J. P. HULDER.

SELF ADJUSTING AUTOMATIC TRACKING MECHANISM.

APPLICATION FILED NOV. 12, 1910.

1,113,637.

Patented Oct. 13, 1914.

2 SHEETS—SHEET 1.

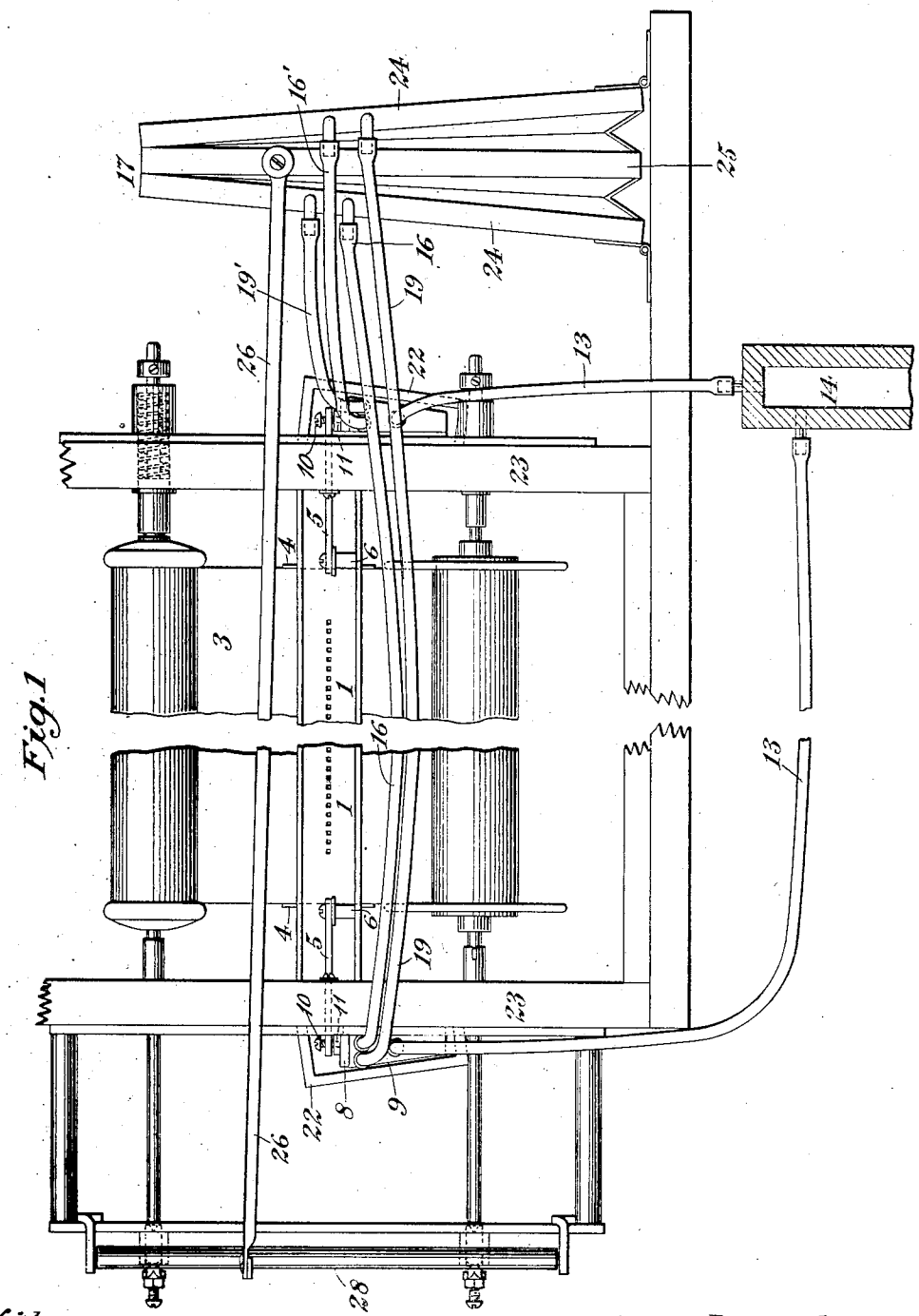


Fig. 1

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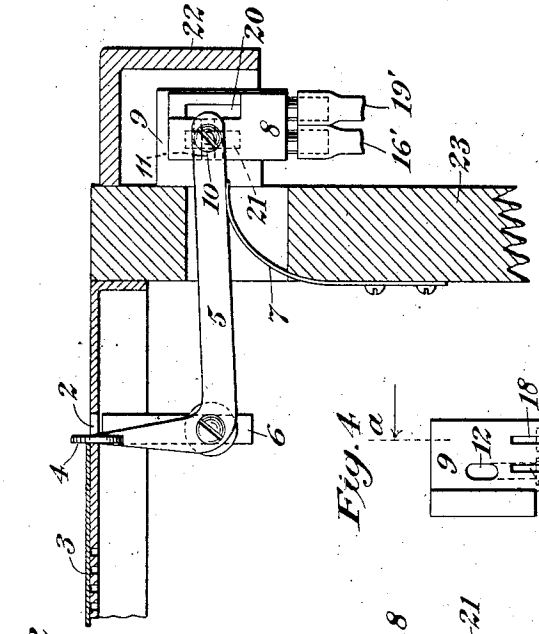


Fig. 2

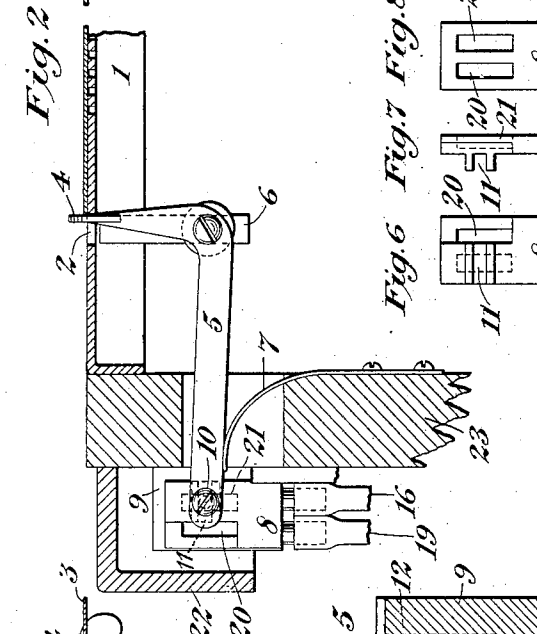


Fig. 3

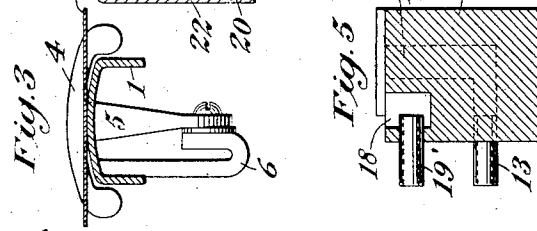


Fig. 4

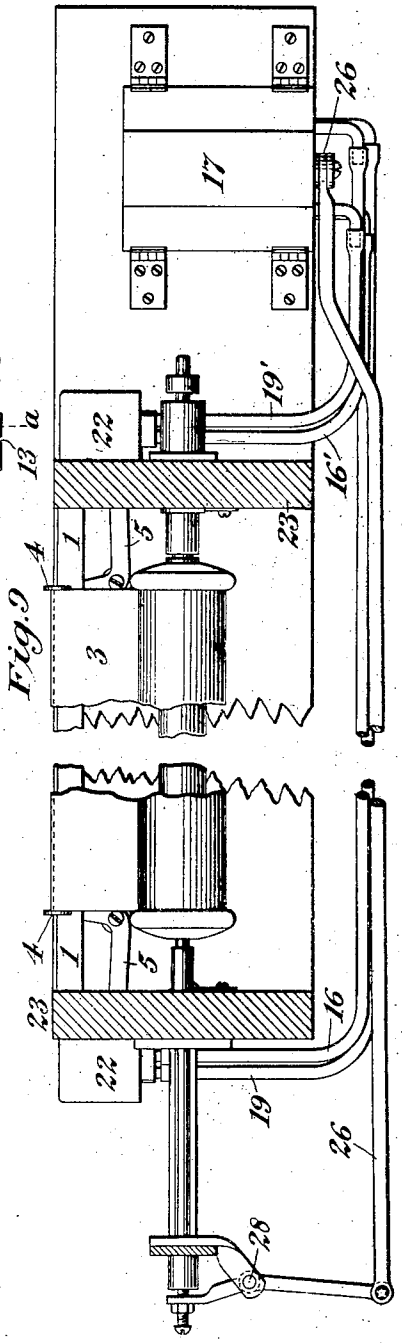
Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9



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UNITED STATES PATENT OFFICE.

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SELF-ADJUSTING AUTOMATIC TRACKING MECHANISM.

1,113,637. Specification of Letters Patent. Patented Oct. 13, 1914.

Application filed November 12, 1910. Serial No. 592,052.

To all whom it may concern:

Be it known that I, JOSEPH P. HULDER, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Self-Adjusting Automatic Tracking Mechanisms, of which the following is a full, clear, and exact specification.

My invention relates to pneumatically operated musical instruments, and more particularly to an improved self-adjusting guide mechanism for automatically maintaining a proper operative relation between the traveling perforated music sheet and the tracker board of such instruments.

Commercial music rolls are made with margins of equal width on either side of the extreme note perforations. To insure their proper operation, each note perforation should register with its corresponding opening in the tracker board. By reason, however, of the fact that the paper may shrink or swell, or the sheet may be wound unevenly on the music or the take-up rolls, or that the note sheets may vary in width, they are apt to be thrown out of registration.

The objects of my invention are to provide a mechanism which will automatically maintain the accurate registration of the note perforations in the traveling music sheet with the note openings in the tracker board throughout the playing of said sheet, and to construct such mechanism so that it will adjust itself to the width of the music sheet be the same narrower or wider than the standard size.

I am aware that certain mechanisms have hitherto been invented for maintaining the effective relation between the music sheet and the tracker, but all such devices which depend upon the coöperation of the sheet with ducts in the tracker to accomplish this object are subject to the disadvantage that they will not operate properly with music sheets which vary from the standard width, and to the further objection that such devices do not adjust themselves to the width of the roll but must be manually adjusted, or that they afford no adjustment whatsoever.

I will illustrate my invention, for the purpose of clearly describing the same, as applied to a device for shifting both of the rolls carrying the music in relation to the fixed tracker board; but it is to be understood that the registration sought may be accomplished also by shifting only one of the rolls, or by having the rolls stationary and shifting the tracker board.

In the accompanying drawing forming a part of this application, Figure 1 is a rear view in elevation showing a tracking device with my improved self-adjusting automatic actuating mechanism applied thereto; Fig. 2 is a horizontal section through the center line of the tracker board; Fig. 3 is a vertical section through the tracker board; Fig. 4 is a detail plan view of the valve seat; Fig. 5 is a section of the valve seat through the line *a*—*a* in Fig. 4; Fig. 6 is a plan view of the top of the valve cap; Fig. 7 is a side view of the valve cap; Fig. 8 is a plan view of the bottom of the valve cap; and Fig. 9 is a plan view of the device looking from the top.

(1) designates a tracker board provided with slots (2) in addition to the usual note openings. These slots are located at either end of the board at a distance from the extreme note openings slightly less than the width of the margin of the standard note sheet (3). In each slot is inserted a guide (4) having a rocker arm (5) which is pivotally supported on a lug (6) projecting rearwardly from the tracker board. The guides are normally held in position toward the note openings by means of a light spring (7) pressing on the rocker arm, and each guide is capable of lateral movement in its slot so that they may adjust themselves to the width of the sheet as it passes between them. Each arm (5) is preferably provided with a pin (10) which engages a groove (11) formed on the top of the valve cap (8) so as to cause the latter to slide on its seat (9) upon any lateral movement of its guide.

The valve seats are each provided with a

main suction or exhaust port (12) communicating, through the tube (13), with the exhaust or wind chest (14) of a type usual in pneumatic actions; a secondary exhaust port (15) which connects through the tubes (16) or 16′) with one compartment of the duplex actuating pneumatic (17); and an atmosphere port (18) also connecting, through the tubes (19 or 19′), with the other compartment of said pneumatic.

Having reference to the drawings, it will be seen that the exhaust port and the atmosphere port of each valve are cross-connected with the pneumatic, that is, the atmosphere port of one valve and the exhaust port of the other valve both communicate with the same compartment of the pneumatic so as to vary the air tension in the two compartments of the pneumatic.

The valve cap has a slot (20) extending through it, and a slot (21) extending partially through it. The valve cap is set on its seat so that the atmosphere port (18) and the secondary exhaust port (15) are normally closed. As, however, the valve is moved on its seat, the atmosphere port is gradually opened to the outer air through the slot (20), and the secondary exhaust port is at the same time gradually placed in communication with the main exhaust port through the slot (21). A valve box (22), open at the rear, incloses the valve and serves to hold the cap in place.

The actuating pneumatic (17), which is preferably located at the side of the tracker box (23) in an upright position, is divided into two separate compartments and consists of two stationary walls (24) having openings for the admission and exhaustion of air, and a hinged movable leaf (25) suspended between them. Normally both compartments of the pneumatic are under equal air tension, but as either one or the other of the valves is moved this equilibrium will be disturbed. A connecting rod (26) serves to transmit the motion of the leaf to the swinging member (28) of the roll-shifting device.

As the sheet is drawn over the tracker board between the guides they will first adjust themselves to the width thereof, and then, as the sheet deviates from its normal path of travel, its edges will operate the valves controlling the pneumatically actuated tracking device so as to restore the sheet to its operative position. For example: If the sheet should shift from right to left, the left edge thereof would operate the left-hand guide member causing its valve to slide so as to admit air into the right-hand compartment of the pneumatic, and to exhaust air from the other compartment. The movable leaf consequently swings from right to left and actuates the roll-shifting device so as to bring the perforations in the sheet into registration with the openings in the tracker board; and vice versa.

In the foregoing specification I have described what I believe to be the best mode of applying my invention, but it will be understood that the construction and arrangement of the various parts may be modified from that illustrated in the accompanying drawings without departing from the spirit of my invention.

What I claim as my invention is:

1. In combination, a traveling note sheet; a tracker bar; two edge guides adapted to contact with the opposite edges of the sheet and to follow the lateral movement thereof in both directions; a pneumatic comprising two compartments having a common movable member; separate valve supports each provided with an atmosphere and an exhaust port which ports are cross connected with the opposite compartments of the pneumatic; valves controlling said ports operatively connected to the edge guides for movement therewith; and means controlled by said pneumatic for maintaining normal relation between the sheet and the tracker.

2. In combination, a traveling note sheet; a tracker bar; a pneumatic having a movable member normally balanced under equal air tension; means controlled by said movable member for maintaining correct lateral relation between the sheet and the tracker; edge guides adapted to contact with the opposite edges of the sheet and to move laterally therewith in both directions and valve means, connected with the edge guides, arranged to control the admission of air on one side and the exhaustion of air on the other side of the movable member, whereby upon any deflection of the sheet normal relation is restored.

3. In combination, a traveling note sheet, a tracker, two edge guides contacting with the opposite edges of the sheet and movable laterally therewith, a pneumatic having a normally balanced movable member, means operative upon the lateral movement of either edge guide to cause movement of the movable member by simultaneously admitting air on one side thereof and exhausting air from the other, and means controlled by the movement of said movable member for restoring normal relation between the sheet and the tracker upon any deflection of the former.

4. In combination a traveling note sheet, a tracker, two self adjustable edge guides contacting with the opposite edges of the sheet and movable laterally therewith, a pneumatic having a normally balanced movable member, means operative upon the lateral movement of either edge guide to cause movement of the movable member by simultaneously admitting air on one side thereof

and exhausting air from the other, said means being inoperative to cause such movement when both edge guides move an equal amount in opposite directions in accommodating themselves to the width of the sheet employed, and means controlled by the movement of said movable member for restoring normal relation between the sheet and the tracker upon any deflection of the former.

In witness whereof I have hereunto set my hand this 9th day of November, 1910.

JOSEPH P. HULDER.

Witnesses:

LESTER F. DITTENHOEFER,

GERTRUDE K. BRENNAN.