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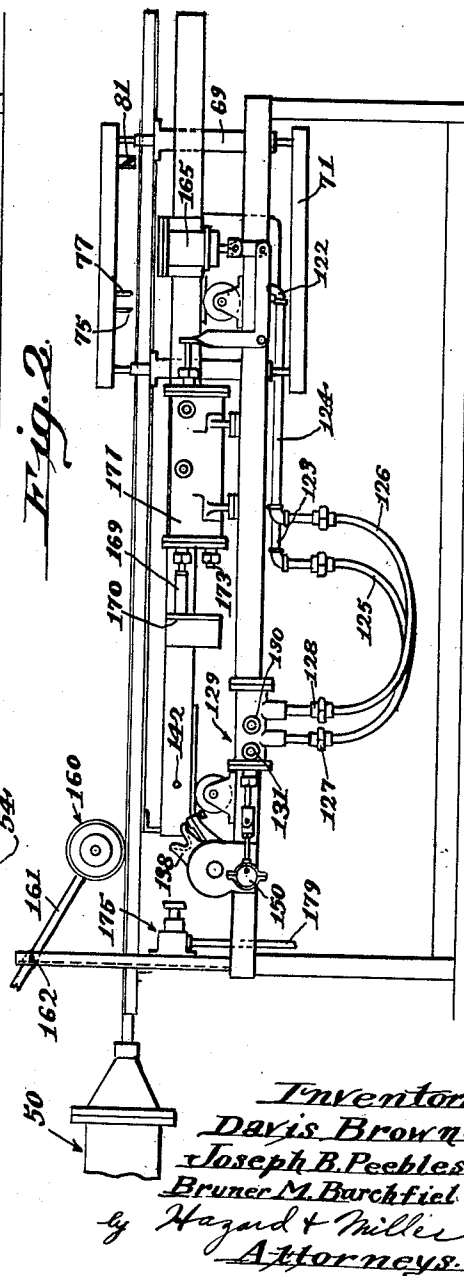
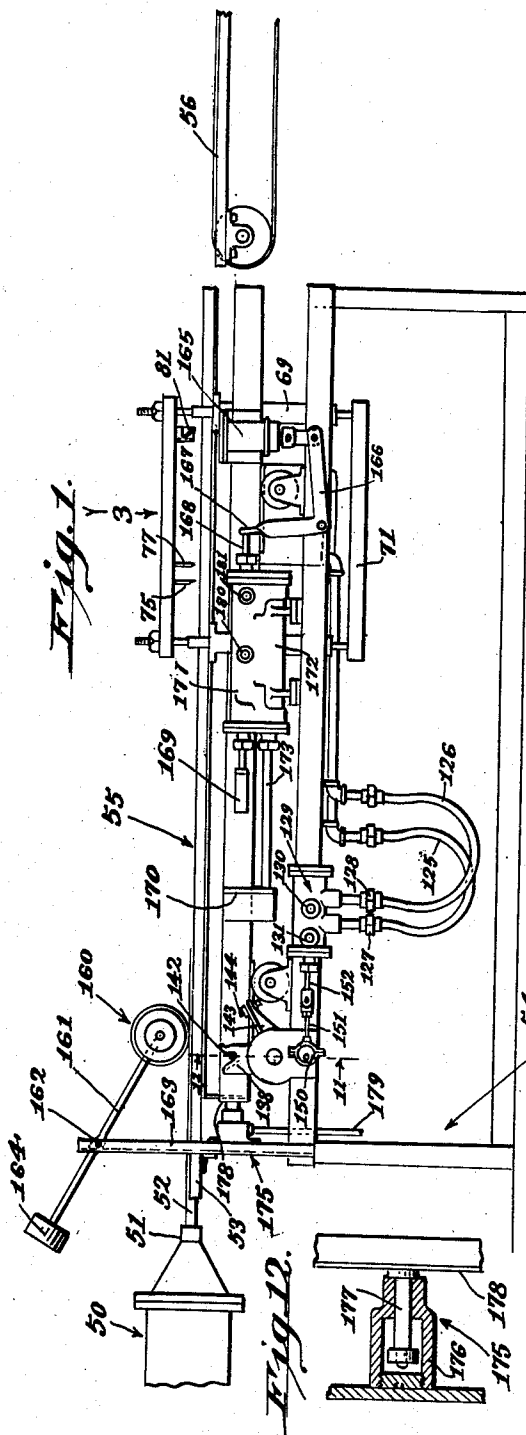
D. BROWN ET AL

2,177,607

APPARATUS FOR MAKING ROOFING TILE

Filed Aug. 4, 1936

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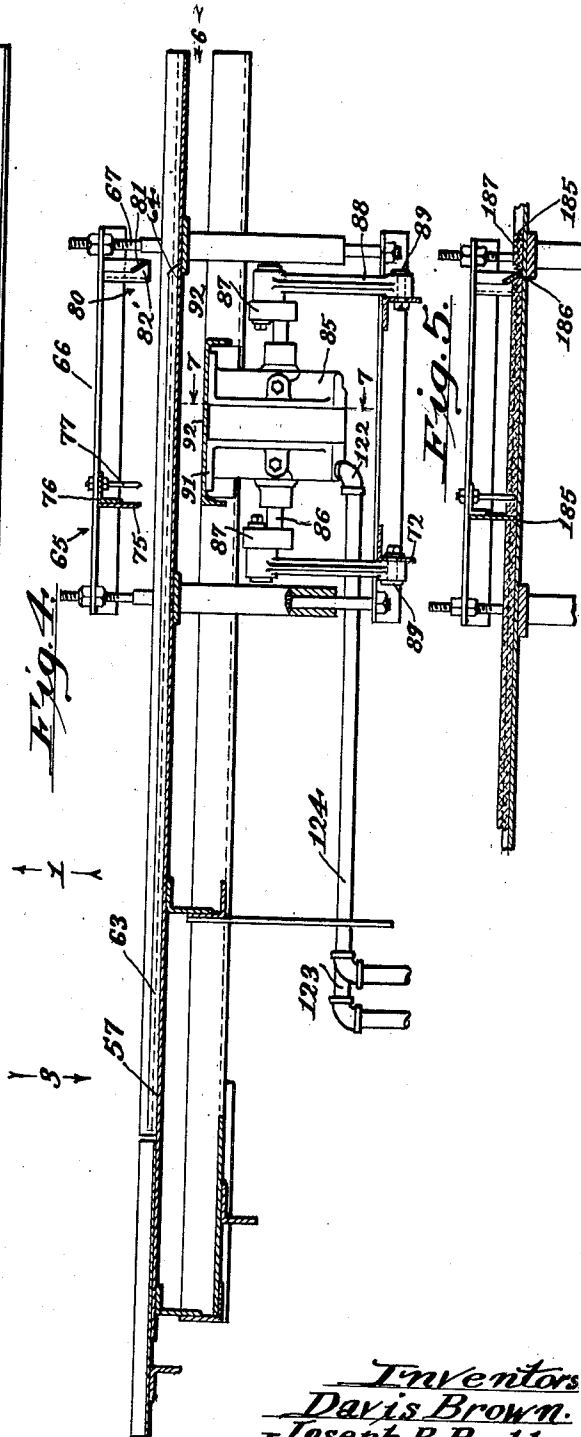
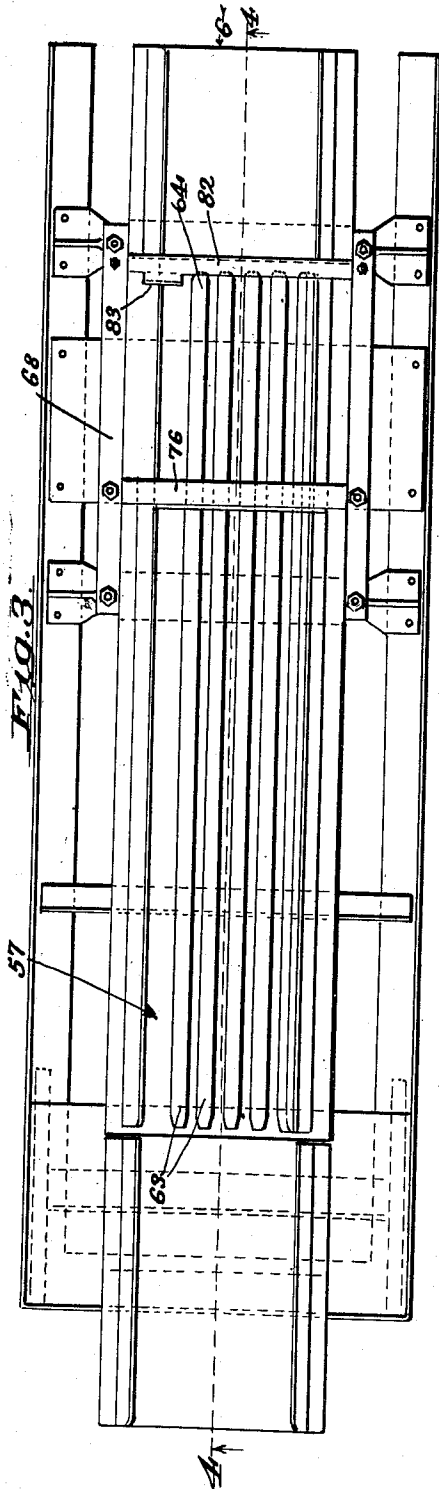
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Fig. 6.

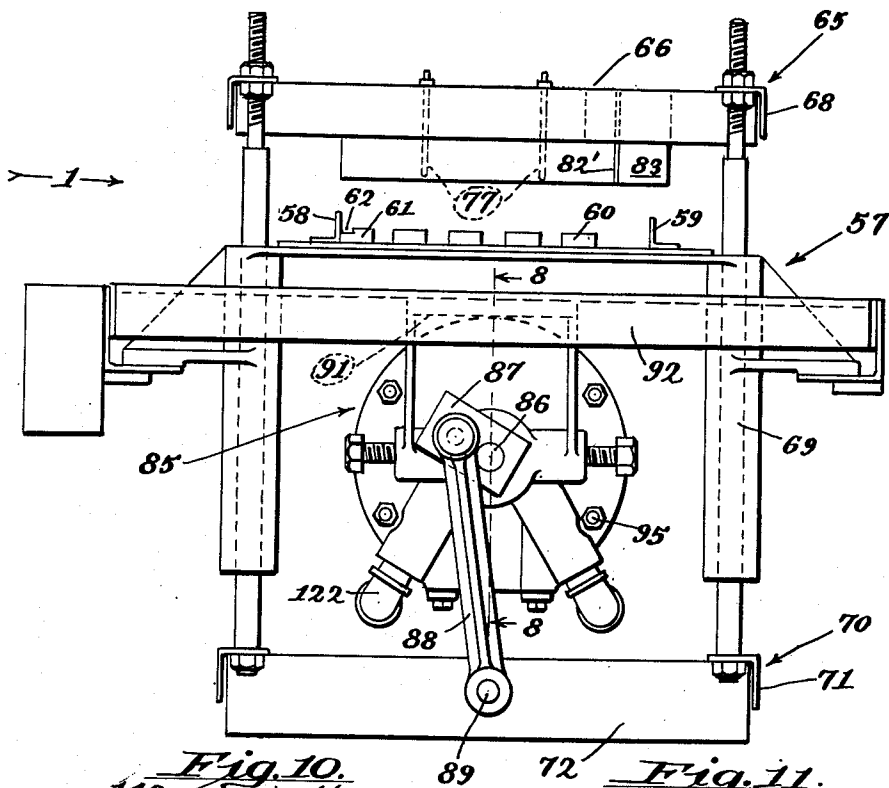


Fig. 10.

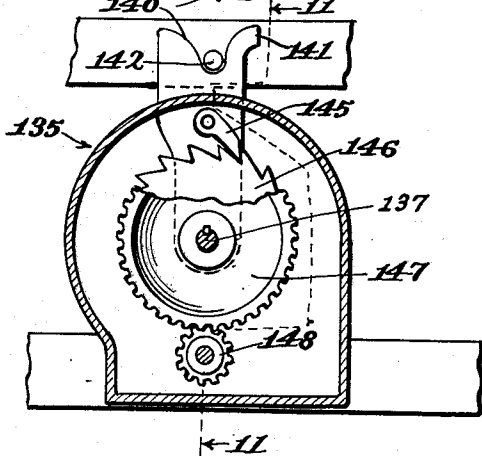
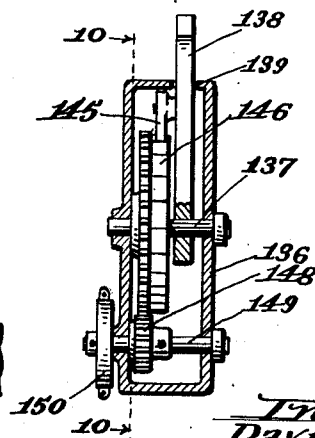


Fig. 11.



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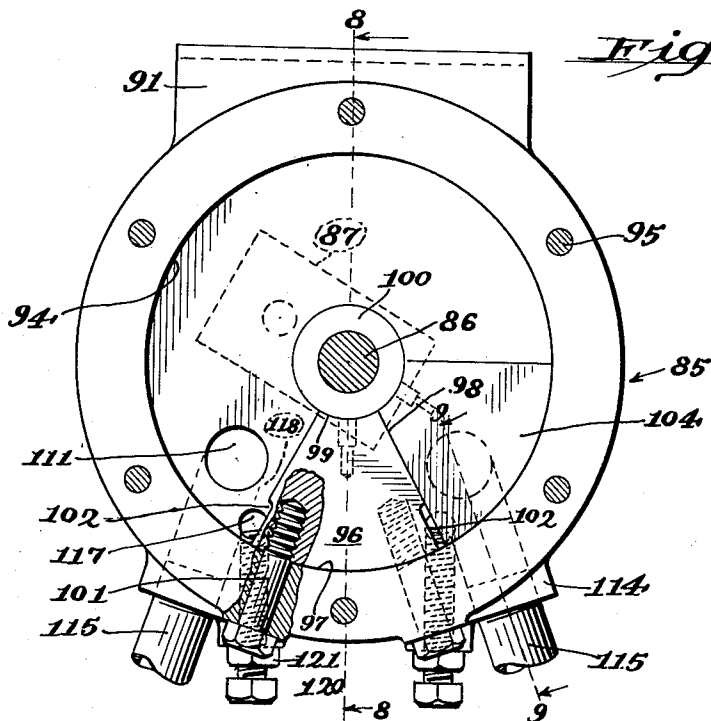


Fig. 7.

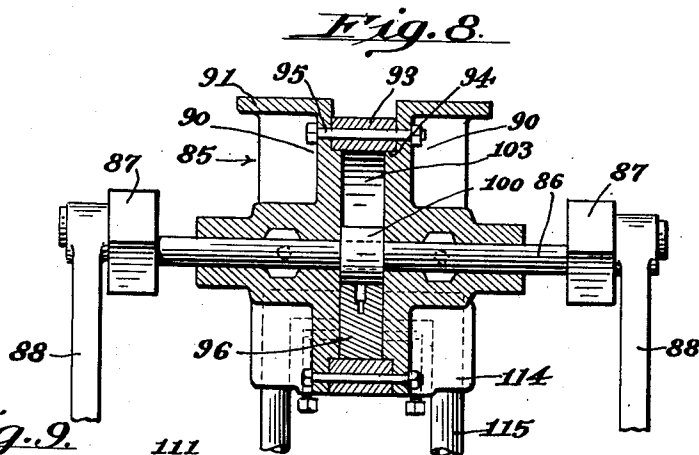


Fig. 8.

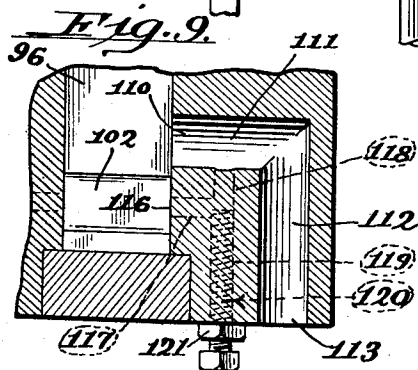


Fig. 9.

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Fig. 13.

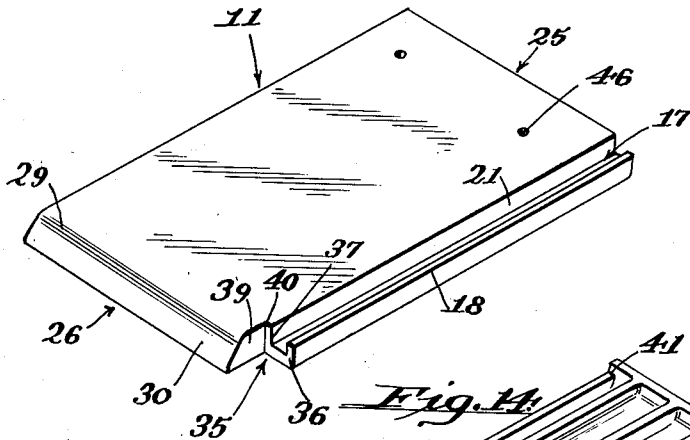


Fig. 14.

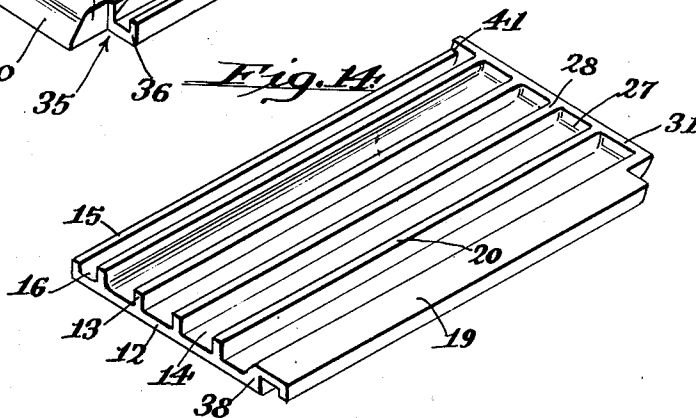


Fig. 16.

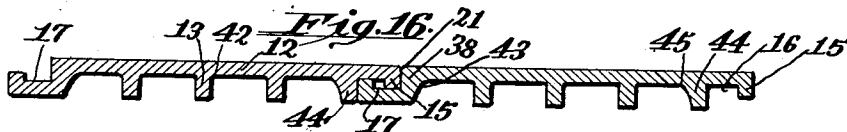
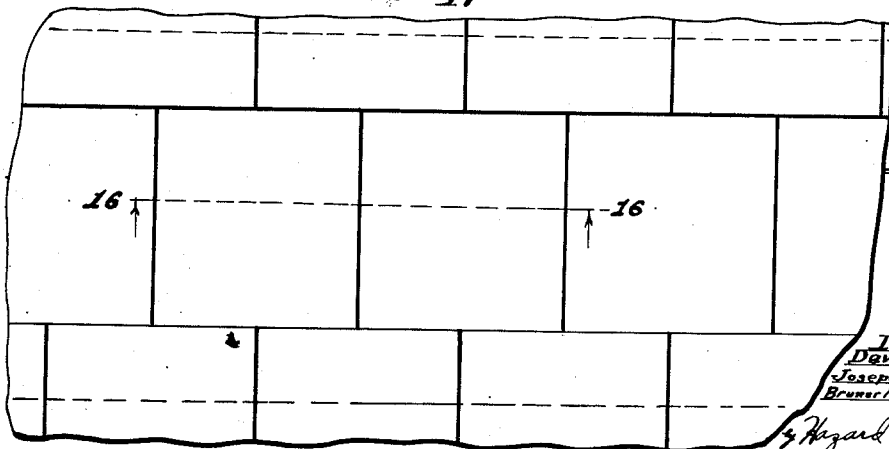


Fig. 15.



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UNITED STATES PATENT OFFICE

2,177,607

APPARATUS FOR MAKING ROOFING TILE

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Brown

Application August 4, 1936, Serial No. 94,184

12 Claims. (Cl. 25-43)

Our invention relates to a roofing tile having a longitudinal edge interlocking between adjacent tile, such interlock being of a type in which the drainage or seepage of water at the longitudinal tile joints is carried downward in part of the interlocking construction and thus drains on to the lower tiles of a roof. Another feature of our invention as to the tile is in providing a sealed end closure for a tile with ribs on its underside, such closure thus when interfitted by an overlap with other tiles prevents seepage of water upward in the grooves formed between the ribs on the underside of the tile and also permits a lesser overlap of the tiles. Another feature involving the sealed end and the interlocking channel of adjacent tiles is in having the channel terminate slightly short of the sealed end so that an adjacent tile has its sealed end extend over and below the end of the channel used for interlocking the adjacent tile.

A characteristic therefore of our invention as it relates to the tile, is that each individual tile has a series of longitudinal ribs on its underside thus forming grooves between the ribs. At the margin or longitudinal side of each tile a longitudinal channel is formed and the edge of the adjacent tile has a downturned partial rib which interfits with the said channel. In addition the lower end of each tile is rounded over forming a seal across the ribs. This gives a convex curve to the lower end of each tile considered on a longitudinal section and thus forms with the ribs flat undersurface portions to fit on the flat top of an under tile. The sealed lower end of each tile where it is turned downwardly engages over the end of the marginal channel of the adjacent tile, such channel being slightly shorter than the total length of the tile.

A further object and feature of our invention is in the method of manufacturing tile in a continuous and in effect, automatic manner. In this a ribbon of clay is forced through a suitable extruding machine which forms the ribbon with continuous longitudinal ribs on its underside, these ribs being all of the same depth. In addition at one edge there is a partial rib, this being about half the depth of the other ribs. On the other margin a channel is formed facing upwardly and this has a longitudinal rim on its outer edge, such rim terminating in a plane of the underside of the main body of the rib. A further feature in the method of making the tile is passing this ribbon through an automatic cutting machine which has a travelling carriage, such carriage moving with the same speed as the ribbon

after a predetermined amount of such ribbon has been fed on to the carriage and then the cutting of the ribbon to form both ends of the tile and the sealed end is done in one operation, this operation also cutting off a short waste strip. The cutting is done during a longitudinal motion of the cutters and the press for sealing the end so that the longitudinal speed of these cutters equals the longitudinal speed of the ribbon of clay. Thus, in the action of cutting the ribbon into tile lengths, a notch is cut out of one corner at the end of the interlocking channel, the lower end of each tile is sealed or rounded off, this also forming a short waste strip, the opposite end is cut by a shear cut transverse to the clay ribbon and at the same time nail holes are punched adjacent the upper edge of the tile.

Another object and feature of our invention relates to the machine for forming the tile. In this machine certain old devices are used such as a known construction for extruding a ribbon of clay, the extruded ribbon being forced longitudinally over a reciprocating carriage which carriage is given an initial impulse near the extrusion portion of the assembly and takes up a speed of longitudinal movement equal to that of the ribbon of clay. The carriage is provided with cutters automatically operated to cut the ribbon while it is moving and in the same operation to sever a short length forming a waste length, this being variable.

In this general type of machine one of the improvements embodied in this invention is in the assembly of vertically reciprocating cutters and dies for severing the ribbon into lengths and then pressing one end of a shingle length downwardly, that is, forcing the web portion of the shingle down at the ends of the ribs to form the end seal, this being operated by a hydraulic engine which has an oscillating action. One of the difficulties encountered in prior machines having cutters not operated by oscillating engines is the abrupt stop at the end of the stroke, but with our improved engine a cushioning action is obtained which decelerates the cutters at the end of their stroke, thus reducing the vibration and impact of the cutter mechanism. Another feature of our invention relates to a valve control for the oscillating engine, this being actuated by the reciprocating carriage through the medium of an oscillating arm having a pawl and ratchet and a gear drive to an eccentric, this eccentric by means of a link operating the control valve for the oscillating engine. Other detail features of the machine involve the construction of combination

dash-pots and impulse cylinders for imparting the initial starting movement of the carriage together with a return action cylinder for moving the carriage back to its initial position after the completion of the stroke and the cutting of the shingle.

Our invention is illustrated in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of the machine assembly taken in the direction of the arrow 1 of Fig. 3 or 6, this showing the carriage in the initial position at the start of its longitudinal movement with the ribbon of clay and in which the cutters are illustrated elevated.

Fig. 2 is a side elevation similar to Fig. 1 but showing the carriage at the end or finish of its stroke and as it is about to be returned to its initial position, the cutting being completed and the cutters again elevated.

Fig. 3 is a plan of a portion of the machine showing the part of the carriage taken in the direction of the arrow 3 of Fig. 4, omitting however, the hydraulic operating mechanism.

Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 3 taken in the direction of the arrows showing part of the oscillating hydraulic motor in elevation and a portion of the cutters and dies for forming the shingle, these being in an elevated position.

Fig. 5 is a partial longitudinal section similar to Fig. 4 but showing the cutters and dies in their lowermost position when severing and die-pressing the shingle end.

Fig. 6 is an end elevation taken in the direction of the arrow 6 of Fig. 3 or 4 illustrating principally an end view of the hydraulic engine and the cutter and die-pressing and severing assembly.

Fig. 7 is a detail transverse section on the line 7—7 of Fig. 4 of the engine showing details of the engine broken away.

Fig. 8 is a longitudinal section of the engine on a reduced scale taken on the line 8—8 of Fig. 6 or 7.

Fig. 9 is a detail of the engine showing features of the ports of the engine, such figure being taken substantially on the line 9—9 of Fig. 7.

Fig. 10 is a detail vertical longitudinal section on the line 10—10 of Fig. 11 partly broken away showing the pawl and ratchet and gear train for operating the hydraulic valve to control the oscillating engine.

Fig. 11 is a vertical transverse section on the line 11—11 of Fig. 10 taken in the direction of the arrows.

Fig. 12 is a diagrammatic longitudinal section of the combination dash-pot and impulse assemblies for retarding the carriage on the return stroke and for giving the initial start to the carriage.

Fig. 13 is a perspective view of one of the tiles showing the upper surface and the channel at one side.

Fig. 14 is a perspective reverse view of the tile showing the full ribs, the half rib on one edge and the underside of the channel.

Fig. 15 is a plan of an assembly of tiles in a roofing.

Fig. 16 is a transverse section of two adjacent tiles on the line 16—16 of Fig. 15 in the direction of the arrows.

Our invention as it relates to the tile is illustrated particularly in Figs. 13 through 16 in which the individual tile is indicated by the numeral 11. This is formed from a continuously molded ribbon of clay which has a web 12 with

a series of internal ribs 13 formed on the lower side. The formation of the ribs thus forms wide longitudinal grooves 14. At one marginal edge a partial and designated half rib or rim 15 is formed, there being a narrow groove 16 between such marginal half rib or rim and the next adjacent full rib 13. It will thus be seen that the upper surface of the ribbon presents a smooth surface of the web of the tile except that on one margin there is formed a longitudinal channel 17, this being on the side opposite that having the half rib or rim 15. This channel has a marginal half rib or rim 18. The base or underside 19 of the channel is on the same plane as the bottom edge 20 of the main ribs 13 so that the half rim or rib 18 is approximately the same in vertical measurement as the half rib or rim 15 on the opposite side of the ribbon. The inner face 21 of the channel 17 is thus in effect a portion of the side face of a rib. It will be understood that as the ribbon of clay is extruded in a continuous operation that the web, the various interior ribs, the marginal rim 15 on one side and the channel structure 17 on the opposite side are formed in a continuous manner and that the individual tiles are made by cutting into proper lengths. In this cutting a transverse cut is made which forms the upper end 25 of an individual tile, this severing the web, the various internal ribs, the marginal rim 15 and the channel structure 17. This cut is at right angles to the plane of the ribbon. The lower end of the tile is formed with a sealed end 26. This is made by die-pressing the web portion downwardly forming connected cross blocks 27 between the ribs and also partially widening or spreading the ends of the ribs 13 adjacent their lower end as indicated at 28. The characteristic of the sealed end 26 is that it has a convex rounded curvature 29 merging with the top surface of the web 12 and this convex curve or nose merges into a sloping end edge 30 which forms an obtuse angle with the plane of the web of the tile. The sealed end has a transverse under edge 31 which is in the same plane as the bottom 19 of the channel and of the lower edges 20 of the main ribs 13.

In the same operation in which the sealed end is die-pressed in shape, a notch 35 is formed at the lower end of the channel structure 17. This is done by making a transverse cut which severs the half rib or rim 18 of the channel, the bottom of the channel leaving an end face 36. This action also makes an end cut 37 in a portion of the lateral rib 38. There is also a longitudinal cut 39 made in this rib from the sealed end 26. This leaves a right angular corner 40 at the transverse cut of the channel 17 at its end face 36 and the side face 39 cut in the rib 38.

To interfit with this the rim 15 joins with the sealed end 26 on a junction line 41 which is positioned slightly above the lower edge 31 of the sealed end as shown in Fig. 14. It will be noted that in forming the ribs, the center ribs 13 have a small fillet 42 where they join the web 12. The rib 38 adjacent the channel 17 has a larger fillet or sloping side wall 43. Also the rib 44 which is adjacent the groove 16 also has a large fillet 45 or sloping inner edge. This construction at the ribs 38 and 44 strengthens the connection of the channel structure 17 on one side of the tile and the groove structure 16 with the rim 15 on the opposite side of the tile.

The tiles are provided with the usual nail hole perforations 46 spaced inwardly from the edge 25. In this construction of a sealed tile however,

the nail holes may be made much closer to the upper end of the tile than in the usual tile as it is not necessary to have such an overlap of the tiles when laid up on a roof.

In setting up the tiles they interfit as shown in Fig. 16 in which it will be seen that the rim 15 on one side of a tile fits in the channel 17 on the edge portion of an adjacent tile. It will be noted that the rim 18 on the outside of the channel 17, being of half the rib height, substantially engages the underside of the web 12 whereas the edge of the rim 15 substantially engages the bottom of the channel 17. The outside of the rim 15 is in close engagement with the longitudinal edge surface 21 of the channel 17 and the rim 18 is in close engagement with the rib 44 of an adjacent tile.

The corner portion of the sealed end 26 of the tile at its junction with the rib 15 fits in the notch 35 formed by cutting the channel 17 a shorter length than the main body of the tile so this gives a seal across the end of the channel 17. Therefore any water seeping between adjacent tiles and flowing down this channel is directed downwardly onto the tiles immediately below in a roof structure.

Our invention, so far as the machine assembly is concerned, has the following main features in which an extruding machine 50 extrudes through a die 51 forming a ribbon of clay 52. This is received by a transfer table 53 mounted on a substantial frame structure 54. This frame structure forms a mounting and track for the carriage designated by the assembly numeral 55. The carriage is mounted on wheels in the usual manner to facilitate its reciprocating movement. The shingles after being formed are conveyed from the machine by an out-feeding conveyor 56, this travelling at a higher rate of speed than the ribbon of clay to lead the cut tiles quickly away from the machine.

Certain characteristics of the carriage 55 is that this has a carriage bed 57 with marginal guides 58 and 59 (note Fig. 6), these being formed of angle-irons and between such angle-irons there are longitudinal straps 60 which fit the grooves between the main rib. There is also a side strap 61 with a longitudinal recessed edge 62 which accommodates the marginal rim 15. These straps and the angles have a somewhat pointed end 63 to facilitate feeding the ribbon of clay over these straps. The straps have a slightly beveled end 64 remote from the end 63. The machine is provided with a cutting and die-pressing assembly 65. This has an upper frame 66 supported on four vertically reciprocating rods 67, these being connected to longitudinal angles 68 forming part of the top frame 66, this frame being adjustable on these rods. The rods pass downwardly through tubular guides 69 forming part of the carriage bed or secured thereto in any suitable manner. The lower ends of these rods are connected to a lower frame 70. This frame has longitudinal angles 71 and cross or transverse angles 72.

The cutters include a transverse severing blade 75 which is illustrated as secured to a transverse angle-iron 76 extending between the longitudinal angles 68 of the top frame 66 and is adjustable longitudinally to regulate the length of the tile. Punches 77 are also secured to the angle-iron 76 to punch the nail holes.

The die 80 for forming the sealed end on the tile has a sloping blade 81 depending from a cross strap 82 located between the longitudinal angles

68. This blade slopes at an angle upwardly and towards the severing blade 75 and forms the main portion of the end seal 26, giving the slope to the end 30 and by the downward flow of clay adjacent the top surface of the web forms the convex curve 29. This die has a longitudinally extending blade section 82' and an outwardly extending shearing blade 83 which forms the notch 35. The longitudinal shearing part 82' cuts the longitudinal cut 39 of the notch and the outwardly extending shearing blade 83 gives the transverse cut 36 and 37 at the end of the channel structure 17. Forming the notch causes a slight waste in the clay ribbon forming the tile.

The cutter assembly with the blade and the end seal forming die is vertically reciprocated by an oscillating engine 85. This engine has a crank shaft 86 extending therethrough with a crank 87 on each end. From each crank there depends a connecting rod 88 which is pivotally connected at 89 to a cross or transverse angle 72 which angles form in effect a cross head. The engine has two similar end heads 90 (note particularly Figs. 6, 7, 8 and 9) which have a supporting base 91 bolted to a cross channel 92 which forms part of the machine carriage. Between these heads there is a ring 93 cylindrical on its inside surface, this ring fitting against shoulders 94 of the end heads and the assembly being attached by bolts 95. Secured to the lower part of the ring 93 there is a somewhat triangular abutment block 96 which has a lower circular edge 97 fitted on the inside of the ring and radial edges 98. This abutment has an upper curved edge 99 which has a close operating fit with the center hub 100 of the crank shaft 86. The abutment 96 is attached to the ring 93 by bolts 101. The two opposite radial edges 98 have a transverse recess 102. This construction forms a cylinder space 103 defined by the inside of the ring 93 and the radial edges 98 of the abutment block 96 and the engine heads 90. A radial piston 104 is secured to the hub 100.

The ports on both sides of the abutment block 96 are the same, there being a main port 110 leading through a head 90. A fluid duct 111 extends longitudinally and then somewhat radially outwardly as indicated at 112, having an opening 113 at a boss 114, in which boss there is threaded a hydraulic supply and exhaust pipe 115. A secondary port 116 is positioned to lead through a head 90 into one end of the recess 102 and partly into the space outside of the radial face 98 of the block 96. From this port there is a longitudinal duct 117 and a somewhat radial duct 118, this communicating with the duct 111 which leads to the main port 110. A valve plug 119 in the form of a bolt is threaded in a perforation 120 in the head and intersects the end of the duct 117. Thus by adjusting the valve plug 119 by the bolt and lock nut 121 (note Fig. 9), the flow of fluid through the port 116 may be regulated.

The two supply pipes 115 have elbows 122 and there are two longitudinal pipes 123 and 124 (note Figures 1 and 2), which are supported in the carriage and from each of these there is a flexible hose 125 and 126 leading to couplings 127 and 128 of a control valve 129. This valve may be of the usual character and has an inlet connection 130 from a hydraulic pump and return 131 to the pump or a reservoir. The geared operation of the valve 129 has an assembly 135 in which a housing 136 has a main shaft 137 mounted therein on which shaft there is a loosely mounted lever 138 operating through a slot 139 in the housing (note Figs. 10 and 11). This lever has

a deep notch 140 and a stop abutment 141. A pin 142 on the carriage engages the notch. The lever in its movement of oscillation between the positions shown in Figs. 1 and 2 positions the notch as in Fig. 2 to be engaged by the pin on the return movement of the carriage. A fixed bracket 143 has a set screw 144 to engage the abutment 141 and thus adjust the movement of the lever 138. A pawl 145 is pivoted on the lever and operates a ratchet 146 which has a gear 147 secured thereto, both being mounted on the shaft 137. This gear meshes with a pinion 148 on the pinion shaft 149, this pinion carrying an eccentric 150 from which eccentric an adjustable link 151 operates the valve plunger 152, thus controlling the flow of hydraulic fluid to and from the oscillating engine 85.

The mechanism for initiating the movement of the carriage with the ribbon of clay and the return of the carriage at the end of its stroke may be arranged somewhat in the manner of the patent application to Davis Brown for Automatic brick and tile cutter, Ser. No. 44,727, filed October 12, 1935, matured to Patent No. 2,058,663 issued October 27, 1936. In this we employ a rotary timing wheel 160. This is mounted on a lever 161 fulcrumed at 162 on a stand 163 extending upwardly from the frame of the machine and having a counterweight 164. This measuring or timing wheel has an electric timer connected thereto, the wheel being rotated by the web of the ribbon of clay. This timer is electrically connected to a solenoid 165 (note Figs. 1 and 2) which operates a bell crank 166, of which one end 167 operates the valve plunger 168. The opposite end 169 is positioned to be engaged by an abutment 170 on the carriage. The valve plunger controls a valve 171 which regulates the operation of a cylinder 172 having a plunger 173. This plunger is forced outwardly to engage the abutment 170 and return the carriage to its initial or starting position. This assembly may be designated as the carriage return mechanism. A combination dashpot and initial impulse mechanism 175 (note Figures 1 and 12) has a cylinder 176 with a plunger 177 therein, this plunger engaging a second abutment 178 on the carriage. A hydraulic fluid pipe 179 leads from this cylinder to a storage tank under hydraulic pressure and is interconnected with the supply pipe, not illustrated, to the valve 171, this valve having waste connections 180 and 181. The general action of the hydraulic impulse mechanisms for starting and returning the carriage thus employs the cylinder 175 acting as a dashpot when the carriage is returned to its initial position by the action of the plunger 173 being pushed out. When this plunger 173 is retracted, the plunger 177 of the first impulse mechanism is forced outwardly starting the carriage on its work stroke. This is only a starting impulse as the friction of the ribbon of clay over the carriage causes the carriage to move at the same rate of speed as the clay. The timing wheel 160 with its electric timer operating the solenoid 165 thus controls the return movement of the carriage and hence the timing of the initial movement.

The operation of cutting the tile and die-pressing the end is substantially as follows: When the carriage is given its initial movement from the position shown in Fig. 1 towards that of Fig. 2, the oscillation of the arm 138 of the gear control 135 is sufficient to rotate the eccentric 150 one half a turn, thus operating the valve plunger

152 and actuating the control valve 29. This has a flexible hose connection to the oscillating engine 85. Presuming the piston 104 is at one extreme of its stroke as shown in Fig. 7, the side face of the piston has one of the ports 110 closed at this instance, this being a pressure or inlet port, the opposite similar port being an exhaust. However pressure fluid is by-passed from the large duct 111 (note Fig. 9) through the ducts 118 and 117 to the small port 116, a part of which port is always uncovered by the recess 102. This gives an initial action of starting the piston in one direction of movement, this giving a relatively slow acceleration. Then when the port 110 is uncovered due to the movement of the piston, the full hydraulic pressure is exerted on the pressure face of such piston, giving a quick and powerful stroke for rotating the crank shaft 86 and thereby either moving the cutter mechanism downwardly or upwardly. This operates in one direction at each half oscillation of the piston and crank shaft.

The cushioning action to secure a gradual deceleration is caused by the piston 104 when adjacent the end of its stroke, cutting off the main port 110 which is functioning at the moment as an exhaust. This causes a trapping of fluid between the face of the piston and one of the faces 98 of the block 96. However such fluid is forced outwardly through the recess 102 and through the small port 116, the by-pass ducts 117 and 118 into the main ducts 111 and 112. Such action therefore reduces the jar at both ends of the vertical stroke of the cutting mechanism mounted on the carriage and travelling therewith.

In this cutting action the transverse cutter blade 75 is brought down at predetermined periods during which time a ribbon of the clay has been fed, thus giving a series of cuts, two of which are indicated at 185 in Fig. 5. At the same time the die cutter 80 makes a severance cut 186 as well as die-pressing the end of the tile. Thus there is a small waste piece 187 left between the severance 186 and the transverse cut 185. This waste piece also includes the small waste block cut out at the notch 35. This waste piece drops through an opening and is not fed on the out-feeding conveyor belt 56.

An important feature from the construction and operational standpoint relates to the die designated by the assembly numeral 80 illustrated for instance in Figs. 1, 2, 3, 4 and 5 and 6. Such die has an upwardly and rearwardly sloping blade 81, this sloping towards the rear severing blade 75. The cutting edge of this sloping blade is horizontal and thus parallel to the bed of the carriage. However the sloping part of this blade does not extend the full width of the clay ribbon from which the tile is formed and cut but at the left hand end considered facing in a forward direction of the movement of the ribbon, there is a longitudinally extending blade section 82' which is vertical as clearly shown in Fig. 6. At the rear end of this latter blade there is the shearing blade 83 which is also vertical as shown in Figs. 3 and 4. Thus in the operation as shown in connection with Fig. 5, the shearing blade 75 cuts through the ribbon of clay, making a vertical cut and completely severing the web and the various ribs. The action of the die and in particular the sloping blade 81 in its downward movement engages the ribbon back of the right hand cut 185 shown in Fig. 5. On account of the rearwardly and upwardly inclined slope of the sloping blade 81, the web is pressed down-

wardly and the ends of the ribs 20, note Fig. 14, must be expanded and this expanding action is taken care of by the beveled ends 64 of the longitudinal straps 60 forming a slight fillet shown in Fig. 14. The characteristics of the action of the longitudinal blade 82' and the cross blade 83 is at the same time to form a longitudinal cut in the clay forming the surface 39 shown in Fig. 13 and to make the cut cross wise at the right angular corner 40, leaving exposed the surfaces 36 and 37. This cuts out the notch designated as 35, Fig. 13. In this action the cutting edges at the bottom of the die, that is, the cutting edge of the sloping blade 81 and of the blades 82' and 83 are all on the same level and thus cut through the web, the ribs and the channel structure giving the formation at the end of the tile shown in Figs. 13 and 14 and developing a slight waste strip 197 which includes the portion cut out to form the notch 35.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

We claim:

1. In a machine for making roofing tile in which a shaping means shapes the material of a tile to form a web exposed to the weather and spacing ribs under the web to support the tile on a roof structure, the combination of a movable transverse die having a bottom cutting edge parallel to the web and a pressure face sloping upwardly and rearwardly, that is, towards the body of the tile from the transverse edge, means to press said die downwardly to engage the top surface of the web, the edge forming a transverse cut through the web and the pressure face distorting or depressing a portion of the web adjacent thereto downwardly to fill the end spaces between the ribs and the web, the said die at the same time producing a small waste piece of the tile material.

2. In a machine for making roofing tile as claimed in claim 1, a plurality of longitudinal straps positioned underneath the web and fitting between the ribs and the web of the tile material, such straps having a bevel at their forward edge whereby the die in distorting the web also distorts the ends of the ribs forming a fillet at the beveled edge of the straps adjoining the web and the ribs.

3. In a machine for making roofing tile in which a tile material is shaped to have a web for exposure to the weather and a plurality of longitudinally extending ribs on the underside to support the tile on a roof with spaces together with an upwardly faced channel along one edge, the combination of a die having a bottom cutting edge parallel to the web and an upwardly and rearwardly sloping pressure face sloping from the edge towards the body of the tile, the die at one end having a longitudinal and a transverse severing blade connected to the sloping face of the die and having their cutting edges in alignment with the bottom edge of the die, and means to reciprocate the die and thereby sever the web and the ribs and the end channel at the same time distorting and pressing downwardly the end of the web and the ribs adjacent thereto to form an end closure for the spaces between the ribs and the web and at the same time cutting out a corner notch formed by the leading end of the upwardly faced channel and at the same time forming a small waste piece of the tile material.

4. In a machine for forming roofing tile in

which a ribbon of clay is continuously extruded and shaped and having means for forming a tile with a continuous web to form a weather surface and with ribs with grooves between the ribs to thereby space the web from a roof when the tiles are so set up in a roof, the combination of a movable tile cutting implement including a rearward transverse cutting blade to sever the ribbon and a forward die with a blade sloping upwardly and rearwardly from its bottom cutting edge to engage the ribbon of clay, the said sloping blade having a structural characteristic to press an end portion of the web downwardly, at the same time severing the web and the ribs from an adjacent section of the ribbon, the sloping blade being adapted to press the web of clay downwardly to form a transverse rib-like sealing structure for the said spaces when the tile is built up into a roof and forming a waste piece of the ribbon defined by a cut made by the transverse cutting and die blades.

5. In a machine for forming roofing tile as claimed in claim 4, the said die having a short transverse severing blade and a longitudinal blade adjoining the end of the die and positioned rearwardly thereof having the structural characteristic to cut a notch in a section of the ribbon of clay which forms a tile and operative to form a notch adjacent the turn-down end of the web at one side thereof.

6. In a tile forming machine having means to develop a ribbon of clay with a web and ribs on the underside, the combination of a reciprocating carriage having straps fitting in grooves between the ribs, the said straps having beveled forward ends, a reciprocating die mounted on the carriage, said die having a rearward inclined face from its lower edge, means to move the die through the ribbon from the web side to sever the web and the ribs and at the same time press an end portion of the web downwardly adjacent the ends of the said straps, the beveled ends of the straps forming a space with the ribs of the ribbon to form a fillet where the ribs are spread by the action of the die.

7. In a tile forming machine having means to develop a ribbon of clay with a web and ribs on the underside and forming grooves between the ribs, the combination of a reciprocating carriage, a cutter and die-pressing assembly on the carriage having a rear transverse severing blade and die positioned forwardly of the said blade, said die having a rear face sloping upwardly and rearwardly from its bottom edge towards the severing blade, means to move the cutting and die pressing assembly downwardly as a unit to develop a series of transverse cuts in the ribbon of clay by the severing blade and to form cuts by the lower edge of the die and the sloping rear face of the die producing a downward distortion of the web and the ends of the ribs whereby the downwardly distorted web forms a closure at one end of the groove of the tile cut between the severing blade and the die, the said die being operative to develop a waste piece of the ribbon between the die and a previous cut made by the severing blade.

8. In a tile forming machine as claimed in claim 7, the means for developing a ribbon of clay having means for shaping the side edge of the ribbon to form an upwardly faced channel, the said die having a longitudinally extending blade section and a transverse shearing blade section connected thereto with their cutting edges in horizontal alignment with the cutting edge of

the die whereby the longitudinal blade section and the shearing blade section make vertical cuts through the ribbon of clay at the upwardly faced channel, thereby severing a notch at the end of the portion forming the tile adjacent the downwardly distorted end forming the closure, whereby the portion severed in forming the notch is integral with the waste piece of the ribbon.

9. In a tile forming machine as claimed in claim 7, the carriage having one or more longitudinal straps which fit in the grooves formed in the clay ribbon between the ribs of the tile below the web, the said straps at their forward edge being beveled whereby the die in distorting the web of the clay and the ends of the ribs forms a fillet on the underside of the tile adjacent the beveled ends of the ribs.

10. In a machine for making roofing tile having a supporting structure to support a portion of a ribbon of clay having a web and ribs on the underside with spacing grooves between the ribs, the combination of a die having a straight transverse bottom cutting edge parallel to the web and an upwardly and rearwardly sloping distorting face, the slope being from the cutting edge, means to move the die downwardly and thereby sever the web and the ribs and at the same time downwardly distort the web and the ends of the rib to form a cross-rib-like structure at the end

of a section of the ribbon forming a tile, said cross-like-rib forming a closure for the ends of the groove on the underside of the tile when set up on a roof.

11. In a machine for making roofing tile as claimed in claim 10, the die having a longitudinal blade section connected to the sloping face at one end thereof and a transverse shearing blade section connected to the longitudinal section whereby the die forms a short longitudinal and a transverse cut simultaneous with the cut forming the end and closure of the tile and thereby forms a notch at one side of the tile adjacent its closed and distorted leading end.

12. In a machine for making roofing tile as claimed in claim 10, the supporting structure having one or more confining and supporting straps positioned in the groove or grooves between the ribs and below the web of the ribbon, the strap or straps having a forward beveled end whereby the cutting die in downwardly distorting the web and the ends of the ribs forms a fillet adjacent the beveled ends of the strap or straps and causes the underside of the downwardly distorted web to conform to the shape of the forward end of the straps.

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