United States Patent [19]

Bombardi

[11] **3,732,773**

[45] **May 15, 1973**

[54] AUTOMATIC PAGE TURNER

[76] Inventor: **Aldo L. Bombardi,** 202 Smull Ave., North Caldwell, N.J. 07006

[22] Filed: **Sept. 10, 1971**

[21] Appl. No.: **179,453**

[52] **U.S. Cl.** **84/491**

[51] **Int. Cl.** **G10g 7/00**

[58] **Field of Search** 84/489, 491, 495, 84/497, 508-509, 511-515

[56] **References Cited**

UNITED STATES PATENTS

445,405	1/1891	Holcomb	84/491
3,281,974	11/1966	Jensen	84/495 X
1,353,582	9/1920	Gemsey	84/515
895,967	8/1908	Coleman	89/491
989,130	4/1911	Detweiler	84/491
1,209,548	12/1916	Brown	84/497

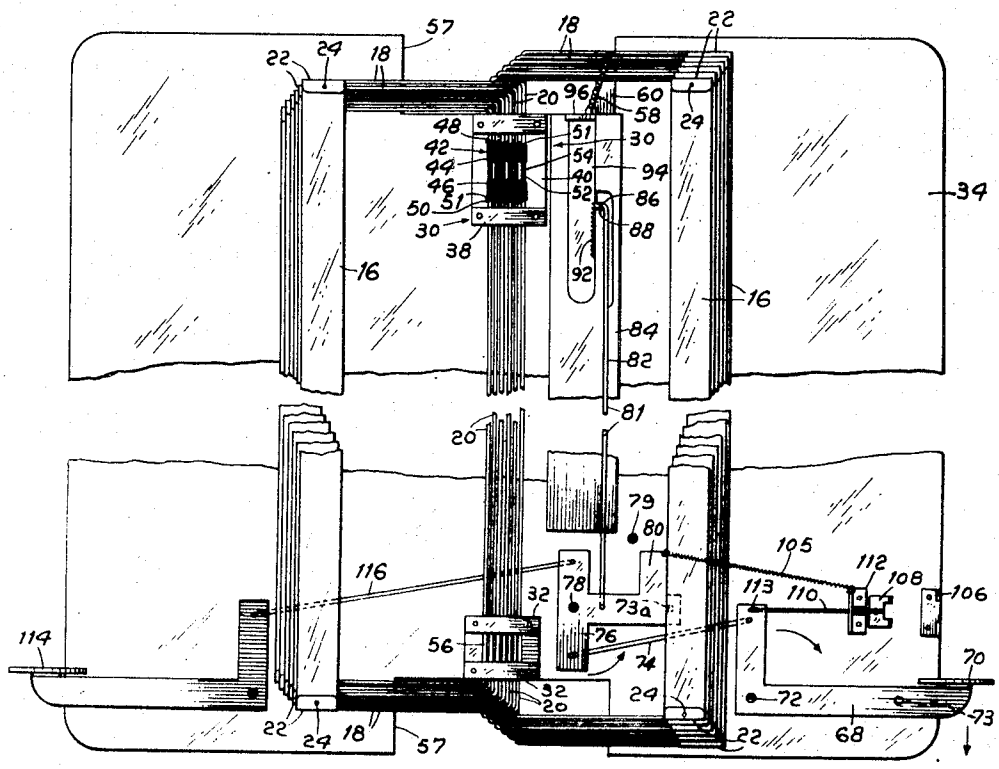
Primary Examiner—Stephen J. Tomsky
Assistant Examiner—Lawrence R. Franklin
Attorney—Edward Goldberg

[57] **ABSTRACT**

A plurality of vertically disposed resilient wire rods are pivotally mounted in bushings which are spaced along the ends of the rods and secured on a base plate. Each rod pivots about a separate vertical axis through the bushings and is spring biased toward one side of the base plate. The opposite ends of each rod are bent to extend horizontally, with each horizontal extension being spaced apart vertically to avoid interference with the other rods. A pair of vertically extending clear flexible plastic strips are secured between the ends of the opposite horizontal extensions of each rod. The plastic strips of each pair are positioned one above the other to engage the front and back faces of a page of a book or a sheet of music which is inserted between the strips. The outer cover or pages are held in place against the base plate by clamps.

In the latched position, the rods are pivoted to the right side of the base plate with each upper horizontal extension engaging a corresponding individual slot in a vertically disposed latching bracket. A lever release mechanism operates a vertical control rod having a pawl at the end which engages the teeth of a slideable rack. The rack is moved upwardly against the horizontal wire rod extensions which are pushed out of the slots to permit the spring biased vertical rods to pivot back to the left with the pages carried between the plastics strips. Each movement of the lever causes the pawl to move the rack upwardly another notch against the next horizontal rod extension to successively release all of the rods and turn the pages from right to left back into the normal position.

16 Claims, 11 Drawing Figures

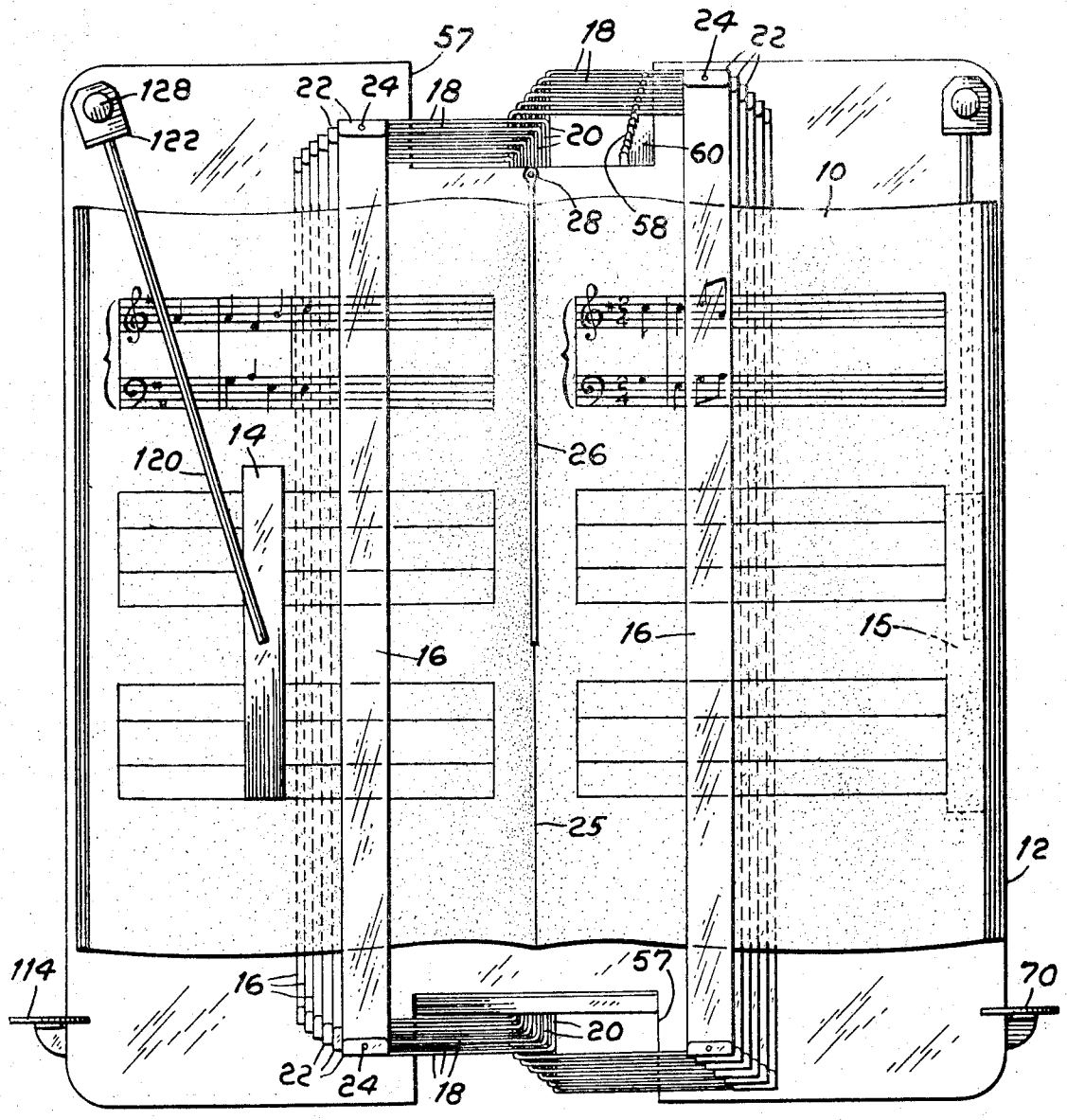


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SHEET 1 OF 4

Fig. 1



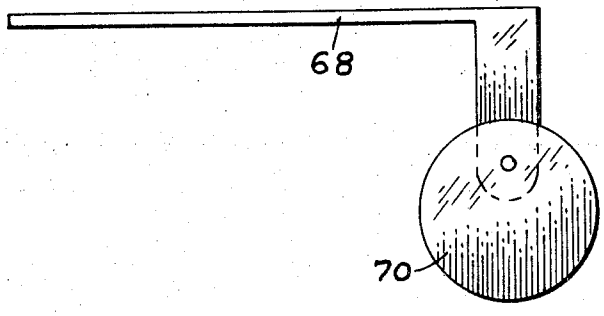


Fig. 6

INVENTOR.
ALDO L. BOMBARDI
BY Edward Goldberg
ATTORNEY

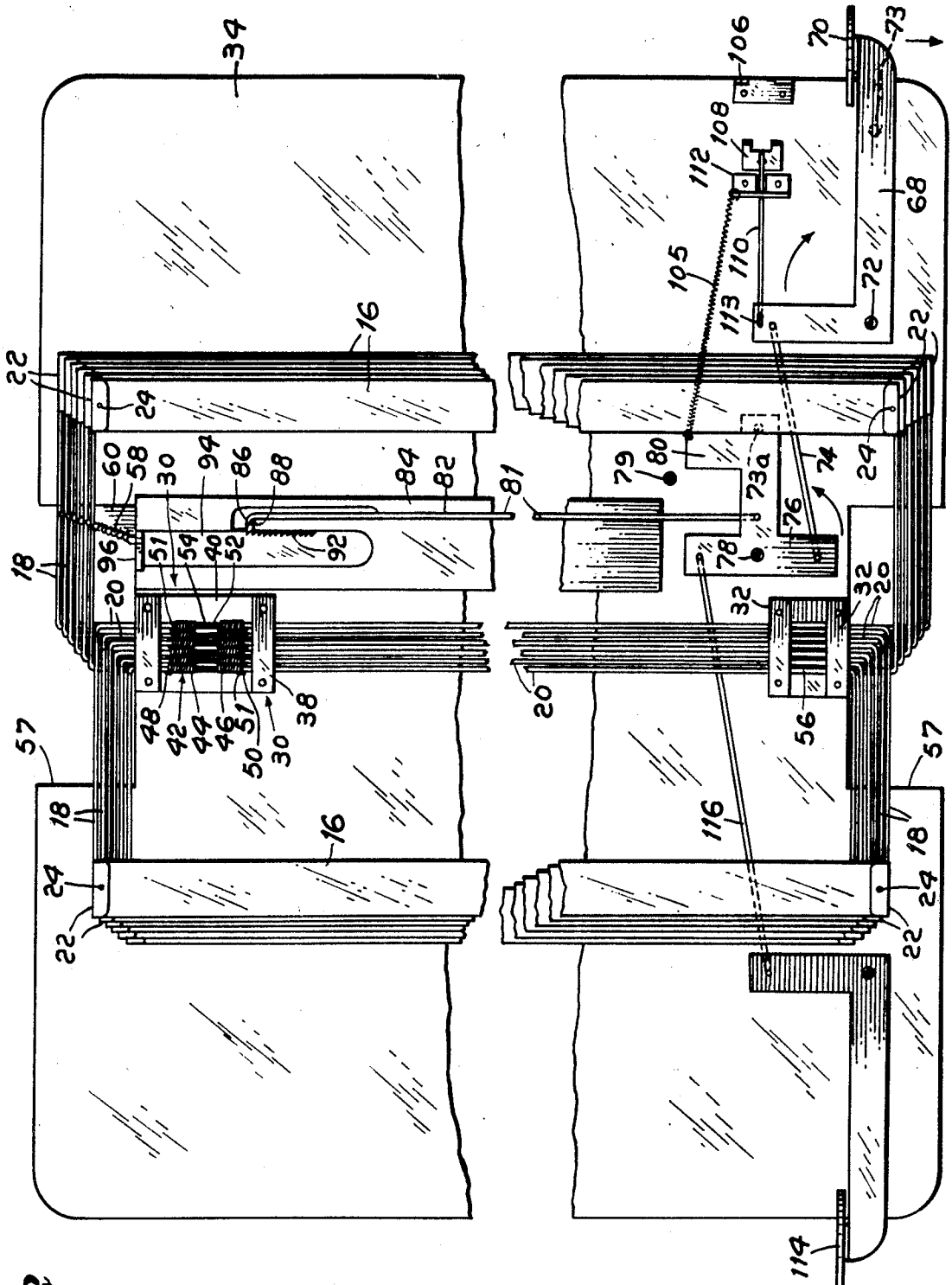


Fig. 2

INVENTOR.
ALDO L. BOMBARDI
BY Edward Goldberg
ATTORNEY

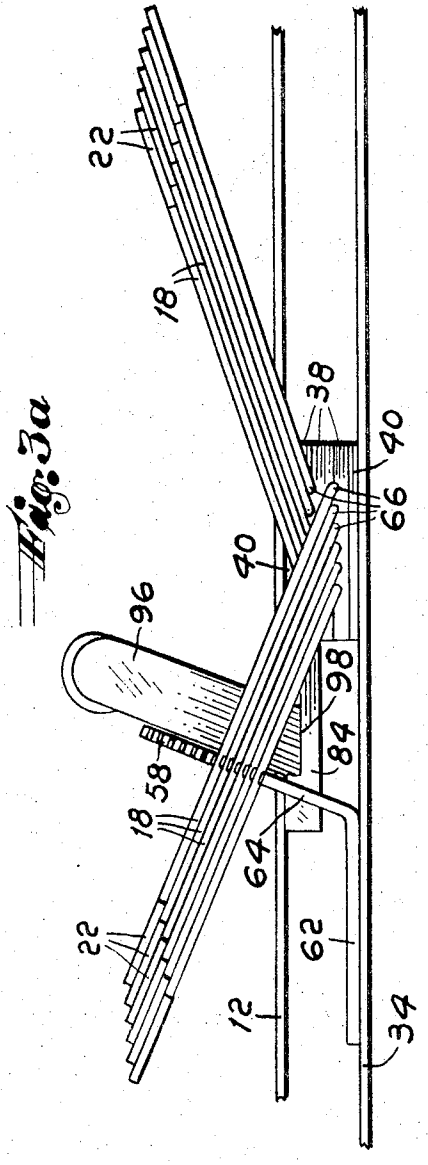


Fig. 3a

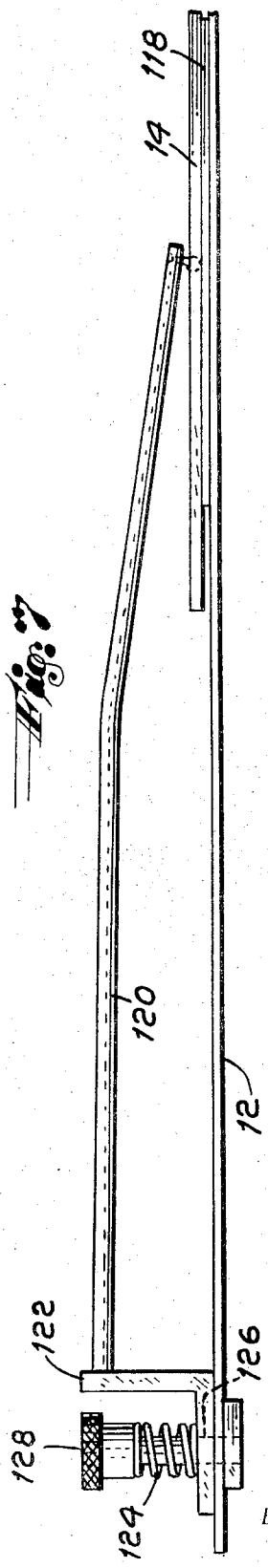


Fig. 7

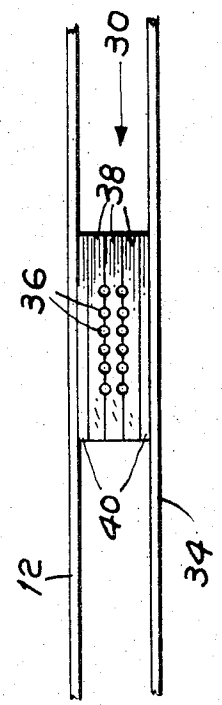


Fig. 3b

INVENTOR.
ALDO L. BOMBARDI
BY Edward Goldberg
ATTORNEY

Fig. 4a

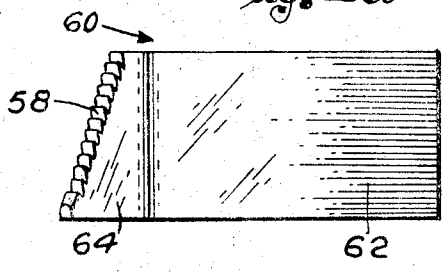


Fig. 4b

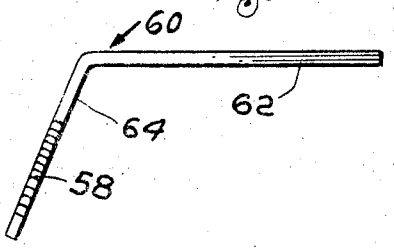


Fig. 5a

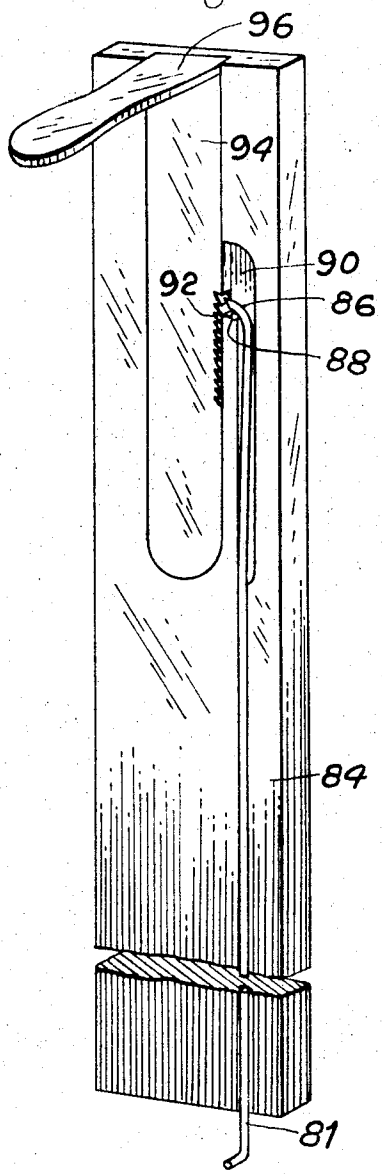


Fig. 5b

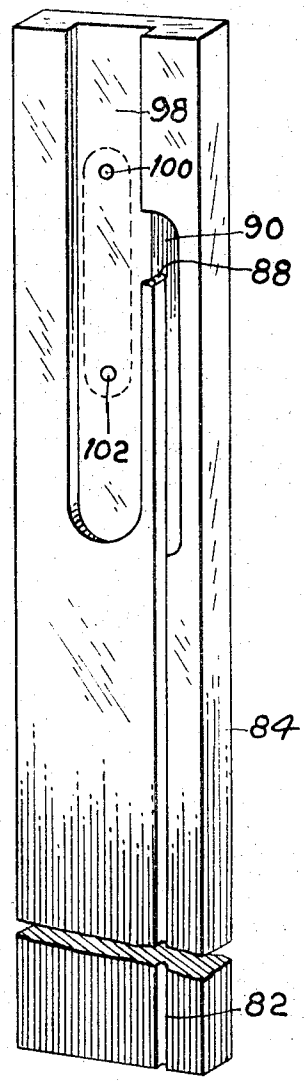
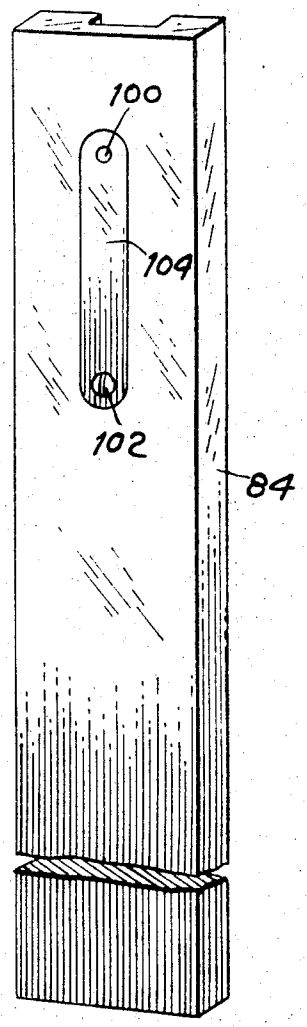


Fig. 5c



INVENTOR.
ALDO L. BOMBARDI
BY Edward Goldberg
ATTORNEY

AUTOMATIC PAGE TURNER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to automatic page turning devices and particularly to a novel mechanism for rapidly turning a plurality of pages of a book or sheet music in a simple reliable manner.

2. Description of the Prior Art

Mechanical page turning devices have been used in the past by musicians and orchestras for turning sheet music. The devices permit rapid turning of pages without interruption of the music by use of a control lever which is actuated by a simple quick finger or foot movement. Examples of such devices are found in U.S. Pat. No. 1,140,612 issued May 25,1915, No. 758,850 issued May 3, 1904 and No. 442,009 issued Dec. 2, 1890. These devices however were often unreliable and did not securely hold the pages. Some page turners held only limited areas which could readily slip out of place. In addition, only a few pages could be accommodated and in many cases the devices blocked the view of the printed material.

SUMMARY OF THE INVENTION

It is therefore the primary object of the present invention to provide an improved automatic page turning device which securely holds and reliably turns an increased number of pages without interfering with the printed material.

This is accomplished by a novel structure including a plurality of vertically disposed wire rods pivotally mounted on a base plate and spring biased toward one side. A plurality of supporting bushings are spaced along the wire rods. The bushings include a corresponding number of channels providing separate vertical axes about which the rods pivot. Each wire rod has horizontally extending portions at opposite ends which are vertically spaced from each adjacent wire rod end. The opposite ends are connected by vertically extending pairs of thin clear flexible plastic strips. Each pair of strips includes an upper and lower strip which accommodate the full length of a page or pages therebetween. A latching bracket includes a plurality of vertically spaced slots adapted to engage respective horizontally extending ends of the wire rods which are pivoted and retained in a latched position at the opposite side of the base plate. Control means are intermittently actuated to successively release each wire from each slot to permit the spring biased wire rods to return to the one side of the base plate while turning a page carried between the plastic strips. The details of the invention and other objects and advantages will become apparent from the following description in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of the novel page turner showing sheets of music on a base plate with one group of wire rod ends and plastic strip holders in a normal released position and another group in a latched position;

FIG. 2 is a partial front view of the device with the upper base plate removed to show the vertical wire rods, supporting bushings, and release mechanism;

FIG. 3*a* is a top end view showing one group of rods in a latched position and another group in a released position;

FIG. 3*b* is a top end view of a supporting bushing for the rods;

FIGS. 4*a* and 4*b* show front and top end views respectively of the latching bracket;

FIG. 5a is a front view of the control rod, pawl, rack and rack guide release mechanism;

FIG. 5*b* is a front view of the rack guide;

FIG. 5*c* is a back view of the rack guide;

FIG. 6 is a top view of a lever release handle, and

FIG. 7 is a side view of a clamp mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in FIG. **1**, pages of a book or sheets of music **10** are placed on an upper base plate **12**, with the back cover or pages clamped in position by a pair of spring loaded pivotal clamps **14, 15** on opposite sides of the base plate. The individual pages are inserted between respective pairs of thin clear flexible plastic vertical strips **16** which engage the front and back faces of each page. Several pages may also be inserted between one pair of strips if it is desired to turn a group of pages together. The plastic strips **16** are connected between respective opposite horizontally extending end portions **18** of a plurality of vertically disposed round wire rods **20**, made of a suitable resilient material such as spring steel or music wire of about one-sixteenth inch diameter. The ends of each pair of plastic strips are preferably secured to the rods by U-shaped detachable metal clips **22** which fit around the ends of the rods and are fastened by individual rivets **24.** The rivets provide a pivot for the plastic strips to permit some additional flexibility. The extending portions **18** of the resilient wire rods are normally bent outwardly at each end before the plastic strips and metal clips are assembled so that the strips are held taut with the wire rod ends in a horizontal position. The center fold **25** of the unbound pages or sheets may also be held in place by another spring loaded clamp **26** which pivots about a center position **28.**

In FIG. **2,** the upper base plate **12** is removed to show portions of the vertical wire rods **20** which are supported in a pair of bushings **30,32** mounted along the center of the device between the upper base plate **12** and a lower base plate **34.** The bushings are spaced along the length of the rods adjacent the top and bottom ends respectively. The bushings have a plurality of channels **36,** such as shown more clearly in the end view of FIG. **3***b*, with each rod being pivotable about a separate vertical axis through a respective channel. In the illustrated example, twelve channels for twelve rods are arranged in two upper and lower rows of six formed between three plates **38** at each end of the bushings. A pair of upper and lower plates **40** extend across plates **38** between the ends of the bushings to secure the bushings between the upper and lower base plates **12, 34.** Each of the top and bottom pair of bushings **30,32** has like channels and plates but different spacing.

As shown in FIG. **2** with the upper plate **40** removed, a plurality of helical torsion springs **42** are each secured around a respective wire rod in the two rows between the end plates of bushing **30.** Each spring is wound in two longitudinal sections **44, 46** with the outer ends **48,50** held in slots **51** in the lower plate **40.** The inner ends are connected by an integral wire **52** so that the two sections form one continuous spring about each rod. Each wire **52** is preferably secured to a rod by a

weld 54, with the spring being twisted when the rod is turned. The two rows of rods each have a like set of springs with the ends of both the upper and lower rows held in slots 51 in the lower plate 40. The ends of the upper row are somewhat longer to extend into the same slots. The springs are wound to apply a torsion which normally biases the rods to a released position on the left side of the base plate. The bottom pair of bushings 32 provides further support plates and channels for the rods but does not have another set of springs. A plurality of split metal sleeves 56 are disposed about each rod between the end plates of bushing 32 to provide alignment of the rods and prevent longitudinal movement.

The central portions of base plates 12, 34 have a reduced vertical dimension to provide an open area 57 at each end in which the rods extend and pivot. The central portions of the base plates may include separate center plates joining the two longer plates at opposite sides and together form the full upper and lower base plates.

After the pages to be turned are inserted between the respective pairs of plastic strips 16 on each rod, the plurality of vertical rods 20 are pivoted from the left to the right side of the base plate with the horizontal extending end portions 18 being inserted into respective outwardly facing slots 58 in a latching bracket 60. The end portions 18 are spaced apart vertically to permit each rod to engage a separate vertically spaced slot 58 the edges of which hold the rod in place until released. The latching bracket, as shown in more detail in FIGS. 3*a*, 4*a* and 4*b*, includes a flat plate 62 secured to the upper area of the lower base plate 34 to the right of center. An angled portion 64 extends outwardly into the central open area 57 above and forwardly of the ends of the base plate and includes twelve slots to accommodate the twelve rods. The slots are spaced at a predetermined distance along an angled edge of portion 64. The end portions 18 of the rods thus also extend forwardly at an angle with respect to the flat base plate so that they are substantially perpendicular to the angled portion 64, with the slots engaging the ends of the rods at about the mid-point of their length. In order for the bushings to accommodate twelve rods in two rows and for the rods to pivot about separate axes while engaging different slots, the rounded transition sections 66 between the vertical and horizontal rod portions are bent and curved to avoid interference and the vertical portions are of varying lengths.

The mechanism for releasing the rods from the latching bracket 60 is shown in FIG. 2 and in further detail in FIGS. 5*a*, 5*b* and 5*c*. At the lower right side of the base plate is a first L-shaped release lever 68 having a manually operable handle 70 which may be a flat round plate as shown in a top view in FIG. 6. Lever 68 pivots clockwise about point 72 when handle 70 is pushed down. A nylon pin 73 may be used to provide a slide for the lever on the base plate to prevent vibration and noise. A link 74 connects lever 68 to another lever plate 76 which pivots about point 78 in a counter clockwise direction when handle 70 is pushed down and lever 68 turns clockwise. Another nylon pin 73*a* similar to that of lever 68 may be used in lever 76. In addition, the pivot points 72,78 of each lever may be mounted in nylon shims or spacers. A pin 79 mounted on lower back plate 34 is spaced at a predetermined distance from an extending arm 80 of lever 76 to act as a stop to limit the movement of lever 76 to a desired amount. This action will be described in further detail later.

A wire control rod 81 is connected at the lower end to lever plate 76 and extends vertically through a long narrow channel 82 in a rack guide block 84. At the upper end of rod 81 is a curved pawl 86 which moves about a pin 88 in a widened upper area 90 of channel 82. The tip of pawl 86 is shaped to engage the teeth 92 having a predetermined spacing along the vertical edge of a flat rack 94. At the upper end of rack 94 is a release plate 96 which extends at a right angle to the plane of the base plate and rack and outwardly at an angle toward the left side of the base plate, as shown in the front views of FIGS. 2 and 5*a* or in the top view of FIG. 3*a*. The angle of the release plate 96 is substantially parallel to the angled portion 64 of latching bracket 60. Rack 94 is slideable in a wide shallow longitudinal channel 98 which connects with area 90 of channel 82, as shown in FIG. 5*b*. A nylon stud or pin 100, extends through the rear wall guide block 84 to apply a predetermined contact pressure to the slideable rack 94 sufficient to prevent it from sliding down due to its own weight when the pawl 86 is out of engagement with teeth 92. This pressure is adjustable by means of a screw 102 which tightens plate 104 and pin 100 against the rack 94.

Downward movement of the release lever 68 and handle 70 thus pulls lever 76 about its pivot point causing rod 81 to move upwardly in channel 82 against the walls which guide the end. The resiliency of the rod 81 then causes the pawl to be directed into engagement with a tooth in rack 94 to push the rack upwardly a predetermined distance equal to the spacing between teeth. The limit pin 79 is spaced at this distance from the arm 80 of lever 76 so that the control rod moves upwardly exactly the desired amount each time. The release plate 96 at the end of the rack is thus moved upwardly an equal distance against the lowermost horizontal wire rod 18 engaged in a slot 58 in latching bracket 60 to force the rod out of the slot. Thereupon, the rod 18 pivots about its vertical axis back toward the left side of the base plate with a page carried between the plastic strips. Upon release of the lever 68, the action of spring 105 connected between the arm 80 of lever 76 and a fixed bracket 112, causes lever 76 to return to its normal position with control rod 82 again moving down so that pawl 86 is aligned with the next lower tooth in rack 94. Pin 88 prevents the pawl from remaining in engagement with the teeth. Further pressing on the release lever 68 then causes the pawl to engage the next tooth or notch in the rack and move the release plate 96 up the same fixed distance required to release the next higher horizontal rod. The movement then continues intermittently until all of the rods are successively released and the pages turned from right to left.

The various elements of the entire release mechanism are designed with the necessary dimensional relationships to provide cooperation between the upward movement of the pawl and teeth and latching bracket so that each movement of the release lever advances the release plate the proper distance to release one wire from one slot in the latching bracket. When all of the rods are released and pages turned, the rack 94 is pushed down manually into the lower position at the end of channel 98 so that the device is ready to be loaded with the next book or group of pages. The pin

88 again holds the pawl 86 out of engagement with the teeth 92 so that the rack can be pushed down without interference.

A further bracket 106, mounted at the right hand edge of the base plate, and a yoke 108 are provided to hold and engage the end of a flexible line which may be operated by a remote foot pedal. The yoke is connected to link 110 supported in bracket 112 and connected at the other end to lever 68 within a slot 113. Movement of the remote pedal and line pulls yoke 108 and link 110 toward the right, thus causing lever 68 to pivot about point 72 and initiate the same release mechanism as described above. The slot 113 provides some desired tolerance in the foot operated mechanism. A second release lever and handle 114 and link 116 connected to lever 76 may be added at the lower left side of the base plate to permit operation of the page turner device from the left side as well as from the right.

One of the clamps 14 which hold the open covers of a book or back pages of sheets of music against base plate 12 is shown in more detail in FIG. 7. A clamp plate 118 is pivotally secured to an arm 120 which is mounted on a bracket 122. The bracket is resiliently and rotatably mounted on the base plate by a spring 124 around a post 126. An adjustable knob 128 can be tightened or adjusted to change the pressure applied by the spring. The clamp can thus assume many different positions. Various other clamp configurations may also be employed.

As previously noted, by inserting several pages between one pair of plastic strips, a group of pages may be turned together. This permits skipping to various selected portions of a book and provides additional flexibility for the device so that many different sequences of operation can be accommodated. In addition, it is relatively simple to make desired changes of pages and corrections and to start the device over again. Any smaller number of the total available plastic strips and rods may also be used with corresponding portions of the latching bracket and by adjusting the starting position of the release plate. The number of pages that can be accommodated is therefore also variable.

The present invention thus provides an improved reliable automatic page turning device. While only a single embodiment has been described and illustrated it is apparent that many variations may be made in the particular design and configuration without departing from the scope of the invention as set forth in the appended claims.

What is claimed is:

1. An automatic page turning device comprising

a base plate adapted to support a publication having a plurality of pages;

a plurality of vertically disposed resilient wire rods pivotally mounted on a central area of said base plate, each vertical wire rod having opposite horizontally extending end portions and being spring biased toward one side of said base plate, each horizontal end of each rod being vertically spaced from each adjacent wire rod end;

a plurality of separate wire rod support means spaced vertically along said wire rods on said base plate, each wire rod being pivotable about a separate vertical axis through said support means;

a plurality of vertically extending thin flexible page holding strips of narrow width spaced from the vertical portions of said rods and being connected respectively between said opposite horizontally extending end portions of each respective wire rod and accommodating the full length of a page between said ends;

latching means having a plurality of vertically spaced slots therein each adapted to engage a respective one of said horizontally extending end portions in a pivoted position to retain said wire rods on the opposite side of said base plate; and

control means for successively releasing each wire rod from engagement in said slots to permit said spring biased wire rods to return to said one side.

2. The device of claim 1 wherein said page holding strips comprise pairs of clear plastic strips, each said pair being adapted to receive a page therebetween.

3. The device of claim 2 wherein said wire rod support means includes a plurality of bushings and a plurality of tubular helical torsion springs secured between a pair of adjacent spaced bushings, each spring being positioned around and secured along a respective wire rod to bias said rods toward said one side.

4. The device of claim 3 wherein said bushings include a plurality of spaced channels, each channel providing a vertical axis for a respective wire rod.

5. The device of claim 4 wherein said control means includes a vertically slideable rack having an extending end adjacent said latching means and a plurality of vertically spaced teeth along one edge, a vertical control rod having a pawl at one end engageable with said teeth, and lever means intermittently actuating said control rod and pawl to successively engage respective said teeth and move said end of said slideable rack against the end portions of said wire rods in said slots to successively release said wire rods.

6. The device of claim 5 including upper and lower base plates, said bushings and control means being mounted between said base plates.

7. The device of claim 6 wherein said latching means is mounted at an end of said upper base plate and includes an angled plate extending forwardly in said central area and having said slots to engage said horizontal wire rod portions, said end of said rack extending forwardly along a side of said angled plate.

8. The device of claim 7 wherein said lever means is manually operable.

9. The device of claim 8 including means connected to said lever means for remotely operating said control means.

10. The device of claim 7 wherein said control means includes a block having a channel for said slideable rack and an adjacent channel for said control rod and pawl, said adjacent channel including means for guiding said pawl into engagement with said teeth during actuation of said control rod and for preventing engagement at other times, and stop means to limit movement of said lever means and control rod to the spacing between said teeth and to release one horizontal wire rod portion from one said slot during each actuation of said lever means.

11. The device of claim 10 wherein the upper central area of said upper base plate is of a reduced length providing an open space between the opposite sides for accommodating said horizontal rod extensions, angled latching plate and rack end.

12. The device of claim 11 wherein said bushings include a plurality of support plates having two parallel

rows of channels therebetween accommodating two rows of vertical wire rods.

13. The device of claim **12** wherein an outer support plate includes pairs of spaced slots, the ends of said springs around each wire rod being slideably engageable in said slots.

14. The device of claim **11** including a pair of adjustable resilient clamping means pivotally mounted at said opposite sides of said upper base plate and having extending arms for holding outer portions of a publication on said upper base plate while inner pages engage said page holding means.

15. The device of claim **14** including a further resilient clamping means pivotally mounted in said central area of said upper base plate and having an extending wire for holding a center fold of said publication.

16. The device of claim **15** wherein said lever means includes levers positioned at each side of said upper base plate permitting operation of said lever means selectively from both sides.

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