May 7, 1968 E. HAILE 3,381,565

FOOT-OPERATED CHORD ORGAN

Filed Oct. 24, 1966 2 Sheets-Sheet 1

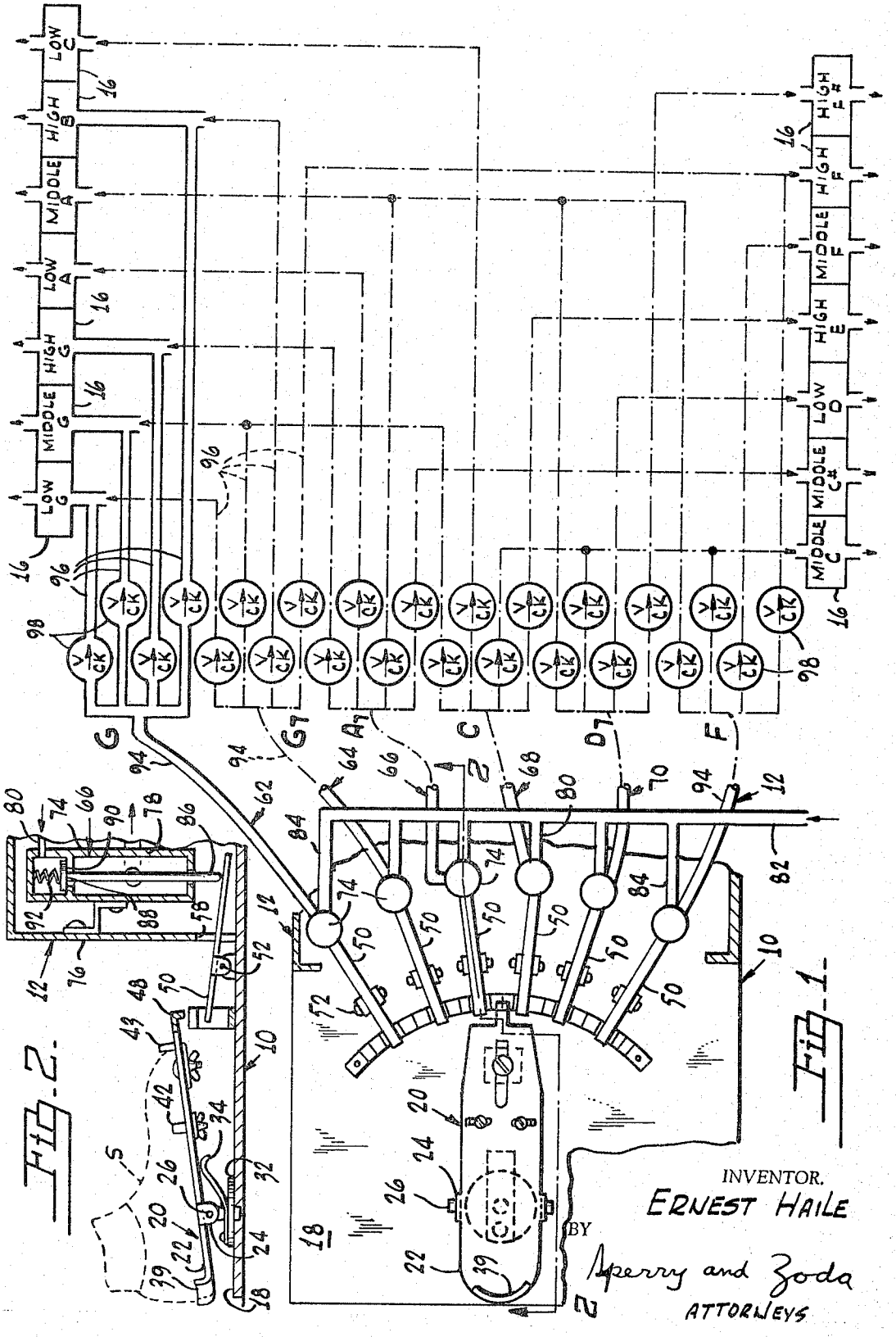


FIG. 2.

FIG. 1.

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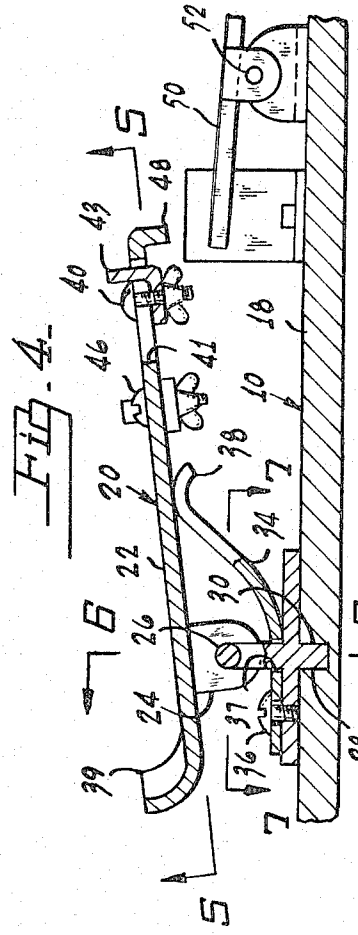


Fig. 4

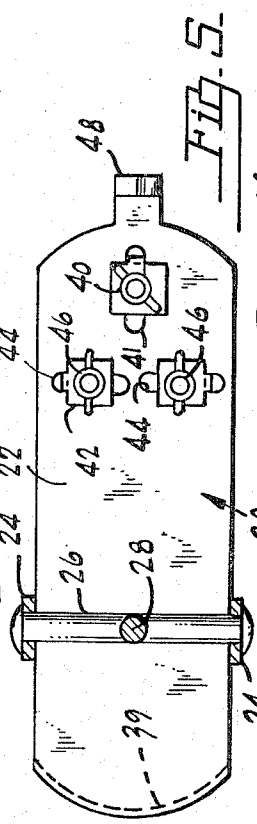


Fig. 5

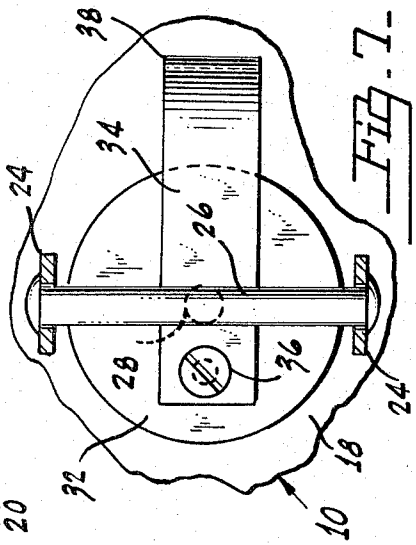


Fig. 7

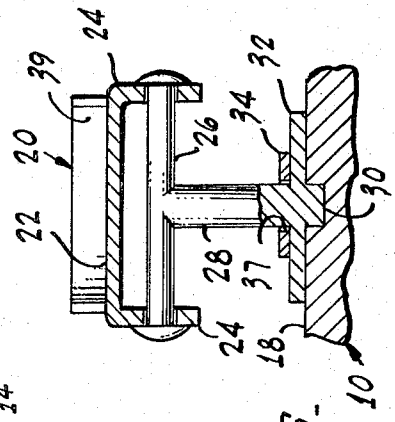


Fig. 6

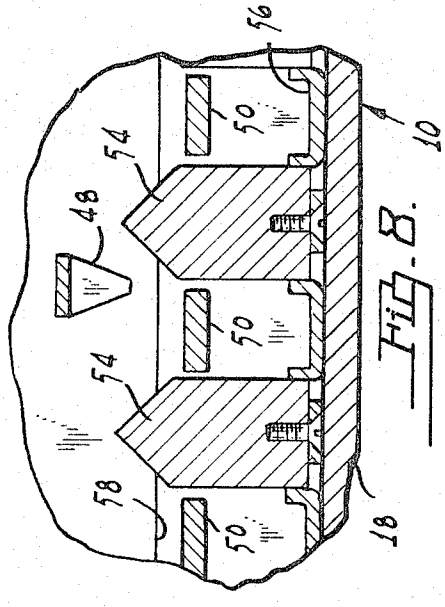


Fig. 8

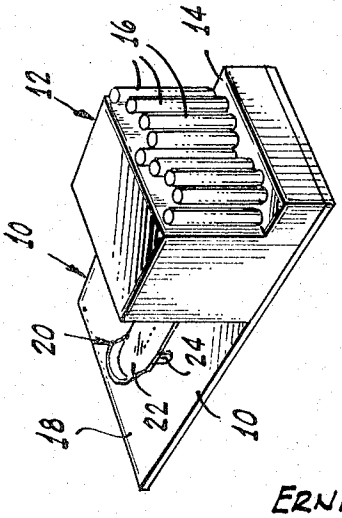


Fig. 3

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FOOT-OPERATED CHORD ORGAN

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This invention relates generally to musical instruments. More particularly, the invention has reference to that class of instruments known as chord organs.

Instruments of the type described have a distinct advantage, in that one is enabled to play the instrument with relatively little instruction. Since the instrument plays complete chords, a melodious, harmonic rendition of a musical selection is possible with, as noted above, a minimum of instruction.

The main object of the present invention is to provide an instrument of the character described which will permit a musician to play chords by operation of a foot pedal, in a manner such as to play chords having an organ sound. It is an object of the invention, in this regard, to so design the instrument so as to leave the musician's hands free, so that if the musician so desires, he may use his hands to play the melody or other harmonic accompaniment, on a different musical instrument.

Another object of the invention is to provide a chord organ of the character described that will be simple in design, capable of manufacture at relatively low cost considering the versatility thereof, and adapted for trouble-free operation over a long period of time.

A further object of the invention is to provide, in connection with a chord organ, a foot pedal and lever assembly that will be particularly designed to admit air under pressure to selected conduits leading to musical-note-sounding elements, whereby to produce the sounding of the selected chord.

A further object is to provide a construction as described which will be designed on a principle such as to permit manufacture of the invention with any number of chords, merely by addition of levers in position to be depressed by the single pedal, plus the addition of conduits, valves, and note-sounding elements needed for producing the desired, added chords.

Yet another object is to provide, in a musical instrument of the type stated, a construction such that even though the foot pedal may not be located with complete accuracy for depression of a selected chord-sounding lever, said foot pedal will be guided automatically to proper position as it is depressed by the user.

Summarized briefly, the invention in a typical embodiment thereof includes a vertically rockable foot pedal, which is also mounted for horizontal swinging movement, thus to be capable of being swiveled to any of a plurality of selected, angularly spaced positions. The foot pedal has a forwardly projecting finger, cooperating with guide elements to cause the finger to be positioned over selected levers, responsive to swivelling of the pedal to positions in which it is in general alignment with the desired lever. On depression of the pedal when so positioned, the lever below the finger thereof will be rocked so as to open a valve the inlet end of which is connected to a source of air under pressure. Extending from the valve is a conduit means, divided into a plurality of tubes each of which is check-valved to prevent backflow to the associated main valve. The respective tubes lead to note-sounding elements, so that on depression of a particular lever, air is permitted to flow through the bank of tubes associated with said lever, thereby to sound, simultaneoulsy, a plurality of note-producing elements such as organ pipes. Since the notes so sounded simultaneously are grouped to produce a particular chord, the depression of the foot pedal in a

selected position will sound a desired chord. Each time a chord is sounded, the foot pedal can be swiftly swung in a horizontal direction to locate the same over a different lever, to sound the next chord. Meanwhile, if the musician is so trained and so desires, the musician's hands are left free to play the melody of the musical selection.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawings, in which like reference characters designate like parts throughout the several views, and wherein:

FIG. 1 is a top plan view, in large part diagrammatic, of a foot-operated chord organ according to the present invention;

FIG. 2 is a sectional view through the foot pedal and lever assembly, taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a perspective view, on a reduced scale, of the complete device;

FIG. 4 is a sectional view on the same cutting plane as FIG. 2, on an enlarged scale, showing the foot pedal assembly;

FIG. 5 is a sectional view, on the same scale as FIG. 4, taken substantially on line 5—5 of FIG. 4;

FIG. 6 is a sectional view through the pedal mount, on the same scale as FIG. 4, taken substantially on line 6—6 of FIG. 4;

FIG. 7 is a horizontal section showing the pedal return spring means, substantially on line 7—7 of FIG. 4; and

FIG. 8 is a sectional view substantially on line 8—8 of FIG. 4, showing the pedal guide means.

Referring to the drawing in detil, in a typical embodiment of the invention the complete device may appear as in FIG. 3, although it should be understood at this point that except as limited by the scope of the appended claims, the device may take other exterior appearances, and can, for example, utilize any of various types of air-operated note-sounding elements, which elements may or may not be exposed to view outside of the cabinet housing the tubing, conduits, and check valves.

Thus, in the illustrated example the invention includes a base plate **10**, on the forward portion of which is mounted a cabinet or housing generally designated **12**.

In the illustrated embodiment, the cabinet **12** is recessed at its front to provide a step or ledge **14**. Mounted upon the ledge **14** is a bank of organ pipes or other air-operated, note-producing elements **16**. It will be understood, in this regard, that said elements may take various forms, and may or may not be exposed outside of the cabinet. It is mainly important that said note-producing elements be designed to sound a selected musical note, when air under pressure is directed therethrough. The organ pipes are shown merely as one example of air-actuated, note-sounding elements that can be used to advantage in the invention.

Projecting rearwardly from the cabinet **12** is a rear portion **18** of the base, and mounted upon said rear portion is a pedal assembly **20**. This includes a pedal member **22** on which one rests his shoe S. Pedal member **22** is formed, in the illustrated embodiment, with depending, apertured ears **24** at its opposite sides, receiving a transversely extending, horizontal pivot pin **26**, integral or otherwise made rigid intermediate its ends with a vertical stem **28** the lower end of which seats in an upwardly opening bearing recess **30** of base plate **10**. Integral or otherwise rigid with stem **28** is a flat, circular collar **32**, lying in face-to-face contact with the surface of the base plate **10**, so as to rotate with stem **28** when one swings the pedal member **22** lateraly to left or right from the centered position thereof illustrated in the drawing.

A leaf spring **34** has a rear end portion fixedly secured as at **36** to the collar. Forwardly of the fixed connection

of the spring 34 to collar 32, the spring has an opening 37, through which stem 28 extends. A free end portion 38 of the spring is in contact with the underside of the pedal member, forwardly of the horizontal pivot access of said member defined by pin 26.

The forward portion of the leaf spring 34 is tensioned so as to exert a continuous, resilient, yielding pressure against the underside of the forward portion of the pedal member, thus tending to rock the front end of the pedal member upwardly about the axis defined by pin 26. The user of the device, as will be understood, depresses the pedal member at its front end, against the restraint of the spring, and whenever the user releases the downward pressure on the front portion of the pedal member 22, said front portion will automatically swing upwardly, so as to permit the pedal member to be swung laterally to a position ready for depression to sound the next desired chord. Since the leaf spring is secured to the colar 32, which rotates with stem 28, the leaf spring will of course turn lateraly about the axis of the stem 28, with the pedal member, so as to be centered at all times in respect to the pedal member 22.

In the illustrated example, the pedal member 22 is formed at its rear end with a heel rest 39, and adjacent its front end, has a longitudinally and centrally extending slot 41 in which a toe stop plate 43 is slidably mounted for adjustment toward and away from the heel rest. Stop plate 43 is of right-angular shape, having a lower portion slidably engaged with the underside of the pedal member. Bolt and nut means 40 extends through slot 41 and through the bottom portion of the stop plate 43, so as to secure the stop plate in selected positions to which it is adjusted along the length of slot 41. In this way, the pedal member is adapted to be adjusted to different shoe lengths, whereby to prevent longitudinal slippage of one's shoe upon the pedal member.

Further serving to hold the shoe and pedal member in a relationship such as to prevent relative slippage therebetween are side stop plates 42, adapted to engage opposite sides of one's shoe. These extend through transversely disposed slots 44, and bolt and nut means 46 are used to hold the side stop plates 42 in selected positions to which they are adjusted transversely of the pedal member according to the width of one's shoe S.

Integral or otherwise rigid with the forward portion of the pedal member is a forwardly projecting, downwardly extending actuating finger 48 which as shown in FIG. 8 is pointed at its lower, free end. Finger 48 is adapted to be positioned over any of a plurality of levers 50 each of which is rockably mounted upon base plate 10, as at 52. The levers are arranged in an arcuate series about the axis defined by the stem 28, so that on swivelling of the pedal member about said axis, the finger 48 will be brought to position over a selected lever. The several levers are each extended radially of the stem 28, as shown in FIG. 1.

The rear end portions of the levers, that is, the portions disposed for engagement by finger 48, are located between guides 54 mounted in upstanding position, in an arcuate series, upon a guide support plate 56 that is secured fixedly to base plate 10. The guides 54 are pointed, in such fashion that if the pedal member is swung to a position in which it is desired to depress a particular lever 50, but is not perfectly aligned with said lever, depression of the pedal member will cause finger 48 to engage a side slope of the guide therebelow. The finger, being pointed complementarily to the guides 54, will be led to a position, as said finger moves downwardly, in which the finger will engage the desired lever 50, and will rock the lever about its pivot axis. The front of the lever, which projects into the cabinet 12 through an opening 58 extending across the back wall of the cabinet, is thus caused to move upwardly.

By way of example, I have illustrated six chord-sounding assemblies generally designated 62, 64, 66, 68, 70, and 72 respectively. The number of such assemblies, however, can be either increased or decreased, as desired. I have found that six such assemblies are adequate to permit the sounding of chords for any substantial number of musical compositions, and this has been found adequate for ordinary usage of the musical instrument illustrated in the drawings. Thus, in the illustrated example six chords G, G7, A7, C, D7, and F may be played.

The construction of the several chord-sounding assemblies is the same, and accordingly the description of one will suffice for all. Thus, taking for example chord-sounding assembly 62, used for the purpose of playing chord G, this includes a main valve 74 mounted in vertical position upon a mounting bracket 76 within cabinet 12, and including a cylindrical valve housing 78 having at its upper end an inlet 80 communicating with a source, not shown, of air under pressure. From the air source, a main supply or inlet conduit 82 extends, and from this conduit branch conduits 84 extend to the main valve of each chord-sounding assembly. Thus, air under pressure is supplied to the upper portion of each valve housing 78.

Main valve 74 includes a vertical stem 86, on the upper end of which is provided a head 88 normally pressed to a position on valve seat 90 by means of compression spring 92 interposed between head 88 and the upper end of the housing.

Below the valve seat, there is provided an outlet opening, communicating with outlet conduit 94, which in turn opens into branch conduits 96 in each of which there is provided a check valve 98.

Branch conduits 96 are four in number, in chord-sounding assembly 66, and lead to note-producing elements 16 designed to sound the desired chord G when air under pressure is directed therethrough. To sound chord G, note-producing elements 16 are used that will sound the following notes: low G, middle G, high G, and middle B.

Chord-sounding assembly 64 is used to sound chord G7, comprising low G, middle G, middle B, and high F. Assembly 66 sounds chord D7, having notes low D, middle A, middle C, and high F sharp.

Chord-sounding assembly 68 is used for chord A7, and actuates note-producing elements selected to provide the following musical notes: low A, middle A, middle C sharp, and high G.

Assembly 70, for chord C, has associated therewith elements 16 sounding the following notes: low C, middle C, middle G, and high E. Finally, assembly 72 is used to provide chord F, and associated therewith are elements 16 sounding the following notes: middle F, middle A, middle C, and high F.

To provide for communication between the main valves and the note-sounding elements of each chord assembly, I may utilize various means, as for example flexible tubing, metallic piping, or the like. Also, although by way of example I have shown a single outlet conduit 94 extending from each main valve, and communicating with branch conduits 96, I may alternatively provide four separate tubes each of which communicates directly with the valve housing 78 below seat 90, with each tube extending directly to its associated note-producing element, and provided with its own check valve 98. These changes are considered sufficiently obvious as not to require special illustration.

Regardless of the arrangement, and regardless of the particular type of note-producing elements employed, the construction is such that the musician, with one foot, can sound any of a desired number of chords according to the capacity of the particular foot-operated organ made in accordance with the invention. In every instance, the other foot of the musician is left free, and in addition, the musician has his hands free if he desires to play another musical instrument. Of course, even if the musician is not trained to play additional instruments at the same

time that the chord organ is being played, he or she can play the chord organ with a minimum amount of instruction. One need only learn, by reading sheet music or by memory, which chords follow upon one another for the purpose of playing the chords of a particular song or musical composition, and with little training, one can quickly swing the foot pedal back and forth about the axis defined by stem **28**, to locate it properly with respect to the lever associated with the next chord to be sounded. Each time the foot pedal is depressed, the subsequent relaxation of the downward pressure exerted by the user permits the force of the leaf spring **34** to assert itself, to instantly raise the front portion of the foot pedal so that the user can swing it to the desired position for sounding the next chord.

I claim:

1. A foot-operated musical instrument for sounding a plurality of musical notes simultaneously, comprising:

(a) a support structure;

(b) a plurality of note-sounding elements carried by said structure;

(c) a pedal assembly on said structure including a foot pedal member mounted for swivelling and rocking movement; and

(d) a series of chord-sounding assemblies each of which includes

(1) a main valve operable responsive to swivelling of the pedal member to a position adjacent said valve and rocking of said member while in said position, and

(2) a plurality of conduits each of which is connected through said valve between a selected note-sounding element and a source of air under pressure.

2. A musical instrument as in claim **1** wherein said pedal assembly further includes

(1) a T-shaped element including an upstanding stem mounted on said structure for rotation about a vertical axis and a horizontal pivot pin on which the pedal member is rockably supported; and

(2) means underlying the pedal member resiliently yieldably exerting a pressure thereagainst tending to bias the same to a normally raised rest position.

3. A musical instrument as in claim **2** further including a collar on said stem to which said resiliently yielding means is anchored for bodily rotation with said T-shaped element and pedal member about said vertical axis.

4. A musical instrument as in claim **1** wherein said pedal member includes means mounted for adjustment transversely and longitudinally of the pedal member for adjusting the same to the width and length, respectively, of a foot supported on said member.

5. A musical instrument as in claim **1** wherein said pedal assembly includes guide means arranged in an arcuate series about the axis of swivelling movement of the pedal member and arranged to guide said member through a valve-operating path during rocking motion of the guide member.

6. A musical instrument as in claim **5** wherein said guide means includes a series of upstanding blocks having sloped side surfaces slidably engageable by the pedal member when the same is rocked downwardly so as to cammingly bias the pedal member laterally during said rocking motion to a proper position for operating the selected valve, the pedal member including a depending actuating finger pointed complementarily to said sloped surfaces.

7. A musical instrument as in claim **1** wherein each chord-sounding assembly further includes a check valve mounted in each conduit leading to a note-sounding element and arranged to prevent backflow of air under pressure passing through said conduit.

8. A musical instrument as in claim **1** further including a main air supply conduit common to all the main valves and branch air supply conduits individual to the respective main valves and extending from said main supply conduit to each of said main valves.

9. A musical instrument as in claim **1** in which each of said chord-sounding assemblies further includes a lever fulcrumed intermediate its ends on said support structure, said levers being arranged in an arcuate series about the axis of swivelling movement of the pedal member, each lever having one end disposed for engagement by the pedal member when the pedal member is rocked after swivelling thereof to a selected valve-operating position, each of said levers having its other end disposed to operate an associated main valve in response to rocking of the lever by the pedal member.

10. A musical instrument as in claim **1** wherein said support structure includes

(1) a base plate, and

(2) a cabinet mounted on one end portion of the base plate and housing said chord-sounding assemblies and main valves, said foot pedal assembly being mounted on the other end portion of said base plate.

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RICHARD B. WILKINSON, *Primary Examiner.*

G. M. POLUMBUS, *Assistant Examiner.*