July 31, 1951 C. J. MELBY 2,562,728

EDGING DEVICE FOR SHEET MATERIAL

Filed April 4, 1950 2 Sheets-Sheet 1

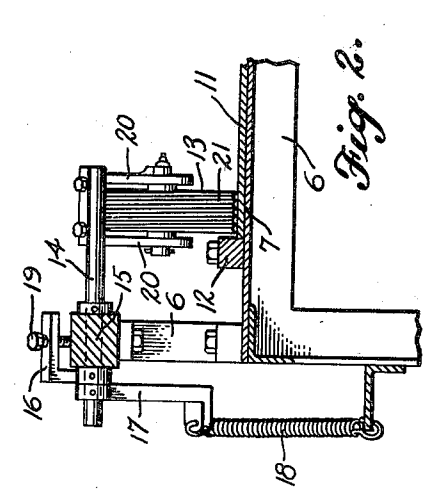


Fig. 2.

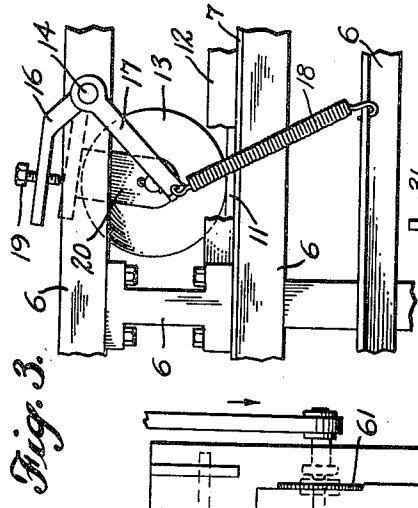


Fig. 3.

Fig. 1.

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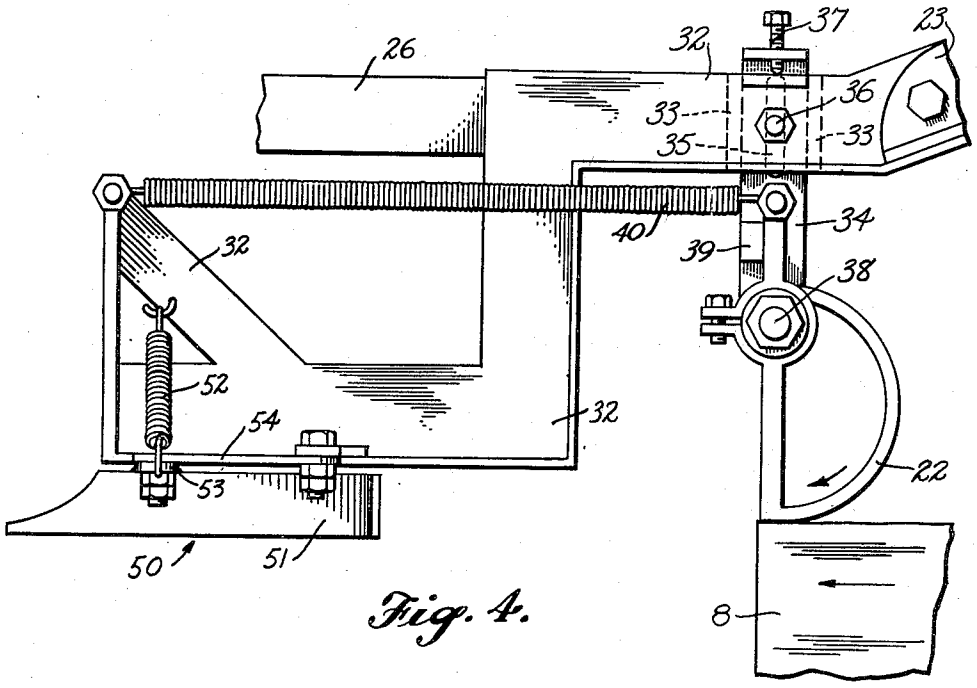


Fig. 4.

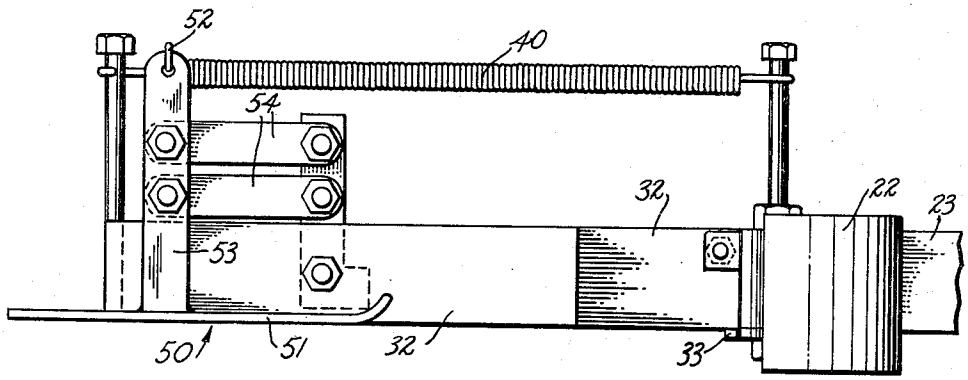


Fig. 5.

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UNITED STATES PATENT OFFICE

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EDGING DEVICE FOR SHEET MATERIAL

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Application April 4, 1950, Serial No. 153,923

4 Claims. (Cl. 144—117)

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My invention relates to mill machinery and particularly to apparatus for squaring up the edges and ends of shingles, shakes, box boards, and other sheet products wherein parallel sides and parallel ends at right angles to the sides are desired. More particularly my invention relates to such a device employed in connection with pieces of sheet material of varying widths. In the interest of clarity and to prevent undue duplication of words, the various products which may be edged in my device will be referred to as shingles, but it is to be understood that such word is used in an illustrative sense and not as a limitation.

My present invention is in the nature of an improvement on issued Letters Patent to me dated February 17, 1942, and bearing Number 2,273,653.

My present invention in a general way improves over devices embodied in my said Letters Patent as to the resilient guide 34' of my previous patent and as to hold down means operating in conjunction with the outside cutter head 24 thereof.

Other objects and advantages of my invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawings:

Figure 1 is a fragmentary plan view of a device embodying my invention;

Fig. 2 is a fragmentary enlarged view taken substantially in the direction of broken line 2—2 of Fig. 1;

Fig. 3 is a side fragmentary elevational view of parts shown in Fig. 2 of the drawings on substantially the same scale as Fig. 2;

Fig. 4 is a fragmentary plan view on a still larger scale than Fig. 1 and showing an edging guide of my invention and illustrating a fragment of a shingle in connection therewith and with the shingle in a different position than illustrated in connection with Fig. 1; and

Fig. 5 is a fragmentary plan view of parts shown in Fig. 4 of the drawings.

As my present invention is an improvement on said Letters Patent issued to me, many of the parts of the present invention will be readily apparent in view of my said issued Letters Patent and in the interest of brevity some of the parts herein are not described in complete detail.

Referring now to Fig. 1 of the drawings, any suitable supporting frame structure is employed and fragments thereof are numbered 6. A deck structure 7 supports shingles for sliding movement thereon. The intake portion of the mechanism is toward the lower right of Fig. 1 and shingle 8 will thus be the incoming shingle in the intake portion of the device. A conveyor chain 9 has spaced lugs 10 thereon and thus spaces shingles 8 and 11 as lugs 10 abut against the butt edge of a shingle and urge the shingles in the direction of the arrows indicated on Fig. 1. A fixed edge guide 12 is carried by frame 6 and one edge of shingles 8 and 11 are guided thereagainst as a primary guide edge so that the other three edges of the shingle can be squared therewith, i. e., the opposite edge of the shingle can be cut parallel with the initial guide edge of the shingle and the ends of the shingle may be cut at right angles to the initial or primary guide edge.

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In order to insure that the shingles are held down and continuously crowded against the guide edge 12, I provide a plurality of hold down crowding rolls 13. Referring also to Figs. 2 and 3, a pivotal support 14 is carried by frame structure 6. The pivotal support 14 may be in the nature of a shaft journaled in bearing 15 which bearing 15 in turn is carried by frame structure 6. Lever arms 16 and 17 may be integral and are rigidly mounted on shaft 14 and towards one side of the machine. The weight of the mechanism tends to hold rolls 13 in a downward position and such tendency is augmented by a spring 18 connecting between arm 17 and frame structure 6. Downward movement of each roll 13 is limited by an adjusting screw 19 carried by arm 16 and abutting a portion of the frame structure 6. Adjusting screw 19 is threadedly engaged with the arm 16. Thus the lowermost position of each roll 13 may be such so that a limited rise of each roll 13 is accomplished by a shingle passing thereunder.

Also, rigidly mounted on each shaft 14 is a yoke 20 which rotatably mounts a roll 13. Thus as each shaft 14 angularly moves, by reason of a shingle passing thereunder or passing there past, each roll 13 will rise or fall which in turn is reflected in angular movement in shaft 14 and parts rigidly connected therewith.

Each roll 13 is preferably provided with a helical grooved track 21 on the periphery thereof. The direction of angular grooving of the grooved track 21 of each hold down crowding roll 13 is such to urge shingles sidewise and against edge guide 12.

The machine may be designed for most convenient ease of operation for a left or right handed operator. The construction shown in the drawings is shown for operation by a right handed operator. Obviously, appropriate changes can be made in redesigning the machine if it is to be operated by a left handed operator. Thus, an operator will feed the shingle 8 into substantially the position shown in Fig. 1 of the drawings and before one of the lugs 10 arises to engage the butt end of a shingle and with one edge of

the shingle substantially close to the guide edge 12. Then the conveyor chain 9 moves the shingle 8 in the direction of the arrow upon a lug 10 engaging such a shingle. As the shingle continues to move towards the left, as viewed in Fig. 1 of the drawings, the shingle engages hold down crowding rolls 13 and is urged or maintained against the edge guide 12. As soon as the outer edge of a shingle 8 approaches a movable guide cam 22 the opeartor moves the lever 23 and parts connected therewith until the movable guide cam 22 engages the leading outside edge of the shingle 8.

As will hereinafter appear, the mechanism connected with the movable guide cam 22 is such that an operator can move the guide cam 22 into contact with the leading outside edge of a shingle 8 and promptly thereafter the movable guide mechanism, including movable guide cam 22, will be locked against further transverse movement so that the rotary cutter head 24 may cut on a plane parallel to edge guide 12 and which plane of cutting is determined by the initial setting made by the operator in moving the movable guide cam 22 against a leading edge portion of a shingle 8. While cutting saws may be readily substituted and are a full mechanical equivalent of the rotary cutter head 24, nevertheless I prefer to employ a movable cutter head 24 in finishing the outside edge of a shingle 8 as I find the same performs a better job than may be accomplished by the use of a saw mechanism. Also, if a rotary cutter head 24 is to be employed I preferably provide rotation of the same in the same direction of travel of the shingle rather than counter to the travel of the shingle as this locates frayed or torn edges, if any, at the tip end of a shingle rather than at the butt end of a shingle. Due to the manner of laying or applying shingles frayed or torn parts at the tip end of the shingle will not degrade a shingle, while the same tears or frays at the butt end of a shingle would degrade the same.

The mechanism interconnecting lever arm 23 with the rotary cutter head 24 may be somewhat similar to the structure illustrated in my said issued patent. In my said issued patent the resilient guide 34' is replaced by the movable guide cam 22 for reasons hereinafter explained and which movable guide cam 22 comprises one of the primary inventions herein. As the said resilient guide 34' of said issued patent moved outwardly and then inwardly automatically until the same engaged the outside edge of a shingle, the operator had two hands available for feeding shingles and hence it was more convenient for a right handed operator to feed the mechanism indicated in my said patent. In the present invention the operator moves the lever arm 23 by his most adept arm, such as his right arm, and hence will be feeding the shingles with his left hand and hence the arrangement of my present invention. The assembly for mounting the rotary cutter head 24 for swinging movement may be substantially the same as that indicated in my said patent. This assembly comprises fixed pivots 25 carried by main frame structure 6. Parallel arms 26 each have an end portion pivoted on fixed pivots 25 and have their other end portions pivotally connected to a cross link 27. Cross link 27 mounts rotary cutter head 24. One way of driving rotary cutter head 24 comprises a driven belt 28 connected to any suitable source of power, not shown. Driven belt 28 is rigid about an idle sheave 29. Idle sheave 29 is connected with rotary cutter head 24 by means of belt 30. Cross link 27 connects with shaft 31. Thus, as the operator moves the lever arm 23 toward and away from himself or toward and away from shingle 8, movable guide cam 22 moves away from or toward shingle 8 and at the same time shaft 31 moves away from or toward shingle 8. Locking means are provided in connection with shaft 31 so that it may be locked against longitudinal movement of the shaft or transverse movement relative to the shingles in synchronism with the travel of the shingles in a manner similar to that illustrated in my said patent. In other words, the operator provides an initial position transversely of the machine of the cutter head 24 and shortly thereafter locking mechanism limits longitudinal movement of the shaft 31 and relatively fixes the crosswise movement of the rotary cutter head 24 because of the relative position of the shingle 8 in its travel to the cutter head 24. This means that once a cut is started by the cutter head 24, the cutter head 24 is fixed so that it cuts in a line parallel to the edge guide 12 and the relative width of cut will depend upon the initial setting of the guide cam 22 by the operator as respects a particular width shingle.

Most shingles are narrower at the tip than at the butt portion and in order to provide parallel edges it is generally necessary to cut off a tapered piece gradually increasing in width as we approach the butt end of a shingle. However, some shingles taper slightly in the opposite direction and devices of my invention will operate on either normal or abnormal shingles.

Referring now to Figs. 4 and 5 which show the details of construction embodying the movable guide cam 22, a frame structure 32 is connected with the parallelogram construction embodying arms 26 and cross link 27. In Fig. 4 of the drawings it is shown that frame structure 32 connects with one of the parallel arms 26. The frame structure 32 is provided with guides 33 through which guide plate 34 is mounted for longitudinal movement. In order to provide for an adjustment between movable guide cam 22 relative to rotary cutter head 24 a slot 35 is provided in plate 34 and nut and bolt means 36 extend through an opening in frame structure 32 and through the slot 35. Also, a threaded set screw 37 threadedly engages a portion of the frame structure 32 and abuts against a portion of plate 34. Thus upon slightly loosening of nut and bolt means 36, the set screw 37 may be tightened and the guide 22 moved relatively closer to a shingle than is the rotary cutter head 24. Of course, after any adjustment is obtained the nut and bolt means 36 are tightened to maintain such an adjustment.

Movable guide cam 22 is mounted for angular movement on a shaft 38 and assumes a normal position against stop 39 because of the influence of spring 40. As the outside edge portion of a shingle 8 (a fragment of which is shown in Fig. 4) abuts against the cam surface of movable guide cam 22 as the shingle 8 is moving in the direction of the arrow shown in Fig. 4, then if the butt portion of the shingle increases in width the cam guide 22 can angularly move in the direction of the arrow shown in Fig. 4. Generally the cam guide 22 is adjusted relatively further laterally away from the fixed guide 12 than the cutter 24, such as one-eighth of an inch, so that straight edged shingles will have a trimmed edge. Also the locking mechanism for determin-

ing the lateral position of the swinging frame supporting cutter 24 will delay until cam guide 22 is intermediate the length of a shingle. Thus for normal shingles which have a narrower tip and a wider butt, the operator merely moves the parallelogram supporting the movable cam guide 22 until the cam guide 22 abuts against the leading tip portion of a shingle and maintains the lever arm 23 in this position without additional pressure until the locking mechanism hereinafter described engages shaft 31 and locks the parallelogram and parts connected therewith in the desired position and then when the shingle 8 passes the guide cam 22 the rotary cutter head 24 will be laterally fixed to cut in a plane parellel to and at the proper distance away from edge guide 12. However, if the operator sees a shingle which is enough wider at the tip than at the butt so the outer edge will not have a complete cut on the outside edge, he may merely increase the pressure on lever arm 23 so that by the frictional engagement between the cam surface of the guide cam 22 and the outside edge of a shingle 8, the cam guide 22 will be caused to angularly move thus permitting the rotary cutter head 24 to move closer to the edge guide 12 until a cutting alignment of the rotary cutter head 24 is reached which will be sufficient to take a larger cut at the tip of the shingle and a sufficient cut at the butt of the shingle so that the outside edge of the shingle is cut on a line parallel to the inside edge of the shingle abutting against edge guide 12. On normal shingles having a narrower tip and a wider butt, the guide cam 22 will angularly move as the shingle 8 passes the said guide to relieve pressure and prevent breakage of the shingles.

In my former patent I employed a resilient spring leaf 34' and shingles were placed under relatively high strains as the shingles varied in width between the tip and the butt portions. However, with the cam guide 22 which is angularly movable, substantially equal pressures obtain as the cam guide 22 presents a portion of its cam surface which is closer or further away from the edge guide 12. With an elongated spring 40 guide cam 22 can angularly move substantial distances without reaching the limitations of spring 40 while on the other hand the leaf spring 34' of my previous patent at times reached its limit of resiliency and hence at times substantial side pressures were involved which tended to break or shatter the shingles. Thus there is a distinct improvement in the mode of operation and construction of the present invention involving movable guide cam 22 over leaf spring 34' of my previous patent.

The means for locking shaft 31 against further longitudinal movement after it has been manually adjusted for a particular shingle and in synchronism with the travel of the shingle 8 is substantially the same as indicated in my said issued patent and is therefore only fragmentarily and diagrammatically illustrated herein as such forms no part of the present invention. Thus, by way of illustration the fragmentary parts herein correspond with the parts shown best in Figs. 2, 4 and 5 of said patent as follows: shaft 31 corresponds with shaft 37; chain 45 corresponds with chain 49; sprocket-cam 46 corresponds with sprocket-cam 45; and block 47 corresponds with block 40. Thus after shaft 31 has been initially manually positioned by the operator and before the leading edge of a shingle engages rotary cutter head 24, shaft 31 is locked so far as transverse movement of the machine is concerned and the cutter head 24 cuts a complete cut on the outer edge of a shingle and cuts a cut parallel to the guide edge 12. Then the shaft 31 is released so it may be moved in a direction transverse of the machine or longitudinally of said shaft 31 so that the movable guide cam can be properly positioned relative to the advancing outside edge of the next succeeding shingle and the cycle continues thereafter as shingles are fed through the machine.

As the inside edge of a shingle passes along in abutting relation on the edge guide 12, the inside edge of the shingle engages a driven rotary cutter head 48. This driven rotary cutter head 48 is driven by any suitable means, as belt means 49 connected to any suitable source of power, not shown. The driven rotary cutter head 48 is fixed against sidewise movement and cuts a predetermined cut sufficient to clear up the inside edge of the shingle and cuts parallel to the edge guide 12. In accordance with the usual practice the driven rotary cutter head 48 may be adjustable to allow for a smaller or larger cut as is required in individual operations to clear up the inside edge of the shingles. Also, the driven rotary cutter head 48 may be replaced by a driven rotary saw but I preferably employ a driven rotary cutter head 48 and drive the same with the travel similar to rotary cutter head 24 and for the same purpose.

In the foregoing description the shingle was described as merely being held down on its inner edge or its edge adjacent the edge guide 12. However, it is desirable to hold down the outer edge of a shingle and particularly at the time that the rotary cutter head 24 is cutting the outside edge of a shingle. Thus, I preferably mount a hold down means on the parallelogram construction comprising arms 26 and cross link 27 so that this hold down will move transversely with the rotary cutter head 24 and will be in close proximity thereto. Such hold down means 50 has a portion thereof shown in Fig. 1, numbered 50 and the details of the hold down means are illustrated in Figs. 4 and 5 and the hold down member is numbered generally 50 in said Figs. 4 and 5. The hold down means 50 comprises a ski-like member 51 resiliently held downwardly by spring means 52, one end of which is connected to the top of a plate 53 and the bottom of which is connected to frame structure 32. The plate 53 is rigid with ski-like member 51 and is movable upwardly and downwardly therewith. Two parallel links 54 are pivoted to a portion of the frame structure 32 and have their other ends pivotally connected with the plate 53. Thus the plate 53 moves in a vertical plane as we have a parallelogram involved and also ski-like member 51 is maintained substantially parallel to the top of a shingle and with the portion engaging the advancing tip edge of shingles turned upwardly like a ski to facilitate entrance of the shingles under the hold down member and so that the ski-like member 51 may rest on the outside upper edge of a shingle and adjacent the rotary cutter head 24 to hold down the outside edge of a shingle at the time the same is being cut by said rotary cutter head 24.

After the shingles have their outside edge cut by rotary cutter head 24 and their inside edge cut parallel thereto by rotary cutter head 48 we thus have a shingle with two opposed parallel edges, then such shingles are delivered from conveyor chain 9 and under hold down means 55. The lugs 10 on the conveyor chain 9 drop downwardly as they pass about sprocket 43 and the relationship

is such that the shingles do not pass too far toward the left as viewed in Fig. 1 and hold down means 55 prevents overtravel as the same frictionally engages the shingles. It is desired that the shingles shall not travel beyond alignment with the cam surface 56 as it is desired that the butt end of the shingles in their travel longitudinally of hold down means 55 shall engage the cam surface 56 and be moved thereby into alignment with the cam surface 57 (see Fig. 1 toward the left thereof). In order to convey shingles at right angles to their travel after they are beyond the influence of conveyor chain 9, I provide a conveyor 58 having lugs 59 thereon. The conveyor 58 is driven by any suitable means, fragmentarily illustrated, and in synchronism with the conveyor chain 9. Thus lugs 59 of conveyor chain 58 will be presented in timed sequence to the delivery of shingles to the conveyor 58 after the same leave conveyor 9. As the shingles travel under hold down means 55 under the influence of lugs 59 the butt portion of a shingle will engage cam surface 56 and the shingles are moved toward the left as respects Fig. 1 of the drawings and into alignment with cam surface 57. As the shingles continue they are held down by hold down means 60 and they encounter spaced apart driven rotary saws 61 and 62. As the shingle 63 is held in alignment by spaced lugs 59 and is held down by hold down means 60, the butt and tip of the shingle will be cut by saws 61 and 62 and at right angles to the parallel cuts on the edges of the shingles provided by cutters 24 and 48. As the details of the conveyor 58, lugs 59, hold down means 55, hold down means 60, and driven rotary saws 61 and 62 form no part of the present invention they are not further described and are somewhat fragmentarily illustrated. As we are cutting across the grain of the wood rather than with the grain, preferably rotary saws 61 and 62 are employed rather than cutter heads. Also, in accordance with common practice the rotary saws 61 and 62 rotate against the travel of the shingle 63 rather than with the same.

Thus from the foregoing description it is obvious that I have provided devices which are operable in combination with a trimming device for trimming pieces of sheet material, as shingles, of varying widths. In the trimming device there is an edge guide 12 so that the inner edge of a shingle may be abutted against the same. A laterally movable frame comprising parallel arms 26 and cross link 27 carries driven rotary cutter head 24 for cutting the outer edge of a shingle which has its inner edge abutted against the fixed guide 12. The laterally movable frame structure also carries a guide cam 22. The guide cam 22 operates in advance of the rotary cutter head 24 and determines the lateral position of the movable frame and in turn the rotary cutter head 24 connected therewith. Any suitable means, as lever arm 23, may be employed for swinging the movable frame and parts connected therewith particularly the cam 22 and the cutter head 24.

The cam 22 has a spiral cam track and is normally held so that a portion of the spiral cam track removed from the center of rotation of the cam 22 may be moved into engagement with the tip portion of a shingle. The spring 40 normally urges the cam track 22 and parts associated therewith against a fixed stop 39. The cam track 22 is mounted for angular or rotary movement about shaft 38. The periphery of the cam track 22 engages the outside edge of a shingle 8 and thus by frictional engagement the cam

22 may be rotated in a given direction, as clockwise in Fig. 4 of the drawings, and present a cam portion closer to the shaft 38 as the cam 22 is angularly moved by frictional engagement with the outer edge of the shingle 8.

The hold down means best shown in Figs. 4 and 5 of the drawings provide a ski-like member 51 for holding the outer edge of a shingle and at a time and location when the cutter 24 is operating.

Obviously, changes may be made in the form, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only a preferred form of embodiment.

I claim:

1. In a trimming device to provide trimmed outside edges to pieces of sheet material, as shingles, of varying widths, the combination with a fixed guide to be engaged by the inner edge of a shingle, a frame laterally movable toward and away from the outer edge of a shingle having its inner edge abutting said fixed guide, a side edge cutter connected with said movable frame for cutting the outer edge of a shingle, and a conveyor for urging shingles through the trimming device, comprising cam guide bearing means connected with said movable frame; a rotatable cam guide positioned in advance of said side edge cutter and determining the lateral position of said movable frame and parts connected therewith and having a spiral cam track engageable with the outer edge of a shingle and rotatable, by engagement with the outer edge of a shingle, to present to said shingle cam surface portions gradually approaching its center of angular movement; resilient means normally urging said cam guide track into an angular position to present a portion of its spiral cam track removed from its center of rotation for engagement with the outer edge portion of a shingle; and lever means for laterally moving said frame, said cam guide, and said side edge cutter toward and away from said fixed guide.

2. The combination of claim 1 wherein the said rotatable cam guide has a fixed stop arresting angular movement in one direction and with a portion of cam track surface removed from its center of rotation presented to the outside edge of a shingle; and spring means angularly urging the cam against said fixed stop.

3. The combination of claim 1 wherein shingle hold down means are connected with said laterally movable frame and engage the outer edge of a shingle in close proximity to said edge cutter.

4. In a device for trimming outside edges of sheets of material of varying widths, the combination with a fixed side guide, a swinging frame movable toward and away from said fixed guide, and a side cutter carried by said swinging frame, comprising a rotatable cam guide connected with said swinging frame; and a spiral cam track carried by said cam guide and aligned to engage the outside edge of a sheet of material to determine the relative position of the swinging frame upon contact with said edge of the material and to rotate by engagement with said edge of the material and to present to said edge of the material portions of the spiral cam track having different distances from the center of rotation of the cam guide.

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No references cited.