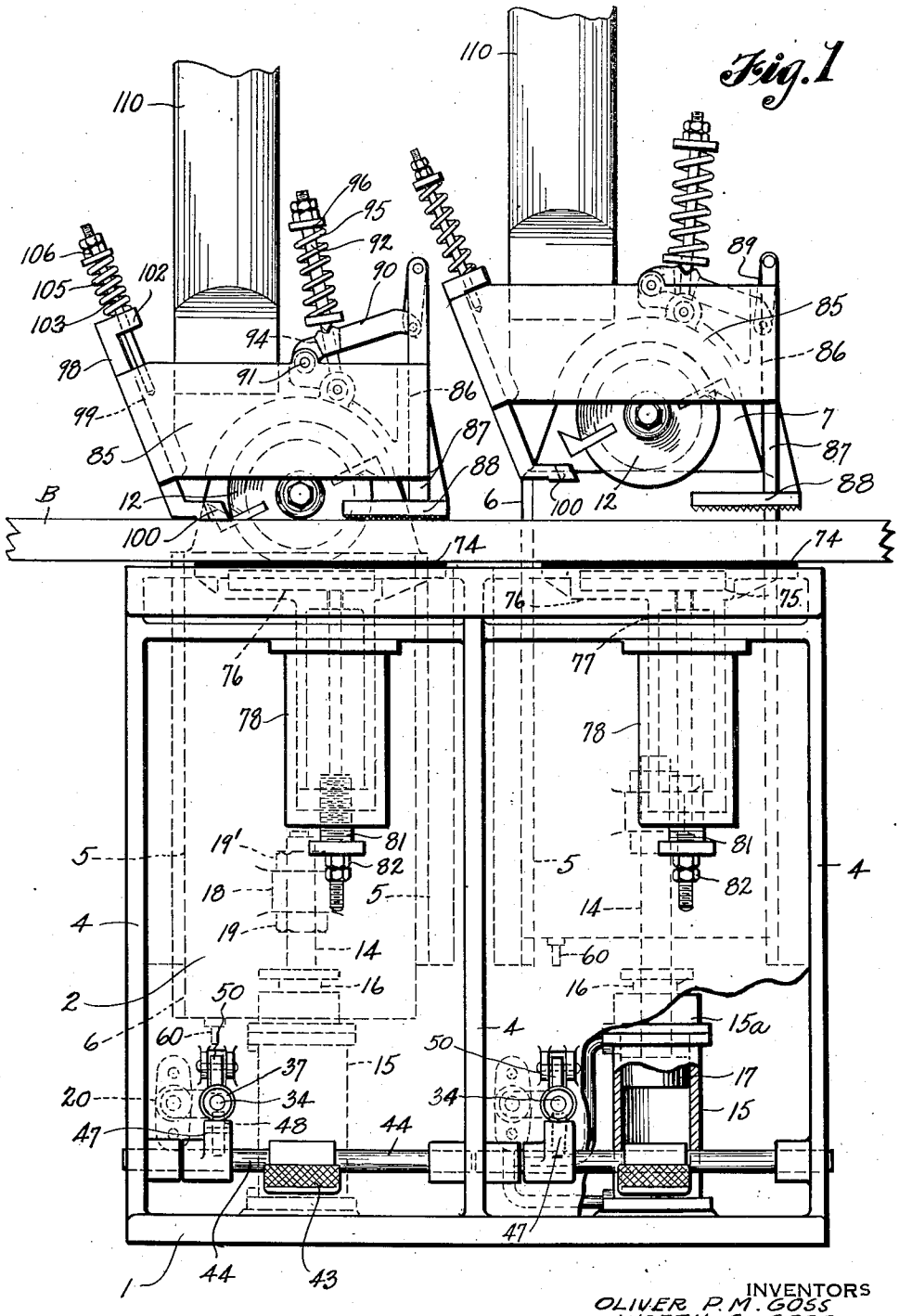
March 26, 1935. O. P. M. GOSS ET AL 1,995,505

POCKET ROUTING MACHINE

Filed May 9, 1933 3 Sheets-Sheet 1

Fig. 1



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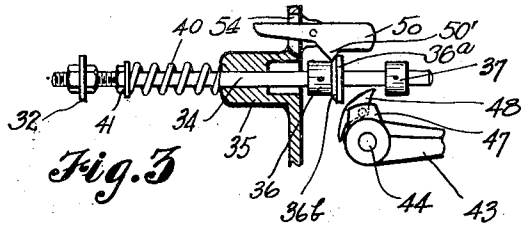


Fig. 3

Fig. 2

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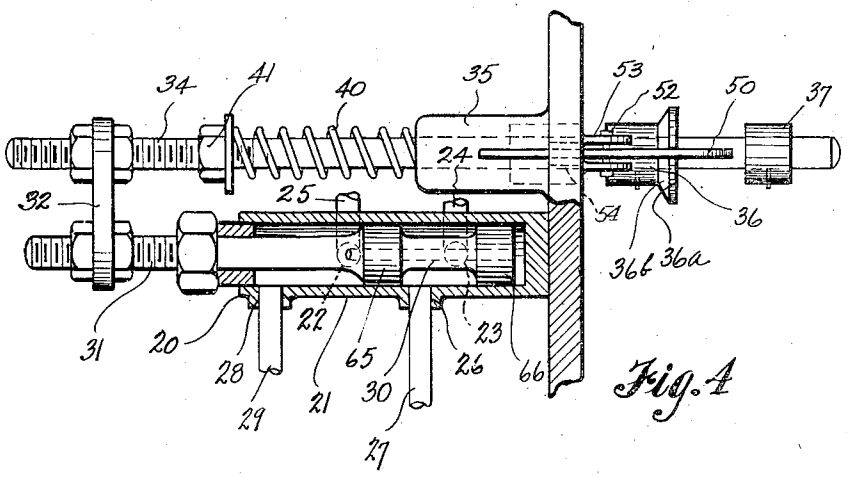


Fig. 4

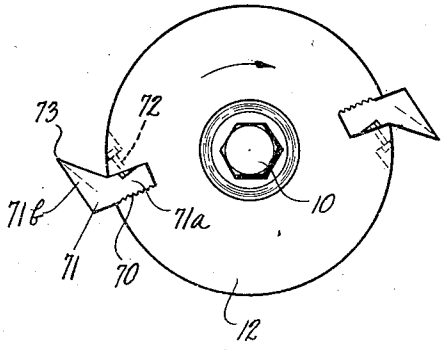


Fig. 5

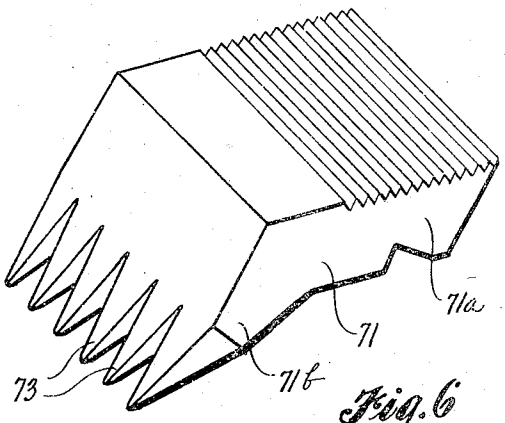


Fig. 6

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POCKET ROUTING MACHINE

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Application May 9, 1933, Serial No. 670,090

3 Claims. (Cl. 144—2)

This invention relates to machines for cutting out defects from lumber and it has reference more particularly to the provision of a machine for cutting out defects in commercial lumber for the reception of patches of definite size and character prepared by another machine; the character of the patch and the method of applying and securing it being disclosed and claimed in our co-pending application filed on April 21, 1933, Serial No. 667,219 and now Patent No. 1,976,722.

It is the principal object of this invention to provide a machine of the above stated character whereby defects in lumber, such as knots, pitch pockets, stains, scars and the like, may be quickly and economically cut out and thereby to provide pockets or recesses of uniform size and shape into which repair patches, as disclosed in the above mentioned application, may be readily applied.

It is also an object of this invention to provide a machine which operates to remove the defect by cutting through the piece in a manner to provide a tapered pocket into which a similarly tapered, prepared repair patch may be snugly wedged and glued.

Still another object of the invention is to provide a cutter head including cutters of novel form, in combination with a chip breaker arranged to co-act therewith to prevent damage to the piece by reason of its splintering should this occur by reason of cutting against the grain of the piece.

Other objects of the invention reside in the various details of construction, and in the combination of parts, and in their mode of operation, as will hereinafter be fully described.

In accomplishing these and other objects of the invention, we have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a front elevation of a machine embodying the present invention, one cutter head being in lowered and the other in raised position.

Fig. 2 is a side elevation of the machine with certain parts in section for purpose of better illustration.

Fig. 3 is a sectional detail of a part of the valve latch mechanism.

Fig. 4 is a top, or plan view of the valve, as associated with the latch mechanism; the valve being shown in longitudinal section.

Fig. 5 is a face view of the cutter head.

Fig. 6 is an enlarged perspective view of one of the cutters dismounted from the head.

It has been found practical, in the patching of lumber in accordance with the invention disclosed in this and the previously mentioned pending application, to provide cutters for the formation of recesses or pockets of various sizes and to arrange for an easy and ready actuation of a selected cutter to suit the size or character of the defect which it is desired to remove. In accordance with this idea we have illustrated in Fig. 1 a two unit machine wherein each unit is like the other in all respects, except as to size of the cutter head, therefore, the following description, as applied to one unit, will apply equally to the other.

Referring more in detail to the drawings—

In its present preferred form of constructon, the machine comprises a main frame structure having a horizontal base 1 cast integral with an upright wall portion 2 supporting a horizontal bed 3. Webs 4 integral with the base, wall and bed support the latter and add rigidity to the frame.

Cast on the back face of the wall 2, in each unit, are two parallel, spaced guide flanges 5—5 between which a supporting frame 6, for mounting the cutter head and driving motor of that unit, is vertically slidable. On the upper end of this frame a head casting 7 is fixed and this has an integral, forwardly extended arm 8 horizontally overlying the bed 3. Fixedly mounted on the casting 7, at the back side, is an electric motor 9 and this has its shaft 10 extended forwardly and revolubly through suitable supporting bearings 11 to a position substantially coextensive with the arm 8 where it is equipped with a cutter head 12.

When a piece of lumber, such as a board or plank, is to be operated on by the cutter head, it is moved into position across the bed plate 3, as seen in Figs. 1 and 2, and the cutter then is actuated downwardly against the board by a downward adjustment of the vertically slidable frame 6. When raised for reception of the board, the cutter head is disposed in that position in which it is illustrated in Fig. 2, where it is supported through the mediacy of a piston rod 14 and a fluid pressure medium in a cylinder 15 that is fixed on the base 1 below the slide frame. The cylinder, as seen in Figs. 1 and 2, is vertically disposed and the piston rod is slidable through a packed gland 16 in the upper cylinder head 15a and has a piston 17 fixed to the end within the cylinder while its upper end extends through a lug 18

on the back side and lower end of the slide frame 6 and is adjustably secured therein by nuts 19—19′ threaded onto the rod against opposite sides of the lug.

Pressure medium, such as water, or other suitable fluid, is admitted into and from opposite ends of the cylinder 15 to raise and lower the slide 6 and cutter head under control of the valve device, designated in its entirety by reference character 20. This valve device comprises a valve cylinder 21 that is bolted to the wall 2, and provided in its side wall at points spaced lengthwise of the cylinder with openings 22 and 23 from which pipes 25 and 24 lead, respectively, into upper and lower ends of the cylinder 15. Intermediate these openings, is an opening 26 into which a pipe 27, supplying the pressure medium, is threaded, and at one end of the cylinder is an exhaust port 28 through which used medium is exhausted into a pipe 29.

Within the valve cylinder 21 is a sliding valve member 30 having an actuating rod 31 extended slidably through a packed gland at the cylinder end. This rod is operatively connected by a link 32 with a shift rod 34 that is disposed parallel with the valve cylinder and slidably mounted in a guide bearing 35 cast or fixed on the back side of wall 2. The shift rod 34 extends forwardly from the wall 2 and, as seen best in Fig. 2, has collars 36 and 37 fixed thereon at its outer end in spaced relation. A coiled spring 40 is disposed about the inner end portion of the shift rod and bears at opposite ends against the inner end of the guide bearing 35 and a nut 41 on the rod so as to yieldingly urge the shift rod to its inner limit of travel.

For manual actuation of the valve member to control admittance of pressure medium into and from the cylinder 15, we have provided a foot pedal 43, that is pivotally mounted on a horizontal shaft 44 that extends between webs 4—4 of the frame structure, as in Fig. 1. This foot pedal extends forwardly and is urged to a lifted position by a spring 46 that bears upwardly against it. Also fixed on the cross shaft 44 is an arm 47 mounting a pivoted pawl 48 normally disposed at the back side of collar 37 on the shift rod 34. Therefore, when the foot pedal is depressed, the pawl moves forwardly and engages the collar 37 and actuates the shift rod forwardly, and when the shift rod has thus been moved to actuate the valve member 30 from one of its extreme positions to the other, a latch 50 pivoted on the frame drops back of collar 36 to retain the valve shifting rod in its forward position against rearward action by the spring 40.

By reference to Fig. 3, it will be observed that the collar 36 that is fixed on the shift rod has an encircling shoulder 36*a* with an inclined surface 36*b*. Also that the latch 50 is disposed above and in alinement with the rod and has a latch tooth 50′ shaped to fit against the inclined shoulder. This latch is pivotally supported on a pivot pin 52 extended between ears 53 cast on the frame wall 2 and the inner end portion of the latch extends through a slot in the wall to a position at the inside of the wall. When the shift rod 34 is moved forwardly from the position of Fig. 2, by depression of the foot pedal, the collar 36 simply lifts the latch head, in passing forwardly beneath the tooth 50′ and the latter then drops back of the collar to prevent return of the rod by spring 40 when the pawl 48 on the foot pedal disengages from the collar 37 as the pedal is finally depressed. Forward shifting of the rod 34 thus actuates the valve member 30 to such position as to cause pressure medium to be admitted through the valve, as presently described, into the upper end of the cylinder 15 thereby to actuate the frame 6 from the raised position of Fig. 2 to the lowered position; however, on final downward travel of the slide frame, a stud 60 adjustably mounted in the lower end of the frame 6 engages the inner end of the latch 50 to rock the outer end upwardly thereby lifting the latch tooth 50′ of the collar 36 thereby releasing the rod 34 for rearward movement under influence of the spring 40. This rearward action of the shift rod operates to move the valve member 30 accordingly, and thus the valve is again adjusted to cause pressure medium to flow therethrough into the lower end of the cylinder 15 to lift the slide frame back to initial or starting position. Thus, unless the foot pedal is only partly depressed, a started operation is automatically carried on to completion for lowering and then raising the cutter.

The valve member 30, as seen best in Fig. 4, is designed to control the admittance and exhaustion of pressure medium from supply pipe 27 to the cylinder 15. It comprises two spaced heads 65—66 fitted to the cylinder and providing an intermediate clearance through which the pressure medium may flow as admitted from the supply connection to either one of the other of the cylinder connections, depending on the setting of the valve at one extreme or the other. The setting of the valve for admitting pressure medium into one end of the cylinder 15 provides for exhaustion of the medium from the other end of the cylinder so that the piston 17 may move under influence of the admitted pressure.

The cutter head 12 may be of standard construction except for the special cutters applied thereto. As seen best in Figs. 5 and 6, the head 12 is circular and is provided at diametrically opposite sides with recesses 70 for mounting therein the cutters 71. Each cutter has a shank portion 71*a* seated in the head recess where it is held by a set screw, 72, and a foot 71*b* formed with a series of symmetrical, equally spaced, V-shaped cutting points 73, as seen in Fig. 6. These cutters are set in the head so as to point in the direction of rotation of the head, as indicated by the arrow thereon in Fig. 5.

In cutting a defect from a board, the cutter head is actuated, while revolving at a high speed, downwardly and through the board. It has a very definite downward and upward travel, and in order that variation in the length of the pockets will not result by reason of difference in thickness of the boards operated on, it is necessary that the cutter head be lowered into the board to the same extent each time. Therefore, we have located a horizontally disposed wooden pad 74 within a recess 75 provided to contain it in the bed plate directly below the cutter. This pad is fitted in and movable with a support 76 at the upper end of a hollow slide 77 fitted for vertical travel in a cylindrical guide 78 fixed to the underside of the bed. A coiled spring 79 is disposed in the guide and bears upwardly against the closed upper end of the hollow slide 77 and urges the slide upwardly, thereby to yieldingly retain the pad at a slight distance above the level of the bed plate. A rod 80 is axially contained in the cylindrical guide and this is fixed, at its upper end, in the support and is slidable at its lower end through a sleeve 81 that is threaded into the lower end

wall of the cylindrical guide, and has a nut 82 threaded thereon to engage the lower end of the sleeve to limit upward travel of the support. The spring 79 rests on the sleeve 81 and its tension is adjusted by adjustment of the sleeve.

At the outer end of the arm 8 is a housing 85 partially enclosing the cutter head, and at one side of this housing is a vertical guideway 86 in which a slide 87 is fitted. This slide is provided at its lower end with a bifurcated presser foot 88 adapted to bear downwardly against a board along opposite sides of the head to hold the board against movement during the cutting operation. At its upper end this slide 87 is connected pivotally by a link 89 with the swinging end of a lever 90 pivoted at 91 on the housing. A bolt 92 is also pivoted at one end in the housing, as at 93, and extends upwardly through an opening 94 in the arm and a coiled spring 95 is disposed about the bolt and bears against a nut 96 threaded onto its outer end and against the lever, thereby, through the connection, to urge the presser foot downwardly. The lever is limited in its downward swing so that when the cutter head is raised clear of the board, the presser foot also will be raised free of the board, but as the head is lowered, the foot engages the board to be operated on before the cutters take effect.

Likewise, at the other side of the head a chip breaker slide 98 is slidably fitted in a dovetailed, guideway 99 in the head. The guideway 99 is inclined inwardly from its upper end toward its lower end in the direction of the vertical plane of the cutter head mounting shaft. At its lower end this slide has an inturned foot 100 adapted to engage the board closely adjacent the outcoming side of the cutters so as to prevent splintering of the board by reason of the cutters working against the direction of the grain. This foot 100 has serrations designed to permit the pointed ends of the cutters to pass therebetween. At its upper end the slide 98 has a laterally turned portion 102 through which a bolt 103, parallel with the slide, extends. The inner end of the bolt is fixed in the housing, and a coiled spring 105 is mounted on its outer end and is held by a nut 106 on the rod so as to bear downwardly on the slide and urge it downwardly. The inturned part 102 of the slide is adapted to engage the housing when the head is lifted, thereby to lift the foot 100 clear of the board. The housing 85 is hollowed out to contain the cutter head and a suction tube 110 enters the housing to carry off the chips and dust from the cutter. The inwardly inclined position of the guideway 99 provides that when the slide 98 is extended, the chip breaker 100 at its lower end will contact with the board closely adjacent the point of entrance of the cutter head and will automatically retract to keep in the clear of the cutter head knives as the cutter head advances into the piece.

Assuming that the machine is so constructed, it is used in the following manner: with both cutter heads in raised position, and motors 9 in operation, a board B, to be operated on, is passed to the machine across the bed plate 3. The operator locates a defect in the board and positions the board so that the defect is directly below one or the other of the cutter heads. This of course would be determined by the size of the defect as it is not desired to remove more of the board than is necessary.

After the board has thus been positioned, the operator presses the control foot pedal 43 of the selected cutter downwardly to its limit and then releases it for return movement by spring 46. As the pedal is thus pressed downwardly, the pawl 48 on the arm 47 engages collar 37 of the shift rod 34 and moves the rod forwardly so that it will be held in that position by the latch tooth 50' engaging back of collar 36. This actuation of the shift rod causes a similar movement of the valve slide 30 whereby pressure medium is admitted through the valve 20 to the upper end of cylinder 15 and the cutter head is thereby actuated downwardly to cut through the board to remove the defect. As the cutter head and its enclosing housing 85 moves downwardly, the presser foot 88 is pressed against the board to hold it against movement during the cutting operation. Also, the foot of the chip breaker slide 98 is pressed against the board to co-act with the cutter and prevent damage to the piece by cutting against the grain.

In cutting through the piece, the cutters of the head 12 also form a channel in the wooden supporting pad 74 beneath the board and this pad then serves as a chip breaker for the under surface of the piece being operated on.

If the piece operated on is of full thickness, the pad 74 will yield downwardly as the head is lowered to its limit of travel, but if the piece is less than full thickness, it is held in its slightly lifted position, thus to receive the cutter head to the full depth intended so that all recesses will be of the same length.

When the cutter head has reached its final downward travel, the head of latch 50 is tripped from the collar 36 by the depression of the inner end of the latch by the stud 60 on the lower end of frame 6 and the shift rod 34 is thereby released for rearward movement by the coiled spring 40 which operates to reverse the valve mechanism and effect an upward movement of the cutter back to initial position.

If it should be desired to hold the cutter head at a lowered position, this could be done by only partly depressing the foot lever so that the pawl 48 would retain its hold on collar 37 and thus hold the valve 30 in its forwardly adjusted position.

With a machine of this character, the defects in boards could be easily and quickly cut out and pockets of accurate size and definite shapes could be provided for the reception of patch plugs. Furthermore, the use of the rotating cutter heads makes it possible to form a pocket of a downwardly tapered form into which a patch may be wedged.

Having thus described our invention, what we claim as new therein and desire to secure by Letters Patent is—

1. A machine of the character described comprising a bed plate, a downwardly yieldable support in the bed plate, a chip breaker block contained in the support and normally held thereby slightly above the plane of the bed plate for the support of a lumber piece thereacross, a revolving cutter head above the bed plate and block, a support therefor, means for moving the latter support to actuate the cutter downwardly and through a piece of lumber resting upon the chip breaker block; said block being adapted to be formed with a recess by the cutter head in passing through a lumber piece and to prevent chipping of the under surface of the piece by the cutter.

2. A machine of the character described comprising a bed plate, a downwardly yieldable support in the bed plate, a chip breaker block contained in the support and normally held thereby

slightly above the plane of the bed plate for the support of a lumber piece thereacross, a revolving cutter head located above the bed plate and block, a supporting frame for the cutter head, means for moving the frame vertically to actuate the cutter head downwardly and through a piece of lumber resting on the chip breaker block; said block being adapted to be formed with a recess by the cutter head in passing through the lumber piece and to prevent chipping of the under surface of the piece, a guideway in the cutter head frame, a slide movable in the guideway having a foot bar on the slide engageable with the lumber piece close to the outcoming side of the cutter and yieldable means urging the foot bar against the lumber piece; said guideway being inclined in a manner whereby upward travel of the slide relative to the cutter head as the latter enters the lumber piece will effect a relative outward movement of the foot bar to maintain its spacing relative to the cutter head.

3. In a machine of the character described, a board supporting bed, a carrier, a cutter head revolubly mounted by the carrier and movable therewith directly from and toward the bed to cut through a board located thereon, a chip breaker block set in the bed for the support of the board thereon and adapted to receive the cutter head thereinto after it has passed through the board, a yieldable presser foot adapted to engage with the board in advance of the cutter to hold it against movement on the bed during operation thereon; said cutter head carrier being formed with a guideway angularly inclined relative to the line of travel, a chip breaker foot slidably movable in said guideway and a spring bearing thereagainst to urge it to an extended position thereby to cause the foot to engage the board close to the line of entrance of the cutter head and to move away from this line in accordance with the advancement of the head into the board.

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