May 1, 1951 D. S. BOYD 2,551,485

LEAF TURNER DEVICE

Filed Nov. 12, 1947 2 Sheets-Sheet 1

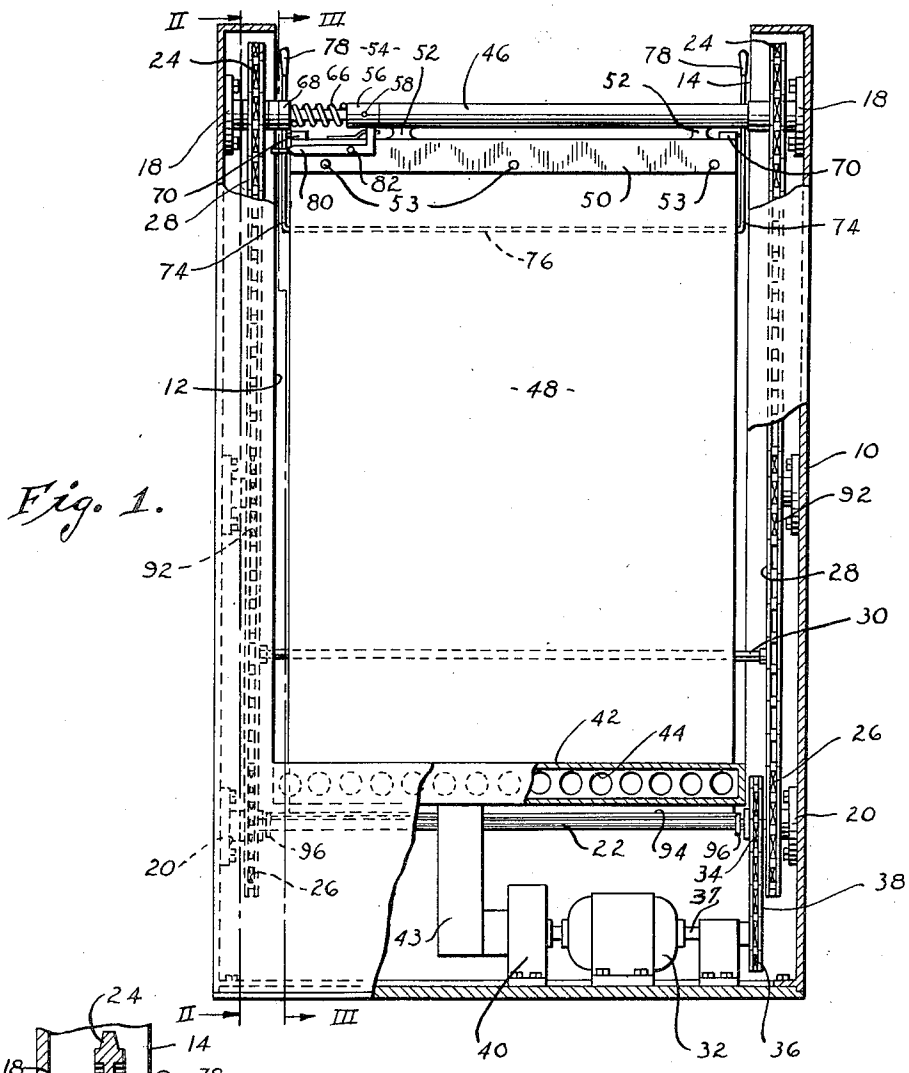


Fig. 1.

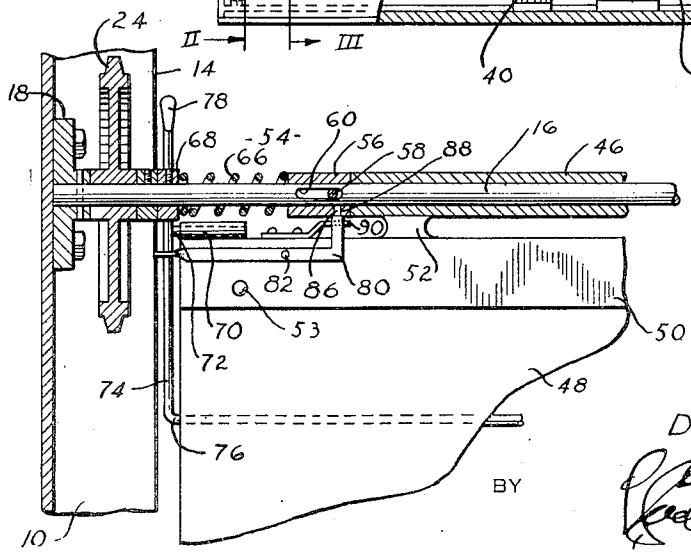


Fig. 7.

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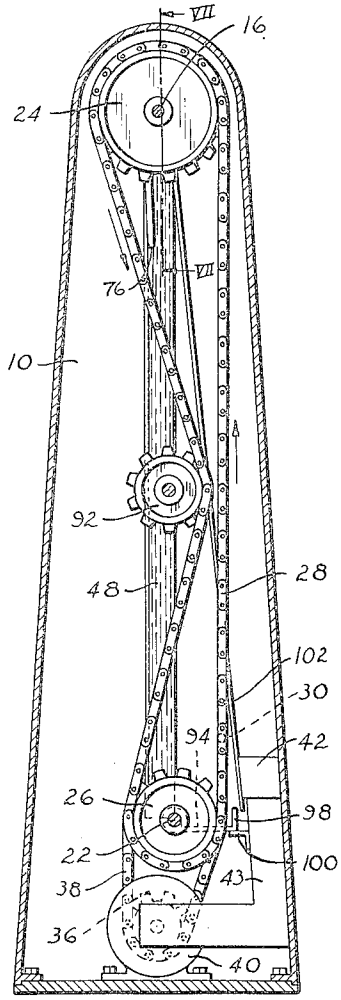


Fig. 2.

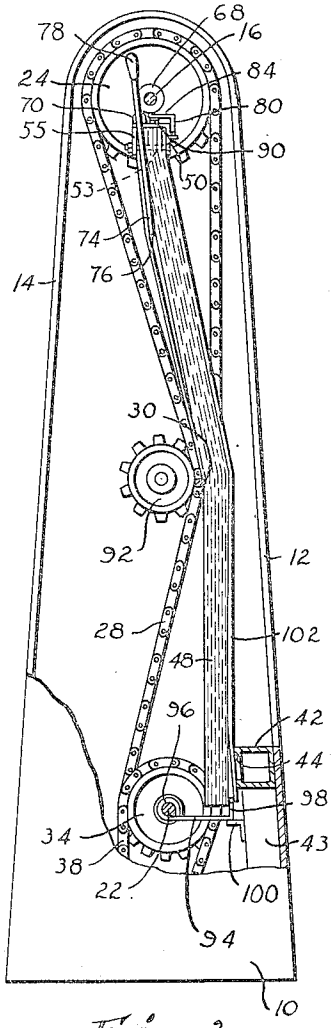


Fig. 3.

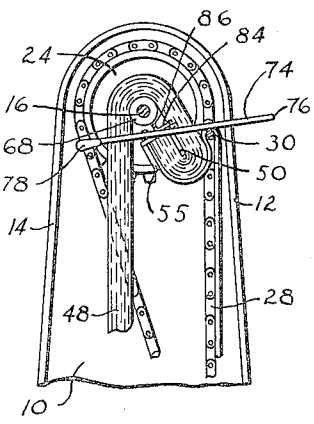


Fig. 4.

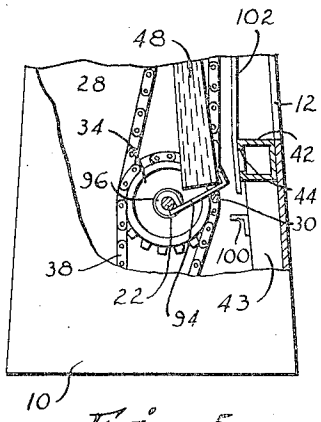


Fig. 5.

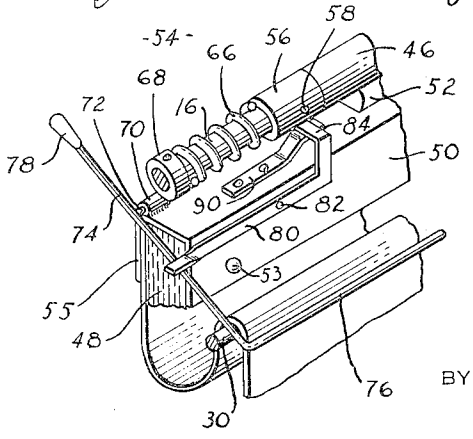


Fig. 6.

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LEAF TURNER DEVICE

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5 Claims. (Cl. 40—104)

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This invention relates to the field of advertising and displaying of merchandise generally, the primary object being to provide a device for automatically turning consecutive leaves of a book or like pack of flexible sheets of material and returning the said pack to an original starting position for repeating the cycle of operation.

The most important object of this invention is the provision of a leaf turning device in the nature of that set forth in Patents Nos. 1,630,290 and 1,689,106, issued May 31, 1927, and October 23, 1928, respectively and to improve upon a device of such character as disclosed in my copending application bearing Serial No. 724,615, filed January 27, 1947, and covering "Leaf Turner."

Another important object of this invention is the provision of a leaf turning device having a pair of spaced apart rotatable shafts, the uppermost of which is provided with a sleeve for mounting a pack of leaves and having releasable means operable by the leaf turning mechanism per se for holding the sleeve against rotation on the upper shaft until the last leaf of the pack is being turned over the uppermost shaft.

A further object of this invention is the provision of a leaf turner of the kind above set forth having a spring loaded clutch and a latch mechanism for holding the clutch against the sleeve until such time as the last pack is being turned, the leaf turning portion of the device being operable to release said latch.

Another important object of this invention is the provision of a leaf turning device having means associated therewith for maintaining the pack of leaves in a separated condition from the leaf to be turned as the latter commences its folding movement over one of the rotatable shafts of the assembly.

Many additional objects will be made clear during the course of the following specification, reference being had to the accompanying drawings, wherein:

Figure 1 is a front elevational view of a leaf turning device made in accordance with my present invention, parts being broken away and in section to reveal details of construction.

Fig. 2 is a cross sectional view taken on line II—II of Fig. 1.

Fig. 3 is a cross sectional view taken on irregular line III—III of Fig. 1 showing parts thereof in a different operating position from that shown in Fig. 1.

Fig. 4 is a fragmentary cross sectional view similar to Fig. 3 showing certain parts of the assembly in a different phase of its cycle of operation.

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Fig. 5 is a fragmentary cross sectional view similar to Fig. 3 showing other parts of the mechanism in an operative position.

Fig. 6 is a fragmentary perspective view of the clutch latching mechanism; and

Fig. 7 is a fragmentary cross sectional view taken on line VII—VII of Fig. 2.

Referring now more specifically to the drawings, the numeral 10 designates broadly a frame having an opening 12 and an opening 14 at the front and rear thereof respectively.

The normally uppermost shaft 16 is rigidly mounted upon the frame 10 in a horizontal position within a pair of spaced apart brackets 18. A pair of bearings 20 mounted upon the frame 10 near the lowermost end thereof mounts a shaft 22 for rotation. The shafts 16 and 22 are substantially parallel and each have a pair of sprocket wheels mounted thereon. The shaft 16 has sprockets 24 rotatably mounted thereon at each of its ends while the shaft 22 has a pair of sprocket wheels 26 thereon adjacent the respective bearings 20 and rotatable with the shaft 22.

A pair of endless chains 28 pass over each of the sprockets 24 and the sprockets 26, as clearly illustrated in Fig. 1 and a horizontal rod 30 secured at each end thereof to one of the chains 28 in a horizontal position and substantially parallel to the shafts 16 and 22, completes the conveyor assembly of the device. Rotation of the shafts 16 and 22, and thereby movement of the endless chains 28 in the direction of the arrows shown in Fig. 2, is accomplished through a prime mover, which, in the instance illustrated, constitutes an electric motor 32.

A pair of sprockets 34 and 36 on the shaft 22 and a shaft 37 of the motor 32 respectively, are joined by a short endless chain 38. The motor shaft 36 has operably secured thereto at its opposite end, an impeller (not shown) and disposed within a housing 40 for creating a suction within an elongated tubular member 42. The member 42 is disposed transversely across the frame 10 and suitably mounted thereon and has connection with the housing 40 through the medium of a conduit 43.

A plurality of openings 44 are formed in the member 42 as illustrated in Figs. 1, 3 and 5 for reasons hereinafter more fully described.

The uppermost horizontal shaft 16 has a sleeve 46 loosely telescoped thereon for mounting a pack of leaves, broadly designated by the nu-

meral 48. These leaves 48 are fastened together by a bracket 50. This bracket 50 is L-shaped in cross section as shown in Fig. 6 and has attachment to the sleeve 46 through the medium of a pair of ears 52. A plurality of pins 53 pass through the bracket 50 and the pack of leaves 48, there being a removable plate 55 received by the pins 53 and disposed along the back of pack 48 to hold the latter tightly in place. Obviously the leaves of pack 48 may be individually threaded on pins 53 or bound together and then mounted on bracket 50. It is thus seen that the entire pack 48 is disposed in depending relationship to the sleeve 46 and the shaft 16 in full view through the opening 12 in the front of the frame 10. When the pack 48 is in a suspended relationship as illustrated in Figs. 1, 2 and 3, the lowermost loose edges of the leaves hang directly in front of the openings 44 of the member 42.

A clutch mechanism broadly designated by the numeral 54 includes a collar 56 circumscribing the shaft 16 and having a transverse pin 58 passing therethrough and through an elongated slot 60 formed in the shaft 16. A spring 66 coiled about the shaft 16 is held against the collar 56 by a second collar 68, mounted upon the shaft 16. It is thus seen that the spring 66 yieldably holds the collar 56 against the sleeve 46.

A pair of bearings 70 on the bracket 50 near each end thereof and adjacent the normally rearmost face of bracket 50 journal a pair of stub shafts 72 having arms 74 secured thereto. These arms 74 are joined by a cross bar 76 at their lowermost ends. This cross bar 76 extends the entire length of the bracket 50 and traverses the width of the sheets of material forming the pack 48.

As illustrated in Figs. 2, 3, 4 and 6, this bar 76 is disposed between the last sheet or leaf of the pack 48 and the remaining leaves thereof. In other words, the bar 76 is disposed in front of the last leaf of the pack 48. The uppermost free ends of the arms 74 are each provided with a counterweight 78, which weights 78 tend to move the bar 76 away from the last sheet of the pack 48 and against the remaining sheets thereof.

A latch 80 pivotally secured to the bracket 50 as at 82 has an arm 84 overlying the bracket 50 and extending below the collar 56. Extending upwardly from the arm 84 of the latch 80 is a pin 86 integral with the arm 84 and normally held within an opening 88 formed in the collar 56 by a leaf spring 90 mounted upon the bracket 50 and underlying the arm 84. This latch 80 extends outwardly beyond one end of the bracket 50 in overlying relationship to one of the arms 74, as clearly illustrated in Figs. 6 and 7. Each of the endless chains 28 has an idling sprocket 92 mounted upon the frame 10 and substantially midway between the shafts 16 and 22 for disposing the normally rearmost length of the chains 28 at an angle illustrated clearly in Figs. 2 and 3.

A U-shaped rod 94 substantially coextensive in length with the shaft 22 is looped about the shaft 22 as at 96. This rod 94 is freely swingable upon the shaft 22 and has an offset portion 98 on the free edge thereof. A shelf 100 underlies the rod 94 for holding the latter in a normally horizontal position.

In operation, the pack of leaves 48 is suspended from the sleeve 46 through the medium of bracket 50 in a substantially vertical position as illustrated in Fig. 2. As the motor 32 is caused to be energized, the shafts 16 and 22 as well as the

sprockets 24 and 26 thereon, will be rotated. Such rotation will move the endless chains 28 and the transverse bar 30 connected thereto. As the bar 30 moves around the lowermost sprockets 26, it will move into engagement and in underlying relationship to the rod 94 in the manner illustrated in Fig. 5. This rod 94 will thereby be moved upwardly and the portion 98 thereof will contact the pack of leaves 48 and be interposed between remaining leaves of the pack 48 and the leaf 102 that has previously been sucked forwardly toward the openings 44 within the member 42. As the bar 30 continues to be moved upwardly along the back of the leaf 102, the same will move out of engagement with the rod 94 and the latter will be free to fall downwardly by gravity to its normal position upon the shelf 100. As bar 30 continues to move upwardly, it will fold the sheet 102 over the top of the sleeve 46. During such normal operation, the bar 76 remains in the position illustrated in Fig. 3 and the latch 80 is engaged with the collar 56. Thus, the sleeve 46 is held against rotation on the shaft 16 and the bracket 50 is thereby held against movement. When all of the leaves of the pack 48 have been folded over the sleeve 46 with the exception of the last leaf thereof, the bar 30 will move behind such last sheet because of the suction action present at the openings 44. This bar 30 will move upwardly in the same manner as above described and will also move behind the arms 74. This action is clearly illustrated in Fig. 6 and as bar 30 comes into contact with the arms 74, the latch 80 will be released thereby releasing the sleeve 46. As the bar 30 continues to move around the uppermost sprockets 24, the arms 74, cross bar 76, bracket 50 and sleeve 46 will all be moved over the shaft 16 in the manner illustrated in Fig. 4. With the latch 80 released, the collar 46 will be free to release itself against the action of the spring loaded clutch 56. When the entire pack has been thus turned over the shaft 16, the opening 88 of the collar 56, will again move into position where the pin 86 will automatically engage therewith.

It is notable that as the rod 30 moves downwardly along the rearmost stretch of the chains 28, the same will pass over the idler sprockets 92 and move the entire pack 48 toward the suction means including the member 42. The single sheet 102 will be held by such suction and when the bar 30 continues to move downwardly past idlers 92, the remainder of the pack will fall back slowly by gravity to a vertical position.

It has been found that when the rod 94 is entirely omitted from the assembly, a leaf or leaves of the pack 48 that may become accidentally crimpled or have parts of their lowermost edges folded into the path of the rod 30, will be carried along with the leaf 102. By the provision of this rod 94 and its portion 98, the crimpled leaves of the pack 48 are positively moved out of the way and there is no tendency of the rod 30 to engage with sheets or leaves not intended to be folded.

The counterweights 78 on the arm 74 are selected to have only a slight tendency to move the bar 76 against the pack 48. Thus, as the leaves are continually folded over the sleeve 46, the arm 74 will not accidentally disengage the latch 80. However, when all of the leaves of the pack 48 have been removed with the exception of the last leaf, the weights 78 will cause the arms 74 to swing tightly against the latch 80 and as the rod 30 moves upwardly, the same will move

into engagement with the arm 74 in the manner illustrated in Fig. 6.

It is clear, therefore, that there will be no tendency whatsoever of the bracket 50 to flop over the shaft 16 prior to all of the sheets being folded thereover with the exception of the last sheet. The possibility of the last sheet clinging to the sheet next adjacent thereto and thereby causing movement of the bracket 50 and rotation of the sleeve 46, is positively eliminated. This feature, along with the utilization of the rod 94 and its function, constitutes the two primary improvements of my present leaf turner over that which is set forth in my aforesaid copending application. Tests have proved that virtually any weight sheet may be used for the pack 48, the only changes that need be made, being perhaps a change of the weights 78 and a shifting of the collar 68 upon the shaft 16 to increase or lessen the action of the spring 66 upon the clutch mechanism.

Manifestly many details of construction herein set forth for the purpose of illustration only may be changes without departing from the broad principles herein set forth. It is, therefore, desired to be limited only by the spirit of this invention and scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a leaf turning device of the character described, a horizontal shaft; a sleeve telescoped on said shaft and rotatable thereon; means for fastening together a plurality of leaves of flexible material at one end thereof, said means having connection with the said sleeve for suspending the leaves therefrom; structure for folding said leaves one at a time over said sleeve; and releasable means for holding the sleeve against rotation on the shaft as said leaves are folded.

2. In a leaf turning device of the character described, a horizontal shaft; a sleeve telescoped on said shaft and rotatable thereon; means for fastening together a plurality of leaves of flexible material at one end thereof, said means having connection with the said sleeve for suspending the leaves therefrom; structure for folding said leaves one at a time over said sleeve; and releasable means for holding the sleeve against rotation on the shaft as said leaves are folded, said releasable means including a spring-loaded clutch on the shaft and latch means for holding the clutch engaged with the sleeve, said latch having parts operable by said structure when all of said leaves have been folded for permitting free rotation of the sleeve.

3. In a leaf turner; a frame; upper and lower horizontal shafts mounted within the frame; sprockets loosely mounted on the upper shaft; sprockets secured to the lower shaft; chains operating over the sprockets and adapted to transmit movement of the lower shaft to the sprockets of the upper shaft; a sleeve loosely mounted on the upper shaft, a clamp forming a part of the sleeve and adapted to clamp a pack of leaves suspending the pack of leaves vertically within the frame; means embodying a clutch at one end of the sleeve, adapted to normally hold the sleeve against movement; means for successively turning the leaves of the pack of leaves supported by the clamp, successively exposing the leaves to view; and means operated by the leaf-turning means for rotating the sleeve and clamp against the action of the clutch as the last leaf of the pack is turned.

4. In a leaf turner; a frame; upper and lower horizontal shafts mounted within the frame; sprockets loosely mounted on the upper shaft; sprockets secured to the lower shaft; chains operating over the sprockets and adapted to transmit movement of the lower shaft to the sprockets of the upper shaft; a sleeve loosely mounted on the upper shaft, a clamp forming a part of the sleeve and adapted to clamp a pack of leaves suspending the pack of leaves vertically within the frame; releasable apparatus at one end of the sleeve, adapted to normally hold the sleeve against movement; means for successively turning the leaves of the pack of leaves supported by the clamp, successively exposing the leaves to view; and means operated by the leaf-turning means for releasing said apparatus and rotating the sleeve and clamp as the last leaf of the pack is turned, said last mentioned means having parts normally disposed between said last leaf and the remainder of said pack.

5. In a leaf turner; a frame; upper and lower horizontal shafts mounted within the frame; sprockets loosely mounted on the upper shaft; sprockets secured to the lower shaft; chains operating over the sprockets and adapted to transmit movement of the lower shaft to the sprockets of the upper shaft; a sleeve loosely mounted on the upper shaft, a clamp forming a part of the sleeve and adapted to clamp a pack of leaves suspending the pack of leaves vertically within the frame; releasable apparatus at one end of the sleeve and normally holding the sleeve against rotation on the upper shaft; means for successively turning the leaves of the pack of leaves supported by the clamp, successively exposing the leaves to view; means operated by the leaf-turning means for releasing said apparatus and rotating the sleeve and clamp as the last leaf of the pack is turned; and means forming a part of said apparatus and engageable with the sleeve for yieldably retarding the rotation of said sleeve when the apparatus is released.

DONALD S. BOYD.

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