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PATENTED AUG. 18, 1903.

N. D. HOSLEY & S. R. HARCOURT.
ACCENTUATION MECHANISM FOR AUTOPNEUMATIC MUSIC
PLAYING INSTRUMENTS.

APPLICATION FILED MAY 19, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

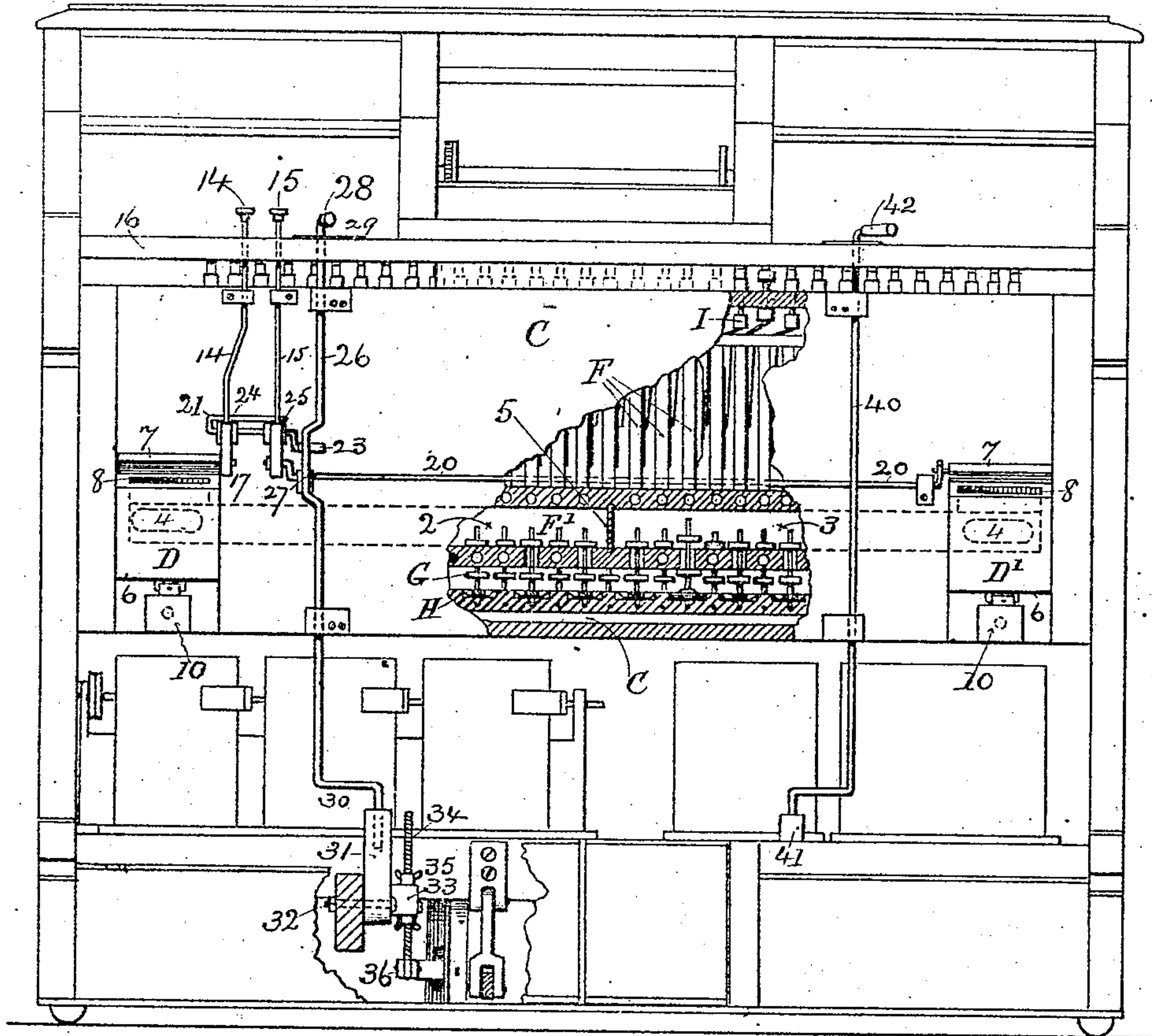


FIG. 1

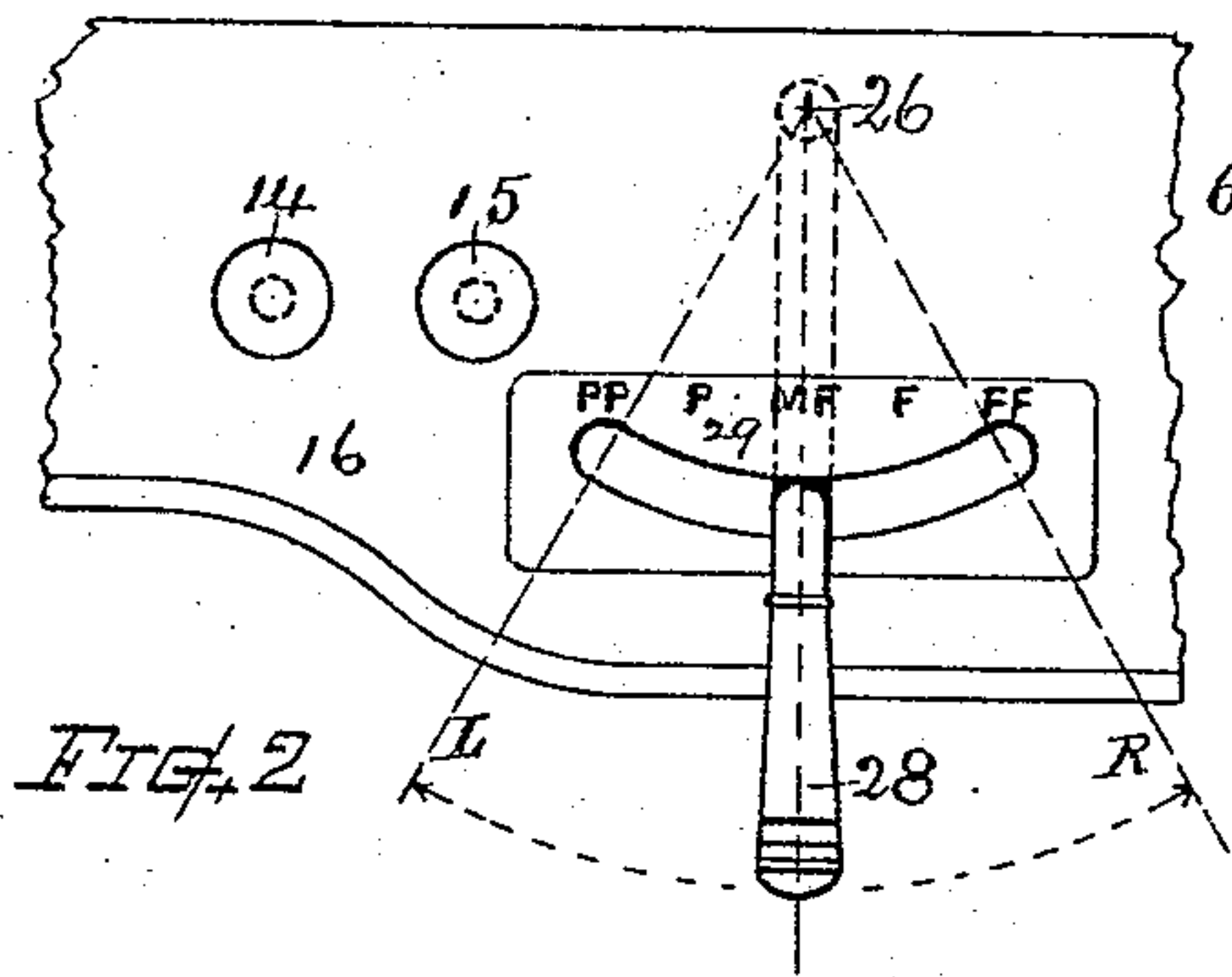


FIG. 2

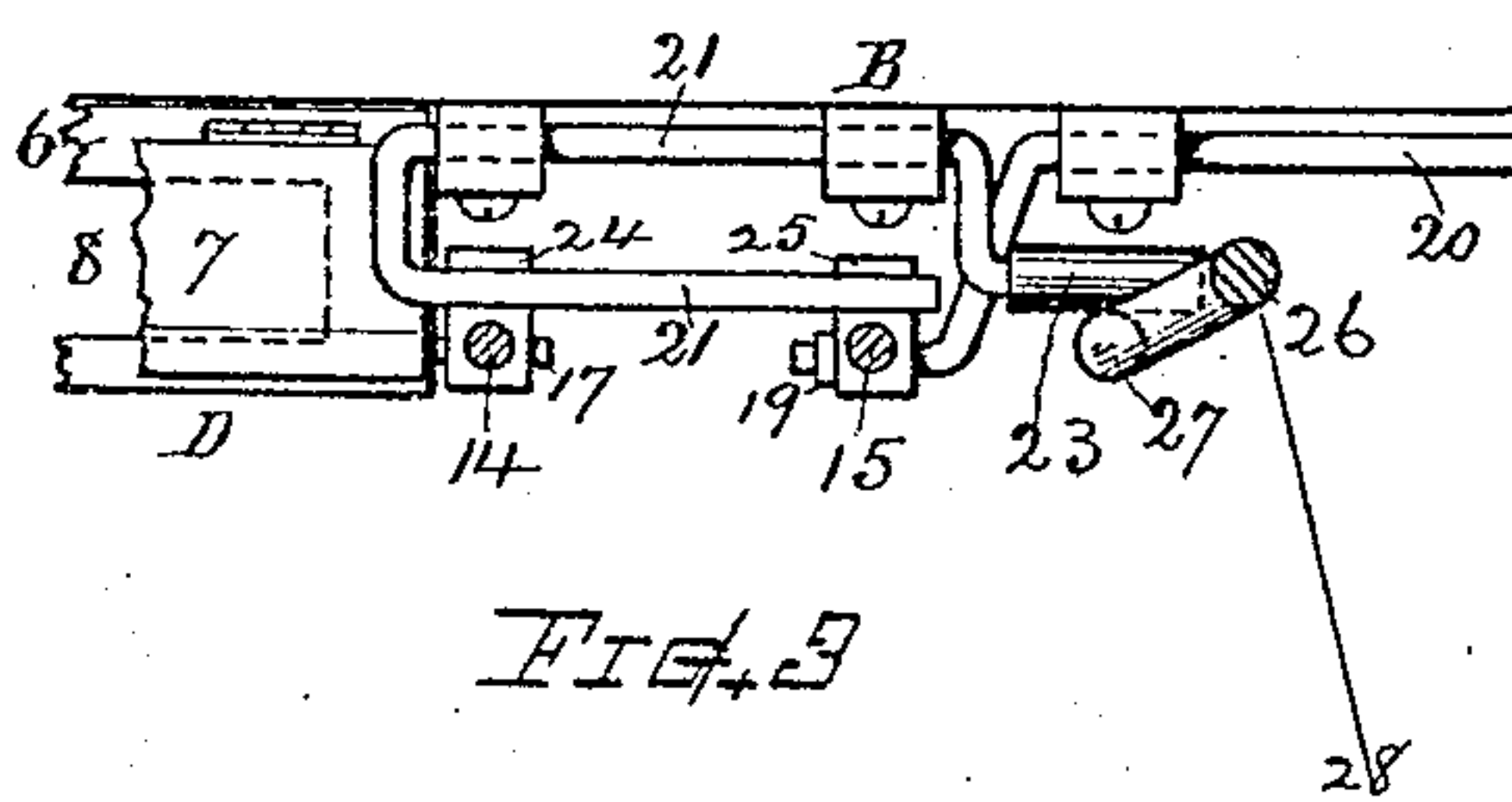


FIG. 3

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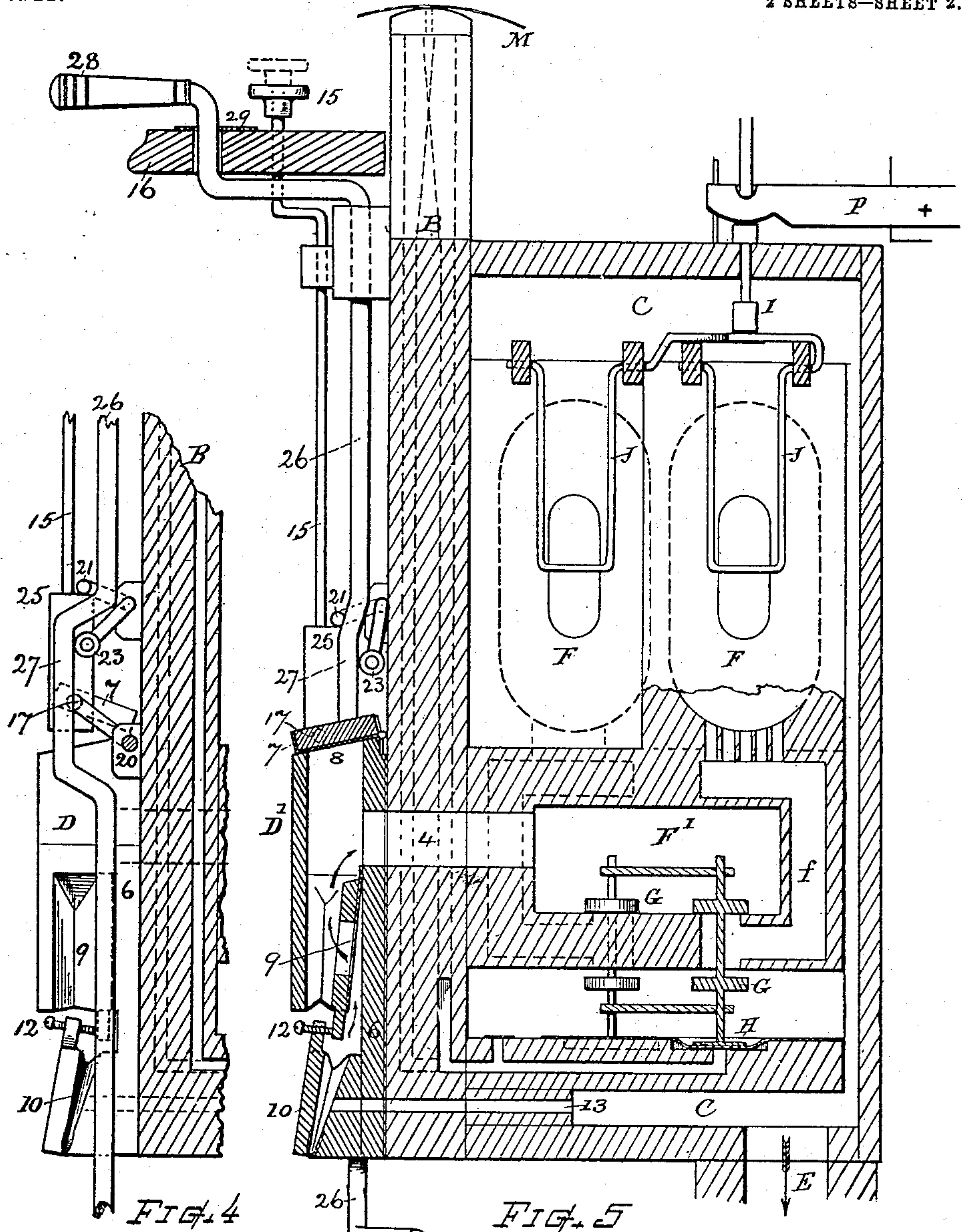
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2 SHEETS—SHEET 2.



Witnesses.
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No. 736,600.

Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

NELSON D. HOSLEY AND STILLWELL R. HARCOURT, OF MERIDEN, CONNECTICUT, ASSIGNORS TO WILCOX & WHITE COMPANY, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ACCENTUATION MECHANISM FOR AUTOPNEUMATIC MUSIC-PLAYING INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 736,600, dated August 18, 1903.

Application filed May 19, 1902. Serial No. 107,902. (No model.)

To all whom it may concern:

Be it known that we, NELSON D. HOSLEY and STILLWELL R. HARCOURT, citizens of the United States, both residing at Meriden, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Accentuation Mechanism for Autopneumatic Music-Playing Instruments, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The prime object of our present invention is to provide means in an automatic piano-player for controlling the accent in certain parts of the music in a way that will enable the operator to more artistically bring out melody or theme-notes in the composition as arranged on a perforated music-sheet, while the bass or accompaniment notes are subdued, as more fully hereinafter explained.

Another object is to provide an autopneumatic music-playing action with a plurality of choker-controlled divisions of the flushing-leader, through which external air is carried to the operating-pneumatics, thereby affording facilities for a varied potential in the effect of the pneumatic impulses at different parts of the scale; also, to provide means for separately and unitedly manipulating the several choker mechanisms or means by which the air-induction is regulated or varied.

Another object is to provide in a pneumatic piano-playing mechanism and for controlling the air-supply to the flushing-leader and pneumatics, an inlet-choker device provided with a pneumatically-regulated inlet-valve and a controlling-valve having means for manipulation by the operator.

Another object is to provide means in an autopneumatic piano-player or music-playing instrument, of a plurality of inlet choker mechanisms operated in conjunction with the mechanism that controls the soft-pedal of the piano and having manipulating-devices disposed in such relation that the several mechanisms can be manipulated with one hand by the operator.

For the attainment of these objects we have devised mechanism the nature, struc-

tural organization, and mode of operation of which is explained in the following detailed description, the particular subject-matter claimed being hereinafter definitely specified.

A practical embodiment of our invention as applied to an autopneumatic piano-playing instrument is illustrated in the drawings, wherein—

Figure 1 represents a front view, partly in section. Fig. 2 represents a top view of the accentuation-manipulating devices. Fig. 3 is a plan section showing the connection for working the choker-valves. Fig. 4 represents a sectional side elevation of the choker-valve box and the actuating connection. Fig. 5 is a vertical sectional view showing the construction and combination of the accentuation mechanism in relation to the pneumatic action and wind-chest, and Fig. 6 shows the choker-valve and its opening-spring.

The pneumatic music-playing action in connection with which our invention is in the present instance shown is in its general character similar to that employed in the automatic piano-player described in Letters Patent No. 592,641, and the arrangement of the tracker, primary pneumatics, flushing-valves, operating-pneumatics, action-puppets, and chest is substantially the same as described in Letters Patent No. 470,323, both of which patents can be referred to for an understanding of the operation of any portions of the instrument not herein particularly shown and described. It will be understood, however, that we do not wish to confine our invention to the specific form and arrangement of primary and operating pneumatics shown in the said Letters Patent, since it is obvious that the invention is applicable to music-playing instruments in which the pneumatics are otherwise formed and disposed, but acting on similar principles of inflation and collapse in connection with a flushing-leader.

On the drawings the reference-letter C indicates the chest, chamber, or inclosure containing the system of pneumatics, and within the interior of which there is induced a partial vacuum by exhaustion of the air, as at E, by means of suitable suction-bellows in well-known manner.

B indicates the tracker-board, H the primary or controlling pneumatics, F the operating pneumatics, F' the flushing-leader or air-supply conduit with valve-seat passages and windways *f* into the larger pneumatics, G the puppet-valves therefor worked by the primary pneumatics as controlled by the perforated music-sheet M passing over the tracker, and I and J the action-puppets and connections that actuate the music-playing devices or fingers P, all of which parts can be of well-known or any suitable construction.

As a feature of our invention the interior chamber or flushing-leader F' is divided into a plurality of compartments 2 and 3 by a substantially air-tight partition 5, which may be a plate of sheet metal or other material supported across the interior and preferably separating the treble end from the bass end of the system or at such positions as may be desired.

At convenient positions, preferably upon the front of the chest and communicating with the interior of the flushing-leader F' by a suitable inlet-passage 4, we provide what we term "chokers" D and D', one for each of the several leader-compartments. Said chokers, as shown, each consists of a body-plate 6 or box having an air-inlet space that opens into the passage 4 and is furnished with a mouth-opening 8, guarded by a hinged stop-valve 7, and another opening guarded by a movable perforated padded member that seats against the body-plate 6 and is connected to the box portion by flexible bellows-fold edge strips, thereby forming an automatically-operable pneumatic choke-valve 9, that opens by exhaust of the internal air-pressure.

Adjacent to the choke-valve 9 there is arranged a small collapsible pneumatic 10, the movable part of which is provided with a suitable lug, preferably carrying an adjusting-screw or detent 12, that acts against a projecting lug fixed on the valve member and tends to close said choke-valve 9 toward its seat and to regulate the action of the same in accordance with the relative air-pressures within the leader and the vacuum-chamber, with which latter the interior of the pneumatic 10 is connected by an air-duct 13, as best shown in Fig. 5.

For operating the stop-valves 7 we provide endwise-movable actuators or rods 14 and 15, each having a push-button at its top end above the run-board 16 and connected at their lower ends at 17 and 19 for working the said valves by positive action, the actuator 14 connecting direct with the stop-valve of the choker D, and the actuator 15 for the distant choker devices D' connected to a cranked shaft 20, that in turn connects with or works the stop-valve at the mouth of said choker, as best shown in Fig. 1. The actuators 14 and 15 and the cranked shaft 20 are arranged in suitable bearings secured upon the tracker-board front or to some suitable supporting part of the instrument.

The hinged valves 7 are each provided with

a spring 18, (see Fig. 6,) that lifts the valve and normally tends to keep the mouth of the choker-box open and the actuator-rod and button elevated.

A depressor connection or rocker 21 is arranged for simultaneously depressing the actuators 14 and 15 for closing the choker-mouth valves 7. Said depressor is preferably formed of a properly-bent wire journaled in bearings on the tracker-board and having an arm or member that by a downward swing engages above suitable offsets or lugs 24 and 25 on the respective actuators 14 and 15. The construction is such that said actuators and the valves in connection therewith can be independently depressed without reference to the rocker or depressed in plurality by the action of the rocker, or, again, either one of the valves worked by means of the rocker member while the other is held in depressed position by pressure on its actuator-button. The rocker 21 is operated in conjunction with the pedal-operating shaft 26, the said shaft having an offset or cranked portion 27, that swings against a crank 23, forming a part of the rocker.

The upright shaft 26, by which the pedal mechanism is controlled, is arranged near the actuator 15 and is provided with a swinging arm or handle-lever 28 above the run-board 16 in such near proximity to the push-buttons of the valve-actuator rods 14 and 15 that all can be conveniently included by one hand. (See Fig. 2.) The handle-lever preferably swings in a curved slot cut through the run-board, and the latter is best provided with an index-plate 29, denoting the "accentuato" positions for the handle-lever. The shaft 26 is supported in suitable bearings and is provided at its lower part with an offset arm or crank 30, that engages with the pedal-controlling mechanism.

The means for moving the piano-pedal comprises an angle block or lever 31, fulcrumed on the frame or casing at 32 and carrying a pivotally-attached swivel-block 33, through which there is arranged a screw-threaded rod 34, with nuts 35 above and below the swivel-block for adjustment of the rod therein, while the lower end of the rod is connected to the arm of a lever 36, that extends rearward for engagement with the pianissimo-pedal in well-known or suitable manner.

The cranked lower end 30 of the shaft 26 swings against the angle-lever 31, and the latter, through the rod 34 and connections, works the pedal of the piano when the handle-lever 23 is swung toward the left.

A shaft 40 and pedal-operating connections 41, similar to those above described, are arranged for controlling the loud pedal of the piano.

The operation of the improved choker mechanism is as follows: When the mouth 8 is open, the air passes in therethrough in full and free quantity and the pneumatic choke-valve 9 remains closed and inactive; but when said mouth-valve is positively closed by

the operator pressing down the actuator-button then the free inflow of air is checked and a greater or less degree of exhaust force is immediately established in the leader F' and passages by the suction of the operating-pneumatics F' under the influence of the partial vacuum maintained in the chamber C. This exhaust causes the collapse of the choke-valve pneumatic 9, overpowering the presser-pneumatic 10, which is of much smaller area, thereby drawing said choke-valve away from its seat, (see Fig. 5,) so that outside air can under resistance flow in therethrough to pass to the flushing-leader F' in quantities proportionate to the resistance on said choke-valve and the quantity demanded by the operating-pneumatics at any instant in the playing. As the number of pneumatics in operation increases the suction also increases and the choke-valve becomes more opened, allowing more air to pass in for flushing the large pneumatics, and vice versa. The small pneumatic 10, acting under the direct influence of the bellows-exhaust, presses against the choke-valve 9 as a variable spring, tending to force it to its seat with an effect that is in a measure proportioned to the relation of the force of exhaust in the chamber C, the flushing-supply in the leader F', and the quantity of air demanded by a greater or less number of the operating-pneumatics called upon to act at one time. By this arrangement the choker is automatic in its action and pneumatically regulated for allowing the requisite quantity, be it more or less, of outside air to pass in for flushing the pneumatics with the desired promptness and force, but as modified by the resistance or choking effect of the devices.

The combination of swing-lever and shaft, plurality of chokers, push-button actuator-rods, and divided air-chamber enables the performer to obtain effects in accentuation heretofore unattained in any prior form of automatic piano-playing mechanisms.

The idea involved in the arrangement and combination herein disclosed is to accentuate the melody or theme or certain notes of a composition as arranged on a perforated roll of music-paper, while the bass or accompaniment notes are subdued, as a pianist would do in finger-playing. Where the theme of a musical composition is written in the lower register, the melody can be played loud and the accompaniment soft. The operation of the accentuation mechanism and method of playing the theme or melody in the upper register loud and the accompaniment soft is as follows: Assuming the autopneumatic playing action to be in operation, then the performer places a finger of his left hand upon the actuator end or stop-device push-button 14 and with the thumb of the same hand holds the lever 28 to extreme left or at the line L, thus closing both chokers and causing the notes throughout the whole register to be struck with equal force. Now at

the instant the perforations in the music-sheet representing the note or notes to be emphasized passes to the holes or ducts in the tracker the lever 28 is suddenly released or shifted by moving the thumb to the right and the lever immediately returned or swung back to its primal position at the left, thereby causing a more or less quick closure and re-opening of the valve 7 of the choker D', while holding down the button 14 with the finger. This motion opens the upper-register choker at D' just as the perforations for notes to be emphasized uncover the ducts in the tracker and allows a greater inrush of air to the pneumatics F', consequently causing them to strike a harder blow than the pneumatics in the lower register, as the finger by holding down the button keeps the valve 7 of the choker D closed, thereby choking the air that enters the leader for operating the pneumatics of the bass notes, causing them to strike a light blow. Notes in the lower register can be played louder than notes in the upper register by operating the lever 28 in the same manner, but with the finger holding down the actuator push-button 15, that operates the mouth-valve of the upper-register choker. While playing, the accentuation can be instantly changed from the upper-register to the lower-register notes, if desired, by merely shifting the pressure of the finger from the push-button 14 to the push-button 15. The effect of the action of the swing-lever 28 and its shaft 26, as above stated, is to operate the rocker 21 and cause the depression and rise of the actuator-rod which is not being held down by the finger, relieving for an instant the choke on the inflow of air and at the same time working the piano-pedal.

What we claim as of our invention, and desire to secure by Letters Patent, is—

1. In an autopneumatic music-playing instrument, the combination with the wind-chest and series of operating-pneumatics, a flushing air-chamber comprising a plurality of separate compartments, windways therefrom into the respective pneumatics, inlet-passages for ingress of air to the several flushing-compartments, a separate inlet choker appliance consisting of an internally-chambered body affixed to the wind-chest over each inlet-passage, and having two entrance-ways for air, provided with a pneumatic choking member disposed at one of said entrance-ways for opening and closing the same by pneumatic influence, and a stop-valve for closing the other entrance-way; actuating stops and connections that individually control the several stop-valves, and an actuating means for effecting simultaneous closure of said stop-valves, for the purposes set forth.

2. In an automatic music-playing instrument, the combination, with the flushing air-compartment, its inlet-passage, and the main vacuum-chamber; of an inlet-controlling pneumatic choke member arranged in connection with the inlet-passage through which

air enters said compartment and actuated by air-pressure induced by the exhaust of said compartment, a supplementary pneumatic device having its interior connected by an air-duct with said vacuum-chamber and actuated by air-pressure induced by the exhaust of said vacuum-chamber, means for transmitting force and motion from said supplementary pneumatic device to said pneumatic choke member, an inlet-way and a controlling-valve that affords, when open, a free entrance for the air into the passage to said compartment, and when closed causes the entering air to pass under the influence of said pneumatic choke member, substantially as set forth.

3. A choker appliance for pneumatic music-playing actions of the character described, consisting of a box or body having an inlet-way for air, provided with a mouth-opening, a valve-seat, and a normally open stop-valve therefor; and a second inlet-way provided with a pneumatically-actuated choke member adapted to close or open automatically, by the exhaust influence within the interior of the box, and means for operating said mouth-stopping valve controlled by the performer.

4. In a pneumatic action for music-playing instruments, the combination with power-pneumatics, a flushing-leader, and windways from said leader into the power-pneumatics; of a choker appliance comprising a manually-operated valve, and a pneumatically-operated valve severally controlling separate air-inlet passages thereinto, and a passage-way from said choker appliance into the flushing-leader, for the purpose set forth.

5. In combination with a pneumatic music-playing action, its air-supply conduit, vacuum-chamber, and means for exhaustion of air from said chamber, a choker appliance comprising an air-inlet way provided with a stop-valve, and a pneumatically-moved choke-valve its pneumatic motor internally communicating with the inlet-way, means for manipulating said stop-valve, and a smaller pneumatic having an air-duct communicating with the vacuum-chamber, and provided with a contact member that acts against said pneumatic choke-valve to regulate the extent of its opening.

6. In combination with a pneumatic music-playing action, an accentuation mechanism comprising a plurality of choker appliances having mouth-controlling valves, connecting means whereby said valves are independently operated, and actuators therefor provided with finger-pressible ends, and a swinging handle-lever for effecting the accentuation action, said handle-lever and the finger-pressible ends of said actuators being disposed adjacent to each other within convenient span for manipulation by one and the same hand, and for operation substantially as set forth.

7. In a pneumatically-operated music-play-

ing mechanism, in combination with the pneumatics that operate the music-playing devices, and the flush-valves therefor, a flushing-leader or wind-chamber divided into a plurality of separated compartments, each compartment having an individual inlet-passage for outside air, a plurality of choker devices respectively connected with said inlet-passages, individual actuators having finger-buttons and connections for separately controlling said choker devices, and means adjacent thereto adapted for unitedly manipulating the choker-mouth valves, substantially as set forth.

8. In a pneumatic action for piano-playing instruments, in combination, a series of operating-pneumatics, flush-valves therefor, valve-actuating primary pneumatics controlled by a traveling perforated music-sheet, a wind-chest containing said pneumatics, a flushing air-conductor, a dividing-partition within said flushing air-conductor, separate choker mechanisms for the treble and bass portions of the instrument, the expression-pedal-actuating connections, means substantially as described for independently controlling said choker mechanisms, means adapted for simultaneously controlling the same in conjunction with the working of the expression-pedal-actuating connections, and a pneumatic regulating means for said choker mechanism.

9. The combination as described, of the wind-chest containing the system of pneumatics, the interior chamber, a partition dividing the interior chamber for separate air-supply to the upper and lower register sections, an inlet-way for air leading into each division of said chamber from the exterior of the wind-chest, a choker mechanism for the inlet-way to each section, comprising a hinged mouth-valve and a pneumatic choke-valve, the adjacently-disposed actuators having push-button heads, offset lugs below, and lower ends connected with the respective hinged mouth-valves, a rocker device acting against said lugs, and the controller-shaft having the swing-lever handle adjacent to said push-buttons, and provided with an offset or crank portion that operates said rocker, substantially as set forth.

10. The combination, with the upright shaft having the cranked lower end and the top end handle-lever; of the pedal-actuating bar; an angle-lever carrying the swivel-block, and the threaded rod connected to said pedal-actuating bar and arranged through said swivel-block, with adjusting-nuts threaded on said rod above and below the swivel-block, for the purpose set forth.

Witness our hands this 30th day of April, 1902.

NELSON D. HOSLEY.

STILLWELL R. HARCOURT.

Witnesses:

JAMES H. WHITE,
FRANK C. WHITE.