No. 747,816. PATENTED DEC. 22, 1903.

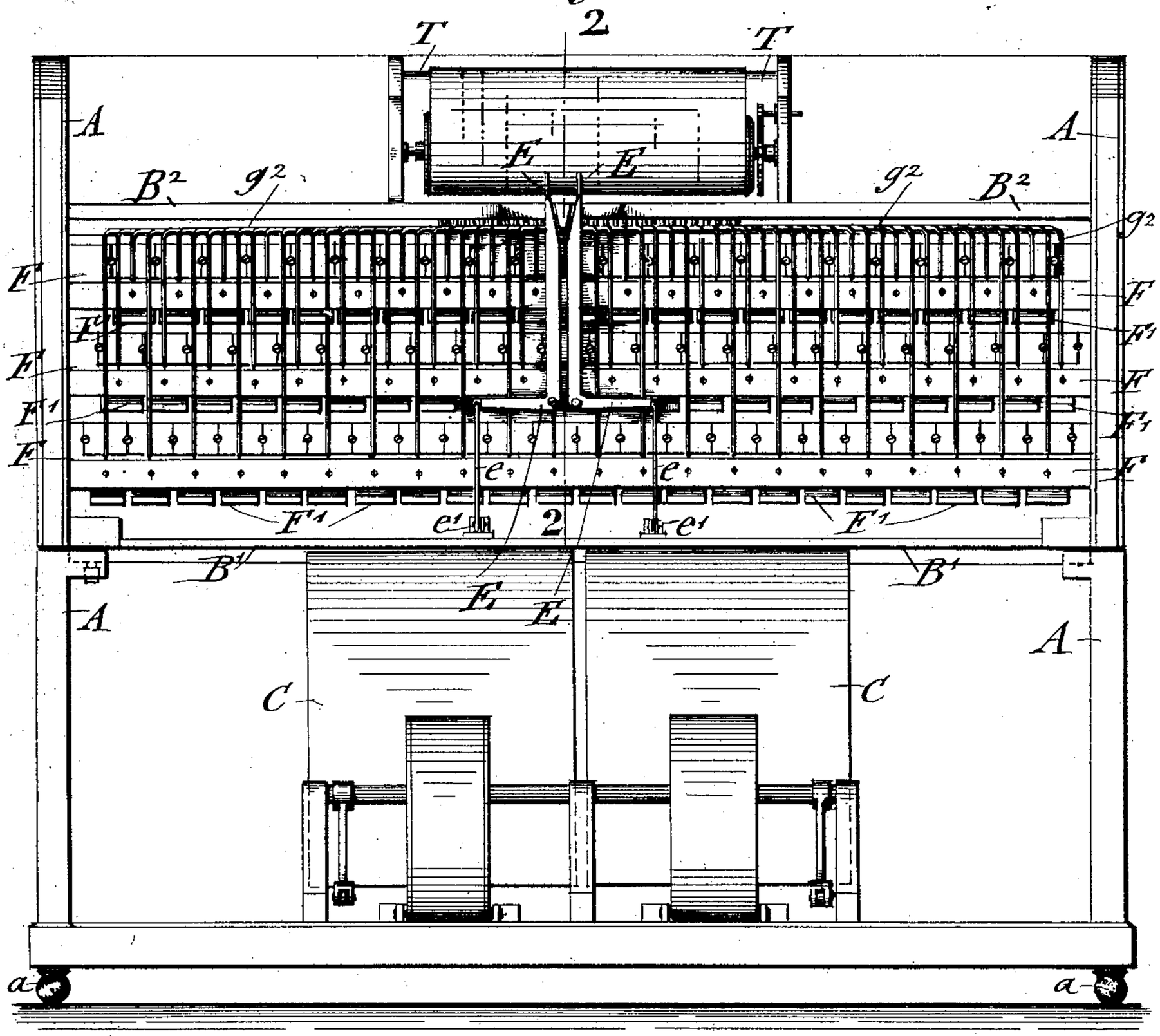
J. WIESER.

SELF PLAYING ATTACHMENT FOR PIANOS.

APPLICATION FILED MAY 18, 1903.

NO MODEL. 6 SHEETS—SHEET 1.

Fig: 1.



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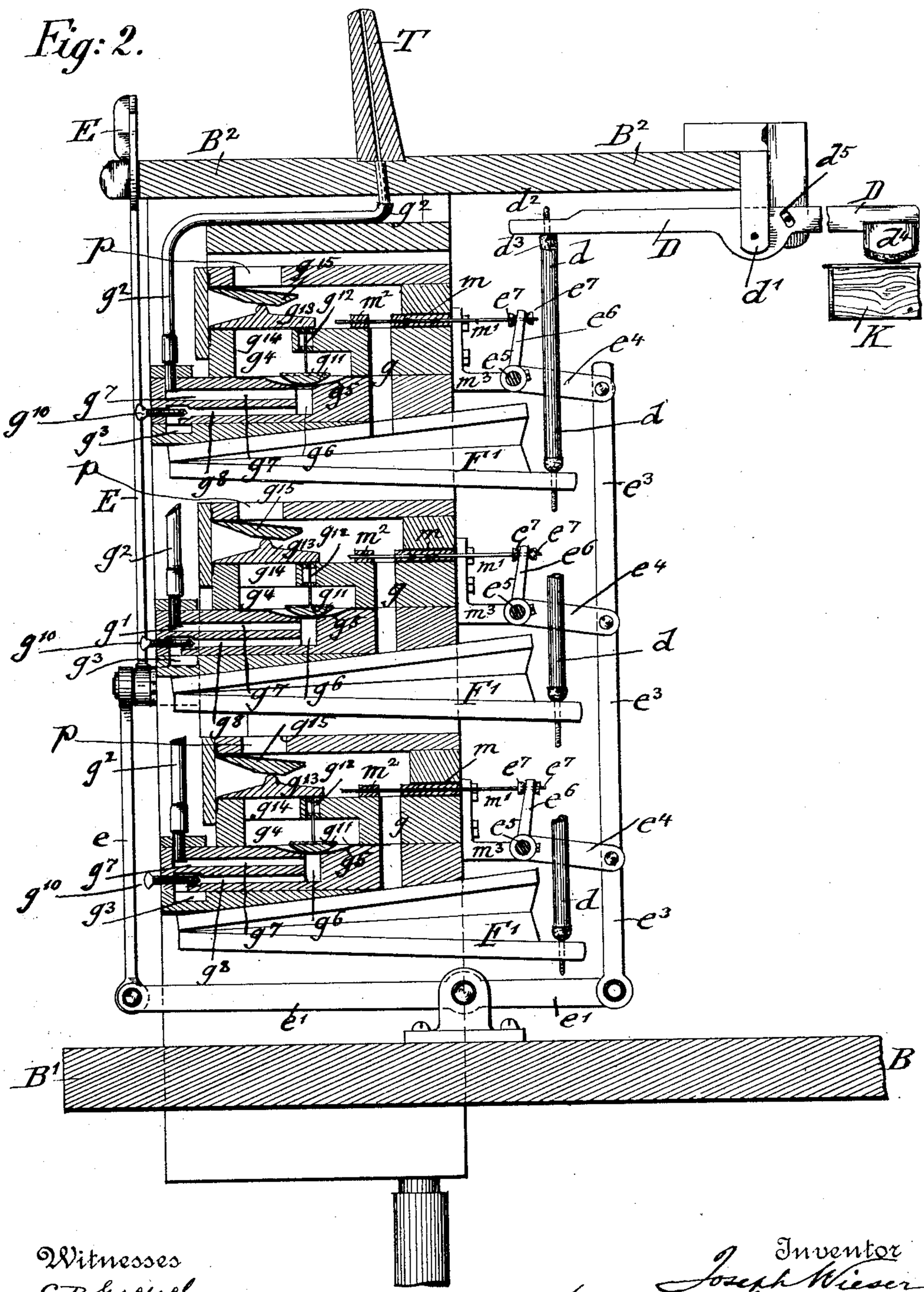
NO MODEL. 6 SHEETS—SHEET 2.

Fig: 2.



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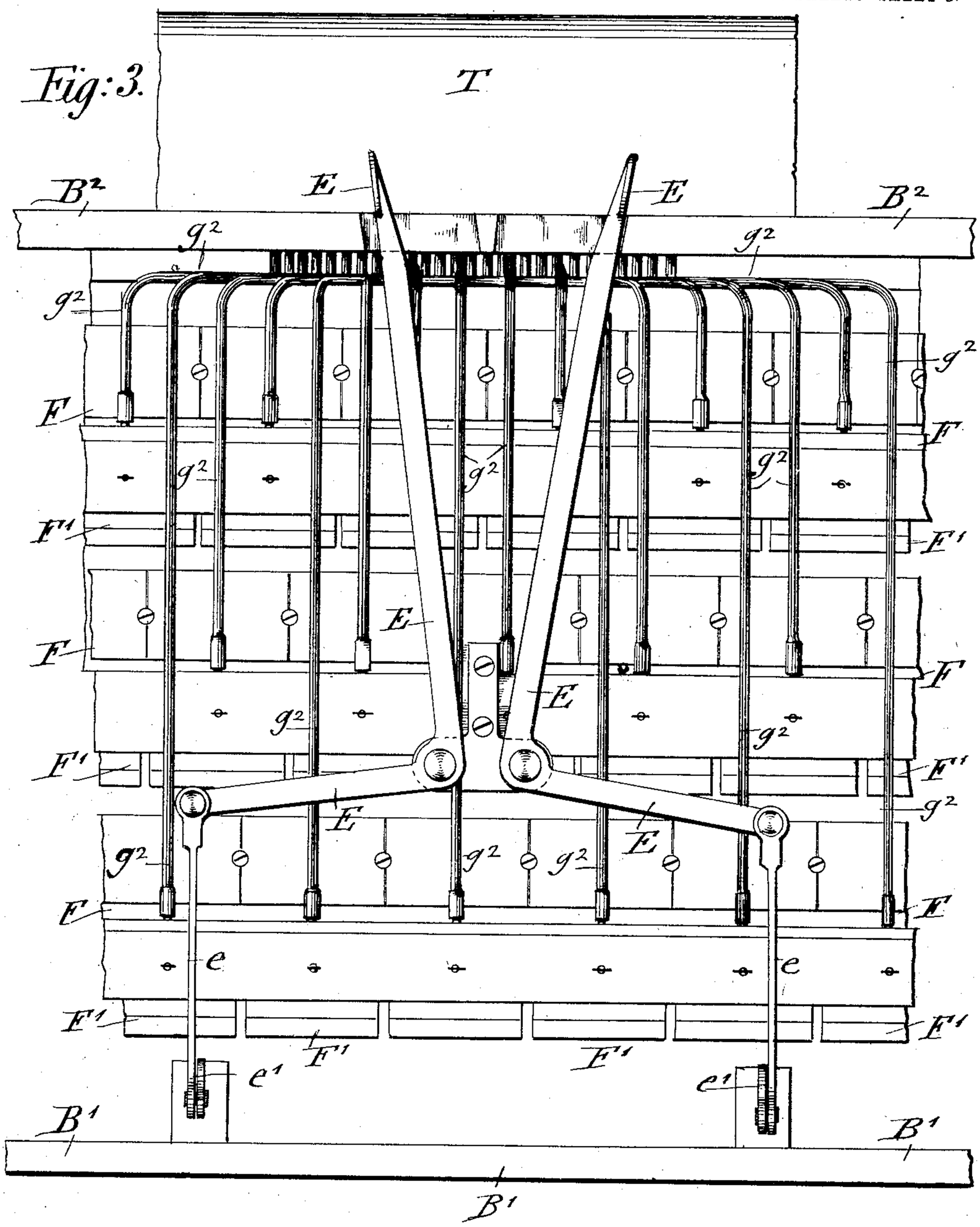
NO MODEL. 6 SHEETS—SHEET 3.

Fig: 3.



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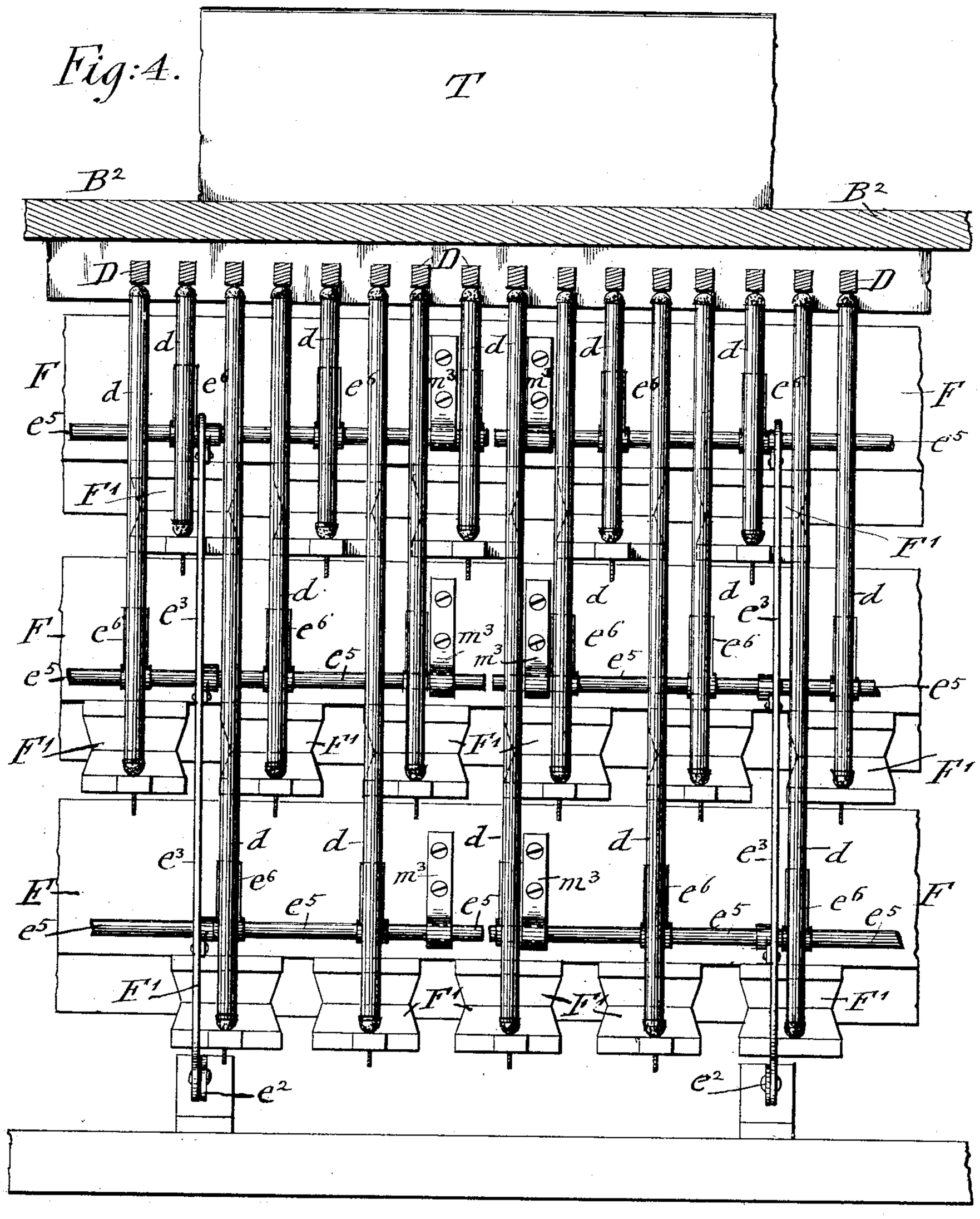
NO MODEL. 6 SHEETS—SHEET 4.

Fig: 4.



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NO MODEL. 6 SHEETS—SHEET 5.

Fig: 5.

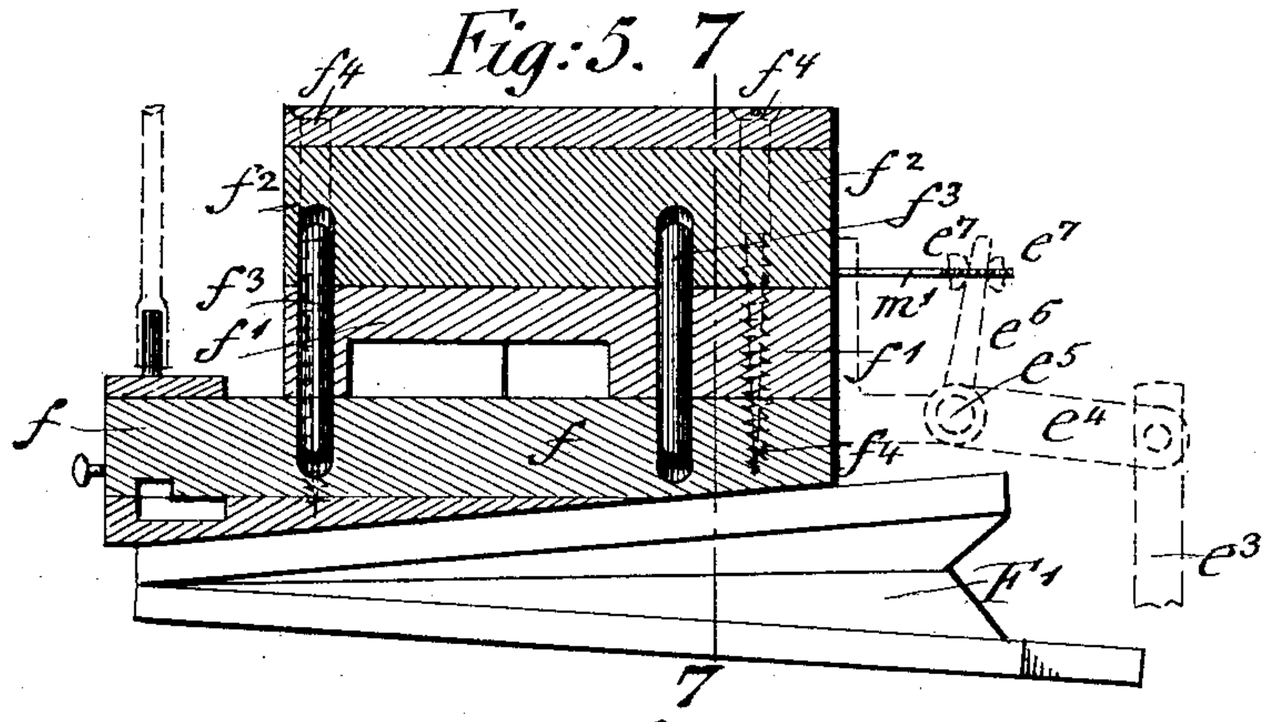


Fig: 6.

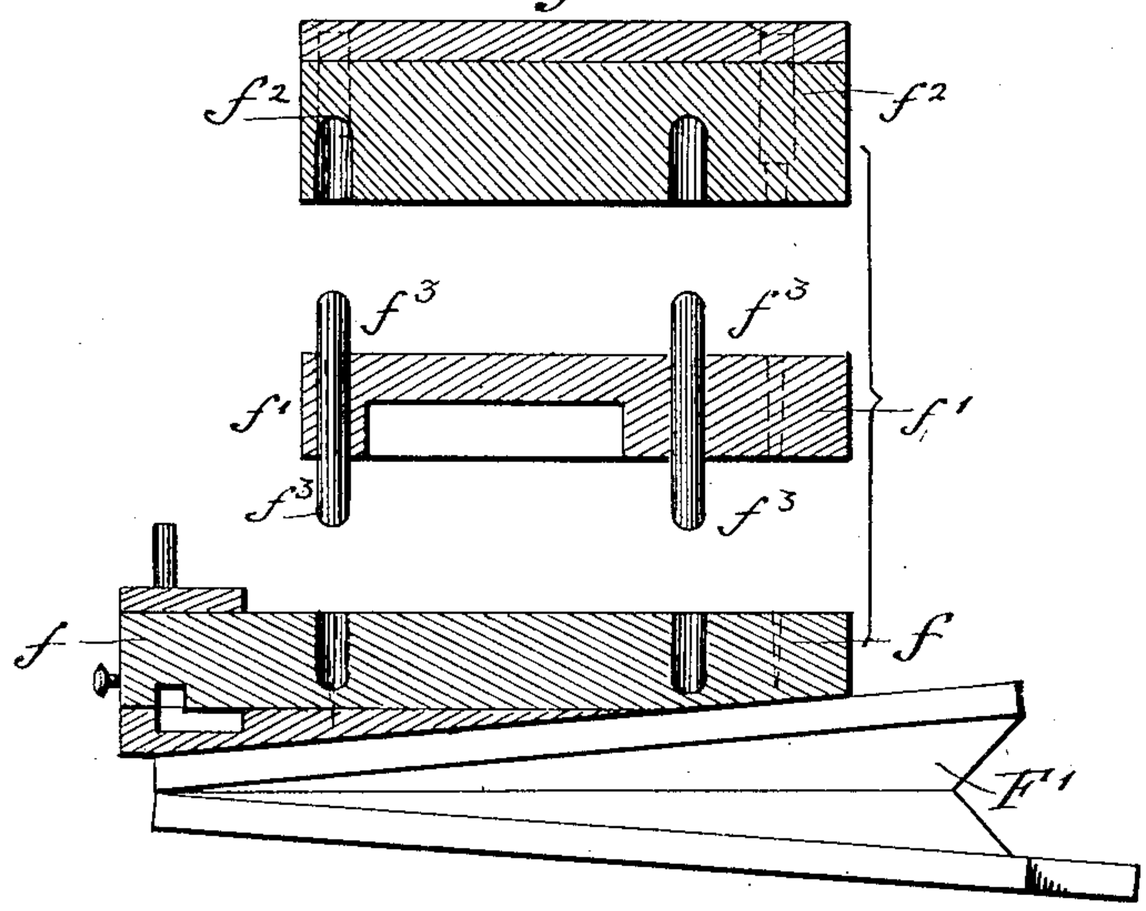
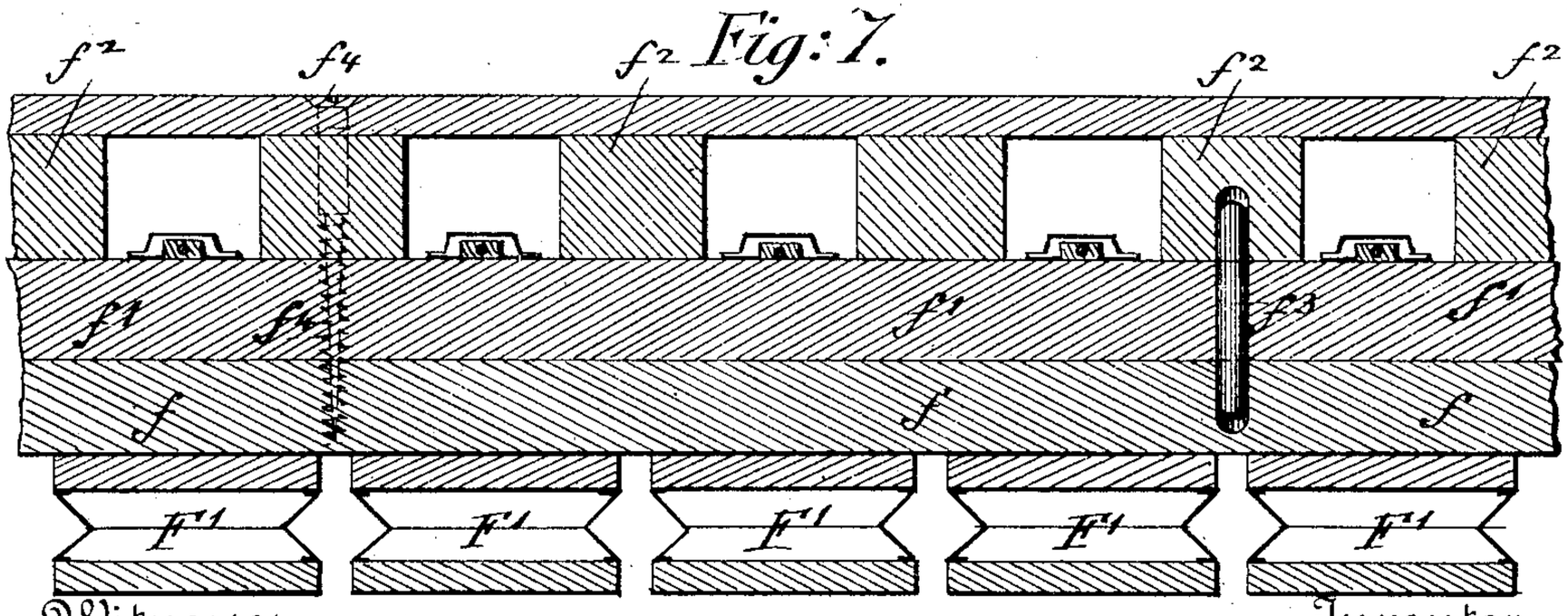


Fig: 7.



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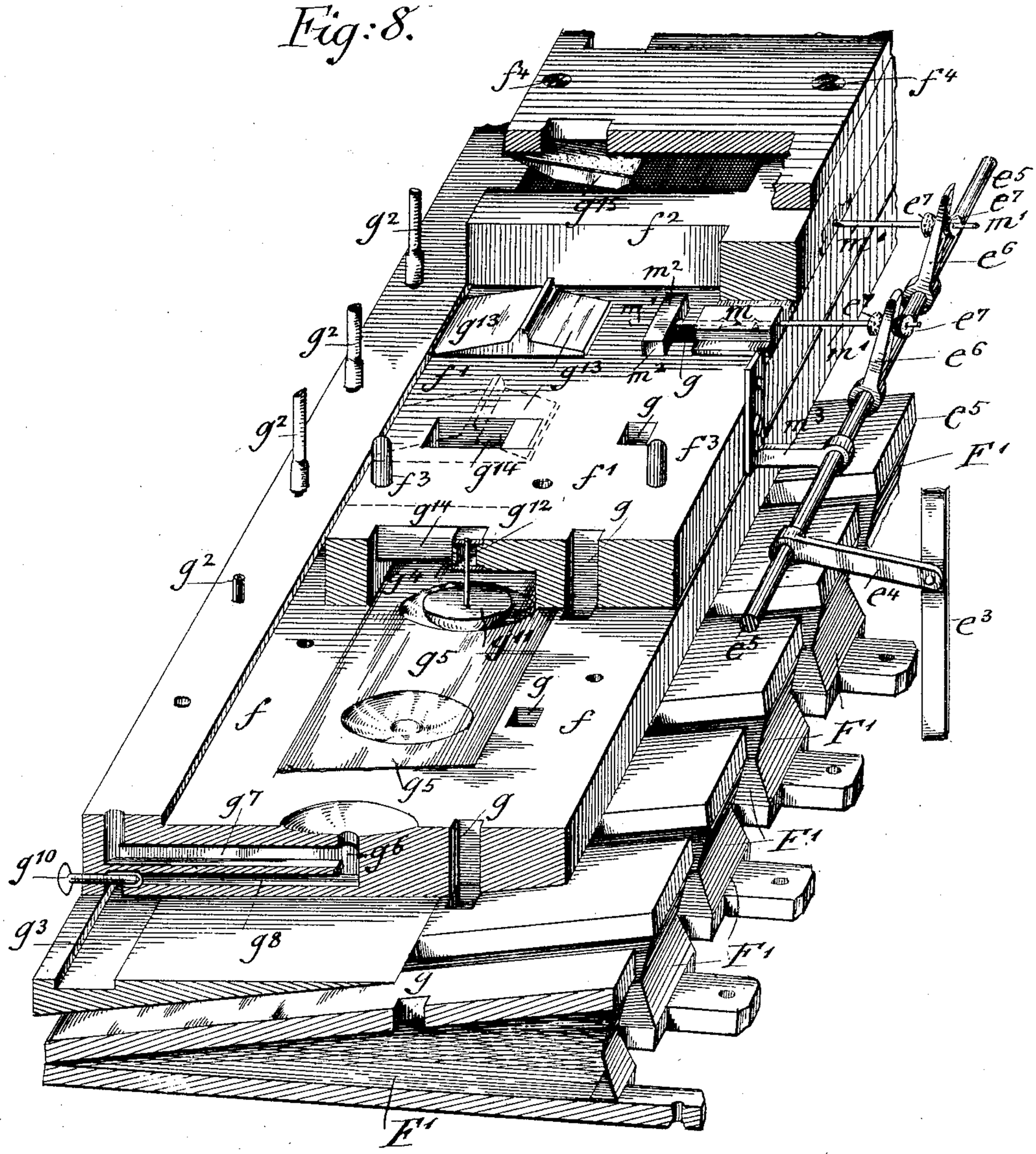
NO MODEL. 6 SHEETS—SHEET 6.

Fig: 8.



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No. 747,816. Patented December 22, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH WIESER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO KARL FINK, OF NEW YORK, N. Y.

SELF-PLAYING ATTACHMENT FOR PIANOS.

SPECIFICATION forming part of Letters Patent No. 747,816, dated December 22, 1903.

Application filed May 18, 1903. Serial No. 157,601. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WIESER, a citizen of the United States, residing in New York, borough of Brooklyn, and State of New York, have invented certain new and useful Improvements in Self-Playing Attachments for Pianos, of which the following is a specification.

This invention relates to certain improvements in self-playing attachments for pianos of that class which is made independently of the piano in a separate structure and moved up to the same, so that its rear end extends over the keyboard of the piano for playing it, which attachment is operated in connection with a perforated music-sheet and a series of pneumatic actions operated from the music-sheet by the tracker, the power for operating the attachment being given to the same either by means of foot-power or by an electric motor or otherwise, the improvements being more specifically designed for the purpose of controlling the expression of the piece of music to be played at the will of the player, so that a superior rendering of the piece of music is produced, inasmuch as the finger-levers by which the keys of the piano are operated are controlled in a better degree than heretofore by the pneumatic actions in the attachment; and for this purpose the invention consists of a pneumatic self-playing attachment for pianos which comprises a series of pneumatic valve-actions arranged in horizontal rows one above the other, channels for connecting each pneumatic valve-action with the tracker and the perforated music-sheet moved over the same, and a series of finger-levers which are connected by lifter-rods with the pneumatics of the different valves in connection with suction-regulating slide-valves, which are connected by suitable mechanism with so-called "expression-levers" arranged at the front part of the attachment.

The invention consists, further, in the specific construction of the pneumatic valve-actions and their suction-regulating slide-pieces; and the invention consists, lastly, in certain additional details of construction and combinations of parts, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved self-playing attachment for pianos, in which the front wall of the casing and the motor mechanism for the perforated music-sheet are removed. Fig. 2 is a vertical transverse section on line 2 2, Fig. 1, drawn on a larger scale. Fig. 3 is a front elevation of a portion of my improved self-playing attachment, showing the arrangement and location of the expression-levers at the front part of the same, said figure being drawn on a still larger scale. Fig. 4 is a rear elevation of a portion of the self-playing attachment, showing the lifter-rods operated by the pneumatics of the valve-actions, said portions being also drawn on a larger scale. Fig. 5 is a detail vertical transverse section through one of the valve-actions, showing the method of building up the parts of each action. Fig. 6 shows the parts of the valve-action separated from each other. Fig. 7 is a vertical longitudinal section through the valve-actions, taken on line 7 7 Fig. 5; and Fig. 8 is a perspective view of one row of pneumatic valve-actions shown as broken off at different points of the same, so as to illustrate the individual parts of each row of valve-actions in a clear and connected manner.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the upright side walls of my improved pneumatic self-playing attachment for pianos, which is supported on suitable casters *a*, so as to be movable. The side walls A support a horizontal partition-board B′, which divides the space into a lower and an upper part, in which lower part the pedal-operated suction-bellows C are arranged, by which the air is exhausted from the pneumatic valve-actions F and the tracker T, connected therewith, while in the upper part above the partition-board B′ are arranged three rows of valve-actions F, one above the other, as many valve-actions being necessary as there are keys of the piano to be actuated. The opposite ends of the different rows of pneumatic valve-actions are supported on the side walls A, which are provided with upright suction channels or ducts that are connected at their lower ends with the exhaust-bellows C, the upright

channels being opened or closed by means of slide-valves which are arranged on the horizontal partition B′ and which are operated by a so-called "rewinding-lever," which device is well known and not shown in the drawings. Each pneumatic valve-action F is provided at its lower part with a power-bellows or "pneumatic" proper, F′, the movable member or lid of which is connected by a lifter-rod *d* with a finger-lever D, that is supported at the rear end of a top board B^2 of the attachment. The number of finger-levers D corresponds with the number of valve-actions F and keys K of the keyboard of the piano to be operated. The finger-levers D are fulcrumed to a bar which is attached to the side walls and supported on the top board B^2, which is extended at the rear of the casing A beyond the valve-actions F and the pneumatics F′ operated thereby, so that the ends of the finger-levers D project sufficiently at the rear end of the attachment for permitting them to be moved into proper position vertically above the keys of the piano, as shown in Fig. 2. At the front part of the attachment are arranged two elbow-levers E, known as "expression-levers," which are fulcrumed at their elbows to the middle row of valve-actions, their upper longer arms projecting above the top board of the casing, so as to be actuated by the player in the usual manner, while the lower shorter arms are connected by pivot-rods *e* with fulcrumed levers *e′*, that extend backwardly below the lower row of valve-actions to the rear of the same, where they are connected with two upright pivot-rods e^3. The upright pivot-rods e^3 are connected by cranks e^4 with horizontal rock-shafts e^5, one for each row of valve-actions, which rock-shafts turn in suitable bearings of brackets m^3 on the rear walls of the valve-actions F. The rock-shafts e^5 are provided each with as many crank-arms e^6 as there are individual valve-actions, the crank-arms e^6 being connected by means of buttons e^7 with the stems *m′* of regulating slide-valves *m*, so that by moving the expression-levers E more or less the slide-valves *m*, and thereby the valve-actions F, are opened to a greater or less degree, so that thereby the motion of the pneumatics and by the same the touch of the finger-levers on the keys of the piano and the expression of the same are controlled. Each row of valve-actions F is built up of three individual sections *f f′* f^2, as shown in Figs. 5, 6, and 7, which are connected by means of registering pins f^3, that pass through holes in the intermediate sections and engage socket-holes in the lower and upper sections *f* and f^2, and by means of wood-screws f^4 of sufficient length so as to connect the upper sections f^2 with the intermediate sections *f′* and the bottom sections *f*, the connecting-screws f^4 serving for fastening the sections together, while the pins f^3 serve for properly registering the same. By unscrewing the fastening-screws f^4 the individual sections can be readily separated from each other in case repairs would be required, while they may be readily assembled, the pins and sockets serving for the convenient assembling or building up of the sections of each row of valve-actions. The pins f^3 are glued permanently into the middle section *f′*, but inserted loosely into the sockets at the bottom and top sections *f* and f^2. By this arrangement the individual sections of each row of valve-actions can be independently made up and the different rows of valve-actions built up from the bottom row upward until all the rows of valve-actions are properly assembled and ready for being placed in the casing of the attachment. Each row of valve-actions is attached to the supporting-casing A at its ends and can be removed independently for inspection and repairs without removing the remaining rows of valve-actions. The pneumatics F′ are attached to the lower sections *f* and connected with the upper sections f^2 of the valve-actions by channels *g*, while in the lower sections of the valve-actions are arranged channels g^7, which are connected by flexible tubes g^2 with the tracker T, that is arranged on the top board B^2 midway of the casing, as shown clearly in Fig. 2. The upper ends of the tubes g^2 of the different valve-actions F are connected with the suction-openings at the lower part of the tracker in the usual manner. The lower section of each pneumatic valve-action F is connected with the suction-channel of the main suction-bellows C by horizontal channels g^3, while the middle section *f′* of each valve-section F is connected with the suction-channel of the suction-bellows C by a horizontal channel g^4, which is separated from the lower section *f* of the valve-action by a diaphragm g^5, of leather or other flexible suitable material, interposed between the middle and lower sections, as shown clearly in Figs. 2 and 8. A duct g^6 below each diaphragm g^5 communicates by the channel g^7 with the tracker-tube g^2 and by a channel g^8 with the channel g^3 and the suction-channel of the suction-bellows C. The channel g^8, which connects the channel g^3 with the duct g^6 below the diaphragm g^5, is opened to a greater or less extent by a screw g^{10}, by which the escape of air through the suction-channel g^8 is regulated, so as to accelerate or retard thereby the return of the diaphragm into its normal position after the pneumatic valve-action has been operated. The diaphragm g^5 operates a button g^{11}, which rests on the same and which is provided with a stem g^{12}, that is freely guided in the middle section, said stem acting by its upper end on a hinged flap-valve g^{13}, which separates the middle section from the upper section of the valve-action and which closes a duct g^{14}, connected with the channel g^4 in the middle section of the valve-action when the flap-valve g^{13} is in its lower position, but opens the same when the valve is opened by the diaphragm g^5. To the under side of the upper section

f^3 is hinged a flap-valve g^{15}, which rests on the flap-valve g^{13}, so that when the latter is closed atmospheric air can pass through the upper section f^2 and duct g to the pneumatic and permit it to expand. Due to the suction action of the suction-bellows C on the channels g^3 and g^4, a "vacuum equilibrium" is established, and the diaphragm g^5 and button g^{11} resting thereon are in their normal positions, as shown in Fig. 2. As soon, however, as one of the openings in the perforated music-sheet passes over the tracker T, connected by the tube g^2 and channel g^7 with the duct g^6, atmospheric pressure is established in the duct g^6 and the suction on the diaphragm g^5 released, so that the button g^{11} resting thereon is lifted and the flap-valve g^{13} opened by the stem of the flap-valve. The hinged valve g^{15} closes thereby the port p, which is connected with the atmosphere, so that atmospheric air cannot pass into the upper section of the valve-action and to the pneumatic; but as the valve g^{13} is open and the duct g is thereby connected with the channel g^4, a suction action is exerted on the pneumatics F′ and the same caused to collapse. The lifter-rod d, the key-operating lever D, and the key of the piano are thereby actuated. When the tracker-ducts g^2 are closed by the music-sheet, the flap-valves g^{13} are returned to their normal positions, the quick or slow return of the parts being regulated by the amount of suction through the narrow suction-channel g^8, which suction can be regulated at will by the set-screw g^{10}. On the upper side of each middle section f' is guided the suction-regulating slide-valve m, the stem of which is guided in the rear wall of the valve-action and connected with the crank-arm e^6 of the rock-shaft e^5, as before described. Said suction-regulating slide-valve m opens more or less the vertical duct g, which connects the upper with the lower section f by the oscillating motion of the expression-levers E and controls thereby the expression of the key, as required by the piece of music to be played. The stems m' of the suction-regulating slide-valves m are extended into the upper sections f^2 of the valve-actions and are guided in a stationary block m^2, as shown clearly in Fig. 2 and the upper part of Fig. 8, so that a reliable motion of the slide-valves m is obtained. By moving the slide-valves m more or less over the ducts g, leading to the pneumatics, the suction action of the main suction-bellows on the pneumatics, and thereby the strokes of the finger-levers on the keys and the forte or piano playing of the same—in other words, the expression—is controlled.

The finger-levers D are fulcrumed to stationary hangers d', attached to the rear end of the top board B^2. The finger-levers D are provided at their front ends with perforations for the pins d^2 of the lifter-rods d, which latter are provided with the usual felt cushions d^3 for lifting the front ends of the finger-levers D whenever their pneumatics are actuated. To the rear end of each finger-lever D is attached a felt-covered head d^4, by which the key on the keyboard of the piano is actuated. The finger-levers D are arranged in two sets, one for playing the white keys and the other set for playing the black keys of the piano, the latter set being longer, so as to extend back over the black keys. The finger-levers for the white keys are provided back of their pivots with curved slots d^5 for the pivot-rods of the black keys, which slots permit the free play of the finger-levers for the white keys without interfering with the finger-levers of the black keys.

The expression-levers E at the front part of the self-playing attachment regulate by their connection with the suction-regulating slide-valves m of all the valve-actions the expression of every action, and thereby the stroke of the finger-levers on the keys of the keyboard without requiring any intermediate registering or other mechanism by which the pneumatic actions of each row or group of the same are simultaneously operated. By providing an individual expression-regulating slide-valve for each valve-action every action can be regulated independently of the other to a nicety by opening the valve more or less, so that the "expression" of the entire attachment is considerably improved and rendered superior to the devices heretofore used for this purpose. As the left-hand expression-lever is connected with one group of valve-actions, which we may term the "bass-actions," and the right-hand lever with the valve-actions that control the middle and treble keys, which may be termed the "treble-actions," the player can vary the expression of the piece of music played on the piano by opening the slide-valve of the actions more or less for the bass or treble, according as the bass or treble is to predominate at the time, so that thereby not only greater freedom of execution can be given to the music played by the attachment, but also the monotony and the uniformity of mechanically-played music be to a considerable extent obviated.

My improved self-playing attachment for pianos has the following advantages: first, that the valve-actions are so constructed that every individual action can be readily inspected and repaired whenever required; secondly, that the different rows of valve-actions can be independently removed for repairs; thirdly, that the expression can be regulated at the will of the player by operating the expression-levers which control the suction-regulating slide-valves of all the pneumatic actions of the entire attachment, so that the piece of music can be more perfectly played according to the individual taste and capacity of the operator; fourthly, that all the parts of the self-playing attachment can be manufactured separately and assembled in a very quick and convenient manner, so that

the cost of the attachment can be considerably reduced.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions, pneumatics for the same, key-levers operated by the pneumatics, and pneumatic connections for said valve-actions, of expression-regulating devices, one for each valve-action, capable of gradual variation, substantially as set forth.

2. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions, pneumatics for the same, key-levers operated by the pneumatics, and pneumatic connections for said valve-actions, of expression-regulating devices, one for each valve-action, controllable during their movement, and means for moving said expression devices, substantially as set forth.

3. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions, pneumatics for the same, key-levers operated by the pneumatics, and pneumatic connections for said valve-actions, of pressure-regulating slide-valves, one for each valve-action, and means for operating said slide-valves, substantially as set forth.

4. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions, pneumatics for the same, key-levers operated by the pneumatics and pneumatic connections for said valve-actions, of shiftable expression-regulating devices, one for each valve-action, and a lever mechanism for operating said expression devices actuated at the front of the attachment, substantially as set forth.

5. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions, pneumatics for the same, key-levers operated by the pneumatics, and pneumatic connections for said valve-actions, of expression-regulating slide-valves one for each valve-action, means for operating said slide-valves, and means for guiding and limiting the motion of the same, substantially as set forth.

6. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions and pneumatic connections for the same, of a series of key-actuating pneumatics controlled by said valve-actions, a series of key-levers operated by said pneumatics, expression-regulating devices, one for each valve-action, controllable during their movement, and means for moving said expression devices adapted to operate the same simultaneously or in separate groups, substantially as set forth.

7. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions and pneumatic connections for the same, of a series of key-actuating pneumatics controlled by said valve-actions, a series of levers operated by said pneumatics, expression-regulating slide-valves, one for each valve-action, and means for operating said slide-valves simultaneously or in separate groups, substantially as set forth.

8. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions and pneumatic connections for the same, of key-operating pneumatics controlled by said valve-actions, a series of finger-levers, means on said pneumatics for actuating said finger-levers, shiftable expression-regulating devices, one for each valve-action, and lever mechanisms for operating all of said devices at the same time or in separate groups, substantially as set forth.

9. In a self-playing attachment for musical instruments, the combination, with a series of pneumatic valve-actions and pneumatic connections for the same, of key-operating pneumatics operated by said valve-actions, a series of finger-levers, lifter-rods between said pneumatics and finger-levers, expression-regulating slide-valves one for each valve-action, and lever mechanisms for operating all of said slide-valves at the same time or in separate groups, substantially as set forth.

10. In a self-playing attachment for musical instruments, the combination, with a series of pneumatic valve-actions and pneumatic connections for the same, of channels connecting said valve-actions with the suction-channels of the tracker, channels connecting said valve-actions with the suction-bellows, pneumatics operated by said valve-actions, finger-levers, means on said pneumatics for actuating finger-levers, expression-regulating slide-valves one for each valve-action adapted to regulate the supply of air to the key-operating pneumatics, expression-levers for operating said expression-regulating slide-valves, and intermediate lever mechanism between said levers and the slide-valves of the different valve-actions, substantially as set forth.

11. In a self-playing attachment for musical instruments, the combination with a series of pneumatic valve-actions and pneumatic connections for the same, of channels connecting said valve-actions with the channels of the tracker, channels connecting said valve-actions with the suction-bellows, pneumatics controlled by said valve-actions, finger-levers, means on said pneumatics for actuating said finger-levers, expression-regulating slide-valves one for each valve-action so as to regulate the size of the suction air-ducts leading to the pneumatics, means for guiding said slide-valves, expression-levers arranged at the front of the pneumatic valve-actions, and lever mechanisms between said expression-levers and the expression-regulating slide-valves, substantially as set forth.

12. In a self-playing attachment for musical

instruments, a lower, middle and upper section each provided with cavities and ducts so that when superposed they form valve-actions, registering devices secured to the middle section for detachably connecting the same with the upper and lower sections, and fastening means for the sections, substantially as set forth.

13. In a self-playing attachment for musical instruments, a plurality of individual sections each provided with cavities and ducts so that when superposed they form valve-actions, registering-pins attached to one of said sections for engaging sockets of the other sections, and fastening means for the sections, substantially as set forth.

14. In a self-playing attachment for musical instruments, a lower, middle and upper section each provided with cavities and ducts so that when superposed they form valve-actions, said upper and lower sections being provided with sockets, registering-pins engaging said sockets, secured to the middle section for detachably connecting the same with the other sections, and fastening means for the sections, substantially as set forth.

15. In a self-playing attachment for musical instruments, a plurality of individual sections, comprising a lower, middle and upper section, each provided with cavities and ducts so that when superposed they form valve-actions, registering-pins attached to the middle section, fastening-screws for the sections, the lower and upper sections being provided with sockets for connecting the same with the registering-pins of the middle sections, substantially as set forth.

16. In a self-playing attachment for musical instruments, the combination with a plurality of individual sections each provided with cavities and ducts so that when superposed they form valve-actions, pneumatic connections for the so-formed valve-actions, and key-operating pneumatics controlled by the valve-actions, of shiftable expression devices, one for each valve-action, in the ducts leading to the pneumatics, and means for operating said devices so as to increase or decrease the size of the connecting-ducts, substantially as set forth.

17. In a self-playing attachment for musical instruments, the combination with a plurality of individual sections each provided with cavities and ducts so that when superposed they form valve-actions, pneumatic connections for said valve-actions, and key-operating pneumatics controlled by said valve-actions, of expression-regulating slide-valves, one for each valve-action, in the ducts leading to the pneumatics, and means for operating said slide-valves so as to increase or decrease the size of the ducts, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOSEPH WIESER.

Witnesses:
PAUL GOEPEL,
C. P. GOEPEL.