

C. S. BURTON.
TRACKER DEVICE FOR AUTOMATIC MUSICAL INSTRUMENTS.

APPLICATION FILED JUNE 24, 1912.

1,064,704.

Patented June 17, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

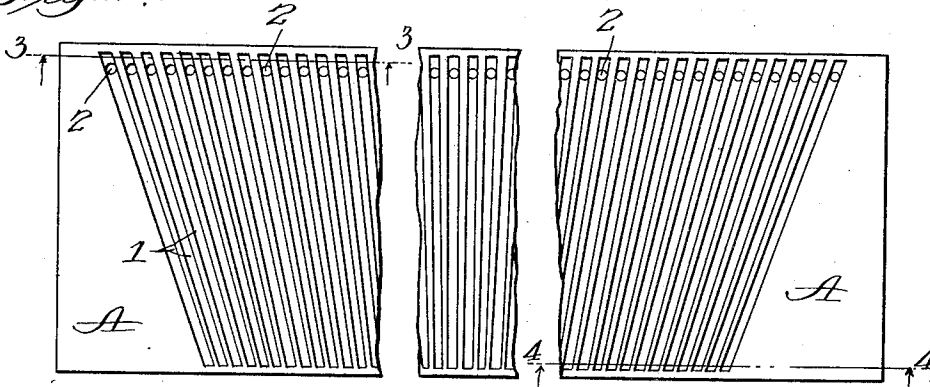


Fig. 2.

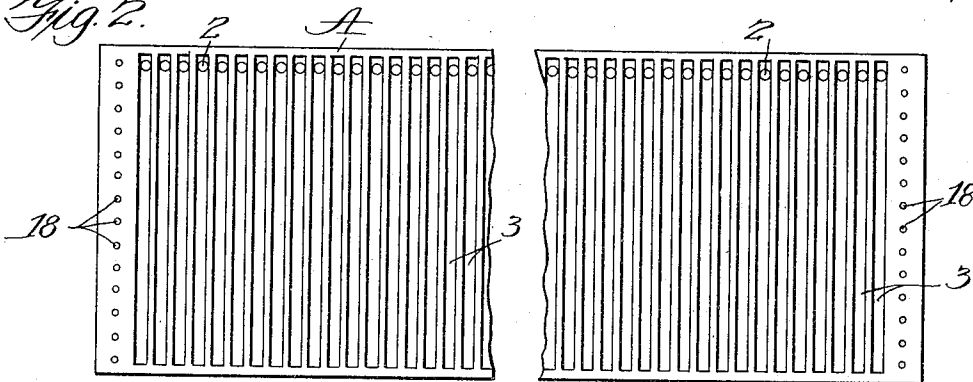


Fig. 3.

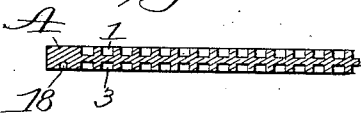


Fig. 4.

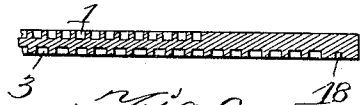
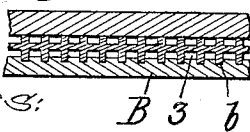


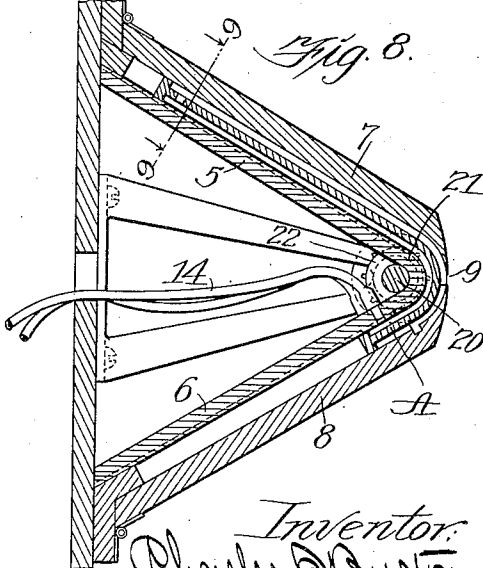
Fig. 9.



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B 3 b

Fig. 8.



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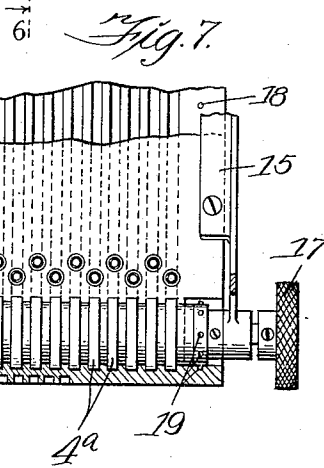
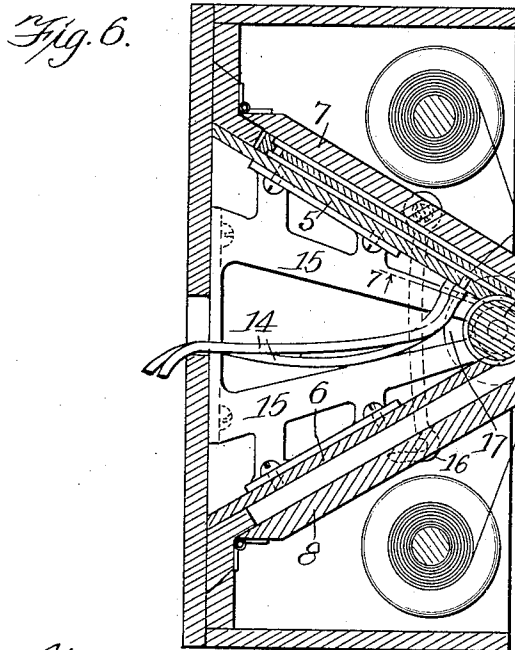
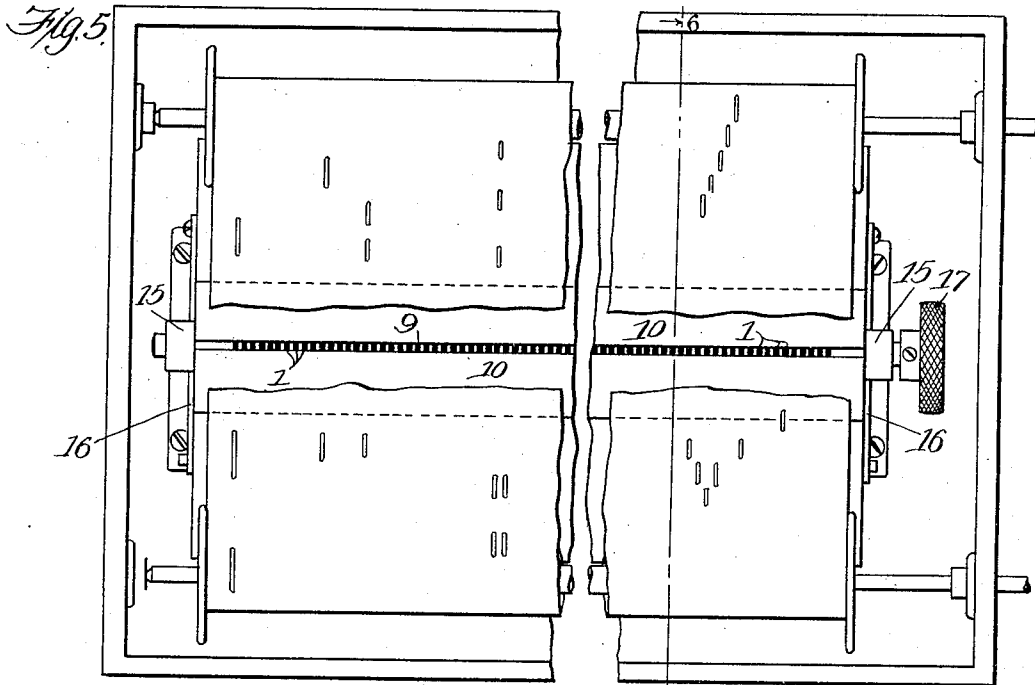
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES S. BURTON, OF OAK PARK, ILLINOIS.

TRACKER DEVICE FOR AUTOMATIC MUSICAL INSTRUMENTS.

1,064,704.

Specification of Letters Patent.

Patented June 17, 1913.

Application filed June 24, 1912. Serial No. 705,393.

To all whom it may concern:

Be it known that I, CHARLES S. BURTON, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tracker Devices for Automatic Musical Instruments, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved tracker device for automatic musical instruments, especially adapted to coöperate with note sheets or controllers for such instruments, which are cut according to different scales, so that upon the same instrument note sheets cut according to all the scales in common use may be used by easy adaptation of the tracker device thereto.

It consists of the elements and combinations shown and described as indicated in the claims.

In the drawings Figure 1 is a plan view of an apron or web constituting an essential feature of this invention. Fig. 2 is a plan view of the opposite side of such apron. Fig. 3 is a section at the line 3—3 on Fig. 1. Fig. 4 is a section at the line 4—4 on Fig. 1. Fig. 5 is a front elevation of a complete tracker device embodying this invention. Fig. 6 is a section at the line 6—6 on Fig. 5. Fig. 7 is a section at the line 7—7 on Fig. 6. Fig. 8 is a sectional view similar to Fig. 6, showing a modified form of a tracker device. Fig. 9 is a section at the line, 9, 9, on Fig. 8.

In the structure shown in the drawings, A is a rubber apron, having upon one side longitudinally extending grooves 1, which diverge from a transverse line near one end toward the opposite end near which said grooves terminate. Each of the grooves 1 is connected by a hole 2 extending from the bottom of the groove through to the opposite side of the apron, and on said opposite side of the apron there are formed parallel longitudinally extending grooves 3, into the bottom of which, near one end, the holes 2, respectively open, so that the grooves upon one side connect with corresponding grooves on the other side through said holes thus forming in the surfaces of the apron a set of air ducts, each of which is continuous from the commencement of the groove near one edge of one surface of the apron to the closed end of the corresponding groove near

the same edge of the opposite surface of the apron. The grooves 1 at their narrower spaced ends are spaced according to a scale preferably slightly less, but in any event as narrow, as the most narrowly spaced note sheet for which the tracker is designed to be adapted; and at their more widely spaced ends, said divergent grooves 1 are spaced according to the scale, or a little more widely than the scale, of the most widely spaced music or note sheets for which the device is adapted.

4 is a roller over which the apron is folded, said roller having circumferential rifts and grooves adapting it to fit the surface of the apron having the parallel grooves 3; that is, so that the ribs 4^a of the roller fit snugly in the grooves 3 of the apron. The roller 4 is mounted in brackets, 15, 15, for rotating about its axis.

6 and 7 are fixed plates which extend divergently from one side of the roller 4, having their edges next to the roller notched or toothed to fit the grooves of the roller, and being mounted with their outer surfaces substantially tangent to the roller, or more strictly speaking, tangent to a cylinder of the diameter of the roller at the bottom of its grooves.

7 and 8 are plates which are mounted in fixed position covering the apron except a narrow interval or rift 9 which is left between the proximate edges of said plates 7 and 8, directly in front or at the forward side of the roll. The plates 7 and 8 are spaced from the plates 5 and 6 respectively, so as to barely accommodate the apron between them,—that is, so that the ribs on the two surfaces of apron between their grooves are in contact with the surfaces of said plates 5 and 6 upon one side and 7 and 8 upon the other side,—and thereby converts the grooves into air ducts which by the holes, 2, through which the corresponding grooves communicate are each rendered continuous over both surfaces of the apron from the closed end near one edge of one surface to the closed end near the same edge of the other surface, and which are closed except at the rift 9, where the grooves 1 upon the outer side of the apron are uncovered. The proximate edges of the plates 7 and 8 which bound the rift 9, are chamfered off upon the forward or outer side, so that said plates terminate in knife edges which bound the rift 9, the chamfered surfaces 10 being pref-

erably conformed to the arcs of a circle of considerably greater diameter than the roll 4. One of the interior plates, as 6, has apertures 12, positioned for registering with the parallel grooves 3 of the apron; and said apertures are fitted with nipples 13 for convenience in attaching thereto flexible or other tubes 14, which extend to the pneumatic action for the well-understood purpose for which such tube connections are provided from trackers of automatic musical instruments.

Means being provided for moving the apron longitudinally over the roll, as, for example, by rotating the roll, it will be seen that the diverging grooves 1 of the outer side of the apron, crossing the rift 9, between the proximate edges of the outer plates 7 and 8, form by the intersection of said grooves with said rift, tracker duct mouths whose spacing may be varied from the narrowest spacing of the diverging grooves to the widest spacing thereof, all intermediate spacings being obtained in the movement of the apron from a point at which the interval or rift 9 crosses the channels 1 at their more narrowly spaced ends, to the point where said rift crosses the channels at their most widely spaced ends. This construction, therefore, affords opportunity for adapting the tracker to coöperate with note sheets cut to any scale from the narrowest to the widest between the limits fixed by the spacing of the grooves 1 at their most narrowly spaced end, and their spacing at the opposite end. Incidentally, it will be observed that the device affords means for adapting the space of the tracker mouths to the slight variation which results from the shrinking and swelling of the note sheets from atmospheric changes.

It will be understood that the inner plates 5 and 6 on the one hand, and the outer plates 7 and 8, on the other hand, together constitute a sheath, between whose inner and outer walls, formed by these plates, the flexible apron A is held so as to make air tight, or substantially air-tight junction at the edges of the ribs of both surfaces, thus causing the channels between the ribs to be inclosed except at their communicating ends as described. In order to facilitate the adjustment of the apron from one position to the other in the sheath walls, it is preferable that the inner and outer walls be connected so as to be movable toward and from each other to relax the pressure on the apron, preventing it from becoming stretched or distorted in movement from one position of adjustment to another. It is preferable, also, that the inner member of the sheath comprising the plates 5 and 6, should be fixed in position, the movement for relaxing the grasp of the sheath walls upon the apron A being movement of the

outer plates, and particularly is this the more convenient construction because of the fact that the outer plates are separated by the rift 9, so that they can be more readily moved for relaxing the hold upon the apron. Brackets 15 and 15, in which the shaft of the roller 4 is journaled, are provided with suitable extensions for rigidly supporting the plates 5 and 6 constituting the inner member of the sheath, of which, it will be observed, the roll 4 also constitutes a part, being exposed between the proximate edges of said plates 5 and 6, as above described, and being also supported by the brackets. The plates 7 and 8, constituting the outer member of the sheath, are hinged respectively at their edges remote from the rift 9 to the corresponding edges of the plates 5 and 6, and latches 16, 16, are provided at the opposite ends of the tracker device, connecting the two plates 7 and 8 for holding them in closed position. When the apron is to be adjusted, the latches will be released, and the roll 4 rotated by means of the hand wheel or knob 17 at one end of the shaft, the engagement of the ribs of the roll 4 with the inner grooves 3 of the apron being sufficient to adapt the roll to propel the apron in either direction. It may be found advisable, however, in some instances,—depending somewhat upon the texture of the apron, its flexibility and firmness,—to provide more positive means for moving the apron by the rotation of the roll on its shaft, and for this purpose, the apron may be provided on its inner side, along its lateral margins, with the equivalent of rack teeth, most conveniently in the form of recesses 18 for the engagement of the teeth of pinions 19, 19, mounted upon the shaft of the roll 4 at the opposite ends of said roll.

A modification of the device, in which the roll 4 is dispensed with, is shown Figs. 8 and 9. In this form, the inner sheath wall, comprising two members or plates 5 and 6, is made unitary by an approximately half-cylindrical portion 21, constituting a bend which connects the two parts 5 and 6 at the position opposite the rift 9, produced as in the first described form, by the approximating edges of the outer plates 7 and 8 of the sheath. When this structure is employed, a shaft 20 is provided extending inside the semi-cylindrical portion 21 of the inner member of the sheath, said shaft having its axis coincident with the axis of said semi-cylindrical portion, and on this shaft, at opposite ends of the tracker device, there are provided pinions, 22, 22, as in the other form, for engaging the lateral margins of the apron, which is provided with recesses 18, as in the other form, for that purpose. This form has one advantage over the form first above described, consisting in that the

tubes 14 can be connected at the inner surface of said semi-cylindrical bend, 21, if desired, this being an area not available for that purpose when the roll 4 is present; and by utilizing it for this purpose, the apron is enabled to have longer range of adjustment within a sheath of given extent, and this is desirable because it diminishes the angle of divergence of the grooves 1 necessary to produce a given change in spacing between the more narrowly spaced and more widely spaced ends. In this form the inner sheath wall, B, is shown formed with grooves, *b*, and the ribs intervening between the grooves, 3, of the inner surface of the apron are engaged in these grooves, *b*.

I claim:—

1. A tracker device for automatic musical instruments comprising in combination with a sheath, a flexible apron having upon one side a set of longitudinally extending grooves, uniformly spaced at each end and diverging from each other, and having upon the other side a set of parallel grooves spaced from each other, their spacing corresponding to that of the grooves upon the opposite side near their more widely spaced ends, the apron having apertures connecting the respective grooves of the first set with the corresponding grooves of the opposite set located at a line transverse to the grooves at which the spacing of the two sets is the same, the sheath having in its wall at the side of the apron having the diverging grooves, a rift extending transversely of said grooves.

2. A tracker device for automatic musical instruments, comprising in combination a flexible apron having upon one side longitudinally extending equally spaced diverging grooves, stopping short of the ends of the apron, and upon the other side longitudinally extending equally spaced parallel grooves stopping short of the ends of the apron, the spacing of the second set of grooves being substantially that of the more widely spaced ends of the first set, the apron having apertures connecting the respective grooves of the first set with the corresponding grooves of the second set at a transverse line at which their spacing is equal: a sheath in which such apron is mounted for longitudinal movement, comprising two portions at an angle to each other and a curved portion which connects them, the inner and outer walls of such sheath being movable relatively to close upon and release the apron, the outer wall having a narrow rift at the said curved portion extending transversely of the grooves of the apron.

3. A tracker device for automatic musical instruments comprising a flexible apron and a sheath in which it is mounted for longitudinal movement, said sheath having its opposite end portions at an angle to each other and connected by an intermediate out-

wardly convex portion, the outer surface of the apron having a set of longitudinally extending grooves more widely spaced at one end than at the other end, the inner surface of the apron having a set of longitudinally extending grooves which are parallel throughout, the apron having apertures which connect the grooves of the first set with those of the second set at a transverse line at which the two sets are equally spaced, the outer wall of the casing having a rift extending transversely of the set of diverging grooves of the apron, and the inner wall having apertures registering with the grooves of the parallel set of grooves.

4. A tracker device for automatic musical instruments comprising a flexible apron having at one portion of its superficial area a set of grooves more widely spaced at one end than at the other, and at another portion of said area, a set of grooves which are parallel throughout, and whose spacing is substantially that of the other set at or near the more widely spaced end of the other set, the respective grooves of the first set having communication in the substance of the apron with the corresponding grooves of the other set, and a sheath in which said apron is mounted for longitudinal movement between the opposite walls of the sheath, said sheath having a narrow rift extending transversely of the grooves of the apron at a line past which the portion of the apron's area having the diverging set of grooves moves, and having another portion of its extent past which the set of parallel grooves move provided with apertures registering with said grooves respectively.

5. A tracker device for automatic musical instruments comprising a flexible apron and a sheath between whose opposite walls the apron is retained and adapted to be moved longitudinally, said sheath having a bend intermediate its ends, and a rift at such bend; air ducts formed by grooves in the apron crossing such rift, the sheath having apertures registering with the said air ducts at an area remote from the rift.

6. A tracker device for automatic musical instruments comprising a flexible apron and a sheath between whose opposite walls the apron is adapted to be retained and to be moved longitudinally, said sheath having a bend intermediate its ends and a rift at such bend, the apron having in its surface grooves forming air ducts crossing said rifts, the sheath having apertures registering with the said air ducts in the apron at an area remote from the rift, the inner and outer walls of the sheath being mounted for movement toward and from each other to press and release the apron, and means for holding them pressed together upon the apron.

7. A tracker device for automatic musical instruments comprising a flexible apron and a sheath between whose opposite side walls the apron is retained and adapted to
 5 be moved longitudinally, said sheath having a bend, the outer wall having a rift at such bend, the inner wall comprising a roll mounted opposite the rift at the bend, the apron having grooves in its surfaces forming
 10 air ducts transverse to the rift in the sheath, the sheath having apertures registering with the said air ducts at an area remote from the rift, the roll having means for engaging the apron to feed it longitudi-
 15 nally in the sheath, and means for rotating the roll.

8. A tracker device for automatic musical instruments and a sheath between whose opposite walls the apron is retained and
 20 adapted to be moved longitudinally, said sheath having a bend intermediate its ends, the outer wall of the sheath having a rift at such bend, the inner wall comprising a roll mounted opposite the rift at the bend,
 25 the apron having in its outer surface a set of grooves which are more widely spaced at one end than at the other end, said grooves extending transversely of the rift in the
 30 sheath, the inner surface of the apron having a set of grooves which are parallel and extend transversely of said rift, and are spaced apart upon a scale corresponding
 35 to the spacing of the more widely spaced ends of the grooves upon the opposite side of the apron, the apron having apertures
 40 leading from the respective grooves of one set to the corresponding grooves of the other set at a line at which the spacing of the two sets of grooves is equal, the inner wall
 of the sheath having apertures registering

with the grooves of the parallel set, the roll having circumferential grooves with which the ribs between the grooves of the parallel set of the apron are engaged.

9. A tracker device for automatic musical
 instruments comprising a flexible apron
 and a sheath between whose opposite walls
 the apron is retained and adapted to be
 moved longitudinally, said sheath having a
 bend intermediate its ends and a rift in
 50 its outer wall at such bend, the apron hav-
 ing in its outer surface a set of grooves
 extending transversely to the rift and more
 widely spaced at one end than at the other
 end, and having on its inner surface a set
 55 of grooves extending transversely to the
 rift and parallel with each other, the spac-
 ing of said parallel set of grooves being
 substantially that of the more widely
 spaced end of the opposite set, the apron
 60 having apertures connecting the respective
 grooves of the first set with the correspond-
 ing grooves of the second set, the inner
 walls of the sheath having apertures regis-
 tering with the grooves of said parallel set,
 65 said inner wall comprising a roll opposite
 the rift in the outer wall at the bend, said
 roll having circumferential grooves to ac-
 commodate the rifts between the grooves
 of the parallel set, the adjacent members
 70 of the inner wall of the sheath having their
 proximate edges serrated for fitting the
 grooves of the roll.

In testimony whereof, I have hereunto
 set my hand, at Chicago, Illinois, this 30th
 75 day of December, 1910.

CHARLES S. BURTON.

Witnesses:

EDWARD T. WRAY,
 M. GERTRUDE ADY.