

(No Model.)

C. PITTRICH.

APPARATUS FOR TURNING OVER THE LEAVES OF MUSIC.

No. 487,769.

Patented Dec. 13, 1892.

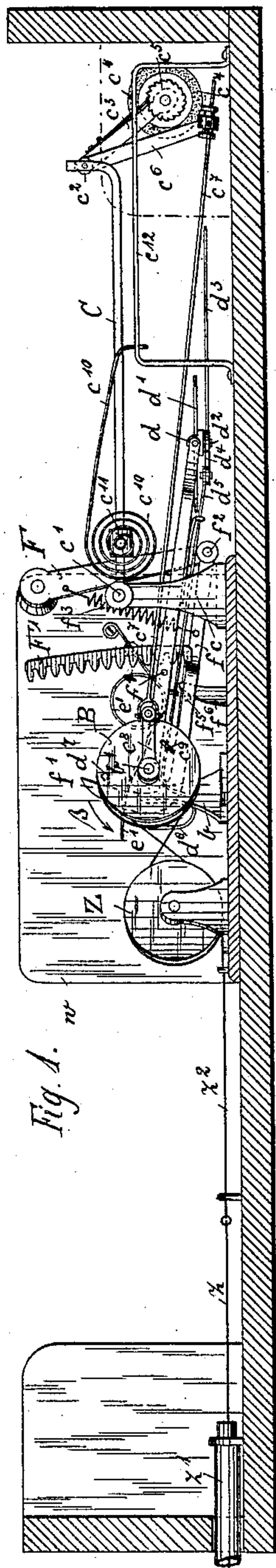
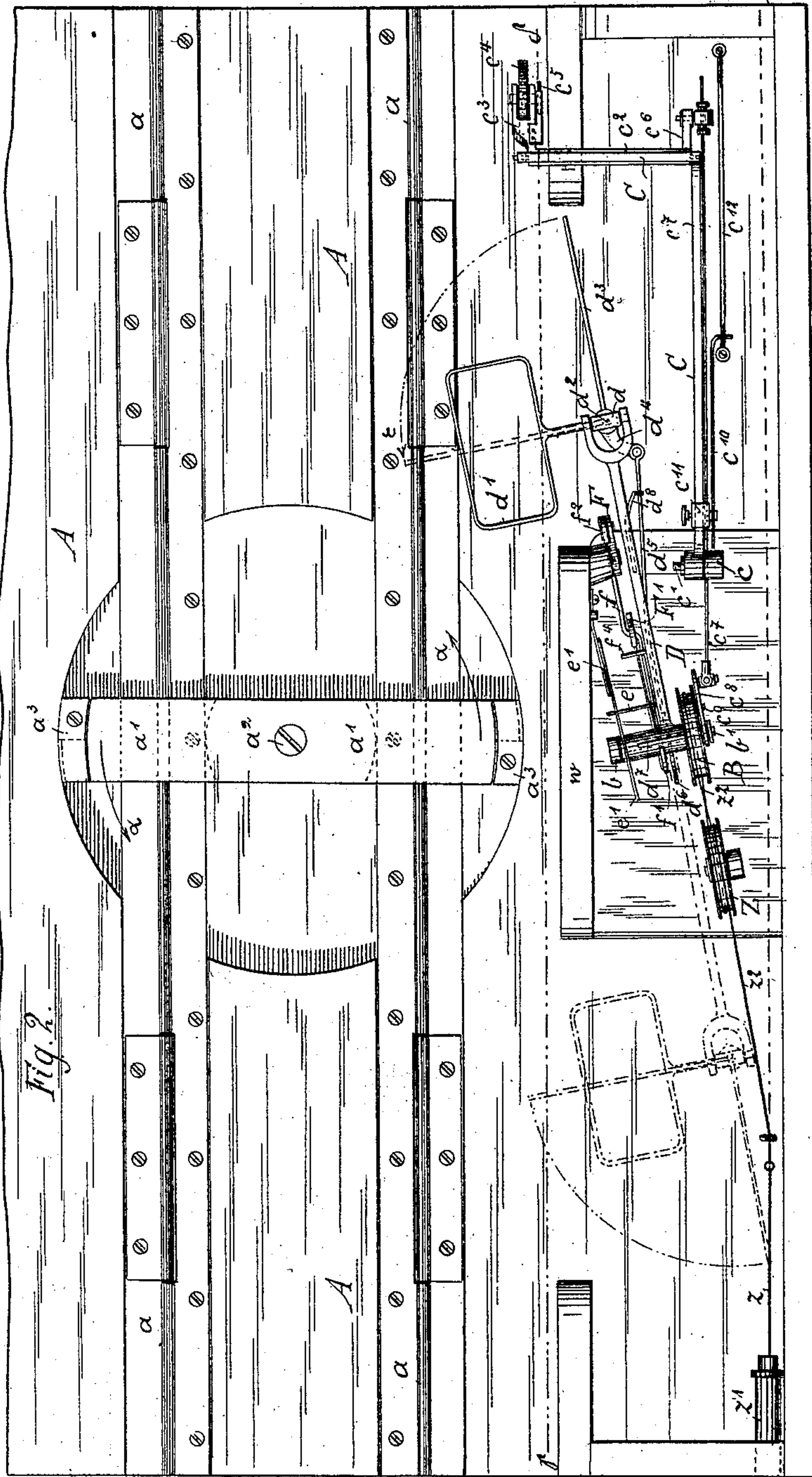


Fig. 1.





# UNITED STATES PATENT OFFICE.

CARL PITTRICH, OF DRESDEN, GERMANY.

## APPARATUS FOR TURNING OVER THE LEAVES OF MUSIC.

SPECIFICATION forming part of Letters Patent No. 487,769, dated December 13, 1892.

Application filed September 17, 1890. Renewed September 24, 1892. Serial No. 446,824. (No model.)

*To all whom it may concern:*

Be it known that I, CARL PITTRICH, a subject of the Emperor of Germany, residing at Dresden, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Apparatus for Turning Over the Leaves of Music and other Books, of which the following is a specification.

The apparatus forming the subject of this invention is adapted for turning over the leaves of music and other books and essentially differs from other similar apparatus in certain features of construction productive of considerable advantages to the user. In kindred apparatus such as have hitherto been in use each leaf had to be connected with a turner or arm by means of appropriate clamping or holding devices, so that the number of leaves that could be turned over by the apparatus employed, corresponding, as it did, to the number of arms, was necessarily limited. This drawback is removed by the arrangement herein described, which enables an indefinite number of leaves to be turned over without interruption. For this purpose a gripping device is adapted to grasp each succeeding leaf of the book, to turn it over, and to release it again, which operations are repeated over and over again as many times as there are leaves to be turned over without any time being lost in connecting each leaf with its particular turning-over arm, as was the case in the old contrivances. It is sufficient to place the book upon the desk or stand and to remove and replace it when done with in the usual way. No damage is done by this apparatus to the leaves, which were frequently torn through the repeated application of the operative arms of the old construction.

The apparatus is preferably operated by means of a pedal, and the user may take up his position either near the pedal or at any suitable distance therefrom. A further convenience arises from the fact that the apparatus may directly be fitted to the music stand or desk, which if provided with a cover or case will serve to protect the said apparatus along with its other internal parts.

Other advantages possessed by this improved leaf-turner will become apparent in the course of the following detailed description thereof.

In the accompanying drawings, Figure 1 is a horizontal section of the improved apparatus seen from below, the casing being cut away on line I II, Fig. 2. Fig. 2 is an elevation thereof.

In the drawings it has been assumed that the apparatus is portable and may be detachably secured to the music stand or frame in any well-understood manner. The mechanism is mounted on suitable base-sections A, united by countersunk hinges  $a$ .

$a'$  is a bolt adapted to turn on a pivot  $a^2$  and engage with stops  $a^3$ , provided upon the stand, so as to retain the latter in its extended position. This bolt moves within a circular slot corresponding in depth to the bolt. When the bolt is turned in the direction of the arrow  $x$ , Fig. 2, the frame may be folded upon the hinges  $a$ , so as to form a case of rectangular shape, wherein the leaf-turning apparatus may conveniently and safely be carried from place to place.

The apparatus is operated through the medium of a cord or, preferably, a thin flexible steel wire  $z$ , inclosed in and guided by a socket or sleeve  $z'$ , preferably formed of a wire coil covered by a sheath of india-rubber or fabric. Motion is imparted by this wire or cord through the medium of a suitable link  $z^2$  to a spring-case Z and through this to a disk B in such a manner that the spiral spring contained in the said spring-case Z is unwound or caused to expand. When the cord is released, the said spring contracts again and causes the disk B to resume its initial position. The disk B is set loosely upon the shaft or spindle  $b'$ , having its bearings in the support  $b$ , and operates through the agency of the mechanism now to be more particularly described. This mechanism mainly consists of (a) a device for forming the initial fold in the leaf it is desired to raise, being the upper leaf for the time being, (b) a gripper arrangement for grasping and turning over such raised leaf, and (c) an auxiliary controlling device whereby the gripper is adjusted and retained in the proper position for grasping the upper leaf for the time being.

First. The leaf-raising device is constructed as follows: Upon a pivot  $c'$ , firmly secured to a post or support  $c$ , is arranged a swinging arm C, carrying a shaft  $c^2$ , which is provided with



a fork or yoke or cross-head  $c^3$ . In this is journaled a wheel or roller  $c^4$ , which by a ratchet-wheel  $c^5$  and a spring-controlled pawl is prevented from turning in one direction, while it is free to turn in the opposite direction. The swinging or oscillating motion of the shaft  $c^2$ , along with the roller  $c^4$ , is produced by the arm  $c^6$ , also firmly secured to the before-mentioned shaft  $c^2$ , and by a link  $c^7$ , pivoted or adjustably jointed to the said arm, the opposite end of which is also adjustably connected with the pivot of a crank  $c^8$ , loosely mounted upon the main shaft  $b'$ . By means of a spring cam or tappet  $c^9$ , provided on or in the disk B, the crank  $c^8$  is caused to partake of the forward motion of the disk B (say in the direction of the arrow, Fig. 1) and through the medium of the link  $c^7$  and the arm  $c^6$  to move the wheel or roller  $c^4$  in one direction. During the backward motion of the disk B, on the contrary, the spring-tappet  $c^9$  passes beneath the crank  $c^8$  and takes up its position underneath the same, as shown in Figs. 1 and 2. The wheel or roller  $c^4$  exercises a certain pressure upon the paper, which pressure should be adjustable according to the thickness and nature of the paper or material of which are made the leaves to be turned over. This result is obtained by means of a spiral spring  $c^{10}$ , one end of which is attached to a socket  $c^{11}$ , movably set upon the arm C, while its other end engages a fixed yoke or rail  $c^{12}$ . By shifting the socket  $c^{11}$  the lever-arm, under the action of the spring  $c^{10}$ , is caused to alter its position and accordingly to vary its degree of pressure. This arrangement has for its object to slightly raise or form an initial open fold in the leaf to be turned over, exactly in the same way as it is usually done with the finger, and this peculiar action is obtained by means of the roller or wheel  $c^4$ , which when checked by the ratchet-wheel  $c^5$  in its tendency to move in one direction takes away with it to the short distance it is allowed to travel the leaf with which it is in frictional contact, thus forming in the latter an open undulation or upward fold, enabling the gripping device to seize the said leaf.

Second. The gripping device consists of an arm D, mounted upon a socket or sleeve capable of turning upon the shaft  $b'$ . This arm D at its outer end carries a fork or cross-head in which is journaled a nave or boss  $d$ , firmly secured to or integral with a frame  $d'$ . This nave  $d$  is provided on its lower surface with a pin  $d^2$ , on which a finger  $d^3$  is capable of completing a quarter of a revolution or describing a quarter of a circle under the action of another arm  $d^4$ , Fig. 2. This rotary motion is produced by means of the link  $d^5$ , the hook-shaped portion  $d^6$  of which engages the pin  $d^7$ , fixed in the disk B. A spring  $d^8$ , Fig. 2, has the tendency to constantly carry back the finger to its extended position. The object of this arrangement is to grasp and turn over

the leaf raised by the device described in paragraph 1, and its operation is as follows: The frame  $d'$  lies upon the upper leaf. By turning the disk B in the direction of the arrow the pin  $d^7$  is caused to engage the hook-shaped portion  $d^6$  and by acting in the depression or bent portion near the end of the same to bring the finger  $d^3$  into the position indicated in dotted lines in Fig. 2. In this position it underlies the leaf folded up in the manner described in paragraph 1. This leaf is then grasped between the frame  $d'$  and the finger  $d^3$ , which as the pin  $d^7$  proceeds takes up its position under the arm D and turns it over along with the leaf. Owing to the inclined or angular position occupied by the shaft  $b'$  and the influence of the back of the book to raise the leaves, the frame  $d'$ , which would lie under the leaf after it has been turned over, if the said shaft  $b'$  were not so inclined, recedes out of the way of such sheet, so that at that moment the frame lies beyond the edge of the sheet and is free to move back through the backward revolution of the disk B; but before the pin  $d^7$  brings the arm back to its original position it again engages the hook-shaped portion  $d^6$  of the link  $d^5$  and causes the finger  $d^3$  to assume its extended or open position, when the arm D is free to resume its initial position, as indicated in the drawings.

Third. The arrangement for adjusting the gripping-arm mainly consists of a spring  $e'$ , secured to the wall  $w$  and pressing upon a pin  $e$ , provided upon the arm D. This spring constantly tends to move the arm D to one of the two positions it is adapted to take up. To the wall  $w$  is also pivoted an oscillating arm F, to which, by a pin  $f^2$ , is pivoted a lever  $f$ , terminating in a yoke or hook  $f'$ . A spring  $f^3$ , connecting the lever  $f$  and arm F, constantly keeps up the lever  $f$  against the shaft  $b'$ . There is also arranged upon the lever  $f$  a spring-controlled slotted piece or rack  $F'$ , and when the arm F, lever  $f$ , and slotted piece  $F'$  are in operative position the pin  $f^4$  on the arm D engages one of the slots or notches of the rack  $F'$ , another pin  $f^5$ , provided upon the hooked lever  $f$ , sliding in the meantime upon the stationary wedging surface of a cam  $f^6$ . (See Fig. 1.) The object of this arrangement is to bring the gripping device into the position enabling it to grasp the leaf lying uppermost and to retain it in such position. When the disk B turns in the direction of the arrow, the pin  $d^7$ , fixed to this disk, presses upon the yoke  $f'$  of hooked or yoked lever, overcoming at the same time the pressure of the spring  $f^3$ , and with the assistance of the cam  $f^6$  moves the said lever first sidewise and then downwardly. This motion is followed by the toothed piece or rack  $F'$ , which, according to the higher or lower position of the arm D, (which position depends upon the thickness of the pile of leaves that remain to be turned over,) engages by one of



its slots the pin  $f^4$  on the arm D, and thereby maintains the gripper arrangement in the position in which it can take hold of a leaf.

The whole of the apparatus operates as follows: By pulling the cord  $z$  the spring-case Z is turned in a corresponding direction—say to the right—and the spring it contains is expanded or partially uncoiled. At the same time the disk or pulley B will turn in the opposite direction, and this motion is transmitted by the spring cam or tappet  $c^9$  to the crank  $c^8$ , and hence through the link  $c^7$  to the leaf-raising device, which in consequence folds up the uppermost leaf. In the meantime the pin  $d^7$  has set in motion the adjusting device, and the pin  $f^4$  upon arm D has been engaged by one of the notches or recesses of the rack F'. As the pulley or disk B continues to rotate the pin  $d^7$  engages the yoke  $d^6$  and by means of the link  $d^5$  turns the finger  $d^3$  in the direction of the arrow, Fig. 2, to the extent of a quarter of a circle, whereby it is brought under the raised sheet, which it then grasps jointly with the yoke or frame  $d'$ . The pin  $d^7$  now takes up its position under the arm D, which in the meantime has been released again from engagement with the rack-piece F', and turns this arm on its pivot or main shaft  $b'$  in the other direction—say to the left—as shown in dotted lines in Fig. 2. When the cord  $z$  is released, the spring contained within the case Z contracts again, and thereby causes the disk or pulley B to turn in the opposite direction, when under the action of the pin  $d^7$  the finger  $d^3$  is stretched out again and the arm D brought back to its initial position, as shown in Figs. 1 and 2. These operations are repeated as many times as there are leaves to be turned over.

I claim—

1. In an apparatus for turning over the leaves of music and other books, the combination with the arm pivoted at an angle to the book-rest, a frame for engaging the leaves mounted on said arm, a finger pivoted on the end of said arm, and an operating-link therefor, whereby the finger may be moved beneath each succeeding leaf, substantially as described.

2. In a device for turning the leaves of music and other books, the combination, with the friction-roller for giving the initial fold, of an independently-movable arm carrying a frame which overlies the leaf and a finger pivoted

on said arm for passing beneath the leaf when moved up by the friction-roller, substantially as described.

3. In apparatus for turning over the leaves of music and other books, the combination, with an arm D, carrying a frame  $d'$ , and finger  $d^3$ , of a frictional roller  $c^4$ , substantially as described, and illustrated in the accompanying drawings.

4. In apparatus for turning over the leaves of music and other books, the combination, with a rotating disk B, of a cam or tappet  $c^9$ , a crank-arm  $c^8$ , a link  $c^7$ , arms C,  $c^3$ , and  $c^6$ , shaft  $c^2$ , and a frictional roller  $c^4$ , substantially as described, and illustrated in the accompanying drawings.

5. In apparatus for turning over the leaves of music and other books, the combination, with a rotating disk B and arm D, carrying a frame  $d'$ , and finger  $d^3$ , of a pin  $d^7$ , secured in said disk, and a link  $d^5$   $d^6$  for operating said arm and finger, substantially as described, and illustrated in the accompanying drawings.

6. In apparatus for turning over the leaves of music and other books, the combination, with a rotating disk B, arm D, a frame  $d'$ , finger  $d^3$ , link  $d^5$   $d^6$ , and pin  $d^7$ , of spring-controlled levers, links, or arms F  $f$   $f'$ , rack F', and pin  $f^4$ , substantially as described, and illustrated in the accompanying drawings.

7. In apparatus for turning over the leaves of music and other books, the combination, with a rotating disk B, arm D, frame  $d'$ , finger  $d^3$ , link  $d^5$   $d^6$ , pin  $d^7$ , links or arms F  $f$   $f'$ , and pin  $f^4$ , of a pin  $f^5$ , secured in link or arm  $f$   $f'$ , and a cam  $f^6$ , substantially as described, and illustrated in the accompanying drawings.

8. In apparatus for turning over the leaves of music and other books, the combination, with a disk B, crank-arm  $c^8$ , cam or tappet  $c^9$ , link  $c^7$ , arms or levers C  $c^3$   $c^6$ , shaft  $c^2$ , friction-roller  $c^4$ , and ratchet-wheel  $c^5$ , of a spring  $c^{10}$ , adjustable sleeve  $c^{11}$ , and rail  $c^{12}$ , substantially as described, and illustrated in the accompanying drawings.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

CARL PITTRICH.

Witnesses:

EMIL DOMSCH,  
OTTO WOLFF.