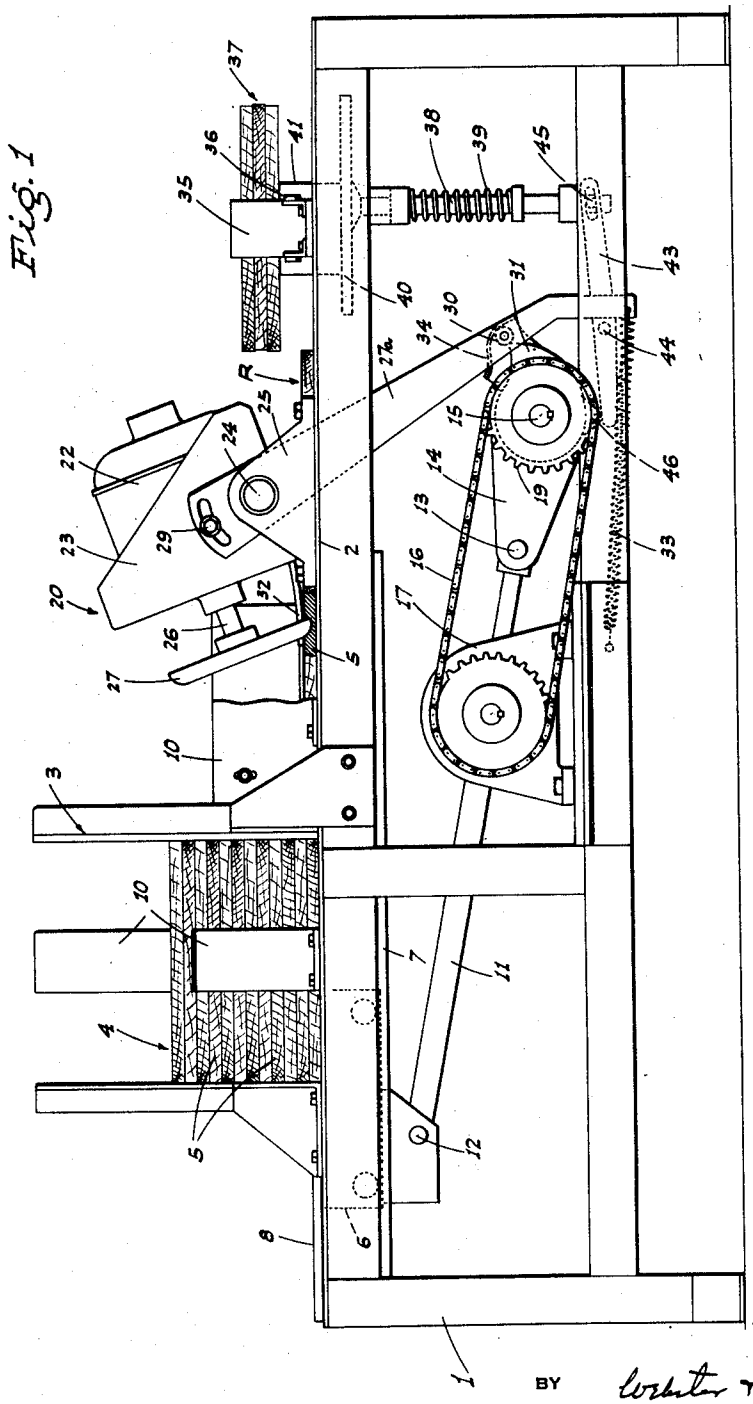
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MACHINE FOR CUTTING HANDHOLDS IN WOODEN BOX ENDS

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Fig. 1



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Fig. 2

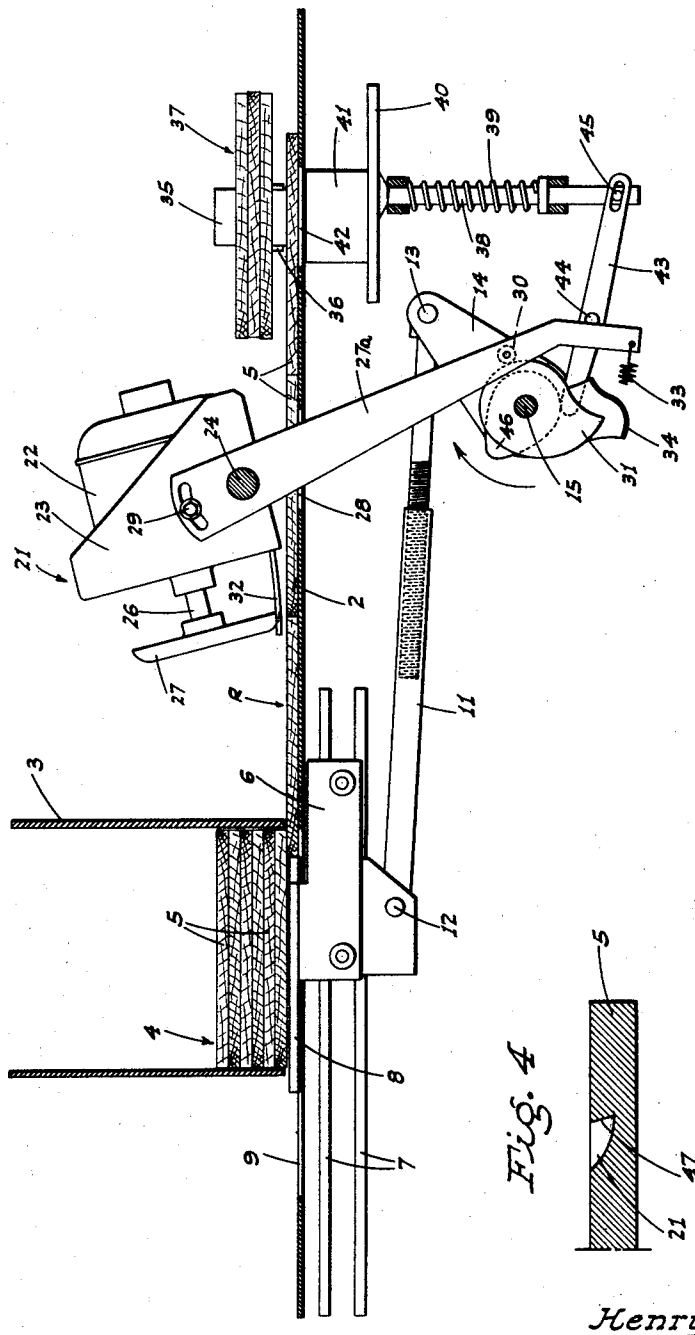


Fig. 4

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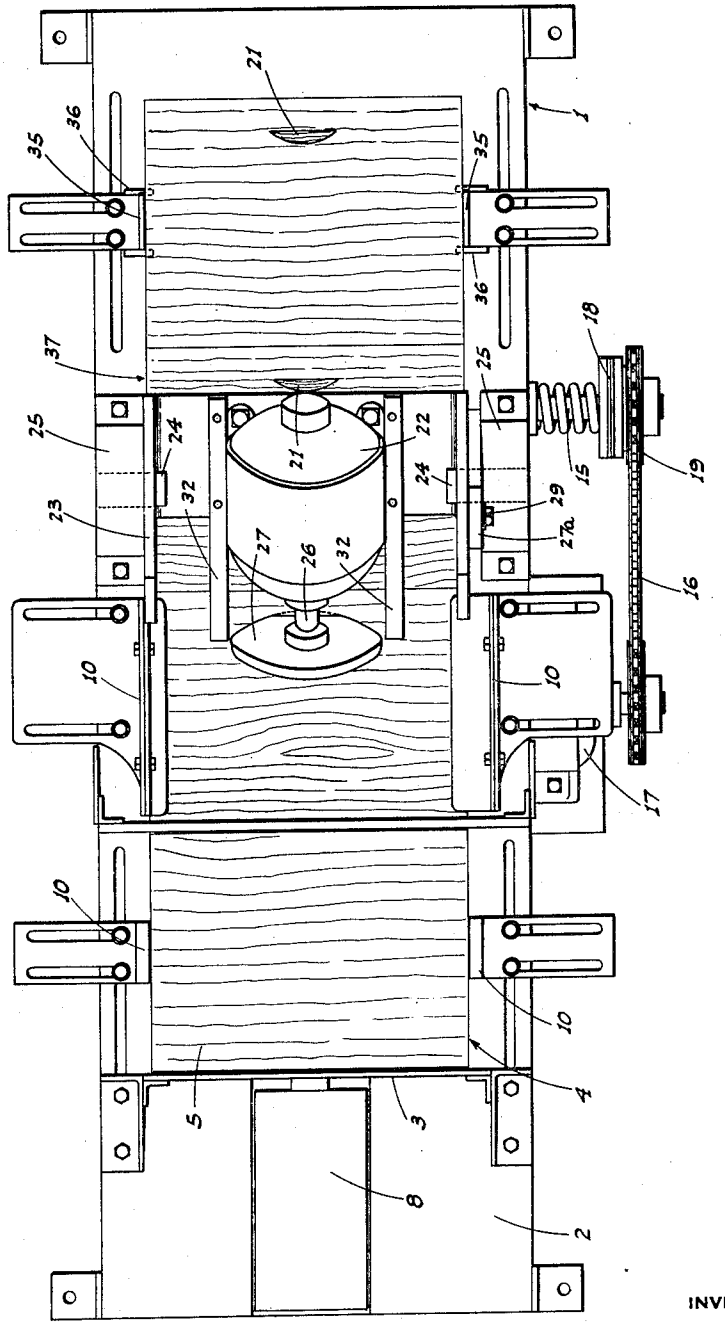


Fig. 3

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MACHINE FOR CUTTING HANDHOLDS IN WOODEN BOX ENDS

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2 Claims. (Cl. 144—136)

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This invention is directed to, and it is an object to provide, a novel machine for automatically cutting the hand-hold or finger groove in wooden box ends in the course of manufacture of the same.

Another object of this invention is to provide a machine for cutting hand-holds in wooden box ends, which is operative to undercut the top or upper edge of the finger groove whereby to facilitate engagement thereof with the fingers for lifting of the box.

A further object of the invention is to provide a machine, of the character described, which comprises a frame-supported table having a box end hopper associated therewith, a reciprocating carriage arranged to advance box ends step by step along the table in a single file row from the hopper, and a motor unit including a rotary cutter mounted adjacent said row operative—in predetermined timed relation to the carriage—to cut a hand-hold or finger groove in each box end.

An additional object of the invention is to provide a machine, as above, which includes a novel actuating mechanism, including a cam assembly, to effect the requisite predetermined timed operation of the box end advancing carriage, and the rotary cutter motor unit.

A further object of the invention is to provide a practical machine for cutting hand-holds in wooden box ends, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the machine, showing the carriage retracted and the rotary cutter motor unit in operative position.

Fig. 2 is a longitudinal sectional elevation of the machine, somewhat diagrammatic, showing the carriage partially advanced, and the rotary cutter motor unit in its non-working position.

Fig. 3 is a plan view of the machine.

Fig. 4 is a fragmentary section of a box end showing the vertical transverse configuration of the hand-hold or finger groove.

Referring now more particularly to the characters of reference on the drawings, the machine comprises an upstanding elongated main frame 1 including a flat horizontal table 2 on top thereof. Adjacent one end of the table 2 the frame 1 supports an upstanding box and hopper 3 adapted to receive a stack 4 of box ends 5.

Below the box end hopper 3 and the table 2, the machine includes a carriage 6 mounted for horizontal reciprocating motion on guide rails 7; said carriage including a box end engaging and advancing plate 8 which works in, and extends

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slightly above, a longitudinal slot 9 in the table.

With reciprocation of the carriage 6, in the manner hereinafter described, the box ends 5 are withdrawn, one at a time, from the bottom of the stack 4 and advanced as a longitudinal row R, and in single file order, along the table 2. Such row of box ends 5 is guided by laterally adjustable guides 10 mounted in connection with the table on opposite sides of the row R.

The carriage 6 is reciprocated by means of a connecting rod 11 pivoted at one end, as at 12, to the carriage, and pivoted at the other end, as at 13, to a crank arm 14 on a cross shaft 15 journaled in the frame below the table 2.

The cross shaft 15 is driven by an endless chain and sprocket unit 16 from a motor and reduction gear unit 17 likewise mounted in the main frame below said table. A safety release clutch 18 is interposed between the cross shaft 15 and the adjacent sprocket 19 of the unit 16 whereby if any jam occurs in the machine the unit 17 and other working parts are protected against damage.

A rotary cutter, motor unit, indicated generally at 20, is mounted above the row of box ends 5 beyond the hopper 3, and functions, in predetermined time relation to the step-by-step motion of such row, to cut a hand-hold or finger groove 21 in each box end; such unit being constructed and operating as follows:

An electric motor 22 is secured in a longitudinally opening U-frame 23, and the latter is fitted, on opposite sides, with trunnions 24 carried in upstanding journal brackets 25 on the main frame 1 at opposite sides of the table 2. The electric motor 22 is disposed with its drive shaft 26 extending lengthwise of the table and projecting toward the box end hopper 3. A rotary cutter 27 is mounted on said motor shaft 26, and the frame 23 is normally in a position with the rotary cutter 27 clear of the row R of box ends on the table.

A motor tilting or rocking arm 27a is pivoted, adjacent but short of its upper end, on one of the trunnions 24 and extends therebelow some distance through a slot 28 in the table 2. Above the corresponding trunnion the upper end of the arm 27a is arcuately adjustably secured to the adjacent side of the U-frame 23, as at 29.

Adjacent but short of its lower end, and on one side thereof, the arm 27a is provided with a roller 30 which cooperates with an actuating cam 31 on the cross shaft 15. With each revolution of such cross shaft 15 the cam 31 swings the arm 27a in a direction to cause the U-frame 23 and motor 22 to rock or tilt in a direction to lower the rotary cutter 27. The timing is such that when this occurs the row R of box ends 5 is stationary, whereupon said cutter 27 cuts or mills the hand-hold or finger groove 21 in the adjacent one of the box ends 5 of said row. The

electric motor 22 is constantly in operation when the machine is in use.

When this tilting or rocking of the motor takes place a pair of leaf springs 32, which project from the bottom of the frame 23 on opposite sides of the rotor 27, bear against said adjacent box end 5 to frictionally hold it down during the hand-hold cutting operation. After the hand-hold is cut in each box end 5, the arm 27a rides over the high point of the cam 31 and is swung back to its normal or starting position with the rotary cutter 27 clear of the row R, by means of a pull-back spring 33. A pull-back plate 34, associated with the high point of the cam 31, simultaneously engages the roller 30 to assure of such return movement of the arm 27a to its starting position.

The crank arm 14 and the cam 31 bear such relative rotative positions on the cross shaft 15 that the rotary cutter, motor unit 20 is in non-working position, while the carriage 6 is advancing the row R of box ends, and said carriage is retracting, with the row R stationary, when the cam 31 actuates the arm 27a to swing the motor unit 20 to its working position.

At the forward end of the row R the leading one of the box ends 5 is successively engaged from below, by mechanism hereinafter described, and elevated between laterally adjustable stack guides 35 on the table, which guides include stack supporting fingers 36 of snap-by type. In this manner a stack 37 of finished box ends is accumulated at the end of the machine opposite the box end hopper 3.

The mechanism which successively engages and elevates such foremost one of the box ends 5 of the row R comprises a vertical plunger 38 suitably guided in the main frame and normally retracted by a spring 39. At its upper end the plunger 38 includes a head 40 having a push-up block 41 thereon which works through a slot 42 in the table. A rocking lever 43 is pivoted, as at 44, on the main frame 1 below the table, one end of such rocking lever 43 being secured by a lost-motion connection 45 with the lower end of the plunger 38. At its opposite end the rocking lever 43 runs on a cam 46 on the cross shaft 15. With rotation of such cross shaft, and at substantially the same time that the rotary cutter, motor unit 20 is working on one of the intermediate box ends of the row, the cam 46 actuates the lever 43 to raise the plunger 38, head 40, and block 41. When this occurs the block engages the then stationary and foremost box end 5 of the row R and pushes said box end upwardly into the finished stack 37; retraction of said box and from its position at the bottom of the stack 37 being prevented by the stack supporting fingers 36.

The described invention provides a practical, efficient, economical and automatic machine for the milling of hand-holds or finger grooves in wooden box ends; the structure being such that it requires a minimum of attendance, maintenance, and repair. As the functions of the machine are automatic the operator need only maintain a sufficient supply of box ends 5 in the end hopper 3, and occasionally remove the finished stack 37.

The row guides 10, together with the stack guides 35, are laterally adjustable to a substantial extent so that the machine may be set to work with box ends of different widths. The box end hopper 3 is similarly adjustable.

By reason of the fact that the drive shaft of the rotary cutter, motor unit 20 extends longitudinally of the machine, and as said unit is rocked or tilted about a transverse horizontal axis until the shaft inclines forwardly and downwardly to cause engagement of the cutter 27 with each box end, the resulting hand-hold or finger groove 21 is undercut at the top or upper edge, as at 47. By reason of this undercutting the hand-holds or finger grooves provide for a very effective engagement by the fingers of a person lifting a box.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a box end feeding device operating to progressively feed a box end past a given point and which includes a supporting frame and a table along which the box ends move; a mechanism for cutting a hand hole in each box end as it passes said point, such mechanism comprising a pair of laterally spaced journal brackets mounted on the frame adjacent the table, trunnions journaled in the brackets, a U-frame fixed to the trunnions, a motor secured in said U-frame, the drive shaft of the motor extending to and normally overhanging said point, a cutter on the outer end of the drive shaft, a lever pivoted on one of the trunnions, the upper end of the lever being secured to the U-frame, and the lower end of the lever projecting below the table, a yielding element connected with the lower end of the element and effective to normally swing the U-frame to hold the cutter out of engagement with box ends on the table, and cam means operative to swing the lever to bring the cutter into engagement with each box end as it passes said point.

2. A structure as in claim 1 including spring fingers on the U-frame operative to swing into engagement with a box end simultaneously with the engagement thereof by the cutter.

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