May 23, 1950 L. GORLENKO 2,508,913

DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 1

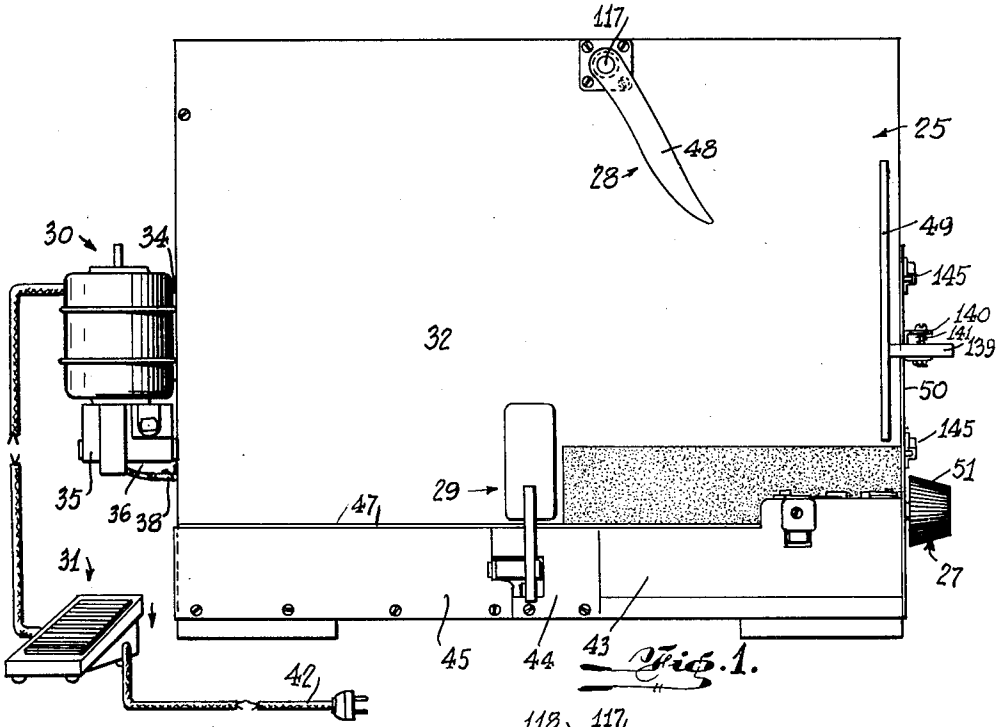


Fig. 1.

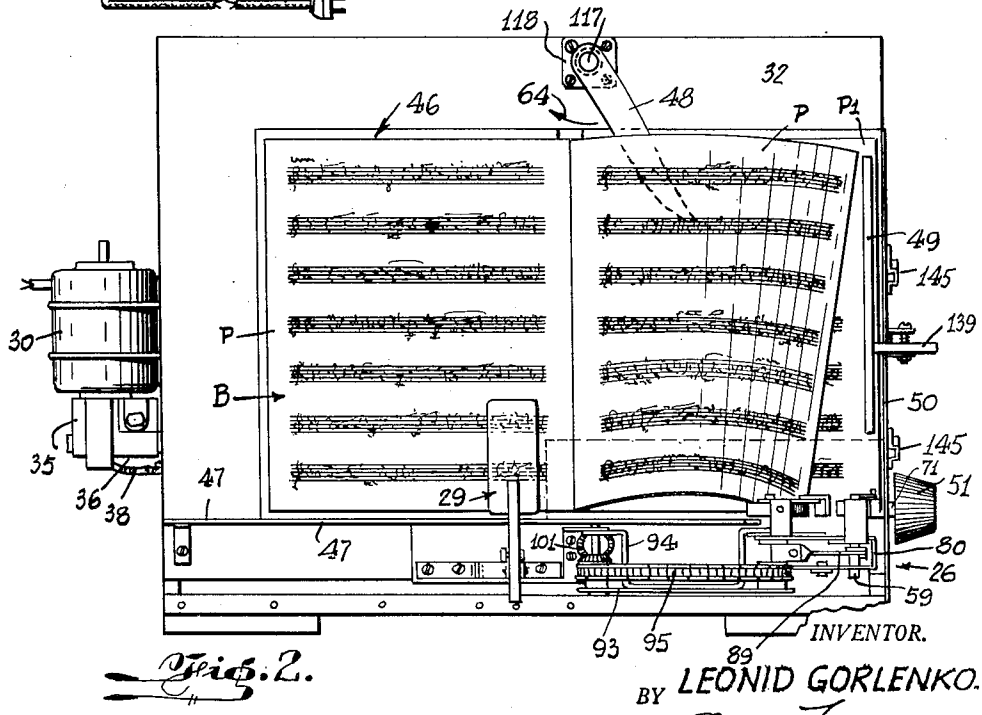


Fig. 2.

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DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 2

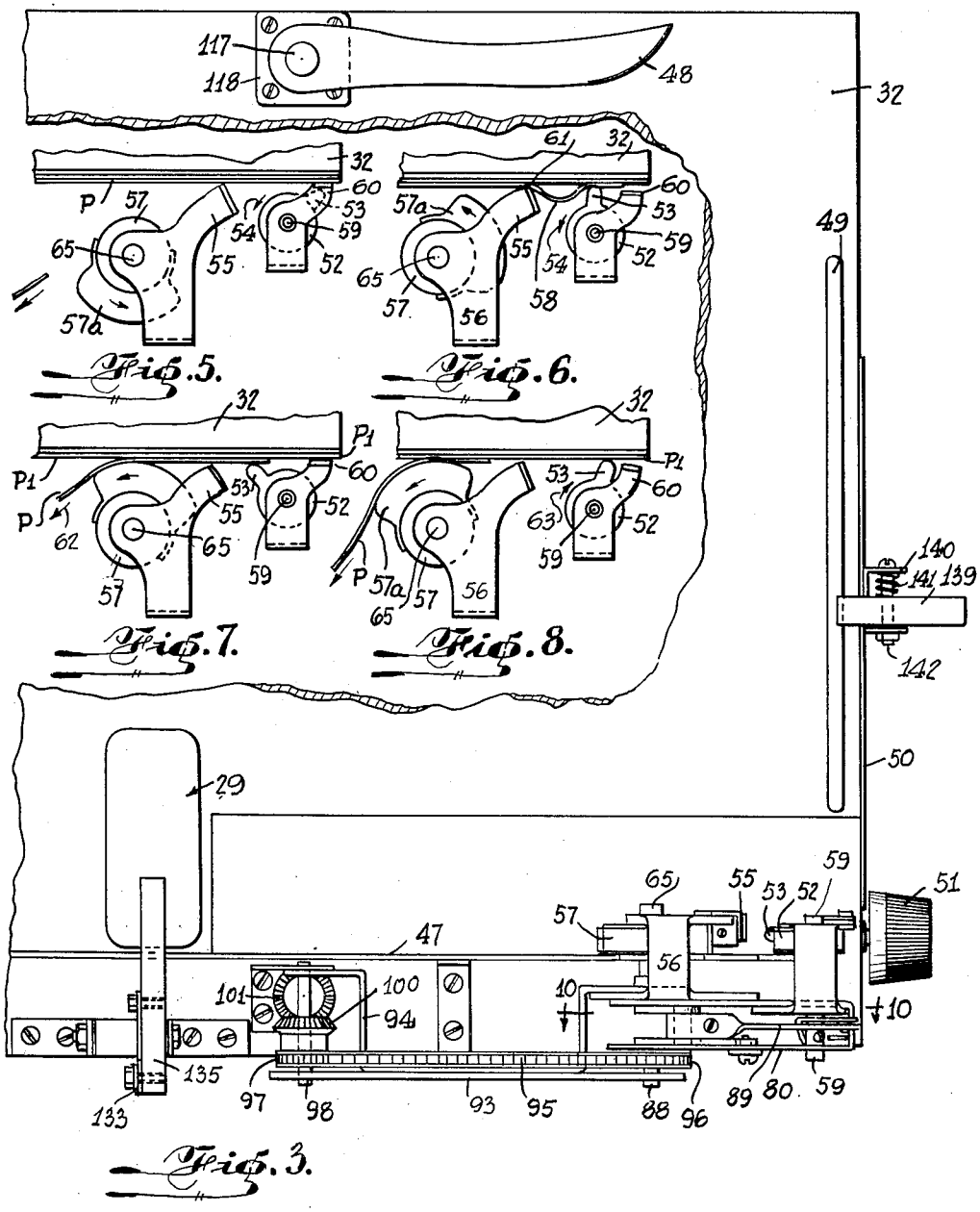


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 3.

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DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 3

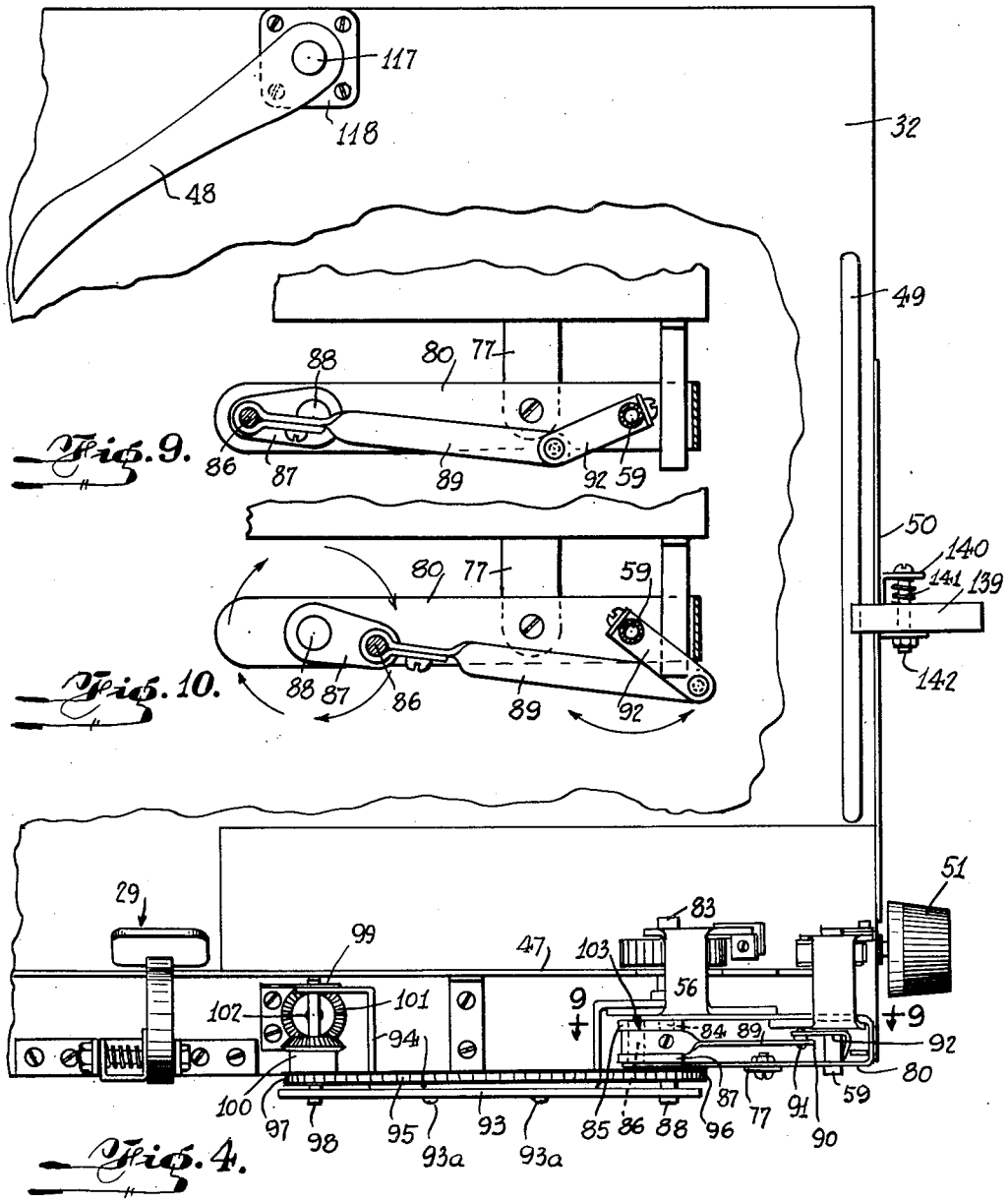


Fig. 9.

Fig. 10.

Fig. 4.

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DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 4

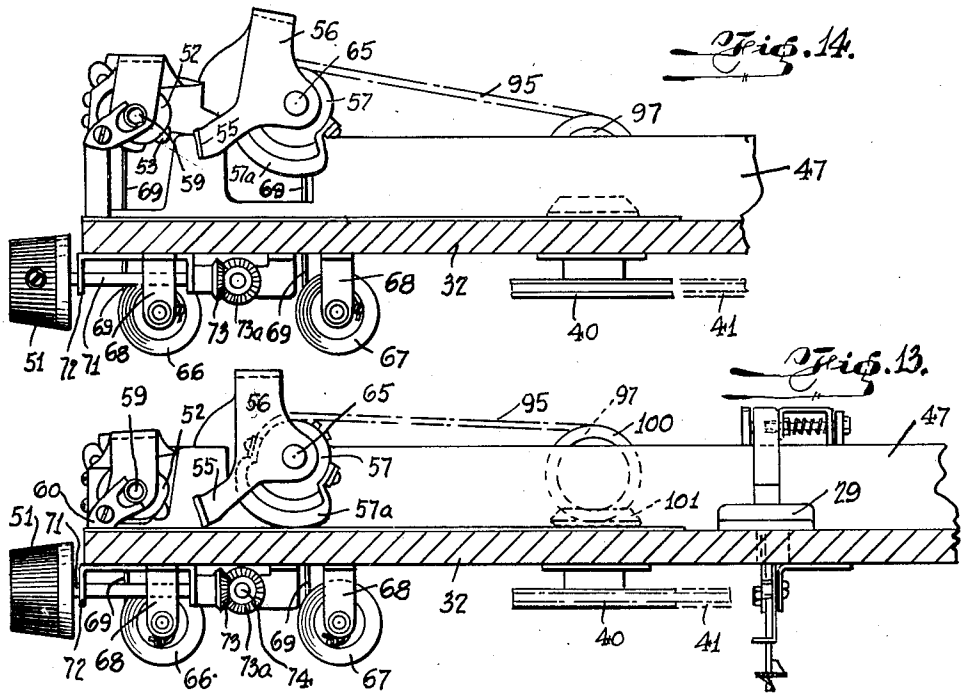


Fig. 14.

Fig. 13.

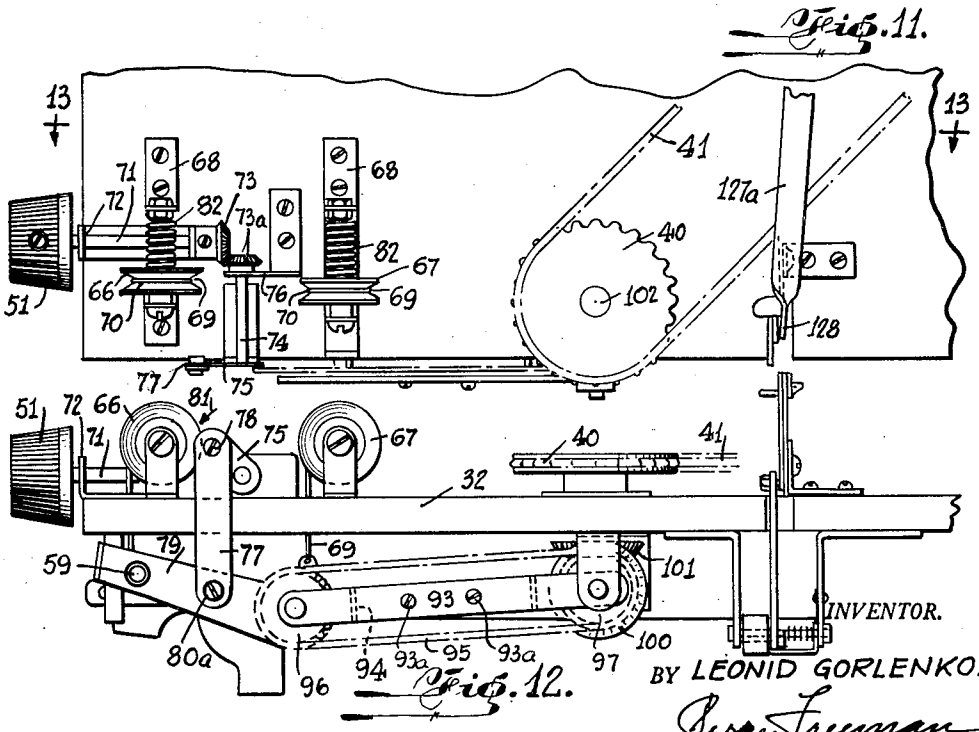


Fig. 12.

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DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 5

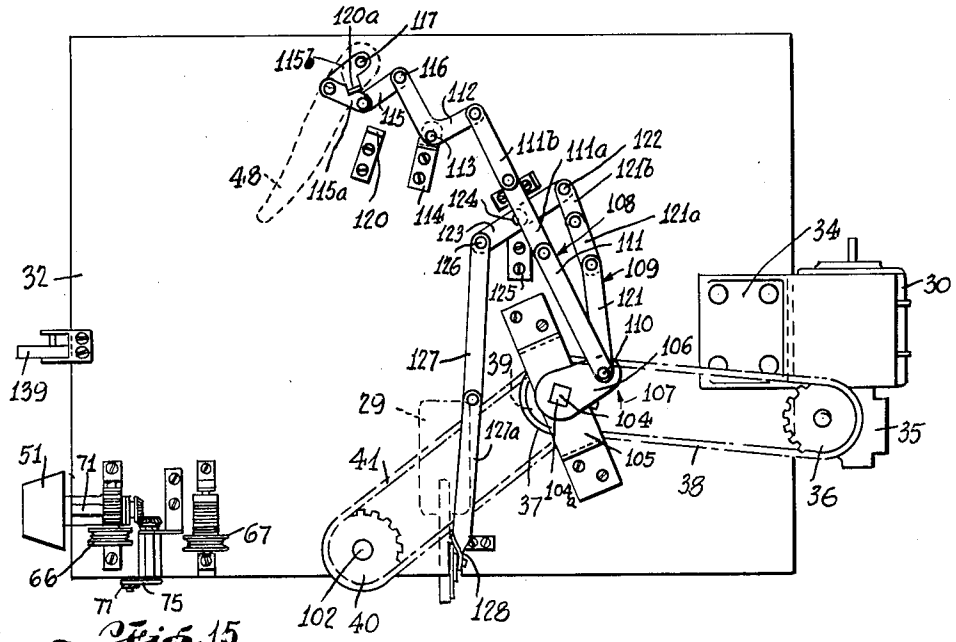


Fig. 15.

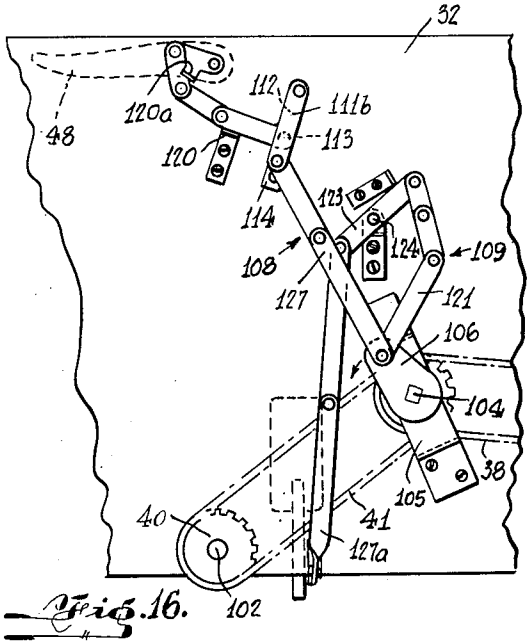


Fig. 16.

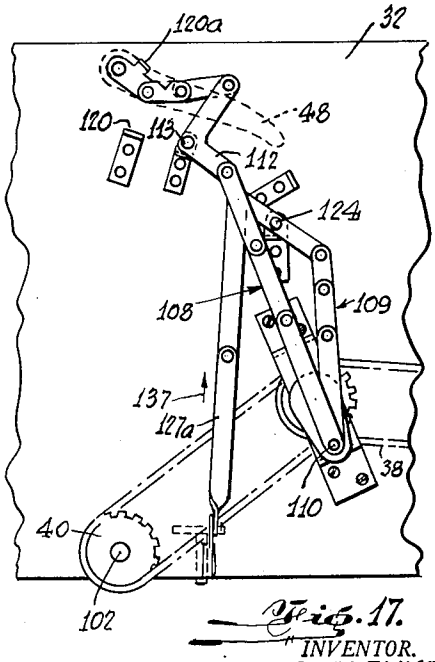


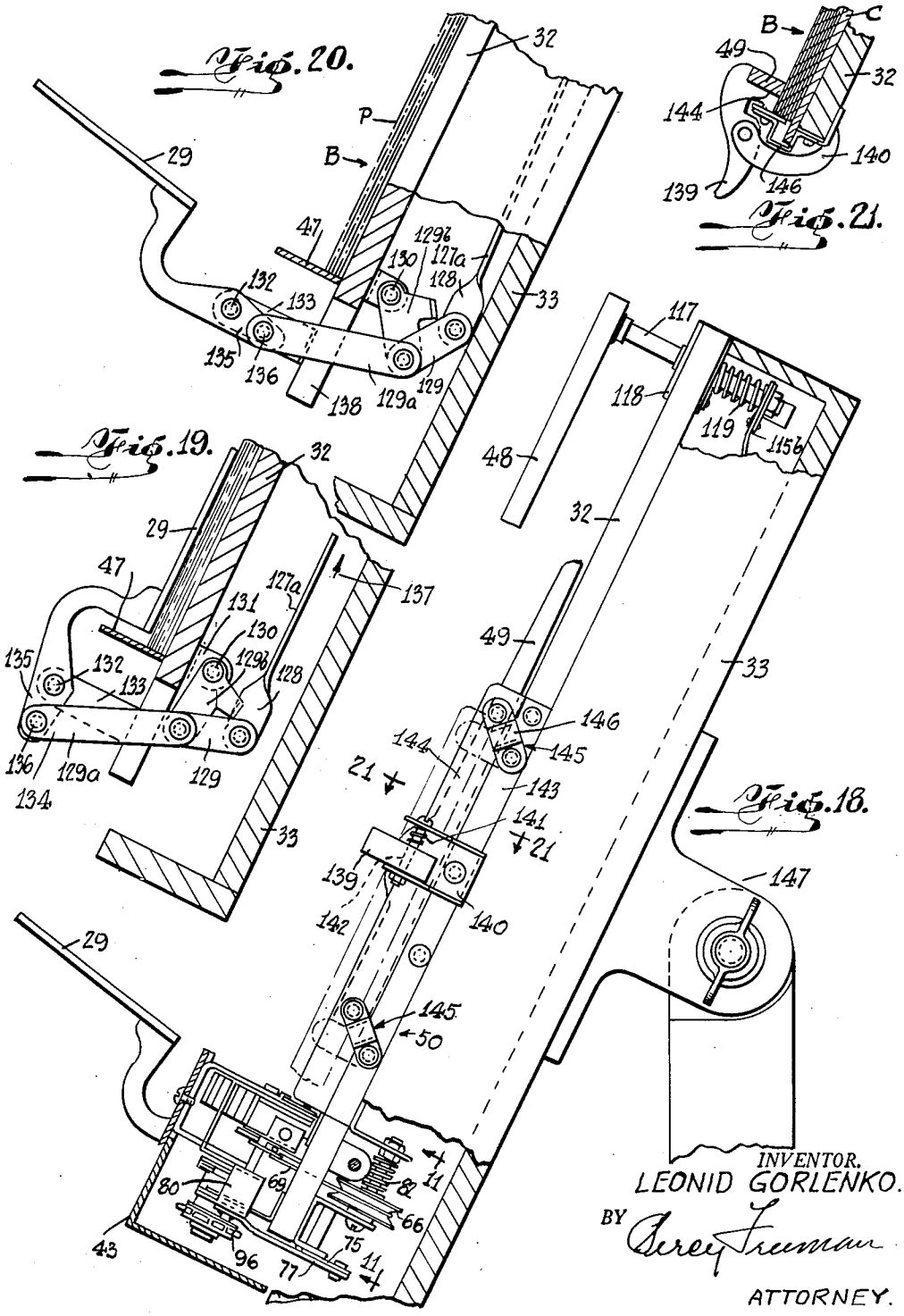
Fig. 17.

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DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Filed Nov. 17, 1947 6 Sheets-Sheet 6



Patented May 23, 1950 2,508,913

UNITED STATES PATENT OFFICE

2,508,913

DEVICE FOR MECHANICALLY TURNING PAGES OF BOOKS

Leonid Gorlenko, New York, N. Y.

Application November 17, 1947, Serial No. 786,824

5 Claims. (Cl. 84—518)

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This invention relates to new and useful improvements in devices for turning sheets mechanically and has especial reference to devices for turning sheets of music on stands and the like without interrupting the operation of a musical instrument by the player thereof.

It is well known among musicians and like people that the turning of the sheets of music is awkward and interrupts not only the physical operation of the instrument being used but even momentarily distracts the mind of the player from the music. This is especially true when, as is so often the case, more than one sheet is inadvertently turned at a time and the interruption is greater. It is also true that often the fingers must make more than one attempt to turn the sheet before it is successfully achieved thus creating loss of time as well as irritation in the mind of the players.

An object of this invention is to achieve the rapid and positive turning of the desired sheet merely by the depression of a foot pedal by the artist so that the hands are free to continue playing and the mind is not disturbed or irritated as before.

A further object is to provide a device in which the turning of the music sheet is made to simulate the movement of the hands in manual turning as closely as possible so that a rapid and positive turning is achieved without any likelihood of the sheet being creased or torn in the process.

A further object is to provide a device which is readily adapted to be associated with muisc stands, and the like and may be readily altered to be fitted to a piano if desired without changing the character of the inventive combination of elements.

Yet another object is to provide a device which is simple in operation, economical to construct and assemble in operative position with the support on which it is mounted and which permits a minimum number of the parts thereof to be exposed to the eye.

Further and more specific objects, features, and advantages will more clearly appear from the detailed specification hereinafter set forth especially when taken in connection with the accompanying drawings which illustrate present preferred forms which the invention may assume and which form part of the specification.

In brief and general terms the invention includes the following means which comprise the invention when taken separately and/or in combination with each other:

(*a*) A pedal-switch operated motor driving a

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linkage to actuate a swingable leaf turning arm and a leaf clamping plate to proper synchronous manner;

(*b*) A preliminary sheet gathering finger and a related sheet moving roller synchronously operative to gather and move the sheet along the free edge and provided with means to clamp the sheet when not actively engaging it and to clamp the remaining sheets when one sheet is being operated upon;

(*c*) Mechanical connections between the motor and the elements set forth in paragraph (*b*) whereby their operative movements are effective in desired relative sequence;

(*d*) A manual device to release the engaging fingers and rollers from the sheet and away from the stand when it is desired to insert into position a piece or book of music, and means normally to retain said elements under pressure in operative position against the sheet;

(*e*) Means on the sheet-support or platform whereby books of music having heavy thick covers may be properly adjusted and positioned thereon to permit equally efficient contact with and operation of the sheets by the above mentioned elements.

The present preferred form which the invention may take is illustrated in the accompanying drawings of which,

Fig. 1 is a front elevation of the device as seen without any sheets thereon to be turned;

Fig. 2 is a view similar to Fig. 1 but with a book of music thereon in position and with one sheet partially turned;

Fig. 3 is an enlarged front elevation of the device shown in Fig. 1, showing the mechanism visible from the front, with the covers removed and with the parts in their extreme inoperative positions;

Fig. 4 is a view similar to Fig. 3, with the elements in their extreme operated position;

Figs. 5 to 8 are somewhat diagrammatic views of the preliminary page turning elements in four of their successive operating positions;

Fig. 9 is a horizontal section taken on the line 9—9 of Fig. 4;

Fig. 10 is a horizontal sectional view taken on the line 10—10 of Fig. 3;

Fig. 11 is a partial view of the rear of the music stand as viewed along the line 11—11 in Fig 18;

Fig. 12 is a view of Fig. 11, taken from the bottom thereof;

Fig. 13 is a horizontal section taken on the line 13—13 of Fig. 11;

Fig. 14 is a view similar to Fig. 13 showing the

sheet engaging and moving elements moved away from the support of the device to permit the ready insertion of a music book;

Figs. 15, 16, and 17 are views of the rear of the support with the back cover removed to show the mechanism for operating the top page or sheet turning arm and the page clamping plate;

Fig. 18 is a side elevation from the right of Fig. 1, partly broken away, showing the parts in one operating position;

Fig. 19 is a partial section of the lower portion of the device showing the sheet clamp plate in its operative position;

Fig. 20 is a view similar to Fig. 19, showing the same plate in its inoperative position; and,

Fig. 21 is a horizontal section taken on the line 21—21 of Fig. 18 showing how a music book with a stiff cover may be inserted.

Referring now merely to the specific elements chosen to embody in the drawings one form which the invention may assume, it is to be noted that the invention comprises the following parts; the music book or sheet stand 25, the preliminary page-operating mechanism 26, the hand release mechanism 27 with the knob 51, the page turning arm and mechanism 28, the page-holding plate and mechanism 29, the motor 30, and the foot-operated switch 31. The back rest of the stand comprises a panel 32 or casing having a rear cover 33, see Figs. 18, 19 and 20.

Referring to Fig. 1, it is seen that the left of the panel 32 there is mounted a motor 30 on a bracket plate 34 attached to the panel. This motor is generally provided with any suitable reduction gear mechanism 35, to which is secured a sprocket 36 (Fig. 15). This sprocket is connected to another sprocket 37 by means of a chain 38. Another sprocket 39 on the same shaft with sprocket 37 connects with a sprocket 40 by means of a chain 41. The shaft of sprocket 37 is utilized, by means to be described later, to operate the turning arm 48, and the shaft of sprocket 40 is utilized to operate the preliminary page-operating mechanism 29 as will be set forth.

Referring to Fig. 1, the motor 30 is connected to an electric power supply cable 42 which, at one point, passes through a foot-operated switch 31. Covers 43, 44 and 45 are secondary only and not essential to the operation of the mechanism.

A music book 46 may be positioned against the front of the panel 32 with the bottom of the back of the book resting against a shelf 47. The page holding plate 29 is normally in the position shown in Fig. 20, at which time the turning arm 48 may be in the position shown in Fig. 4. The retainer strip 49 is lifted to permit the book to be pushed against the metal strip or fence 50 which is disposed along the right edge of the panel. The knob 51 is turned by hand, and, by means to be described, operates to move the preliminary page-operating mechanism 26 away from the panel so that the music book or sheets may be readily moved into position on the panel. After the book or music is in position, the knob 51 is turned in the opposite direction to return the parts to contact or engagement with the pages of the music, as shown in Fig. 13. The arm 48 and the plate 29 are returned to starting position by pressing against the foot pedal until they have assumed the position shown in Fig. 3.

Referring now to Figs. 5 to 8 inclusive, the turning of the motor will, in a manner later set forth, cause the preliminary wheel 52 to move with its finger 53 in the direction of the arrow 54. Arm 55 of the rotating wheel bracket 56 is still pressing against pages P of the book. This wheel 52 is what may be termed the edge gathering wheel since it contacts the sheet near the bottom thereof and close to its free edge and moves it to a gathered condition as seen in Fig. 6. The rotating cam 57, at this instant of the operation, is not in contact with the pages. Finger 53 rotating in the direction of the arrow 54, is gathering the corner of the first page, as shown at 58. The distance of the finger 53 from the center line of the shaft 59 is greater than the distance of the arm 60 from the center line of the shaft 59, thereby pushing the gripping arm 60 away from the page P (Fig. 6). Arm 55, associated with cam or roller 57 is still holding the page at the point 61.

Referring now to Fig. 7, the wheel 52 has now reached its extreme left position, and has released its gripping of page P, thus permitting arm 60 to move forward to contact the remaining pages P' to hold them in normal position, while page P is being turned. Just before the wheel 52 releases its grip on page P, the cam 57 in its relative rotation, engages the page and is moving the same in the direction of the arrow 62 to the left. The gathering or preliminary wheel 52, meanwhile is returning in the direction of arrow 63 to its former position shown in Fig. 5, with either finger 53 or the arm 60 holding down the page P'. Approximately at the time when the wheel 57 has reached the position shown in Fig. 8, which is the same position as shown in Fig. 2, the arm 48 has started to swing from right to the left in the direction of the arrow 64 (Fig. 2). The page-holding plate 29 meanwhile also has started to move away from the sheets into the position shown in Fig. 4. The page P has now been turned from the right-hand side to the left-hand side. When this happens the wheel 57 is again out of contact with the page P, thus permitting the arm 55 to hold down the pages. The arm 29 is in the position shown in Fig. 3, and until the pedal 31 is again pressed, the pages and the mechanism will remain stationary in this position.

Cam 57 has preferably a rubber-faced projection 57*a*, the surface of which is greater in distance from the shaft 65 than is the arm 55. Thus, while the cam 57 and the rubber-faced projection 57*a* is in contact with the pages, the arm 55 will be out of contact. Both wheels 52 and 57 are held against the panel by means of spring wheels 66 and 67 which are mounted on the rear of the panel 32 by means of brackets 68 (Figs. 12-14). These wheels have connected thereto one end of cables 69 with one turn of the cable around the wheels as at 70 and the other end of the cable 69 being connected to the wheels 52 and 57 respectively.

Knob 51 operated by hand is mounted on shaft 71 within the bearing 72 and has its other end provided with a mitre gear 73 which is in mesh with a mitre gear 73*a* connected to a shaft 74. The mitre gear 73*a* and shaft 74 are mounted on a bearing 76 with arm 75 secured to the free end of the shaft 74. A link 77 has one end pivotally secured to the arm 75 at 78, while the other end is pivotally secured to lever 79 at 80. The lever 79 rotates around the shaft 59.

Referring to Figs. 11 and 12, turning of the knob 51 will cause the mitre gears 73 and 73*a* to swing arm 75 in the direction of the arrow 81 causing the lever 79 to swing outwardly and away from the panel, as shown in Fig. 14.

As previously explained moving the lever 79

with the wheel 52 and the cam 57 away from the panel 32 will permit the insertion of a series or book of music sheets. As illustrated in Fig. 11, springs 82 are mounted and secured to the wheels 66 and 67 in such manner that torsion is put on these springs when the knob 51 is turned to move the lever 79 away from the panel 32. This torsion of springs 82 is also required in the operation of the mechanism as described for the diagrammatic views in Figs. 5 to 8 inclusive. In other words, these springs will cause the wheel 52 and the cam 57 to be pressed normally against the panel 32.

Referring now to Figs. 9 and 10, which illustrate the bracket 80 with the operating mechanism for the wheel 52 and the cam 57 which however are not shown in these views, it will be seen that the wheel 52 is mounted on shaft 59 while the cam 57 is mounted on shaft 83 the lower end 84 of which is secured in the crank plate 85. A pivot 86 is mounted on the other end of the crank plate 85 and crank plate 87. Shaft 88 extends into the other portion of the crank plate 87. The crank arm 89 is connected to the pivot 86 at one end while the other end 90 is pivotally secured at 91 to the arm 92 which in turn is secured to the shaft 59. Shaft 88 runs in the bearing plate 93 which is secured to a bracket 94 by means of screws 93a. A sprocket chain 95 connects sprocket 96 on shaft 88 and sprocket 97 on shaft 98. Shaft 98 has its bearing plate 93 at one end, while its upper end finds its bearing in the brackets 94 and 99. Bevel gears 100 and 101 connect the sprocket wheel 97 to shaft 102 of sprocket 40. The chain 95, is, therefore, in continuous motion causing the crank 103 to move in a clockwise circle, with the crank arm 89 transmitting an oscillatory movement to the arm 92. Thus it will be seen how the rotating wheel 57 and the wheel 52 are activated. The pivoting of plate or arm 93 on bracket 94 with wheel 52 mounted on one end and cam 57 at the other explains how these wheel shafts may be laterally axially moved to temporarily remove arms 60 and 55 from contact with the sheet P.

It will also be seen that while the wheel 52 and cam 57 are thus being operated, the page-turning arm 48 and the page clamping plate 29 have to be and are relatively operated in proper relation with the other elements. The mechanism for achieving this result is shown in Figs. 15–17. As previously explained, the motor 30, through its reduction gear unit 35, drives the sprocket wheel 36 and sprocket wheel 37 through chain 38. Sprocket wheel 37 is mounted on a shaft 104 on which is also mounted sprocket wheel 39. Bearing plate 105 supports the shaft 104. Secured to a square portion 104a of the shaft 104 in an arm 106 which rotates in the direction of the arrow 107.

Two sets of arms 108, for the operation of the page-turning arm 48 and set of links 109 are connected to the arm 106 at the pivot 110. Links or levers 111, 111a, and 111b are secured to a bell crank lever 112 fulcrumed at 113 to a bracket 114 secured to the back of panel 42. Links or levers 115, 115a, 115b are connected to the bell crank lever 112 at 116, with the free end of the link 115b connected to shaft 117, to which is mounted the page-turning arm 48. The shaft 117 passes through the panel 32 by means of bearing plate 118 (Fig. 18). A torsion spring 119 is secured to the shaft 117 in such manner as to have a tendency to return the arm 48 into the original position shown in Fig. 3. Stops 120 and 120a may be utilized to prevent the various links reaching the dead center point.

Links and levers 121, 121a, and 121b are fulcrumed at 122 to a swinging rocker arm 123 fulcrumed at 124 by means of bracket 125. The other end 126 of the rocker arm 123 has connected thereto the links or levers 127 and 127a. End 128 (Figs. 19 and 20) of the lever 127a is connected to links 129, 129a, 129b. Arm 129b is fulcrumed at 130 to a bracket 131. The page clamping plate 29 is fulcrumed at 132 to a bracket 133 extending forward from panel 32. The free end 134 of the arm 129a is fulcrumed to an extension 135 of the plate 29 at 136.

Referring to Figs. 15, 16, 17, 19, and 20, it can be readily seen that the upward movement of the arm 127a in the direction of the arrow 137 will cause the levers 129, 129a, and 129b to swing the page-clamping plate 29 outwardly away from the sheet of music as shown in Fig. 20, thus permitting the turning page to pass by, after which the page to the left side of the book will again be securely held by the plate 29.

It is understood that a slot 138 has to be provided in the panel 32 to clear the arms 129a. Fastened to the retainer 49 (Figs. 18 and 21) is a finger grip 139 secured within the bracket 140. A spring 141 around the shaft 142 will have a tendency to keep the retainer strip 49 at all times in contact with the edge of the pages P.

Referring to Fig. 18 the metal strip 50 is made up of two parts 143 and 144. They are secured in relation to each other by means of swinging arms 145 having an offset 146. In Fig. 21 it will be seen that, when the music book B is provided with a stiff cover C, it is preferable to swing the metal strip 144 outwardly, thus permitting the protruding edge of the stiff cover C to enter the space created by the offset 146.

As shown in Fig. 18, secured to the rear cover 33 of the panel casing may be an upright standard or tripod 147 of any conventional form.

In a general survey of the operation it will be noticed that whether the music is an ordinary separate piece of sheet music comprising a small number of pages, or a book with a stiff back thereon it can be easily inserted by turning the knob 51 and withdrawing the wheels 52 and 57 momentarily by hand. If a stiff extending cover is on the book then the mechanism above described is operated to permit its insertion.

When the pedal switch 31 is depressed by foot pressure, the motor is started and through the series of chains, gears, and systems of links and levers above described the device will first gather the lower right hand corner of the page to be turned as shown in Fig. 6; then the cam 57 takes over to move the lower portion of the sheet laterally to the left as shown in Fig. 7. The pages not being turned are held by the arm 60 as shown in Fig. 7. This movement naturally moves the upper edge of the page away from those beneath and when this occurs the leverages and links mentioned will remove the plate 29 from its clamping position, and swing the turning arm 48 to turn the page to its left hand position. Continued pressure on the switch 31 will cause the motor to swing the arm 48 back to normal as shown in Fig. 3 and the clamping plate 29 to its upright clamping position as also shown in said figure. This entire action takes place by the action of the foot once the parts are established and the music has been properly placed on the support. Thus the attention of the player is maintained on the music and not disturbed by efforts to turn the

music pages and consequently his whole attention is concentrated thereon with expected good results.

While the invention has been described in detail and with respect to a present preferred form which the invention may assume, it is not to be limited to such details and forms since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications of the invention which may come within the language or scope of any one or more of the appended claims.

What I claim as my invention, is:

1. In combination with a support adapted to hold open a series of music sheets thereon, movable means to press against the left hand sheets, means to gather the right hand uppermost sheet near the lower corner thereof, means further inwardly from the corner along the lower portion of the sheet to move the sheet laterally to the left after being gathered, means to engage the top of the sheet to turn it, a motor, and connections between the motor and the above mentioned means to operate them in proper sequence.

2. In combination with a support adapted to hold an open series of sheets of music thereon, a first rotatable element engaging the uppermost right hand sheet near the lower free edge thereof, a second rotatable element engaging the lower portion of said sheet further inwardly from said edge, and motor means connected to said elements to operate them sequentially first to gather the edge of the sheet and then to move the sheet to the left.

3. In combination with a support adapted to hold an open series of sheets of music thereon, a first rotatable element engaging the right hand uppermost sheet near the lower free edge thereof, a second rotatable element engaging the lower portion of the sheet further inwardly from said edge, a swingable arm disposed on the support above the right hand sheets, motor means on the support, and driving connections between the motor means and the mentioned elements and arm to cause said elements first to gather the lower free corner of said sheet, then to move it laterally to the left, and then to cause the swingable arm to engage the sheet and turn it as the upper edge of the sheet is presented in the path of the arm.

4. In combination with a support adapted to hold an open series of sheets of music thereon, a first rotatable element engaging the right hand uppermost sheet near the lower free edge thereof, a second rotatable element engaging the lower portion of the sheet further inwardly from said edge, a swingable arm disposed on the support above the right hand sheets, a clamping plate disposed normally against the left hand sheets, motor means on the support, and driving connections between the motor and said elements, said swingable arm and said clamping plate, first to move the clamping plate away from the left hand sheets, next to gather the lower free corner of the uppermost right hand sheet, then to move said sheet laterally to the left along the lower portion thereof, then to turn the sheet by the swinging arm as the upper edge of the sheet is presented into the path of said arm, and then to move the clamping plate back into engagement with the turned sheets.

5. In combination with a support adapted to hold an open series of music sheets thereon, a rotatable finger engaging the lower free corner of the uppermost sheet near the lower free edge thereof, a rotating cam engaging the lower portion of said sheet further inwardly from the corner, said finger and said cam being mounted on opposite ends of a pivoted bar, brackets supporting said finger and cam respectively, sheet-retaining arms on said brackets, means to rotate said finger and said cam sequentially, the distance between the end of the finger and of the cam surface and their respective axes of rotation being such as to cause the axes to be moved back when the finger and the cam respectively engage the sheet whereby the retaining arms are temporarily released and whereby said arms are restored to the next succeeding sheet when the finger and the cam are disengaged from the uppermost sheet.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
124,172	Stuart	Feb. 27, 1872
444,390	Bannier	Jan. 6, 1891
470,828	Brewington	Mar. 1, 1892
477,828	Von Trautvetter	June 28, 1892