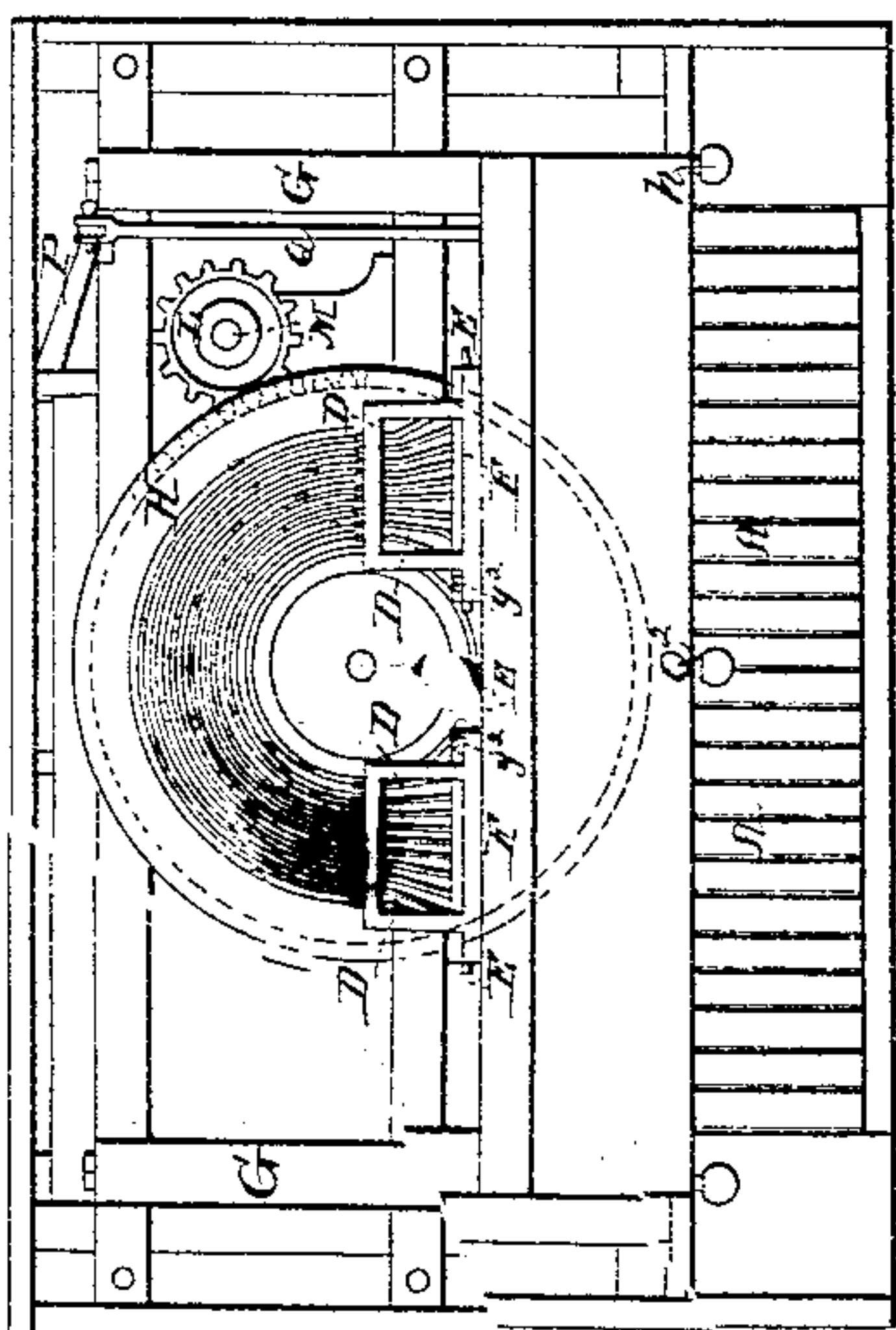
*Fig. 5.*



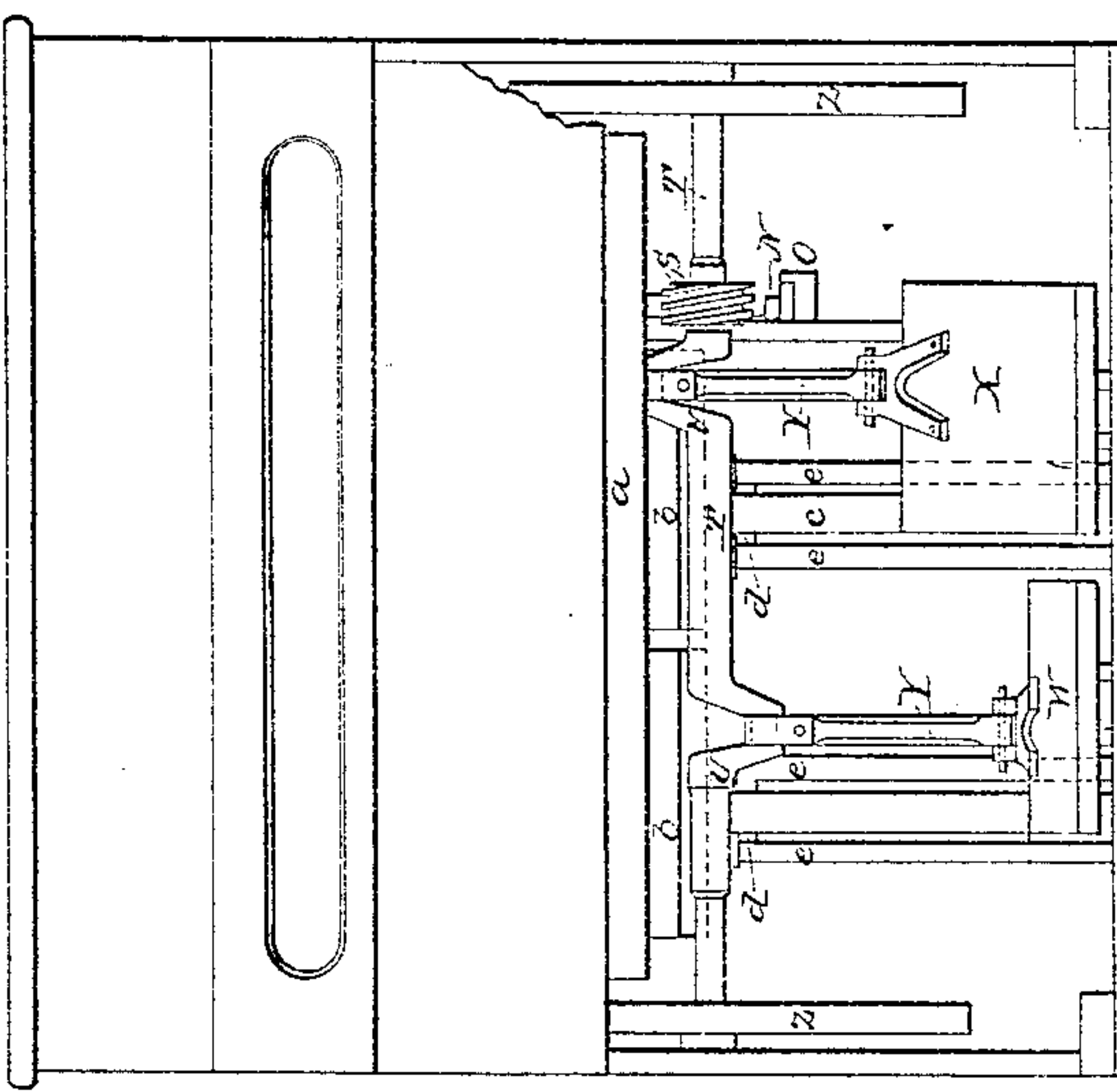
*Fig. 2.*



*Fig. 1.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

FRANCIS PEABODY, OF SALEM, MASSACHUSETTS.

## IMPROVEMENT IN MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. 50,381, dated October 10, 1865.

*To all whom it may concern:*

Be it known that I, FRANCIS PEABODY, of Salem, in the county of Essex and State of Massachusetts, have made an invention of certain new and useful Improvements in Musical Instruments, particularly in those provided with finger-keys for operating the valves of the sound-producing mechanism of such instruments; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view of the operative parts of a melodeon provided with my invention. Fig. 2 is a transverse and central section; Fig. 3, a front elevation, with a portion of the case removed in order to exhibit mechanism in rear thereof. Fig. 4 is hereinafter described. Fig. 5 is a vertical and transverse section, taken through the shaft M, hereinafter mentioned. Figs. 6 and 7 are representations of the application of the swell-board of the lifter or wedge g, hereinafter mentioned.

Heretofore in the construction of melodeons and various other musical instruments it has been found difficult to obtain a regulation of their movements sufficient to render the time accurate without impairing the expression. Various regulators have been used for such purpose, particularly those having vanes or wings to act against the air; but instruments thus controlled produce music in exact cadence, but without expression, and thus are likely to fail in interesting their auditors.

By means of my invention a person with little or no knowledge of the principles of music, but with a few hours of instruction, may play a keyed instrument in accurate time, may vary the time by increasing or diminishing it at pleasure, or may change it in any part of a tune and vary the expression by diminuendo or crescendo with as much ease and taste as in hand-playing. In fact, with my invention a performer can regulate the movements of the main operative parts of the instrument by the exercise of the same mental power which he would employ to control his hands were he to play the keys by them. With my invention he controls the movement of the instrument by means of his mind acting through his feet on pedals, the feet at the same time serving to put in motion the mechanical parts of the in-

strument necessary to the development of musical sounds.

In carrying out my invention I employ, in connection with the pedals and bellows of the instrument, a fly-wheel, a cranked shaft, and certain pitmen connecting the pedals with the cranks of the shaft—that is, I combine with the pedals and bellows and other operative parts a means of generating a momentum to be used in maintaining and regulating the operation of the bellows and the motions of the automatic mechanism by which the keys are played.

The melodeon or musical instrument hereinafter described contains a mechanism for automatically playing the keys of its reeds, this mechanism in various particulars being analogous to several features of the subject of a patent heretofore granted to me. In the patented instrument which is described in the United States Patent No. 40,573 the mechanism for playing the keys is controlled by a regulating apparatus having no connection with the pedals and bellows of the instrument, and having its motions regulated by the reaction of the atmosphere against certain vanes or fans of such apparatus. Thus it will be seen that between my present invention and that heretofore patented by me there are material differences, for with the former the movements of the mechanism for playing the keys or sound-producing part of the instrument are controlled and regulated by the person who actuates the pedal or pedals of the bellows. The performer is also able to play on the keys with his fingers, and either while the key-playing apparatus may be in action or while it may be out of operation.

In the drawings, A represents a series of finger-keys used for the purpose of depressing the valves of a series of reed-cells, such valves and reed-cells not being shown except in Figs. 2 and 3, as they are to be in all respects like those employed in melodeons.

Directly on each key a pin, B, rests, such pin being supported immediately in rear of the key-board and so as to be capable of being freely moved vertically. One arm of a lever, D, rests on the head of each of the pins B, there being two sets of the said levers, one of which is the treble and the other the bass set.

The fulcrum-rod E of each set of levers is supported by one of two mandibles or frames,



F F, which are carried by a frame, G, so hinged to the main frame of the instrument as to be capable of being turned from a horizontal into a vertical position in order to facilitate either the application of a circular dent-plate, H, to its supporting-wheel I or the removal of such plate from such wheel, as occasion may require. Furthermore, each of the mandibles F should be applied to its frame G by means of clamp-screws  $y^2$  going through slots or holes in the mandible large enough to allow of the proper lateral adjustment of the mandible, such as will suffice to bring its levers into their due relations to the operative dents of the dent-plate. The said dent wheel or plate extends underneath the two sets of levers D, which are arranged on opposite sides of its center—that is to say, one set is on one side, while the other is on the other side thereof. The upper surface of the dent wheel or plate is provided with dents or cams for actuating the levers, these dents or cams being arranged in concentric circles in such manner that those for operating the bass-levers may alternate with those for actuating the treble-levers. In this arrangement the circle of cams for operating either set of levers will not operate the other set of such levers, but pass around between the levers thereof, while the dent-wheel may be in rotation. In Fig. 1 the red circles on the plate H denote the lines in which the treble-dents are arranged, the black circles indicating the lines in which the bass-dents are disposed. In other respects the arrangement of the dents should be such as to enable them during a rotation of the dent-plate to so actuate the levers D as to cause them to set the keys in operation in such manner as to produce from the reeds the tones required.

The crown-wheel I of the plate H is supported by a vertical shaft or spindle, K, and engages with a pinion, L, mounted on the upper part of an upright shaft, M. The lower end of the shaft M is pivoted in a step, N, supported by a slider, O, capable of being moved longitudinally by means of a lever, P, provided with an actuating-rod, Q. A worm-gear, R, fixed on the shaft M engages with an endless screw or worm, S, which is carried by a horizontal shaft, T. This shaft has two bell-cranks, U V, which project in opposite directions from it. Each of the cranks is joined with one of two pedals or foot-levers, W X, by means of a connecting-rod, Y. One or more fly-wheels, Z, are fixed on the shaft T.

The exhaust or vacuum bellows of the instrument is represented at *a*, it being placed underneath the reeds in the ordinary manner. There is a separate pumping or exhausting bellows, *b*, to each of the pedals W X, such exhausting-bellows being arranged with respect to the bellows *a* and the shaft T in manner as shown in Fig. 2 of the drawings. A strap, *c*, passing around a pulley, *d*, sustained by two posts, *e e*, connects the vibratory board of each exhausting-bellows with one of the pedals. The

rod Q at its front end is jointed to a lever, Q', provided with an actuator or knobbed rod, Q<sup>2</sup>, the whole being arranged as exhibited in the drawings. By laying hold of the rod Q<sup>2</sup> and pulling it the slide O will be moved so as to throw the worm-gear R out of engagement with the worm S. Under these circumstances the shaft T, while revolving, will produce no rotary motion of the mechanism for rotating the dent-plate supporting-gear I.

For elevating the swell-board *f* of the instrument I employ a sliding wedge, *g*, connected to a knobbed rod or actuator, *h*. By laying hold of and pulling the knob of the rod the wedge will be forced underneath the swell-board or a projection therefrom, and will raise such board and maintain it raised to such extent and as long as it may be desirable. The depression of the swell-board may be produced by its weight or by a spring suitably applied to it.

The shaft M, by its arrangement with respect to the exhaust-bellows, passes directly through such bellows, which, as constructed, has a passage, *i*, (for the reception of the shaft,) extending through it and formed by a flexible tube, *k*, united at its two ends to the two boards of the bellows, the same being as shown in Fig. 4. The flexible tube will contract or expand lengthwise with the movement of the bellows and without impairing its air-tight properties.

The spring S' within the exhausting-bellows *b* should be such as to expand the said bellows, the strap *c*, by going around the pulley *d* and being connected to the pedal, serving during a depression of the pedal to effect a contraction of the said bellows.

In order to measure with great exactness the time of the instrument by the tread of the feet of the performer, I employ two pedals and construct the driving-shaft with two cranks arranged as described, but one crank and one pedal, however, would answer to put the shaft in revolution; but I have found the regulation and control of the instrument to be better when two cranks and two pedals are employed with two exhausting-bellows, in manner as hereinbefore specified. With these cranks and pedals and with the straps passing around pulleys and connected with the vibrating boards of the exhausting-bellows, as described, the said bellows while being actuated will remove the air from the vacuum-bellows. A vacuum being established in the exhausting and vacuum bellows their action will be suspended by the pressure of the external air on the vibrating boards of the exhausting-bellows. The slackening of the straps also suspends the action of the pedals in creating a movement of the bellows until a fresh supply of air through the reed-openings and into the vacuum-bellows again enables the vibratory boards of the exhausting-bellows to operate or move. From this it will be seen that the action of the pedals on the bellows takes place only when re-



quired to establish and maintain a proper vacuum. In this way a clear and pure tone or one much better than heretofore usually produced by reed-instruments can be obtained.

In the event of a cylinder being used in lieu of the rotary dent-plate hereinbefore described (such cylinder being provided with dents projecting from it and being arranged so as to operate the levers of the mandibles during the rotary motion of the cylinder on its axis) the pinion L on the head of the shaft M may be a bevel-gear and be made to engage with another bevel-gear fixed on the head or shaft of the cylinder.

I do not confine my invention to a reed musical instrument only, as it will be evident that it is applicable to organs or those instruments which have pipes. By my peculiar arrangement of the exhausting-bellows *b*, and by means of the operative mechanism thereof, as described, important results or advantages are gained—that is to say, by arranging the exhausting-bellows *b* in rear of the exhaust-bellows *a* and the shaft M, I avoid the necessity of carrying the shaft through the exhausting-bellows. So by the employment of an expansion-spring within the exhausting-bellows and by using the strap *c* to contract the bellows during a depression of the pedal the expansion of the bellows will take place only while a depression of any one or more of the keys may be in the act of being produced or air be rushing through any one or more of the reed-openings, the expansion being all that may be necessary for the amount of air received by the bellows. In ordinary cases where the bellows is expanded by pressure of the player's foot on the pedal the expansion of the bellows is likely to be greater than necessary, and the result is a pulsation of the air or such an action thereof as may more or less disagreeably affect the sounds of the reeds or produce other bad consequences. No such pulsation or bad results are incident to my improvement. By the combination of the fly-wheel and its cranked shaft with the pedal and the exhausting-bellows in manner as described, the elevation of the pedal

will be produced by the momentum of the fly-wheel while such fly-wheel may be in revolution. Thus the spring of the exhausting-bellows will be relieved of most if not all the duty of raising the pedal.

In the instrument hereinbefore explained the keys may be played automatically by the dent-plate, or they may be played by the hands of a performer, or they may be played partly by his hands and in other respects by the dent-plate, the time while the dent-plate may be in operation being regulated by the fly-wheel and its shaft rotated by the feet of the player acting through the pedals and their pitmen. It is therefore that

I claim as my invention—

1. For regulating the time of a musical instrument by the feet of a person, the combination of one or more fly-wheels, cranked shafts, and pedals with the automatic mechanism, which in such instrument may be used for actuating those parts of it by which its musical sounds are produced, such fly wheel or wheels, cranked shaft or shafts, and pedal or pedals being used substantially in manner as hereinbefore explained.

2. The arrangement of the exhausting-bellows *b*, the exhaust or vacuum bellows *a*, and the shaft M.

3. The improvement, as described, for operating the exhausting-bellows, the same consisting in the expansive spring of such bellows, the contractile strap *c*, the pulley *d*, the pedal, its rod Y, and the cranked shaft T, provided with a fly-wheel, as specified.

4. The combination of ungearing mechanism—viz., the slide O, the levers P Q', and rods Q Q<sup>2</sup>—with the mechanism for revolving the dent-plate and its supporting-gear.

5. The combination of the separate adjustable mandibles F F with the dent-plate M and the two series of bass and treble levers D thereof.

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