Sept. 11, 1962 O. SCHMITT 3,053,000

PAGE TURNING DEVICE

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FIG. 1

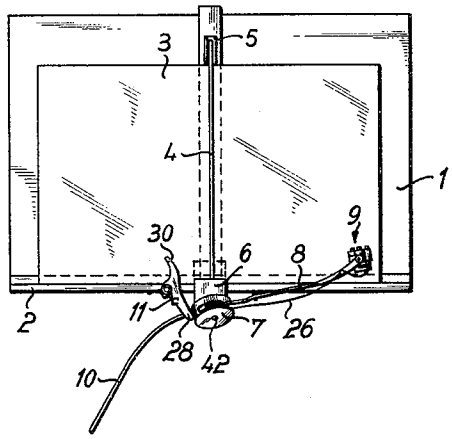


FIG. 2

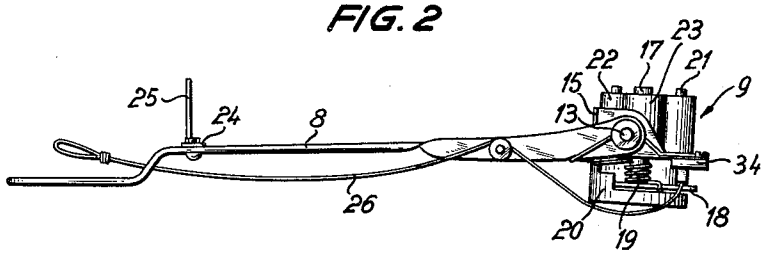
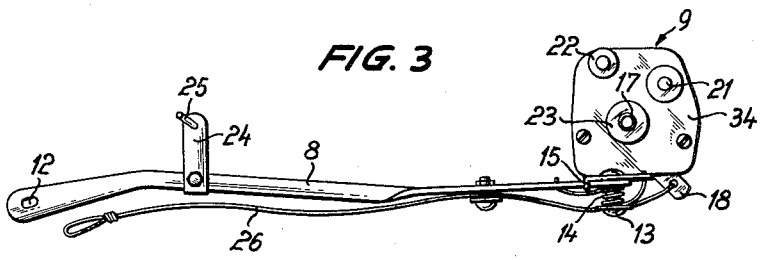


FIG. 3



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FIG. 4

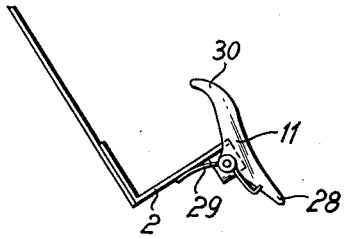


FIG. 5

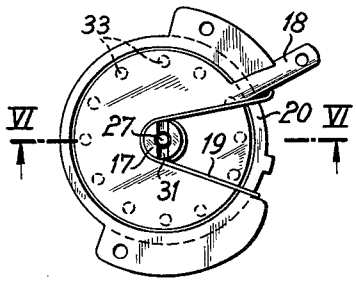


FIG. 7

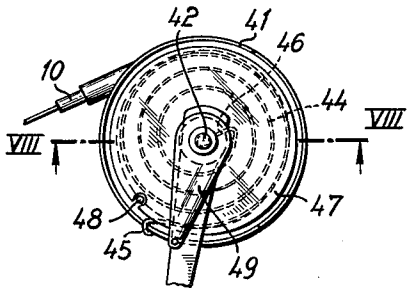


FIG. 6

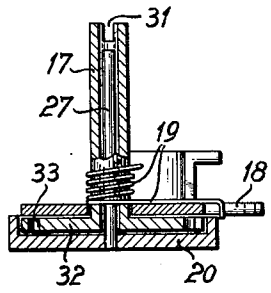
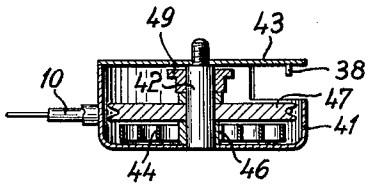


FIG. 8



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3,053,000

PAGE TURNING DEVICE

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6 Claims. (Cl. 40—104)

This invention relates to page turning devices, and more specifically to a page turning device which by means of a swing arm actuated by a "Bowden" cable and a page gripper arranged on the swing arm is adapted to turn a page at a time of a book, sheet music or a children's picture-book.

Page turners for sheet music in which a sheet of music placed on a piano desk or a music stand is engaged by a suction disc or a rubber finger of a swing arm and released therefrom shortly before the turning movement of the swing arm is completed are well known. However, these page turners have the drawback that the suction disc or the rubber finger does not reliably engage the pages to be turned as the pages have frequently lost their stiffness due to continual use, or the rubber finger, when frequently used, has lost its adhesive power.

It is therefore an object of this invention to overcome this drawback of known page turners and to provide a page turning device which will turn each of the pages in a reliable manner independent of the stiffness of the pages.

The invention has to do with a page turning device which comprises a swing arm pivoted at one of its ends, a page gripper arranged at the opposite end of the swing arm, a self adhesive tape carried by the page gripper and serving as page gripping finger, and means arranged to feed a predetermined section of said self adhesive tape after each turning operation.

The self-adhesive tape referred to herein is a tape which requires no outside activating agent, such as water, but is one which will adhere when pressure engaged and which may be pulled out of contact with an article. The invention is not restricted to any particular tape composition, and any of the many conventional pressure sensitive tapes may be used.

The page turning device is particularly suitable for persons who have their arms amputated so that, for example, the reading of a book will be greatly facilitated since the motion of the swing arm and, consequently, the turning of the pages is effected by depressing a foot pedal.

A preferred embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a front elevational view of a music desk with a page turning device according to the invention mounted thereon;

FIG. 2 is an elevational view of a swing arm and a page gripper attached thereto;

FIG. 3 is a top plan view of the swing arm and page gripper;

FIG. 4 is a side elevational view of a device serving as retaining means for the pages already turned over utilizing the page turning device;

FIG. 5 is a top plan view, on an enlarged scale, of a tripping mechanism;

FIG. 6 is a section therethrough taken on the line VI—VI of FIG. 5;

FIG. 7 is a top plan view of a tripping box without lid, and

FIG. 8 is a section through the tripping box with the lid thereon, taken on the line VIII—VIII of FIG. 7.

FIG. 1 shows a music desk 1 which is supported by a stand or pedestal, not shown in the drawings. The desk 1, which may also be so constructed that it can be placed

on a table, has at its lower edge a supporting angle piece 2 on which can be rested a book, music, loose sheets of music or the like. In FIG. 1 a loose single sheet of music 3 is placed on the supporting angle piece 2 and firmly urged against an angular member 5 mounted on the desk 1 intermediate the length thereof by a spring steel wire 4. Instead of one angular member 5, two angular members may be used between which the backs of stitched or bound books can be clamped. The spring steel wire 4 and the angular member 5 are secured to a spring clip 6 which is clamped on the supporting angle piece 2 of the desk 1. The spring clip 6 carries an axle 42 on which there is mounted a tripping box 7 capable of converting a straight movement into a rotational movement. The tripping box 7 has a swing arm 8 which is swung upon actuation of the tripping box 7 by means of a "Bowden" cable 10 and a foot pedal not shown in the drawings. As can be seen from FIG. 1, the tripping box 7 is arranged in a slightly oblique position so that the page gripper 9 provided on the swing arm 8, which is guided in a slot in the tripping box 7 and rotatable around the axle 42 of the tripping box 7, can rest, when in a page gripping position, on the sheet 3.

During one turning operation the swing arm 8 with the gripper 9 leaves the plane of the desk 1 and returns to it again after having passed a plane which extends normal to the plane of the desk.

A page retaining means 11 (see FIGS. 1 and 4) is mounted on the supporting angle piece 2 and includes a lower finger 28 which is integrally connected to an upper finger 30. The fingers 28, 30 are urged to the positions shown by means of a spring 29. When the swing arm 8 moves from the right to the left, as viewed in FIGURE 1, the swing arm 8 engages the lower finger 28 so as to pivot the upper finger 30 out of the path of the page being turned so that the page may pass therebeneath and be engaged by the upper finger 30 when the lower finger 28 is released by the swing arm 8 so that the upper finger 30 may retain the last-turned page in its position.

As shown in FIGS. 2 and 3 the arm 8 is provided at one of its ends with a hole 12 by means of which it is held on the axle 42 of the tripping box 7. At the other end of the swing arm 8 the gripper 9 is pivotally mounted on a shaft 13. Under the action of a spring 14 engaging the swing arm 8 and the gripper 9, the gripper 9 is supported in gripping position by a stop member 15 bearing against the swing arm 8. The gripper 9 consists of an upper portion carrying the self adhesive tape, and a lower portion carrying a housing 20 in which a tripping mechanism of the electric pull switch type is accommodated and which rotates a hollow shaft 17 through a small angle, for example 30°, whenever a pull is exerted on a tripping lever 18. A spring 19 engaging the housing 20 of the tripping mechanism and the tripping lever 18 causes the latter after each tripping operation to be restored to its initial position.

A pin 21 is rigidly mounted on a plate 34 closing the housing 20 and carries a reel onto which a self adhesive tape is wound in a known manner. The self adhesive tape is allowed to intermittently run off the reel. The unwinding tape is guided around a rotatable roll 22 and wound onto a drum 23. The drum 23 is rigidly mounted on the hollow shaft 17 which is intermittently rotated by the tripping lever 18 around a pin 27 rigidly connected with the housing 20. The adhesive tape guided around the roll 22 adheringly engages the page to be turned, the adhesive area of the tape being at all times unused and thus reliably gripping the page.

On the swing arm 8 there is further mounted one end of a sheet metal element 24, the other end of which is provided with an elastic tongue 25 which consists, for example, of rubber and which prior to the lifting of the

page is folded down under the supporting angle piece 2 and after the lifting of the page by the gripper 9 engages behind the curved page and thus assists the operation of the gripper 9. One end of a cord 26 is attached to the tripping lever 18 and the other end is slung around the axle of the tripping box 7 or is attached to a rotating arm 49 mounted on the axle 42 of the tripping box 7. When the swing arm 8 is in its initial page engaging position, that is in the right-hand position in FIG. 1, the cord 26 is in slack condition. On swinging the swing arm 8 to the left and the latter reaching its mid-position, the cord 26 will engage 2 fixed stop pins 38 disposed at the edge of the tripping box 7 and be tightened as the arm 8 continues moving beyond its mid-position. Shortly before the arm 8 reaches its final position, the cord 26 causes the tripping lever 18 to be pulled through to its stop against the action of the spring 19. Due to this, the hollow shaft 17 together with the drum 23 carrying the unwound adhesive tape turns through a small angle so that an unused portion of the adhesive tape is available for the next turning operation. Thereupon the cord 26 causes the gripper 9 carrying the adhesive tape drum 23 to tilt around the shaft 13 against the action of the spring 14 whereby the gripper 9 is drawn off the page almost turned over and at the same time moved away from the page so that the arm 8 and the gripper 9 may return to the right for turning over the next page.

It will be apparent that due to the action of the tripping mechanism of the electric pull switch type the adhesive tape is intermittently wound off the reel on the pin 21 and wound onto the drum 23 and thus, for each turning operation, an unused portion of adhesive tape is made available to grip and turn a page.

As shown in FIGS. 5 and 6, the drum 23 is fixed in a recess 31 of the hollow shaft 17. The hollow shaft 17 and a disc 32 secured thereto rotate around the pin 27 rigidly connected with the housing 20. The disc 32 is accommodated in the housing 20 and provided with a click-stop device, not shown in the drawings, which locks the disc 32 with respect to the housing 20 and the pin 27 in a position determined by the tripping lever 18. The disc 32 is further provided with circumferentially spaced apertures 33 which cooperate with a pin arranged on the tripping lever 18 and with another pin located in the rigid housing 20, thus constituting a click-stop device. Both of the pins has a vertically extending side and a beveled surface. The pin carried by the tripping lever 18 is caused by the pressure of the spring 19 which also acts in an axial direction, to enter into a respective one of the apertures 33 of the disc 32 so that on actuating the tripping lever 18, this pin will carry along the disc 32. When the tripping lever 18, due to the action of the spring 19, moves back into its initial position, the pin of the tripping lever 18 will slide with the beveled surface thereof across the apertures 33 of the disc 32 locked by the pin of the housing 20. The disc 32 together with the hollow shaft 17 remains stationary in the advanced position because the apertures 33, in the pulling direction of the tripping lever 18, cooperate with the pin located in the housing 20 in such a manner that the apertures 33 of the disc 32 carried along by the pin arranged on the tripping lever 18 will slide across the beveled surface of the pin located in the housing 20, whereas on return movement of the tripping lever 18 the disc 32 is held in its position by the pin arranged in the housing 20. Such an intermittent stepping rotation of a shaft through reciprocating movement of a tripping lever is known per se, e.g. from electric pull switches.

The foot pedal not shown in the drawings and actuating the "Bowden" cable 10 consists of a base plate and a foot-operated plate hingedly connected thereto at one of its ends. The foot-operated plate is held by a spreading spring at an angle which is determined by a stop member, and is provided at its free end with an opening serving to fix the wire core of the "Bowden" cable. A foot pedal of this type is shown in FIGS. 6 and 7 of applicant's German Patent 800,273.

As the foot depresses the pedal, the wire core of the "Bowden" cable is pulled down. The pulling movement effected by the "Bowden" cable is converted into a rotational movement in the tripping box 7.

As shown in FIGS. 7 and 8, the tripping box 7 has a circular housing 41 in the center of which is the rigid axle 42. The upper portion of the axle 42 is threaded to hold a lid 43 on top of the housing by means of a nut. The lid 43 is secured against rotation by a lug at the lid and a corresponding recess in the housing, and is provided with the stop pin 38. On the bottom of the housing 41 there is located a spiral spring 44 the outer end 45 of which is connected to the housing 41 and the inner end 46 of which is seated in an extension on a disc 47. The disc 47 is provided with a peripheral groove receiving the wire core of the "Bowden" cable 10. The end of the wire core is fixed in a fastening device 48 at the edge of the grooved disc 47. The swing arm 8 is rigidly connected to the grooved disc 47 and rotatable about the grid axle 42 thereby.

The housing 41 has a slot in the upper portion of its circular wall which allows the swing arm 8 to carry out its rotational movement. In its normal position the swing arm 8 bears against one end of this slot under the action of the initial tension of the spiral spring 44. Mounted on the rigid axle 42 is one end of a rotatable arm 49 to the free end of which the cord 26 is fastened and which on being actuated is carried along to the stop pin 38. In case no rotatable arm 49 should be provided, the cord 26 is slung around the axle 42.

When the pedal is depressed by foot the wire core of the "Bowden" cable 10 is pulled down, whereupon the wire core lying in the groove of the disc 47 and fixed in the device 48 causes the grooved disc 47 and together with it the swing arm 8 to turn from its initial position in anticlockwise direction, thus tightening the spiral spring 44. The swing arm 8 and the gripper 9 attached thereto cause the page to be turned over. From its end position the swing arm 8 is restored to its initial position under the action of the tightened spiral spring 44.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. A page turning device comprising a support having means for attachment to a book holder, a swing arm, means at one end of said swing arm pivotally attaching said swing arm to said support, a page gripper mounted on said swing arm at the other end thereof for movement with said swing arm, said page gripper including a self-adhesive tape which serves as a page gripping finger, means connected to said swing arm for swinging said swing arm in a page turning operation, and said page gripper including means connected to said swing arm for feeding a predetermined section of said self-adhesive tape after each page turning operation.

2. A page turning device as claimed in claim 1, wherein said page gripper includes an upper portion and said means for feeding said self-adhesive tape includes a first pin mounted on said upper portion, and a second pin carrying said self-adhesive tape as a roll, a guide roll positioned on said upper portion for guiding said self-adhesive tape, a drum carried by said page gripper upper portion for receiving used sections of said self-adhesive tape, said page gripper also including a lower portion in the form of a housing, and a tripping mechanism in

said housing and connected to said drum for rotating said drum.

3. A page turning device as claimed in claim 2, wherein said tripping mechanism includes a tripping box having a centrally located axle, said swing arm being secured to said axle for rotation thereon, a shaft carried by said swing arm mounting said page gripper thereon for tilting movement, a spring resisting tilting of said page gripper relative to said swing arm, said means for feeding said self-adhesive tape including a receiving drum and a tripping lever connected to said drum for imparting a turning movement thereto, a cord having one end secured to said tripping lever, means carried by said axle for pivoting with said swing arm having the other cord end connected thereto, and a cord-engaging stop pin carried by said tripping box to tighten said cord on movement of said swing arm beyond a predeterminted range of movement so as to first actuate said tripping lever for feeding an unused portion of the self-adhesive tape into a page gripping position and then tilt said page gripper around said shaft relative to said swing arm against the action of said spring with said page gripper thus being moved away from an almost turned over page.

4. A page turning device as claimed in claim 1, wherein said support attaching means includes a spring clip for mounting the page turning device on a desk, said spring clip having clamping means for holding a book and the like of which pages are to be turned, and said means for swinging said swing arm including a tripping mechanism having means for converting a pulling movement into a rotational movement.

5. A page turning device as claimed in claim 4, wherein clamping means includes a spring steel wire secured at one end to an end of said spring clip, an angular member secured to said spring clip at the opposite end of said spring clip, and the other end of said spring wire being releasably secured to said angular member.

6. A page turning device as claimed in claim 1, wherein an elastic tongue is mounted on the swing arm to assist the turning operation of the page gripper.

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