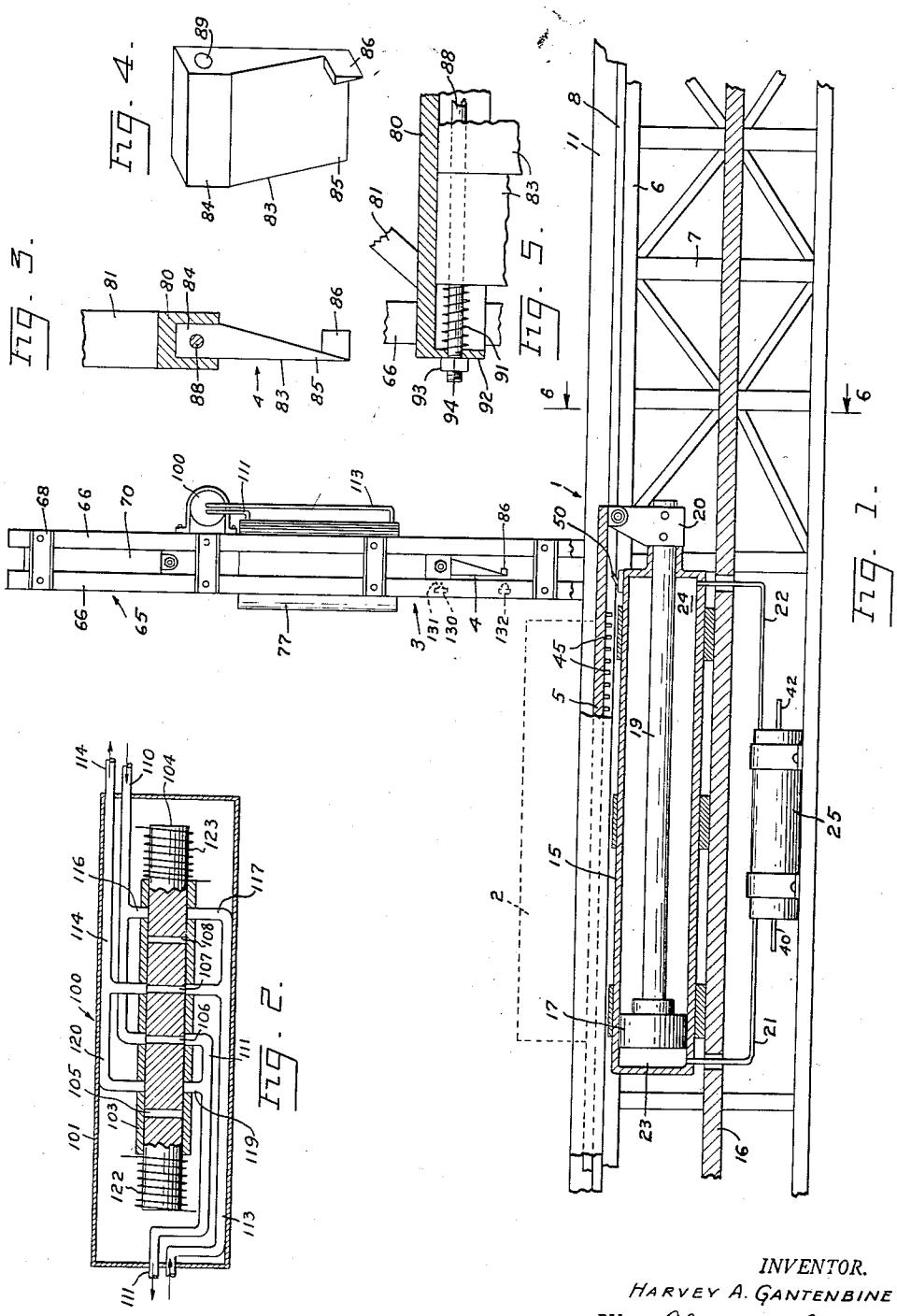
June 17, 1958 H. A. GANTENBINE 2,839,105

SHAKE RIVING MACHINES

Filed Jan. 20, 1956 3 Sheets-Sheet 1



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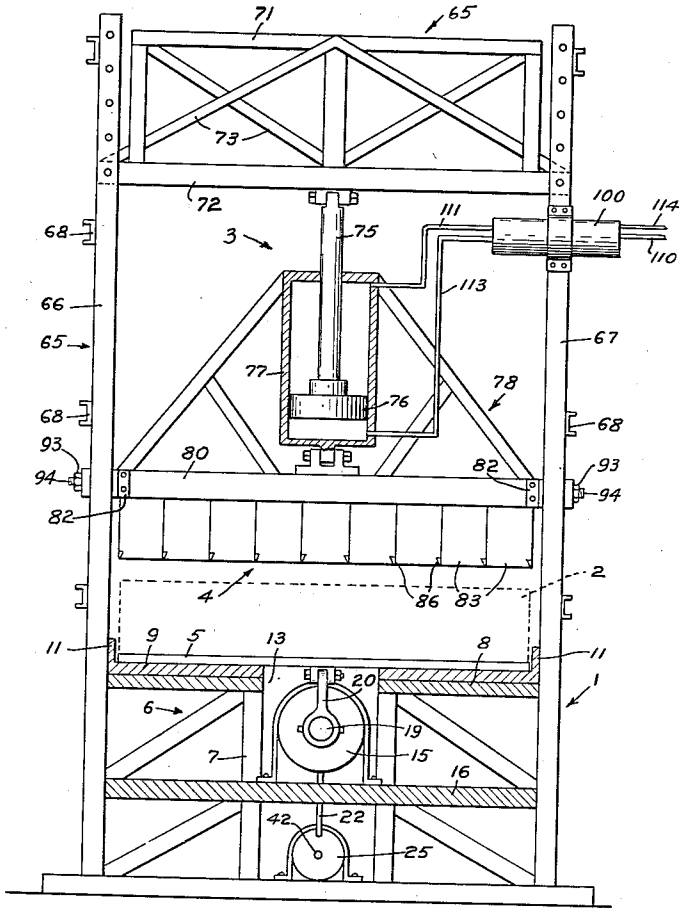


Fig. 6.

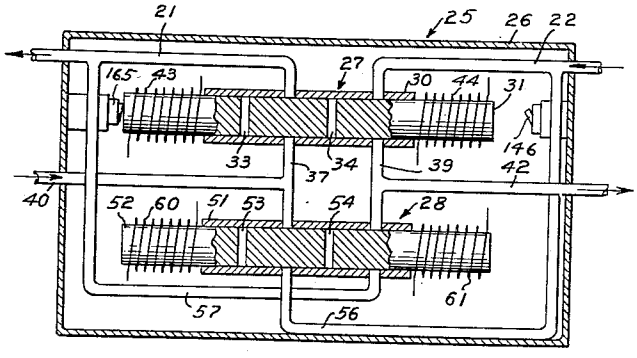


Fig. 7.

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Filed Jan. 20, 1956 3 Sheets-Sheet 3

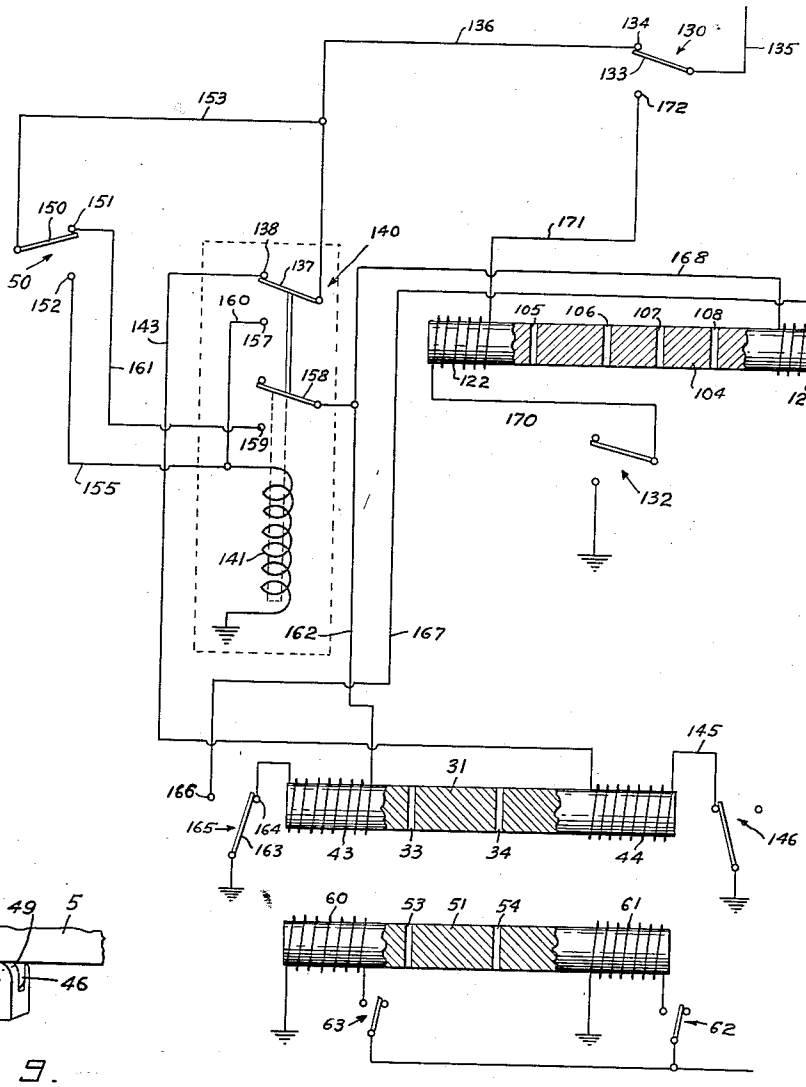


Fig. 9.

Fig. 8.

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United States Patent Office 2,839,105 Patented June 17, 1958

2,839,105

SHAKE RIVING MACHINES

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Application January 20, 1956, Serial No. 560,304

6 Claims. (Cl. 144—194)

This invention relates to a machine for riving shakes.

The object of this invention is to provide a machine for riving shakes, which is electrically controlled and hydraulically actuated.

Another object of this invention is to provide a machine of the class described which is fully automatic being controlled in its operation by an electric circuit. The latter controls and operates a plurality of hydraulic actuating valves which in turn operate an hydraulic means for reciprocating up and down a ram carrying a multiple knife and also operates an hydraulic means for intermittently advancing a platform carrying a block of wood from which said shakes are riven.

Another object of this invention is to provide a special knife for riving shakes from a block, by which a plurality of uniform shakes are riven in a single operation.

Other objects and advantages will appear as the specification proceeds and the novel features of the device will be particularly pointed out in the claims hereto annexed.

In this specification and the annexed drawing, the invention is illustrated in the form considered to be the best but it is understood that the invention is not limited to such form; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

In the drawings:

Fig. 1 is a side elevation of the device showing some parts in section.

Fig. 2 is a central longitudinal cross-section of a ram operating hydraulic valve.

Fig. 3 is an end view of a knife and the lower part of the ram.

Fig. 4 is a perspective view of the knife.

Fig. 5 is a partial longitudinal cross-section showing the arrangement of the knives on the ram.

Fig. 6 is a vertical cross-section of the machine taken along the line 6—6 of Fig. 1.

Fig. 7 is a central longitudinal cross-section of the conveyor operating hydraulic valves.

Fig. 8 is a wiring diagram of said machine, and

Fig. 9 is a perspective view of a stop.

My machine for riving shakes consists of a conveyor 1 adapted to advance intermittently and carry wooden blocks 2, and a ram 3 arranged for vertical movement over said conveyor and carrying a multiple knife 4 for splitting a plurality of shakes in each splitting operation.

The conveyor 1 consists of a platform 5 slidably arranged on a table 6. The latter consists of a supporting frame 7 carrying two guides 8 and 9, each having a side flange 11, on which guides said platform is adapted to advance intermittently to a desired point and then to return to its former position. The guides 8 and 9 are separated by an opening 13 within which hydraulic means for moving said platform are arranged. Said means consists of a long cylinder 15, secured to a supporting surface 16, and having a piston 17 slidable therein. The latter has a long piston rod 19 attached thereto extending beyond

said cylinder and carrying a head 20 by which said rod is connected to the platform 5. The cylinder 15 can be operated by any fluid such as oil, which is pumped into it through one of the pipes 21 or 22 communicating with the front end 23 and the rear end 24 of said cylinder respectively.

The pipes 21 and 22 communicate with a regulator 25, consisting of a casing 26 (Fig. 7) containing two electrically operated sliding valves 27 and 28.

The valve 27 regulates the forward intermittent movement of the platform 5, and the valve 28 forces the said platform backward to its initial position. The valve 27 consists of a casing 30 in which slides a core 31, having a pair of passages 33 and 34. The passage 33 brings in communication the pipes 21 and 37. At the same time the passage 34 becomes aligned with pipes 22 and 39. The pipe 37 is connected with a pipe 40, and the latter is connected with a pressure pump, not shown in the drawing. When the passage 33 places the pipe 21 in communication with the pipe 37, the fluid runs from said pressure pump through said pipe 40, pipe 37, passage 33, pipe 21 into the front end 23 of the cylinder 15 and thus forces the piston 15 to move to the right looking at Fig. 1. The motion of the piston 15 displaces the fluid from the rear end 24 of the cylinder which fluid runs into the pipe 22, passage 34, pipe 39 and a pipe 42 back to said pressure pump, or a storage tank and whence to said pump.

The core 31 is moved by the action of solenoids 43 and 44 located at the ends of said core and moving the same back and forth as hereinafter shall be set forth in detail. The platform is moved intermittently forwardly only a small distance at a time and after each movement the platform 5 stops for a short time. To control the distance which said platform should advance, and to stop it at desired positions a series of stops 45 (Fig. 1) is arranged longitudinally under the middle of said platform 5. Fig. 9 shows that each stop 45 is swingably suspended from the platform 5 on a lug 46 by a pin 48 and has one upper corner 49 rounded so as to permit said stop to swing in counter-clockwise direction. The stops 45 advance with the platform and actuate a switch 50 located on the rear end 24 of the cylinder 15, thus interrupting the flow of current in a controlling electric circuit and stopping the forward movement of the platform as hereinafter shall be described in detail.

The valve 28 of the regulator 25 is provided for returning the platform 5 to its intital position as shown in Fig. 1. The valve 28 consists of a casing 51 and a core 52 therein having passages 53 and 54. The passage 53 places the pipe 37 in communication with a pipe 56 connecting said passage with the pipe 22, while the passage 54 brings at the same time the pipe 39 in communication with a pipe 57 connecting said passage with the pipe 21.

When the platform 5 is moved forwardly, the valve 28 occupies the position shown in Fig. 7. To move the platform 5 back to its initial position, as shown in Fig. 1, the core 52 of said valve 28 is moved to place the passages 53 and 54 in communication with the corresponding pipes, thus permitting the fluid to flow from the pipe 37 into the passage 53, pipe 56, pipe 22 and the rear portion 24 of the cylinder 15, thus forcing the piston 17 and the platform 5 to the left looking at Fig. 1 to their initial positions. The oil from the front portion 23 of said cylinder flows into the pipe 21, pipe 57, passage 54, pipe 39 and pipe 42 and from there into a storage tank, or a pump, not shown in the drawings. When the platform 5 moves back, the stops 45 swing on the pins 48 and thus pass over the switch 50 without actuating the same.

The valve 28 is operated by a pair of solenoids 60 and 61 through manual switches 62 and 63 (Fig. 8).

The ram 3 includes a stationary frame 65 extending above the platform 5 and straddling the same. The frame 65 consists of two parallel uprights 66 secured to one side of the conveyor frame 7 and two parallel uprights 67 secured to the other side of the same. The uprights 66 and 67 are connected by a plurality of channels 68 and may be reinforced by various braces for greater rigidity.

A stationary frame 70 is adjustably secured to the tops of said uprights 66 and 67 which frame consists of beams 71 and 72 interconnected by a plurality of braces 73 (Fig. 6). Suspended from the beam 72 is a piston rod 75 carrying on its lower end a piston 76 slidably arranged in a cylinder 77. The latter carries a knife supporting frame 78, which comprises a channel 80 bridging the distance between said uprights 66 and 67 and extending beyond the same a short distance. The channel 80 slides between the uprights 66 and 67 and is rigidly connected to said cylinder 77 by braces 81 (Figs. 3 and 5). The channel 80 is provided with an angle iron stop 82 near its end for guiding said channel within said uprights and for preventing sideway swaying of said ram 3. The channel 80 carries the multiple splitting knife 4 consisting of a plurality of knives 83 each having a rectangular head 84 (Figs. 3 to 5) and a splitting wedge 85 depending therefrom. A small cross-wedge 86 is formed on the side of the wedge 85 for splitting the shakes of uniform width from the block 2 in one operation. Fig. 6 shows a central knife 83 as having two cross-wedges 86 inclined toward the central vertical line of the ram while the rest of the knives have one cross-wedge 86 inclined toward the same line.

The splitting knives 83 are slidably carried on a rod 88 passing through openings 89 in the heads 84 of said knives and are yieldably forced toward each other by springs 91 provided on said rod between the outermost knife 83 and a side wall 92 closing each end of the channel 80. The rod 88 is securely retained in the channel 80 by nuts 93 screwed on the threaded ends 94 of said rod extending through said walls 92.

The above described arrangement of the knives 83 permits them to expand during the splitting operation and contract immediately thereafter.

The reciprocal motion of the cylinder 77 and connected therewith the knife supporting frame 78 is controlled by an electrically operated sliding valve 100 enclosed in a casing 101 and secured to the stationary frame 65. The valve comprises a valve casing 103 (Fig. 2) and a core 104 slidable therein and having four passages 105, 106, 107 and 108 therein. Fluid under pressure is brought to said valve by a pipe 110 from a source not shown in the drawing. A pipe 111 is secured to the casing 103 opposite said pipe 110 and both pipes are brought in communication by the passage 106. The pipe 111 is connected to the top of the cylinder 77. When said pipes are brought in communication by the passage 106, the fluid will exert pressure on the piston 76 from the top and will force said cylinder upwardly. The fluid which is under said piston will be forced through a pipe 113, connecting the lower portion of said cylinder with the valve casing 103, the passage 107, a pipe 114 connecting said casing with a storage tank or a pump.

If the core 104 of the valve 100 is moved to the right, looking at Fig. 2, so that the passage 108 shall communicate with a pipe 116, connected to the pipe 110, and with a pipe 117, connected to the pipe 113, the fluid under pressure will flow through the latter pipe into the lower portion of the cylinder 77 thus forcing the cylinder downwardly. The fluid above said piston 76 will be displaced through said pipe 111, pipe 119 connecting the latter pipe and the casing 103, passage 105, and a pipe 120 connected to the pipe 114, which leads to a storage tank, or a pump as above said.

The valve 100 is operated by two solenoids 122 and 123 controlled by an electric circuit shown in Fig. 8. Said electric circuit includes an upper limit double polarity switch 130 (Fig. 1) secured to one of the uprights 66 and operated by a pin 131 carried by the channel 80, and also a down limit double polarity switch 132 secured to the same upright below the first mentioned switch. Said switches control and limit the up and down motion of the ram 3. When the ram 3 is in uppermost position and is ready to move downwardly, the pin 131 presses the knife 133 of the switch 130 into contact with a pole 134 closing the circuit as follows: from a source not shown, through a wire 135, through knife 133, pole 134, wire 136, a knife 137 and a pole 138 of a double pole double throw switch 140 operated by a solenoid 141, a wire 143, solenoid 44, wire 145, and a switch 146 secured to the wall of the casing 26 opposite the core 31, which latter switch is normally closed. The solenoid 44 pulls the core 31 to the right looking at Fig. 7 to bring the passages 33 and 34 into registry with the pipes 21 and 37, and 22 and 39 respectively. The core 31 moves to the right until it hits the switch 146 and turns it off, thus breaking off the circuit and stopping the further movement of the core. When said pipes 21 and 37, and 22 and 39 are brought into communication, the fluid under pressure flows into the conveyor cylinder 15 and the platform 5 begins to move forward. Prior to that the switch 50 carried by the cylinder 15 is in a position shown in Fig. 8, the throw knife 150 of which is being pressed into contact with the pole 151 by one of the stops 45. When the platform 5 starts to move, the stop 45 slides over said switch 50 and the knife 150 jumps to its normal position in contact with the pole 152, thus establishing the following circuit: from the wire 136, through a wire 153, switch 50, pole 152, wire 155, solenoid 141, thus swinging the double pole double throw switch 140 into the opposite position, wherein the throw knife 137 shall contact the pole 157 and the throw knife 158 shall contact the pole 159. The current then will flow from the pole 157 to a wire 160, wire 155, solenoid 141, thus continuing to hold said switch 140 in the latter position. Another circuit is also established from the contact 151 of the switch 50 through wire 161, pole 159, knife 158, wire 162, solenoid 43, pole 164 and knife 163 of the switch 165, secured to the wall of the casing 26 opposite the core 31 which switch is normally closed. The solenoid 43 pulls the core 31 to the left looking at Fig. 7, until the core 31 hits the switch 165 and swings the knife 163 from a pole 164 to a pole 166 at which time the core 31 occupies the position shown in Fig. 7.

The last described position of the switch 165 establishes a new circuit which runs from said pole 166 to a wire 167 to the solenoid 123 of the valve 100, a wire 168, and the wire 162, thus energizing said solenoid to pull the core 104 to the right, looking at Fig. 2, to bring the pipes 120 and 119 and the pipes 116 and 117 into respective communication through respective passages and thus forcing the cylinder 77 downwardly. The downward movement of the cylinder 77 and associated therewith the ram 3 will split a plurality of shakes off the block 2 and actuates the upper limit switch 130 to change its polarity to the pole 172.

When the ram 3 reaches its desired lower limit on the downward stroke, it actuates the switch 132, thus completing the following circuit: switch 132, wire 170, solenoid 122, wire 171, the pole 172 of the switch 130, thus moving the core 104 of the valve 100 into a position shown in Fig. 2, for directing the fluid into the upper portion of the cylinder 77 and thereby raising the ram 3. The latter on its way up will actuate the switch 130 and thus start the cycle over again.

When it is desired to move the platform 5 backward, the switch 62 is turned on and the solenoid 61 pulls the core 52 to the right so that the pipes 37 and 56 and the pipes 39 and 57 are brought in communication with the

passages 52 and 54 respectively thus permitting the fluid to flow to the right side of the cylinder 15 thereby moving the piston 16 and the platform 5 to the left, looking at Fig. 1. When the platform is moved to a desired position, the switch 62 is turned off and the switch 63 is turned on, whereby the solenoid 60 moves the core 52 into a hold position as shown in said Fig. 7.

I claim:

1. A machine for riving shakes comprising a platform for carrying a block of wood, hydraulic means for intermittently advancing the same a predeterminate distance with each operation of riving shakes, a multiple knife arranged for riving a plurality of shakes in each operation, said knife being above said platform, a ram carrying said knife, hydraulic means for vertically reciprocating the ram, electrically operated valves operating said first and second mentioned means, and an electric circuit for actuating said valves and synchronizing the movements of the same.

2. A machine for riving shakes comprising a table, a platform for carrying a block of wood, said platform being slidable on said table, hydraulic means for advancing said platform intermittently a predeterminate distance with each riving operation; a sliding valve for actuating said hydraulic means; a frame straddling said table, a hydraulic ram arranged to slide vertically in said frame above the table, a multiple knife secured to said ram for riving shakes, a sliding valve for actuating said hydraulic ram, an electrical means for operating and synchronizing movement of said valves.

3. A machine for riving shakes comprising a table, a platform for carrying a block of wood, said platform being slidable on said table, a hydraulically operated cylinder under said platform operatively connected to the latter, an electrically actuated sliding valve for operating said cylinder, a switch, an electric circuit connecting said switch with said electrically actuated valve, means on said platform for actuating said switch for advancing said platform intermittently a predeterminate distance with each riving operation; a frame over said table, a ram vertically slidable in said frame, a hydraulically operated ram cylinder for moving said ram up and down a predetermined distance in each riving operation; a knife secured to said ram for riving shakes from said block of wood, an electrically operated sliding ram valve for operating said ram cylinder, electrical means associated with said sliding ram valve for limiting the upward and downward stroke of said ram; and an electric circuit including the above mentioned switch and means for operating and synchronizing the movements of said sliding valves.

4. A machine for riving shakes comprising a table, a platform for carrying a block of wood, said platform being slidable on said table, a hydraulically operated cylinder under said platform operatively connected to the latter, an electrically actuated sliding valve for operating said cylinder, a switch, an electric circuit connecting said switch with said electrically actuated valve, means on said platform for actuating said switch for advancing said platform intermittently a predetermined distance with each riving operation; an electrically operated sliding valve operatively connected with said cylinder for returning said platform to its starting position.

5. A machine for riving shakes comprising a table, a platform for carrying a block of wood, said platform being slidable on said table, a hydraulically operated cylinder located under said platform and operatively connected with said platform for intermittently advancing the same a predetermined distance with each riving operation, and returning said platform to its initial position, a sliding valve for operating said cylinder, a switch, a plurality of stops carried by said platform for actuating said switch to advance said platform intermittently a predetermined distance with each riving operation; a frame straddling said table, a ram slidable in said frame, a hydraulically operated cylinder for moving said ram up and down a predetermined distance; a knife secured to said ram for riving a plurality of shakes with each operation, a sliding valve for actuating the ram cylinder, an upper limit switch and a lower limit switch operated by said ram for limiting the motion of the same, and an electric circuit including said switches for operating and synchronizing the movements of said sliding valves.

6. A machine for riving shakes comprising a table, a platform for carrying blocks of wood, said platform being slidable on said table, a hydraulically operated cylinder located under said platform and operatively connected with said platform for intermittently advancing the same a predetermined distance with each riving operation and returning said platform to its initial position, a pair of platform sliding valves, one of which controls advancing of said platform and the other controls returning of said platform to its initial position, a switch secured to the cylinder, a plurality of stops carried by the platform for actuating said switch to advance the platform intermittently a predetermined distance with each riving operation, a vertical frame straddling said table, a ram slidable in said frame, a hydraulically operated ram cylinder for moving said ram up and down a predetermined distance; a knife secured to said ram for riving shakes, a ram sliding valve for actuating the ram cylinder, upper and lower limit switches operated by said ram for limiting the motion thereof, and an electric circuit including the first mentioned switch and said limit switches for operating and synchronizing the movements of all said sliding valves.

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