Oct. 23, 1928. 1,689,106

L. BOYD

LEAF TURNER

Filed Nov. 17, 1927 2 Sheets-Sheet 1

Fig. 1.

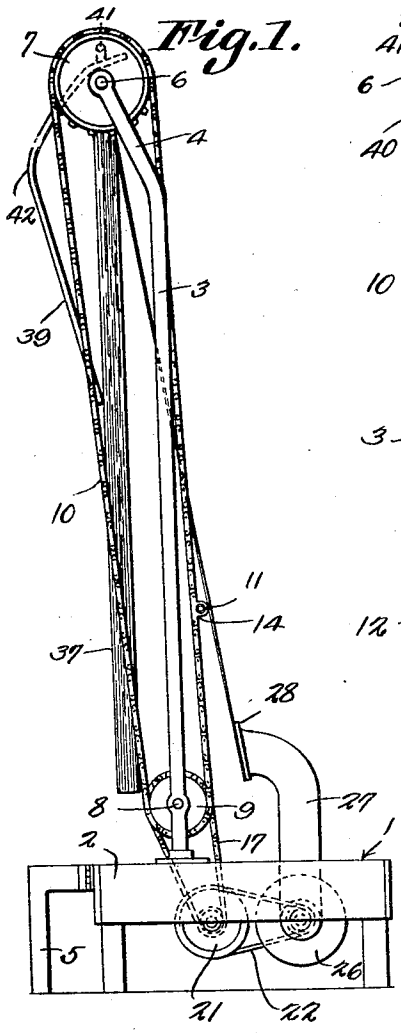
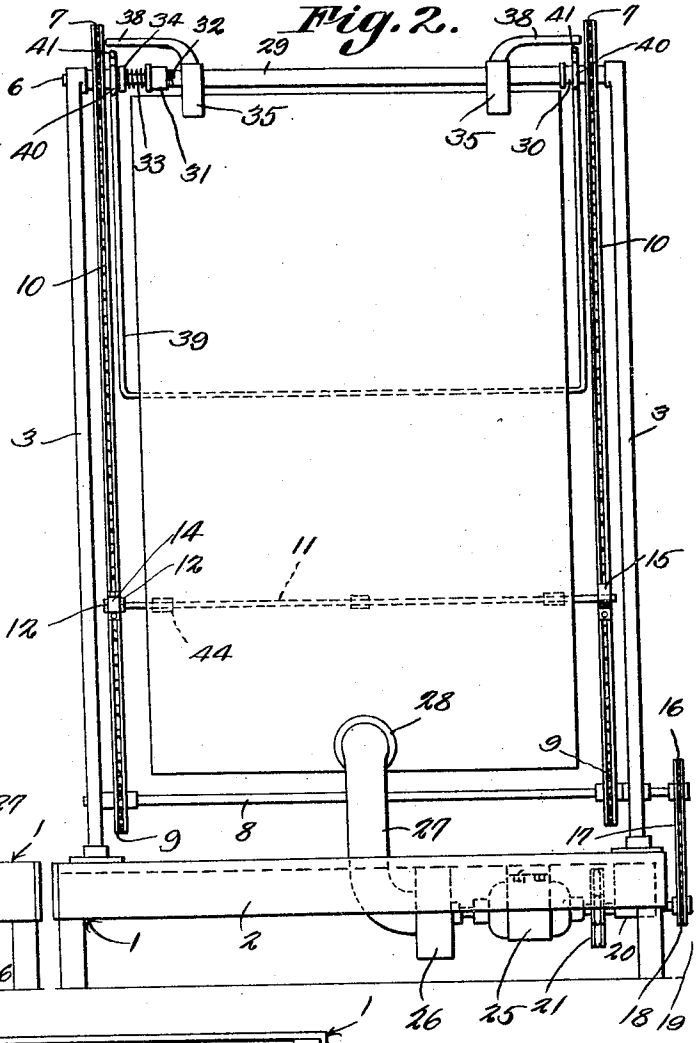


Fig. 2.



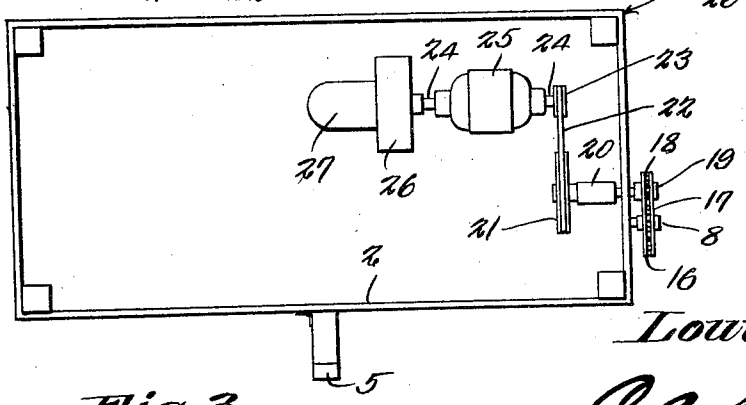


Fig. 3.

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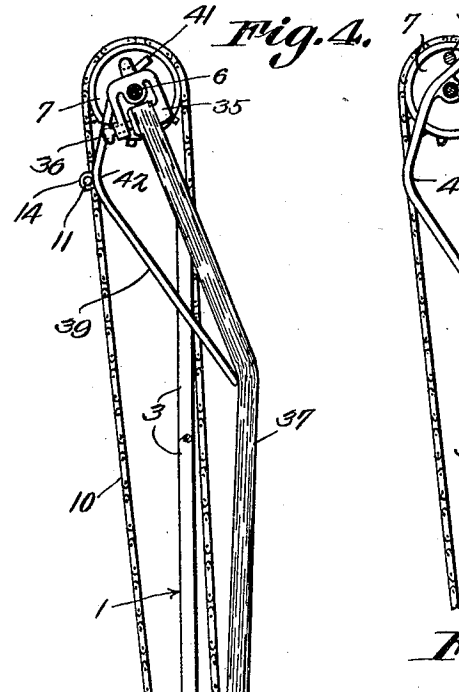


Fig. 4.

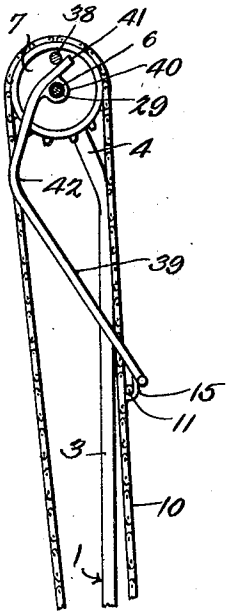


Fig. 5.

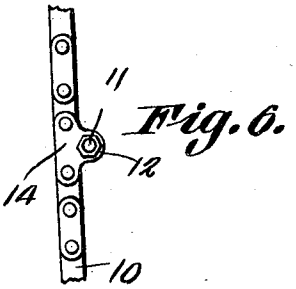


Fig. 6.



Fig. 7.

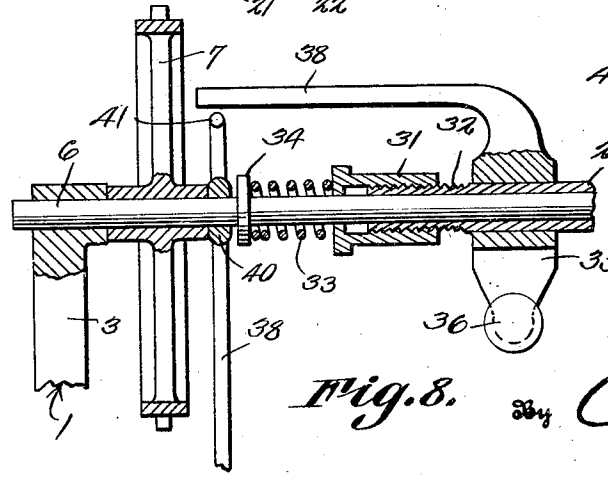


Fig. 8.

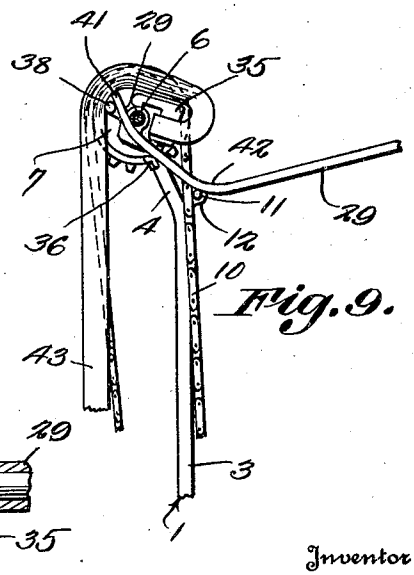


Fig. 9.

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Patented Oct. 23, 1928. 1,689,106

UNITED STATES PATENT OFFICE.

LOUIS BOYD, OF CONNELLSVILLE, PENNSYLVANIA.

LEAF TURNER.

Application filed November 17, 1927. Serial No. 233,934.

The device forming the subject matter of this application is a leaf turner of that general sort shown in my prior Patent No. 1,630,290, issued May 31, 1927. The device includes a means whereby the leaves of a book may be turned over, to display wall paper or anything else, the construction being such that the book is restored to its original pendent position, after all of the leaves have been turned over, one at a time.

The present invention aims, especially, to provide novel means for moving the book into the path of a mechanism which holds the leaves, one at a time, within the range of a leaf turner. Another object of the invention is to provide novel means whereby after the last leaf has been turned, the binding of the book may be inverted or turned about an axis, thereby to restore the book to its original pendent position.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:—

Figure 1 shows in side elevation, a device constructed in accordance with the invention;

Figure 2 is a front elevation of the structure shown in Figure 1;

Figure 3 is a bottom plan of the base;

Figure 4 is a view similar to Figure 1 but showing the parts as they will appear when the leaf turner cooperates with the reverser to move the book forwardly so that the leaves respond readily to the suction mechanism;

Figure 5 is a sectional elevation showing the parts as they will appear when the reverser and the leaf turner are in cooperating relation to rotate the binding of the book with respect to a horizontal axis and to restore the book to its original pendent position;

Figure 6 is a detail showing one of the sprocket chains;

Figure 7 is a detail showing one of the other sprocket chains;

Figure 8 is a sectional view illustrating the brake mechanism and portions of the reversing means;

Figure 9 is a view showing the parts as they will appear whilst the binding of the book is being reversed to restore the book to its original pendent position delineated in Figure 1.

In carrying out the invention there is provided a frame 1 including a base 2 and parallel vertical standards 3 mounted on the base 2. The base 2 may be sustained by a foldable prop 5. The standards 3 have off-set upper ends 4 connected by a cross rod 6. Idle sprocket wheels 7 are journaled on the cross rod 6. A shaft 8 is mounted to turn in the standards 3 and is located near to the lower ends of the standards. There are sprocket wheels 9 on the shaft 8. A sprocket chain 10 is engaged with the sprocket wheels 7—9. The numeral 11 marks a leaf turner, in the form of a rod, on which, if desired, rollers 44 may be journaled, the rollers being adapted to lift the friction when the turner 11 cooperates with the leaves of a book as hereinafter described. By means of nuts 12, one end of the leaf turner 11 is held in a socket 14 on one of the chains 10. The opposite end of the leaf turner 11 is engaged in a U-shaped bracket 15 on the other of the sprocket chains 10. Owing to the fact that the leaf turner or rod 11 is supported, merely, in the bracket 15, instead of being fastened securely in the bracket, the rod or turner 11 is driven by the chain 10, the rod or carrier being merely supported in the bracket 15. The object of this one-chain drive is to keep the carrier rod level at all times. If there were a two-chain drive, the carrier rod at times might not be level. The one-chain drive, prevents the chains 10 from being so yoked together by the carrier rod 11 that the sprocket chains will jump off the sprocket wheels 7 and 9.

There is a sprocket wheel 16 on the end of the shaft 8, the sprocket wheel 16 cooperat-

ing with a sprocket chain 17 engaged with a sprocket wheel 18 on a shaft 19 journaled in a bearing 20 on the base 2, the inner end of the shaft 19 carrying a sprocket wheel 21 cooperating with a sprocket chain 22 that is engaged with the sprocket wheel 23 on the shaft 24 of a motor 25 of any desired sort, preferably an electric motor. The shaft 24 is connected with a suction device 26 having a conduit 27 which is extended horizontally and then upwardly through the base 2, the conduit 27 terminating in a mouth 28 which is inclined slightly with respect to the vertical, as shown in Figure 1 of the drawings.

A tubular shaft 29 is mounted on the cross rod 6 to turn thereon, but is limited in its turning movement by a brake mechanism which will now be described. One end of the tubular shaft 29 engages a fixed abutment 30 on the rod 6, an adjusting collar 31 being threaded at 32 on the opposite end of the shaft 29. The collar 31 engages one end of a compression spring 33 disposed about the rod 6, the opposite end of the spring 33 engaging an abutment 34 on the rod 6. It will be obvious that the pressure exerted by the spring 33 may be changed by shifting the collar 31 lengthwise of the shaft 29. The object in exerting a variable braking pressure on the shaft 29 is to adapt the device for use in connection with books of different weights, an observation which will be understood more readily after the operation of the device has been gone into.

Book holders 35, in the form of clamps, are secured to the tubular shaft 29 and include screws 36 adapted to bind upon the butt ends of the leaves of a book 37. The clamps or book holders 35 have laterally extended, outwardly projecting arms 38. The device includes a reverser 39 which is U-shaped in elevation, as shown in Figure 2. The side portions of the reverser 39 are mounted as shown at 40 on the cross rod 6, so that the reverser can swing on the cross rod. The upper ends of the side portions of the reverser 39 form fingers 41 cooperating with the arms 38 on the book holders 35 in a way which will be described hereinafter. The side portions of the reverser 39 are curved as at 42 to form cam members.

So far as the drive is concerned, it will be understood that the motor 25 operates the shaft 24, the shaft driving the suction device 26, and the member 26 creating a suction on the conduit 27. The shaft 24 of the motor 25 rotates the sprocket wheel 23, and the chain 22, together with the sprocket wheel 21, rotates the shaft 19; and from the shaft 19, motion is transmitted to the shaft 8 by means of the sprocket wheel 18, the sprocket chain 17, and the sprocket wheel 16. The sprocket wheels 9 on the shaft 8 actuate the sprocket chains 10, and the chains 10 carry the leaf turner 11 in an orbit about the book 37.

When the leaf turner 11 moves downwardly behind the standards 3, as shown in Figure 4 of the drawings, the leaf turner cooperates with the cam portions 42 of the reverser 39. This causes the reverser to swing to the right in Figure 4, and the book 37 is carried to the right, so that the foremost leaf of the book is brought into the field of suction at the mouth 28 of the conduit 27. As soon as the leaf turner 11 rides off the cam at 42, the reverser 39 and all of the book 37 excepting the first leaf, swings down and back into the position shown in Figure 1, the first leaf being held against the mouth 28 of the conduit 27, by suction. When the leaf turner 11 moves upwardly at the front of the standards 3, the leaf turner engages the leaf that is held by suction against the mouth 28 of the conduit 27, and turns that leaf over. One leaf after another, thus, is turned over, as shown at 43 in Figure 9 to form a pendent portion. The lower end of the reverser 39 tends to swing forwardly, but the reverser 39 remains in the position of Figure 1, as long as there is a single leaf left, against which the lower end of the reverser can abut. When, however, the last leaf has been turned over and back by the action of the turner 11, then the reverser 39 swings by gravity into the position of Figure 5, the lower end of the reverser then being in the path of the leaf turner 11, as the leaf turner moves upwardly. The leaf turner 11 now engages the lower end of the reverser, and swings the reverser upwardly, backwardly and downwardly around an axis represented by the rod 6. When the reverser swings as aforesaid, the fingers 41 at the upper end of the reverser cooperates with the arms 38 of the book clamps, and the book clamps (35) along with the butt ends of the leaves of the book 37, are swung around the cross rod 6 from the position shown in Figure 9 to the position shown in Figure 1, whereupon the cycle is repeated.

What is claimed is:—

1. In a device of the class described, a frame, a book holder having an arm, a book including leaves, the butt ends of the leaves being held by the book holder, mechanism for mounting the book holder on the frame for rotation about an axis, a leaf turner, means for mounting the leaf turner for movement in an orbit about the book, means for moving the free ends of the leaves, one at a time, into the path of the turner, whereby the turner will turn the leaves backwardly and downwardly with respect to said axis, and a reverser mounted to swing on the frame and resting against the last leaf of the book, the turner engaging the reverser to carry the book toward the means for moving the free ends of the leaves, the reverser swinging into the path of the turner after the last leaf has been turned, whereby the turner will operate the reverser and cause the reverser to engage

the arm, thereby to swing the holder and the butt ends of the leaves around said axis and to restore the book to its original position.

2. A device of the class described, constructed as set forth in claim 1, and further characterized by the fact that said mechanism includes a tubular shaft carrying the holder and journaled on the frame, and means for applying an adjusted braking pressure to the shaft thereby to limit its rotation and to adapt the device for use in connection with books of different weights.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

LOUIS BOYD.