

(No Model.)

W. H. ROLLINS.
MECHANICAL MUSICAL INSTRUMENT.

No. 563,415.

Patented July 7, 1896.

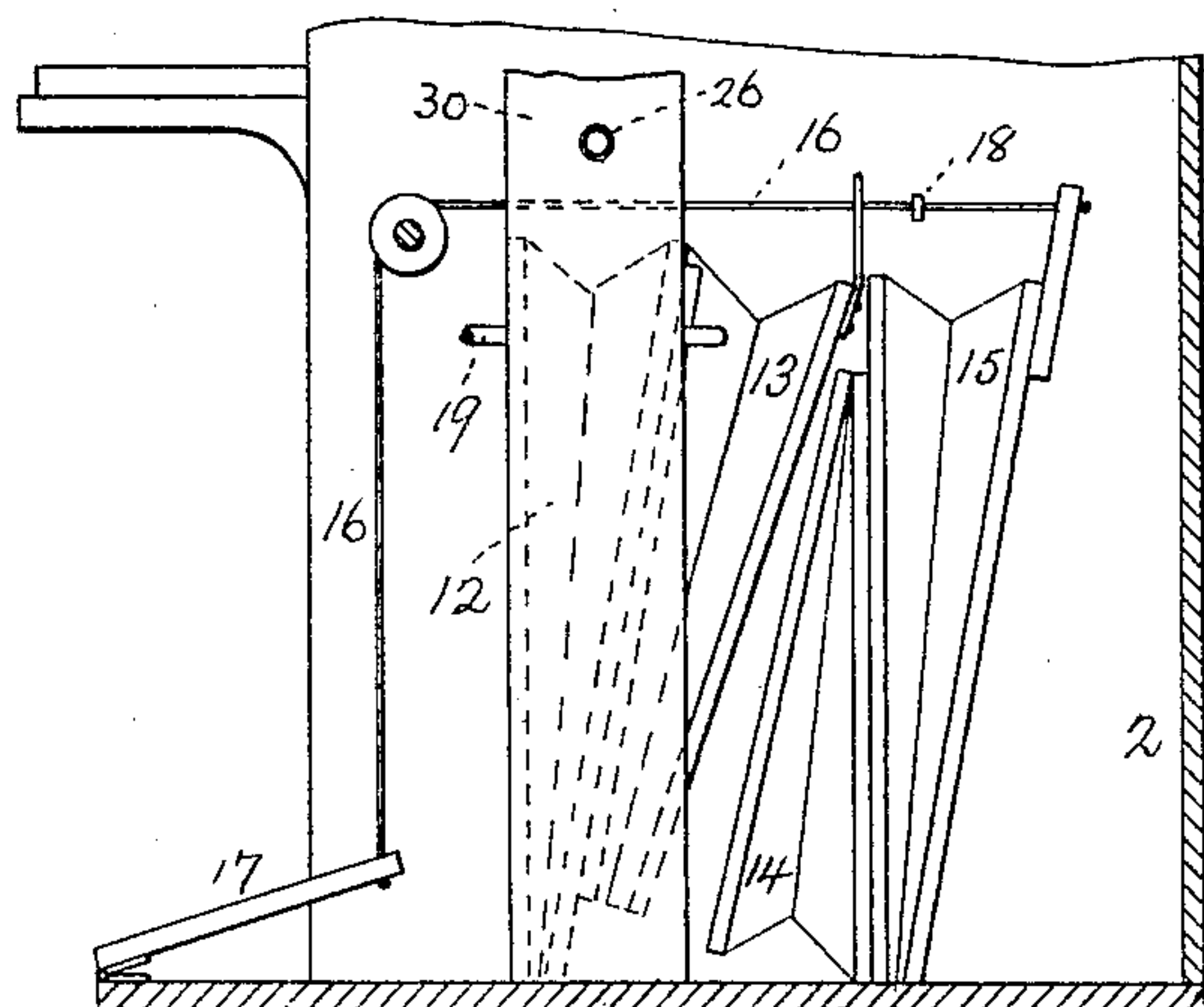


Fig. 1.

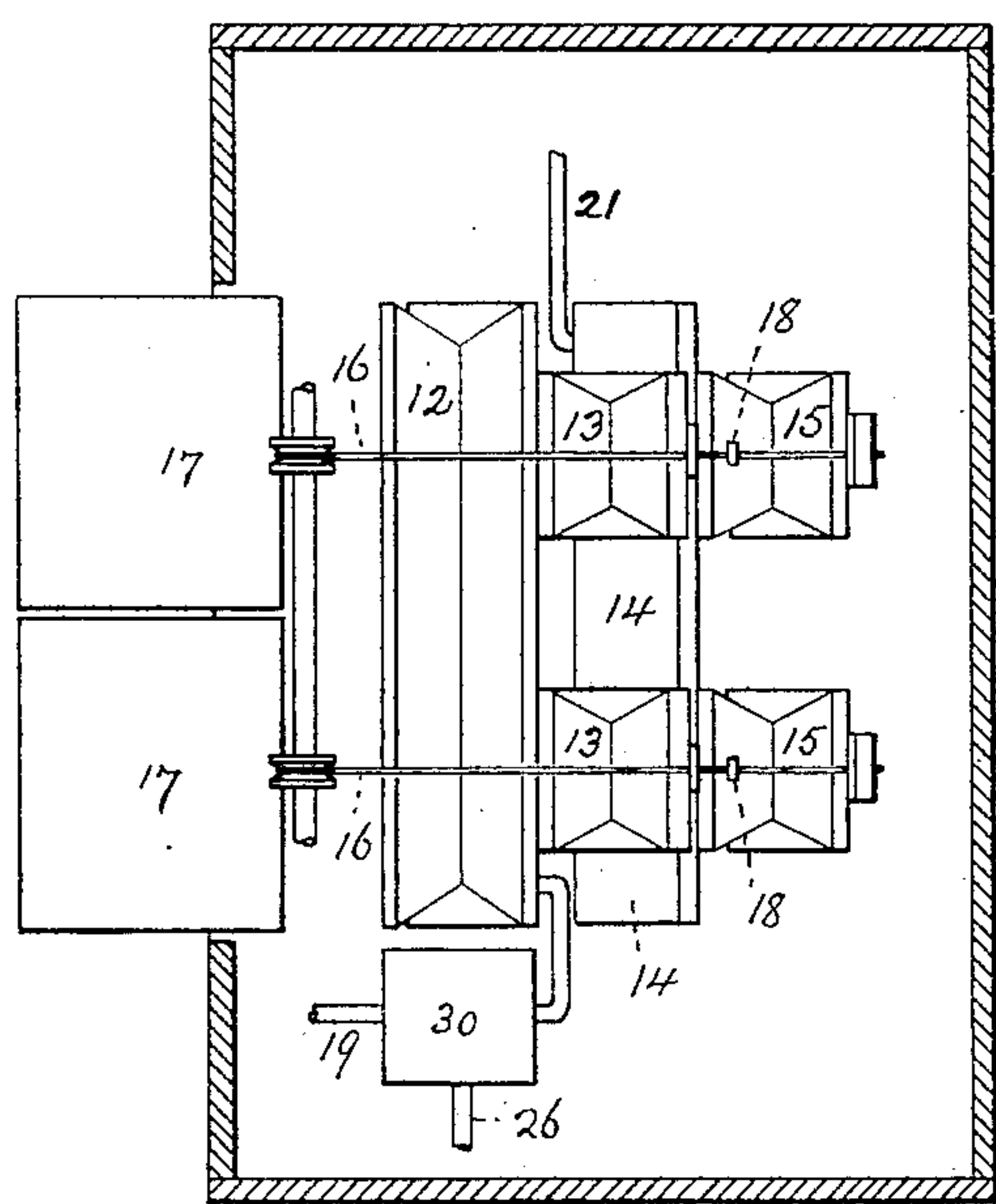


Fig. 2.

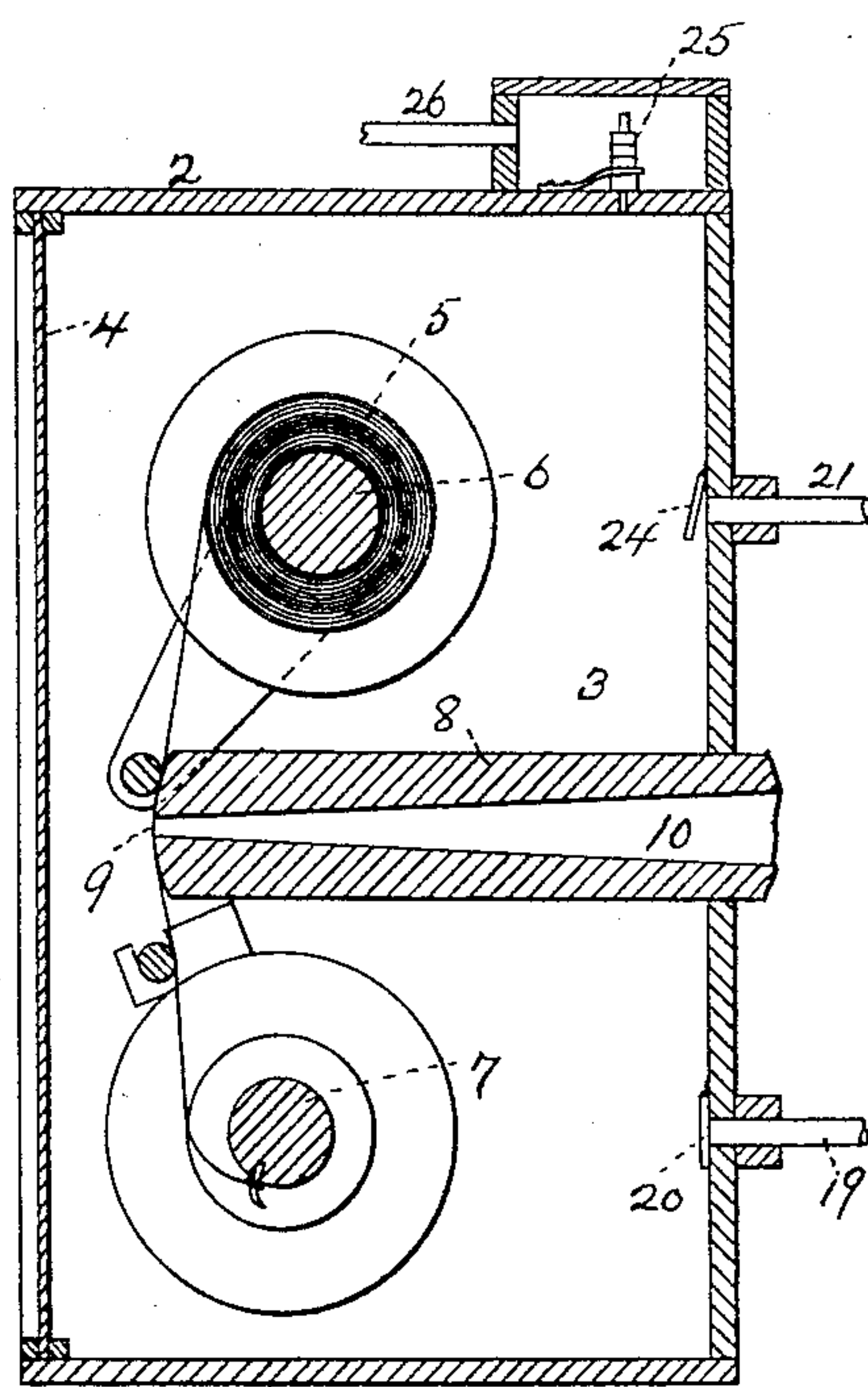


Fig. 3.

WITNESSES.

A. D. M. M.

Francis C. Stanwood

INVENTOR.

William Herbert Rollins.

By H. C. Lodge Atty.

UNITED STATES PATENT OFFICE.

WILLIAM HERBERT ROLLINS, OF BOSTON, MASSACHUSETTS.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 563,415, dated July 7, 1896.

Application filed March 10, 1896. Serial No. 582,526. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HERBERT ROLLINS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Mechanical Musical Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to musical instruments called "organs" and to those forms of organs in which the admission of air to the pipes or reeds, or both, is controlled by pneumatics operated either by the hands or feet, or both, or automatically by means of a roll of perforated paper passing over the face of a tracker-board. This invention is further applicable to organs using either an exhaust or a pressure system, in one of which the air is sucked over the reeds; in the other the air is forced into the pipes or reeds.

This invention comprises improvements in that system, as applied to a class of organs operated by pneumatics, wherein a higher air-pressure is employed for said pneumatics than that used on the pipes or reeds.

My improvements consist especially in providing devices whereby the excess of pressure in the systems operating the pneumatics is discharged into the low-pressure system, thus avoiding loss of air and likewise preventing danger of injury to the pneumatics. I accomplish this either by directly connecting the two air systems by a pipe in which is a valve adapted to remain closed except when the pressure is in excess, or in case of automatic organs, working on the pressure system and employing a perforated roll of paper operating across the face of a tracker-board and inclosed in a chamber, I frequently place the relief-valve in the chamber. Likewise, in providing pipes from the low-pressure reservoir, as well as from the high-pressure reservoir, to the pressure-chamber operating the pneumatics and in equipping said pipes with check-valves. Hence so long as the pressure in the high-pressure reservoir exceeds the pressure

in the low-pressure reservoir the valve in the latter remains closed. Conversely should the pressure in the main reservoir exceed that in the high-pressure, the valve will admit air from the low-pressure system to the pneumatics and the operation as heretofore practiced will be established.

One part of my invention relates particularly to that type or form of organ wherein the perforated sheet is operated in an airtight chamber under pressure from the bellows, and based upon the well-known fact that in pipe or reed organs the best sound effects are produced by the lowest possible air-pressure. To this end I propose to employ two reservoirs of air, or one reservoir with relief-valves to lessen the pressure in the air-pipes or reeds, whereby a high pressure is maintained in the chamber where the perforated sheet is operated and from which air is conveyed to the pneumatics, while a lower air-pressure is used to supply the reeds or pipes of the instrument in creating sound.

Briefly stated, the reasons for creating two air systems—high and low pressure—are as follows: One of the difficulties which causes imperfect speaking, where a single air system of uniform pressure is employed, is due to the fact that the performer does not always maintain the air-pressure to its full capacity, and consequently the air does not enter the holes in the face of the tracker-board in sufficient volume (when the note is a short one) to lift the pneumatics quickly enough. For a very short note the hole in the sheet consists of a circular aperture one-tenth of an inch in diameter, so that as this hole passes over the corresponding hole in the face of the tracker-board there is only a minute fraction of time in which the hole is fully open; but if the pressure of air at this point is made higher, or increased by a supplementary reservoir or bellows which alone is intended to supply the pneumatics, then the reeds can be operated by the main reservoir or bellows at a less pressure. By this method the speaking will be more prompt, because the high pressure of the supplementary air system will operate the pneumatics quickly, and thus surely open the valves to allow the air to reach the reeds even when the note is exceedingly short.

The drawings accompanying this specification represent, in Figure 1, a side sectional elevation in part of an organ equipped with apparatus embodying my invention. Fig. 2 is a plan of the same. Fig. 3 is a vertical section through the air-chamber of a pressure-organ equipped with a tracker-board and illustrating one portion of my invention as applied to an organ of this peculiar type.

As before premised, one portion of my invention relates to both pressure and exhaust organs, but for purposes of further reference I will briefly explain their principal operating parts. These include a plurality of pipes or reeds, a pair of bellows, a perforated sheet of paper which travels over a "tracker-board," so called. This board comprises a series of tapered ducts or air passages, smallest at their mouths and which contact against the perforated sheet, while their opposite ends operate "pneumatics," so termed. These latter elements are closed to the passage of air, but operate expansively to actuate the valves proper, these latter controlling the passage of air through the various pipes or reeds in the production of sound. It may be observed that each pneumatic is fitted with a small air duct or vent to permit its collapse after being expanded.

In carrying out my invention the relation of the above-named instrumentalities remains the same, while the coöperation of said parts is unchanged. Hence I have not deemed it necessary to illustrate these various elements grouped together as an organized structure, but have illustrated only such elements as have a direct bearing upon my invention.

In the present instance I have shown my invention applied to a pressure-organ constructed after the manner of an "Æolian vocalion," so styled.

In said drawings, 2 represents the case in part, formed with a chamber 3, made air-tight, and equipped with a sliding front 4, preferably of glass. Within this chamber is mounted and operated the perforated sheet 5. This latter is wound upon a delivery-roll 6, suitably journaled, and is adapted to be transferred to a receiving-roll 7 mechanically actuated. Centrally of said chamber is positioned the "tracker-board" 8, so called. This board or bar is perforated, as shown, each perforation or tracker-hole 9 being the mouth of air ducts or passages 10, which convey the air to the pneumatics. (Not shown.) Furthermore this instrument is equipped with apparatus to create a double air system, and such apparatus comprises a main bellows 12, having feeders 13, and a secondary or supplementary bellows 14, having feeders 15. These are preferably arranged as shown in Fig. 1, where a flexible band 16 interconnects the foot-levers 17 with said bellows. A stop 18 on the belt permits of prior movement of the secondary feeders before movement of the main feeders, when all the feeders advance together. In this way the secondary bellows

have a longer stroke and an excess in the air delivered takes place, thus creating increased pressure or a high-pressure air system. A pipe 19 from the main bellows connects with the air-chamber 3 and terminates with a check-valve 20, while the main volume of air from the primary bellows 12 passes to a receptacle 30, from which said air is delivered to the reeds or pipes. A pipe 21 from the secondary bellows likewise terminates in the chamber 3 and is equipped with a check-valve 24, while an adjustable relief-valve 25, opening into the low-pressure system by the pipe 26, prevents excessive pressure in the air-chamber, which pressure might otherwise damage the pneumatics. Hence whenever excess of pressure in the high-pressure air system occurs a discharge of air is permitted into the low-pressure system. In this way no air is lost and still the high-pressure system is easily regulated.

From the above arrangement it will be seen that as the pressure of air from the secondary bellows or reservoir is normally to exceed that from the main bellows or reservoir the valve 20 is generally closed. Should, however, this pressure fall below that of the main bellows for any cause, then a converse position of the valves occurs, the valve 25 being closed. This arrangement is to enable the organ to be used, however the pressure. Under my invention it is intended that the main valve 20 shall always be shut. Hence, with a high pressure of air to operate the pneumatics, I find that the instrument will speak perfectly even with the tracker-holes uncovered only one-third. Furthermore, the employment of the main bellows at a low pressure to supply the pipes and reeds produces much sweeter tones, since in general the air-pressure is too high.

Hitherto it has always been thought necessary to have high pressure to insure prompt speech and that the lag was in the pipes or reeds; whereas I have found that the trouble exists in the pneumatics. Consequently I consider that the gist of my invention is embodied in the employment of a double air system, or such an air system that the pneumatics shall be operated by a higher air-pressure than are the pipes or reeds, thereby insuring prompt speech and sweet tones, while the instrument can be operated with less effort.

What I claim is—

1. In a pressure-organ a plurality of reeds, an air-tight chamber, a perforated sheet to be coiled and uncoiled within said chamber, and a tracker-board, combined with forcing apparatus for two air systems, pipes to connect each air system with the air-chamber, check-valves to prevent air returning through said pipes, and a pipe for air supply to the reeds substantially as described.

2. In a pressure-organ, an air-pressure chamber, a relief-valve therefor, forcing apparatus to produce a double air system of

unequal pressure, pipes from said chamber to each forcing apparatus, check-valves in said pipes, and a pipe from one forcing apparatus to the reeds, substantially as stated.

5 3. In musical instruments the combination with a plurality of sound-producing pipes or reeds, and pneumatics to control the valves of said pipes or reeds, of air forcing or exhausting mechanism to produce two air systems of unequal pressure, the high pressure
10 to operate the pneumatics, the low pressure

the pipes or reeds, and a pipe-system valve supplied to interconnect the two air systems when the high pressure becomes excessive, as set forth and stated.

In testimony whereof I affix my signature
in presence of two witnesses.

15

WILLIAM HERBERT ROLLINS.

Witnesses:

H. E. LODGE,

FRANCIS C. STANWOOD.