(No Model.) 2 Sheets—Sheet 1.

C. R. HILL.

LEAF TURNING APPARATUS.

No. 590,761. Patented Sept. 28, 1897.

Fig: 1.

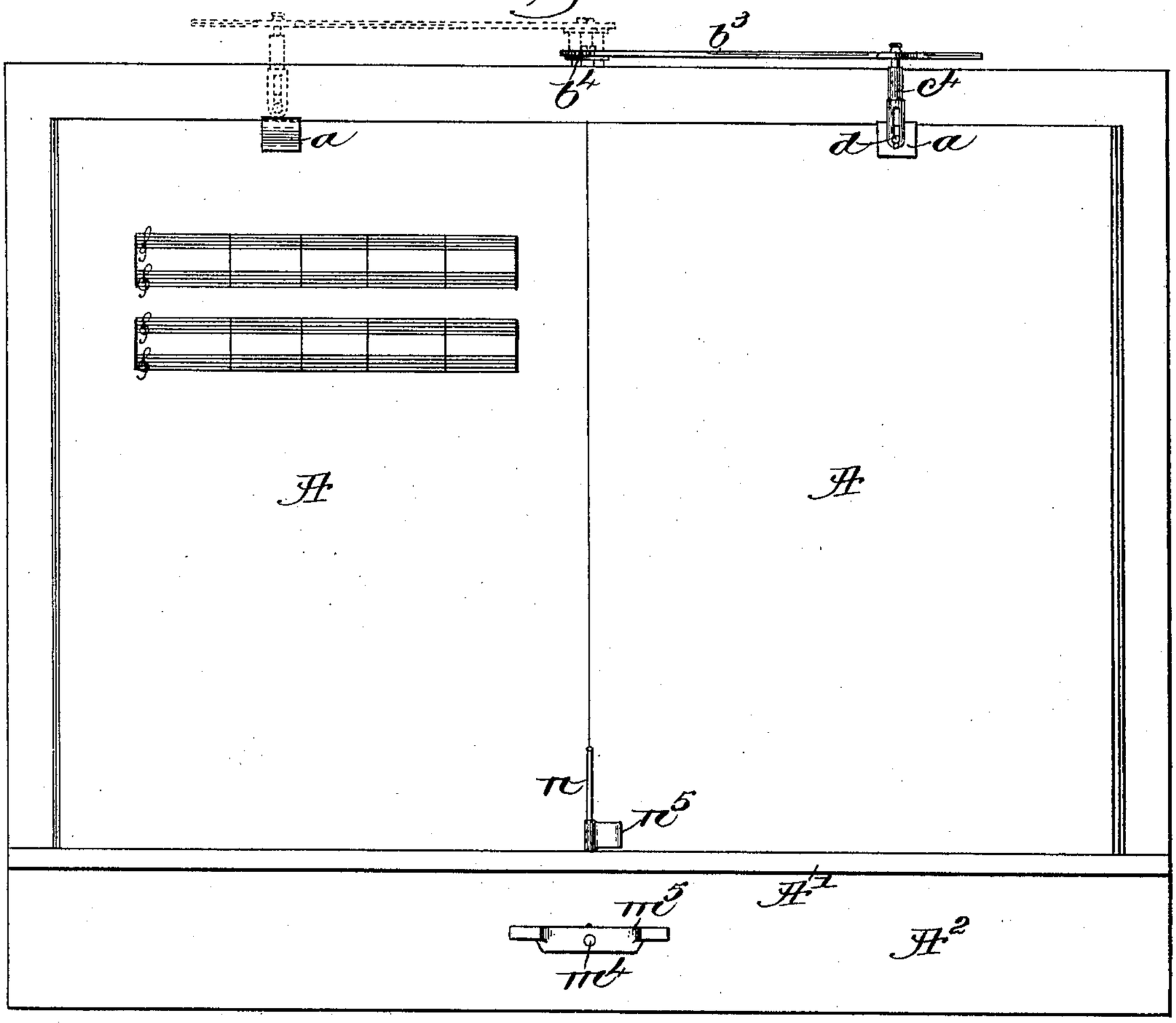


Fig: 1a.

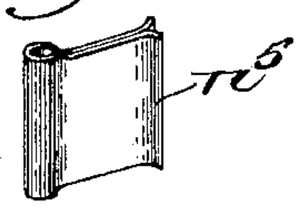


Fig: 2.

Witnesses.

Edward F. Allen.

A. C. Harwood

Inventor.

Charles R. Hill

By Mosby & Gregory.

Attys.

(No Model.) 2 Sheets—Sheet 2.

C. R. HILL.

LEAF TURNING APPARATUS.

No. 590,761. Patented Sept. 28, 1897.

Fig: 3.

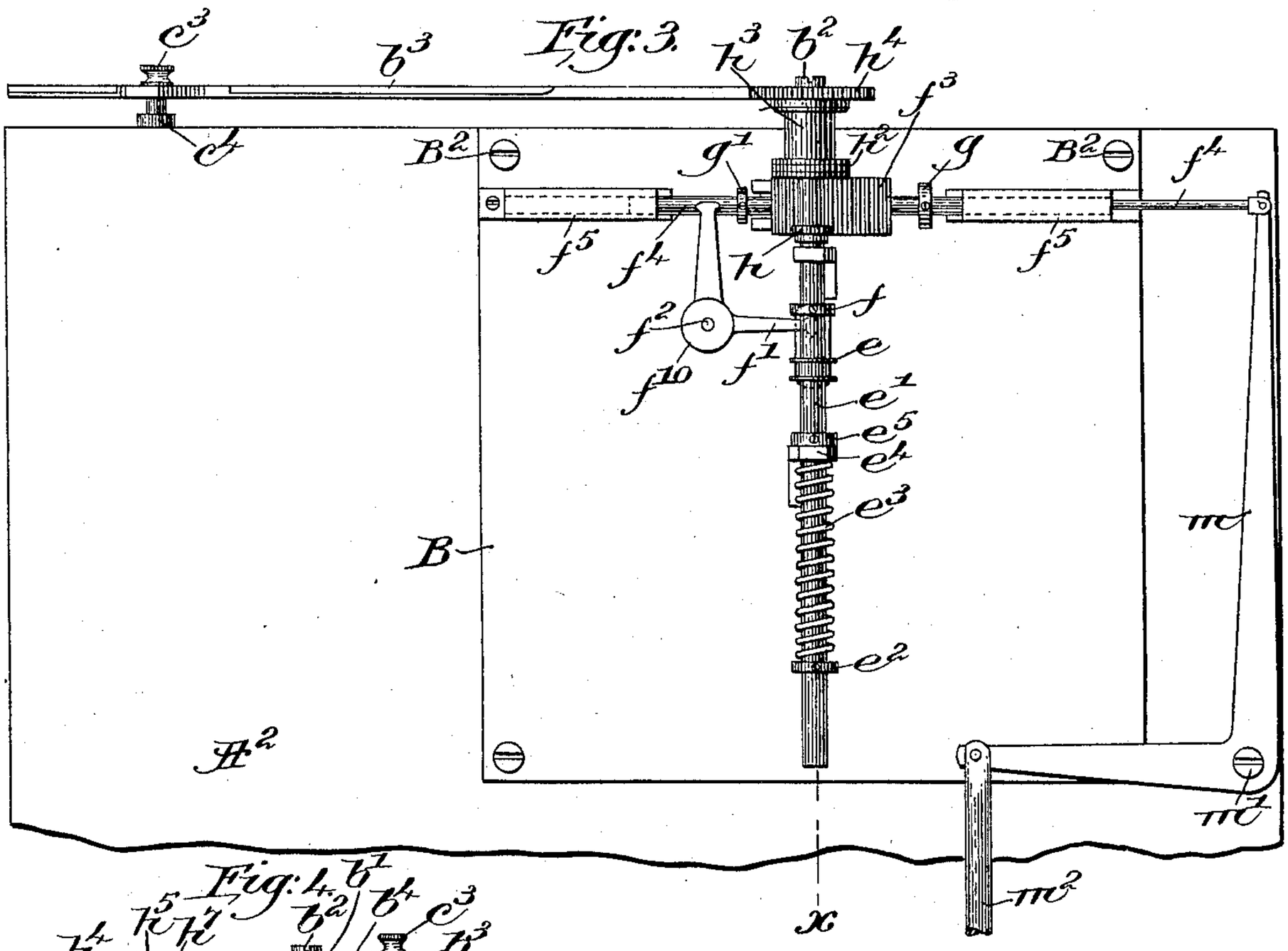
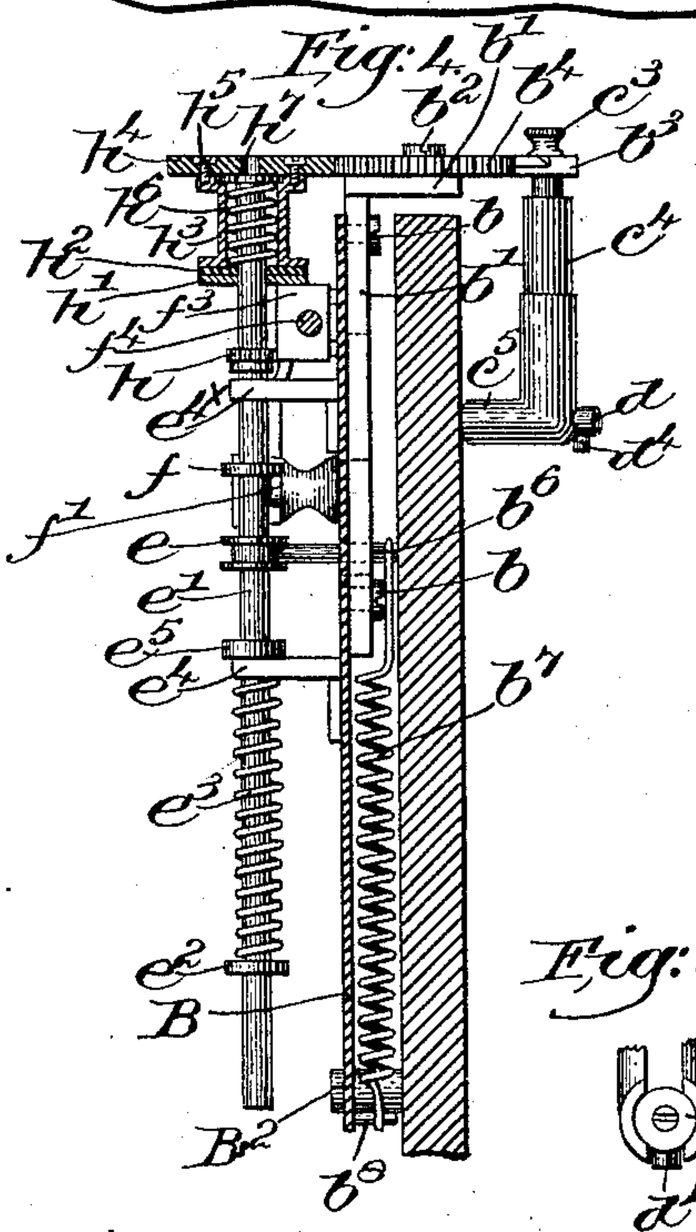


Fig: 4.



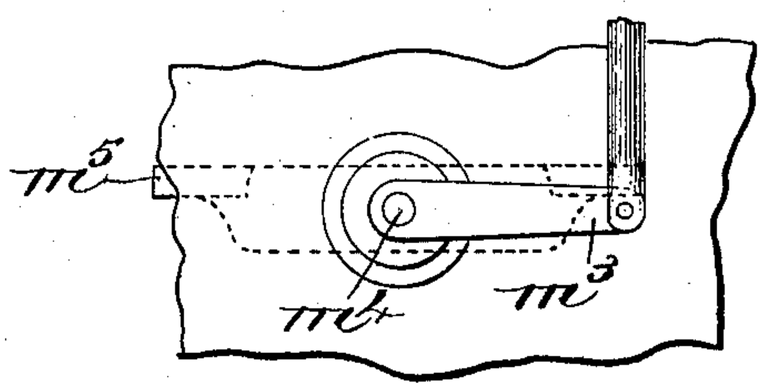


Fig: 5.

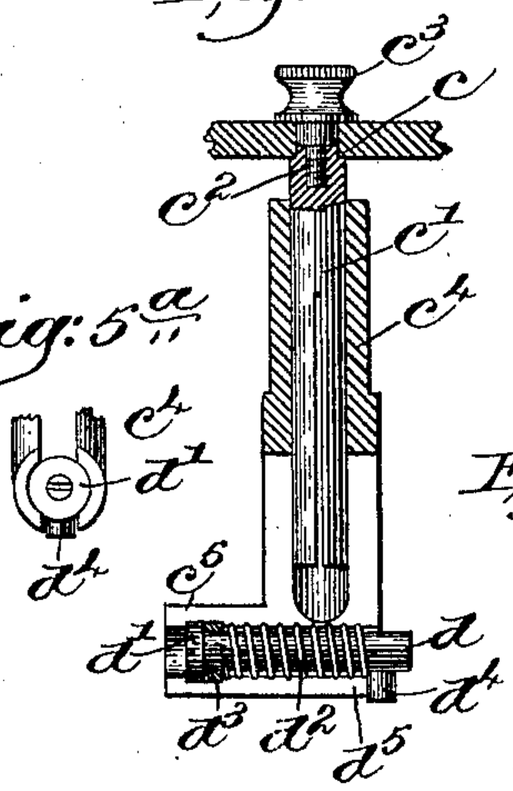


Fig: 5a.

Fig: 6.

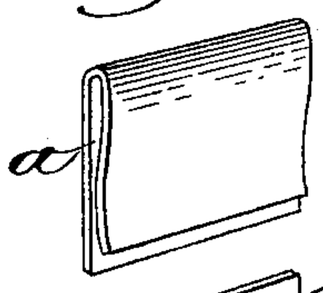
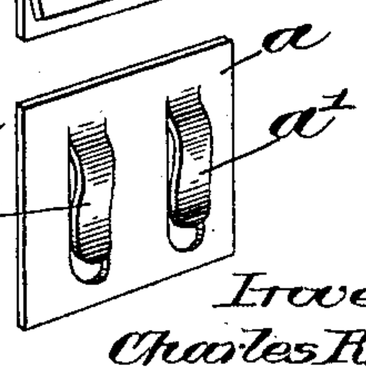


Fig: 7.



Witnesses.
Edward F. Allen.
A. C. Harmon.

Inventor:
Charles R. Hill.
by Darby & Gregory,
Attys.

UNITED STATES PATENT OFFICE.

CHARLES R. HILL, OF WALTHAM, MASSACHUSETTS.

LEAF-TURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 590,761, dated September 28, 1897.

Application filed May 19, 1897. Serial No. 637,162. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. HILL, of Waltham, county of Middlesex, State of Massachusetts, have invented an Improvement in Leaf-Turning Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a novel leaf-turning apparatus adapted to engage and turn each leaf as needed.

In my invention I attach to each leaf to be turned an armature, and coöperating with this I provide an arm or carrier having a magnet to engage the armature attached to the leaf and take said leaf with it, turning it over, and the carrier having turned the leaf fully over a releasing device is moved to detach the armature fixed to the leaf from the magnet.

The arm or carrier referred to has combined with it suitable actuating means to move it to and fro, said means being preferably under the control of a foot or other treadle or starter.

Figure 1 represents a piece of sheet-music supported on a music holder or stand, my improved mechamism being mounted on the stand. Fig. 1ª shows the clip n^5. Fig. 2 is a top or plan view of Fig. 1. Fig. 3 is a rear side view. Fig. 4 is a section in the line x, Fig. 3. Fig. 5 is an enlarged detail of the magnet. Fig. 5ª shows the faces of the magnet, and Figs. 6 and 7 show two forms of armatures or contacts to be fixed to the leaf or sheet to be turned.

To prepare the sheet-music A so that it may be made a coöperative part of my leaf or sheet turning apparatus, I add to the front side of the said leaf an armature or contact a, preferably a piece of metal, which is fitted over the top edge of the leaf and retained there frictionally; or it may, if desired, be otherwise attached, as by glue; and so also, if desired, the armature may be cut to present fingers a' (see Fig. 7) to overlap one side of the leaf.

The sheet-music may in use be supported upon a shelf, as A′, of a suitable stand or rack A^2, suitably supported wherever the same is to be used, and this stand or rack is made instrumental in holding the mechanism employed to turn the leaves one after the other.

To the rear side of this stand (see Figs. 2 and 3) I have attached a suitable frame-plate B, it resting upon hollow lugs B′, through which and into the stand are inserted suitable screws B^2. This said frame-plate at its rear end has loosely mounted upon it through set-screws b the foot of a stand b', said stand having at its top a right-angled portion which receives a stud-screw b^2, which serves as the fulcrum for the magnet-carrier b^3, said magnet-carrier being represented as a lever having at one end a semicircular series of teeth b^4, while at or near its other end the said carrier is provided with a hole for the reception of the reduced upper end c of a rod or pin c', the upper end of said rod having a tapped hole to receive a screw-threaded part c^2 of a stud-screw c^3, inserted through the hole of said carrier and screwed into the threaded hole of the rod or pin c'. This rod or pin has mounted upon it snugly, so as to slide thereon, the hollow shank c^4 of a magnet c^5, and the said pin is split for a portion of its length to hold the magnet frictionally. This magnet is bored out centrally and receives within it a sliding spring-pressed releasing device d. This releasing device is composed of a rod (see Fig. 5) provided with a head d' and fitted to slide in a suitable bearing d^3 of the magnet, a suitable spring d^2 surrounding the shank of the releasing device and normally acting to keep said releasing device with its head in the recess of the magnet and away from its face.

When the carrier occupies the position shown in Figs. 1 and 2, the magnet contacts with the armature a, and thereafter as the carrier is swung around from the right toward the left the magnet in engagement with the armature carries the leaf with it, putting the leaf from the right to the left side. As the carrier arrives in its farthest position to the left the protruding end of the releasing device (represented in Fig. 5) strikes the stand, and the releasing device is moved forwardly with the magnet, the head of the releasing device striking the armature or the sheet opposite the armature, thereby detaching the armature from the magnet by pressure, and in order that the carrier may then move quickly back into its operative position to engage the next leaf to be turned the magnet must have a vertical movement in order

that it may be put into a plane above the top of the leaf just turned over by it.

The releasing device has a projection d^4 extended at right angles from it which travels in a slot d^5 of the magnet as the releasing device is reciprocated in the magnet.

This invention is not limited to the particular shape shown for the magnet, nor to the particular shape of the armature, nor to any particular way of attaching the armature to the leaf.

The stand b' is slotted where it is entered by the stud-screws b, so that the stand may be slid vertically with the carrier in order that the magnet may rise, as described, above the top of the leaf. The stand b' has fixed upon or with relation to it a stud b^6, to which is attached one end of a suitable spring b^7, the opposite end of the spring being attached to a pin b^8, fixed to the frame-plate. This pin b^6 extends through a slot in the frame-plate and enters an annular groove in a collar e, fixed on a shaft e', having attached to it at or near its lower end a suitable collar e^2, on which rests a spring e^3, the upper end of said spring acting against a bracket e^4, connected to and extended backwardly from the frame-plate, the shaft e' above said stand having attached to it a second collar e^5, which bears upon the said stand through the action of the spring and limits the downward position of the shaft.

The shaft e' has fixed upon it a third collar f, under one end of which normally stands an arm f' on an elbow-lever mounted upon a stud f^2, the opposite end of said elbow-lever standing in the path of movement of a toothed slide f^3, the said slide being secured to a rod f^4, mounted in bearings f^5, fixed to the frame-plate B.

The rod f^4 has attached to it two stop-collars g g', the collar g limiting the turning-over stroke of the carrier b^3 and the magnet, as the latter approaches an armature to engage it, by contacting with the inner end of the bearing f^5, while the collar g', as the rod f^4 is moved to the left, viewing Fig. 3, to cause the carrier, its magnet having engaged an armature of a leaf, to turn it, meets the upper end of said lever, causing it, acting on the collar f, to lift the shaft e, causing it to slide in its bearings e^4 and $e^{4\times}$, and at the same time the stand b' is elevated through the action of the grooved collar e and pin b^6, so that while the shaft e' is rotated, as will be described, during the operation of turning the leaf over it will be lifted to remove the magnet from its engagement with the armature after the leaf shall have been turned over.

The shaft e' has fixed upon it a small pinion h, which engages with the teeth of the toothed slide f^3, and as the slide is moved its teeth acting on the pinion rotate the shaft, and the engagement of the pinion and the teeth of the slide is not broken during this operation because the teeth of the slide are long teeth.

The shaft e' has fixed on or with relation to it, just above the toothed slide, a plate h', and resting on this plate is a friction-washer h^2, and this friction-washer has resting upon it the foot of a sleeve h^3, the upper end of the sleeve having fast upon it a toothed gear h^4, screws h^5 being used to effect this connection, and the said shaft within said sleeve is surrounded by a spiral spring h^6, which rests at its lower end upon the said washer, the upper end of the spring resting on another collar h^7, fast on the top of the shaft.

The spring, the washer, and the sleeve and collars referred to constitute a frictional connection between the shaft e' and the toothed gear h^4, and this gear as the shaft is rotated engages the teeth b^4 of the carrier and moves the same back and forth. This frictional connection of the toothed gear h^4 with the shaft e' enables the magnet when it comes to a bearing upon the first leaf to be turned to yield somewhat, so as not to injure or strain the carrier, and owing to this frictional adjustment of the gear to the shaft the magnet is enabled to adapt itself to the varying thicknesses of the pile of leaves to be turned.

The rod f^4 is herein shown as actuated by or through an elbow-lever m, pivoted at m', the opposite end of said elbow-lever having attached to it a link m^2, in turn connected with an arm m^3 of a rock-shaft m^4. This rock-shaft, as herein shown, has connected with it at its end at the front of the stand A^3 a lever m^5, so that the end of said lever may be struck when desired to move the carrier to turn a leaf, or this lever may have connected with it in any suitable manner a rod attached to a treadle, so that by the foot the movement of the carrier may be effected at the desired times.

The carrier and its actuating devices constitute important features of my invention, even though the magnet should be omitted and other usual means for engaging and disengaging a leaf is substituted for it.

The shelf of the stand may, if desired, be provided with a pin or spring n to act at the folded part of the piece of sheet-music and locate the same correctly, the armatures when the spring or pin is at the fold of the music occupying the proper position to be engaged by the magnet.

The shaft e' is rotated by the toothed slide in the direction to cause the carrier, its magnet having engaged an armature attached to a leaf, to turn said leaf over, and as soon as the rear end of the magnet meets an obstruction—as, for instance, the stand, when the leaf is fully turned over—the carrier is thereby temporarily stopped; but the shaft under the action of the toothed slide continues to rotate, while the slide in the last part of its stroke acts through the lever f' to lift the shaft, and while the said carrier is so temporarily arrested the shaft is turned, it slipping in the gear b^4, said gear being prevented from rotation by reason of its engagement with the

teeth of the carrier. After the shaft e' has been lifted sufficiently to put the magnet above the leaf the toothed slide may be moved in the opposite direction at any desired time to enable the magnet to engage another leaf.

In practice I sometimes find in sheet-music a single page, and to provide for turning this page I mount on the pin or spring n a bifurcated clip n^5, (see Figs. 1 and 1^a,) and between the jaws of this clip I push the edge of the said single page, so that while the magnet in engagement with the armature at the top of the page near one corner is turning the page the clip holding the lower end of the edge of the page will turn about the pin or spring.

The stud f^2 on which the lever f' turns may have applied to it outside said lever a suitable friction washer or device f^{10}, so that the said lever will not move of itself.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a leaf-turning apparatus, a support for the leaves to be turned, a carrier having a magnet adapted to engage an armature applied to each leaf to be turned, means to move said carrier to engage said armature and cause it to turn over the leaf, and a sliding pin to effect the release of the armature attached to said leaf from the said magnet, substantially as described.

2. In an apparatus such as described, a stand to hold sheet-music and the like the leaves of which are to be turned, a vibrating toothed carrier provided with means to engage a leaf to be turned, a toothed wheel in engagement with the teeth of the carrier, a sliding shaft on which the said wheel is mounted, a pinion fixed on said shaft, and a sliding rack to engage said pinion to rotate said shaft at the desired time in one and then in an opposite direction, substantially as described.

3. In an apparatus such as described, a stand to hold sheet-music and the like, the leaves of which are to be turned, a vibrating toothed carrier provided with means to engage a leaf to be turned, a toothed wheel in engagement with the teeth of the carrier, a shaft on which the said wheel is frictionally mounted, means to rotate said shaft at the desired time in one and then in an opposite direction, and means to raise and lower said shaft and its attached carrier for engaging the leaf to be turned, substantially as described.

4. The shaft e' provided with a frictionally-held toothed gear, and having an attached pinion, and a toothed magnet-carrier, combined with a toothed sliding block and means to reciprocate said block, substantially as described.

5. The shaft e' provided with a toothed gear, and having an attached pinion and a collar f, means to normally depress said shaft, a toothed block engaging said pinion, a rod carrying said block, a lever having one of its ends located to coöperate with said collar, the other end of said lever engaging the said rod, and means to slide said rod, it in its movements rotating said shaft and also sliding it vertically during a portion of its said rotation, substantially as described.

6. In an apparatus of the class described, a movable carrier, provided with a split pin or rod, combined with a magnet having a sleeve fitted to said rod, substantially as described.

7. In an apparatus of the class described, a movable carrier, and a connected hollow magnet, combined with a sliding spring-pressed pin, to operate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES R. HILL.

Witnesses:
GEO. W. GREGORY,
MARGARET A. DUNN.