

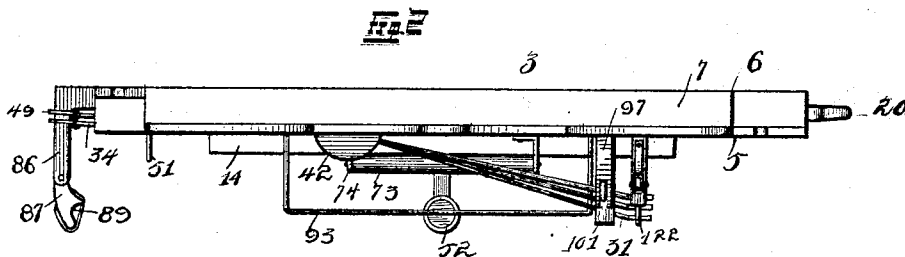
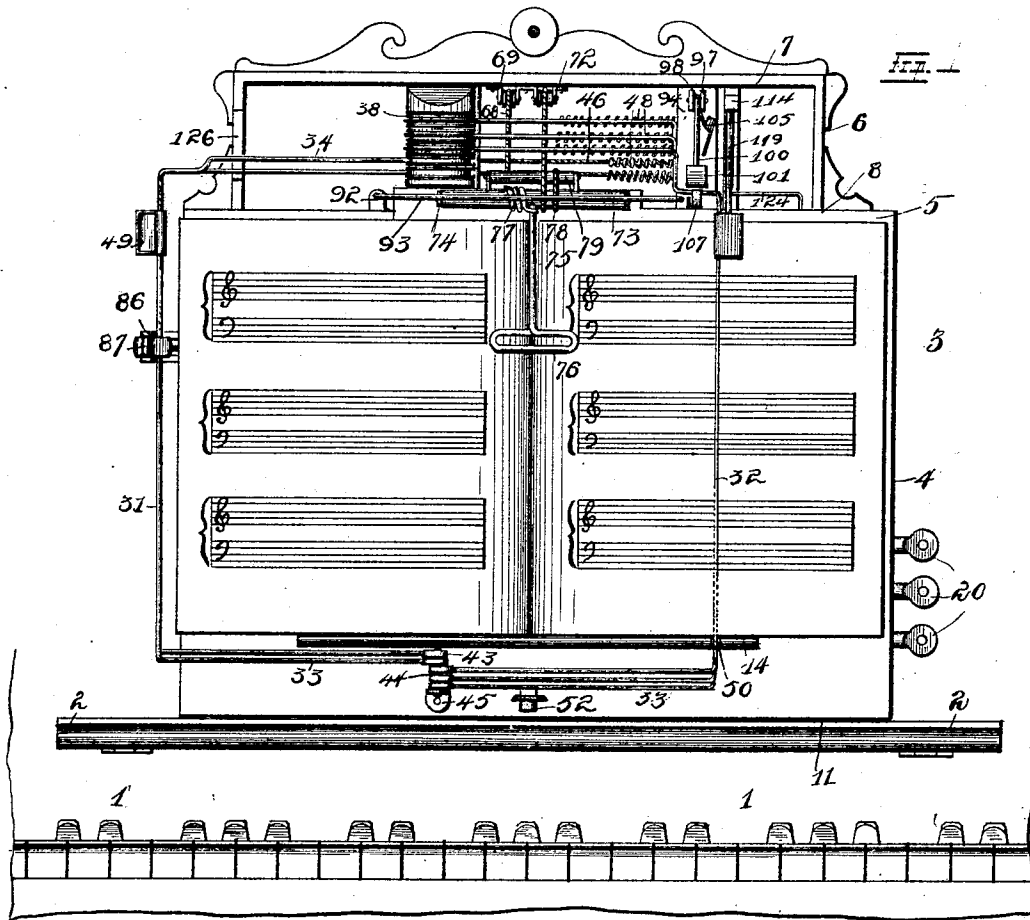
(No Model.)

4 Sheets—Sheet 1.

W. C. BOEING & T. P. STORK.
MUSIC LEAF TURNER.

No. 521,756.

Patented June 19, 1894.



Witnesses

Alfred A. Bickel

Herbert H. Robinson

Inventors

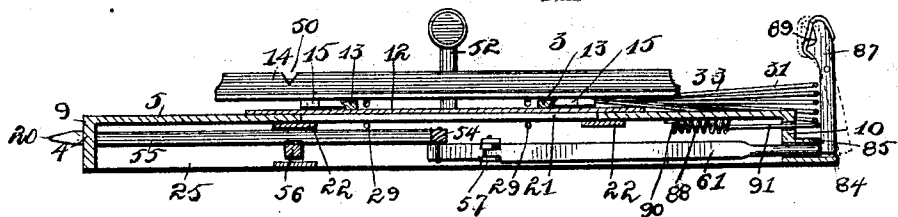
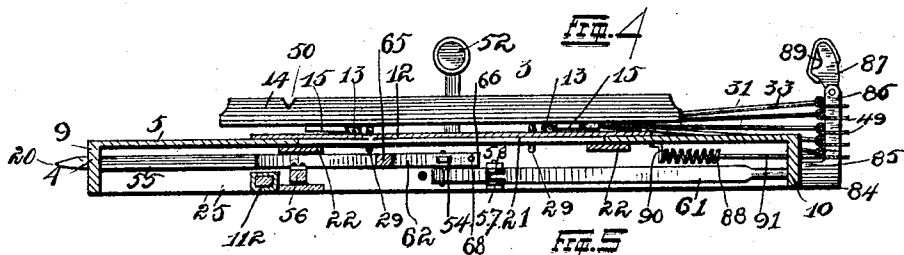
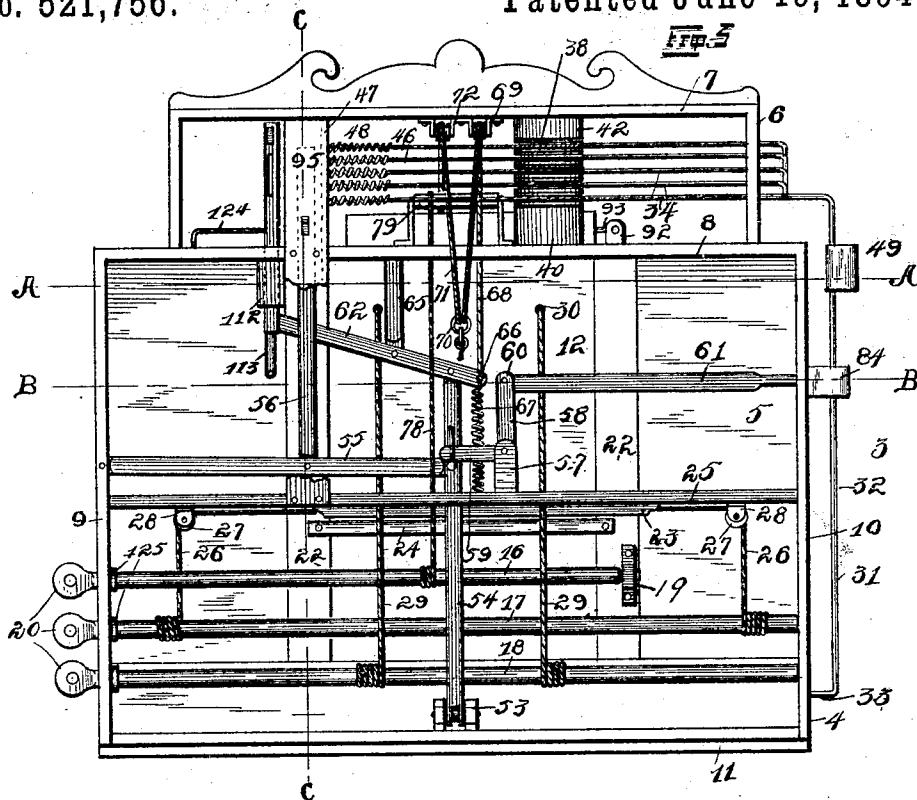
William C. Boeing,
Theodor P. Stork,

By their Attorneys Higdon & Higdon, Longan.

W. C. BOEING & T. P. STORK.
MUSIC LEAF TURNER.

No. 521,756.

Patented June 19, 1894.



Witnesses

Alfred A. Eichen

Herbert H. Robinson

Inventors

William C. Boeing,
Theodor P. Stork,

By their Attorneys Higdon, Higdon & Longan

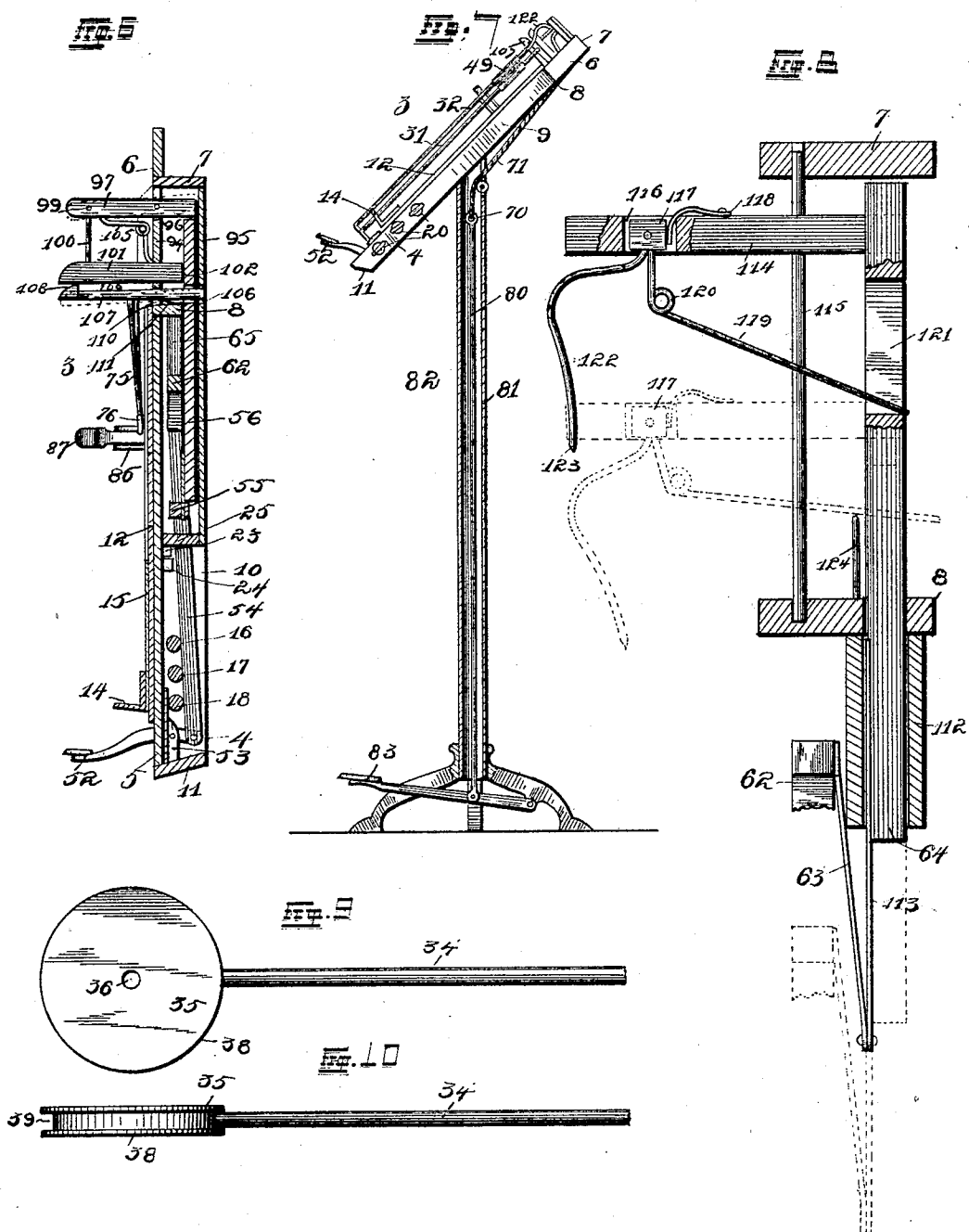
(No Model.)

4 Sheets—Sheet 3.

W. C. BOEING & T. P. STORK.
MUSIC LEAF TURNER.

No. 521,756.

Patented June 19, 1894.



WITNESSES

Alfred A. Eicks
Herbert H. Robinson

Inventors

William C. Boeing
Theodor P. Storm,

By their Attorneys Higdon Higdon & Angan

W. C. BOEING & T. P. STORK.
MUSIC LEAF TURNER.

No. 521,756.

Patented June 19, 1894.

Fig. 11

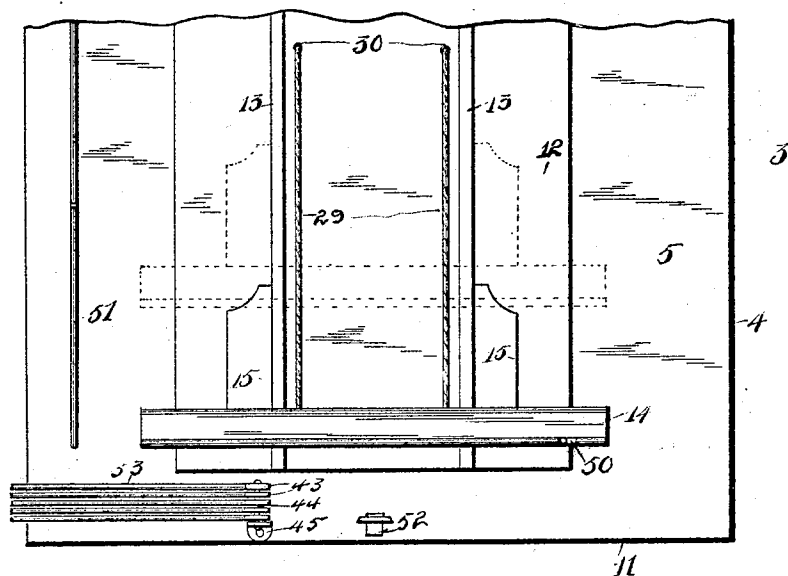


Fig. 12

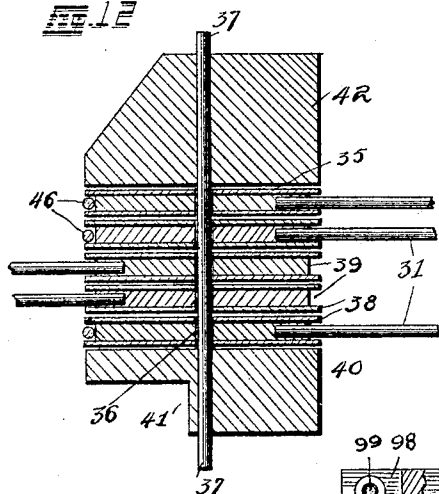


Fig. 13

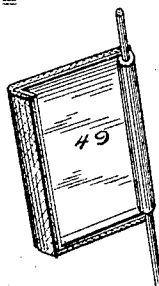
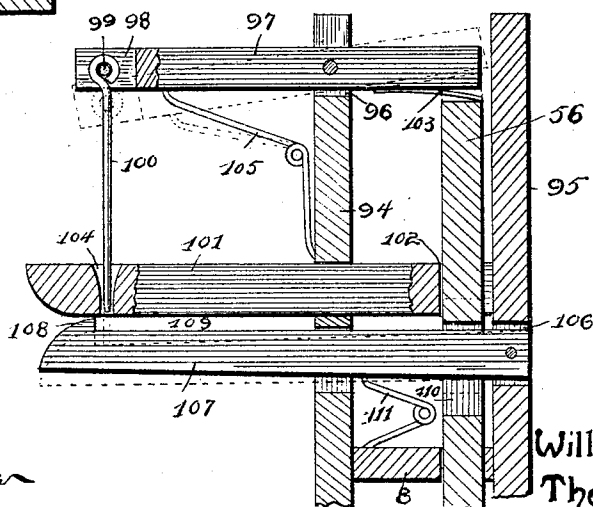


Fig. 14



Witnesses

Alfred A. Eicher
Herbert H. Robinson.

Inventors

William C. Boeing
Theodor P. Stork

By their Attorneys Higdon & Higdon & Longau

UNITED STATES PATENT OFFICE.

WILLIAM C. BOEING AND THEODOR P. STORK, OF HERMANN, MISSOURI.

MUSIC-LEAF TURNER.

SPECIFICATION forming part of Letters Patent No. 521,756, dated June 19, 1894.

Application filed November 29, 1892. Serial No. 453,493. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. BOEING and THEODOR P. STORK, of Hermann, Gasconade county, Missouri, have invented certain new and useful Improvements in Music-Leaf Turners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

Our invention relates to "music leaf turners," and consists in the novel arrangement and combination of parts as will be more fully hereinafter described and set forth in the claims.

The object of our invention is to improve upon this article of manufacture and to include among its features compactness, cheapness, simplicity, and constructed in different forms readily applicable to pianos, organs or music stands, and which in operation will turn either bound or loose sheet music.

In the drawings: Figure 1 is a front elevation of our invention applied to a piano or organ. Fig. 2 is a top plan view of the complete construction. Fig. 3 is a rear elevation showing all of the working parts in detail. Fig. 4 is a horizontal plan sectional view taken on a line A—A in Fig. 3. Fig. 5 is a horizontal plan section taken on a line B—B in Fig. 3. Fig. 6 is a vertical sectional view taken on the line C—C in Fig. 3. Fig. 7 is a side elevation of our complete invention applied to a music stand, shown in section. Fig. 8 is a side sectional detail elevation of a portion of the working mechanism, showing in dotted lines its alternate position in operation. Fig. 9 is a top plan view of one of the turner-frames with a portion of the same broken away, and showing its mounting disk. Fig. 10 is a side elevation of the construction shown in Fig. 9. Fig. 11 is a front elevation with parts broken away of the frame, showing in dotted lines the vertical adjustment of the music rack. Fig. 12 is a vertical transverse sectional view of the turner-frames carrier showing in detail the position and mounted on the frames. Fig. 13 is a perspective view in detail of a portion of one of the turner-frames having a felt-covered plate thereon engaged by a tongue of the mechanism. Fig. 14 is a side sectional detail elevation of a part

of the working mechanism, showing its alternate position in operation, in dotted lines.

Referring to the drawings: 1 indicates the key-board of an ordinary piano or organ and as is usual in this class of manufacture, a music-rack 2 is provided above the keys. Resting upon said music-rack 2 is our complete device 3 which may be secured to the piano or organ by a clamp (not shown) without defacing the finish of the instrument.

The complete device consists of a rectangular frame 4 covered upon one side by a thin wooden covering 5 and said frame 4 is surmounted by a fancy substantially rectangular-shaped frame 6, between the top 7 of which and the top bar 8 of the frame 4, are located various parts of the working mechanism, and the construction of the frame 4 with the cover 5 forms a shallow box in which connecting parts of the mechanism are operated.

In Fig. 3, looking at the back of the construction, one end of the frame is indicated by the numeral 9 and the other by 10 and the bottom 11 of said frame 4 is slanting upwardly from the front cover 5 to the back of the frame.

Taking Fig. 11 for detail inspection, it will be seen that upon the front of the cover 5 is located a rectangular-shaped semi-cover 12 which does not extend to the bottom of the frame, but which projects slightly above the top strip 8 of the frame 4, and said rectangular semi-cover 12 is horizontally adjustable in order to throw different sizes of sheet music into position for operation. Vertically mounted upon said cover 12 are guide strips 13 upon which the music holder 14 is vertically adjustable, said music-holder 14 consisting of a horizontal angle strip having upwardly projecting pieces 15 the inner faces of which are inclined to correspond with the slanting outer sides of the guide-strips 13, as shown in Figs. 4 and 5.

Referring to Fig. 3 it will be seen that there are three horizontally mounted operating shafts 16, 17 and 18 mounted in alignment one above the other, in the lower part of the frame 4. The shaft 16 does not extend across the whole length of the frame but has its inner end mounted in a bearing-block 19 secured to the back of the cover 5. The func-

tion of this shaft will be hereinafter described. The shafts 17 and 18 extend entirely across the frame 4 and are mounted in bearings provided by the end pieces 9 and 10, all of said shafts 16, 17 and 18 having thumb-pieces 20 projecting beyond the side strip 9 of the frame 4. In this connection it is necessary to state that the cover 5 is provided with a rectangular opening 21 which extends from the top strip 8 down to a point adjacent the shaft 18 and upon the back of the semi-cover 12 and projecting through the opening onto vertical strips 22 is a guide-strip 23 which is confined between a strip 24 connecting said strip 22 and a horizontal cross-piece 25 connecting the side-strips 9 and 10 intermediate of the top and bottom of the frame 4. Both ends of the guide-strip 23 are provided with ropes 26 which extend horizontally and over pulleys 27 secured in bearings 28 upon the under side of said cross-piece 25. Said ropes 26 are secured at their free ends to the shaft 17 in such a manner that when the rod is turned one way, one of said ropes winds itself upon the shaft and draws the semi-cover 12 horizontally to one side, while the other rope 26 proportionately loosens or unwinds on said shaft, and with the turning of the shaft in an opposite direction, the operation is reversed. For the vertical reciprocatory adjustment of the music-rack 14, the shaft 18 is used, the same having two ropes 29 secured at equal distances toward the center from the ends of said shaft, said ropes passing upwardly and through openings 30 in the semi-cover 12 and down upon the front of same to the rack 14 to which they are secured. By the revolving of said shaft 18 in one direction, the rack 14 is raised, while the reversing of its position allows the rack 14 to gravitate downward, the necessary bearings being perfect in order to insure the successful operation above mentioned.

From the above description it will readily be seen that the adjustment either vertically or horizontally of the rack guarantees the proper location of the music sheets for successful engagement by the turner-frames, as it is absolutely necessary that the adjustment be perfect in order that the device will carry out its specific function.

Ordinarily sheet music for pianos and organs is of a regulation size but it is well known that some music especially accompaniments are sometimes furnished upon smaller sheets than the usual size.

We will now take up the construction of and manner of securing the turner-frames. As seen in the illustrations, the frames 31 are substantially rectangular in form, consisting of a main vertical portion 32 having inwardly projecting arms 33 and 34, said arms 34 provided with a set-off portion which makes the frames successively larger or wider between the arms 33 and 34, according to their arrangement. This difference will be best understood by reference to Fig. 3 of the drawings

where it will be seen that the first frame adjacent the cover 5 is of less width vertically than the successive frames. In this connection it is necessary to state that we do not limit ourselves to the number of frames 31 used, as this is a detail matter which involves no invention. The ends of the arms 34 are secured in the periphery of a circular disk 35 having a center-bore 36 to fit over a shaft 37 and said disk provided with peripheral flanges 38 which provide an annular rectangular depression 39. Projecting upwardly a little to one side of the center horizontally of the frame 6 surmounting the frame 4 and secured to the top-strip 8 of the frame 4 is a circular piece 40 having a cut-out portion 41 in one side, to allow of its projection over the semi-cover 12. The circular disks 35 having the arms 34 of the frame 31 projecting therefrom, are placed in alignment upon the block 40 and a block 42 is then placed upon the top of the same, with its upper end immediately under the cross-piece 7 and the shaft 37 is then placed through apertures in said cross-piece 7, block 42, the bores 36 in the disk 35 and the block 40. One side of the block 42 is tapered to a point even with the front of the top-strip 7 of the frame 6 to give a finished appearance to the device. The ends of the arms 33 are provided with circular perforated disks 43 which fit over a shaft 44 held by a casting 45, immediately under the rack 14 when it is at its downward limit, said vertical shaft 44 being in alignment with the shaft 37 holding the ends of the arms 34 as above described. Premising that the frames 31 are all in the position as shown in Fig. 3 it will be seen that cords 46 normally lie in the annular grooves 39 of the disks 35, upon one side, one end of each cord being secured immediately back of the point where the arms 34 connect with said disks. Connecting with each of the cords 46 and secured to a strip 47 vertically connecting the top-strip 8 of the frame 4 with the top-piece 7 of the frame 6, are coil springs 48 which normally keep the frames 31 in said position shown in Fig. 3. If the frames 31 are open or caused to describe an arc of a circle, rotating upon the shafts 37 and 44, the springs 48 are lengthened by such movement into the form shown in Fig. 1, where three of the frames are in this position, while the other two are normally at rest.

The means provided for holding and releasing the frames in the position shown in Fig. 1, will be hereinafter described, but it is necessary to state that upon such release the tension of the springs cause each frame to independently and successively resume the normal position shown in Fig. 3.

Projecting from the rear side of the frames 31, upon the portion 32 and substantially on a line with the top of the frame 4, are rectangular felt-covered plates 49 which assist a function of the retaining mechanism.

The rack 14 is provided with a cut-out or notched portion 50 which is wide enough to

admit of the frames 31 resting therein, under the different horizontal adjustments of said rack.

Located at the left-hand of the device is a supporting wire 51 extending upon the cover 5 about the length of the frames 31, to hold up the music sheets upon that side of the device, and the frames 31 when in position upon the other, serve the same function.

In order to thoroughly understand the working of the engaging and releasing mechanism, it is necessary to state that there are two movements of this mechanism, one being controlled by a finger-lever 52, which projects through the cover 5 and is pivoted between lugs 53 upon the back of the same, immediately above the bottom 11 and intermediate of the end pieces 9 and 10, said lever 52 having upon its inner end a pivotal connection with a vertical lever which operates all parts. The other movement consists in the raising of the vertical lever 54 and its attendant parts by means of a rope operative over certain pulleys under the top-strip 7 of the frame 6 and which in addition to operating the parts actuated by the movement of the lever 52, operates additional parts. The last movement is for the device only when operated by a foot-pedal, and we now desire to state that separate styles of turners are not required for pianos or music stands, as the same construction is applicable to both having no fixed connection with either. We will therefore first consider the operation of the device when the parts are actuated by the operation or downward movement of the finger-lever 52.

The vertical lever 54 pivoted at its lower end to the lever 52 has a controlling bearing in the horizontal cross-piece 25, said lever being located behind the shafts 16, 17 and 18. Pivoted immediately above said cross-piece 25 to the lever 54, is a horizontal lever 55 having its opposite end pivoted to the side-piece 9 of the frame 4 and having pivoted intermediate of its length, an upwardly extending lever 56 connecting with parts hereinafter described. Projecting upwardly from the cross-piece 25 a short distance from said lever 54, are lugs 57 providing a pivotal point for the elbow of a bell-crank-lever 58 one arm 59 of which extends horizontally into a guide upon the rear face of the lever 54 and the vertical arm 60 pivoted to the end of a horizontal lever 61 projecting through the side-strip 10 of the frame 4 to operate another part. Pivoted to the upper end of said lever 54 and projecting upwardly toward the side 9 at an angle therewith, is a lever 62, the upper free end of which is pivoted to a connecting-lever 63 connecting at its lower end with a vertically reciprocatory slide 64 by means of the rod 113. Intermediate of the two end pivotal points of said lever 62, is pivoted a lever 65 which connects the same with the upper strip 8 of the frame 4. A projection 66 of said lever 62 beyond the pivotal connection

with the lever 54, connects with the upper end of a tension coil spring 67, the lower end of which is secured to the cross-piece 25 and which normally keeps said lever 54 to the downward limit of its movement, and therefore the connecting parts to said lever 54 assume a similar position. Also secured to the projecting end 66 and extending upwardly is a cord 68 which passes over a pulley 69 secured to the under side of the strip 7 and then passes downward connecting with a free ring 70. A cord 71 secured to said ring 70 passes upwardly over a pulley 72 adjacent the pulley 69 and thence downward and is secured to a roller 73 mounted in brackets 74 upon the semi-cover 12 shown in Fig. 1. Projecting from said roller 73 is an arm 75 having a cross-piece 76 upon the end thereof, said arm 75 extending down far enough to engage any size of music. Said roller is provided with a tension spring 77 around its periphery, having one end secured to same and the other end to the top of said cover 12, the normal tendency of said spring being to keep the arm 75 with the cross-piece 76 down against the music. As this device is only used to prevent the music from turning out of order, as the same in operation raises to allow the turning of a sheet, it is necessary to provide means for normally keeping the same out of engagement with the music when the device is used upon a piano or organ and to do this the shaft 16 is provided having a cord 78 connecting with same and running up over a roller 79 located above said roller 73 and the free end of said rope secured to said roller 73 so that when said shaft 16 is turned, said arm 75 is caused to assume a position at right angles with the cover 12. Therefore it will be seen that the ring 70 connected to a rod 80 operative within the standard 81 of the music-stand 82 will when said rod 80 is pulled down by the operation of the treadle 83 pull upon both the ropes 68 and 71, thus lifting the arm 75 for the passage of a sheet of the music, and at the same time operating the releasing and turning mechanism connected with the lever 54.

Projecting outwardly from the side piece 10 of the frame 4, in alignment with the lever 61 is a piece of wood or other desirable material 84 having sides 85 and upon the end of said projection 84 and extending at right angles therefrom, are brackets 86 between which are pivoted an oscillating bumper 87 the lower end of which is pivoted to said lever 61, and which when said lever 61 is pushed outwardly, throws its free end toward the music sheets, and upon the releasing of the lever 54 a spring 88 compels the return of the bumper 87 to its normal position. The stop or bumper 87 has a hollow or cut-out portion 89 in its inwardly curved free end, and the same is covered with felt or rubber to present a pliable and yielding cushion for the frames 31 when the springs throw them back to their normal position, said arm 87 being tilted in-

wardly with the releasing of the frame. The spring 88 which controls the arm 87 has one end fastened in a lug 90 and a rod 91 upon the other end which projects through and is secured to said arm 87 in front of the lever 61. (See Figs. 4 and 5 for illustrations.)

Secured upon the top-strip 8 of the frame 4 to one side of the semi-cover 12 is a lug 92 to which one end of a rectangular wire rack 93 is secured, the free end of said rack being secured in a strip 94 vertically connecting the top strip 8 of the frame 4 and strip 7 of the frame 6, said strip 94 forming one side of a substantially rectangular vertical box or casing, an additional side of which is provided by the strip 47 to which the springs 48 are secured and a strip 95 upon the back which extends down through and connects with the cross-piece 25, and which in the illustrations is broken away to show the detail position of other parts.

The mechanism shown in Fig. 14 may properly be termed the releasing mechanism while that shown in Fig. 8, including two separate movements in operation, should be termed a retaining mechanism as it absolutely prevents the frames from turning over out of their order. We will therefore first describe the mechanism shown in Fig. 14 which is operated by the vertical lever 56 having a pivotal connection with the lever 55, which is operated by the lever 54. A rectangular opening 96 in the connecting-strip 94 adjacent the cross-piece 7 has pivoted therein a horizontal rocking-lever 97 which is provided in its outer free end with a slot 98 provided with a transversely located pin 99 from which depends a tongue 100, preferably made of a piece of strong steel wire. Below said lever 97 and extending in alignment with the same, is a projecting stationary bar 101 which is secured to the back strip 95 and provided at a point adjacent thereto, with a vertical slot 102 through which the lever 56 extends, the upper end of which is normally in contact with the spring 103 which is a flat steel one and secured upon the under side of the lever 97, the object of which is to prevent any lost movement of either the lever 56 or 97, said spring normally holding both of said levers in engagement. Toward the outer end of said bar 101 is provided an opening 104 vertically extending through said bar 101 and having upwardly flaring walls to guide the entrance of the pin or tongue 100. The outer free end of the lever 97 is normally held up by a spring 105 being of substantially the form of an angle, the tension of said spring necessitating the lever's normal upward position. Located immediately below the bar 101 and pivoted in an opening 106 in the strip 95, is a vertically oscillatory reciprocatory lever 107 which has upon its outer free end, a projection 108 which is substantially in alignment with the vertical opening 104 in the bar 101, and the object of which is to form a space 109 between the lower side of the bar 101 in the up-

per side of the lever 107 into which the arms 34 of the frames 31 fit when the music and frames are in place for operation. A vertical slot 110 in the lever 56, allows the free movement of said lever 56 over the lever 107, without affecting its function, which is a downward releasing movement the lever 107 being pushed downward from the normal contact of the projection 108 against the under side of the bar 101, to allow of the passage of a single frame with a single movement of the lever 54, primarily. This movement is attained by the upward movement of the lever 56 which tilts the lever 97 into the position shown by dotted lines in Fig. 14 and which causes the tongue 100 to pass downwardly through the opening 104 and push down upon the lever 107, retaining this position against said lever 107 until a single frame has been released. The lever 107 is normally urged upward by a spring 111 connecting the under side of said lever with the top-piece 8 of the frame 4.

Adjacent the construction above described is located the retaining mechanism about to be described, which prevents the frames from assuming their normal position out of the successive order.

Adjacent the strip 95 and depending below the top-strip 8 of the frame 4, is a rectangular-shaped box 112 open at both ends, to allow the operation of the slide 64 therein, said slide 64 having a depending metallic strip 113 which at its lower end is pivoted to an upwardly extending connecting-rod 63 which at its upper end is pivoted to the lever 62. The slide 64 is provided near its upper end with a projecting fixed arm 114 which projects outwardly in front of the device and which is vertically reciprocatory together with the slide 64 upon a shaft 115 secured in the top-strips 7 and 8, as detailed in Fig. 8 of the illustrations. Near the outer end of the arm 114 is a vertical slot 116 in which a block 117 is transversely semi-rotary. Said block 117 is normally kept in a vertical position by a flat steel spring 118 which is secured upon the top of the arm 114 and engages the end of said block. Depending from said block and secured to its under surface back of the pivotal point, is an angle spring 119 which has a tension coil 120 in its length, the free end of said spring 119 being vertically operative in a slot 121 extending vertically in the slide 64 below said arm 114. Projecting downwardly from the under side of the block 117 and in front of the angle spring 119 is a curvilinear tongue 122, which first projects downwardly from said block 117 thence outwardly beyond the end of the arm 114, and thence downwardly and inwardly, terminating in a pointed end 123. Located upon the top-strip 8 of the frame 4 is a rectangular wire gage 124 best shown in Fig. 3 of the illustrations, and which when the arm 114 is brought down by the movement of the slide 64, strikes the arm of the spring 119, tilting

the same upwardly and throwing the tongue 122 inwardly, into the position as shown by dotted lines in Fig. 8. In operation this movement of the tongue 122 causes the same to enter the opening between the plates 49 upon the first and second frames, and by its inward movement engages the second leaf and holds it against the next frame, while at the same time or a little after the tongue 100 sets free the foremost turning frame which carries the upper music leaf to the left and the next leaf behind is prevented by this means from following the first through suction. The spring 118 normally keeps the block 117 in a vertical position, with the ends 123 likewise. This keeps the tongue 122 in proper position for necessary repetitions of the leaf-turning operation.

Before proceeding with the operation of the device, we desire to include several of the minor details. The shafts 16, 17 and 18 are provided with collars 125 adjacent the end strip 9 of the frame 4, to prevent their horizontal movement.

The upright end strip of the frame 6 at the left-hand side of the device is provided with a notched or cut-out portion 126 which allows the resting of the frames 31 therein, to present a flush and level appearance.

We will first describe the operation of the device when used without a foot pedal.

In arranging the frames and music for operation, the book is first laid upon the rack with as many of the pages turned to the left, as are to be played. This only leaves the back cover upon the right-hand side of the holder. A single frame is then brought over to the right-hand side with the upper arm engaging between the arm 101 and lever 107 and then a leaf is placed at the right upon said frame. This alternate arrangement of the sheets and frames is then continued, until the first sheet to be played is in position. When the player desires to turn over the first sheet he pushes down upon the lever 52, which owing to its pivotal connection both at its axis and with the lever 54, throws said lever 54 up. The upward movement of the lever 54 causes, by means of intermediate levers, the pin 100 to push down the lever 107, allowing one single frame to release itself, said pin staying in the depending position long enough to prevent the other frames from releasing. Indirectly the lever 54 causes the tongue 122 to go downwardly and inwardly, thereby holding back the second leaf by the engagement of the end 123 against the felt covered plate 49 on the frame 31. The frame 31 behind the leaf of music, throws the same over to the left hand of the device thus exposing the next sheet to the gaze of the player. The tension of the springs 48 guarantees the quick movement of the page of music, thus preventing any delay to the player in reading the music.

The operation of the music-stand shown in Fig. 7 is substantially similar to that above described, except that the arm 75 is made

use of by means of the pedal attachment, and which is operated by the rope 71, and which raises with each movement of the lever 54.

When used upon a music-stand, the device is operative equally as well with the foot-pedal as with the finger-lever, except that when the finger-lever is used, the arm 75 does not operate, but is thrown up at right angles with the cover 5 by the manipulation of the shaft 16.

The superior qualities of our invention exist in the easy arranging of music thereon, the prompt, quick and noiseless turning of a great number of leaves, which makes the same especially useful for concert-players, amateurs, and accompanists of songs, as well as for orchestras, zither-players and soloists on any instrument.

Having fully described our invention, what we claim is—

1. An improved music leaf turner, having a series of semi-rotary music leaf turner frames rectangular in form and horizontally arranged, a retaining mechanism having a downwardly and inwardly operative tongue, a wire gage 124 for releasing said retaining mechanism said retaining mechanism also including a depending tongue 122 adapted to engage and hold the leaves of the music after one of same has been turned, to prevent leaves from being turned by suction caused by the turning of one of said leaves, substantially as shown and described.

2. An improved music leaf turner, having a series of spring-actuated semi-rotary music leaf turner-frames rectangular in form, said frames being journaled in a horizontal position to the main frame and held in a position to the right side of the device by the retaining mechanism, consisting of a bar 101, lever 107, rock-lever 97 carrying the tongue 100, and the frame mechanism, consisting of arm 114, carrying a tongue 122, arranged and combined to operate in the manner set forth and for the purposes stated.

3. An improved music leaf turner having a finger-lever vertically oscillatory, said finger-lever connecting at its rear end with a vertical lever, said vertical lever operating three other levers, one of said levers having a horizontal movement, and adapted to operate a bumper to engage the frames when resuming their normal position, one of said levers having a vertical movement and adapted to operate the releasing mechanism, and the other of said levers having a vertical movement and adapted to operate the retaining mechanism, substantially as set forth.

4. An improved music leaf turner, having a releasing mechanism for releasing the frames in successive order, said releasing mechanism consisting of a vertically oscillatory lever 97 immediately pivoted, its forward end carrying a depending tongue 100, the downward movement of said tongue adapted to lower a vertically oscillatory lever 107 having a projection upon its outer end to release the turn-

er-frames in successive order, substantially as set forth.

5 An improved music leaf turner having a retaining mechanism operative by a vertical slide indirectly connecting with a lever adapted to operate all parts, said operative slide having a fixed horizontally projecting arm, a semi-rotary block mounted in said arm, a spring mounted upon said arm to control the
10 normal position of said block, an angle spring projecting downwardly from said block, the free end of said spring operative in a vertical slot, an outwardly, downwardly, and inwardly

projecting tongue secured to the under side of said rotary block, and a wire stop to push 15 up upon the free end of said spring and draw the hooked tongue downwardly and inwardly, by the downward movement of the operative lever, substantially as set forth.

In testimony whereof we affix our signatures 20 in presence of two witnesses.

WILLIAM C. BOEING.
THEODOR P. STORK.

Witnesses:

HERBERT S. ROBINSON,
E. E. LONGAN.