2 Sheets- Sheet 1.

E. & B. Holmes,

Wood Molding Machine.

No. 17,329. Patented May 19, 1857.

Fig: 1

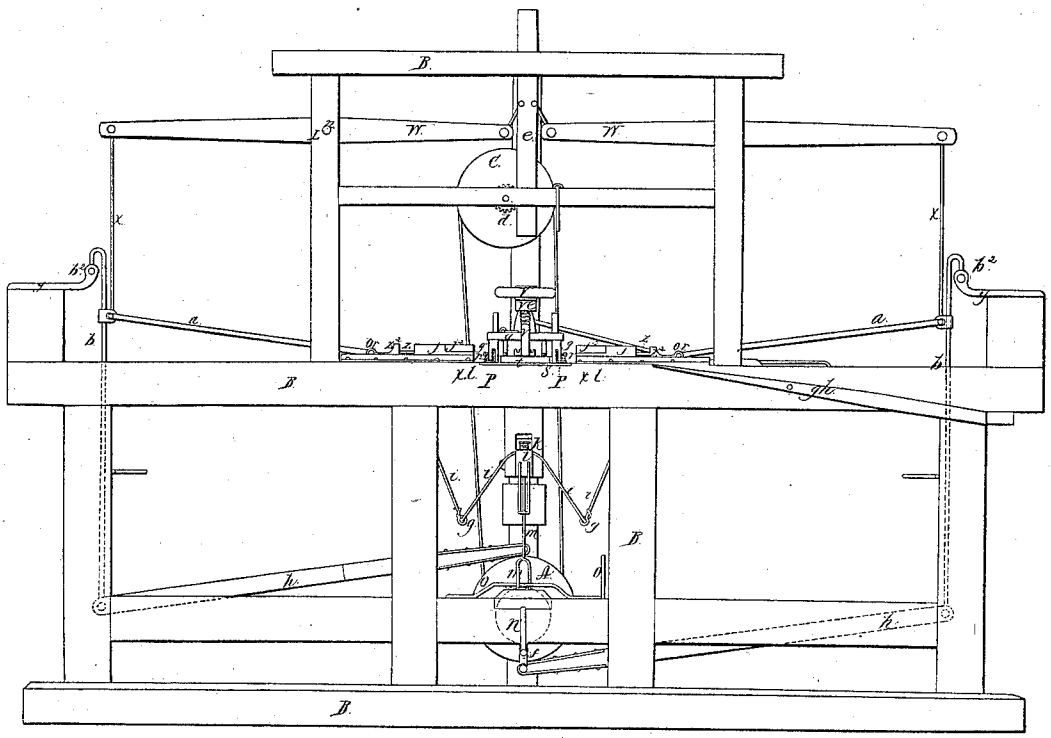
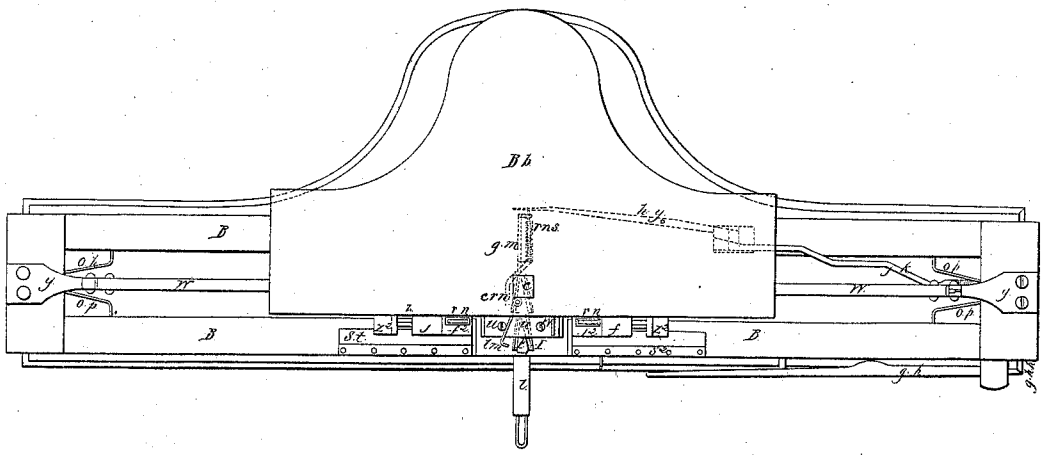


Fig: 2.



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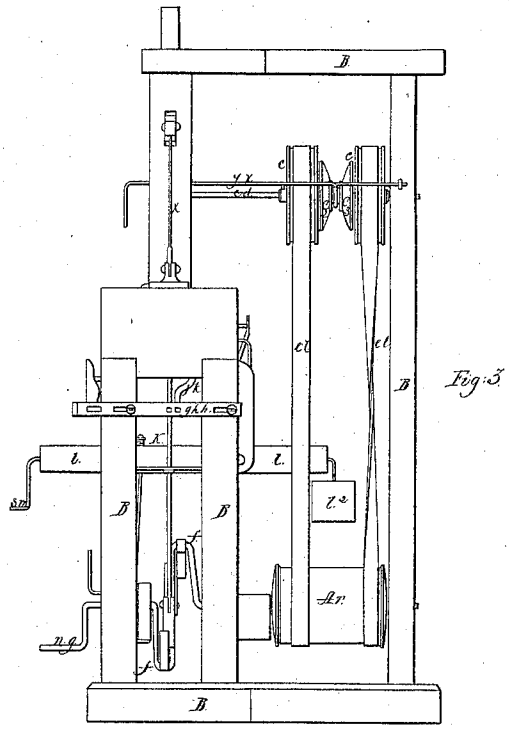


Fig. 3.

Fig. 6.

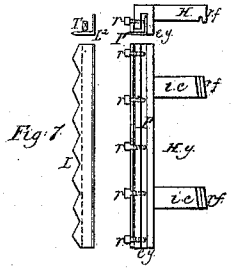


Fig. 7.

Fig. 4.

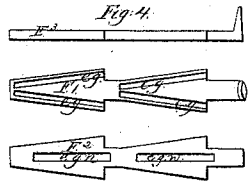
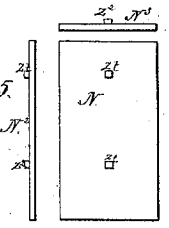


Fig. 5.



UNITED STATES PATENT OFFICE.

EDWARD HOLMES AND BRITAIN HOLMES, OF BUFFALO, NEW YORK.

MACHINE FOR MAKING WASHBOARDS.

Specification of Letters Patent No. 17,329, dated May 19, 1857.

To all whom it may concern:

Be it known that we, EDWARD HOLMES and BRITAIN HOLMES, of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Machines for Making Washboards; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure I, is a front elevation. Fig. II, is a plan. Fig. III, is an end elevation. Fig. IV, three views of the wedge which expands and contracts the iron frame, in which the incising cutters are fixed. Fig. V, is a bed plate upon which the wedge is operated. This plate is not stationary but is raised and depressed, by means of a screw as hereinafter described. Fig. VI, is an expanding iron frame to which the incising cutters are attached. Fig. VII, represents the incising cutters, corresponding in form on their cutting edge to the corrugations of the zinc.

Fig. I, (reference letters:) *a a*, sliding arms, by the lateral motion of which the nails are driven into the washboard. *b*, *b*, vibrating levers, which work the sliding arms (*a a.*) b^2, joint, of vibrating lever *b b*. *h*, *h*, crank levers, connected to crank on driving shaft and to vibrating lever *b*, *b*. *c*, pulley, on pinion shaft. *d*, pinion, *e*, rack. *f*, crank, on driving shaft and connected to lever *h*. *g*, toggle joint, forming a connection between the levers *i i*. *i i*, levers, which move the sliding plates *j* and j^2. *j* and j^2, sliding plates which drive the stiles of the washboard on to the incising knives and through which the piston or driver *z* passes. There are also grooves cut in the plate j^2 for the reception of the nails before they are driven into the washboard. *k*, spiral springs resting on top of lever *l*, *l*, principal lever in the series of levers which move the plates *j* and j^2. *m*, *m*, rod which connects the lever *l*, to the eccentric *n*. These rods also pass through the spiral springs *k*, (forming heads) and resting upon the springs. The object of these springs is to move the lever *l* (and consequently the plates *j* and j^2) through a greater distance than is done by the eccentric *n*, so as to drive the stiles on to the zinc. The eccentric *n*, will make the movement sufficient to force the stiles on to the knives and make the incision. As soon as the incision is made the knives are drawn back from the stiles. This leaves the zinc projecting beyond the knives. The eccentric *n* having worked the lever through a sufficient distance to make the incision in the stiles and having also compressed the springs *k*, the expansion of the springs then carries the lever *l* farther down, and with sufficient force to drive the stiles on to the zinc. *n*, eccentric on driving shaft. *o*, *o*, crooked levers which throw or cause the rod *m*, *m*, to connect and disconnect with the eccentric (*n.*) *p*, *p*, end view of incising knives as they are set in the expanding iron frame *q*, *q*, to which the cutters are fastened. *r*, *r*, set screws, which hold the cutters in place. *s*, bed plate, upon which the back-board is placed. *t*, movable bed plate, upon which the wedge works (represented in Fig. V.) *u*, end view of the top plate which sits over the wedge. This plate is connected to the movable bed plate (*t*) by means of bolts. It rests upon shoulders on the bolts, so as to leave the wedge free to move without being compressed by the plate. The expanding iron frames which are represented in Fig. VI, also move freely under this plate. *v*, *v*, screw, which raises and depresses the top plate (*u*,) bed plate (*t*) wedge, and expanding iron frames. *v e*, nut supported above the top plate (*u*) and through which the screw (*v*, *v*,) works. *w*, *w*, levers, having a jointed and adjustable connection with the rack *e*, and by means of the rod *x*. Also a jointed connection to the sliding arm (*a*). It also works upon a center pin as shown at *t*, *n*. As the rack (*e*) is run up or down (through the arrangement of this lever and the rod *x*) the connection of the sliding arm *a*, with the vibrating lever *b*, is varied, in order that the lateral motion of the sliding arm *a* will be greater or less, as required. *x*, rod, connecting the lever *w*, to the sliding arm *a*. *z*, piston or driver, which drives the nails into the washboard. z^2, sliding head, which has a jointed connection to the arm *a*, as shown at (*o r.*) The pistons or drivers *z*, are also fastened to, and move with this sliding head. L *n*, center pin, or fulcrum on which lever *w*, works. X *l*, space, between the cutters and the plates *j* and j^2, into which space the stile of the washboard is put, in order to receive the action of the incising cutters, and then driven on to the

zinc and nailed to the back-board. *y*, projecting plate, for the purpose of forming a joint at (b^2). B, B, B, wood frame of machine. *o r*, jointed connection of arm *a*, with sliding head z^2. A, driving pulley.

Fig. II, (reference letters:) Single letters of the same name and style, refer to like parts as in Fig. I. *r n*, represents a slit, through plate j^2, into which slit is put a nail, for the purpose of being driven into the washboard. There should be, three or more slits in this plate, equaling the number of nails to be driven into the stile. *j* and j^2, two sliding plates, which are connected and move together. Slits are made in the plate j^2, into which the nails are put. The piston or driver *z*, passes through a cylindrical bore, in plate *j*, and strikes the head of the nail as it lies in the slit, and drives the nail into the washboard. *g h*, *j k*, *c r n*, *g m*, *h y*, *l m*, and *g h h*, are a series of levers and bent arms or pins arranged and operated for the purpose of holding the wedge (F I) in its place, while the iron frames and cutters are expanded—and for driving out the wedge, and thereby contracting the frames and cutters at the point of time desired. The vibrating lever *b*, is constantly in motion. When the wedge (F I) is to be driven out (into the position shown in Fig. II) the operator moves the lever *g h*. This moves the lever *g h h*, and *g h h*, moves *j k*, in a manner, so as to cause *j k* to catch on to the vibrating lever *b*. This gives a lateral motion to *j k*—*j k*, and, *h y*, are wedge shaped at their intersecting ends,—their angles being reversed and lying parallel, so that as *j k*, is moved outward by the vibrating lever *b*, the opposite end of *h y*, is thrown inward, and in the direction to cause, *l m*, to unhook from the wedge. The same movement of, *h y*, drives the pin, *g n*, against the wedge, and thereby moves the wedge outward the proper distance, to contract the iron frames, and release the cutters from the incision made in the stiles. *l m* is unhooked from the wedge a moment before the pin, *g m*, strikes the wedge. A spiral spring (*r*, *n*, *s*,) moves the lever, *h y*, in the opposite direction—*h y*, works upon a fulcrum, near its wedge shaped end, so that a slight movement there gives a sufficient movement to its opposite end to work the pin, *g m*, and the bent arm (*c r n*) and the hook *l m*. The pin *g m*, works under the plate (*w*) and the bent arm *c r n*, and hook, *l m*, work on top of said plate. Motion is communicated to this series of levers, by the vibrating lever *b*, the operator, at pleasure forming a connection between *b*, and, *j k*. The wedge is moved back and the hook, *l m*, connected therewith by hand. *o p*, *o p*, guides, to the vibrating lever *b*, to keep its motion in line. B *b*, top piece to frame. The levers and pins just above described, and represented in part by the dotted lines, are represented in plan, as if this top piece was removed. *s t*, *s t*, guide rails on which the sliding head z^2, and sliding plates *j* and j^2, work. *y*, projecting plate or arm, to which the vibrating lever *b* is jointed (as at b^2.)

Fig. III, (reference letters:) Single letters of the same name and style refer to like parts in each of the figures. *c*, *c*, pulleys, on pinion shaft (*e d*). *e d*, shaft for pinion *d* and pulleys *c c*. c^2, c^2, friction tighteners or clutches to pulleys *c*, *c*. *y x*, rod, which is connected to the tighteners to move the tighteners from and against the pulleys. The pulleys run loose on the shaft except when the tighteners are pressed against them one pulley turns the shaft in one direction and the other pulley in the opposite direction, the bands of one being crossed. *g h h*, slotted lever, which is connected to and operated by lever, *g h*, (Fig. II). *f*, *f*, cranks on driving shaft and to which the levers *h*, *h*, are connected. A *r*, pulley, which drives pulleys *c*, *c*. This is on same shaft with driving pulley A, Fig. I. *e l*, *e l*, bands, running from pulley A *r* to pulleys *c*, *c*. *n g*, hand crank, on driving shaft, used in model, but not in full sized operating machine. *o*, crooked lever, (see Fig. I). *s m*, handle or step to lever, *l*,

Fig. IV, (reference letters:) F^1, plan of upper side of wedge. *e g*, grooves in upper side of wedge. F^2 plan of under side of wedge. *e g n*, grooves in under side of wedge. F^3, side view of wedge.

Fig. V, (reference letters:) N, top plan of bed plate, upon which the wedge works. The end view of this plate is marked "*l*" in Fig. I. N^2, side, or edge view of plate. N^3, end view. *z t*, ribs or studs, projecting upward from the plate and which fit into the grooves *e g n* of the wedge.

Fig. VI, (reference letters:) H, end view of expanding frame. H *y*, plan of the lower side of the expanding frame, the arms *i c*, projecting over the wedge and the body, *e y*, dropping downward, to receive the cutters. *r f*, lip or flange, which works in the grooves *e g* of the wedge and causes the frame to expand or contract as the wedge is moved out or in. P, shows the cutter as set in the expanding frame. *r*, set screws, which hold the cutters in place. The cutters are made in sections. This drawing shows but one half of the expanding frame. It has its counter half—one working upon the right and the other upon the left of the wedge.

Fig. VII, (reference letters:) L, plan of cutters represented as if made as one, from a single piece of steel. We prefer to make the cutters in sections, allowing one set screw, to hold one section in place. The sections when arranged together present the same outline as represented in the figure.

L^2, end view of cutter. T, stop or guide, placed on the cutter, to regulate the depth of the incision.

Operation: That part of the wash board called the back board is laid upon the bed plate, *s*, Fig. I, and between it and the wedge plate *v*. The zinc being previously corrugated and fitted is placed on the back board. The zinc should be about half an inch wider than the back board, so as to project beyond the board about one quarter inch on each side. The screw V, V, is then turned so as to lower the plate *l*, expanding frame and cutters, and bring them into their position for work—the back board and zinc being held sufficiently tight, between the plates *l* and *s*.

The stiles of the washboard are put into the space *x l*, between the sliding plates *j* and j^2 on the one side, and the cutters on the other side. By a movement of the crooked lever *o*, *o*, the rod *m*, *m*, is hooked on to the eccentric *n*, and thereby the lever *l*, is drawn downward. This moves the lever *i*, *i*, in a manner to move the sliding plates *j* and j^2 toward the cutters. The wash board stiles being between the sliding plates and the cutters, are consequently driven on to the cutters, and the necessary incision is made. At the moment the incision is made, the lever or rod, *l m*, is unhooked from the wedge, and the pin, *g n*, strikes the wedge and drives it back. This movement of the wedge contracts the iron frame and the cutters are thereby moved back from the stiles, leaving the incision exposed, for the entrance of the zinc. By means of the springs *k*, on the lever *l*, (and to which spring the rod *m*, *m*, is connected) the lever *l* is moved downward farther than it can be by the eccentric, *n*, and consequently the stile is driven on to the zinc. The incision is made by the motion communicated by the eccentric, *n*,—the stile is driven on to the zinc by the motion communicated (and continued) by the springs K. Hence the springs K continue the movement of the lever *l*, downward after the eccentric, *n*, has ceased to act, and sufficiently far to enter the zinc into the incision made in the stile.

The movement of the cutters is so adjusted, that the incision must be an equal depth in either stile, and this, whether, one stile happens to be of soft and the other of hard wood. If by chance the zinc should project farther on one side of the back board than it does on the other, it would still be caused to enter the incision in each stile an equal depth, because the sliding plates move an equal distance with each stile, and if the zinc should strike the bottom of the incision in one stile before it reaches the bottom of the incision in the other, the zinc will be moved along with the stile (the zinc sliding under the plate *t*) until it reaches the depth of the incision in the other stile, thus insuring the entrance of the zinc an equal depth in each stile. And this same effect will be produced notwithstanding there may be a difference in the quality of the wood in each stile.

The cutters present the same outline following the line of their cutting edge, as the edge of the corrugated zinc, and hence the zinc will fit the incision made by the cutters. In point of time the incision is first made,—then, the stile is driven on,—the zinc entering the incision,—and then the nails are driven.

As soon as the zinc has entered the incision in the stile, the rod *y*, *x*, is drawn inward, (by hand) so as to bring the tightener or clutch (c_2) against the inner pulley (*c*,) which causes the pinion-shaft (*e d*) to revolve, in the direction to run the rack *e*, upward. One end of the lever *w*, is jointed to the rack *e*, and the other end is connected to the rod *x*,—and the rod *x*, is connected to the sliding arm (*a*) so that as the rack *e* is run up, the arm (*a*) slides down on the vibrating lever *b*, so that the vibrating lever *b*, is made to communicate, just the amount of lateral motion to the arm *e*—(and hence to the drivers *z*) as required to drive the nails—consequently the movement of the drivers is entirely under the control of the operator.

The nails may be driven at one blow of the drivers, or several blows may be employed. It is usual to employ two or more blows. Different size nails may be used. The nails are dropped into the slits (*r n*) where the drivers strike them upon the heads and drive them through the stile into the backboard. Three or more slits are made in plate j^2, and consequently, as many nails (as slits) may be driven into each stile simultaneously.

The arm (*a*) is jointed to the sliding head z^2 (as shown at or) the pistons or drivers *z*, being connected to the sliding head. These drivers equal the number of slits in the plate (j^2) and are operated as before described.

After the nails are driven into the board, the rod *y x* is moved outward (by hand) so as to bring the tightener c^3 against the outside pulley *c*. The belt of this pulley being crossed, the shaft (*e d*) is caused to revolve in the other direction so as to run the rack, *e*, downward. This raises the construction of the sliding arm (*a*) upward on the vibrating lever *b* to a point on said lever *b* which has but a slight motion, consequently the lateral movement of the arm (*a*) is nearly suspended and remains so until it is again moved down on lever *b*.

The driving pulley, A, together with the levers *h*, *h*, and vibrating lever *b*, are kept constantly in motion. The other parts of the machinery are intermittent and are

regulated, entirely by the operator, as herein described. Steam or water power is applied, to drive the machine.

The drawings are in proportion and are on a scale of one inch and a half to one foot.

Having thus fully set forth the construction and operation of the machine as a whole, what we claim therein as our invention, and desire to secure by Letters Patent is—

1. We claim increasing, both stiles of the washboard at the same time, and also entering the zinc into the incision in both stiles at the same time, when the same is done, by means substantially as herein set forth.

2. We claim raising and lowering the end of the sliding arm (*a*) at its connection with the vibrating lever *b*, for the purpose of controlling the number of blows to be given by the drivers, and the force thereof when the same is accomplished by means, and used for the purpose substantially as herein described.

3. We claim the combination of the expanding iron frames (represented by Fig. VI) with the wedge and cutters, for the purpose, as herein set forth.

4. We claim the combination and arrangement of the series of levers, *g h*, *g h h*, *j k*, *k y*, and *r n*, with the pin, *g m*, and spiral spring *r n s*, and hook *l m*, or their equivalents, for the purposes substantially as herein set forth.

5. We claim the combination of the spiral spring *k*, (or its equivalent) with the lever *l*, and rod *m*, for the purpose of continuing the movement of the lever *l*, after the incision is made in the stiles, and the cutters withdrawn, so that the stiles will be carried to the zinc, and the zinc entered in the incision made by the cutters, substantially as herein described.

6. We claim the application of the eccentric (*n*) in connection with the lever (*l*) and its arrangements (or equivalents) for the purpose of applying power to make the incision in both stiles of the washboard at the same time, and also to facilitate the entrance of the zinc into both stiles at the same time, substantially as herein set forth.

EDWARD HOLMES.
BRITAIN HOLMES.

Witnesses:
E. B. FORBUSH,
SAM HICKOCK.