W. A. WATSON. NOTE SHEET CONTROL MECHANISM. APPLICATION FILED JAN. 8, 1915.

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UNITED STATES PATENT OFFICE.

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NOTE-SHEET-CONTROL MECHANISM.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM A. WATSON, of Malden, in the county of Middlesex and State of Massachusetts, have invented cer-

5 tain new and useful Improvements in Note-Sheet-Control Mechanisms, of which the following is a specification.

A particular object of my invention is to provide an improved self-contained tracker

10 bar which not only can be utilized to reliably effect transposing, but also insures a dependable or fixed line of travel for one edge of the note sheet.

With this and further objects in view, my

- 15 invention consists in the improvements which I shall now proceed to describe and claim.
- Of the accompanying drawings, in which similar reference characters designate simi-20 lar parts or features:—
 - Figure 1 is a front elevation of a preferred embodiment of my invention.
- embodiment of my invention. Fig. 2 is a partial plan view of the same. Fig. 3 is an elevation from the right of 25 Fig. 1, on a larger scale.
- Fig. 4 is a detail section hereinafter referred to. Fig. 5 is a detail plan view of the tracker bar. Fig. 6 is a detail end view of the tracker bar.
- 30 The end walls 12, 13 of the tracker bar or spool box support the tracker bar 39, the take-up spool 15 and the record spool 16. The latter is, of course, as usual, removable. When in place, and re-winding is being per-
- 35 formed, it is driven by its chuck spindle 17. During playing, the transmission gearing is in such a shifted position that the spindle 17 is disconnected from the motor, but the spindle must still rotate with the spool 16 as
 40 the music sheet is drawn from it over the tracker bar, onto the take-up spool, owing to the chuck 18 fitting the usual slot recess in one end of the spool.

Secured to the spindle 17 is a brake wheel
45 19 having a smooth periphery. Adjacent to the wheel 19, and mounted loosely on a sleeve of wheel 19, is a disk 20 having a pinion 21 fast therewith. To the disk, at substantially diametrically opposite points, are
50 pivotally connected two arms 24, 25, having weighted outer portions 26, 27, and inwardly

extending portions, near their pivots, shaped to constitute brake shoes to act on wheel 19 to retard unwinding from the record spool. A pin 30 projects from the fixed upright 55

13 into a slot 31 formed in the disk 20.

Meshing with the pinion 21 is a toothed member illustrated as a gear wheel 32 carried by a rock shaft 33 mounted in the uprights 12, 13, said shaft having a finger 34 60 to bear against the surface of the record roll.

For the best results, it is desirable not only that the longitudinal movement of the note sheet over the tracker bar shall be steady and under the full control of the motor, but also 65 that its lateral position relatively to the suction holes in the tracker bar shall be under control. I will now proceed to describe my improvements to provide for this last mentioned control, and also my improved struc- 70 ture of two-part tracker bar, one part being movable relatively to the other, one having the "speaking" or note holes which may be shifted for transposing or regulating, the other having the holes which control expres- 75 sion and may, therefore, be termed the mechanical controlling holes.

In the embodiment of my invention illustrated in Figs. 1, 5 and 6, the tracker bar comprises a fixed member 39 and a slidingly 80 adjustable member 40. The member 40 has holes 41 of the usual kind in tracker bars to coöperate with the "speaking" or note selecting holes or slots of a note sheet 42 (Fig. 1) in the well-understood manner, said holes 41 85 communicating by means of tubes 43 with the valve mechanisms for controlling the hammers of the piano action (not necessary to illustrate herein). The member 40 has at one end an internally threaded lug 44 in 90 which a screw 45 fits. The screw is mounted to rotate (without longitudinal movement) in bearings provided in lugs 46, 47, projecting rearwardly from one end of member 39, said screw having a milled wheel 48, here- 95 inafter referred to as the adjuster since by means of it the performer may manually effect a change of position of the member 40 longitudinally of the member 39, said member 40 being certain to retain whatever po- 100 sition of adjustment has been given to it.

The member 39 is removably secured in

fixed position relatively to the spool box by suitable means, such as by screws passed through the walls 12, 13, into the ends of said member.

5 As shown in Fig. 1, the note sheet has, near each margin, holes 49, which coöperate with holes 50 in the fixed member 39 of the tracker bar. These holes 50 communicate through suitable tubes with certain mechani10 cal devices of the player mechanism to control expression, such as the choker-bellows or by-pass, or the hammer rail actions of a piano player. If desired, there may be more than one hole 50 at each end of member 39, 15 to control a greater number of expression or

mechanical devices of the instrument.

The member 39 has another hole 51 communicating through a tube 52, with the mechanism for actuating the sustaining 20 pedal which is another mechanical or expression device of the instrument not necessary to illustrate herein.

Since the member 39 is in fixed position relatively to the spool box, it will now be 25 understood that all holes or ducts which relate to the mechanical or expression devices of the instrument, always remain at a given distance from the wall or walls of the box, and are not affected by changes in position 30 of the member 40 which has the "speaking" holes, when transposition is desired, or when adjustments are made for any other purpose. The holes 50, 51, as shown in Fig. 5, extend through a rearward extension or block 35 53, integral with or rigidly secured to, the left-hand end of the member 39, said block having a slot or recess 54 in which is pivotally mounted a lever which is hereinafter referred to as the paper guide finger 55. 40 As will be seen, this finger also is never affected by any change of position of the tracking holes 41. The inner end of this finger is formed as a valve 56 coacting with the inner end of a tube 57, said finger be-45 ing normally held by a spring 58 in posi-tion to close the mouth of tube 57. The tube 57 (see Fig. 1) communicates with the interior of a pneumatic 59, the fixed side of which is secured by suitable means such as 50 stays 60 projecting rigidly from wall 12. A tube 61 connects the interior of the pneumatic 59 with the suction mechanism of the instrument so as to have a constant tendency to collapse the pneumatic, the movable 55 wall of which is connected by a light link 62 with an arm 63 of a vertical rock shaft 64 (Figs. 1 and 2), the latter having short arms 65, 66, which overlap the projecting ends of the spindles of the record and take-up spools. These spools are normally held 60 up spools. toward the right by springs 67 in their left-hand bearings, but during playing, the collapsed or partially collapsed pneumatic 59 exerts a pull on link 62 so that the short

arms of the rock shaft hold the spools shift-65 ed somewhat to the left, against the action of springs 67. If now the note sheet tends to travel out of proper position so that its left-hand edge acts on guide finger 55 to open valve 56, the admission of air through 70 tube 57 results in the expansion of the pneumatic so that the springs 67 can shift the spools sufficiently to the right to restore the correctness of tracking.

Among the advantages of my improve- 75 ments, I will mention the following:

Reliably steady and uniform travel of the note sheet not only enables large rolls to be used successfully but also causes the perforations of the note sheet that are intended 80 to control the mechanical devices to perform their functions properly regardless of any transposing adjustments that may be given to the tracker bar member 40. This is because the tracker bar holes which con- 85 trol the mechanical or expression devices are never changed in position. The tracking or guide finger, being never changed as to its location, insures a dependable and fixed line along which one edge of the paper 90 always travels. If the paper, due to atmospheric conditions, swells or shrinks so that the treble notes are not properly controlled, the performer can adjust member 40 the necessary degree without affecting opera- 95 tions of the guide finger. And the performer can be certain that no change will occur in the adjustment effected.

The sliding member 40 can be shifted, and will remain where adjusted. Conse- 100 it quently, proper tracking of the note perforations can be reliably effected by the performer. It is also up to the performer to secure transposing, or to insure proper average spanning of the marginal note holes if 105 Furthermore, the paper shrinks or swells. if the owner or other person wishes to leave a note sheet in place but render playing by a stranger impossible, he need only operate the adjuster 48 sufficiently to cause the sheet 110 holes to overlap two tracking holes 41. This will permit the admission of insufficient air to any of the holes 41 to result in the operation of any action hammers.

There are sometimes conditions which 115 cause the performer to wish to vary the apparent size of the note holes in the tracker bar as, for instance, if the usual vent holes or "bleeds" of the pneumatics of the instrument get partially clogged by dust which 120 renders it desirable to correspondingly restrict the tracker holes. This can be done by slightly moving the slide 40 (not sufficiently to cause transposing) and still permit the tracker holes to accurately perform 125 their functions. The note tracker holes are then certain to remain in the lateral positions to which they have been adjusted, and still no change has been made in the positions of the expression or mechanical holes or the guide finger.

In brief, the slide 40 and its adjuster 48 5 enables transposition of the piece to be effected without affecting the operation or function of the guide or tracking finger, the sustaining lever hole, or other expression holes. And if the paper is shrunken, or over size, the error can be cured by averag-10

ing the relative spacing of the sheet holes and the note tracking holes.

It is to be understood that during rewinding, which is rapid, the note sheet 15 leaves the finger 55 and is not worn or curled by contact therewith. This is be-

- curled by contact therewith. cause the pneumatic 59 is not collapsed during re-winding and consequently the spools are shifted by their bearing springs 67 suf-
- 20 ficiently to remove the edge of the sheet from the finger, the latter remaining in its fixed location. As the power for collapsing the pneumatic 59 is derived from the pneumatic chest or stack, no specially designed devices
- 25 for cutting off the suction from the pneumatic 59 during re-winding are necessary. Such cutting off of the suction may be effected by the usual cutting out devices of the wind chest when re-winding. There-30 fore, it is unnecessary to illustrate or de-
- scribe such devices herein.

It will be understood that if for any reason the tracking mechanism controlled by the finger 55 fails to work properly, cor-

- 35 rection as to the relationship of the note sheet holes and the holes 41 of member 40 can be brought about by use of the regulator or adjuster 48.
- I do not claim herein, nor fully describe 40 the operation of, the brake members 26, 27 as the same forms the subject matter of a divisional application filed June 7, 1915, Ser. No. 32547.

Having now described my invention what 45 I claim is:

1. A tracker mechanism for automatic musical instruments comprising a spool box, and a tracker bar comprising two members one of which is fixed and provided with a

50 slot, the other member being adjustable in said slot, said members carrying all the parts for effecting their relative adjustment, whereby the entire two-member tracker bar may be removed as a unit without affecting 55 the adjustment of its two members.

2. A tracker mechanism for automatic musical instruments comprising a spool box, and a tracker bar comprising two members one of which is fixed and the other adjustable

60 relatively to the side of the spool box, the adjustable member having the holes for cooperating with the note-selecting apertures of the record, and the fixed member having holes for coöperating with other apertures

of the record to control mechanical portions 65 of the instrument, said members carrying all the parts for effecting their relative adjustments whereby the entire two-member tracker bar may be removed as a unit without affecting the adjustment of its two mem- 70 bers.

3. A tracker mechanism for automatic musical instruments comprising a spool box, a tracker bar comprising one member fixedly connected with the spool box and another 75 member slidingly connected with the fixed member, and means for adjusting the sliding member, said means being entirely carried by the two members of the tracker bar.

4. A tracker mechanism for automatic 80 musical instruments comprising a spool box, a tracker bar comprising one member fixedly connected with the spool box and another member slidingly connected with the fixed member, means for adjusting the sliding 85 member, said adjusting means comprising a screw directly mounted on one of the tracker bar members to rotate but not move longitudinally thereof, said screw engaging an internally threaded member directly carried 90 by the other tracker bar member.

5. In a mechanical musical instrument, a tracker bar comprising two members one of which is fixed and the other adjustable relatively to the side of the spool box, said mem- 95 bers carrying all the parts for effecting their relative adjustment, one of said members having a duct for the passage of air to control mechanism for effecting the relative lateral position of the tracker bar and 100 note sheet, and a laterally yieldable member carried by and projecting from the tracker bar, said member having means for con-trolling the relative positions of the note sheet and tracker bar, the entire structure 105 being removable as a unit without affecting the adjustment of the two members or the position of said laterally yieldable member. 6. In a mechanical musical instrument, a

tracker bar comprising two members one of 110 which is fixed and the other adjustable relatively to the side of the spool box, said members carrying all the parts for effecting their relative adjustment, one of said members having a duct for the passage of air to con- 115 trol mechanism for effecting the relative lateral position of the tracker bar and note sheet, and a laterally yieldable member carried by and projecting from the tracker bar, said member having means for coöperating 120 with the said duct to control the admission of air to the latter, the entire structure being removable as a unit without affecting the adjustment of the two members or the position of said laterally yieldable member.

7. A tracker mechanism for automatic musical instruments comprising a spool box, and a tracker bar comprising two members

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one of which is fixed and the other adjustable relatively to the side of the spool box, the adjustable member having the holes for coöperating with the note-selecting aper-5 tures of the record, and the fixed member having holes for coöperating with other apertures of the record to control mechanical portions of the instrument, said fixed member having a finger to be engaged by the edge

of the record to control the lateral position 10 of the record.

In testimony whereof I have affixed my signature, in presence of two witnesses.

WILLIAM A. WATSON.

Witnesses: A. W. Harrison, Geo. N. Goddard.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."