

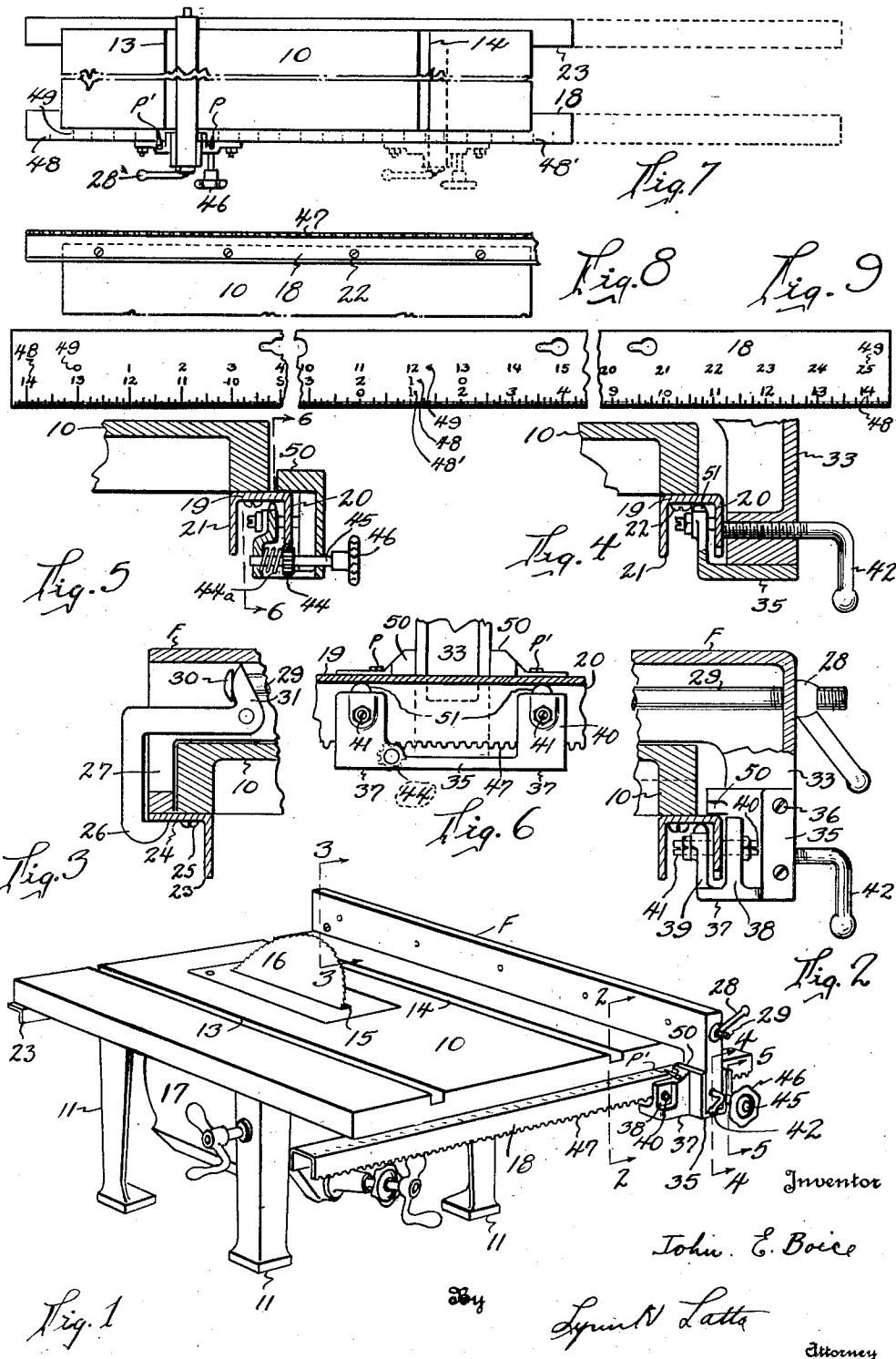
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WOODWORKING MACHINE

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WOODWORKING MACHINE

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5 Claims. (Cl. 143—174)

This invention relates to power driven circular saws for woodworking, and has as its object to provide improvements in the work-guiding fence and the mechanism for adjusting and supporting said fence relative to the bed of the machine. One object is to provide a rail, or a pair of rails for supporting the fence, which are extensible relative to the bed so as to increase the possible width of cut beyond the normal range of adjustment of the fence. A difficulty that has been encountered in connection with such extensible rails is that of getting the rail set in a position that is accurately perpendicular to the plane of normal operation of the cutter, without adopting, an expensive and complicated type of connection between the rail and bed. The present invention provides a method of setting the rail which makes it possible to connect the rail to the fence by screws extended loosely through openings in the rail and threaded into the underside of the bed. According to this method, the fence is adjusted to a position in exact alignment and coincidence with one edge of one of a pair of grooves in the upper surface of the bed, parallel to the cutter and one on either side thereof. When it has been ascertained that there is proper coincidence, the fence is locked in that position and the rail is then loosened. The rail, with fence locked to it, is thence transported to the other side of the saw and the lower edge of the fence is brought into exact coincidence with the corresponding edge of the other groove. The rail is then in proper position with the screw holes in registry with threaded holes in the bed, and the screws are reinserted and the rail is locked in this position, in which position it will extend beyond one side of the bed and will continue to guide the fence in exact parallelism with the cutter.

Another object is to provide a scale for indicating the distance between the cutter and the fence, in either normal or extended position of the rails. To this end, the invention contemplates providing two scales on the front rail, one to be used in normal position and the other for extended position, and the distance of offsetting of one scale relative to the other being exactly the same as the distance between the grooves of the bed, so that shifting of the rails according to the method above mentioned will bring the alternative scale into correct position.

Another object is to provide improved means for accurately holding the fence in upright position, its face perpendicular to the plane of the upper face of the bed.

A further object is to provide improved means

for effecting fine adjustment of the fence after its position has been roughly effected by other means. The invention contemplates, in connection with this object, the provision of rack teeth in one edge of the front rail, and a pinion carried by the fence carriage and engaging said teeth, together with means for substantially preventing the fence from "lagging" behind a position of parallelism to the cutter, and for bringing it back to exact parallelism as it is clamped in the adjusted position.

Another object is to provide an improved rear lock for engaging the rear end of the fence with the rear rail, said lock being operable from the front of the machine.

Other objects will appear during perusal of the following specification in connection with the accompanying drawing, in which:

Figure 1 is a perspective view of a woodworking machine embodying the invention,

Figure 2 is a sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a sectional view taken on the line 3—3 of Figure 1, showing the rear lock,

Figure 4 is a sectional view taken on the line 4—4 of Figure 1,

Figure 5 is a sectional view taken on, the line 5—5 of Figure 1,

Figure 6 is a sectional view taken on the line 6—6 of Figure 5,

Figure 7 is a plan view of the machine,

Figure 8 is an inverted plan view thereof,

Figure 9 is a detail plan view of one end of the front rail.

Referring now to the drawing in detail, the invention provides the usual bed 10, supported on legs 11, and having in its upper surface two parallel grooves 13 and 14, between which is the cutter slot 15. The cutter 16, carried by a tiltable arbor 17 beneath the bed, projects through the slot 15, parallel to the grooves 13 and 14. The work guiding fence is indicated at F, being formed as an inverted channel.

The present invention provides a front rail 18, in the form of a channel having a web portion 19 and front and rear flanges 20 and 21 respectively, the web portion being attached to the under side of the bed 10 by machine screws 22 (Fig. 8) so that the flanges project downwardly.

The rail 18 has four screw receiving openings, 50 the distance between the first and third opening, and the distance between the second and fourth opening, in each case being exactly equal to the distance between the grooves 13 and 14. When the rail is in normal position shown in full lines 55

in Fig. 7, both ends project slightly beyond the side edges of the bed. By removing the screws 22, after having checked the parallelism between the fence and the cutter slot, as hereinbefore described, and then moving the fence from its position adjacent slot 13 (Fig. 7) to a corresponding position alongside groove 14, the rail will be carried with it to the extended position shown in dotted lines in Fig. 7, in which position the first and second openings in the rail will be brought into registry with the third and fourth openings in the underside of the bed. The screws are then inserted in these openings and securely tightened while the fence remains in alignment with the slot 14. This will insure the fence retaining a position of parallelism with the cutter when it is unlocked and adjusted along the rail in the new position of the latter.

The rear end of the fence is supported on the rear rail 23, which is in the form of an angle iron having a top flange 24 secured to the bed in the same manner as the web of the rail 18, and partly projecting beyond the rear edge of the bed. The rear rail is provided with openings corresponding to those in the front rail and its position may be shifted to correspond with the extended position of the front rail, by removing the screws 25 which secure it to the bed.

The rear end of the fence is secured in any given adjusted position by means of the clamping jaw 26 which engages the underside of the rear rail 24. By rotating the nut 28 on the threaded end of the pull rod 29 extending longitudinally through the fence, the head on the end of the rod is caused to engage a fork 31 formed integrally with the jaw 26, whereby the latter will exert upward pressure against the rail 24, clamping the latter between the jaw 26 and the lower end of the rear leg 27 of the fence. During adjustment of the fence, the leg 27 rides against the upper surface of the rail 24.

The forward end of the fence has a forward leg 33 projecting downwardly just forwardly of the rail 18. A slide bracket is secured to the leg 33. It is in the form of a U-shaped yoke 35 embracing and secured to the lower region of the leg by screws or the like 36, and having opposed extensions 37 each of which in cross section comprises a yoke having spaced parallel upwardly extending ears 38 and 39 respectively receiving between them the forward flange 20 of the rail 18. In each pair of opposed ears 38, 39 are threaded contact adjustment screws 40, 41 respectively, the opposed ends of which are spaced just enough to allow the rail flange to slide freely between them without dragging. By loosening the pair of screws in one extension 37, and advancing one screw while retracting the other, the angle of the fence relative to the rail 18 may be changed. This is for the purpose of lining up the fence in exact parallelism with the slot 15 and saw 16, in the event it should get out of alignment.

Each time the fence is clamped to the rail, the contact of the two rear contact screws 41 with the flange 20 causes the fence to assume this position of proper alignment. Clamping is effected by the clamping screw 42, which is threaded through the leg 33 midway between the two contact screws 40, and engages the forward face of the flange 20.

The function of the two forward screws 40 is to prevent the fence from "lagging" as it slides along the rail. Adjustment of the fence toward or from the saw is effected by means of a ro-

tatable pinion 44 secured on a shaft 45 which is journaled in one of the extensions 37. The shaft 45 is turned by a handwheel 46. The pinion 44 travels in geared engagement with rack teeth 47 in the lower edge region of the flange 20. This causes the forward end of the fence to move along the rail 18. If there were substantial play between the contact screws 40, 41 and the rail flange 20, the frictional engagement of the rear leg of the fence with the rear rail would cause it to lag behind the forward end of the fence, thus cocking the fence at an angle to its true position of parallelism with the cutter. Upon tightening up the clamping screw 42, the fence would resume its position of parallelism as before described, but in doing so, would shift laterally at its rear end. Keeping the forward screws 41 adjusted so as to allow a minimum amount of play in the gap between the contact screws, reduces such "lagging" to a minimum.

It will be understood that the adjustable feature of the contact screws 40, 41 may be dispensed with without destroying the functions of self alignment under pressure of the screw 42, and non-lagging translation along the rail. The former feature is of course not new per se, and the present invention is to be understood as being restricted to combination of the two features in a structure embodying a fence carriage having clamping means disposed intermediate two laterally projecting rail embracing members each having opposed rail contacting members engaging respectively forward and rear regions of the rail. The invention also contemplates the combination with this structure of a portion of the carriage which rides on the upper surface of the rail to provide support whereby the fence is carried above and out of contact with the bed. Reference is here had to the shoes 50 which are formed integrally with the respective extensions 37 of the carriage.

The pinion 44 is employed for securing fine adjustment of the fence. Translation of the fence to about the desired position is accomplished by disengaging the pinion and sliding the fence by direct manual push. Disengagement of the pinion is accomplished by pushing the handwheel away from the operator. A coil spring 44a returns the pinion into engagement with the rack.

The position of the fence is indicated by pointers *p* and *p'* one on each extension 37. When the rails are in normal position the pointer *p* indicates distances of the fence from the left side of the cutter and the pointer *p'* indicates distances on the right side of the cutter, the former cooperating with the scale 48 and the latter cooperating with the scale 48'. These two scales overlap at the center of the rail, a distance equal to the distance between the two pointers, minus the thickness of the fence, i. e. two inches. Each of these scales starts at its outer end with the numeral 14 and terminates just beyond the center of the rail at "0".

When the rails are in extended positions, the pointer *p'* indicates distances on the third scale 49, which starts at the left end of the rail, opposite the numeral "13" on scale 48', with "0" and terminates at the right end of the rail with the numeral "25". This third scale 49 is set ahead of scale 48' exactly the distance between the grooves 13 and 14, i. e., a given numeral on the scale 49 will be spaced from the corresponding numeral on scale 48', the distance between the grooves.

The invention provides means for maintaining the work guiding face of the fence in a vertical plane. This means comprises a pair of coacting teats 51 projecting upwardly from the ears 39 and engaging the underside of the rail 18. One teat could be used if it were disposed intermediate the shoes 50.

I claim as my invention:

1. In a woodworking machine, a bed having a cutter slot and a pair of grooves spaced from the respective sides of said slot, an extensible fence rail attached to the bed and having two indicating scales for indicating the distance of the fence from the cutter in normal and extended positions of the rail respectively, a fence adapted to be clamped to said rail, corresponding indicia of the respective scales being spaced apart a distance equal to the distance between said grooves, and means detachably securing the rail to the bed, said means also being spaced from each other a distance equal to the distance between the grooves, whereby the position of the rail may be changed from normal to extended position or vice versa by first clamping the fence to the rail in a position in registry with one of said grooves, then loosening the rail from the bed, then moving the rail and fence together to a position in registry with the other groove, and then reattaching the rail to the bed in the latter position.

2. In a woodworking machine, a bed, a rail comprising a horizontal web portion secured to the underside of the bed and projecting forwardly of the forward edge thereof and a forward downwardly projecting flange having rack teeth in its lower edge, a fence comprising a horizontal portion and a downwardly projecting portion including a carriage slidable along said rail, said carriage having spaced vertical portions integrally connected by a portion extending under said flange, and adjustable elements extended through said spaced portions in pairs that are spaced from each other longitudinally of the rail, each pair including substantially axially aligned elements adjustable toward or from each other and embracing between them the downwardly projecting flange of the rail.

3. In a woodworking machine, a bed, a rail secured to the forward region thereof, a fence for guiding work on said bed, a carriage on which the forward end of the fence is secured and supported, said carriage having a pair of upper spaced integral members supported on and slid-

ably engaging the upper surface of the rail, a pair of spaced integral lower members each provided with separate projecting means engaging respectively the rear and under surfaces of said rail, and a clamping member engageable with the forward surface of the rail and adapted to cooperate with said last mentioned pair of members for aligning the fence in parallelism with a tool member when said clamping member is tightened, the members of each of said pairs being spaced substantially equidistantly on either side of said clamping member, said upper and lower members cooperating to maintain said fence in a position with its work engaging face at a fixed inclination with respect to said bed.

4. In a machine of the class described, a tool, a bed having a pair of grooves for positioning a work guiding member with relation to said tool, an extensible fence rail attached to the bed and having two indicating scales for indicating the distance of the fence from the tool in normal and extended positions of the rail respectively, a fence adapted to be clamped to the rail, corresponding indicia of the respective scales being spaced apart a distance equal to the distance between said grooves, and means detachably securing the rail to the bed in normal and extended positions of the rail, whereby the rail may be changed from either of said positions to the other by first clamping the fence to the rail in a position in registry with one of said grooves, then loosening the rail from the bed, then moving the rail and fence together to a position in registry with the other groove, and then reattaching the rail to the bed in the latter position.

5. In a machine of the class described, a bed provided with a fence carriage supporting rail comprising a horizontal portion and a downwardly projecting flange, a fence comprising a horizontal position and a downwardly projecting portion including a carriage slidable along said rail, said carriage having spaced vertical portions integrally connected by a portion extending under said flange, and adjustable elements extended through said spaced portions in pairs that are spaced from each other longitudinally of the rail, each pair including substantially axially aligned elements adjustable toward and from each other and embracing between them the downwardly projecting flange of the rail.

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