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F. G. LYNDE,  
TRACKING DEVICE.  
APPLICATION FILED NOV. 8, 1913.

1,114,700.

Patented Oct. 20, 1914.

Fig. 1.

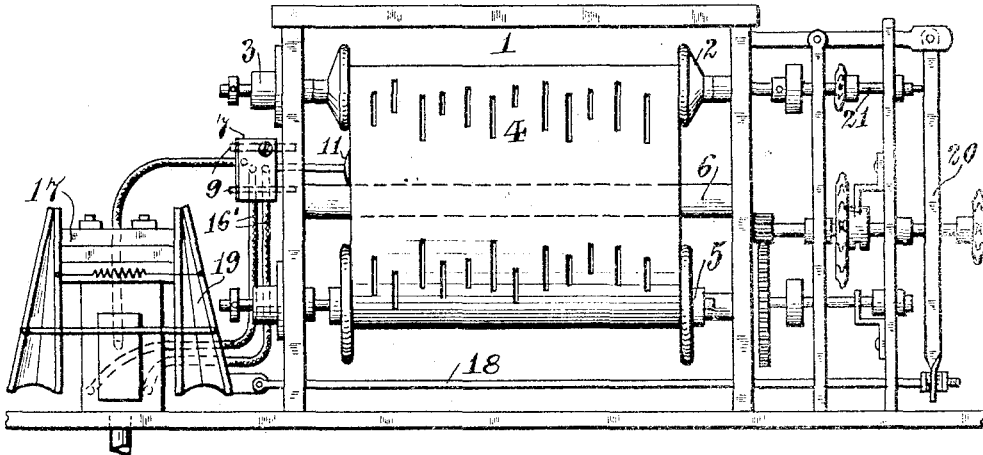


Fig. 2.

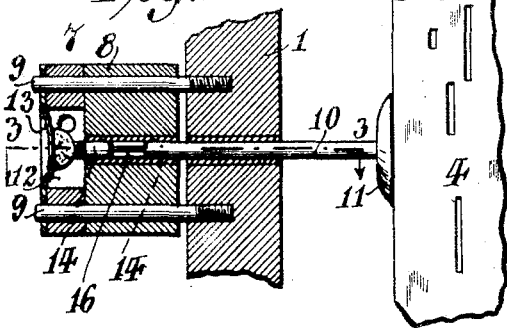


Fig. 3.

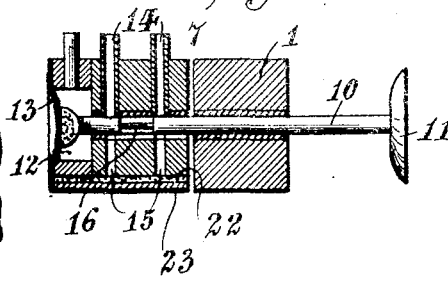
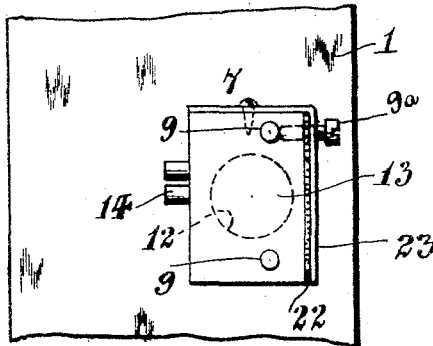


Fig. 4.



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# UNITED STATES PATENT OFFICE.

FRANK G. LYNDE, OF NEWARK, NEW JERSEY, ASSIGNOR TO LAUTER COMPANY, OF  
NEWARK, NEW JERSEY, A FIRM.

## TRACKING DEVICE.

1,114,700.

Specification of Letters Patent.

Patented Oct. 20, 1914.

Application filed November 8, 1913. Serial No. 799,833.

To all whom it may concern:

Be it known that I, FRANK G. LYNDE, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Tracking Devices, of which the following is a specification.

My invention relates to certain new and useful improvements in tracking devices for automatically effecting lateral adjustment of the perforated music sheet of a player piano to preserve the registry of its perforations with the ducts of the tracker bar.

One of the prime objects of the invention is to minimize valve leakage in the control for the sheet shifting mechanism and to provide a control which will instantly respond to any wandering however minute of the music sheet while on the direct wind.

Another object of the invention is to provide a control which may be adjusted relative to the edge of the music sheet without effecting the valve piston or its vacuum chamber and in which all possible parts and connection are mounted in position inaccessible from the opening to the spool box.

A still further object is to provide a noiseless sensitive movement of the valve piston, which can be delicately balanced in inoperative position by a part of the vacuum system of the piano.

Various other objects and advantages will be in part obvious and in part more fully set forth in the following description of a physical embodiment of my invention, which consists broadly in mounting a sheet-shifting control valve piston casing on the outside of the spool box, the valve piston of which has one end in operative engagement with the edge of the traveling music sheet and the opposite end cushioned against a flexible wall resiliently held in position by the vacuum system of the piano.

The invention further consists in the new and novel features of construction and combination of parts hereinafter set forth and claimed.

Referring to the accompanying drawings—In the drawings Figure 1 is a front elevation of a portion of the player piano at the spool box showing a preferred physical embodiment of my invention; Fig. 2 is an enlarged vertical transverse sectional

view taken through the control shown attached to the spool box in Fig. 1; Fig. 3 is a horizontal sectional view taken on line 3--3 of Fig. 2 with parts in side elevation; and Fig. 4 is an elevation of the left hand side of the device shown in Figs. 2 and 3.

In the drawings is shown a spool box 1 within which is mounted a supply roll 2 one end of which is mounted in the usual spring box 3 by means of which the perforated music sheet 4 is normally pressed in one direction. The sheet is drawn on to a take-up roll 5 driven by any suitable mechanism and is normally in operative engagement with the ducts in the tracker bar 6 to play the piano. The wanderings of the music sheet from its normal position on the tracker bar permits the actuation of a sheet shifting mechanism control 7, which comprises a hollow casing 8 slidably mounted on pins 9, which project laterally from the outside of the spool box 1 and normal to the adjacent edge of the traveling music sheet and is locked by any suitable means such as a binding screw 9<sup>a</sup>, one of which engaging one of the pins 9, is sufficient to secure the casing 8. A valve piston 10 relatively small in cross-sectional area extends from the casing through the adjacent side of the spool box and terminates in a sheet edge engaging head 11. The opposite end of the piston is positioned in a vacuum chamber 12 formed in the casing and bears on a diaphragm 13 forming a pneumatic cushion of relatively great pressure area outlining the end of the chamber 12. The vacuum chamber 12 is connected by means of the tubing 12' with some part of the vacuum system in which the vacuum is low and in which the vacuum is destroyed by some suitable mechanism during the re-wind. The casing has a pair of parallel conduits 14, extending transversely of the piston, which conduits have ends 15 open to the atmosphere.

The piston has a reduced portion 16 normally fitting between the conduits but adapted to be shifted due to the wanderings of the sheet to open one or the other of the conduits to the atmosphere. The conduits lead to tubing 16' which in turn communicates with the sheet shifting pneumatic mechanism 17 of any conventional or suitable construction to actuate the reach rod

18 in one or the other longitudinal directions, depending upon which of the conduits 14 is opened by the shifted piston 10. The rod 18 has one end attached to the movable end of a pneumatic 19 forming a part of the mechanism 17 and the other end attached to the free end of a depending lever 20, which bears, adjacent its pivoted end, against the end of the roll driving shaft 21, which is capable of limited longitudinal movement in its bearing and may be moved in cooperation with the spring box 3, the required lateral movement of the music sheet to correct its alinement with respect to the tracker bar 6. The conduits 14 are muffled by a porous fabric 22, such as felt, which will offer but little resistance to the passage of air. A plate 23 preferably of brass covers the fabric 22 to protect the same and provides a neat name plate.

In operation should the music sheet wander to the left, the left conduit 14 will be opened to the atmosphere, the pressure of which will actuate the mechanism 17 to shift the lever 20 away from the end of the shaft 21, permitting the spring box 3 to shift the music sheet back to its operative position on the tracker bar. Should the sheet wander to the right, the opening of the other conduit 14 will cause the lever to bear on the shaft 21 to reset the music sheet.

By means of a structure of this character, the cushioned end of the valve piston is inclosed from the atmosphere thus minimizing leakage to the sheet shifting valve control, but at the same time utilizing the external air pressure against the diaphragm to maintain the valve piston in cushioned conduit closing position. The pressure area of the diaphragm may be as large as desired, and the cross-section of the piston may be as small as desired to reduce sliding friction and a polished needle slidably mounted in a close fitting bearing has been found efficacious. As the vacuum chamber is relatively large and inclosed and as the small piston closes the valve bearing, the possibility of air leakage to this chamber is practically eliminated.

Mounting the control on the outside of the spool box removes from sight the tubing and connected parts and the only element visible from the outside of the piano is the end of the piston engaging the music sheet. Further this mounting prevents tampering with the control as it is necessary to remove the breast board of the piano before access is afforded to the same, but by mounting the control on the pins a simple means of bodily adjustment is provided without affecting the position of the piston therein or the volume of the vacuum chamber.

It is of advantage to make the cross-section of the conduits as small as possible which gives rise to whispering noises as the

air is drawn through the same, but by placing the felt covering over the conduits the air is muffled and foreign noises eliminated and at the same time the infiltration of dust to the sheet shifting pneumatic is eliminated.

Although I have shown only one form of mechanism embodying my invention, it is obvious that various changes within the skill of the mechanic may be made therein without departing from the spirit of the invention, provided the means set forth in the following claims are employed.

Having thus described my invention, I claim:—

1. In a tracking device for player pianos, a control having a hollow space inclosed from the atmosphere, a diaphragm wall outlining one end of said space, means adapted to connect said space to the vacuum system of the piano whereby to maintain said wall in a collapsed position, a piston bearing against said wall and actuated by the wanderings of the music sheet from the normal position of the same on the tracker bar and means controlled by the actuation of the piston for re-setting the sheet in operative position relative to the tracker bar.

2. In a player piano having a tracker bar, the combination with a traveling music sheet, of mechanism actuated by the lateral wanderings of the sheet to maintain the same in operative position relative to the tracker bar, said mechanism including pneumatics for shifting the sheet relative to the tracker bar, a valve, a valve casing therefor; a sheet controlled piston having a portion within said casing and controlling said pneumatics and means for maintaining said valve in inoperative position relative to said pneumatics, including a diaphragm controlled by a vacuum system.

3. In a player piano having a music sheet shifting mechanism, the combination with a member having an inclosed space, a portion of said space being defined by a flexible wall, of means for insuring a tension within said space differing from the pressure on the outside of said flexible wall, and a music sheet controlled member bearing against said wall and controlling the sheet shifting mechanism.

4. In a player piano, the combination with a spool box, of a pin projecting laterally from the outside of said box, a valve casing slidably mounted on said pin, a music sheet controlled piston projecting from said casing through said spool box parallel to said pin and means for locking said casing in adjusted position.

5. In a tracking device for player pianos, a valve casing having an air conduit there-through opened at one end to the atmosphere and connected to sheet shifting mechanism, a sheet actuated valve for controlling said conduit, and a muffler incom-

pletely closing said open end of the conduit to minimize noises caused by the air passing through said conduit.

5 6. In a player piano, the combination with a conduit leading to a mechanism actuating pneumatic and adapted to be opened to the atmosphere, of a porous member in-  
completely closing said conduit to prevent  
10 noise caused by the air as it passes into said conduit.

7. In a player piano, the combination with a conduit leading to a mechanism actu-

ating pneumatic and adapted to be opened to the atmosphere, of a porous member in-  
completely closing said conduit to prevent  
15 whispering noises of the air as it passes into said conduit and a face plate covering said porous member to protect the same.

In witness whereof I have hereunto set my hand in the presence of two witnesses. 20

FRANK G. LYNDE.

Witnesses:

M. H. O'BRIEN,  
H. R. BAUER.