No. 612,597. Patented Oct. 18, 1898.

J. P. TIRRELL.

SECTIONAL PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.

(Application filed Mar. 15, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1

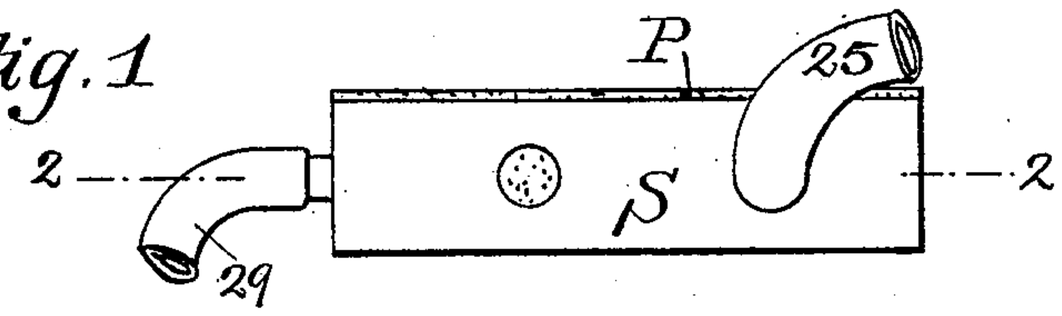

Fig. 4

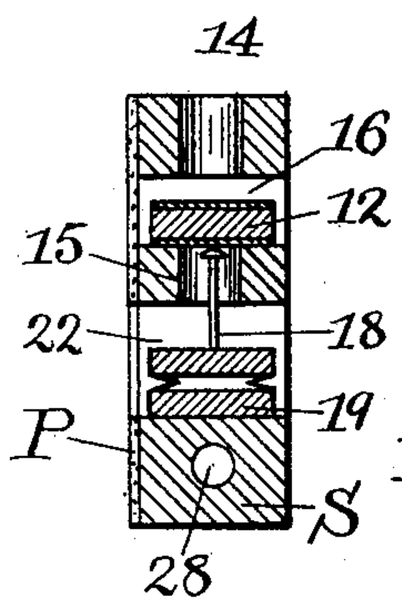

Fig. 3

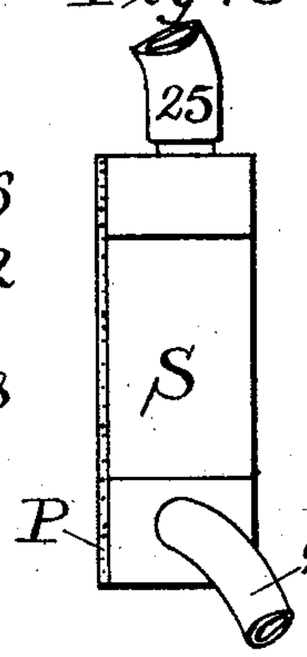

Fig. 2

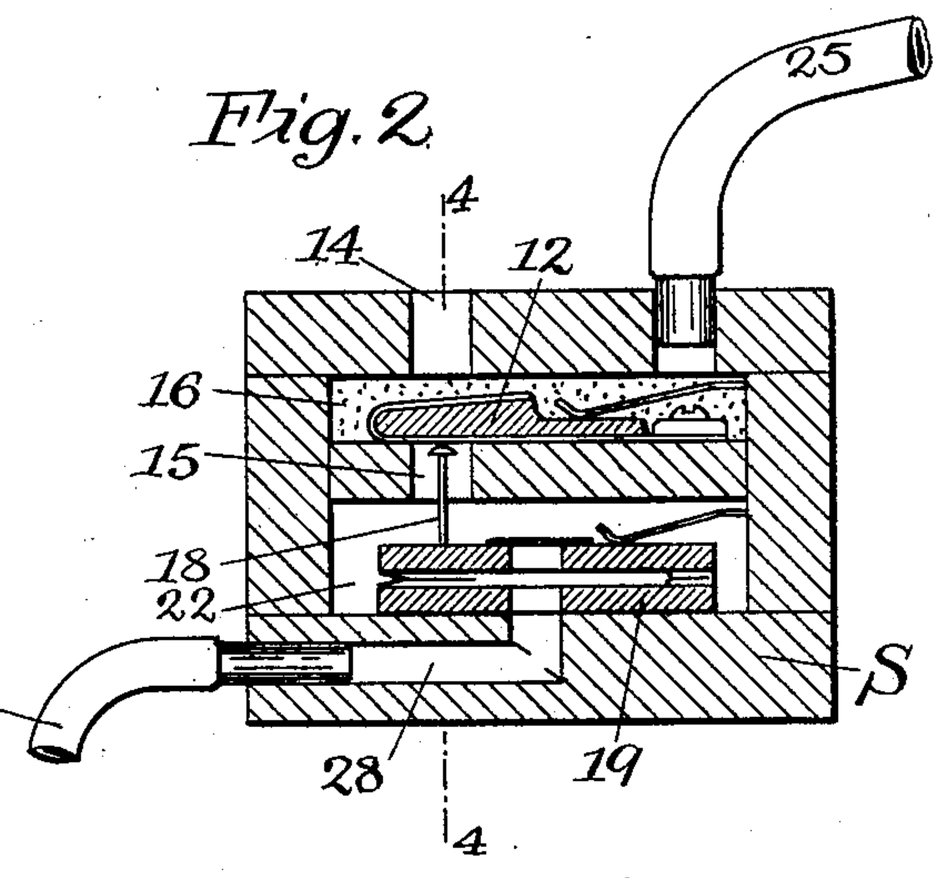

Fig. 5

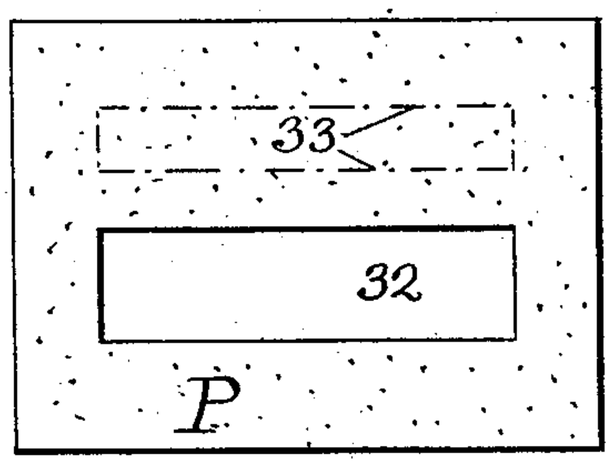

Fig. 6

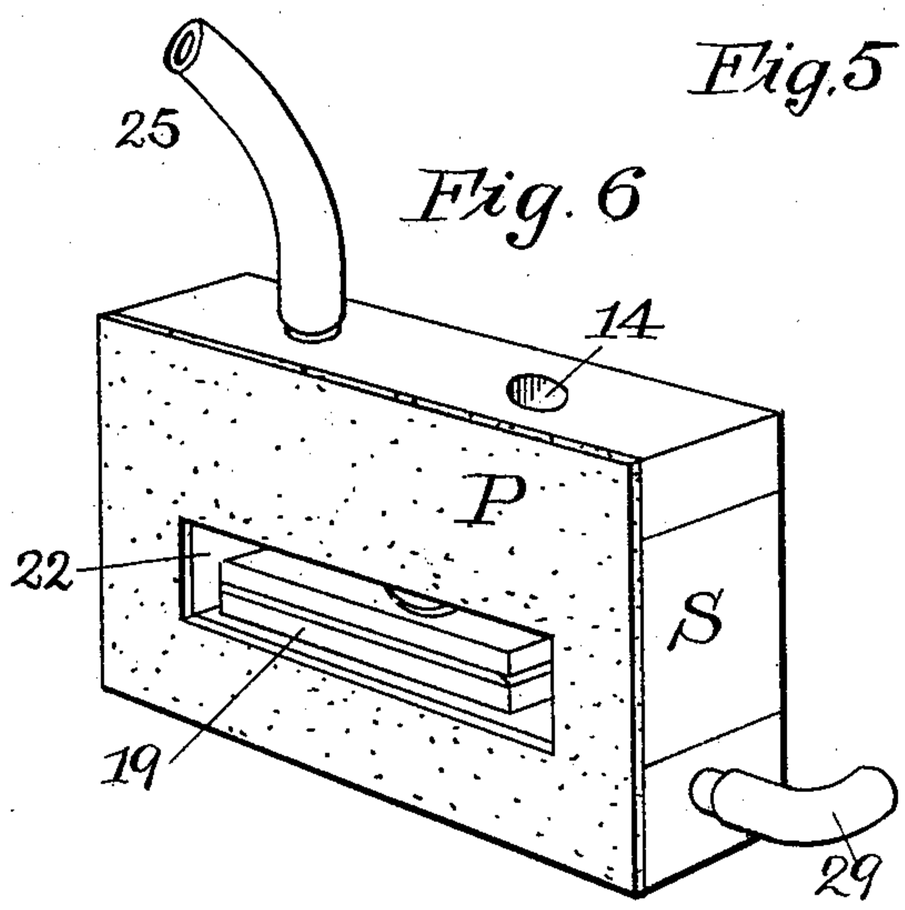

Fig. 15

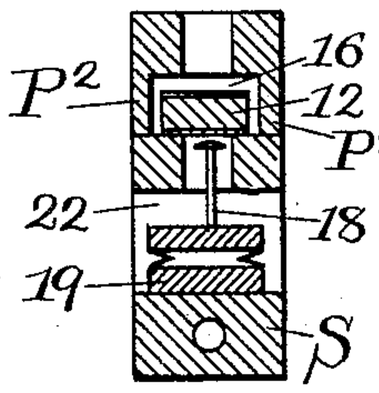

Fig. 14

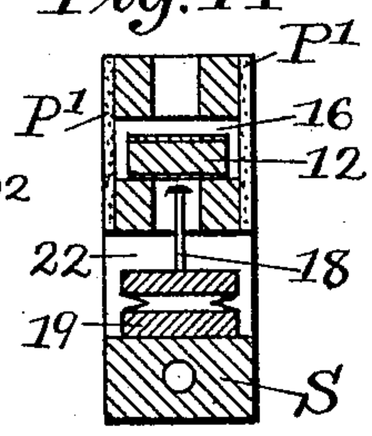

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Fig. 7

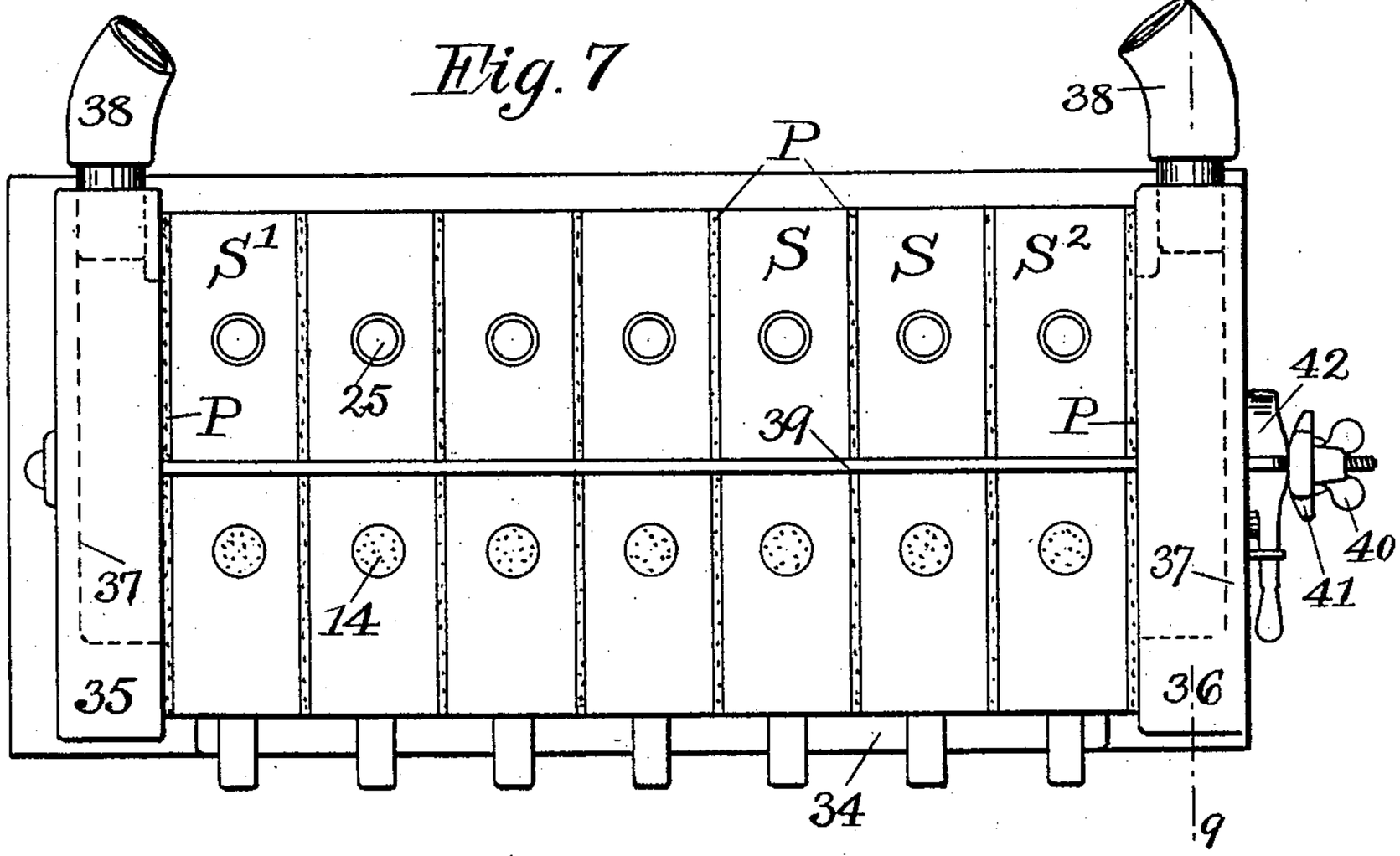


Fig. 8

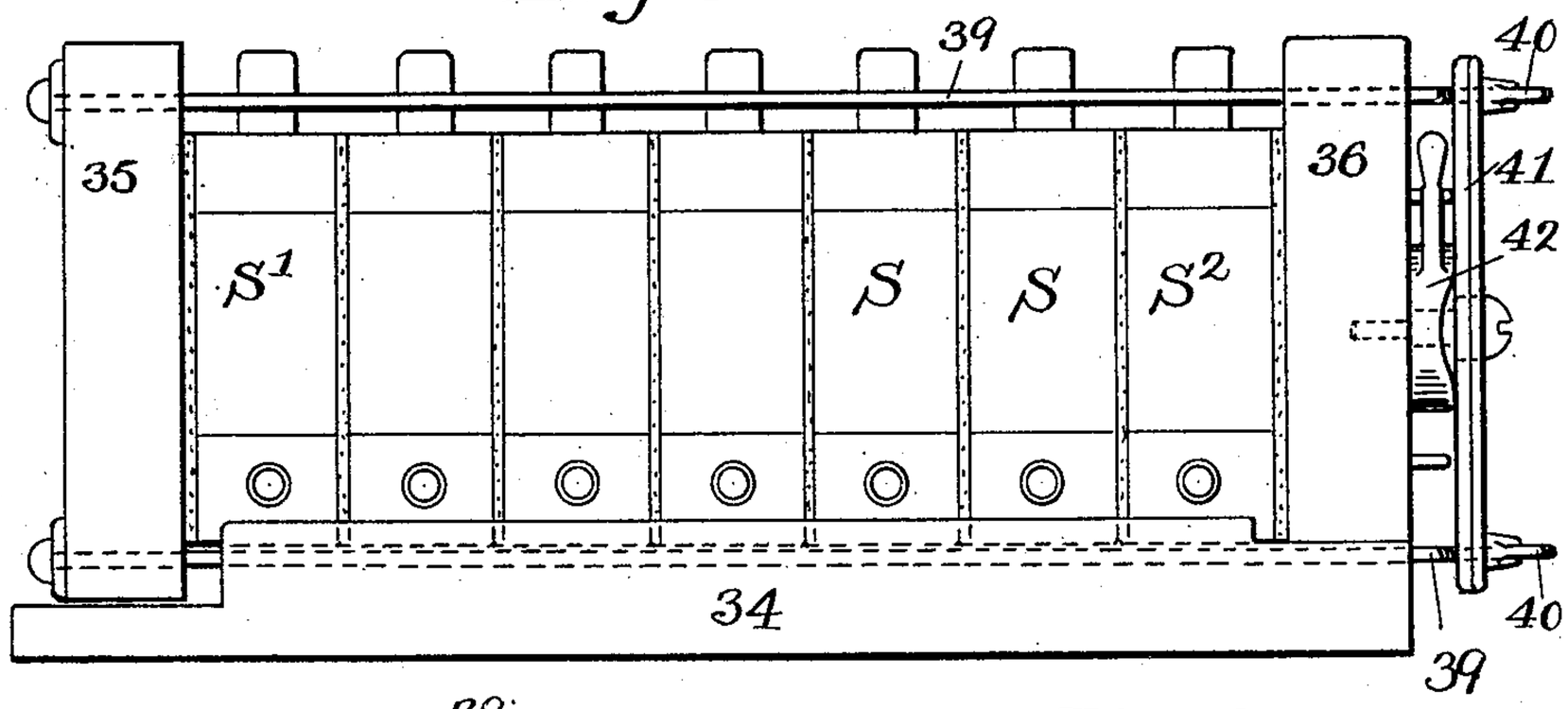


Fig. 10

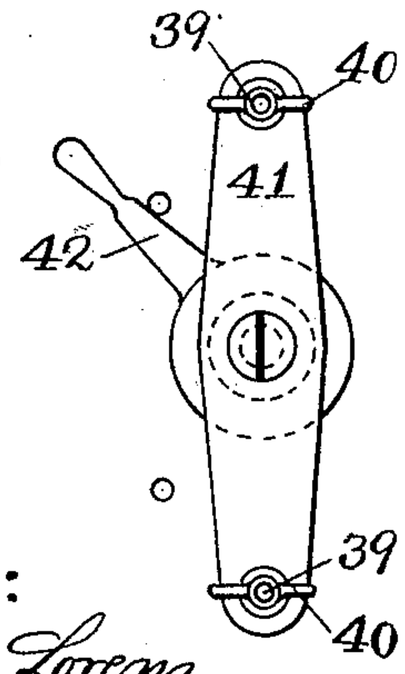
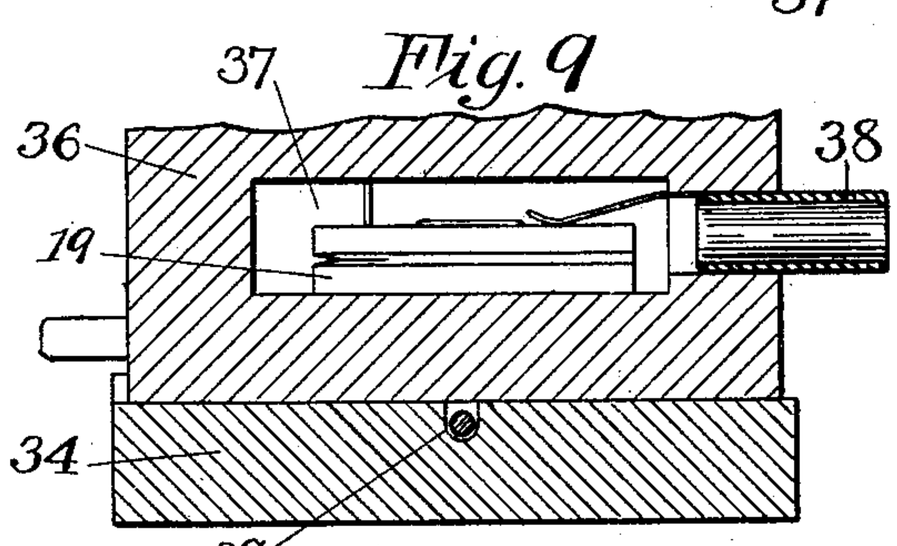


Fig. 9



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(No Model.) 3 Sheets—Sheet 3.

Fig. 11

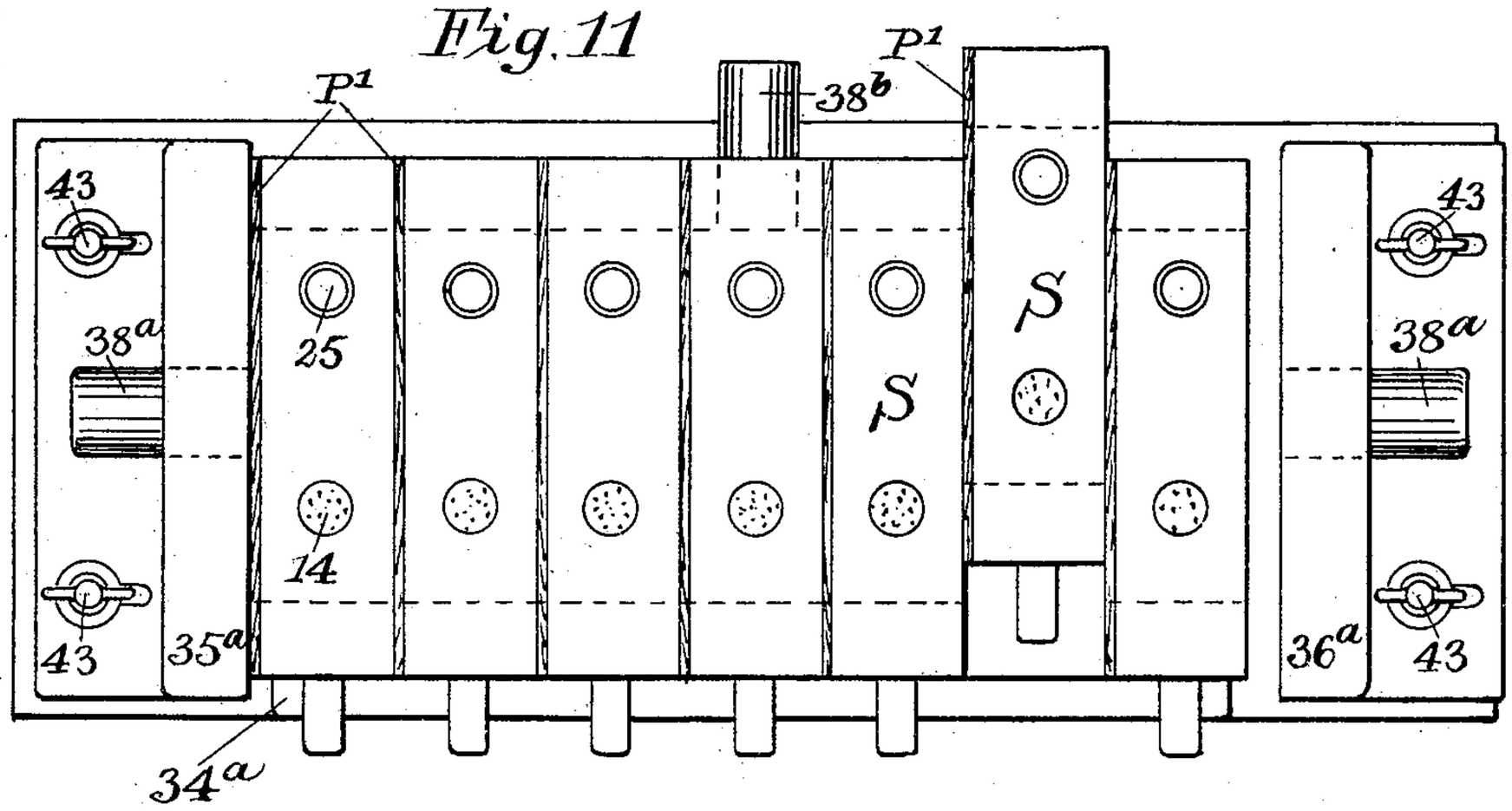


Fig. 12

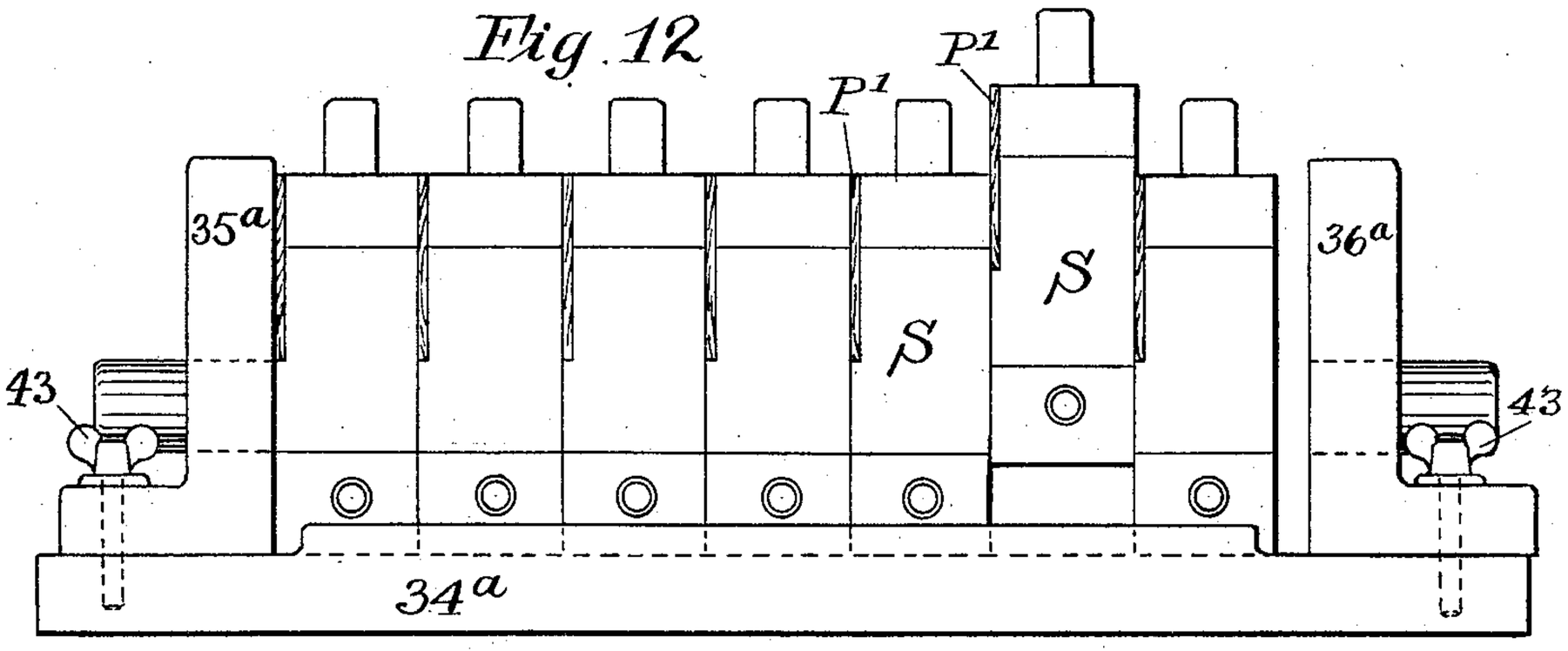
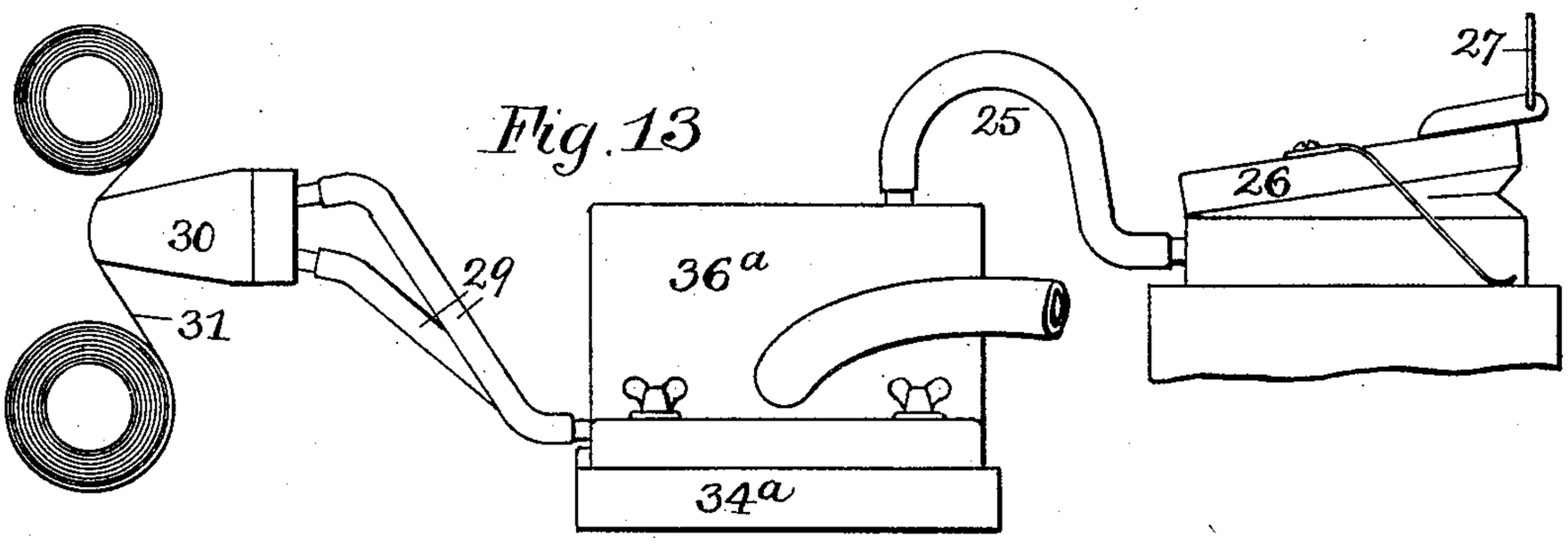


Fig. 13



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UNITED STATES PATENT OFFICE.

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SECTIONAL PNEUMATIC ACTION FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 612,597, dated October 18, 1898.

Application filed March 15, 1898. Serial No. 673,895. (No model.)

To all whom it may concern:

Be it known that I, JACOB PORTER TIRRELL, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sectional Pneumatic Actions for Musical Instruments, of which the following is a specification.

This invention relates to improvements in the construction and arrangement of pneumatic actions for musical instruments. Its object is to organize and arrange such actions in a series of independent sectional casings, so as to enable each action in its entirety to be readily removed for examination or repairs without disturbing the other actions of the series. This object is achieved by providing each action with an independent sectional casing having an exhaust-chest open at both sides and having a communicating valve-chamber attached thereto or integral therewith, so that these sections when placed together side by side constitute a complete and operative series of pneumatic actions having a common or continuous exhaust-chest and independent valve-chambers.

A further object of this invention is to secure the constructive advantages of making the respective sections of small pieces of wood or other material, the splitting, warping, and checking tendencies of which are thereby restricted to the independent pieces or sections instead of extending along a considerable length of the action-case, as is liable to occur where the latter is made from extended lengths of material.

For greater clearness and convenience of description my improved sectional casing, with its contained action parts, will hereinafter be referred to in its entirety as a "pneumatic action."

Figure 1 of the drawings is a plan view of one of my independent or sectional pneumatic actions. Fig. 2 is a side view thereof in section taken on the line 2 2 of Fig. 1. Fig. 3 is a front view of the action of Figs. 1 and 2, while Fig. 4 is an end view thereof in section, taken on the line 4 4 of Fig. 2. Fig. 5 is a side view of a partition used between the sectional actions when assembled in series. Fig. 6 is a perspective view of my sectional action, showing the partition of Fig. 5 in its proper position. Fig. 7 is a plan view, and Fig. 8 is a front view, of a series of these sectional actions clamped together with the aforesaid partitions between them. Fig. 9 is an end view in section, taken on the line 9 9 of Fig. 7, showing the interior of the exhaust-chest. Fig. 10 is an end view of my preferred means for clamping the sections together in series. Fig. 11 is a plan view, and Fig. 12 a front view, of a modified arrangement of my means for clamping the aforesaid sectional pneumatic actions together, showing the right end clamp loosened and drawn backward and one of the sectional actions drawn partly out. Fig. 13 is an end view, in reduced scale, of the apparatus of Figs. 11 and 12, showing in connection therewith the tracker-bar, note-sheet, and pneumatic motor commonly employed in connection with these actions in musical instruments. Figs. 14 and 15 are sectional end views corresponding to that of Fig. 4, showing two modified forms of construction of this invention.

Each of the sections S of the embodiment of my invention illustrated in the drawings and described herein contains a pneumatic action of an ordinary type, which, however, is but one of the many types of actions to which this invention is applicable. As this type of action is so well known in the art it requires but a brief description. Each section S comprises an exhaust-chest 22, having a primary actuator 19 therein, and a valve-chamber 16, having a valve 12 therein for closing the ducts 14 and 15, the valve being connected with the primary actuator by means of the connecting-pin 18. Each primary actuator is connected by means of the air-passage 28 and tube 29 with a tracker-bar 30, while each valve-chamber is connected by means of a tube 25 with a pneumatic motor 26, as shown in Fig. 13, so that each sectional action serves, when properly connected, to operate its associated reed, picker, or other tone producing or controlling device by means of the connecting-rod 27, the respective actuations being initiated in the usual well-known way by the passage of a perforated note-sheet 31 over the tracker-bar.

I will now more particularly describe the improved features of my invention which I believe to be new and desire to claim herein, and whereby I secure the advantages set forth in the preceding statement of invention. I will, however, preface that description by a brief recital of the disadvantages and objections resulting from or attendant upon the usual construction and arrangement of the pneumatic actions now in common use. These ordinarily consist of a series of actions located within an integral case having a continuous exhaust-chest and separate valve-chambers. The long pieces of wood of which these chests are ordinarily and most conveniently made are liable, by reason of their length and by reason of their being glued or joined together in an integral structure, to split and become warped and require the use of more expensive lumber, inasmuch as these greater lengths must be entirely free from knots or imperfections. Furthermore, the primary pneumatics and valves when placed within this integral case are difficult of access, requiring for the examination or repair of a single part of one of the actions the breaking and remaking of air-tight joints over or along the entire series of sections, which necessitates the services of an expert.

My improved sectional actions are constructed of a width exactly suited to the action parts contained therein, the exhaust-chest 22 and preferably also the valve-chamber 16 of each being open at both sides, so as to allow of direct access to the primary and the valve when the section is removed. The walls and partitions of each section are made up of small pieces, thus permitting the use of odds and ends of lumber, and thereby confining the splitting or warping action of the wood of each section within its own limited compass, and not in the slightest degree affecting thereby the adjacent walls or sections. If, however, it happens to be more expedient in the manufacture of these actions to employ long strips of lumber, the action-case may be made up in extended lengths of the proper cross-section and be subsequently cut transversely into sections of the proper length.

In assembling my improved sections in series for use it is necessary to separate the valve-chambers thereof, so that each valve shall be in an isolated chamber. For this purpose I prefer to employ between the sections a partition P. (Shown separately in Fig. 5 and shown applied upon the side of a section in Fig. 6.) These partitions are preferably made in width and length coextensive with the sections and are each provided with an aperture 32, coextensive with the exhaust-chest opening 22 and located coincident therewith when the sections are assembled, so as to make the exhaust-chest continuous. The valve-chambers are, however, separated by that portion of the partition P which is bounded by the dot-and-dash line 33 in Fig. 5. These partitions are made of leather, paper, or other air-tight material, thereby forming an air-tight packing between the joints of the sections, in addition to closing communication between the respective valve-chambers.

These improved sections when assembled for use as shown in Figs. 7 and 8 are placed side to side, preferably, upon a base 34, and the outer sides of the valve-chambers of the terminal sections S′ and S² are closed by partitions P, like that of Fig. 5. Upon the outer sides of these partitions are applied the clamping-pieces 35 36, one or both of which are provided with an exhaust-space 37, communicating with the common exhaust-chest 22, and with a pipe 38, leading to exhausting apparatus. These clamping-pieces are drawn together by means of the threaded rods 39 and thumb-nuts 40.

As a ready means for quickly tightening or loosening the sections the rods are engaged by the yoke 41, between which and the clamping-piece 36 is located the oscillating cam 42, which when in the position shown in Figs. 7 and 8 serves to clamp the sections tightly together and which when turned by moving its handle 42 downwardly from the position shown in Fig. 10 loosens those sections, so that they may readily be removed. The amount of tension exerted upon the sections is regulated by means of the thumb-nuts 40.

In the modified form of my invention shown in Figs. 11 and 12 the partitions P′ are seated in a correspondingly-recessed portion of one side of each section, extending only far enough across the side to fully cover and separate the valve-chambers 16. In this modification also the end clamping-pieces 35ª 36ª are bolted to the base 34ª by means of thumb-screws 43, instead of being held together by the threaded rods of Figs. 7 and 8. These clamping-pieces are also shown to be provided with the exhaust-tubes 38ª. One or more of the sections in either of the series shown may be provided with an exhaust-tube 38ᵇ, which may be employed instead of or in addition to the tubes 38ª, the number and location of these exhaust-tubes being dependent upon the length of the series.

In the modified construction of this invention shown in Fig. 14 the valve-chamber is closed upon each side by one of the walls or partitions P′, which extend only to the exhaust-chest. These walls serve the purpose of the partitions P of the earlier figures of the drawings when the sections are assembled in series.

In the modified form shown in Fig. 15 the side walls P² of the valve-chamber are integral with the upper wall thereof. This modification, like those of Figs. 12, 14, and 15, are but illustrations of various ways in which the construction of this invention may be varied from my preferred form shown in Figs. 1 to 6, inclusive, without departing from the chief characteristics of this invention. The partitions P or the walls P′ may be left loose or

they may be fastened by means of glue or similar means to their respective sections, so as to be integrally removable therewith, or each alternate section S may have one of the partitions P attached to each of its sides, the intervening sections being unprovided with partitions, inasmuch as in any and all of these ways the object of the present invention may be secured—namely, to so construct and arrange the actions that each may in its entirety be removed for examination or repairs without disturbing the other actions of the series.

By thus constructing and arranging pneumatic apparatus in removable sections each may readily be removed for examination and replaced even by unskilled hands, thereby dispensing with the services of an expert for this kind of work. The possessor of a machine thus arranged may keep on hand extra or duplicate sections, which may be substituted for those found to be damaged beyond repair or which cannot be repaired with the tools available or within the desired time.

The "exhaust-chest" 22 is thus designated herein because in this instance it is employed in connection with an exhaust-bellows. If employed in connection with pressure-bellows, it would probably be designated a "wind-chest," a name already well known in the terminology of this art. The term "exhaust-chest" therefore as used herein is intended to include all that is ordinarily meant by the terms "wind-chest" or "exhaust-chest," according as it may be used in connection with pressure or with exhaust apparatus.

I claim as my invention—

1. A sectional casing for a pneumatic action, comprising an exhaust-chest open at both sides and a valve-chamber attached thereto and communicating therewith.

2. A sectional pneumatic-action casing, provided with an exhaust-chest which is open at both sides, and a valve-chamber communicating therewith, with means for closing one side of the valve-chamber.

3. A series of sectional pneumatic actions, each of which is contained in a sectional casing, provided with an exhaust-chest open at both sides, and with a valve-chamber attached thereto and communicating therewith, whereby the sections when clamped together form an operative series of actions having independent valve-chambers and a common exhaust-chest.

4. A sectional pneumatic-action casing comprising a valve-chamber and an exhaust-chest each open at both sides, in combination with an air-tight partition for closing one side of the valve-chamber.

5. A series of sectional pneumatic-action casings, each having an exhaust-chest and a valve-chamber, which when detached are open at both sides, in combination with a series of air-tight partitions located between the sections and separating the respective valve-chambers, leaving the respective exhaust-chests open to form a continuous chest.

6. A series of sectional pneumatic-action casings, each comprising an exhaust-chest and a valve-chamber, a series of air-tight partitions located between the sectional casings, and separating the valve-chambers without separating the chests, leaving the latter common to the entire series, with end pieces for closing the outer apertures of the terminal sections, and with means for sustaining and clamping the sections together in complete series.

7. A series of sectional pneumatic-action casings, each comprising an exhaust-chest and a valve-chamber, a series of air-tight partitions located between the sections and separating the valve-chambers without separating the chests, leaving the latter common to the entire series, end pieces for closing the outer apertures of the terminal sections, means for sustaining and clamping the sections together in complete series, and means for exhausting the air from the common exhaust-chest.

Signed by me at Boston, Massachusetts, this 7th day of March, 1898.

JACOB PORTER TIRRELL.

Witnesses:

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C. B. KENDALL.