July 16, 1957 P. LEE 2,799,303

SAFETY ATTACHMENT TO POWER SAWS

Filed Nov. 18, 1955

FIG. 1

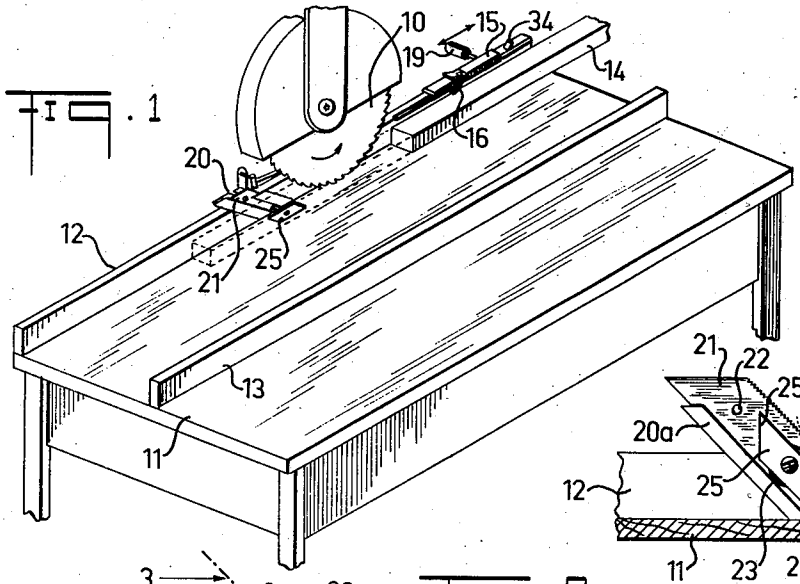


FIG. 7

FIG. 2

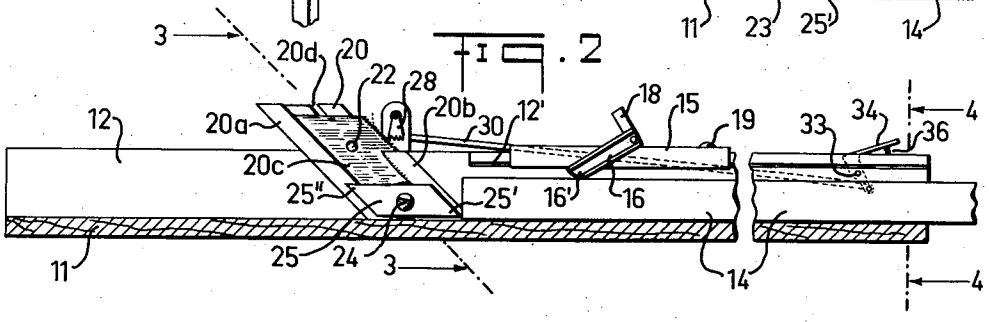


FIG. 3

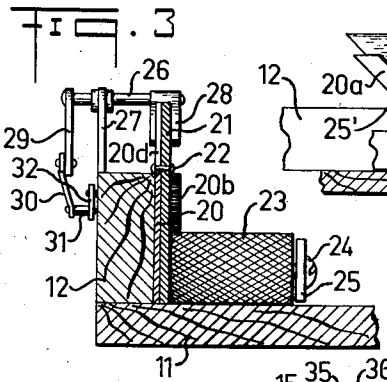
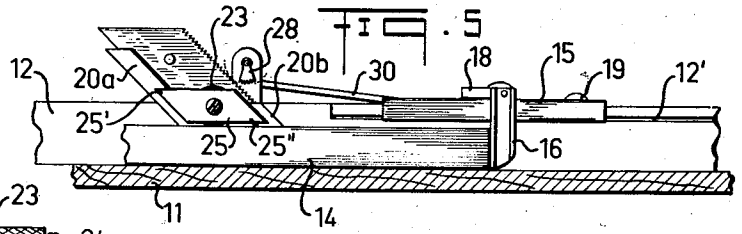


FIG. 5



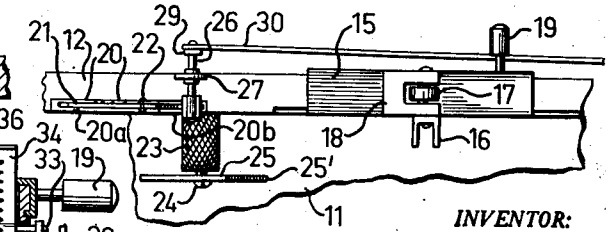


FIG. 4

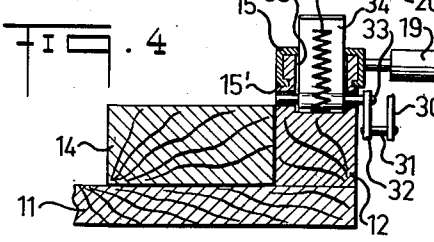


FIG. 6

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SAFETY ATTACHMENT TO POWER SAWS

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Application November 18, 1955, Serial No. 547,615

14 Claims. (Cl. 143—51)

My present invention relates to a safety attachment designed to prevent kickback in power saws, especially during ripping operations, and to facilitate the handling of boards in the immediate vicinity of the saw blade.

In my prior U. S. patent application Serial No. 506,107, filed May 5, 1955, issued April 5, 1957, as Patent No. 2,788,032, I have disclosed an attachment of this general character having means for pushing a board past a rotating saw blade and for preventing the swirling blade from hurling back the sawed-off strip of wood toward the operator. The general object of my present invention is to provide a more simplified construction for an attachment of this type.

A more specific object of this invention is to provide an anti-kickback saw attachment adapted to engage the board being cut from above, preferably at a point located beyond the saw blade, in such manner as to inhibit any substantial backward movement of the board by frictional contact with the upper board surface, the attachment being arranged to accommodate boards of various thicknesses without requiring individual adjustment.

Another more particular object of this invention is to provide, in association with an anti-kickback attachment as set forth above, conveniently operable means for releasing the attachment in order to prevent undesirable jamming of a board.

It is also an object of this invention to provide an attachment of the aforementioned character provided with anti-kickback and guiding means adapted to engage a board without leaving objectionable traces thereon.

I have found, in accordance with my instant invention, that boards of varying thicknesses may be locked against undesirable unidirectional movement by means of a roller slidably guided (as by being journaled in a slot) along a path forming an acute angle, between about 30° and 60°, with the (usually horizontal) supporting surface on which the board is moving, the apex of the angle pointing in the forbidden direction of movement. Such roller, whose periphery may be roughened or knurled for better frictional contact with the wood, will ride freely on the board when the latter moves in its permitted or forward direction but will act as a clamp upon the board when this movement is reversed.

Another feature of my invention resides in the provision of a simple mechanism for picking up the aforementioned roller and depositing it upon the upper surface of an approaching board. This mechanism comprises, fundamentally, an elongated member pivotally supported on the roller axis, the end of said member facing the oncoming board forming an acute angle close to the supporting surface on which the board is moving and onto which the roller has dropped following the withdrawal of the preceding board. The distance between the pointed end of the elongated pick-up member and its pivotal axis must exceed not only the radius of the roller but also the thickness of the board; the leading edge of the board will then engage the pointed end of this member and, in rotating the member about its pivot,

cam this pivot upwardly along the inclined path of the roller which eventually reaches a position above the upper surface of the board and comes to rest on this surface upon the continued forward movement of the board. The pick-up member is preferably centrally symmetrical with respect to its pivot whereby, following a 180° rotation during the operation just described, its opposite, similarly pointed end will present itself to the next following board. Advantageously, the pick-up member is in the form of a parallelogram whose height is slightly less than the diameter of the roller, whose acute angle is at least approximately complementary to the angle of the guide slot or equivalent path-forming means, and whose two diagonals are each longer than the roller diameter; the shorter edge of such parallelogram approximately determines the maximum thickness of a board to be accommodated by the mechanism.

My invention will be described in greater detail with reference to the accompanying drawing in which:

Fig. 1 is a perspective view of a saw table equipped with an attachment embodying the invention;

Fig. 2 is a side elevational view, on a larger scale, of the attachment itself in an inoperative position;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a view similar to Fig. 2 but showing the attachment in operative engagement with a board;

Fig. 6 is a top plan view of some of the elements shown in Fig. 2; and

Fig. 7 is a detail view showing the pick-up mechanism of the attachment at an intermediate stage between the positions of Figs. 2 and 5.

A conventional rotating saw blade **10**, here shown as being of the so-called universal type with overhead support, is positioned above a saw table **11** provided with a fixed outer guide rail **12** and an adjustable inner guide rail **13**. A board about to be fed toward the blade **10** is indicated at **14**.

A carriage **15** straddles the rail **12** and is provided with depending flanges having inturned edges **15'** (Fig. 4) entering corresponding channels **12'** extending along the rear half of the rail. Carriage **15** serves as a support for a pusher member **16** which is pivotally secured to a lug **17** thereof and is rigid with a stop plate **18** preventing the counter-clockwise rotation of member **16** (as viewed in Figs. 1, 2 and 5) beyond a vertically depending position illustrated in Fig. 5. The rounded underside **16'** of member **16** enables the latter to ride freely and without scratching on the board **14** and other boards of different thickness; when the board has been advanced so far that further direct pushing by hand would be hazardous to the operator, carriage **15** is retracted by means of a handle **19** for a sufficient distance to allow member **16** to drop behind the board whereupon a forward movement of the carriage will feed the remainder of the board past the saw blade **10**. Handle **19** is mounted in a safe position, e. g. extending laterally from the carriage as shown, so as to avoid any risk of the operator's fingers coming into contact with the rotating blade.

The anti-kickback attachment proper comprises a guide plate **20** which is fixedly imbedded in a recess of guide rail **12**, beyond the position of saw blade **10**, and has the form of a parallelogram whose sides are inclined by about 45° to the surface of table **11**. The two inclined sides are provided, as best seen in Fig. 6, with integral flanges **20***a*, **20***b* defining a slot **20***c* between them. Flange **20***a* extends above rail **12** for the full height of plate **20** whereas flange **20***b* is somewhat foreshortened and terminates flush with the upper surface of this rail. Plate **20** is also provided with a slot **20***d* aligned with but narrow-

er than slot 20c; both of these slots are parallel to the inclined edges of the plate. A second plate 21, slightly shorter and narrower than plate 20 but of similar parallelogrammatic shape, is embraced by flanges 20a, 20b and is further guided by a pin 22, received in slot 20d, for sliding displacement relative to plate 20. A knurled roller 23 is rotatable about a horizontal bolt 24 while passing through slot 20c and is frictionally engageable by a serrated edge of flange 20b, bolt 24 secured, e. g. by a threaded connection, to plate 21. Normally, i. e. in the absence of a board 14, plate 21 and roller 23 rest directly on table 11 as illustrated in Figs. 2 and 3.

A pick-up member 25, in the shape of a parallelogrammatic blade with 45° flank inclination, is loosely pivoted on bolt 24 alongside roller 23 whose diameter slightly exceeds the height of member 25, one of the longer edges of this member being normally adjacent the upper surface of table 11. Blade 25 when thus positioned has one of its two sharp corners 25', 25'' facing in the direction of the oncoming board 14. It will be noted that the shorter sides of blade 25 are of a length approximately equal to the height of board 14 but slightly less than the distance from corner 25' (or 25'') to the axis of bolt 24, thus a little shorter than half the longer diagonal of the parallelogram.

A horizontal shaft 26 is journaled in a bracket 27 rising from the rail 12 adjacent plate 20. Shaft 26 carries a sectoral arm 28 having a milled or serrated periphery; this arm is adapted to engage a similarly roughened edge of sliding plate 21 projecting above the foreshortened flange 20b. A lever 29 secured to the other end of shaft 26 is pivotally linked to a rod 30 which, via a pin 31, is coupled with a crank 32 fastened to a stud 33. A trip member 34, received in a recess 35 at the rear of rail 12, is secured to stud 33 so as to be fulcrumed thereon while being urged counter-clockwise (as viewed in Fig. 2) by a compression spring 36. The projecting end of trip member 34 is adapted to be depressed, against the force of spring 36, by the carriage 15 when the latter is fully retracted beyond a normal limiting position illustrated in Fig. 1.

The operation of the system illustrated in the drawing is as follows:

As the board 14 is pushed forwardly past the blade 10, its leading edge comes into contact with pointed corner 25' of pick-up blade 25, thereby tending to rotate this blade in clockwise direction (as viewed in Fig. 2) about bolt 24. Such rotation is at first prevented by the table 11, yet continued pressure of board 14 upon corner 25' causes the latter to co-act with the table surface in a camming action which drives the bolt 24 up the slot 20c, thereby raising roller 23 and plate 21 from their normal bottom position as illustrated in Fig. 7.

Upon a further movement of board 14 the latter slips under the roller 23 and the member 25, having gone through a rotation of 180°, comes to rest on top of the board as illustrated in Fig. 5. In this position the board is effectively locked against reverse movement since the roller 23, frictionally engaging the board, cannot move backwards (to the right in Fig. 5) without also frictionally engaging the roughened edge of slot 20c formed by flange 20b; any backward pressure upon board 14 will thus be resisted by a clamping action by the inclined flange 20b which causes board 14 to become tightly wedged between roller 23 and table 11.

When the rear edge of board 14 passes the pusher member 16 (carriage 15 being in its retracted position shown in Fig. 1), the operator takes his right hand off the board and grips the handle 19 to complete the cutting operation. As the carriage 15 reaches the forward end of its travel, pusher 16 has driven the board past blade 10; the same process is now repeated with a new board which drives the sawed-off strip of board 14 out from under roller 23 so that this strip may be taken off the table. If board 14 is not to be followed by another, the strip may be pulled out or pushed out by hand after the saw blade 10 has been stopped. Roller 23 and plate 21 thereupon return by gravity to their normal position, this being facilitated by making slot 20c slightly wider than bolt 24 and allowing plate 21 a certain play between flanges 20a, 20b.

If the blade 10 should become jammed in the wood of a board being cut, the operator simply retracts carriage 15 beyond the position of Fig. 1 so that trip member 34 is depressed. This clockwise movement of the trip member (as viewed in Fig. 2) causes rod 30 to move forwardly (to the left in Figs. 2 and 5) and imparts a similar clockwise movement to arm 28 whose roughened periphery makes tangential contact with the equally roughened exposed flank of plate 21, thereby lifting up this plate and raising the roller 23 from the board. It will be noted that this action of the release mechanism 28, 30, 34 is independent of the position of plate 21 within the range of thicknesses of the boards to be cut, owing to the ability of arm 28 to engage plate 21 anywhere along the length of its flank.

The invention is, of course, not limited to the specific embodiment described and illustrated but may be realized in a variety of modifications and adaptations without departing from the spirit and scope of the appended claims. Furthermore, it will be understood that the principles herein disclosed are equally applicable to bench saws in which the saw blade projects upwardly from the table. Finally, the system described remains operative even if the guide rail 12 is displaced from its position parallel to the blade 10 to enable the taking of miter cuts.

I claim:

1. In a power saw with circular blade, in combination, a table adapted to support a board to be cut by said blade, a roller above said table rotatable about an axis parallel to said table, guide means supporting said roller for movement along a path forming an acute angle with said table, the apex of said angle pointing in a direction opposite to the normal direction of movement of said board, and pick-up means secured to said roller, said pick-up means comprising an elongated member pivotable about the roller axis, said member having a first edge adapted to assume a position adjacent and substantially parallel to said table and a second edge forming with said first edge an acute angle pointing in said opposite direction upon assumption of said position by said first edge.

2. The combination according to claim 1, wherein said guide means comprises a plate perpendicular to said table and provided with a slot, said roller having a shaft received in said slot.

3. The combination according to claim 1, wherein the angle between said first and second edges is approximately complementary to the angle between said path and said table.

4. The combination according to claim 3, wherein both of said angles are between approximately 30° and 60°.

5. The combination according to claim 4, wherein both of said angles are substantially equal to 45°.

6. A safety attachment for power saws comprising, in combination with a table and a saw blade positioned to cut a board advancing on said table, a rail on said table for guiding said board toward said blade, a carriage slidable on said rail, and pusher means on said carriage adapted to engage the rear edge of said board, said pusher means comprising a swingable arm positioned alongside said carriage and pivotally mounted thereon, said arm being displaceable between an elevated position above the upper surface of said board and a depending position, and abutment means rigid with said arm and overlying said rail, said abutment means coming to rest on said rail in said depending position, thereby preventing the latter from swinging beyond said depending position in a direction away from said blade.

7. An attachment according to claim 6, wherein said arm is provided with a curved underside adapted to ride

on the upper surface of said board in said elevated position.

8. An anti-kickback device for a power saw with circular, blade, comprising a supporting element and a supported element engaging each other for relative sliding movement along an inclined path upon a positioning of said supporting element on a horizontal bearing surface, said supported element including a horizontal shaft, a roller journaled on said shaft and a parallelogrammatic pick-up member centrally pivoted on said shaft adjacent said roller, said member having one of its sharp corners facing toward the apex of the angle enclosed between said path and said surface upon a horizontal positioning of one of the edges of said member.

9. A device according to claim 8, wherein said roller is provided with a roughened periphery.

10. A device according to claim 9, wherein said supporting element is provided with a roughened edge frictionally engageable by said roller upon the latter being urged in a direction toward said apex.

11. A device according to claim 8, wherein the height of said member normal to its longer sides is less than the diameter of said roller, both diagonals of said member being greater than said diameter.

12. A device according to claim 11, wherein the angle between said path and said surface and the angles at the sharp corners of said member are each of about 45°.

13. A device according to claim 8, wherein said supported element is provided with a roughened edge, further comprising a release mechanism including a pivoted element positioned for engagement with said roughened edge and operating means for actuating said pivoted element

from a distance for lifting said supported element relatively to said supporting element.

14. In a power saw with circular blade, in combination, a table adapted to support a board to be cut by said blade, a roller above said table positioned in the vicinity of said blade and rotatable about an axis parallel to said table, guide means supporting said roller for movement along a path forming an acute angle with said table, the apex of said angle pointing in a direction opposite to the normal direction of movement of said board, a release member remote from said blade, transmission means operatively linking said release member with said roller for lifting the latter off said board, a guide rail extending above said table past said blade, a carriage slidable on said rail and pusher means on said carriage for advancing said board past said blade, said carriage being operatively engageable with said release member for lifting said roller off said board.

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