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J. P. EUSTIS ET AL

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2 Sheets-Sheet 1

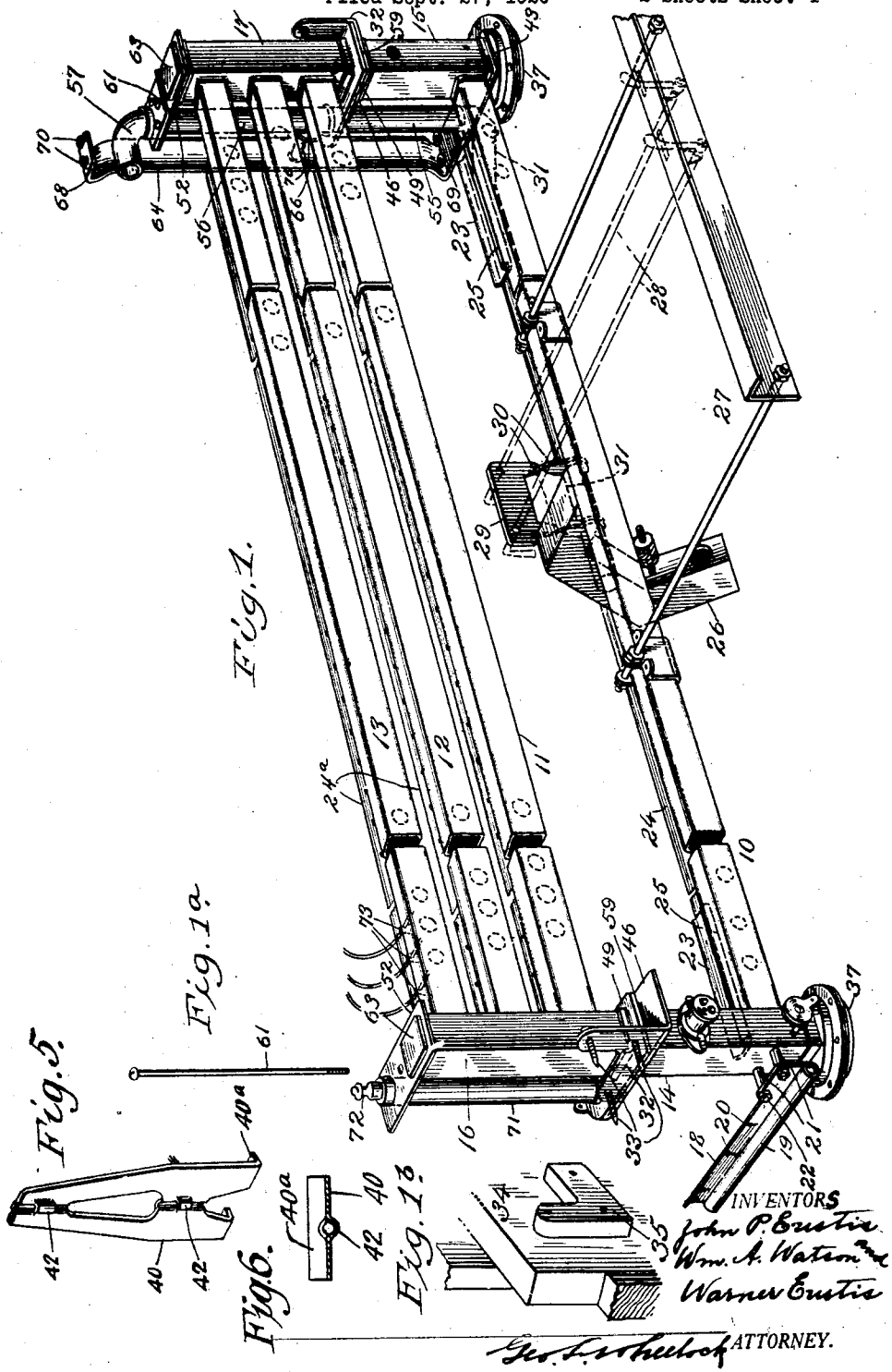


Fig. 1.

Fig. 19.

Fig. 5.

Fig. 6.

Fig. 13.

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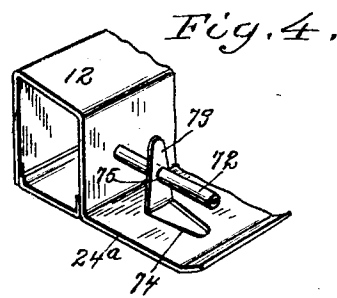
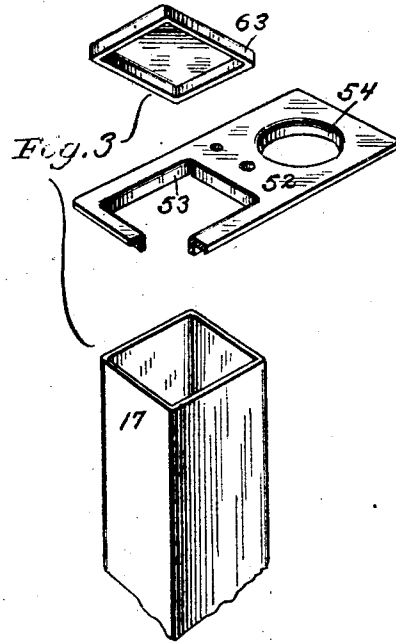
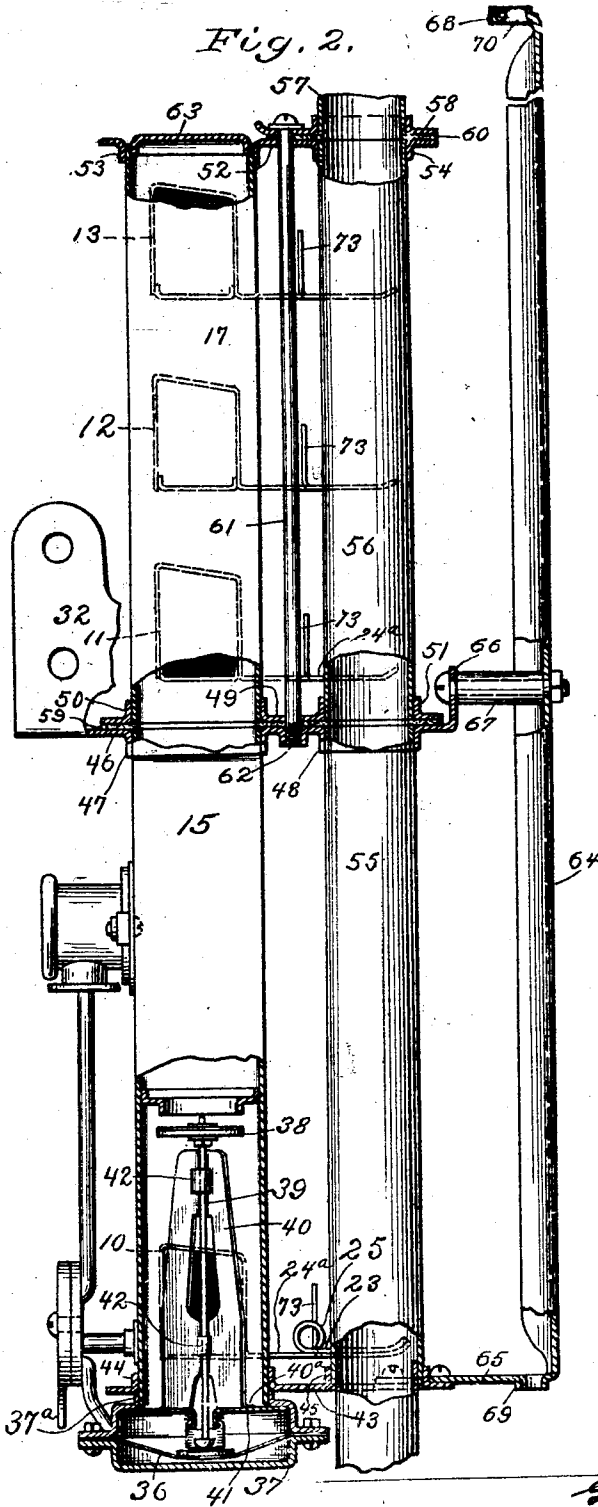
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SUPPORTING STRUCTURE FOR THE MECHANISM OF PLAYER MUSICAL INSTRUMENTS

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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

JOHN P. EUSTIS, OF NEWTON, WILLIAM A. WATSON, OF MALDEN, AND WARNER EUSTIS, OF NEWTON, MASSACHUSETTS, ASSIGNORS TO J. P. EUSTIS MANUFACTURING COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SUPPORTING STRUCTURE FOR THE MECHANISM OF PLAYER MUSICAL INSTRUMENTS.

Application filed September 27, 1920. Serial No. 413,153.

*To all whom it may concern:*

Be it known that we, JOHN P. EUSTIS, WILLIAM A. WATSON, and WARNER EUSTIS, citizens of the United States, residing at Newton, Malden, and Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Supporting Structures for the Mechanism of Player Musical Instruments, of which the following is a specification.

This invention relates to a supporting structure for the mechanism of player musical instruments, and is more particularly adapted for the player actions of player pianos.

One of the objects of the present invention is to provide a suitable construction for the wind-way parts of a player action, especially when the said parts and concomitants are made of sheet metal. Another object of the invention is to provide proper means for supporting the movable parts of player actions. Other objects are to render player actions more durable, efficient and economical in service.

These being among the objects of the present invention, the same consists of certain features of construction and combination of parts to be hereinafter described and then claimed with reference to the accompanying drawings illustrating desirable embodiments of the invention, in which—

Fig. 1 is a perspective view of the improved player action, the parts shown in Figs. 1<sup>a</sup> and 1<sup>b</sup> being shown related therewith conveniently for assembly.

Fig. 1<sup>a</sup> is a perspective view of the tie-bolt which is to be secured into the left-hand end of the player-action.

Fig. 1<sup>b</sup> is a perspective view of portions of one end of a piano case which is specially constructed for the attachment of the corresponding end of the player action.

Fig. 2 is an enlarged end elevation of the same parts of the player action, parts being broken away for the sake of clearness.

Fig. 3 is a perspective view of certain of the joint parts separated in position for being assembled;

Fig. 4 is a perspective view showing a detail of means for supporting and connecting the tracker-tubes with the wind-chest;

Fig. 5 is a perspective view of the valve-stem guide; and

Fig. 6 is a transverse section thereof.

Illustrations of mechanism, over which the present invention may be said to constitute improvements, may be found in the pending application of Wm. A. Watson and Warner Eustis, Serial No. 318,521, filed August 19, 1919, and further reference may be had to an application filed Oct. 6, 1920, Serial No. 414,954, in the names of Warner Eustis and Wm. A. Watson for rewind mechanism for player musical instruments. The said applications disclose player actions in which the stationary parts are preferably made of sheet metal, such stationary parts comprising the air-conduits or wind-ways and parts supported thereby, for, in turn, supporting movable parts of the player action.

Referring to the drawings, the lower wind-way or wind-chest 10 is preferably so combined with the rest of the player action that when the player action is placed into the case of the piano, for instance, the said wind-way will be disposed beneath the key-bed. Above the lower wind-way 10 are wind-ways 11, 12, 13 arranged one above the other, and while the lower wind-way is not divided transversely, the wind-ways 11, 12, 13 are divided transversely in well-known manner for the well-known proper action either upon the hammers of the bass or the treble, or upon the hammers of both bass and treble. The lower wind-way or chest 10 is provided at opposite ends with hollow end-cheek or header sections 14, 15, respectively, while adjacent ends of the wind-ways 11, 12, 13 are connected by means of a hollow end-cheek or header section 16, the cor-

responding opposite ends of said wind-ways 11, 12, 13 being connected by a corresponding end-cheek or header section 17.

Inasmuch as the described wind-way structure is preferably composed of sheet metal, it is desirable, in the event that it is composed of sheet metal, that suitable bearing-brackets for supporting the parts of the player action also be composed of sheet metal. At the left-hand end of the player action shown in Fig. 1, there is illustrated a sheet metal bearing-bracket 18, which is narrower in one direction than the other, and which along one of its longitudinal edges is rolled up into a sleeve 19 adapted to form a bearing for a rock-shaft, which under the present invention may be a part of the automatic damper mechanism. The said bearing-bracket 18 is shown as supported horizontally upon the left-hand header section 14, and desirable means for so supporting it may consist of key-slots 20 formed along the upper edge of the bracket, and with which slots may be engaged studs 21 extending laterally from the header section 14, said studs being screw-threaded at their outer ends and engaged by nuts 22, which hold the said bracket in stationary position upon the player action. It will be seen that these key-slots 20 enable the bracket to be positioned lengthwise, as may be desired. Lower wind-way 10 is provided with a rearwardly extending shelf or ledge 24, and at opposite ends thereof are supported two similar sheet metal bearing-brackets 23, 23, the same being substantially like the bracket 18, so that each of the brackets 23 is provided with an elongated bearing 25 for the rock-shafts of some of the movable parts of the player action, which in the present illustration happen to be for the rock-shafts of parts of the automatic hammer mechanism.

Connected with the mid-length of the lower wind-way 10 is a suitable sheet metal trunk 26, which leads to the pumps (not shown). Supported also by the lower wind-way 10 is a forwardly extending frame 27 of suitable construction, which may be as shown in aforesaid applications, or otherwise constructed, and said frame is peculiarly adapted for supporting the control manuals of the player action, enabling those parts of the player action which are supported by the lower wind-way or chest 10 to be removed from the case of the musical instrument whenever the wind-way 10 is removed. The control manuals are not fully shown, as they may be of most any desirable construction. However, two control shafts 28 are shown, inasmuch as their rear ends are preferably supported, as by a sheet metal bracket 29, which is positioned behind wind-way 10. The supporting bracket 29 is provided with downwardly extending feet 30, which are twisted so as to dispose the

lower extremities thereof at right angles to the plane of the upper end of the bracket 29, and the lower extremities of the feet 30 are orificed to receive a conduit or pipe 31, which is connected with the trunk 26. The feet 30 are rigidly secured to the preferably sheet metal conduit 31 by solder. The upper end of the bracket 29 is provided with bearings for the shafts 28 before mentioned.

Suitably secured to opposite ends of the player action are bracket-plates 32, which are located just beyond the outer sides of the header sections 16, 17. These bracket-plates enable the player action to be supported from the case of a piano, for instance, to which end screws 33 may pass through the brackets 32, while the end-checks 34 of the piano may be provided with raised portions or seat-blocks 35, against which the said brackets 32 may be seated, so that the screws 33 may be employed to removably attach the player action to the case of the instrument. There will of course be a similar construction at each end of the piano case.

As shown more clearly in Fig. 2, the lower end of the right-hand header section 15 is provided with a motor-pneumatic 36 fixed in a two-part sheet metal chamber 37, which is secured air-tight to the said header section, as by flange 37<sup>a</sup>. Upon the motor-pneumatic 36 the stem 39 of expression-valve 38 is adapted to rest. This valve constitutes one of the valves of an expression mechanism for obtaining expression in any suitable or well-known manner. Said valve is illustrated, inasmuch as a peculiar supporting device is preferably employed for guiding the valve-stem. This device comprises an upright sheet metal frame 40, formed by a plate having a base-flange 40<sup>a</sup>, which flange is fixedly secured by means of a supporting base-plate 41 located in the chamber 37. This sheet metal frame 40 extends upwardly in the header section 15 for a considerable distance, for supporting and properly guiding the elongated valve-stem 39, to which end the said plate is slashed or cut transversely so as to provide guides 42, which are formed by bending the metal between the slashes, so that there shall be opposite bends or grooves between any two consecutive slashes.

A connecting sheet metal plate 43 is provided with two orifices to provide flanges 44, 45. One of the orifices of said plate receives the lower end of the header section 15, the two being brazed or soldered together. A similar connecting plate 46 is located at the upper end of the header section 15, except that the said plate is formed with one of the bracket-plates 32 before mentioned. Being formed similarly to the connecting-plate 43 in other respects, the said plate 46 will be provided with two orifices surrounded by two flanges 47, 48, respectively. Flange 47

is soldered or brazed to the upper end of the header section 15. At the opposite header section 14, a similar connecting-plate 46 and bracket 32 are provided, being secured to the header section in substantially the same manner. On the lower end of the upper right-hand header section there is placed a similar connecting-plate 49, the flanges of which, however, extend upwardly away from the flanges on the plate 46. It is also secured by brazing or soldering to the said header section. Its flanges are numbered 50, 51. At the upper end of the upper right-hand header section is placed a similar connecting-plate 52, which is provided with down-turned flanges 53, 54, around its orifice, and said plate is also brazed or soldered to the said header section. Secured to the opposite upper header section 16 is a similar connecting-plate 52.

Conduit or wind-way 31 before referred to may be connected with a vertical conduit section 55, which, in turn, is connected with conduit section 56. These will be referred to later. The uppermost conduit section 57 is provided with an attaching-plate 58 between which and the plate 52 a small rubber gasket 60 is placed. A large rubber gasket 59 is placed between the two plates 46, 49 at each end of the structure. The header-sections alined at each end of the structure will now be collectively termed "headers." It should be remarked that the connecting-plates 52, 49, 46, 43, extend rearwardly from the right-hand header, and connecting-plates corresponding to the plates 52, 49, 46, extend rearwardly from the left-hand header. The orifices in the said plates, which are behind the header at the right-hand end, are adapted to receive the ends of the conduit sections 55, 56, and the lower end of the conduit 57 is received in the attaching-plate 58, said conduit sections being securely held, as by soldering or brazing. In consequence, the header section 15 at the right-hand end will have rigidly attached thereto by the connecting-plates extending from said header section, the conduit section 55; while the upper right-hand end header section 17 will have similarly secured to the back of it the conduit section 56. Therefore, the conduit section 55 will constitute a unit with the header section 15, and the conduit section 56 will constitute a unit with the header section 17. When the described units are properly connected at the right-hand end, and when the header sections are properly connected at the left-hand end, so that the header sections at each end will be in vertical alinement, and the conduit sections 55, 56 in vertical alinement, they are secured rigidly and firmly together by means of tie-bolts 61 which are passed through the connecting-plates before described, the lower ends of the tie-bolts being screw-threaded

and engaged in screw-threaded bosses 62, one of them on each of the plates, such as 46. At the right-hand end of the player action, the tie-bolt 61 also passes through the attaching-plate 58, to which there is none corresponding at the left-hand end. The drifted orifice in the plate 52, which receives the upper right-hand end header section 17, and this also applies to the left-hand end header section 16, receives a flanged sheet metal plug 63, which is soldered or brazed into the header section.

The alined right-hand end header sections, constitute headers or windways, and are adapted to support a sheet metal standard 64, such standard being shown as long, at least, as the combined lengths of the header sections at that end. This standard may be reinforced for strength, but preferably it is stiffened by bending or curving it transversely throughout its length. The standard 64 is provided with a foot-piece 65 bent angularly therefrom, and soldered or brazed to the rear end of the connecting-plate 43. Connecting-plate 46 is provided at its rear end with an upwardly extending lug 66, which carries a stud 67, to which the said standard 64 is secured at about its mid-length. The standard 64 is furthermore provided with an angularly bent top-piece 68. The foot-piece 65 is provided with two shaft bearings, 69, 69 and the top-piece 68 is provided with two shaft bearings 70, 70, the said bearings being in vertical alinement, or approximately so, with the lower bearings 69. Preferably the said standard with its bearings is made use of for supporting certain parts of the shafting involved in the tempo and rewind mechanism, which does not need to be illustrated herein.

It will be seen that when all the described parts are properly assembled and connected, a substantially rigid preferably metallic supporting structure for the parts of the mechanism of player musical instruments is provided, and that the parts of the mechanism may be quickly assembled or detached, and that the described unitary structure may be either removed bodily or in upper and lower sections from the case of the musical instrument to which it is applied.

Inasmuch as no wind-way, such as provided by the conduit sections 31, 55, 56, is necessary at the left-hand end of the player action, for the sake of presenting a fine appearance and for obtaining greater utility of the supporting parts at the left-hand end, the connecting-plates which at that end correspond with the plates 49, 52, support at their rear ends a tube 71, which is closed at its upper end by a removable plug 72, said tube constituting a tool box for containing such tools as are useful in adjusting or repairing parts of the player action.

In Fig. 4 there is shown a portion of 130

wind-chest or wind-way 12, for instance, which is provided with a rearwardly extending shelf or ledge 24<sup>a</sup>, preferably formed in one piece with the sheet metal structure of the wind-chest. Each of the upper wind-chests 11, 12, 13 in the preferred form of the invention is preferably so constructed, and each chest is preferably provided with means for attaching and supporting each of the tracker-tubes 72 which lead to the respective chest.

To this end each of the shelves or ledges 24<sup>a</sup> is provided with a series of lugs 73, which extends lengthwise of the shelf or ledge, and hence, lengthwise of the corresponding wind-chest so that said lugs are located back of the same. These lugs, such as 73, extend upwardly as upright supports for the ends of the tracker-tubes 72. Each lug is preferably struck up from the metal of the shelf or ledge 24<sup>a</sup>, thereby leaving an opening 74, which is produced by the removal of the metal constituting the lug 73. Preferably the upper end of each lug is provided with a circular hole 75, through which the corresponding tracker-tube 72 passes with a snug fit in said hole. The lower end of each tracker-tube then passes into the back of the corresponding wind-chest or wind-way.

It is obvious that the described invention is susceptible to modification, as parts may be omitted, parts added and parts substituted for those shown, without departing from the spirit and scope of the invention as defined in the claims.

What we claim as new is:

1. In a structure for player musical instruments, a horizontal windway, a tracker-tube supporting shelf thereon, and supporting lugs on said shelf for the individual tracker-tubes.
2. In a structure for player musical instruments, a horizontal windway, a tracker-tube supporting shelf thereon, and supporting lugs on said shelf for the individual tracker-tubes, in combination with the tracker-tubes which, with said shelf, extend rearwardly from said windway, and which pass through said lugs.
3. In a supporting structure for the mechanism of player musical instruments, a windway, headers thereon, metallic flanges 46 on the headers, and plates integral with and at right angle to said flanges, and provided with means for attaching said structure in the case of the instrument.
4. In a supporting structure for the mechanism of player musical instruments, windways, headers therefor, horizontal flanges or plates 46 between the ends of said headers, horizontal plates at the upper ends of said headers, and a windway supported by the plates at one end of said structure.

5. In a supporting structure for the mechanism of player musical instruments, a header at one end of said structure, supporting means extending therefrom, and an upright bracket provided with shaft bearings and supported by the said means, said bracket being stiffened longitudinally, and provided with lateral ears in which said bearings are located.

6. A metallic header in a supporting wind-chest structure for the mechanism of player musical instruments, the header having a supporting plate 52 at one end provided with an opening with a drifted flange around said opening for tightly fitting into the end of the header, and a flanged plug inserted in and sealing said opening.

7. In a supporting structure for the mechanism of player musical instruments, header sections, one on the other at both ends of said structure, orificed plates secured around each header section at the meeting ends of the header sections, packing between said plates, and a tie-bolt connecting said plates at each end of said structure.

8. In a supporting structure for the mechanism of player musical instruments, header sections, one on the other at both ends of said structure, orificed plates secured around each header section at the meeting ends of the header sections, packing between said plates, a tie-bolt connecting said plates at each end of said structure, and tubes passing through said plates at both ends of said structure.

9. In a supporting structure for the mechanism of player musical instruments, parallel windways, and plates at the ends of the same having orifices in which said windways fit tightly, there being two sets of the so-connected windways, and a tie-bolt passing through intermediate portions of said plates, between said windways and detachably uniting said sets in vertical alignment.

10. A horizontal wind-way for player musical instruments, having a rearwardly-extending shelf, at least one of the walls of said wind-way and the said shelf being formed of one piece of sheet metal, tracker-tubes connected with the wind-way, and means for attaching said tracker-tubes to said sheet metal shelf.

11. In a structure for player musical instruments, a horizontal wind-way, a tracker-tube supporting shelf, and means for attaching said tubes to said shelf.

12. In a structure for player musical instruments, a horizontal wind-way, having a shelf, and means on said shelf for attaching the tracker-tubes thereto, in combination with the tracker-tubes, which, with said shelf, extend rearwardly from said wind-way.

13. In a supporting structure for the mechanism of player musical instruments, a header at one end of said structure, and an upright bracket attached to said header,  
5 and provided with shaft-bearings.

14. In a supporting structure for the mechanism of player musical instruments, header sections arranged one upon the other at both ends of said structure, plates 46, 52  
10 secured to the header sections at both ends

of the structure, and a tie-bolt connecting said plates at each end of said structure.

15. In a supporting structure for the mechanism of player musical instruments, a wind-way, and bearing-brackets mounted 15 thereon.

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