H. A. CLAUSING.

PLAYER PIANO.

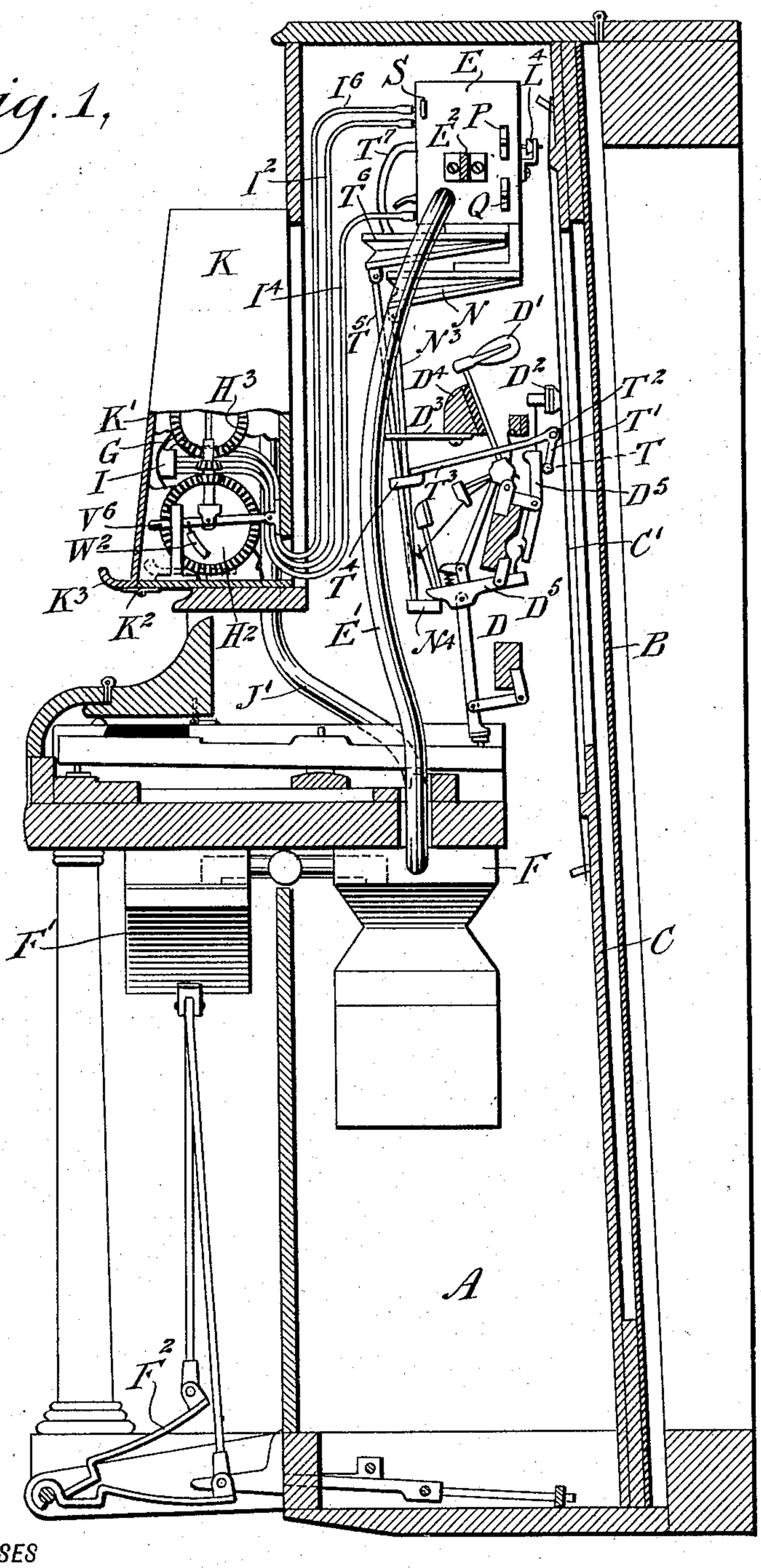
APPLICATION FILED NOV. 27, 1912.

1,167,271.

Patented Jan. 4, 1916.

5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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5 SHEETS—SHEET 2.

Fig. 3,

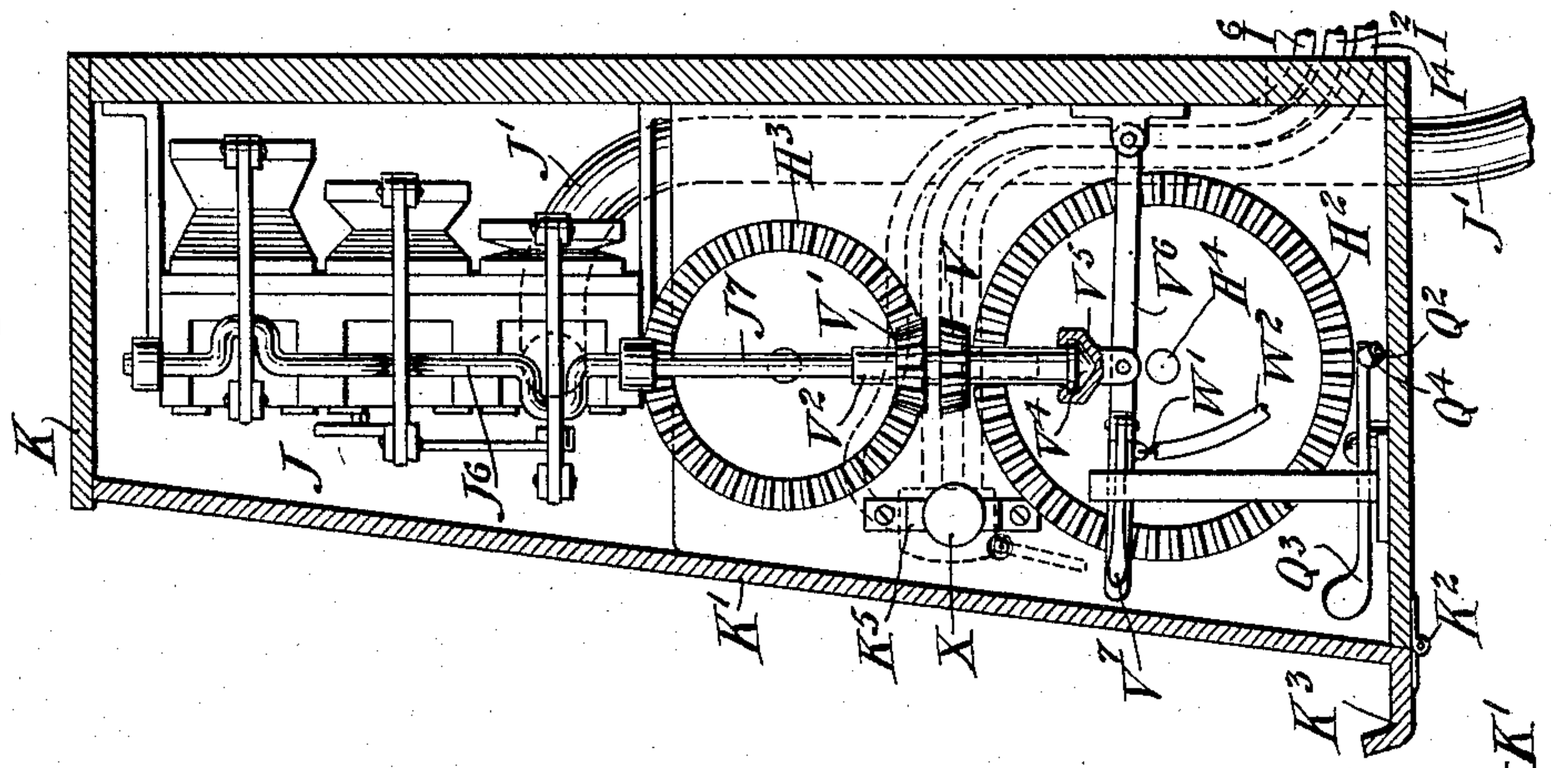
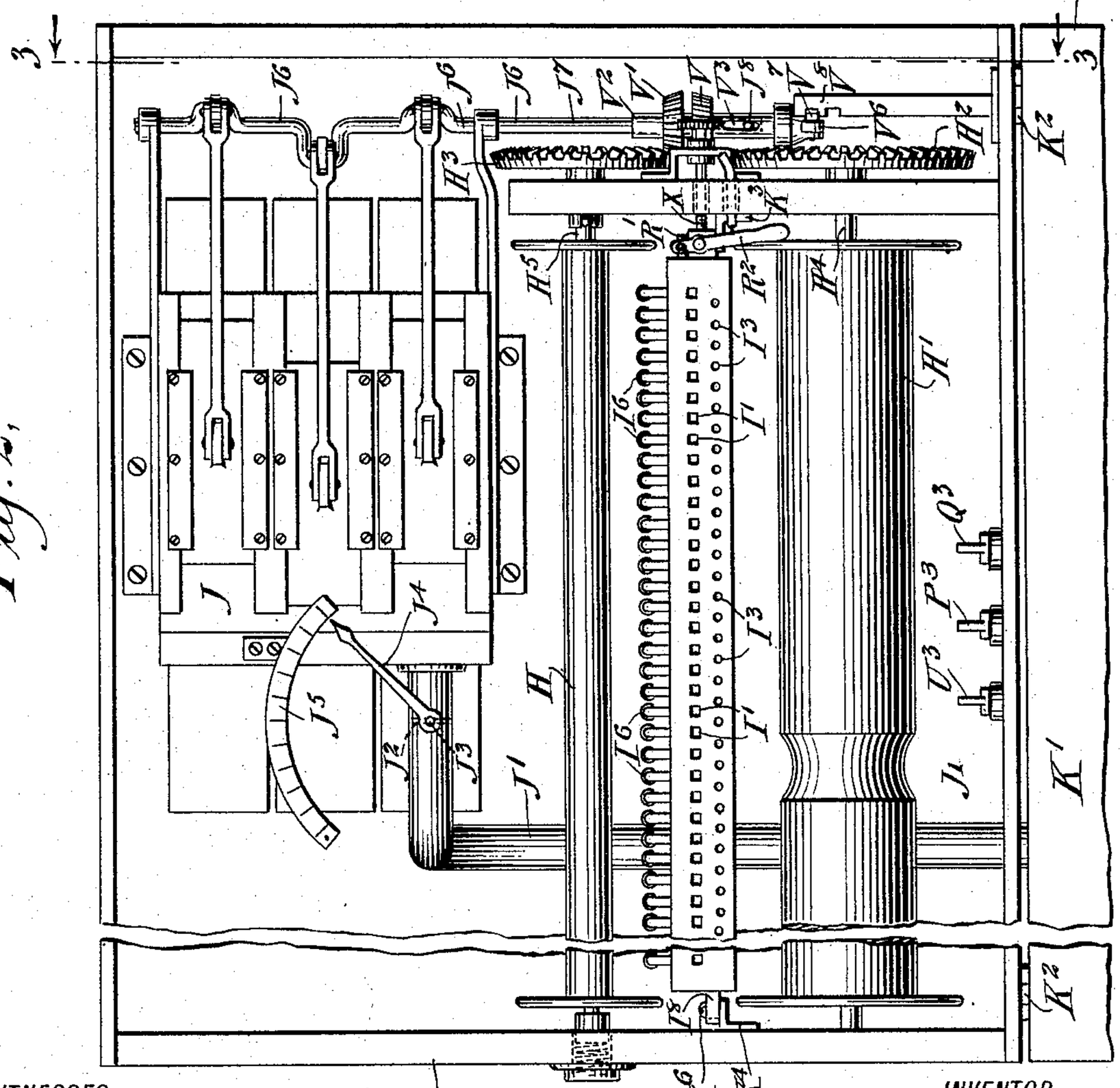


Fig. 2,



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5 SHEETS—SHEET 3.

Fig. 4,

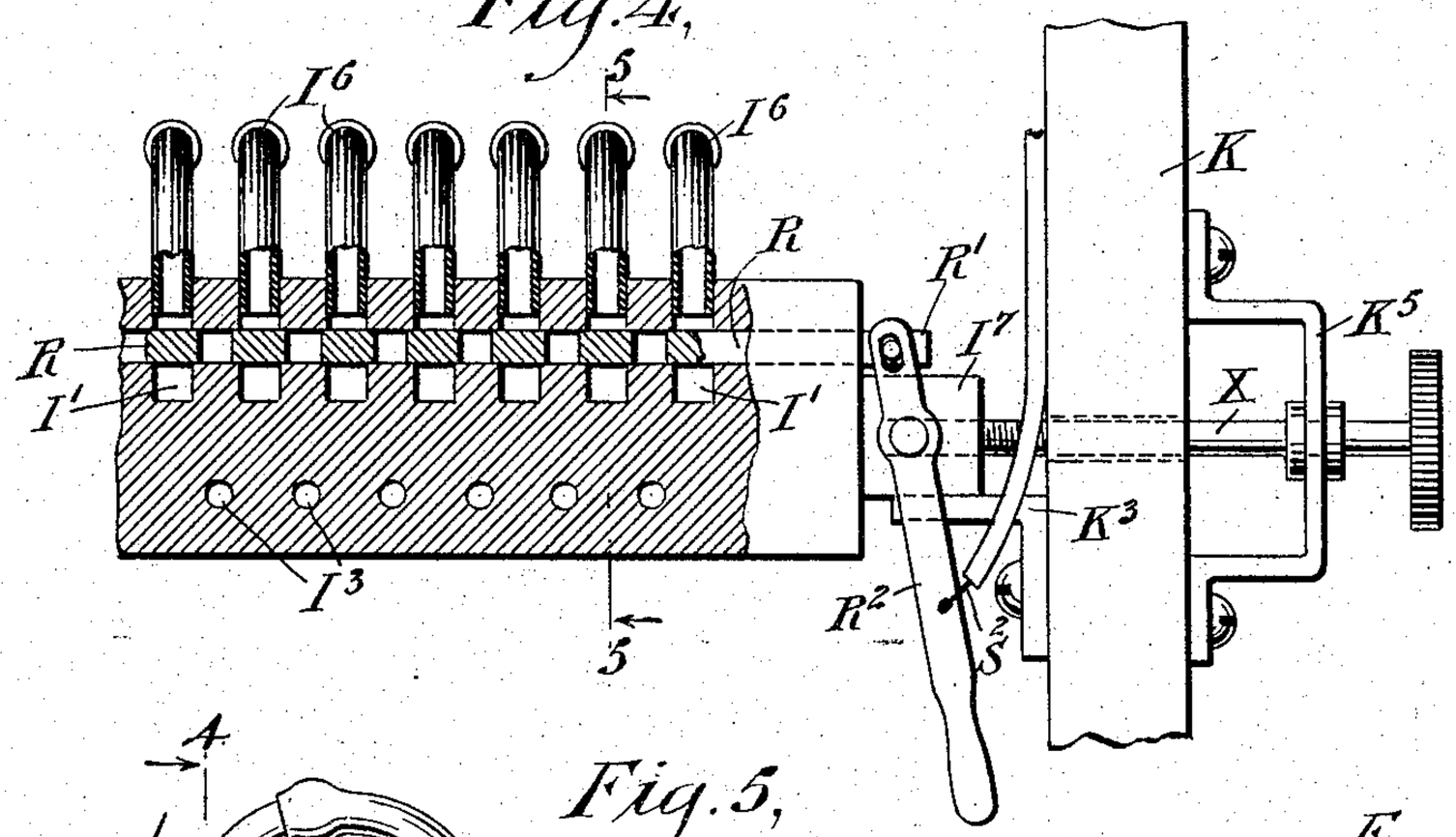


Fig. 5,

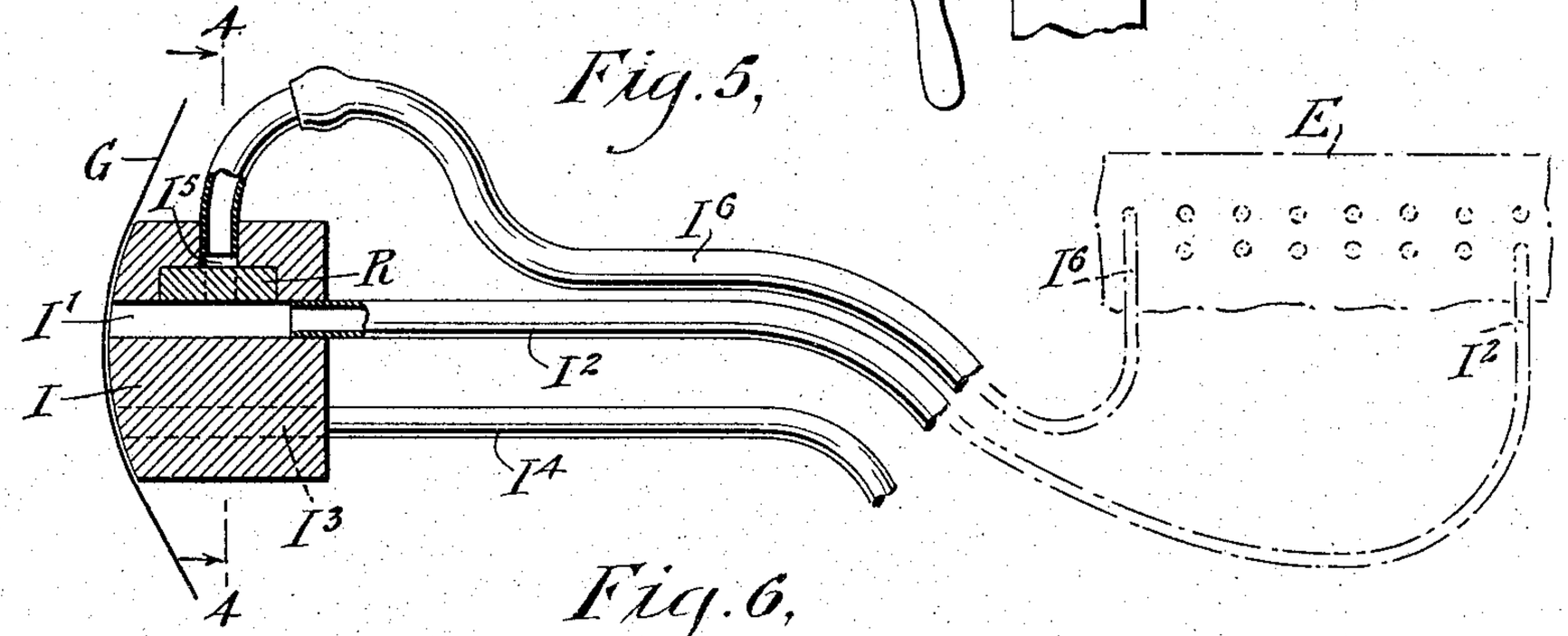
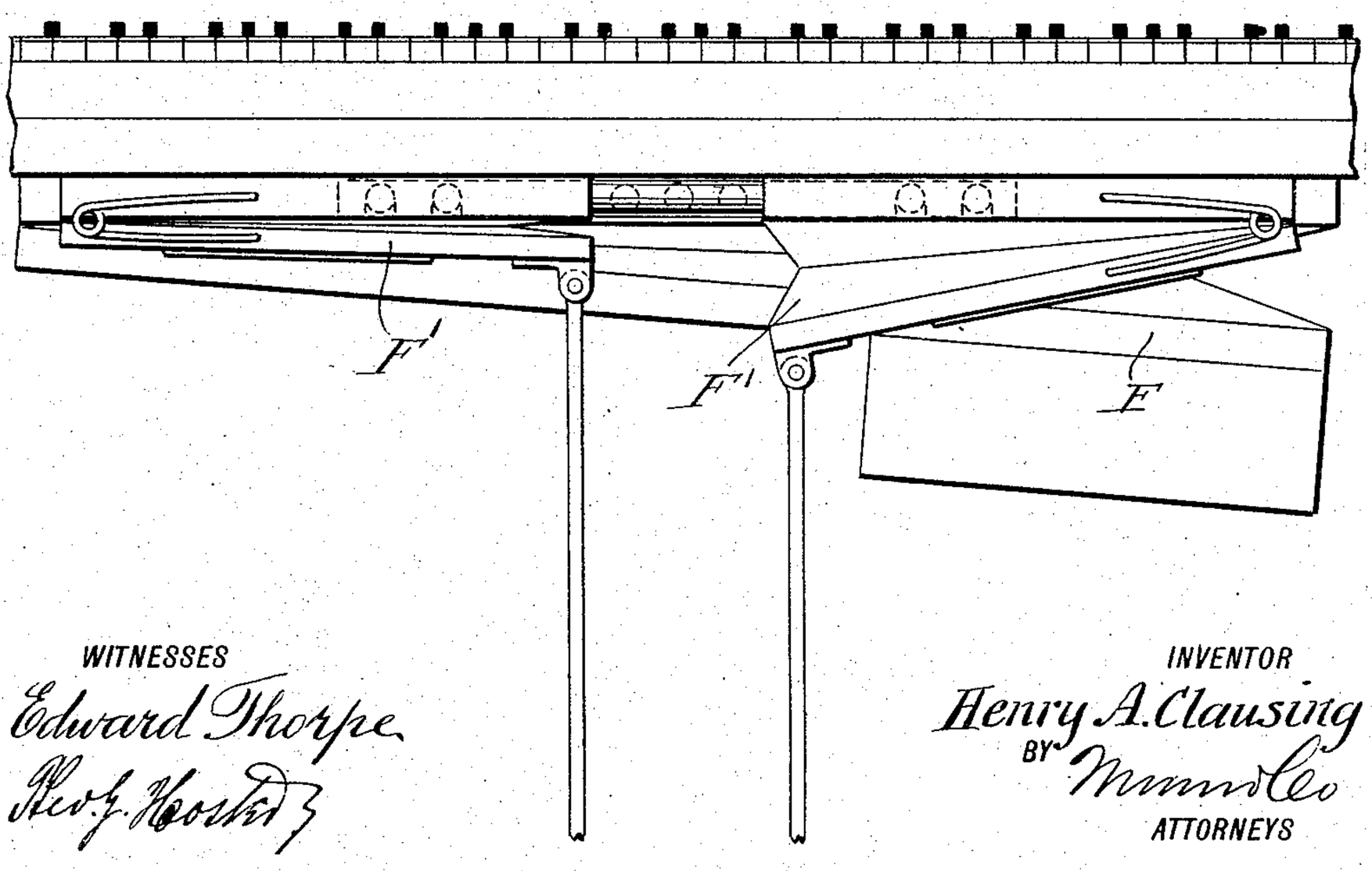


Fig. 6,



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5 SHEETS—SHEET 4.

Fig. 7,

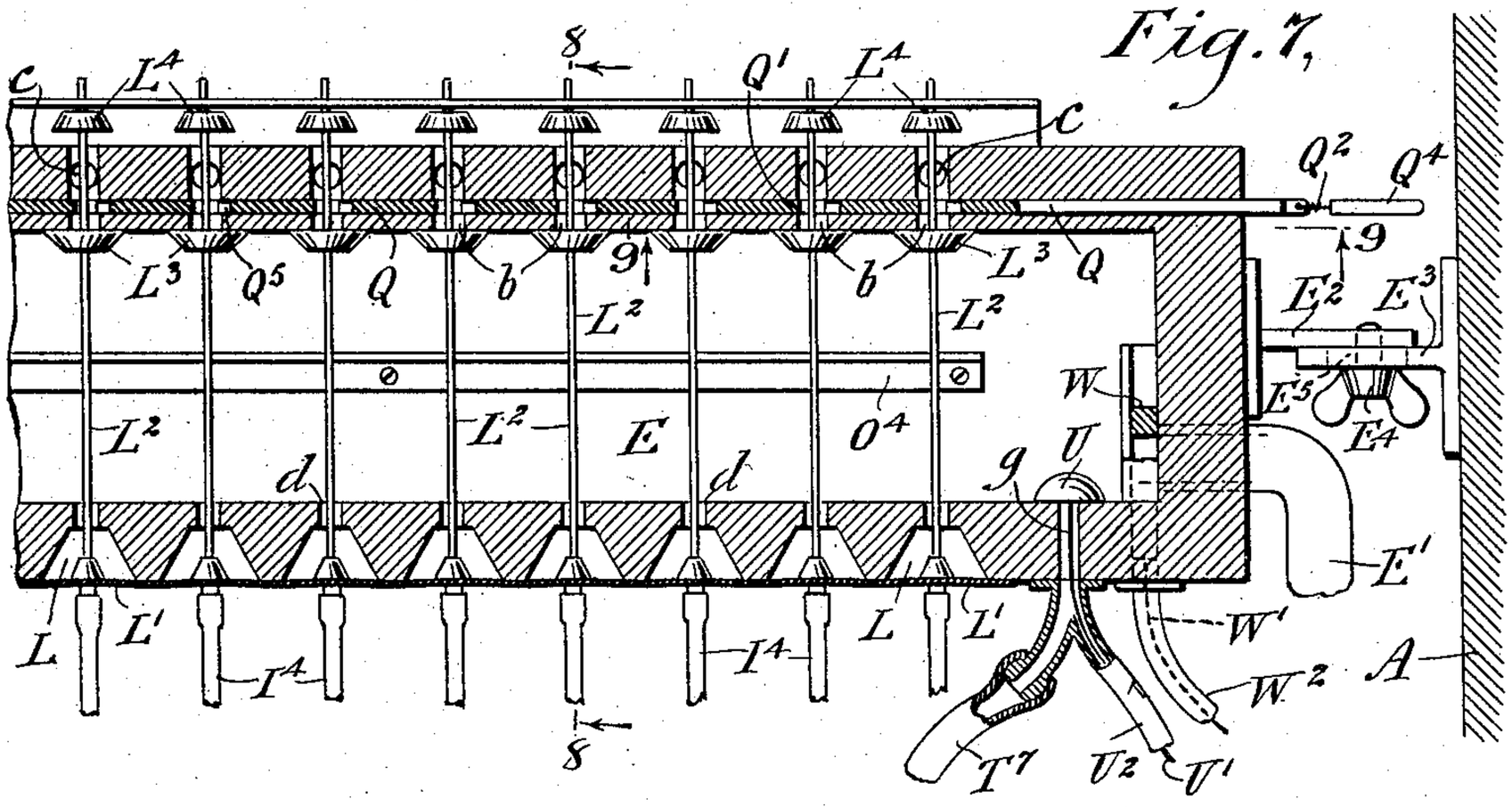

Fig. 8,

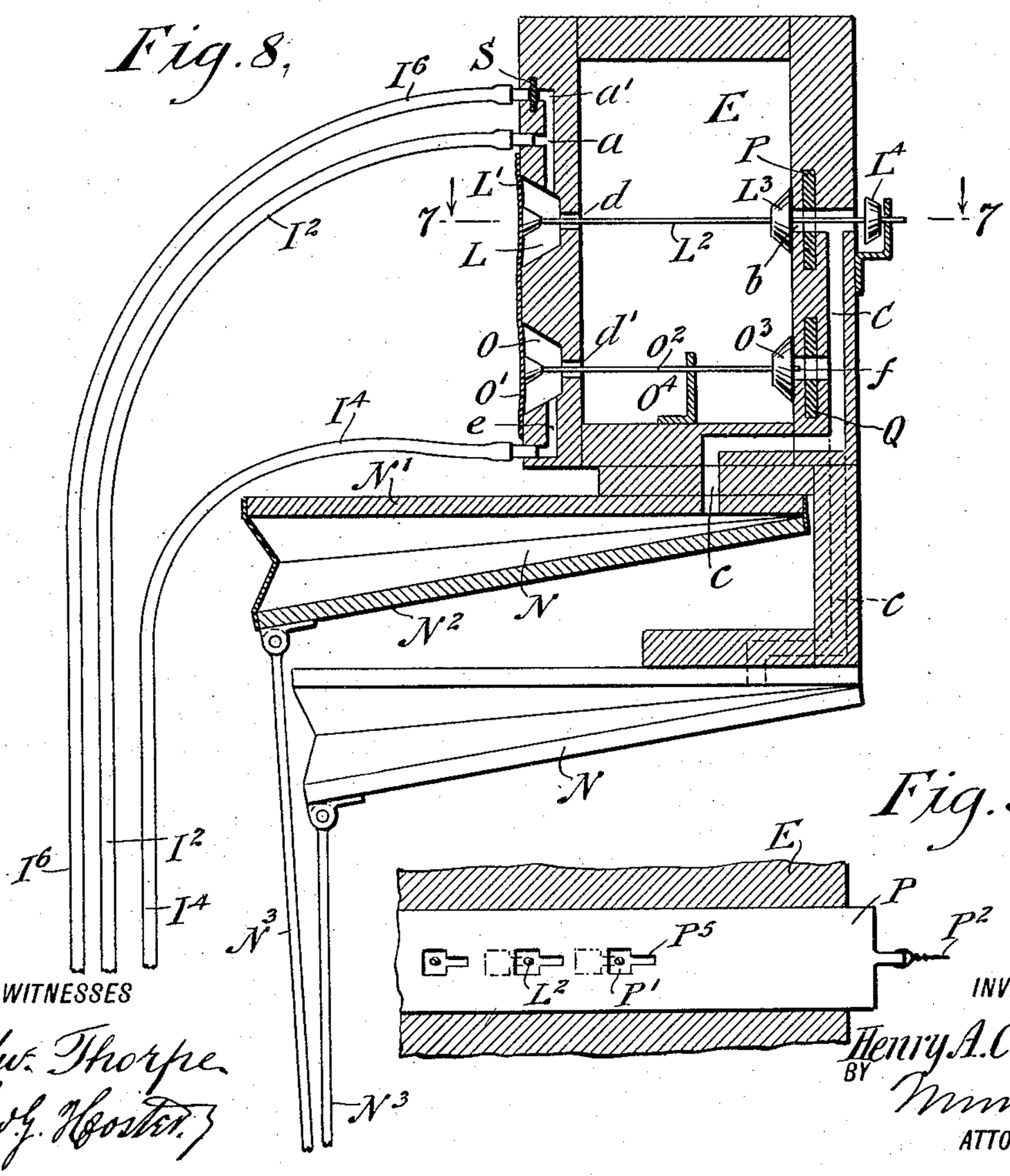

Fig. 9,

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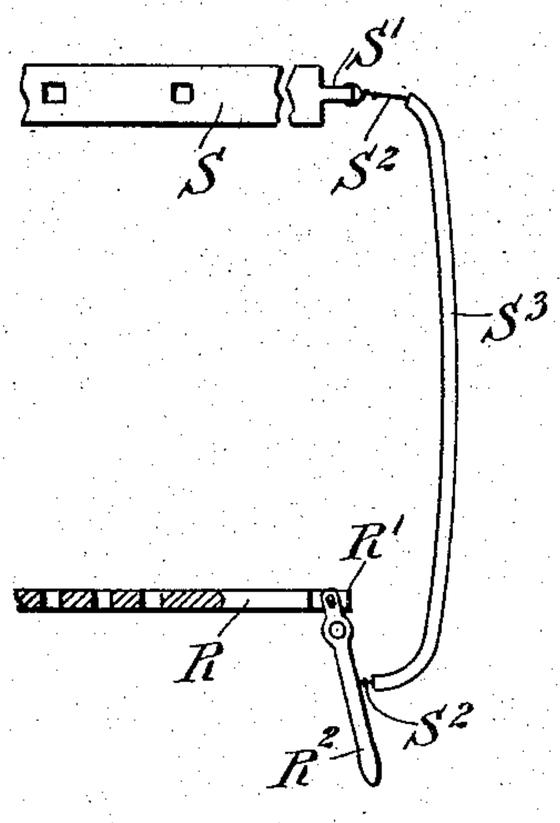
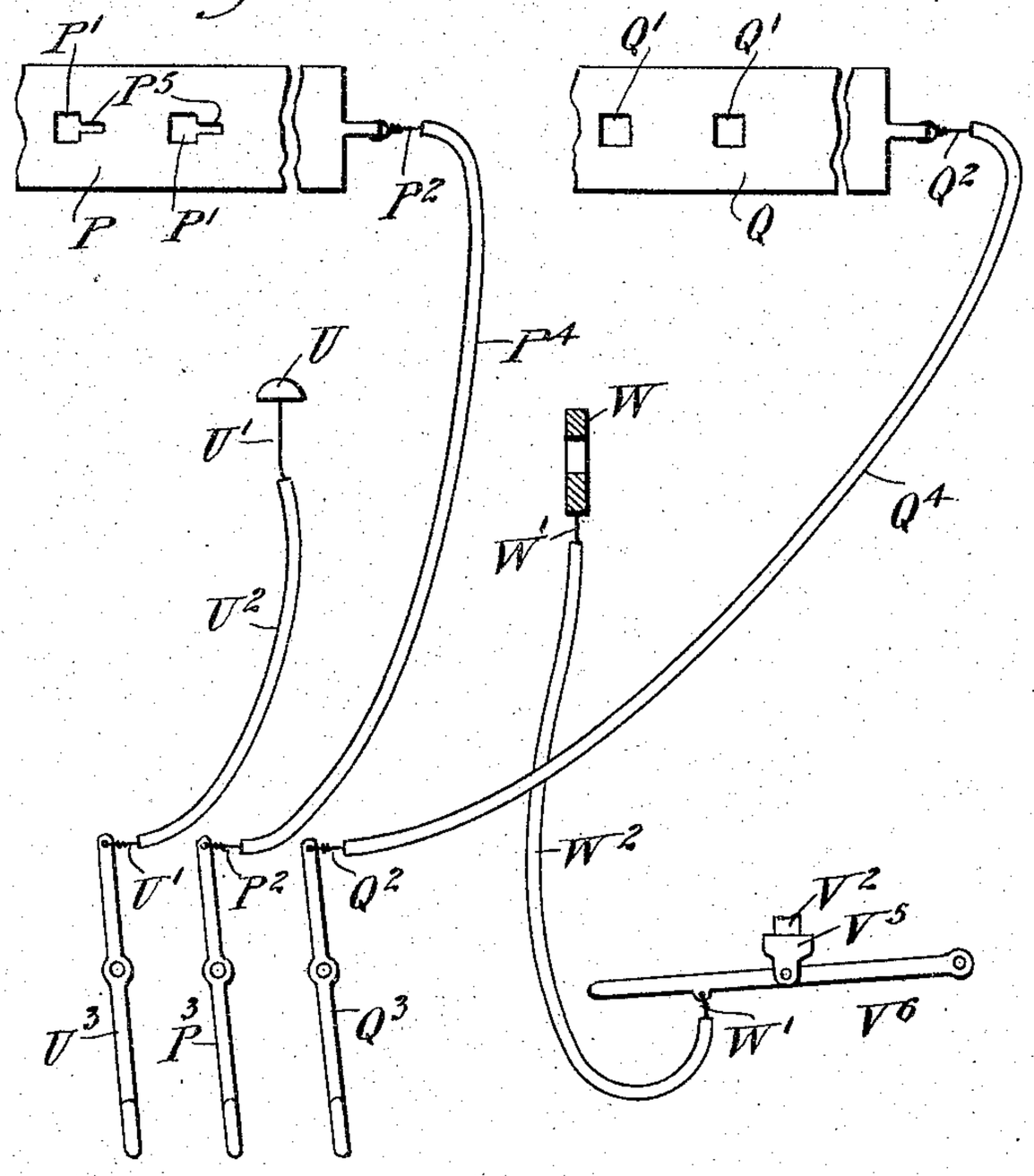
5 SHEETS—SHEET 5.

Fig. 10,





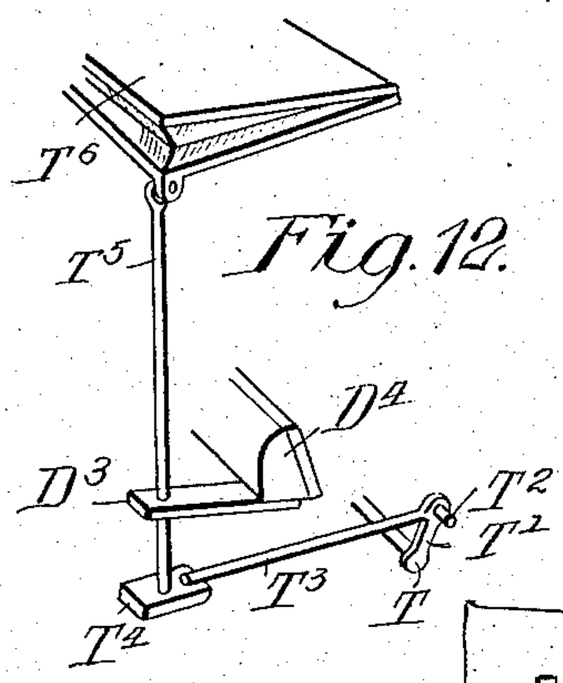
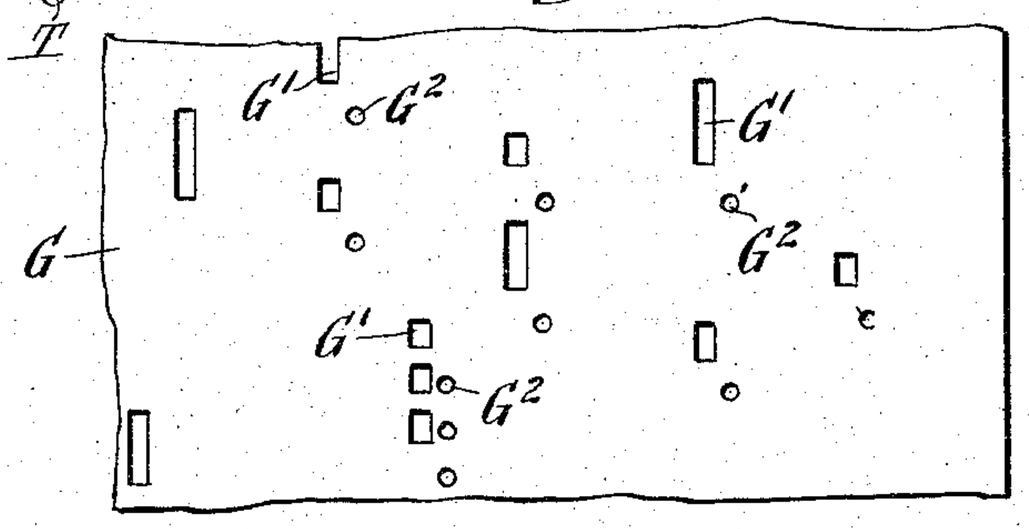
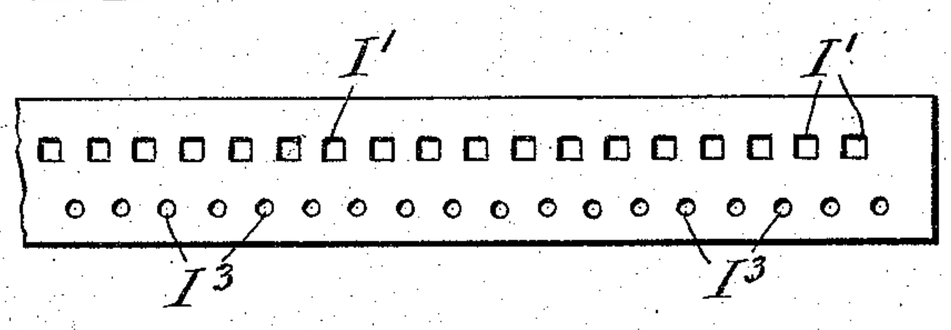


Fig. 12.

Fig. 11.





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PLAYER-PIANO.

1,167,271. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed November 27, 1912. Serial No. 733,778.

To all whom it may concern:

Be it known that I, HENRY A. CLAUSING, a citizen of the United States, and a resident of Lima, in the county of Allen and State of Ohio, have invented a new and Improved Player-Piano, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved player piano arranged to permit variable accentuation of solo themes or other parts of the music in either treble or bass, to provide an octave coupler for increase in the volume of the tone especially when the instrument is used in large rooms or halls, and to permit the performers to throw off the dampers for sostenuto playing.

In order to accomplish the desired result use is made of a music sheet having extra or associated note perforations or openings in addition to the regular ones and adapted to register with the auxiliary tracker board openings for increasing the action of a pneumatic to accentuate say a melody or other part of the music. Use is also made of a manually-controlled slide valve in the tracker board for connecting the regular tracker board openings with an octave coupler for each note sounded through the action of the regular notes in the music sheet. Use is further made of a manually-controlled means for actuating a pneumatic connected with a swinging damper rod for throwing the dampers simultaneously out of or into action.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a cross section of the player piano, part of the tracker-board casing being shown in elevation; Fig. 2 is an enlarged front elevation of the tracker board, motor and winding and unwinding mechanism for the note sheet, the front of the casing for the same being in open position and the parts being shown in rewinding position; Fig. 3 is a transverse section of the same on the line 3—3 of Fig. 2; Fig. 4 is a sectional front elevation of the tracker board, parts being shown in section on the line 4—4 of Fig. 5; Fig. 5 is a cross section of the same on the line 5—5 of Fig. 4 and showing the connection to the octave coupler; Fig. 6 is a front elevation of the keyboard, the suction bellows and equalizer; Fig. 7 is an enlarged sectional plan view of the valve chest on the line 7—7 of Fig. 8; Fig. 8 is a cross section of the same on the line 8—8 of Fig. 7; Fig. 9 is a sectional front elevation of the same on the line 9—9 of Fig. 7; Fig. 10 is a diagrammatic view of the several valves and the lever mechanisms for actuating the same; Fig. 11 is a face view of a portion of the tracker board and a portion of the music sheet, and Fig. 12 is a detail perspective view of certain parts to be hereinafter specifically referred to.

In the piano casing A is mounted in the usual manner the sound board B and the string frame C carrying the strings C′ adapted to be engaged by the hammers D′ and dampers D^2 of the piano action D, of any approved construction. In the upper portion of the casing A is arranged a valve chest or suction chamber E connected by a tube E′ with an equalizer F from which air is sucked by the use of suction bellows F′ actuated by pedals F^2 under the control of the performer to permit of producing the desired suction in the valve chest E. The note sheet G unwinds from the roller H and winds up on the roller H′ and passes over the tracker board I intermediate the said rollers H and H′. The rollers H and H′, the tracker board I and the pneumatic motor J are arranged within a casing K held on the front of the piano casing A above the keyboard, as plainly indicated in Fig. 1. The casing K is provided with a front cover K′ hinged at its lower end at K^2 to permit of swinging the said cover K′ into an open position when using the player piano, the cover K′ being normally closed, however, and provided with a rack K^3 for supporting sheet music when playing the piano by hand.

The motor J is connected by a tube J′ with the equalizer F, and in the tube J′ is arranged a tempo-regulating valve J^2 having its stem J^3 provided at one outer end with a pointer J^4 under the control of the performer, and indicating on a scale J^5 to indicate the position of the valve J^2 in the tube J′.

The tracker board I (see Figs. 4 and 5) is provided with the usual main tracker board openings I′ connected by tubes I^2 with channels *a* formed in the front of the valve chest E (see Fig. 8) and leading into chambers L each covered by a diaphragm L′ en-

gaged by a stem L^2 extending through the valve chest E and carrying the main valve L^3 controlling a port *b* formed in the back of the valve chest E and opening exteriorly of the valve chest. The air admission valve L^4 is secured on the valve stem L^2 outside of the chest E to control the rear or entrance end of the port *b*, it being understood that when the valve L^3 is closed the valve L^4 is opened and vice versa. From each port *b* leads a channel *c* formed in the back and bottom of the valve chest E, and the said channel *c* connects with a pneumatic N having its stationary member N′ secured to the under side of the chest E. The movable member N^2 of each pneumatic N is connected with a depending rod N^3 guided in a guideway D^3 attached to the hammer rest rail D^4, as plainly indicated in Fig. 1. The rod N^3 is provided on its lower end with a lug N^4 engaging the forward end of the corresponding wippen D^5 of the piano action D, so that when the pneumatic N is collapsed the corresponding wippen D^5 is actuated and with it the corresponding hammer D′ to strike a corresponding string C′ for producing the desired sound.

It is understood that when a regular opening G′ of the note sheet G moves in register with a corresponding tracker board opening I′ then air passes through the said opening I′, tube I^2 and channel *a* into the corresponding chamber L to force the diaphragm L′ forward so that the valve L^3 is moved into open position relative to the port *b* while the valve L^4 closes the said port. The suction produced in the chest E now draws air out of the pneumatic N by way of the channel *c* and port *b*, whereby the pneumatic N is collapsed and the corresponding hammer D′ sounds the corresponding string C′ of the piano. As soon as the note sheet opening G′ moves out of register with the corresponding tracker board opening I′ then the air is cut off and the suction produced in the valve chest E now draws air out of the chamber L by way of the port *d* to collapse the diaphragm L′ thus moving the valve L^3 into closed position and the valve L^4 into open position to allow atmospheric air to pass into the pneumatic N to inflate the same, thus returning the corresponding hammer to its normal position of rest.

In order to accentuate any one note, the following arrangement is made: The note sheet G is provided with auxiliary openings G^2 for every note to be accentuated, and this opening G^2 is adapted to register with an auxiliary tracker board opening I^3 at the time the corresponding opening G′ is in register with its tracker board opening I′ (see Fig. 11). The auxiliary tracker board opening I^3 is connected by a tube I^4 with a port *e* formed in the front of the valve chest E and leading to a pneumatic valve chamber O formed in the front of the chest E. The chamber O is covered by a diaphragm O′ on which is secured a valve stem O^2 extending transversely in the chest E and carrying an auxiliary valve O^3 controlling a port *f* leading to the channel *c* previously mentioned. Now when the note sheet opening G′ and the corresponding accentuating note sheet opening G^2 register simultaneously with the tracker board openings I′ and I^3 then both valves L^3, O^3 are opened simultaneously to cause a forcible suction in the corresponding pneumatic N with a view to forcibly collapse the same and thereby causing the corresponding hammer D′ to strike the corresponding string C′ with more force to produce the desired accentuation. It is understood that as soon as the openings G′, G^2 move out of register with the openings I′, I^3 then the valves L^3, O^3 close as the air is drawn out of the chambers L and O by way of the port *d* previously mentioned and the port *d′* connecting the chamber O with the interior of the chest E.

In order to graduate the force with which the pneumatics N are collapsed use is made of two slide valves P and Q provided with openings P′, Q′ adapted to throttle the ports *b* and *f* more or less according to the movement given to the said slide valves P and Q. The slide valves P and Q are connected by wires P^2, Q^2 with levers P^3, Q^3 extending transversely from the bottom of the casing K so as to be within convenient reach of the performer. The wires P^2 and Q^2 pass through tubes P^4, Q^4 extending from the casing K to the chest E. Each of the openings P′ is provided with an elongated extension P^5 (see Fig. 10) for the passage of the corresponding valve stem L^2 when moving the slide valve P into a more or less closed position.

From the foregoing it will be seen that by the arrangement described the performer by manipulating the levers P^3, Q^3 can readily throttle the ports *b* and *f* to produce a collapsing of the pneumatics N with more or less force either when a single note sheet opening G′ moves in register with the corresponding tracker board opening I′, or a note sheet opening G′ and its associate opening G^2 move simultaneously in register with the tracker board openings I′, I^3. As either lever P^3, Q^3 can be individually manipulated a corresponding individual throttling of the ports *b* and *f* may be had to sound any desired note with more or less force as desired. The valve stems O^2 for the accentuating valves O^3 are guided in a guide rail O^4 attached to the bottom of the chest E, as plainly shown in Figs. 7 and 8.

In order to sound two notes an octave

apart simultaneously use is made of an octave coupler arranged in the following manner: From the tracker board opening I′ leads a branch port I⁵ connected by a tube I⁶ with an extension port *a′* of the port *a* an octave from the port *a* connected by the pipe I² with the tracker board opening I′, as indicated in Fig. 5. In the tracker board I is mounted to slide a slide valve R controlling the connection between the openings I′ and I⁵, it being understood that normally the slide valve R closes the openings I⁵, but when the slide valve R is shifted lengthwise of the tracker board then the openings I′ are connected with the openings I⁵. Now when the slide valve R is in open position and the tracker board opening is uncovered by the corresponding note sheet opening G′ then air passes into the port *a* by way of the pipe I², as previously explained, and also air passes by way of the tube I⁶ to the extension port *a′* of the port *a* an octave below so that both valves L³ are opened simultaneously and the two corresponding pneumatics N are collapsed to sound both corresponding strings C′ by the corresponding hammers D′.

The slide valve R is provided at its right-hand end with an extension R′ extending beyond the right-hand end of the tracker board I and the extension R′ is connected with a lever R² under the control of the performer for opening or closing the slide valve R.

The connection between the tubes I⁶ and the corresponding extension ports *a′* of the ports *a* is controlled by a slide valve S mounted to slide in the front of the valve chest E (see Figs. 8 and 10) and the right-hand end of the slide valve S is provided with a lug S′ engaged by a wire S² passing through a guide tube S³ and attached to the lever R² so that when the latter is shifted the slide valves R and S are moved simultaneously into open or closed position according to the direction in which the valve R² is moved at the time. By the use of the two slide valves R and S a positive coupling of two notes, of which one is an octave lower than the other, is had to provide an increase in the volume of the tone especially when the instrument is used in large rooms or halls.

In order to throw the dampers D² off the strings C′ use is made of a rod or a bar T engaging the rear of the damper levers D⁵, as plainly indicated in Fig. 1, and the said rod T is hung on arms T′ fulcrumed at T² on the sides of the casing A. One of the arms T′ is provided with a forwardly-extending arm T³ engaged by a lug T⁴ held on a rod T⁵ connected with the movable member of a pneumatic T⁶ attached to the under side of the valve chest E at one end thereof. The pneumatic T⁶ is connected by a tube T⁷ with a port *g* (see Fig. 7) formed in the front of the valve chest E and opening into the same. A valve U serves to open and close the port *g* and this valve is connected with one end of a wire U′ extending through a guide tube U² and connecting with a lever U³ under the control of the performer and arranged alongside the lever U³ on the bottom of the casing K (see Fig. 3). When it is desired to throw off the dampers D² the performer imparts a swinging motion to the lever U³ to the left so that the valve U is moved into open position relative to the port *g* to collapse the pneumatic T⁶ whereby a swinging motion is given to the rod T in a forward direction so that the damper levers T⁵ are swung forward and the dampers D² are moved out of engagement with the strings C′. If the strings C′ are now sounded by the hammers D′ the sounds are sustained until the lever U³ is returned to normal position to close the valve U and to allow the pneumatic T⁶ to inflate. When this takes place the rod T swings rearwardly to allow the damper levers T⁵ to return to normal position so that the dampers T² reëngage the strings C′ to damp the same.

The mechanism for unwinding and rewinding of the note sheet is actuated from the motor J, which for this purpose has its motor shaft J⁶ provided with an extension J⁷ on which is mounted to slide a hub V² carrying bevel pinions V, V′ adapted to be moved in mesh with bevel gear wheels H², H³, of which the bevel gear wheel H² is secured on the shaft H⁴ of the take-up roller H′ while the bevel gear wheel H³ is coupled with the shaft H⁵ of the roller H carrying the note sheet and on which the note sheet is rewound after the piece of music is played. The hub V² is provided with a slot V³ engaged by a pin J⁸ secured on the extension shaft J⁷ so that the hub V², and pinions V and V′ rotate with the shaft J⁷. The lower end of the hub V² is provided with a head V⁴ engaging a bearing V⁵ pivotally connected with a lever V⁶ fulcrumed on the back of the casing K and mounted to swing up and down. The lever V⁶ is under the control of the performer and is provided with a locking lever V⁷ adapted to engage a notched bracket V⁸ to hold the lever V⁶ locked in uppermost or lowermost position. When the lever V⁶ is in lowermost position then the pinion V is in mesh with the bevel gear wheel H² and the pinion V′ is out of mesh with the bevel gear wheel H³, and when the motor J is running the roller H′ is driven to wind up the note sheet and to draw the same over the tracker board I. After the music has been played the lever V⁶ is swung into uppermost position so that the pinion V moves out of engagement with the gear wheel H² and the pinion V′ moves into mesh with the gear wheel H³, so that when the motor is

running the roller H is rotated to rewind the note sheet thereon. It is understood that the roller H with the note sheet wound thereon can be readily removed and replaced by another one in the usual manner.

The valve chest E is disconnected from the equalizer F during the rewinding of the note sheet on the roller H and for this purpose the following arrangement is made: The entrance end of the tube E′ into the chest E (see Fig. 7) is controlled by a slide valve W to which is secured one end of a wire W′ extending through a guide tube W^2 and connecting with the lever V^6, as plainly shown in Fig. 3. When the lever V^6 is in lowermost position the valve W is open so as to allow of drawing air out of the valve chest E, but when the lever V^6 is moved into uppermost position for rewinding the note sheet on the roller H then the valve W is moved into closed position so as to cut off the tube E′ from the valve chest E to allow full use of the air in the equalizer F for driving the motor at a high rate of speed for quickly rewinding the note sheet on the roller H.

The tracker board I is longitudinally adjustable and for this purpose is provided with reduced portions I^7 and I^8 (see Figs. 2 and 4) at the ends, the reduced portions being mounted to slide on brackets K^3, K^4 attached to the casing K. A screw rod X screws in the reduced portion I^7 and is mounted to turn in a bracket K^5 held on the casing K. The said screw rod X is under the control of the performer to turn the screw rod with a view to shift the tracker board I longitudinally so as to insure proper registration of the openings G′, G^2 of the note sheet G with the tracker board openings I′, I^3. The reduced portion I^8 is slotted and engages a screw K^6 held on the bracket K^4 to guide this end of the tracker board in its longitudinal movement.

The valve chest E is longitudinally adjustable and for this purpose its ends are provided with arms E^2 adjustably held on brackets E^3 secured to the sides of the casing A, each bracket E^3 being provided with an elongated slot E^4 engaged by a screw E^5 held on the corresponding arm E^2. On loosening the screw E^5 the valve chest E can be shifted sidewise and when the desired position is reached the screws E^5 are screwed up to securely fasten the valve chest E in place. By the arrangement described the rods N^3 and T^5 can be moved into proper place relative to the wippens D^5 and arm T^3 owing to the fact that the pneumatics N and T^6 are attached to the valve chest E and moves with the same when the latter is adjusted.

When the player piano is in use and a note sheet G is drawn over the tracker board, the performer manipulates the expression lever P^3 controlling the expression slide valve P for regular playing when a note sheet of usual construction is used, that is, one having only the regular openings G′, it being understood that such openings register only with the regular tracker board openings I′ but not with the tracker board openings I^3. When it is desired to throw the dampers D^2 off or on, the lever U^3 is correspondingly manipulated by the performer, and when it is desired to throw the octave coupler into and out of operation, the lever R^2 is actuated, the connecting wires U′ and S^2 respectively of these levers, and also wires P^2, Q^2 and W′ of levers P^3, Q^3 and V^6 respectively, operating with equal facility to move the members controlled thereby in both directions.

When a note sheet G is used having both sets of openings G′, G^2 then the performer, besides manipulating the levers P^3, U^3 and R^2 as above described, also manipulates the accentuating lever Q^3 to accentuate the melody or other part of the music for which two openings G′, G^2 are provided in the note sheet. As previously stated, the tempo is regulated by the performer changing the position of the pointer J^4 to close the valve J^2 more or less for running the motor at a faster or slower speed. When it is desired to rewind the note sheet G the performer manipulates the lever V^6 to cause the motor to drive the roller H and to move the valve W into closed position.

It will be noticed that by arranging the valve chest E and the pneumatics N in the upper portion of the casing A a convenient connection is had between the said pneumatics and the piano action, and ready access is had to the valve chest for repairs or other purposes.

By the use of the note sheet G and the two slide valves P and J the performer can give any desired expression to the music to properly accentuate say a melody relative to the accompaniment so that it can be heard above the accompaniment with more or less strength.

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

1. In a player piano, the combination of a pneumatic adapted to connect with the playing action, a valve chest having a single vacuum chamber, and a single channel extending vertically through its rear wall and leading to the pneumatic and also having vertically spaced interior ports in its said rear wall communicating between its vacuum chamber and the said channel, one of said ports extending through the said rear wall of the chest and communicating with the exterior thereof, a main valve having inner and outer valve members disposed at the respectively opposite ends of the last mentioned port, an auxiliary valve

controlling the other port, an independent motor for each of said main and auxiliary valves, and a tracker board having a main opening in communication with the said motor of the main valve and having an auxiliary opening in communication with the said motor of the auxiliary valve, all for the purpose described.

2. In a player piano, the combination of a pneumatic adapted to connect with the playing action, a valve chest having a single vacuum chamber, and a single channel extending vertically through its rear wall and leading to the pneumatic and also having vertically spaced ports in its said rear wall communicating between its vacuum chamber and the said channel, one of said ports extending through the said rear wall of the chest and communicating also with the exterior thereof, a main valve having two valve members disposed at the opposite ends of the last mentioned port, an auxiliary valve controlling the other port, said valve chest having its front wall provided with upper and lower cavities opposite to the said ports, diaphragms arranged to cover the cavities and to which the stems of the said valves are connected, and a tracker board having a main opening in communication with one of the diaphragm cavities of the valve chest and having an auxiliary opening in communication with the other diaphragm cavity of the valve chest, all for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY A. CLAUSING.

Witnesses:
H. S. PROPHET,
W. P. ANDERSON.