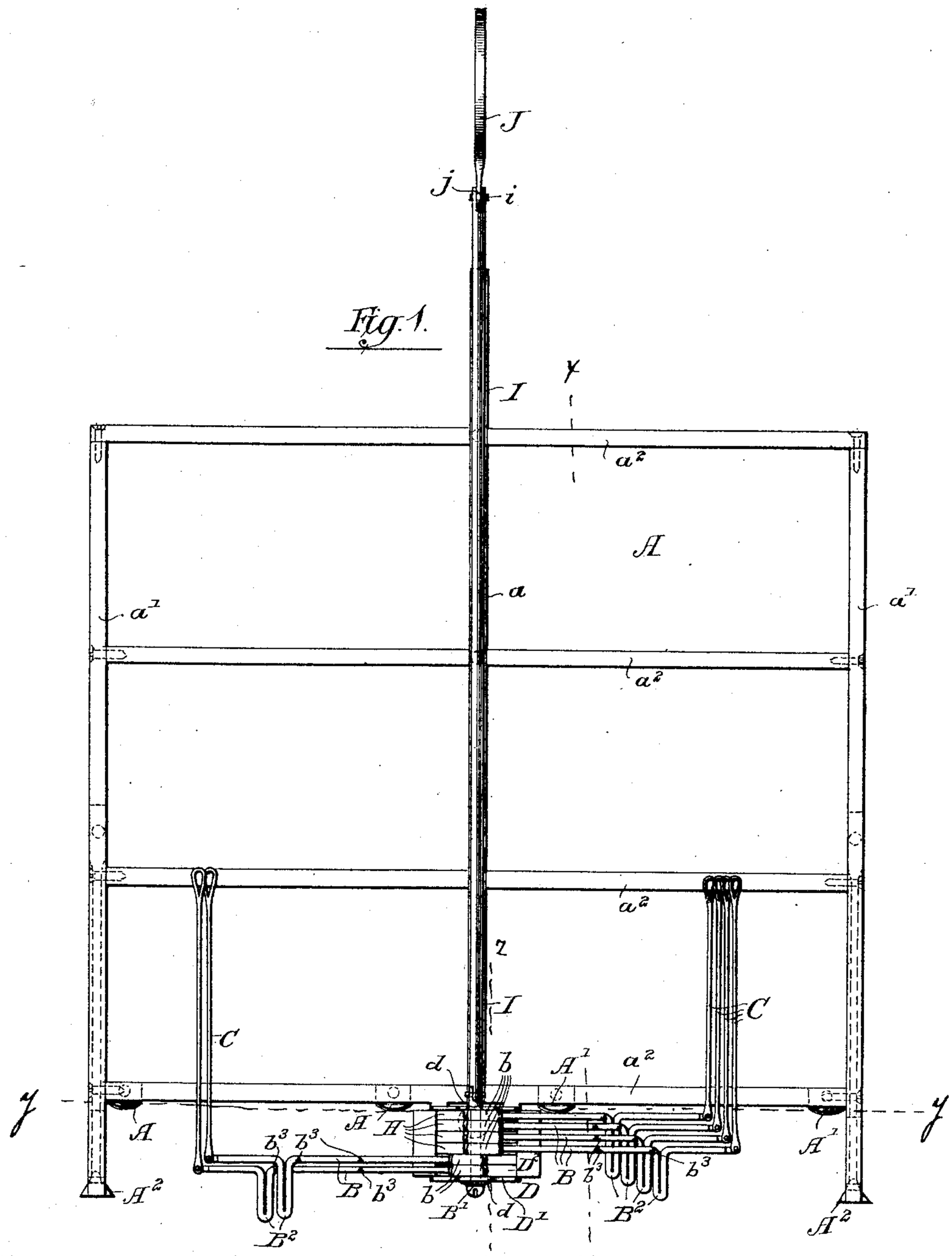
(No Model.) 2 Sheets—Sheet 1.

L. MULLER.

LEAF TURNER.

No. 370,884. Patented Oct. 4, 1887.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

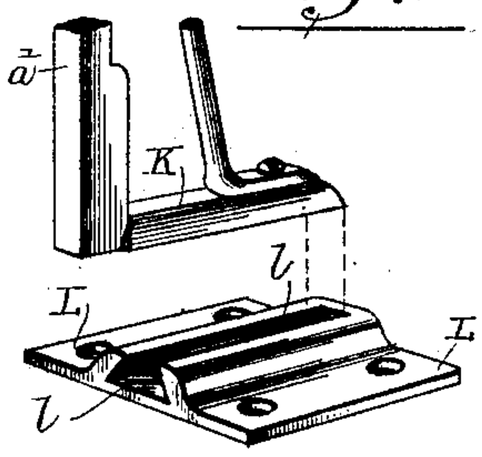

Fig. 8.

Fig. 6.

Fig. 5.

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

LOUIS MULLER, OF HINSDALE, ILLINOIS, ASSIGNOR OF ONE-HALF TO LOUIS MULLER, JR., OF SAME PLACE.

LEAF-TURNER.

SPECIFICATION forming part of Letters Patent No. 370,884, dated October 4, 1887.

Application filed March 3, 1887. Serial No. 229,559. (No model.)

To all whom it may concern:

Be it known that I, LOUIS MULLER, of Hinsdale, in the county of Du Page and State of Illinois, have invented certain new and useful Improvements in Leaf-Turners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to leaf-turners of that class which comprise a rack or book-support for sustaining a book or sheet-music and a series of swinging leaf-carrying arms provided with fingers adapted to engage sheets of music or leaves of a book.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

The leaf-turner herein illustrated as embodying my invention, comprises a rack or support for the music or book, which rack is provided at its lower part with a series of horizontally-arranged swinging leaf-carrying arms provided with pivoted fingers at their outer ends adapted to be swung into a vertical position to engage the leaves of the music or book upon the rack. The pivotal support of the several swinging arms and the frame supporting the same are connected with the rack by a spring or yielding connection, allowing the said parts to move outwardly away from the face of the rack, and such frame is connected with the lower end of a central vertically-arranged rod, which is adapted to be placed over the middle part of an open book, the parts being so arranged that when the rod is placed over a thick piece of music or book the frame carrying the swinging arms will be held by the rod outwardly from the face of the rack, so as to bring the center of rotation of the arms in proper position with relation to the leaves to be turned. The swinging arms are preferably provided at their ends adjacent to their pivotal support with blocks having flat faces, which blocks are acted upon by springs operating to hold the arms in position parallel with the face of the rack, and the fingers which are attached to the free ends of the arms, and which engage the leaves of the music or book, are desirably forked or slotted to engage both of the sides of the said leaves. In the device illustrated the leaf-carrying arms are swung or moved separately by the hand or finger of the user, said arms being provided with a series of depending projections or finger-pieces arranged at different distances from the pivot of the arms, so that said arms may be separately caught and the arms thereby moved in proper order, without special care on the part of the operator to accomplish this end.

The invention may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a book or music support or rack and a leaf-turning device embodying my invention. Fig. 2 is a vertical section of the same, taken upon line *x x* of Fig. 1. Fig. 3 is an enlarged central detail section taken upon the horizontal line *y y* of Fig. 1. Fig. 4 is an enlarged detail section taken upon the vertical line *z z* of Fig. 1. Fig. 5 is an enlarged detail view of one of the fingers for engaging the leaves to be turned. Fig. 6 is a view illustrating a modified construction in the finger. Fig. 7 is a detail perspective view showing a device for attaching the rack, made as shown in Figs. 1 and 2, to a piano. Fig. 8 is a detail side view illustrating a clamp device for attaching the rack to a piano. Figs. 9 and 10 illustrate a modified form of the holding-rod I. Fig. 11 is a section on line *x x* of Fig. 9.

As shown in the said drawings, A is the rack, consisting of a central vertical piece, *a*, vertical side pieces, *a' a'*, and horizontal pieces or bars a^2 a^2, said rack being provided at its lower part with forwardly-projecting pieces A' A', herein shown as attached to the lower horizontal bar, a^2, for supporting the book or music placed upon the rack.

B B indicate a series of leaf-carrying arms arranged horizontally and pivotally supported at the middle of the rack.

C C are a series of fingers attached to the outer ends of the leaf-carrying arms for engaging the leaves to be turned.

D is a movable frame having yielding connection with the rack, and supporting the leaf-carrying arms.

E is a stem or shaft attached to and supporting the frame D, and having sliding connection with the rack.

F is a guide for the stem E, and G is a spring applied between the shaft E and the rack to hold the frame D in place, while allowing said frame to yield outwardly or away from the front face of the rack.

H H are a series of springs acting against flat faces of the inner ends of the arms B B, and operating to hold said arms normally parallel with the face of the rack, and I is a vertically-arranged rod, attached at its lower end to the frame D, and connected at its upper end with the top of the rack by a spring, J.

The leaf-carrying arms are pivoted to the frame D by means of a pivot pin or shaft, B′, secured at its upper and lower ends in lugs or projections *d d* of said frame in the manner shown. The fingers C C, for engaging the leaves of the music or book, are pivoted to the outer ends of the arms, and each of said fingers is preferably split longitudinally to form two separate forks, *c c*, between which the leaf engaged by the finger is placed. The forks of the fingers C may be held in contact with the opposite sides of the leaf by spring-pressure of the fingers themselves, as is the case in the construction shown in Fig. 5; or each finger may be provided with sliding ring *c′*, as illustrated in Fig. 6, which sliding ring may be slipped upwardly upon the fingers to force the free ends of the forks *c c* together, and thereby clamp the leaf held between them, as illustrated in Fig. 6. When the fingers are provided with a sliding ring, they are desirably bent apart in their middle parts, as illustrated in said Fig. 6. The said fingers are connected by a pivotal joint with the ends of the arms, so that the fingers may be swung down horizontally when the book or music is placed upon the rack, and each finger may be then swung upwardly into engagement with a separate leaf.

The movable frame D is herein shown as made of sheet metal, and the pin E is fixed to the rear surface of the frame and extends into and is constructed to slide in the guide F, which is tubular and attached to the middle part of the rack at its bottom.

The spring G is of spiral form, and is placed between a head or shoulder, *e*, of the pin E and an opposing end wall, *f*, of the tubular guide F in such manner as to hold the frame D and the arms carried thereby adjacent to the face of the rack. In the particular construction illustrated the spring G is located within the tubular guide F, and the shaft or pin E is sustained at its forward end by engagement with a central aperture of the wall *f*, and at its rear end by contact of the head *e* of said pin with the inner cylindric surface of said tubular guide F. The said tubular guide F is shown as sustained by attachment to the lower end of the central vertical bar, *a*, of the rack; but it may be otherwise supported, as found desirable or convenient.

Each of the swinging arms B B has attached to or formed upon its end adjacent to the pivot B′ a metal block, *b*, having parallel side faces, *b′ b′*, and a rounded end face, b^2, said block being centrally apertured for the passage of the said pivot-pin B′, as clearly shown in Figs. 2 and 3.

The series of flat springs H H are held at their ends in the frame D, and are arranged to bear against the blocks *b b*. Said springs H H tend to hold the arms B B parallel with the face of the rack by resting against the opposite flat faces, *b′ b′*, of the blocks B, while at the same time allowing the arms to be easily swung through an angle of one hundred and eighty degrees, or from one side of the rack to the other. The springs during such movement of the arms rest against the rounded end surfaces b^2 b^2 of the blocks, which end surfaces are preferably made in a circular curve approximately concentric with the pivot-pin B′, so that the arms may be easily turned after the resistance of the springs to their movement is overcome.

For the general purposes of my invention the springs H H may be held or supported at one or both ends in any desired or preferred manner; but as herein shown said springs rest at their middle parts against the blocks *b b*, and are held at both ends in the frame D. A simple and cheap construction in the said frame and means for sustaining the springs H H are herein shown, in which the main part of the frame consists of a metal plate, D′, the top and bottom marginal parts of which are bent outwardly to form the lugs or projections *d d* for supporting the pivot-pin B′. The springs H H are supported in a second plate, D^2, made of proper width to fit between the parts *d d* of the plate D′, and having outwardly-turned ends *d′ d′*, in which are formed grooves d^2 d^2 for receiving the ends of the springs H H. The plates D′ and D^2 in this instance are conveniently secured together by a screw, d^3, passing through the plate D′ into the plate D^2, and in the construction illustrated said plates are further secured together by means of the pin E, which is screwed into both of said plates D′ and D^2. In placing together the parts of the frame, made as above described, the springs H H are first inserted in the grooves d^2 d^2 of the plate D^2, and said plate is then thrust endwise between the side parts, *d d*, of the plate D′, and is then secured by the screw d^3 in the manner described. When the parts are put together in this manner, the springs H H are held from slipping sidewise out of the grooves d^2 d^2 by the said parts *d d* of the frame D′, so that a simple and convenient means of holding said springs in place is thus obtained.

In the particular construction of the parts herein illustrated the rod I, for holding the music or book in place upon the rack and in proper position with relation to the arms B B, is connected at its lower end with the frame D by being pivoted to the upper end of the

pivot-pin B′, which is extended somewhat above the top of the frame for this purpose, and the spring J is of curved or C form and fixed at one end to the central bar, *a*, of the rack and provided at its free end with a hook, *j*, adapted to engage a pin, *i*, in the upper end of the rod I. By reason of the yielding connection of the rod I with the rack, when the book is placed upon the rack behind the said rod, the latter will be forced and held outwardly at a distance from the face of the rack corresponding with the thickness of the book, and by reason of the attachment of the lower end of the rod to the sliding frame B the pivotal support of the leaf-carrying arms B B will be moved bodily outward, and thereby brought into the same plane with the leaves to be turned. The said rod I thus not only serves to hold the leaves or book in place with relation to the leaf-turning devices, but it also serves to move and hold the pivot of the leaf-carrying arms in alignment with the rear edges of the leaves to be turned.

In Figs. 9, 10, and 11 I have shown a slightly different arrangement of the rod I, in which said rod is pivotally connected at its upper end with the spring J, and has detachable connection with the upper end of the pivot-pin B′. The joint between the said rod I and the pivot-pin in this instance is formed by a dovetailed projection, *i′*, upon the lower end of the rod I, which projection enters a dovetailed recess, b^4, in the top of the said pin B′, the dovetailed projection and recess being so arranged, as more clearly shown in Fig. 11, that the projection *i′* can only be entered into the recess from the rear or inner side of the pin B′, so that the lower end of the rod, when interlocked with the said pin, will be held from outward movement by the latter. The construction wherein the rod I is made detachable at its lower end for inserting the book or music behind it is preferred in practice for the reason, among others, that a rod thus arranged can be more easily manipulated by a person sitting in front of the rack than a rod which is pivoted at its upper end in the manner herein first described, and shown in Figs. 1 and 2. The arrangement of said rod I last described is therefore made the subject of a specific claim herein.

For moving or swinging the leaf-carrying arms B B, I have provided each of said arms with a downwardly-projecting key or finger-piece, B^2, herein shown as formed integral with the arm, by means of a bent part of the wire composing said arm. The finger-pieces B^2 B^2 B^2 of the several arms are arranged at different distances from the pivotal axes of said arms with the finger-piece which is upon the arm first moved in turning the leaves most remote from the said pivotal axis. The object of this construction is to enable the person using the device to unfailingly turn the arms in proper order, when moving the same, by a quick motion of the hand, it being entirely obvious that in the arrangement described the hand or finger will strike first the finger-piece which is farthest to the right, and which belongs to the arm which is next to be turned in swinging the arms from the left toward the right-hand side of the rack, or vice versa. To further insure the actuation of the arms in proper order, the finger-piece which is farthest from the pivot of the arms is made longer than the next adjacent finger-piece inside of it, so that the several finger-pieces are gradually lengthened in approaching the ends of the arms. By this construction the finger-piece will in all cases be struck and caught by the hand or finger when the hand is moved upwardly toward the row of finger-pieces without liability of moving the next finger-piece or of moving two arms at once. The several finger-pieces described are preferably arranged in the same plane, and the arms are each provided with offsets or double bends b^3 b^3, whereby the longer arms are curved around the fingers of the shorter arms. This construction is clearly shown in the sectional view, Fig. 3.

The rack, made as above described, may be attached to a piano, to a supporting-standard, or otherwise supported, as may be found convenient or desirable. In Figs. 1, 2, and 7 the rack is shown as provided with horizontal bars K K, of dovetail shape, attached to the lower ends of the side bars, *a′ a′*, of the rack, and adapted to engage dovetailed grooves *l l* in plates L L, Fig. 7, adapted to be secured, by screws or otherwise, to the music-support of the piano. For use in connection with a piano having a music-support which, by being adapted to fold or for other reason, is not adapted to receive the plates L L, the rack may be provided with a clamp device such as is illustrated, for instance, in Fig. 8. As shown in said Fig. 8, M is a yoke-piece attached to the lower end of the side piece, *a′*, of the rack. Said yoke-piece is provided with a thumb-screw, M′, preferably arranged to act upon a swinging plate, *m*, which is pivoted to the yoke at *m′*, and arranged to rest against the under side of the part, as N, to which the clamp is applied. The yoke M will usually be made with a projecting part, M^2, forming its upper gripping-surface, to enable the clamp to be applied to a rest, N, having an upturned free or outer edge.

One main feature of novelty embraced in my invention is embodied in the construction whereby the leaf-carrying arms are mounted in a yielding or movable frame which may be shifted to correspond with the thickness of the book or music upon the rack, and this construction is herein claimed, broadly, without restriction to the construction illustrated in other parts of the device—as, for instance, the leaf-carrying arms may be made bodily movable in the manner referred to when clock-work or other means is provided for actuating said arms. The construction embracing a rod for engaging the book or music, which rod is connected with the movable support to which the leaf-carrying arms are pivoted, is also novel and herein broadly claimed. It is to be un-

derstood in this connection, however, that the result of holding the movable or yielding frame supporting the leaf-carrying arms in position to correspond with the thickness of the book may be accomplished otherwise than by means of a rod pivoted to the said frame and having a spring-connection at its upper end with the rack—as, for instance, the rod may be adapted for rigid attachment to the frame, so as to hold the latter outwardly without being connected at its upper end with the rack.

I have herein shown the device as provided with means for turning the leaf-carrying arms separately by hand, as above described; but, as far as the operation of the other features of construction herein claimed are concerned, other means may be provided for moving or actuating the arms—as, for instance, they may be moved by clock-work, or by a pedal attachment, as heretofore common in devices of this character.

I claim as my invention—

1. The combination, with a rack or book-support, of a series of pivoted leaf-carrying arms and a support for said arms which is movable relatively to the said rack or book-support, substantially as described.

2. The combination, with a rack or book support, of a series of pivoted leaf-carrying arms, a movable support for said arms, a spring applied to carry the said support toward the rack, and means adapted to engage a book upon the rack for holding the said movable support outwardly in opposition to the action of the spring, substantially as described.

3. The combination, with a rack or book-support, of a series of pivoted leaf-carrying arms, a support for said arms which is movable relatively to the rack or book-support, a spring holding the said support at the rearward limit of its movement, and a rod connected at its lower end with the said arm-support, and having yielding connection at its upper end with the said rack or book-support, substantially as described.

4. The combination, with a rack or book-support, of a series of pivotally-supported leaf-carrying arms, each of said arms being provided with a finger-piece secured to or forming part thereof, said finger-pieces being located at unequal distances from the center of rotation of the arms, substantially as described.

5. The combination, with a rack or book-support, of a series of pivoted leaf-carrying arms, said arms being provided with a depending finger-piece, said finger-pieces being arranged at unequal distances from the pivotal axis of the arms, and constructed to project one below the other, substantially as described.

6. The combination, with the pivoted leaf-carrying arms of a leaf-turning device provided with enlarged parts or blocks *b b*, severally attached to said arms adjacent to their pivotal axis and provided with flat side faces, of springs acting upon the said flat faces of the blocks, substantially as described.

7. The combination, with a rack or book-support, of a movable frame, D, having yielding connection with the said rack or book-support, a series of leaf-carrying arms, B B, pivotally supported in said frame and provided with enlargements or blocks *b b* at their points of pivotal support, said blocks having flat side faces, and a series of springs mounted in said support and bearing against said blocks, substantially as described.

8. The combination, with a rack or book-support, of a tubular guide, F, a frame, D, provided with a stem or spindle, E, sliding in said tubular guide, a spring applied to throw the frame D toward the said rack or support, a series of leaf-carrying arms pivoted to said frame D, and a rod, I, connected with the frame and adapted to engage the front face of a book upon the rack or book-support, substantially as described.

9. The combination, with leaf-carrying arms B B, provided with blocks *b b*, having flat side faces, of a frame, D, said frame consisting of a plate, D′, having forwardly-bent parts *d d*, a pivot-pin, B′, attached to said parts *d d*, a plate, D^2, provided with slots d^2 at its opposite ends, and a series of flat springs, H H, held at their ends in the slots of said plate D^2 and engaging said blocks *b b*, substantially as described.

10. The combination, with a rack or book-support, of a series of leaf-carrying arms, B B, a yielding frame, D, supporting said arms, a rod, I, having detachable connection with said frame, and a spring attached to the upper part of the rack and pivotally connected with the upper end of said rod, substantially as described.

11. The combination, with a rack or book-support, of a series of leaf-carrying arms, B B, a yielding frame, D, a pivot-pin, B′, for the arms mounted in the frame D and extending above the upper part of said frame, a rod, I, having detachable connection with the said pivot-pin, and a spring, J, attached to the upper part of the rack or book-support and pivotally connected with the upper end of the rod, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

LOUIS MULLER.

Witnesses:
C. CLARENCE POOLE,
CHARLES T. LORING.