J. T. AUSTIN.

TRACKER MECHANISM.

APPLICATION FILED SEPT. 19, 1913.

1,212,165.

Patented Jan. 9, 1917.

4 SHEETS—SHEET 1.

Fig. 1.

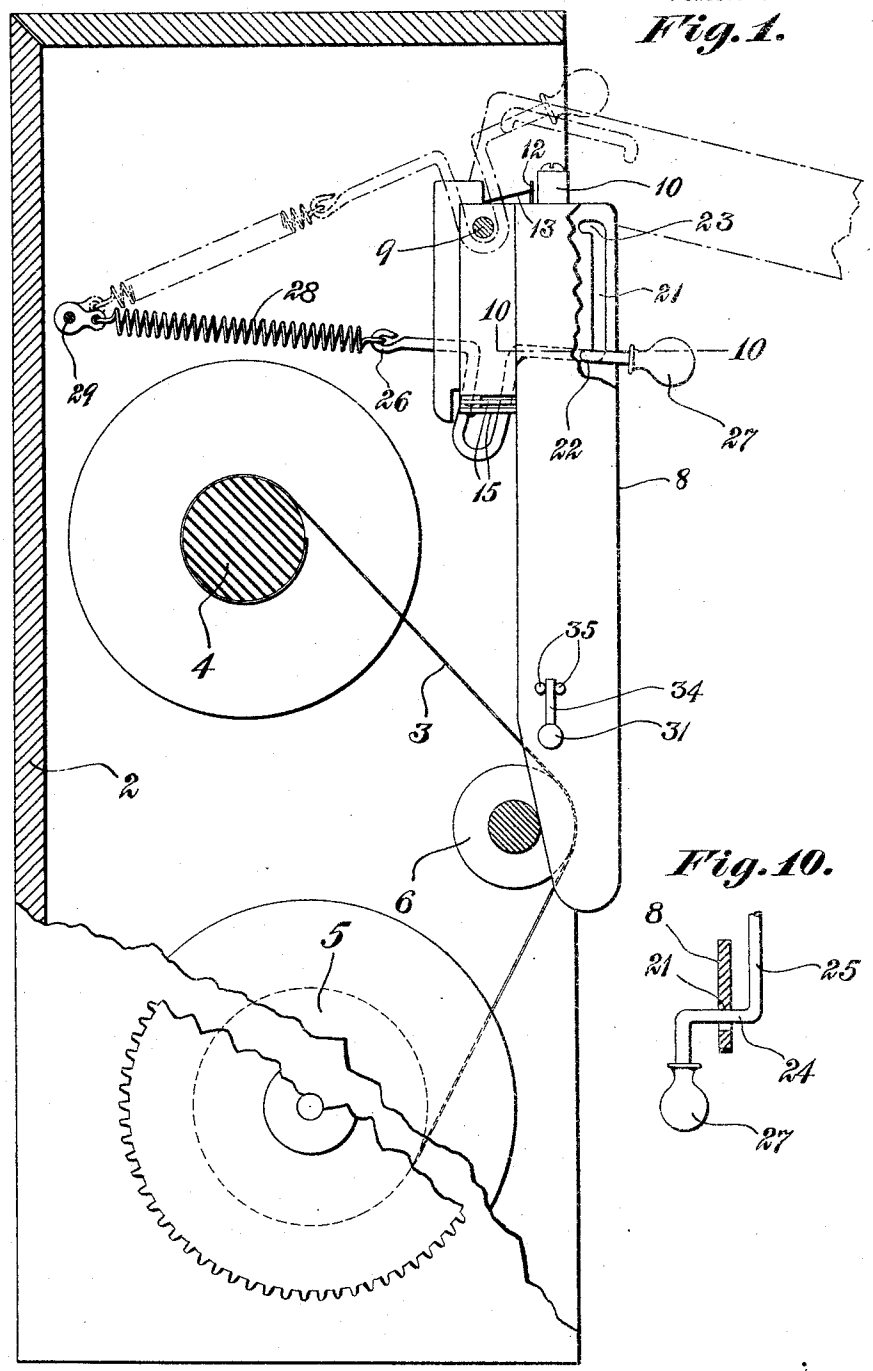


Fig. 10.

Witnesses:

L. L. Markel

James H. Keane

Inventor:

John T. Austin

By his Attorneys,

Southgate & Anderson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. T. AUSTIN.

TRACKER MECHANISM.

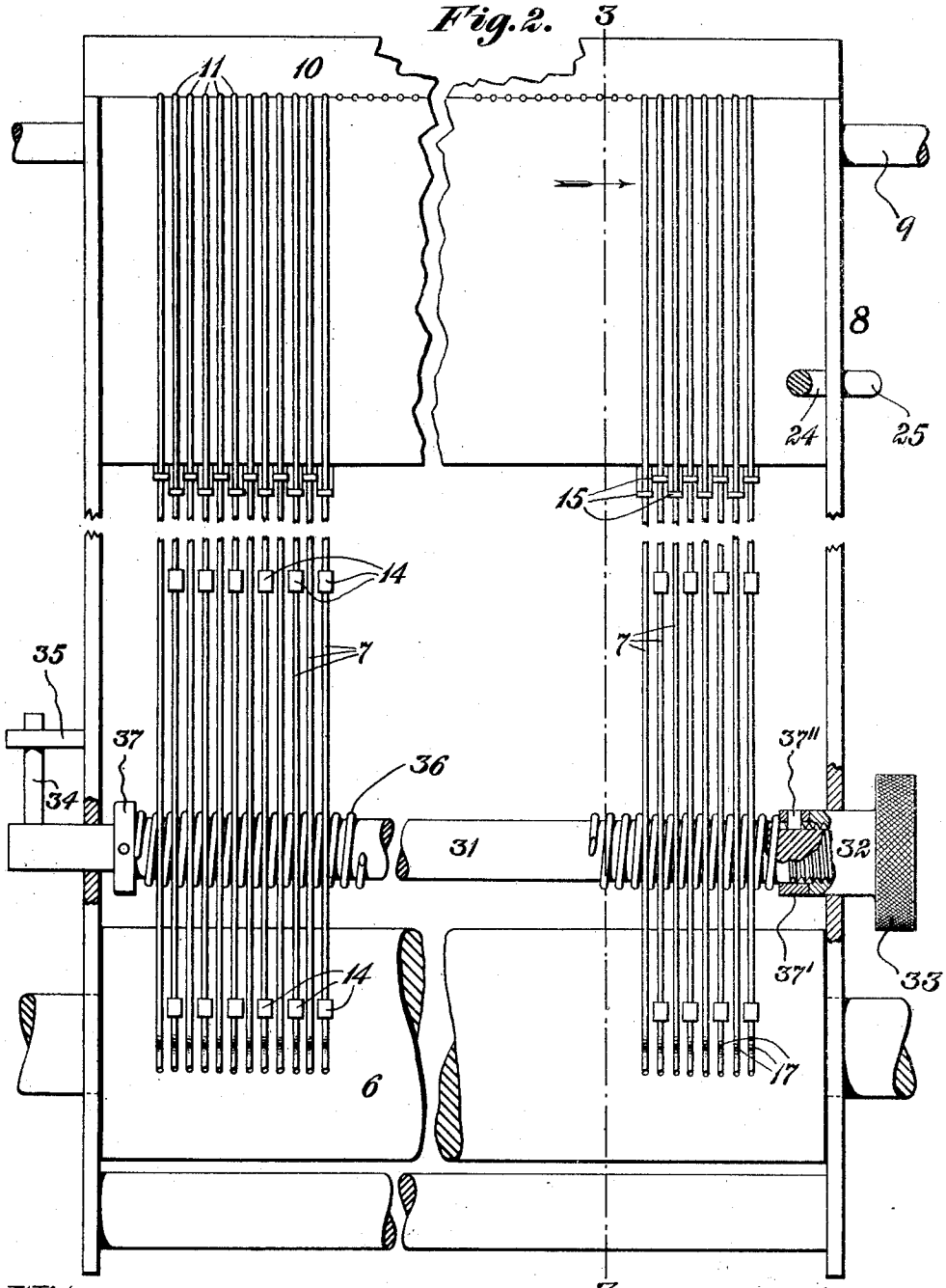
APPLICATION FILED SEPT. 19, 1913.

1,212,165.

Patented Jan. 9, 1917.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

L. L. Markel

James H. Keane

Inventor:

John T. Austin

By his Attorneys,

Fitzhugh & Anderson.

THE NORRIS PETERS CO., PHOTO LITHO., WASHINGTON, D. C.

J. T. AUSTIN.

TRACKER MECHANISM.

APPLICATION FILED SEPT. 19, 1913.

1,212,165.

Patented Jan. 9, 1917.

4 SHEETS—SHEET 3.

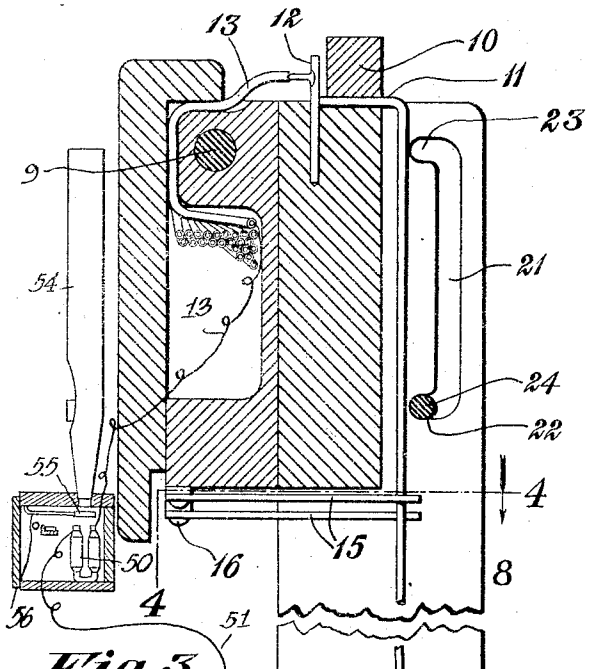


Fig. 3.

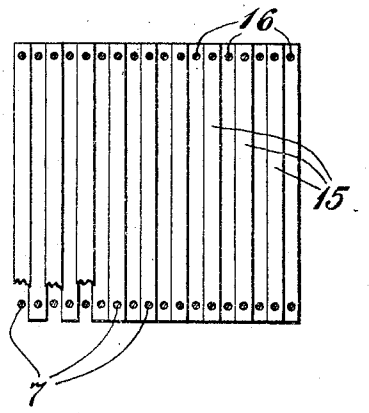
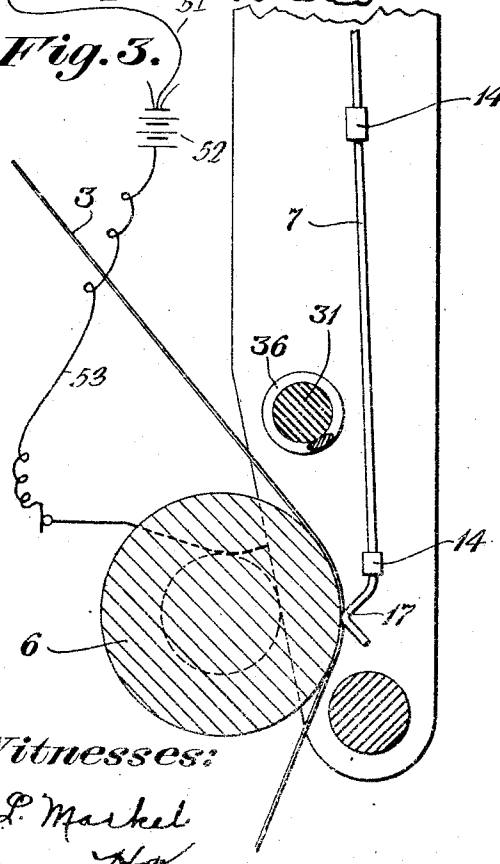


Fig. 4.



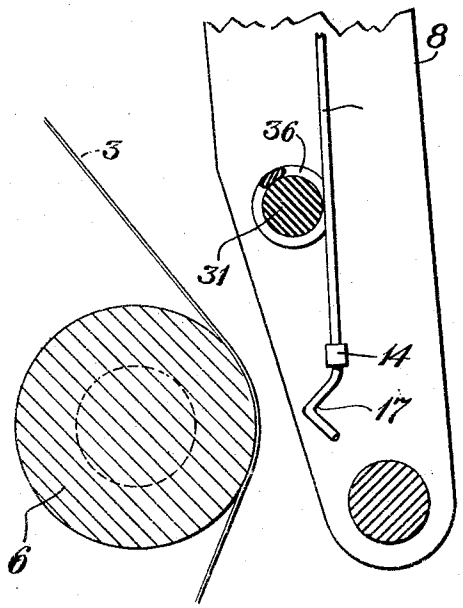


Fig. 5.

Witnesses:

L. L. Markel

James. H. Keane

Inventor:

John T. Austin

By his Attorneys,

Sutherland & Audison.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. T. AUSTIN.

TRACKER MECHANISM.

APPLICATION FILED SEPT. 19, 1913.

1,212,165.

Patented Jan. 9, 1917.

4 SHEETS—SHEET 4.

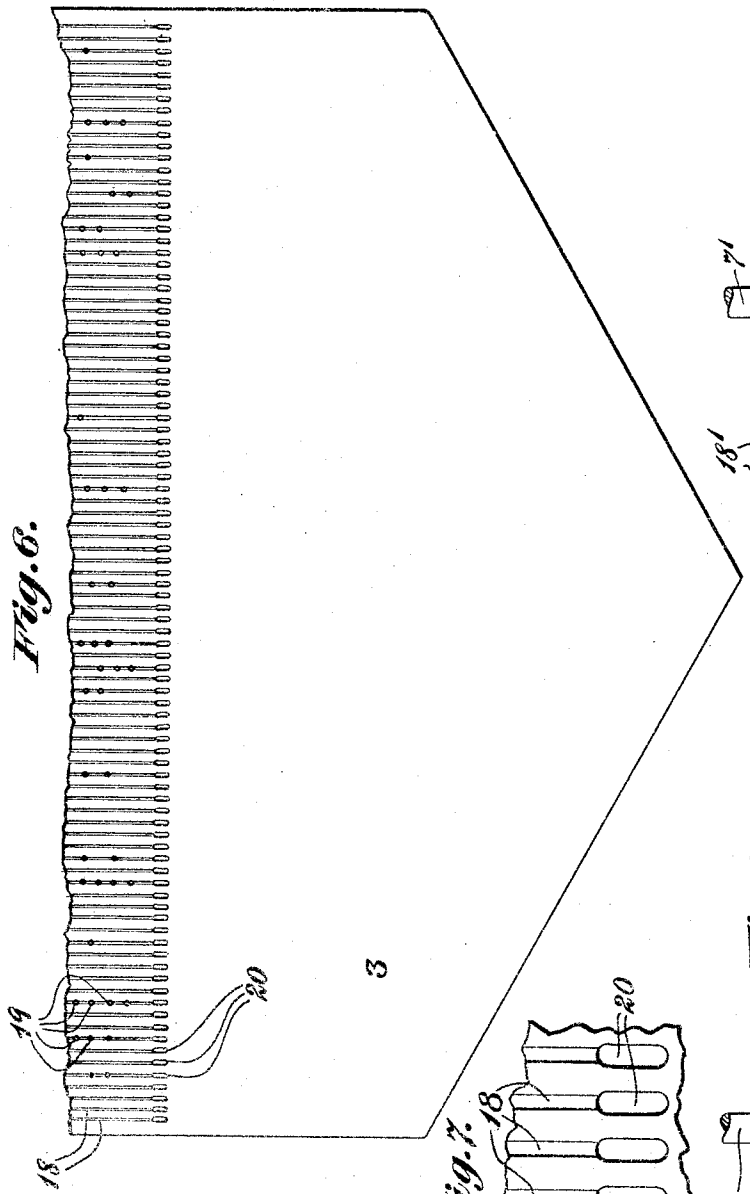


Fig. 6.

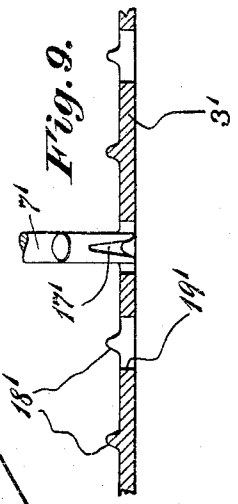


Fig. 9.

Fig. 7.

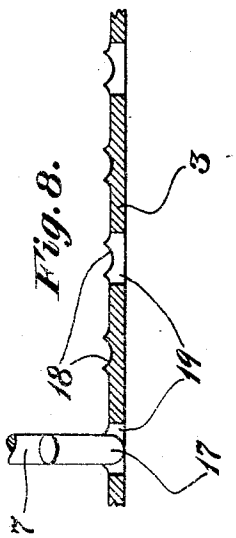


Fig. 8.

Witnesses:

P. P. Markel

James H. Keane

Inventor:

John T. Austin

By his Attorneys,

Rutherland & Muldoon.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN T. AUSTIN, OF HARTFORD, CONNECTICUT, ASSIGNOR TO AUSTIN ORGAN COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF MAINE.

TRACKER MECHANISM.

1,212,165. Specification of Letters Patent. Patented Jan. 9, 1917.

Application filed September 19, 1913. Serial No. 790,675.

To all whom it may concern:

Be it known that I, JOHN T. AUSTIN, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Tracker Mechanism, of which the following is a specification.

This invention relates to tracker mechanism such as is used for example in automatic players for musical instruments of various kinds, for instance organs and pianos, among the primary objects of the invention being to provide simple and effective means of the kind set forth by which accurate and precise tracking or registration is insured.

In the drawings accompanying and forming part of the present specification I have shown in detail one of the several forms of embodiment of the invention which to enable those skilled in the art to practise the same will be set forth fully in the following description. I do not restrict myself to this disclosure; I may depart therefrom materially in many respects within the scope of the invention defined by the claims following said description.

Referring to said drawings: Figure 1 is a side elevation of tracker mechanism involving my invention, showing a certain element in two positions by full and dotted lines respectively, a portion of the roll-box being broken away and in section. Fig. 2 is a front elevation with parts in section of said tracker mechanism. Fig. 3 is a vertical section on the line 3—3 of Fig. 2 looking in the direction of the arrow. Fig. 4 is a horizontal section on the line 4—4 of Fig. 3 also looking in the direction of the arrow. Fig. 5 is a sectional view of a roller, a portion of a carrier and devices on the carrier, the latter being in a retracted position. Fig. 6 is a view of one end of the music sheet. Fig. 7 is a view of a portion of said sheet. Fig. 8 is a cross section of the sheet showing a note-playing governing-member in elevation. Fig. 9 is a view corresponding to Fig. 8 of a modified form of sheet. Fig. 10 is a horizontal section on the line 10—10 of Fig. 1.

Like characters refer to like parts throughout the several figures, which it will be noted are on different scales.

In Fig. 1 I have shown a "roll-box" as it is known which is a familiar thing in automatic musical instrument players and which presents a convenient device for housing or inclosing certain of the parts of the mechanism, but the presence or absence of this particular part is not material.

The music sheet is designated by 3, being carried by the roll 4 and received by the roll 5, the latter in turn being operated by power as usual in this class of instruments. The music sheet 3 between the two rollers 4 and 5 passes over a suitable tracker member, the rotary cylinder or roller 6 being shown for this purpose, the shafts of the three members 4, 5 and 6 being supported by the side walls of the roll-box 2. The tracker member or rotary cylinder 6 is of metal or conducting material or at least its periphery should be, the material from which the core or body of said tracker member 6 is made, not being important from which, as will be evident, said part 6 presents a suitable contact member.

Coöperative with the tracker member 6 and the music sheet 3 are the note-playing governing-members 7, of which there may be any desired number, 276 being provided where the pedal organ and four manuals of an organ are to be played. Where there are this number of organ note-playing governing-members or a higher number, it is evident that a sheet of great width is necessary, but owing to the construction devised by me I obtain precise and accurate tracking or registration, notwithstanding variations in the width of the music sheet from expansion or contraction due to atmospheric or other causes. The members 7 are shown as being electric in type, presenting switches or contact members. When a perforation of the music sheet comes opposite the free portion of one of these members 7, said free portion is automatically projected through said perforation or slot into contact with the periphery of the tracker member 6 which results in the closing of the branch circuit including said tracker member and the particular member 7 thus automatically operated. One of the branch circuits will be hereinafter described. It will be understood that the tracker member 6 is connected with a source of electric energy and that each automatically movable contact member 7 with its individual conductor is also con-

nected to some source of energy and that the uncut or imperfect portion of the sheet insulates the tracker member from the row of members 7 and that when one of them engages the periphery of the tracker member its individual circuit is closed, thus energizing a magnet or performing some like office to effect the sounding of a note or some equivalent act. These governing members or contacts 7 are sustained by a suitable carrier such as that denoted in a general way by 8. The carrier 8 is shown as swinging, although the members 7 might be carried upon a stationary support. A swinging carrier, however, is preferable, in that the mounting and dismounting of the roller 4 is facilitated; as a matter of fact a swinging carrier as 8 for this purpose is old in this art, and in itself is not claimed by me. The carrier 8 is shown supported by the shaft or pivot 9 extending from one side to the other of the roll box 2 and is shown provided with a cross bar 10 notched in its upper edge to freely receive the rearwardly bent portions 11 of the members 7 which as shown are made of wire, a simple way of securing resiliency and hence automatic action or projection through the slots or into like openings in the music sheet 3. The bent portions 11 practically present pivots and thereby permit lateral or side motion of the lower portions of the members 7. Driven into the cross bar 10 are the posts or pins 12 of metal the respective bent portions 11 being in engagement with the respective pins so as to electrically connect the same. From the pins 12 the conductors 13 extend, there being one conductor and one pin, as will be inferred, for each member 7.

In Fig. 3 I have shown one of the branch circuits, the wire 13 extending to one pole of the magnet 50, the wire 51 leading from the opposite pole of said magnet to the battery 52 or other source of electrical energy. Said wire 51 is connected to the battery at one side thereof, the wire 53 leading from the other side of said battery and being electrically connected with the tracker member 6. An organ pipe is also shown in this view, being denoted by 54 and having the valve 55 equipped with the armature for the magnet 50 the valve being normally held closed by the spring 56. When the magnet 50 is energized by the engagement of its coöperating element 7 with the periphery of the tracker member 6, the valve 55 will be opened. The members 7 are insulated from each other for instance by sleeves 14 of fiber or the like placed on alternate members and each of which sleeve carrying members 7 may as shown be equipped with two of such sleeves at different points in its length. The sleeves are of such diameter as to permit a certain amount of free lateral individual movement of the said members 7. When said members 7 are as closely arranged as possible the lower collars or sleeves 14 abut and act as stops to prevent accidental displacement of said members 7, that is to say that although the contact fingers 7 have a certain amount of free lateral movement, the collars or sleeves 14 to which I have referred constitute an effective means for positively preventing abnormal lateral movement of the fingers, owing to which I insure proper tracking of said fingers. The members 7 are held against the music sheet 3 in some suitable manner, the links 15 of insulating material being shown for this purpose, the forward ends of the links being perforated to receive the members 7 between the ends of the latter, while the rear ends of said links are pivoted as at 16 to the swinging frame or carrier 8 near the rear upper side thereof. It will be assumed that the roller 5 is being rotated by power or otherwise to wind the music sheet 3 thereon and that a perforation in said sheet comes opposite the free portion of one of the members 7. As soon as this takes place the free portion of said member on the operative movement thereof is moved through such slot against the periphery of the tracker member 6 to make electrical connection therewith as previously set forth.

As shown the free portion of each member 7 is bent into V-shape as at 17, the apex of each V-portion presenting the active portion of the same and being adapted for contact with the periphery of the tracker member 6. The music sheet as shown has several longitudinally extending guide grooves 18. There may be any number of these grooves as shown corresponding in number with the members 7. These grooves 18 receive the free portions of the members 7 which for such purpose act as tongues. The grooves 18 intersect or register with the respective longitudinal rows of perforations 19. It will be assumed that the free portion of each member 7 is disposed in a coöperating groove or channel 18 in the music sheet and that the latter is being advanced. The consequence is that each member 7 is accurately guided into a perforation, notwithstanding the fact that the music sheet may be expanded beyond or contracted under its normal or original condition. In connection with each guide groove 18 and located at or near the entering end thereof is a placing or locating opening as 20 which as shown consists of a slot. When the leading end of the sheet 3 has been connected with the roller 5 the sheet is advanced by hand or otherwise until the free portions of the members 7 drop into these slots 20, by virtue of which when the sheet is advanced the free ends of the member 7 will be accurately guided into their appropriate grooves 18. There may be any number of

these locating or positioning slots 20, it not being essential that they correspond in number with the guide grooves 18.

Means of a suitable nature are provided for holding the carrier 8 in its several positions, and those illustrated for this purpose will now be described. One of the side bars of said carrier has near its upper end an elongated slot 21 terminating at its ends in the lateral notches or branches 22 and 23. The transverse portion 24 of the latching member 25 is adapted to traverse this slot 21 and to occupy in alternation the two notches or branches. This latching member 25 is furnished at its rear with a hook 26, and at its front with a knob or manipulating portion 27, the hook receiving the front end of the coiled pull spring 28 pivoted as at 29 to one side of the roll-box 2 near the rear of the latter. In Fig. 3 the transverse portion 24 of the latching member 25 is shown as occupying the lower notch 22, the same relation being shown by full lines in Fig. 1, so that the carrier is yieldingly held in its operative position. In view of this condition a double yielding action of the members 7 against the music sheet 3 is secured, one being due to the resiliency of said members and the other to the presence of the spring 28. By pulling the knob 27 forward the transverse portion 24 is moved out of the lower notch 22 and by swinging said latch member 25 upward the carrier is elevated to the dotted line position shown in Fig. 1, and when this is reached the transverse portion 24 is moved into the upper notch 23 by the spring 28 to thus hold the carrier 8 in its elevated position. To lower the carrier 8 the opposite action occurs.

As will hereinafter appear it may be necessary in some cases to hold the carrier 8 in an intermediate position as shown by Fig. 5. When the carrier is in this position the spring 28 will not accidentally return said carrier to its original or operative position, the axis of the spring at such time virtually intersecting the center of motion of the carrier to prevent such operation. When the carrier is in this intermediate position, the members 7 are adjusted if necessary either toward or from each other or in their entirety. There may be some cases where it is only necessary to adjust the members 7 toward or from each other, whereas in other cases it may be only necessary to adjust them as a unit, whereas at other times both adjustments may be requisite. To return the carrier 8 to its original position from the intermediate position thereof, it is necessary to manipulate the knob 27.

As will be understood any suitable means may be provided for securing either or both the adjustments in question, and there may be times when the instrument may only require one of such adjustments. The means shown and now to be described for securing such adjustments have been found satisfactory.

Within the roll-box 2 is mounted an endwise movable non-rotary shaft 31, one end of which is supported in an opening in one side of said roll-box, while the other end thereof has a threaded connection with the nut 32 rotatively supported in an opening in the other side of the roll-box and having for convenience a knurled operating-head 33. The shaft 31 at the end opposite that having the nut 32 is shown provided with a pin 34 disposed between a pair of pins 35 on the outside of the roll-box, this providing a simple means for preventing rotation of the shaft 31. Surrounding said shaft 31 is the coiled spring 36, one end of which bears against the collar 37 pinned or otherwise suitably fastened to the shaft 31, while the other end bears against the collar 37′ pinned as by the pin 37″ to the shaft 31 for sliding movement thereon and engaged by the nut 32. This coiled spring serves as a convenient means for adjusting the members 7 toward and from each other, acting in this respect as a gage member, the nut 32 constituting a suitable means for regulating the distance between the coils of the spring 36, between which the laterally adjustable members 7 are adapted to be received. The length of the spring 36 is greater than the maximum width of the series of governing members 7. It will be assumed that a roller 4 and connected sheet 3 have been mounted in place and that the leading end of said sheet has been connected with the power roller 5 and further that the carrier 8 is up. To rectify the members 7 the following procedure will be adopted. The carrier 8 will be swung down to the position it is shown as occupying in Fig. 5, the members 7 being at this time between the coils of the spring 36 into which they were moved on the initial upward movement of the carrier 8. If the members 7 are not correctly laterally spaced, the nut 32 will be turned and if it be turned in one direction the coils of the spring 36 will be caused to approach to move the members 7 toward each other whereas if the nut be turned in the opposite direction, the spring is permitted to expand to thereby permit separation of the members 7. In this way the members 7 can be accurately spaced to conform to the lateral separation of the perforations in the music sheet. Should it be required that the members 7 be moved as a unit or in their entirety or aggregate to adapt them to the position of the music sheet, this result can be accomplished by endwise bodily shifting the shaft 31 through a thrust for example applied to the nut 32 or otherwise. After the members 7 are adjusted the carrier 8 will be swung down until the active ends of said mem-

bers are received in the positioning openings or slots 20, and during the final movement downward of the carrier 8 the members 7 are moved away from the gaging spring 36.

In Fig. 9 is shown a modified form of music sheet 2′ and a modified form of governing member 7′. In this construction the sheet 3′ instead of being longitudinally channeled or grooved is longitudinally beaded or tongued as at 18′ to fit in the grooves 17′ at the end of the governing member 7′, the beads or tongues 18′ being intersected by the note perforations 19′.

What I claim is:

1. The combination of a contact bar, a perforated music sheet to travel over the contact bar, and a plurality of contact fingers automatically projectable through the perforations in the sheet to engage the contact bar and having a positive guide connection with said sheet.

2. The combination of a contact bar, a perforated music sheet to travel over said contact bar, and a plurality of resilient contact fingers automatically projectable through the perforations of the sheet and against said contact bar, said resilient contact fingers having a positive guide connection with said sheet.

3. The combination of a contact bar, a perforated music sheet to travel over the contact bar, and a plurality of contact fingers automatically movable through the perforations in the sheet to engage the contact bar, the sheet having longitudinally extending grooves intersected by the respective perforations and receiving the respective contact fingers.

4. The combination of a contact bar, a perforated music sheet to travel over said contact bar, and a plurality of resilient contact fingers automatically movable through the perforations in the sheet to engage the contact bar, the sheet having longitudinally extending guide means intersected by the respective perforations and with which said resilient contact fingers are respectively connected.

5. The combination of a contact bar, a plurality of contact fingers automatically movable toward the contact bar, and means for moving said contact fingers laterally toward or from each other.

6. The combination of a contact bar, a plurality of contact fingers automatically movable toward the contact bar, supporting means for said movable contact members, and means for laterally moving said contact fingers as a unit and independently of their supporting means.

7. The combination of a contact bar, a plurality of contact fingers automatically movable toward the contact bar, and means for moving the contact fingers laterally toward or from each other or for moving them as a unit.

8. The combination of a contact bar, contact fingers automatically movable toward the contact bar, a coiled spring between the coils of which the movable contact fingers are received, and means for varying the distance between the coils of the spring.

9. The combination of a contact bar, contact fingers normally movable toward the contact bar, an endwise movable, non-rotary shaft, a coiled spring on said shaft, between the coils of which said contact fingers are received, and means for regulating the distance between the coils of the spring.

10. The combination of a contact bar, a plurality of resilient contact fingers automatically movable toward the other contact member, a coiled spring between the coils of which the resilient contact members are received, and means for regulating the distance between the coils of the spring.

11. The combination of a rotary contact roller, a plurality of contact fingers automatically movable toward the roller, and means for moving the movable contact fingers toward or from each other.

12. The combination of a rotary contact roller, a perforated music sheet to travel over said roller, and resilient contact fingers automatically projectable through the perforations in the sheet, the sheet having grooves intersected by the respective perforations and receiving the resilient contact members.

13. The combination of a contact bar and a plurality of transversely alined contact fingers automatically movable toward the contact bar and provided alternately with insulating sleeves in transverse alinement, the insulating sleeves being adapted to engage each other to prevent abnormal lateral movement of said fingers.

14. The combination of a contact bar, a perforated music sheet of insulating material to travel over the contact bar, and a plurality of contact fingers automatically projectable through the perforations in the sheet on the movement of the sheet to engage the other contact bar and each having a tongue and groove connection with said sheet.

15. The combination of a contact bar, a perforated music sheet of insulating material to travel over the contact bar and a plurality of contact fingers automatically projectable through the perforations in the sheet on the travel of the sheet to engage the contact bar, the sheet having longitudinally extending means having guide connection individually with the respective contact fingers.

16. The combination of a contact bar, a

plurality of contact fingers normally movable toward the contact bar and individually laterally movable.

17. The combination of a contact bar, a plurality of contact springs normally movable toward the contact bar, the springs being pivoted for individual lateral movement.

18. The combination of a contact bar, a plurality of contact fingers automatically projectable into engagement with said contact bar, said movable contact fingers being also movable in a direction transverse to the other movement, and means associated with the movable contact fingers for positively preventing abnormal individual lateral movement of said movable contact fingers.

19. The combination of a rotary roller, the surface of which is of conducting material, a sheet of insulating material to travel in the direction of its length over the roller and having series of perforations, and resilient contact fingers projectable through the perforations of the respective series of perforations as the sheet travels, said contact fingers being individually laterally movable.

20. The combination of a rotary roller, the surface of which is of conducting material, a sheet of insulating material to travel in the direction of its length over the roller and having series of perforations, and resilient contact fingers projectable through the perforations of the respective series of perforations as the sheet travels, said contact fingers being individually laterally movable, each of the fingers having a positive guide connection with the sheet in the direction of the length thereof.

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

JOHN T. AUSTIN.

Witnesses:
HEATH SUTHERLAND,
T. MAY NORRIS.

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