Fig. 1.
This invention relates to improvements in power saws, and particularly to improvements in feed and guide mechanisms for power saws of the type used for re-sawing; i.e., for sawing into slabs boards the large sections which were cut from the log when it was first sawn at the lumber mill.

The problems solved by the present invention have to do with machines used in re-sawing these large timbers. One type of re-sawing is known as "center sawing," where the saw blade cuts a straight path down the center of the timber, equally distant from its two edges. In this type of re-sawing the feed rolls on both sides of the timber must move an equal distance in opposite directions as the thickness of the timber varies.

The other type of re-sawing is known as "slab sawing," where a series of slabs of uniform width are cut off, one at a time and from only one side of the timber, until only a thin slab remains. In slab-sawing the inside feed roll is secured so it does not yield, because each slab cut off is to be of uniform thickness. The outer feed roll is not secured so it will yield as it passes over the irregularities that may be present on the other edge of the timber. A machine must be able to do both types of re-sawing and in both the cut made must be accurate.

One problem in earlier machines has arisen because in re-sawing the mill operator must alternate many times a day between slab sawing and center sawing. Heretofore the changeover from one to the other has been relatively slow and cumbersome operation. The present invention has solved this problem by a construction which is very simple and quick to operate and which is fool-proof in operation. Time heretofore lost in the changeover is practically eliminated. In a busy mill every moment that the saw is idle is very costly in labor and in lost production.

The combination of the present invention also has solved the problem of accuracy with speed in the changeover from center sawing to slab sawing or vice versa. It does this by the novel type of linkage between the members to control positioning of the feed rolls, wherein by simply changing the position of one pin, the two feed rolls may be linked to move in concert (for center sawing) or the inside rolls may be locked to the saw table while only the outside rolls move with the variation in thickness of the timber (for slab sawing).

Another problem which this invention solves relates to the trouble experienced in the past with binding between the two collars on the two sets of driving shafts with the rollers on the yokes on the ends of the control link between the shafts. The present invention has solved this problem by providing a novel type of collar-and-roller connection.

Other objects and advantages of the invention will appear from the following description of a preferred embodiment thereof. This embodiment is described in detail in order to comply with the provisions of United States Revised Statutes, section 4866, but it is not intended to limit the invention to any of the detailed forms of structure described. The scope of the invention is defined by the appended claims.

In the drawings:

Fig. 1 is a reproduction of a photograph of a re-saw machine with a feed mechanism embodying the principles of the present invention.

Fig. 2 is a view in perspective of a portion of the re-saw machine of Fig. 1, showing the feed roll adjustment mechanism with the quick changeover structure. For purposes of clarity the outside feed roll and its housing have been shown in phantom (dot-dash line), and a portion of its base has been cut away to show the attachment of the base to the threaded shaft by which the outside feed-roll housing may be moved back and forth. Other parts, such as the base 35, which would detract from the clearness of the showing of the changeover structure have been omitted, or have been shown broken away with only the outline dotted in.

Fig. 3 is a view in elevation of the table and feed roll portion of the device looking at it from the left side of Fig. 1.

Fig. 4 is a like view looking at the device from the right side. The view shows part of the feed roll housing cut away to expose the drive mechanism to one feed roll.

Fig. 5 is a fragmentary view in plan and partly in section taken generally along the line 5--5 of Fig. 4, and showing the linkage of the feed-roll-position-adjustment shafts to the control levers locked as they would be when the saw is set for slab sawing, but before a board is inserted to be cut.

Fig. 6 is a view similar to Fig. 5 showing the parts in the positions assumed when preparing to or when making a slab cut from a timber. The inside feed roll has remained locked in position on the bed, while the outside feed roll (a) has been moved outwards by the foot control in the first instance when the timber is fed to the blade or (b) has been held outwards by contact with the timber as it is fed past the saw blade.
Fig. 7 is a view similar to Figs. 5 and 6 showing the device as connected for use in center sawing. The locking pin having being moved to a position where it locks both the feed roll shifting mechanisms together for synchronous movement toward or away from the saw blade. Fig. 8 is a view in section taken along the line 4—4 in Fig. 5. Fig. 9 is a view in side elevation looking at Fig. 5 from the left hand side, in the direction indicated by the arrow 9. Fig. 10 is a view in section taken along the line 10—10 in Fig. 5.

Fig. 11 (sheet 7) is a view in perspective of the control lever that is linked with the outer feed roll, and to the foot control pedal. Fig. 12 is a view in perspective of the lever that is linked with the inner feed roll. This lever may either be locked to the main frame of the saw so that its feed roller housing will remain stationary, or it may be locked to the control lever of Fig. 11, so that the two feed-roll mechanisms will move toward or away from the saw blade together.

Fig. 13 is an enlarged view in section taken along the line 13—13 in Fig. 5, showing the novel connection that prevents binding from occurring between the collars on the adjusting shafts and the pins on the yokes on the control levers.

Although the invention may be used in connection with many types of saws, it will be better understood by describing its use in one specific type of saw, and for this purpose a large power radial saw has been selected. The photograph of the machine, reproduced as Fig. 1, shows such a radial saw 22 having a band-type blade 21 which runs around the upper half of an upper idler wheel 22 and around the lower half of a lower driven wheel 23 (Fig. 3). Both the upper and lower wheels 22, 23 may be encased in shields 24 and supported on a frame 25 which also supports the saw table and feed mechanism frame 26.

The timber feed and guide mechanism includes two pairs of driven feed rolls. The rolls 30, 31 are mounted in a housing 22 and the rolls 33, 34 are mounted in the housing 35. The housings 22 and 35 are each slidingly mounted on the saw table plate 36.

All the feed rolls 30, 31, 33, 34 are driven, and for this purpose each feed roll mechanism 32 and 35 preferably has its own motor 37, 38 (Fig. 3). The broken away portion of Fig. 4 shows how the motor 37 is used to drive the pair of feed rolls 30, 31 that are in the housing 32. The motor 35 rotates a deep-grooved sheave 40. One or more belts 41 transmit power from the sheave 40 to a second sheave 42, which is mounted on a shaft 43. A spur gear 44, also mounted on the shaft 43, then drives the gear 45, which are keyed each to its adjacent feed roll which turns free on the shaft 46.

The feed roll mechanisms 32, 35 are made slidably horizontally along the base of the saw table 26 by providing them with flanged bases 44, 48 which engage the flanged bed 36 formed along the top of the saw table 26. Oppositely threaded shafts 51, 52 engage interiorly threaded sleeves 53, 54, secured to the bases 44, 48, respectively, so that rotation of the shafts 51, 52 will cause the feed mechanisms 32, 35 to move inwardly or outwardly along the bed 36 with respect to the saw blade 21 and each other. The shafts 51, 52 may be rotated separately by placing a hand crank 55 (Fig. 9) on their respective splined outer ends 75, 76, 58, 59 are also splined respectively to shafts 51, 52 for relative sliding movement so that any axial movement of the shafts will not be transmitted to the gears. A transmission spur gear 60 is positioned to mesh with the gears 58, 59 so that by turning the crank 55 with the gears in mesh, the roll feed mechanisms will move toward or away from each other in concert. To disengage the gear 60, it can be moved axially outwardly on its stub shaft 61 (Fig. 6). Then the operator can place the crank 55 on the screw shafts 51 and 52 separately to accomplish an independent positioning of each feed roll housing 32, 35 on the bed plate 36.

One of the novel features of construction of the invention has to do with the way whereby the shafts 51 and 52 can be locked to move axially in synchronism or the shaft 51 can be locked against movement while the shaft 52 is left free to move axially under the influence of the timer being sawed. This means might be described as multiple or complementary levers.

One of these levers 65 is shown in perspective in Fig. 11 and in its position in the machine in Fig. 2. The lever 65 on one side of its bearing 66 has provision through a yoke for connection to the shaft 52, as well as provision near the yoke for a yieldable spring connection to the base 26, and on the other side of its bearing it has provision for locking it to its complementary lever 67 and to the foot lever means 68 for spreading the feed rolls apart when a timer is to be fed into the saw.

When in place the lever 65 is journaled at 66 for swinging movement around a vertical pin 69, which pin is supported in the bed plate 36 and its base 26 (see Figs. 2, 5, and 8). On the yoke side of the lever 65 a collar 70 is provided through which slides a shaft 71 of lesser diameter (see Figs. 2 and 5). This shaft is secured at 72 to a boss 73 on the side of the bed plate 36. A spring 74 fits around the shaft at its other end between the nut 75 and the collar 70. When the lever 65 swings counter-clockwise in Figs. 5-7, the collar 70 compresses the spring against the nut 75. As shown in Figs. 8, 11 and 13, the lever 65 has an extension to form a yoke 76 in which is supported a pair of anti-friction rollers 77 on studs 78 held there by suitable nuts 79.

Another feature of novelty is the provision of support for the pair of collars 80 which engage the anti-friction rollers 77. This support includes the small collar 81 placed on the shafts 51 and 52 between the collars 80. It functions as a spacer between the collars. It is a few thousandths of an inch longer axially than the diameter of the anti-friction rollers 77, so that when the shafts 51 and 52 are turned in making adjustments, it will be impossible for the collars to get close enough together to bind on the rollers 77. The collars are positioned on the threaded portion 92 of the shafts 51, 52 by the nuts 82.

The complementary lever 67 (see Fig. 12) has a bearing 65 to fit on the pin 69 above the bearing 66 in the lever 65 so the two levers swing on a common center. The lever 67 has a yoke 85 with anti-friction rollers 77 located on the arm the same distance from the pivot 65 as those in the yoke 76 of the member 65. These are engaged in the space between the collars 80 mounted on the shaft 51 in like manner to those mounted on the shaft 52.

The outer end of the lever 67 has provision for
two holes 87 and 88 that play an important part in locking the parts necessary in effecting a quick change over form slab sawing to center sawing. The hole 87 is formed in a lateral extension 89 of the lever 67 while the hole 88 is formed with a depending face or notch 90 in which the complementary end 91 of the lever 66 can nest and then bring the upper outer alignment to receive the locking pin 95. When this pin is in place the complementary levers 65 and 67 are as one lever (see Fig. 7). When this pin 95 is out of the aligned holes 85 and 92, the levers 65 and 67 move independently. The operator removes the pin 95 when he desires to do slab sawing and this requires that the inner feed rollers 30, 31 be positively locked on the bed plate 36. This is accomplished by means of the bracket 95 on the machine frame 26 having a horizontal portion 97 with a recess 95 (see Fig. 2) into which the lateral extension 89 on the lever 67 nests so its hole 87 aligns with the hole 98 in the bracket 95. Then the operator places the pin 95 in the holes 97, 99 locking the shaft 51 and the connected feed roll mechanism 32 to the lower arm of the bell crank 8. When the operator steps on the pedal 100, the rod 00 moves to the right (in Figs. 2 and 4), and this moves the lever 85. If the levers 65 and 67 are locked together by the pin 95, the effect will be to move both feed roll mechanisms 32, 35 apart; that is, back from the saw blade 21. If the lever 65 is free and the lever 67 is locked to the frame bracket 95, the inside feed roll mechanism 33 will remain in fixed position on the saw table 36, whereas the outer feed roll mechanism 35 will move outwardly on the saw table 36 away from the saw blade 21. When pressure on the foot control pedal 100 is released, the spring 74 restores the lever 59 to its normal position, and also causes the rod 116 to follow the bell crank 109 back to its normal position.

**Operation**

Suppose that the operator has a timber of any length which measures 12 inches square in cross section and it is desired to cut it into boards or slabs one inch thick. The first thing he will do will be to place the pin 95 in the hole 87 to lock the lever 67 to the frame 26. He will then disengage the gear 69 and by means of the crank 55 on shaft 51 will move the gear set of feed rolls 30, 31 up to a position 1 inch in from the saw blade 21. He will place the crank 55 on the shaft 52 and move the outer set of feed rolls 33, 34 out away from the saw blade 21 to a position less than eleven inches from the blade 21. There is about an inch and a half of motion possible in the tension spring 74 to apply pressure on the outside edge of the timber so it is preferable that the feed rolls 33, 34 be set about ten to ten and a half inches from the saw blade for the first cut. Assuming that the saw blade is moving, the operator will set the feed rolls 30, 31, 33 and 34 in operation at the speed it is desired for the timber to travel past the saw blade. The operator will place one foot on the pedal 100 which will move the feed roll housing 35 back more than eleven inches from the saw blade and that will provide an opening between the feed rolls 30, 31 and 33, 34 of slightly over 12 inches, the width of the timber.

As soon as the timber is between the first feed rollers 30, 33 he will release the pedal 100 and the spring 74 will move the rolls 33 against the side of the timber to bring it against the feed roller 30. This positions the timber before it has engaged the saw blade. The feed rolls force the timber through the saw and off the back side is cut the first slab one inch thick. While the timber is being returned for its next trip through the saw, the operator rotates the shaft 52 by the crank 55 to move the feed rolls 33, 34 about an inch closer to the saw blade 21. This is repeated for each slab that is cut from the timber.

Now assume that the next use for the saw is a job of center sawing, that is to saw timber down the middle. The operator moves the locking pin 95 into the holes 88 and 92 to lock the levers 65 and 67 together. Then the operator turns the shafts 51 and 52 separately by the crank 55 until he has the feed rolls 30, 31 and 33, 34 equally distant from the saw blade 21. Then he engages the gear 56 between the gears 58 and 59. As the first timber is placed with its end on the feed table 36 he gauges its width and turns the crank 55 which may be on either shaft 51 or 52. Turning the crank will rotate both shafts and move the feed roll housings 32 and 35 in concert, toward the saw away from the saw blade 21. Having in mind that the spring 74 will allow about one and a half inches of movement to the shafts 51 and 52, and hence to the
feed rolls, he will be able to take a timber which varies along its length up to 3 inches in width. If it varies more than this, he may have to move the crank some as the cut progresses. Assuming the maximum variation in thickness is only two inches, he will set the feed rolls so they are spaced apart about a half inch closer than the minimum width of the timber. Then he puts his foot on the pedal 100 to spread the feed rolls apart while the timber moves up between the rollers 32 and 33. When he releases the pedal, the spring 74 soon centers the timber on the saw hinge and the cut proceeds. As the timber moves along and its width varies, the rollers 30, 31 move back the same distance the rollers 33, 34 move out, and vice versa, so that the saw blade will cut down the middle of the timber.

Assuming the next timber is to be slab sawed, then the operator merely shifts the pin 95 to lock the lever 67 to the bed plate 56 and he proceeds as set out before.

What is claimed is:

1. A selective control mechanism for the slidably guide members mounted on the frame of a resaw device, comprising a first lever pivoted between its ends and between said guide members to said frame and having means for connecting at all times one of its arms to one only of said slidably guide members for movement therewith; a second lever pivot to said frame between its ends and between said guide members, and having means for connecting at all times its arm which is opposite to the connected arm of said first lever to the other of said slidably guide members for movement therewith; releasable means for physically and directly connecting said levers to work in unison; and releasable means for physically and directly securing one of said levers immovable to said frame while the other of said levers remains free to rotate about its point of connection to said frame.

2. The device of claim 1 in which said levers are mounted on a common pivot point.

3. The device of claim 1 in which said means for connecting said levers to their respective slidably guide members each include a threaded rod engageable in a threaded portion of its respective guide member.

4. The device of claim 1 in which there is a resilient pressure means for urging said levers against said securing means on said frame.

5. A resaw device, adapted for slab-sawing and center-sawing, having in combination a frame; a saw table mounted thereon; a saw means therein for moving a saw blade over said table; a feed and guide roll means on each side of said saw blade, each being slidably mounted on said table for movement toward and away from said saw blade; a plural lever mechanism for controlling the movement of said feed and guide roll means independently or in concert; including a first lever pivoted between its ends to said frame, and having a yoke near one end, a threaded rod secured to said yoke and a female threaded portion securing it to one of said feed and guide roll means; a resilient pressure applying means normally urging said lever inwardly whereby its connected roll means is urged toward said saw blade; a second lever mounted to slide co-axially with said first lever, and having a yoke on the opposite side of the pivot point to the yoke on said first lever, a threaded rod secured to said yoke and engaged in a female threaded portion securing it to the other of said feed and guide roll means; means for securing said levers for movement as one; and means for securing said second lever to said frame to anchor it against movement while said first lever is left free to move.

6. The device of claim 5 in which there is an additional lever secured to said first lever so that the operator can move the same against the resilient pressure applying means in order to spread apart said feed rolls to facilitate introduction of a timber to said saw blade.

7. The device of claim 5 in which said last two named means are effected by placing the same pin in one or the other of closely adjacent aligned sets of holes.

8. The device of claim 5 in which said resilient pressure applying means, at the end of making a cut, returns the first and second levers against stops with the holes, required for effecting the securing recited in the last two means, in alignment to receive a locking pin in one or the other set of holes.

9. In a control mechanism for the feed and guide rolls of a re-sawing machine, having a saw table, a saw blade moveable therein, feed and guide roll means moveable toward and away from said saw blade; the combination of a lever mechanism including a pair of levers, one lever being connected to one of said feed and guide rolls and the other lever being connected to the other thereof so that in movement of either of said levers will effect a like movement of its connected feed and guide roll toward or away from said saw blade, said levers each having a first opening therethrough, said openings being alignable with each other, thereby having a second opening therethrough alignable with an opening extending through a portion of said frame; rod means for operatively connecting said levers for simultaneous movement by passing through both said alignable first openings in said levers, which movement when occurring will cause said feed and guide roll devices to move in opposite directions, said rod means, when said levers are disconnected, serving to extend through said frame opening and said second opening for securing one of said levers against movement while the other lever remains unsecured which thereby anchor one of said feed and guide rolls against movement while the other will be free to move toward or away from said saw blade; and means for applying resilient pressure tending to urge said feed and guide roll means toward said saw blade.

10. In a feed roll and guide mechanism for saws the combination of a saw table; a saw blade moveable therethrough; independently moveable feed roll and guide roll mechanisms mounted adjacent said saw table and on opposite sides of said saw blade; means for controlling the position of each of said mechanisms on said saw table in relation to said saw blade; said means including a pair of levers, each having a common pivot point and each being operatively connected to move one engaged in a female threaded portion securing it to the other of said feed and guide roll means; means for securing said levers for movement as one and one of said levers having a second opening therethrough alignable with an opening in a portion of the frame whereby said rod means may be inserted therethrough for securing one of said levers in a non-movable position, while leaving the other lever free for movement, whereby in the latter case only one of said
mechanisms will yield as a piece of wood is being cut, but in the former case with said levers secured together both of said mechanisms will advance toward or retreat from said saw blade in concert as a piece of wood is being cut.

11. The device of claim 7 in which said pin is a tapered pin.

DAVID M. DANIEL.

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