March 24, 1931. C. CEDERHOLM 1,797,463

ROTARY WOODWORKING CUTTER

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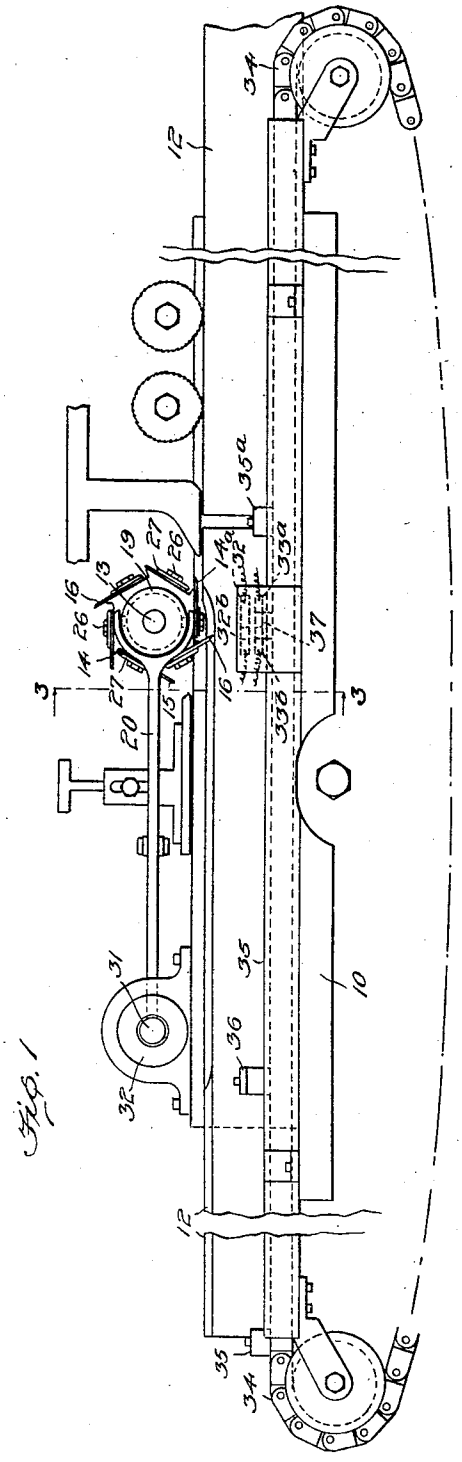


Fig. 1

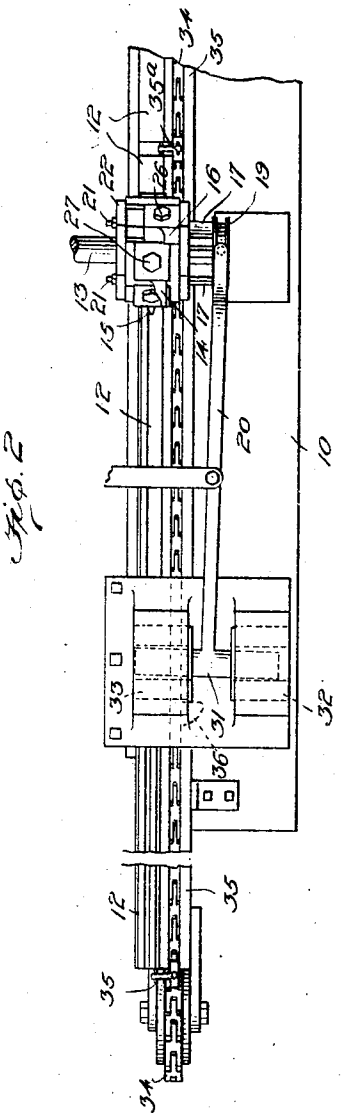


Fig. 2

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Fig. 4

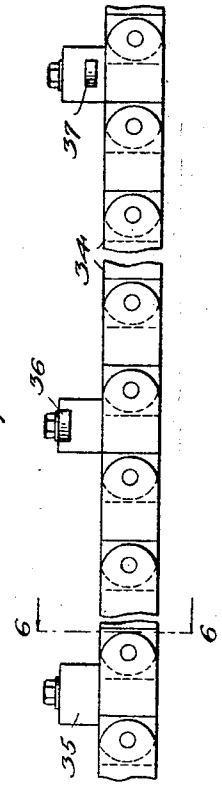


Fig. 5

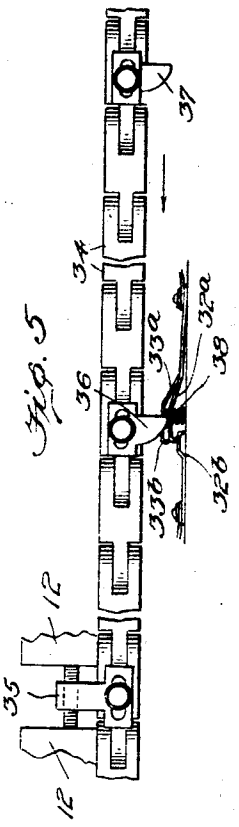


Fig. 6

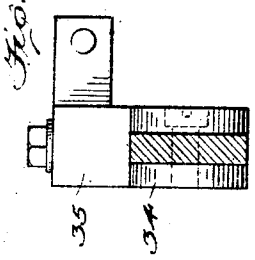
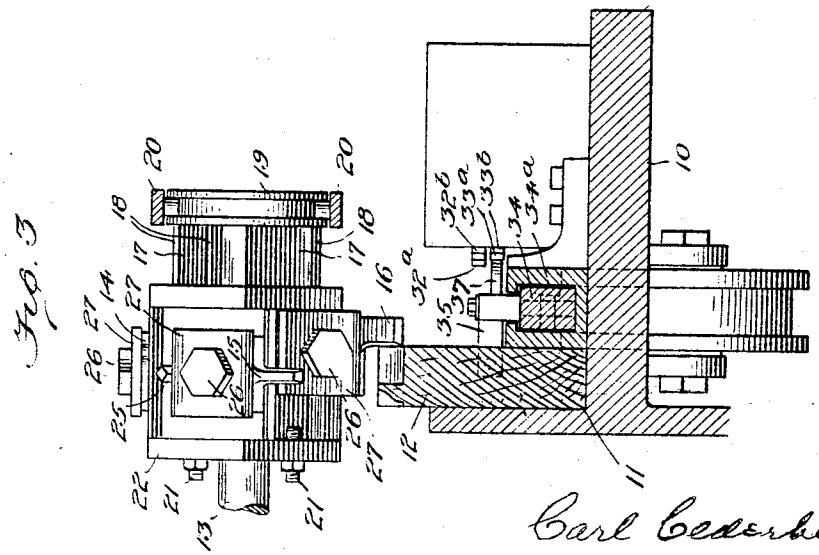


Fig. 3



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Fig. 7

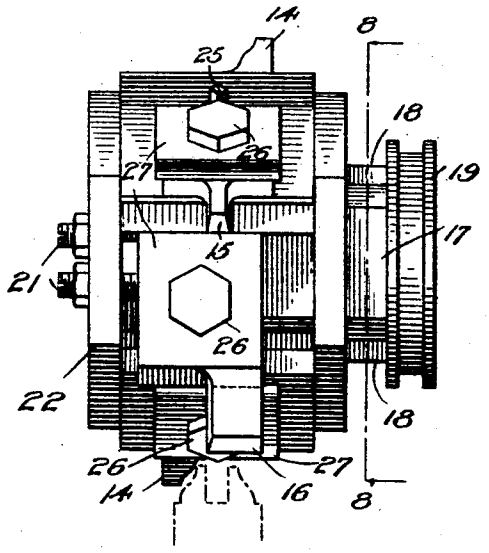


Fig. 8

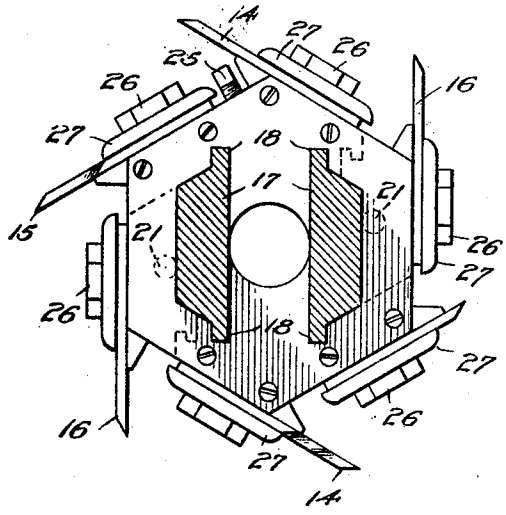


Fig. 9

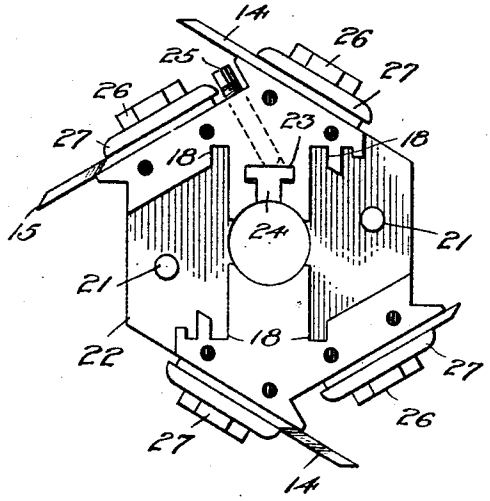


Fig. 10

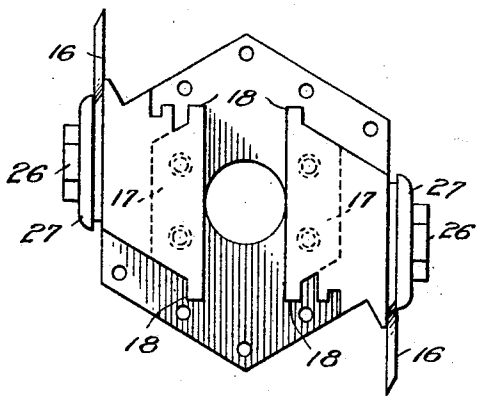
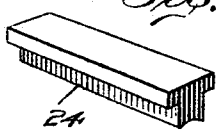


Fig. 11



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Patented Mar. 24, 1931

1,797,463

UNITED STATES PATENT OFFICE

CARL CEDERHOLM, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRANK B. WHEAT, OF LOS ANGELES, CALIFORNIA

ROTARY WOODWORKING CUTTER

Application filed June 18, 1929. Serial No. 371,779.

This invention relates to improvements in woodworking apparatus and particularly to a cutting machine wherein a series of bits produce a mortised molding and a rabbet in the edges of door stiles so that the upper portion of the door may be glazed and the lower portion paneled.

In machines of this character there is usually a cutter head having a series of cutters, at least one of which is slidable longitudinally of the axis of the cutter head whereby it may be periodically moved into and out of engagement with the work being operated upon. This intermittent movement of such slidable bit has heretofore been accomplished manually, and an object of the present invention is to provide an apparatus of the character described wherein the movable bit is automatically moved into and out of engagement with the work by connections whose operation is controlled by the movement of the work itself through the machine. More particularly, the bits are arranged in a cutter head and the movable bit or bits are adapted to be reciprocated by a lever which is oscillated by electromagnets in circuits comprising normally spaced contact members that are caused to engage one another at the proper times by projections on an endless chain that is carried along the work support by the work as the latter traverses said support.

The invention also comprises certain other details of construction, such as adjustable stops for limiting the reciprocatory movement of the slidable bit or bits in the cutter head; a comparatively simple but durable arrangement for slidably mounting the reciprocatory bit or bits in the cutter head; and a rather efficient means for mounting the cutter head on its driving shaft.

With these and other objects in view, the invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be hereinafter more fully described and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawings,—

Figure 1 is a front elevation, showing more or less diagrammatically a machine with the present improvements incorporated therein;

Fig. 2 is a top plan view;

Fig. 3 is a transverse vertical section indicated by the line 3—3 of Fig. 1;

Fig. 4 is an elevational view of a section of the chain for controlling the reciprocation of the slidable bit;

Fig. 5 is an elevational view of the reverse side of said chain;

Fig. 6 is a cross sectional view of the chain;

Fig. 7 is an elevational view of the cutter head;

Fig. 8 is an end view of said head;

Fig. 9 is an end view with the slidable cutters removed;

Fig. 10 is an end view of the slidable bits removed from the cutter head;

Fig. 11 is a detail view of the locking plate for securing the cutter head on its shaft.

For the purpose of illustrating the present invention there has been selected a machine of well known construction and commonly known in the industry as a "sticker", and as none of the machine proper constitutes any part of the present invention, a large portion thereof has been shown more or less diagrammatically. Referring to the drawings the bed plate 10 of the machine has a way 11 that is traversed by a door stile shown at 12 for the purpose of producing on one portion of the edge thereof a mortised molding and on another portion thereof a rabbet so that the first mentioned portion of the door may be glazed and the second portion paneled. These operations are performed on the door stile by a series of bits rotatably carried on a shaft 13 of the machine. As will be seen in Figs. 7 to 9, these bits are carried by a cutter head of hexagonal cross section on two opposite sides of which there are molding bits 14 which in conjunction with one another produce a molding on the edge of the door stile. Carried by said head intermediate these molding heads there is a mortising bit 15, which, in conjunction with the molding bits forms the mortised molding on the door stile edge. On two other opposite sides of said head there are a pair of rabbeting bits 16 which, when in operation, remove one side of the mortised molding so as to produce a rabbet on the edge of the

stile. The operation of these several bits is more fully described in my prior Patent No. 1,201,696, dated October 17, 1916, which shows a construction of cutter head upon which the present invention seeks to improve. In order that the rabbeting bits will not be in a position to act upon that portion of the door stile edge which is to be formed with the mortised molding, said bits are adapted to be moved axially of the shaft 13 so as to be positioned to one side of the door stile traversing the work support until it is desired to form a rabbet on the door stile, at which time a reverse movement axially of the shaft is imparted to said rabbeting bits. In order that said rabbeting bits may be reciprocated axially of said shaft 13 the cutter head is formed with two open sides in which slide plates 17, carrying the rabbeting bits 16, are slidably mounted. To simplify the construction of the head and lend rigidity to the slidable side plates and the bits carried thereby, the edges of said side plate 17 and the corresponding portions of the cutter head are formed with a tongue and groove connection 18. At one end said slidable side plates, carrying the rabbeting bits, are secured to a grooved collar 19 that is engaged by a lever or yoke 20 for reciprocating said side plates as will be later described. At their opposite ends, plates 17 are adapted to engage or abut against stops 21 that are in the form of bolts threaded through end plate 22 of the cutter head, whereby by adjusting said bolts axially of shaft 13, the extent to which said end plates may be reciprocated inwardly of the head may be regulated at will. For securing the cutter head on shaft 13 there is formed in said head a slot 23, T-shaped in cross section, extending parallel to and merging in the bore through which the shaft 13 extends. Insertible lengthwise in said slot is a correspondingly-shaped plate 24 and projecting through the head is a set screw 25 engaging against said plate 24 so that by taking up on the screw the plate will be forced against the shaft 13 so as to clamp the head on said shaft. It might be added that the several bits may be secured to their respective portions of the head by screws 26 with backing plates 27 interposed between the heads of said screws and the several bits. However, as any form of mounting may be used, and especially in view of the fact that the present form of mounting, and the mode of operation, of the several bits is fully described in my prior patent, a further description is believed unnecessary in the present instance.

The lever or yoke 20 engaging in grooves 19 for reciprocating the rabbeting bits 16 is pivoted intermediate its ends by suitable means and its end remote from the forked end engaging the collar 19 is provided with enlargements 31 projecting into coil magnets 32, 33, so that by energizing one or the other of said magnets said lever may be oscillated on its pivotal center to reciprocate the rabbeting bits. Each coil magnet is in a separate circuit, the circuit for magnet 32 comprising normally separated contact members 32*a*, 32*b*, and the circuit for magnet 33 comprising similarly normally separated contact members 33*a*, 33*b*, so that both of said magnets are de-energized at all times, except when their respective contacts are actuating to close their circuits.

This is taken care of by the provision of an endless chain consisting of a multiplicity of articulated links 34 adapted to travel in a track 35 bolted on the bed plate of the machine. At proper intervals along said chain and projecting to one side thereof so as to be engaged by the door stile is a series of abutments 35, 35*a*, 35*b*, etc., equi-distantly spaced apart throughout the entire length of the chain. At certain other intervals around the entire chain there are trips 36, 37, projecting from the opposite side of said chain and at different levels from one another for purposes which will now be described.

It will be observed that contacts 32*a*, 32*b*, for the circuit including coil magnet 32 are spaced vertically above contacts 33*a*, 33*b*, for coil magnet 33, and that trips 36 are located in the same vertical plane as contacts 32*a*, 32*b*, and trips 37 in the same vertical plane as contacts 33*a*, 33*b*. It should be mentioned that the distance between abutment 35 and the following trip 36 is equal to the distance the door stile must traverse its work support past the cutters for the formation of the mortised molding and before lever 20 is oscillated to move the rabbeting bits 16 into position to produce the rabbet on the door stile, it being assumed for the purpose of the present description that at the beginning of the operation of the machine, the rabbeting bits were in their normally inoperative position. Likewise, the distance between trips 36 and 37 lengthwise of the chain corresponds to the length of the rabbet to be formed on the door stile. One abutment and one pair of trips function for each door stile operated upon so that the succeeding abutment 35*a* is adapted to be engaged by the succeeding door stile and the next two trips 36, 37, effect the actuation of lever 20 for the purpose of producing the mortised molding and rabbet on such succeeding stile. In view of this the operation of one abutment and the succeeding pair of trips only will be described, the operations effected thereby being repeated continuously by each succeeding set of abutments and trips on successive stiles passing through the machine.

As will be understood, contacts 32*a*, 33*a*, which are yieldingly held separated from contacts 32*b*, 33*b*, by springs 38 are positioned

in the path of the trips 36, 37, respectively. As a door stile is passed through the machine it engages against one of the abutments, say abutment 35, so that the chain moves along the bed plate in unison with said stile. During the initial movement of the stile along the bed plate or work support the rabbeting bits 16 are positioned out from the head or to one side of the edge of the stile so as to have no effect on the latter. As the chain moves along with the stile, trip 36 comes into engagement with contact member 32*a* and presses the latter against contact 32*b* so as to close the circuit through coil magnet 32. Coil magnet 32 thereupon becomes energized and by electro-magnetic induction oscillates the forked lever or yoke 20 so as to reciprocate the sliding side plate 17 of the cutter head and thereby move the rabbeting bits into position to engage the edge of the door stile and cut away one side of the mortised molding for the purpose of producing the rabbet on the succeeding portion of the door stile edge. The circuit through magnet 32 does not have to be maintained for this purpose. After the proper length of the door stile has been rabbeted it is necessary to throw the rabbeting bits out again so that they will not have any effect on the forward portion on the next succeeding door stile passing through the machine. For this purpose the next succeeding trip 37 engages contact 33*a*, moving it into circuit closing position with respect to contact 33*b* to energize coil magnet 33 which thereupon effects a reverse movement of the forked lever 20 and restores the rabbeting bit to its normally inoperative position so far as performing any actual operation on the door stile is concerned, and, as will be understood, the rabbeting bits remain in this position until the proper trip of the next succeeding set of abutments and trips is brought into engagement with contact 32*a* by the next stile passed through the machine.

As will be appreciated the spacing of the several abutments and trips lengthwise of the chain on which they are carried is dependent upon the dimensions of the door stiles being operated upon. Consequently, as stiles of different dimensions are to be handled, the abutments and trips must be adjusted but this is readily taken care of by having the links detachably secured together by screws instead of rivets so that the positions of the abutments and stops may be varied at will. For similar reasons, the abutments are preferably in the form of screws that may be adjusted longitudinally of the chain so that for minor adjustments of say one-half of one inch these screws need only be adjusted, whereas for greater adjustments one or more links can be added to or taken from the chain, the links preferably being approximately two inches in length.

What I claim is:

1. In an apparatus of the character described, a fixed work supporting surface, a rotary cutter head, a series of bits on said head, means for moving a portion of said bits into and out of engagement with work traversing said surface, and means movable along said surface in unison with the work for controlling operation of said last mentioned means.

2. In an apparatus of the character described, a fixed work supporting surface, a rotary cutter head, a series of bits on said head, electrically actuated means for moving a portion of said bits into and out of position to engage work traversing said surface, and means movable along said surface in unison with the work for controlling operation of said electrically actuated means.

3. In an apparatus of the character described, a fixed work supporting surface, a series of rotatable bits fixed transversely of said surface, a movable bit slidable transversely of said surface, means for reciprocating said movable bit, and means movable along said surface in unison with the work for controlling the reciprocation of said bit.

4. In an apparatus of the character described, a fixed work supporting surface, a series of rotatable bits, means for reciprocating one of said bits transversely of said surface, and means engageable by work traversing said surface and movable along said surface with said work for controlling the operation of said last mentioned means.

5. In an apparatus of the character described, a fixed work supporting surface, a series of rotatable bits, one of said bits being slidable transversely of said work supporting surface, a lever engaging said slidable bit, means for oscillating said lever, and means movable along said surface in unison with the work for controlling oscillation of said lever.

6. In an apparatus of the character described, a fixed work supporting surface, a series of rotatable bits, one of said bits being slidable transversely of said work supporting surface, a lever engaging said slidable bit, a pair of magnetic coils associated with said lever, electrical circuits embracing said coils, and means including an endless traveling member movable along said surface in unison with the work for energizing and de-energizing said coils.

7. In an apparatus of the character described, a fixed work supporting surface, a series of rotatable bits, one of said bits being slidable transversely of said work supporting surface, a lever engaging said slidable bit, a pair of magnetic coils associated with said lever, an electrical circuit for each of said coils, a pair of normally separated contacts in each of said circuits, and means including an endless traveling member movable

along said surface in unison with the work for successively closing said contacts.

8. In an apparatus of the character described, a work support, a series of rotatable bits, one of said bits being slidable transversely of said work support, a lever engaging said slidable bit, a pair of magnetic coils associated with said lever, an electrical circuit for each coil, a pair of normally separated contact members in each circuit, an endless chain movable along said support by work traversing said support, and means on said chain adapted to successively close said contacts.

9. In an apparatus of the character described, a work supporting surface, a series of rotatable bits, one of said bits being movable laterally of said surface, an endless traveling member movable along said surface in unison with work traversing said surface, normally inoperative connections for actuating said laterally movable bit, and means carried by said endless traveling member for rendering said connections operable to move said bit toward and from said surface.

10. In a machine for mortising and rabbeting door stiles, a work supporting surface, a series of rotatable bits, one of said bits being slidable toward and from a stile on said surface, an endless traveling member movable longitudinally of said surface with a stile, normally inoperative connections for moving said slidable bit toward and from the stile, and means carried by said endless traveling member for rendering said connections operable, said last mentioned means being adjustable longitudinally of said traveling member.

11. In a machine for mortising and rabbeting door stiles, a work supporting surface, a series of rotatable bits, one of said bits being slidable toward and from a stile on said surface, an endless traveling member movable longitudinally of said surface, an abutment on said member adapted to be engaged by a stile traversing said work supporting surface, said abutment being adjustable longitudinally of said member, normally inoperative connections for moving said slidable bit toward and from the stile, and means carried by said endless traveling member for rendering said connections operative.

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