To all whom it may concern:

Be it known that I, Joseph Haim Perez, residing in Nevada, Missouri, have invented certain new and useful Improvements in Apparatus for Turning Music-Leaves, of which the following is a specification.

This invention relates broadly to apparatus for turning the leaves of musical compositions in proper succession, at intervals determined by the progress of the musical rendition, the prime object thereof being to provide, in apparatus of the class described, means adapted for actuation, first, to withdraw or separate the sheet next-to-be-turned from its normal relation to its fellows, and second, thereupon to turn said sheet.

A further object of this invention is to provide an apparatus which will be compact, simple, easy of operation, and actually practicable for many-leaved compositions.

Another object is to provide an apparatus capable of operation either with bound or loose-leaf compositions.

Many other objects will be in part obvious and in part pointed out hereinafter.

A preferable embodiment of this invention would provide a pneumatic means of the suction type, for raising from its fellows a sheet to be turned, in operable combination with mechanical means of a type adapted to mechanically complete the turning operation of a sheet which has already been raised from its fellows.

Inasmuch as it is believed that the broad conception of this invention as above-stated is new and novel, illustration is given of but one embodiment of this invention.

The relations of the means and functions in the illustrative apparatus hereinafter immediately to be described are, therefore, not of the essence of this invention, which consists in the features of construction, combinations of elements and arrangements of parts the scope of the application of which will be indicated in the appended claims.

Referring now to the accompanying drawings, wherein is disclosed the embodiment of this invention above-mentioned, Figure 1 is a plan view of said embodiment; Figure 2 is a plan view of a portion of said embodiment, exposing certain parts not shown in Figure 1, due to the removal of a portion of the parts shown in Figure 1; Figure 3 is a side elevation of a tread-device adapted to be used in combination with said embodiment; Figure 4 is a transverse sectional view, taken on the line $x-x$ of Figure 2 and looking in the direction of the arrow, showing a detail of construction; Figure 5 is a side elevation of said embodiment, partly in section as disclosed in plan in Figure 2; Figure 6 is a perspective view of the suction-box disclosed herein as a part of the pneumatic means of said embodiment; Figure 7 is a transverse sectional view of said suction-box, taken on the line $y-y$ of Figure 6; Figure 8 is an enlarged longitudinal sectional view of the tread-device disclosed in Figure 3.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the specific embodiment of this invention above referred to and shown in the accompanying drawings, 1 represents in Figures 1, 2 and 5 a main supporting plate, equipped as shown with four blocks 2 adapted to receive retaining bolts 3 and to act as supports for an upper supporting plate 4, which is illustrated in plan in Figure 1. Each of these plates is in this embodiment adapted to accommodate certain mechanisms hereinafter to be described. These mechanisms are adapted in this embodiment to be operated through the actuation of a foot-treadle illustrated in Figure 3, which will (with special reference to Figure 8) be described in detail later, it sufficing here to say that, upon the actuation of the treadle, the elements within said treadle will at the proper times become effective with reference to a tubing 5, connected to a similarly-numbered tubing shown in Figures 1, 2 and 5 (adapted to actuate a pneumatic device hereinafter to be described), and with reference to certain mechanism-operating cords 6 and 7.

8 and 9, shown in dotted lines in Figure 1, represent respectively the opened sheets of a musical composition, and 10, also drawn in dotted lines, represents, and will hereinafter be utilized to refer to, the sheet lying immediately beneath sheet 9. This musical composition is shown for the purposes of this embodiment as being supported upon plate 4 by means of fixed stops 11 and an adjustable stop 12. Adjustable stop 12 is here shown as being capable of adjustment by means of a thumb-screw 13, guided at its lower end in a grooved plate 14. A winding crank 15, mounted upon a shaft 16, is also shown as forming an element of this
embodiment; shaft 16 being journaled in plates 1 and 4 (see also Fig. 5).

In Figs. 1 and 2 there are disclosed as parts of this illustrative embodiment, the following members: A gear-wheel 17, mounted upon said shaft 16, is shown in mesh with a pinion 18, mounted upon a second shaft 19, so arranged that any quarter revolution of gear-wheel 17 will cause a complete revolution of pinion 18. Gear-wheel 17 carries, rigidly fastened thereon, a four-toothed ratchet 20, carrying a pin 33 adapted to support one end of, and during rewinding to act as a coiling agent for, a main-spring 34, the other end of said main-spring being rigidly fastened to shaft 16. Ratchet 20 is shown here as being adapted, during each revolution of gear-wheel 17, to be first released and then arrested four times, by means of the actuation of a cord 6 and a pawl 21 against the influence of a leaf-spring 22; each tooth of ratchet 20, in its arrested position, corresponding to the termination of a complete revolution of pinion 18. Pinion 18 as shown carries two cams, respectively numbered 23 and 24. Cam 23, during its first half of revolution, is here adapted to actuate a lever 25, mounted upon a pivot 26, so that said lever will effectively bear against the upper pivoted connection 27 between the right-hand pair of the lazy-long levers series 27 to expand said levers (mounted upon a pivot 29 fixed in plate 1), thereby to carry a frame 30 (which frame as shown is constructed to encircle upper plate 4) to its limit of travel; which limit of travel will bring the portion of said frame 30 which passes over upper plate 4 to a position diagrammatically indicated by dotted lines as at 31 in Fig. 1.

A guide-plate 32 to support the free terminus of lever 25 is also shown. Referring to Fig. 1, the portion of frame 30 illustrated therein is here shown as being equipped with pairs of shoulders 35, each adapted to accommodate a hinge-member which is shown as integral with a friction-bar 36. Friction-bar 36, equipped rearwardly with a lipped portion as shown, is supported for travel with frame 30 by means of tracks 37 (Figs. 1 and 5) fastened to plate 4 as at 38; said friction-bar 36, due to the effect of coil-springs 39 mounted as shown, tending to bear against the upper surfaces of said tracks 37 during the whole of any forward and backward movement of frame 30. During the second half of revolution of said cam 23, lever 25, held against said cam 23 by means of spring 30, will return to normal position, as will levers 27 and frame 30, due to the influence of a spring-device 41 mounted as shown upon pivot 29 and pins 43. During the forward and backward movements of frame 30, which is attached as shown to levers 27 by means of sliding-sleeves 42, the said frame moves parallelly, due to the parallel travel of said levers 27 brought about by means of the co-action of pins 43 (on said levers) with track 44 (mounted as shown upon plate 1). Frame 30, in addition, always travels and rests perpendicularly to plates 1 and 4, due to the fact that as here shown (Fig. 4) the portions of the same which reciprocate in sleeves 42, are squared, as are the channels in said sleeves. During the forward movement of frame 30, an abutment 45 thereon engages a latch 46 mounted on track 44 and causes the same to pull taut the cord 47, which, passing over idler 48 mounted in upper plate 4, is adapted (see Figs. 2, 5, 6 and 7) to withdraw the valve 49 of a suction-box 49 from its seat 50 against the influence of spring-member 51, allowing air to enter said suction-box. The arm of latch 46 to which is connected the cord 47 carries, as shown an auxiliary lip, 46", pivotally mounted thereon as at 46"; these parts being adapted by means of the provision on said latch of a leaf-spring 52, to be effectively engaged by frame 30 at a certain point in its forward travel, and being also adapted, by means of the provision on said track 44 of a stop 56, to remain ineffective during the entire backward travel of said frame 30. Cam 24, carried by pinion 18 for revolution simultaneously with cam 23, co-acts with a lever 52, pivotally mounted upon plate 1 as at 53". Cams 23 and 24 as shown are so designed that shortly after frame 30 begins its forward movement as above, cam 24 becomes effective to cause lever 52, against the influence of spring 53" connected to said lever and springs 35 connected to the under-arms 54 of two spindles 55, to exert a pull upon cords 53. Each of said cords is connected to one of said under-arms 54. These spindles 55 are journaled within and pass through plate 4, and are located opposite each other. Each spindle carries an upper arm 57, and each arm 57 is adapted to support a preferably-removable, preferably-elastic friction-member 58 or the like. Two oppositely disposed pins or the like 59 are here provided as shown in Fig. 1, mounted in plate 4, and are adapted to receive a preferably-readily-removable rubber-band 94 or the like.

Reference is now made to Figs. 1, 2 and 5, wherein is illustrated the suction-box 49 and its related parts, and to Figs. 6 and 7, where, in said suction-box itself is illustrated on a somewhat larger scale than in the former figures. Passing through said suction-box as shown is a rigid bar 60, fixedly maintained in the end-walls of said suction-box 12 and carrying at its terminal slots 60, through each of which slots extends a capped post 61. These posts are mounted in plate 1, and are disposed opposite each other, as shown in Figs. 1, 2 and 5. The
slotted termini of bar 59 would each be normally maintained in such a position that the mouthed-portion of suction-box 49 would be resting closely against sheet 9, due to the influence of retractile springs 62 mounted as shown, were it not for the provision of cord 7, which is adapted to maintain said suction-box 49 slightly removed from said sheet 9 as shown in Fig. 5. Cord 7 is connected to said suction-box as at the points 63, and passes over pulley 64 supported by standard 65, said cord being normally maintained taut by means disposed within the treadle-device illustrated in Figs. 3 and 8. Suction-box 49, of the type herein just described for purposes of illustration merely, is further equipped with a valve 49', a spring-member 51 adapted to maintain said valve normally in its seat 50, and a tubing 5, all as hereinbefore mentioned. Tracks 37 are each provided with a lateral slot in the same plane which contains post 61, so that when bar 59 travels vertically on said posts suction-box 49 may be capable of descending to the level of the upper surface of plate 4.

In Fig. 8 are illustrated in detail the working parts of the treadle-device shown in elevation in Fig. 3. 66 represents the base-plate, carrying a weighted portion 67.

A pivot-plate 68 carries therein a rod 69 adapted to support a tread-member 70 for actuation as shown. Spring 71 and a stop-portion 68' tend to maintain said tread-member normally in the position illustrated.

A rear-wall 72 and side-walls 73 are also provided, rear-wall 72 having a portion bent forward horizontally and being provided with slotted areas as shown to allow egress respectively for cord 6 and tubing 5, the former being connected to the similarly numbered cord and the latter to the similarly numbered tubing shown in Figs. 1, 2 and 5. A lever 80 as shown is mounted in the bent-over portion of rear-wall 72, and is normally held, by means of a spring 81, in the position shown. Cord 7, connected to said lever and passing over a pulley 82 mounted in a support 83, is connected to the similarly numbered cord illustrated in Figs. 1, 2 and 5. Bulb 78 is nested between rear-wall 72 and a lever 79 as shown. Lever 79, pivoted to a standard 84 as at 85, is normally held as shown by means of a spring 86 and a stop 87. Lever 88 is likewise mounted upon said standard 84, and is normally held as shown by means of a retractile spring 89 and a stop 90; and is connected to cord 6, which passes under pulley 91 mounted in base-plate 66, and thence over pulley 92, mounted in main-plate 1 (see Fig. 2) to be connected as shown to pawl 21.

It is to be understood that while here a treadle-device is shown as being the actuating means, any other actuating means, adapted for manual or other operation, could, even with reference to this specific embodiment of this invention, be substituted for said treadle-device.

Having described this particular embodiment of my invention, the operation thereof, which to a large extent should now be obvious, may be understood.

When the musician is near the last few musical indicia inscribed on sheet 9, with his foot he presses the tread-member 70 (Fig. 8), whereupon the following actions take place: Lever 80 (Fig. 8) is turned on its pivot to shorten the distance between the portion 80' of lever 80 and pulley 82, thereby to slacken cord 7, which, passing over the various guiding means therefor, allows springs 62 (Figs. 1 and 5) to draw suction-box 49 downward against the outer side-edge of sheet 9. As tread-member 70 continues to be pressed home, lever 79 and bulb 78 are actuated to create a suction in suction-box 49; lever 80 being maintained in its abnormal position, due to the configuration of the portion 80' thereof, to keep cord 7 slackened until slightly after lever 79 returns to normal position and suction-box 49 become completely effective, and said lever 80 being immediately thereafter released as tread-member 70 passes the same, so that spring 81 (Fig. 8), which is stronger than springs 62 (Figs. 1 and 5), is enabled to raise suction-box 49 to its normal position shown in Fig. 5, but with sheet 9 attached thereto. Tread-member 70 now approaches and rapidly actuates lever 88 (Fig. 8), tightening the cord 6 and thereby freeing the pawl 21 (Fig. 2) to allow of a quarter revolution of ratchet 20 in the direction of the arrow. Tread-member 70 will then, on the removal of the operator's foot, return to normal position, returning pawl 21 to its normal position ready to clutch the next successive tooth of ratchet 20; passing lever 79 without changing the position of the same due to the latched portion 79' thereof; and harmlessly vibrating lever 80, due to the just-mentioned ineffectiveness of lever 79 with reference to bulb 78.

Referring now to what takes place during the quarter-revolution of ratchet 21 and gear 17, and the complete revolution of pinion 18, it is to be noted that cams 23 and 24 are carried by pinion 18. These cams rotate together, and are so designed that simultaneously cam 24, through lever 52, spring 50 being stronger than springs 62, pulls cords 53 taut to swing friction-members 58 between sheets 9 and 10 and inwardly against rubber-band 94, thereby to clutch sheet 9 (the sheet to be turned) near its inner side-edge, and cam 23 actuates lever 25 to exert pressure against lazy-tong levers 27 as at 27' to extend said lazy-tong levers, so that frame 30 will pass between 130
sheets 9 and 10 and under suction-box 49, which latter is still holding sheet 9 removed from sheet 10. As the cams continue their revolution, friction members 58 continue their clutching action until the following events take place. As frame 30 extends along tracks 37 (Fig. 1) until well under sheet 9, abutment 45 on frame 30 actuates latch 46 (Fig. 2) to pull cord 47 and open the valve 49 of suction-box 49, thereby to release the grip of the said suction-box on said sheet 9. Frame 30 further rapidly moves forward until sheet 9 is turned over upon sheet 8 and until frame 30 has traveled so far to the left that friction-bar 36 will have passed beyond the left terminal of tracks 37 (Fig. 5) and will be clutching the turned sheet 9 at points substantially co-incident with the dotted lines 31 (Fig. 1).

It will only be after friction-bar 36 has attained a positive clutching position with reference to the turned side of sheet 9, and has moved said sheet to the left sufficiently to swing its inner-side edge clear of the relatively-yielding grip of friction-members 58 and rubber band 94, that cam 24 becomes again effective with reference to lever 52 to release friction-members 58 from their clutching-co-action with rubber band 94.

Pinion 18 will now be near its limit of rotation, and immediately brings the portion 23' of cam 23 beyond the contiguous end of lever 25, and said lever thereupon, due to the influence of its spring 40, thrusts back into the normal position illustrated in Fig. 2, allowing the influence of spring-member 41 to return frame 30 (through the closing of lazy-tong levers 27) to the normal position shown in Figs. 1, 2 and 5; friction-bar 36 riding along tracks 37 to its normal position shown in Figs. 1 and 5. The entire apparatus is then ready for a second actuation.

With reference to the foregoing description of this embodiment of this invention, and of the operation thereof, it has been assumed that the musical composition referred to and illustrated in dotted lines in Fig. 1 was of the unbound or loose-leaf type, for the reason that additional or center-clutching difficulties presented themselves in such a case which do not exist in the case of bound compositions; and it is obvious that were it desired to operate the apparatus herein disclosed with reference to the latter type of composition, it would be merely necessary manually to slip rubber-band 94 from pins 93 (Fig. 1). Another advantageous feature of this embodiment of this invention is the fact that musical compositions of different sizes (the composition shown in Fig. 1 in dotted lines being assumed to represent the ordinarily maximum size of composition) could be used in connection therewith, it being only necessary to adjust the adjustable stop 12 so as to bring the inner side-edges of the sheets of said composition to coincide with the substantial location of the inner side-edges of sheets 9 and 10 as illustrated. While this embodiment is merely presented as one of several possible embodiments of a type of apparatus of several possible types, it should readily be seen that there is provided a practical, compact and cheap construction, and one capable of quick and accurate operation.

Inasmuch as many changes could be made in the above construction, and inasmuch as many apparently widely different embodiments of this invention, and of the different features thereof, could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, and means adapted intermediately of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet.

2. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between
said sheet as so gripped and said supporting member, means adapted intermittently of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, and means adapted during the turning of said sheet to positively engage with a portion of said sheet.

3. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted intermittently of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, means adapted during the turning of said sheet to positively engage with a portion of said sheet, and means adapted to actuate said movable member whereby after movement through said predetermined distance it is returned to normal position.

4. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted intermittently of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, means adapted during the turning of said sheet to positively engage with a portion of said sheet, and means adapted to actuate said movable member whereby after movement through said predetermined distance it is returned to normal position, said actuating means including a spring means provided with an engaging member adapted to permit intermittently of partial actuations of said spring means.

5. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted intermittently of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, means adapted during the turning of said sheet to positively engage with a portion of said sheet, and means adapted to actuate said movable member whereby after movement through said predetermined distance it is returned to normal position, said actuating means including a spring means provided with an engaging member adapted to permit intermittently of partial actuations of said spring means.
spring means, said spring means driving a cam adapted to actuate said movable member, and driving also a second cam adapted to actuate said auxiliary means.

7. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted immediately of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, and a device provided with an actuable member adapted upon an actuation thereof to cause the actuation in predetermined sequence of the above-mentioned means.

8. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted immediately of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, means adapted during the turning of said sheet to positively engage with a portion of said sheet, and a device provided with an actuable member adapted upon the actuation thereof to cause the actuation in predetermined sequence of the above-mentioned means.

9. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted immediately of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, and a device provided with an actuable member adapted upon an actuation thereof to cause the actuation in predetermined sequence of the above-mentioned means, said device including a plurality of means for cooperating with said actuable member, certain of said means being positively connected with certain of the above-mentioned means.

10. In apparatus of the class described, in combination, a supporting member adapted to support a sheet in normal disposition with reference thereto, a pneumatic means normally removed from said sheet, means adapted to cause said pneumatic means to contact with said sheet, means adapted to actuate said pneumatic means to grip said sheet, means adapted to permit of the return of said pneumatic means to normal disposition thereby abnormally disposing said gripped sheet, a movable member adapted to have movement for a predetermined distance relatively of said sheet and between said sheet as so gripped and said supporting member, means adapted immediately of the movement of said movable member said predetermined distance to release said sheet from said pneumatic means whereby said movable member will complete the turning of said sheet, means adapted during the turning of said sheet to positively engage with a portion of said sheet, and a device provided with an actuable member adapted upon the actuation thereof to cause the actuation in predetermined sequence of the above-mentioned means, said device including a plurality of means for cooperating with said actuable member, certain of said means being positively connected with certain of the above-mentioned means.

11. In apparatus of the class described, in combination, a supporting member disposed laterally of the sheet and angularly to the direction of turning of said sheet, a friction device normally located removed from said sheet, and means adapted to cause said friction device to engage with said sheet adjacent said flexible member.

12. In apparatus of the class described, in combination, a pneumatic device normally removed from a sheet; a first means adapted to cause said device to contact with said sheet; a second means adapted to cause said
pneumatic means thereupon to become effective to engage with said sheet; a third means adapted to cause said pneumatic means to return to normal position; a fourth means adapted to turn said sheet; and a main actuating means, including a member having a predetermined travel, adapted upon a single travel of said member to actuate in order said first, second, third and fourth means.

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Witnesses:

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