H. BORGMANN.

BORING AND ROUTING MACHINE.

APPLICATION FILED MAY 23, 1910.

981,743.

Patented Jan. 17, 1911.

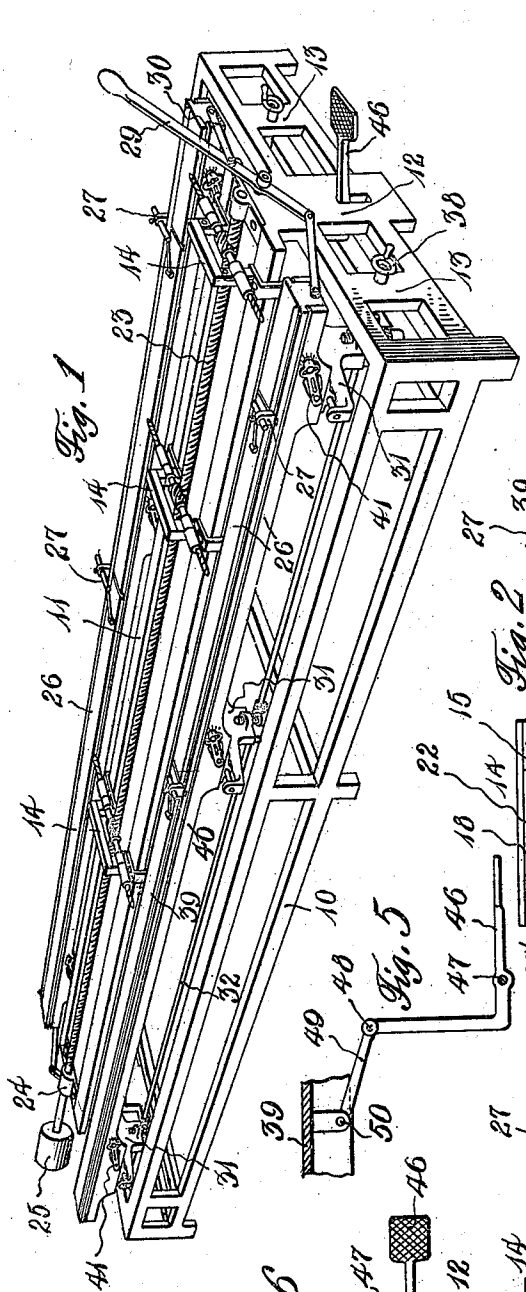

Fig. 1.

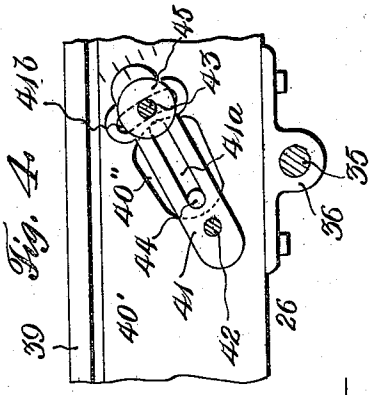

Fig. 4.

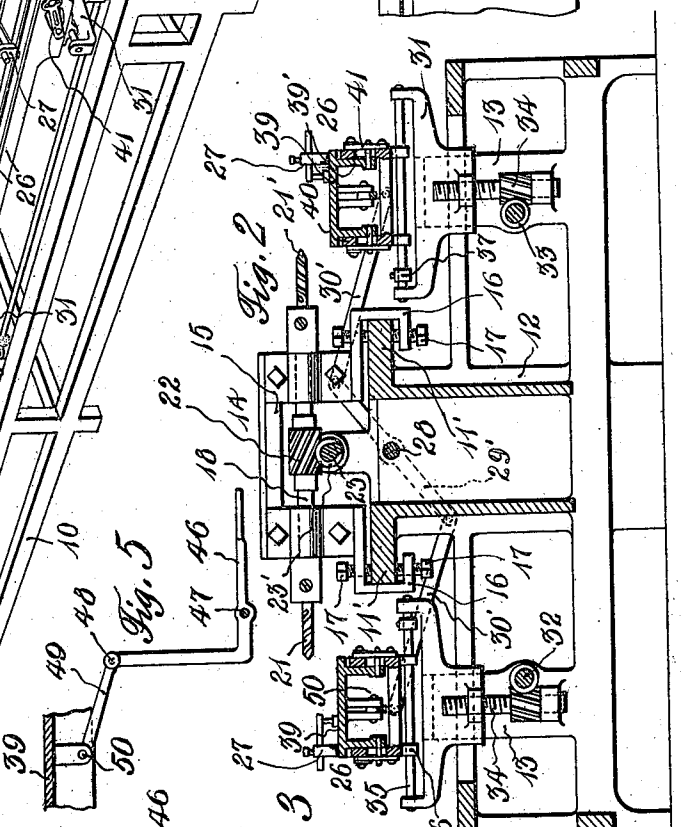

Fig. 2.

Fig. 5.

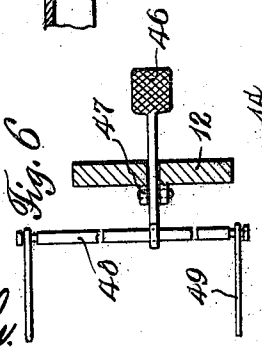

Fig. 6.

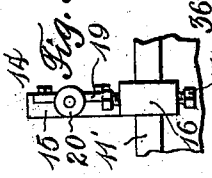

Fig. 3.

Witnesses

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BORING AND ROUTING MACHINE.

981,743. Specification of Letters Patent. Patented Jan. 17, 1911.

Application filed May 23, 1910. Serial No. 562,990.

To all whom it may concern:

Be it known that I, HENRY BORGMANN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a new and useful Boring and Routing Machine, of which the following is a specification.

This invention relates to wood working machinery and has particular reference to a machine for boring or routing the stiles of doors, shutters, or the like.

Among the objects of this invention is to provide a machine whereby a single workman may accomplish a larger volume of work in a given time than a number of workmen operating in the usual way, and at the same time insuring that the work will be performed in the most uniform manner, all of which will more fully appear in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the entire machine, somewhat diagrammatic; Fig. 2 is a transverse vertical section of the machine; Fig. 3 is an end elevation of one of the crossheads; Fig. 4 is a front elevation of one of the guide plates, and Figs. 5 and 6 are, respectively, side and plan views of the treadle mechanism hereinafter described.

Throughout the following detail description and on the several figures of the drawings similar parts are referred to by like reference characters.

The machine includes a frame 10, of any suitable size or proportions and adapted to be stationarily located in any convenient place to which power from any suitable motor may be provided. Arranged lengthwise of the frame 10 and either made integral therewith or attached thereto along its upper part is a runway 11 comprising a pair of oppositely extending flanges or ledges 11′, occupying preferably the same horizontal plane. The ends of the frame also include upright panels 12 and 13. The formation of the frame however with respect to such panels may be varied in any desired way.

The purpose of the runway is to provide a place or means for attachment of any desired number of crossheads 14 illustrated particularly in Figs. 2 and 3. Each of the crossheads comprises a frame 15 which includes a crossbar and pair of lugs 16 which extend outward and downward around the aforesaid flanges 11′ of the runway and to which the crosshead is adjustably secured at any point along the runway or at any desired degree of elevation with respect thereto by means of adjusting devices such as set screws 17. Journaled in the frame 15 and extending transversely of the runway is a tool shaft 18. As a convenient means for connecting the shaft to the frame 15 a pair of caps 19 may be provided and secured to the main portion of the frame by bolts. The ends of the tool shaft 18 are provided with a pair of chucks 20, which serve the dual purpose of collars to coöperate with the bearing boxes of the frame 15 to prevent endwise displacement of the shaft and to carry the boring or routing tools 21 and 21′. The aforesaid tools are preferably made with right and left hand spirals and are detachably secured in the chucks in the usual manner. The shaft 18 is provided at its intermediate portion with a worm gear 22 rigidly secured thereto.

A main power shaft 23 is journaled in any suitable manner lengthwise of the main frame 10, as in bearings or boxes 24, and is adapted to be driven through a pulley 25. The power shaft is preferably provided with a thread or worm extending continuously from end to end and the machine is so designed that the worm gears 22 of the respective crossheads will all mesh with the worm 23′ of the power shaft 23 irrespective of the longitudinal adjustment of the crossheads along the runway. By virtue of the means disclosed for vertically adjusting the crossheads the gear 22 pertaining thereto may be properly related to the power shaft 23 either for the purpose of compensating for the usual wear upon these parts incident to usage or for the purpose of throwing the shaft 18 temporarily out of operation from the power shaft, without removing the crosshead from the runway.

As will be understood from Fig. 3 the crossheads are comparatively narrow and may be adjusted close enough together to enable me to bore simultaneously all of the center holes in a pair of pivoted slat shutter stiles or to form all of the grooves in a pair of stationary slat shutter stiles, one of the stiles being operated upon by the tools on one side of the runway and the other stile by the set on the other opposite side. It will of course be seen that for the boring of the dowel holes in door stiles the

crossheads will be adjusted in groups so that all of the holes in the pair of stiles will be bored simultaneously, the machine of course being long enough for the accommodation of the maximum length of the work to be performed.

A pair of work tables 26 are provided, one on each side of the runway, and movable simultaneously toward and from the crossheads. The work tables are provided with a series of clamps 27 of any suitable character, the same *per se* not constituting any part of this present invention, but which serve to hold the stiles in place while being operated upon. Any suitable means may be provided for operating the tables and I have shown for this purpose a rock shaft 28 extending throughout the full length of the machine and journaled in the panels 12, preferably just below the bearings 24. A lever 29 is secured at the front end of the shaft 28, and a pair of links 30 serve to connect the front ends of the tables with said lever 29, the points of connection with the lever being on opposite sides of the shaft 28. A corresponding lever 29′ is connected to the rear end of the shaft and has similar connection through links 30′ with the rear ends of the tables so that a single sweep of the lever 29 will move both of the tables toward the crossheads and a reverse sweep of the lever will withdraw them from the crossheads. The tables are supported upon the frame 10 for slidable movement in any desired manner. As illustrated a series of yokes 31 for each of the tables are provided and preferably said yokes are adjustable vertically by any convenient means such as that shown in Fig. 2 especially. Such means comprises a shaft 32 extending throughout the length of the frame 10 and journaled in the panels 13, said shaft bearing a series of worms 33 operating upon adjusting screws 34. Each of the yokes includes a guide rod 35 which is connected with the table through a pair of ears 36. Any suitable means such as stop collars 37 may be provided to determine the extent of movement of the tables along said guide rods. The shafts 32 may be operated at the front end of the machine by hand wheels 38.

For the purpose of routing the stationary slat shutter stiles I provide that the aforesaid tables shall each comprise relatively movable and stationary parts 39 and 40, the one lying above and having slidable connection with the other. The part 40, which for this consideration is stationary with respect to the movement of the part 39, is that which has the ears 36 and is provided with upright parallel sides 40′ between which the downwardly extending flanges 39′ of the movable section extend. A set of plates 41 are mounted on the outside of the side walls 40′ and the same are pivoted to the said side walls at 42. Each of the plates has a longitudinal slot 41^a and a transverse slot 41^b, the latter being in the form of an arc drawn from the pivot 42 as a center. By means of a set screw 43 operating through the slot 41^b into the adjacent side wall 40′ the plate 41 with its longitudinal slot 41^a is set at any desired degree of inclination corresponding to the angle of the shutter grooves desired. A pin 44, rigidly connected in each side wall 39′ of the movable section of the table, extends outwardly through and coöperates with the longitudinal slot 41^a of each plate whereby the movement of the movable section 39 will correspond to the position of the slot or slots 41^a. In order that the pin 44 will not prevent the desired adjustment of the plate 41 the side wall 40′ is cut away at 40″. Any suitable means such as a washer 45 mounted on the set screw 43 may be provided to constitute a limiting stop to determine the extent of movement of the pin 44 along its slot. The foregoing description of the plate 41 will be understood as being applicable to all of such parts.

As a convenient means for operating the sections 39 relatively to the sections 40 I provide a foot lever or treadle 46 pivoted at 47 in the front panel 12, the inner or rear end of said lever being extended upwardly and to which is connected a cross bar 48. A pair of links 49 on the ends of said rod 48 are pivotally connected at 50 with the respective sections 39. When the treadle is depressed the inner upper end of the bell crank with its rod 48 will be drawn forwardly causing the sections 39 to be moved upwardly and forwardly along the guide plates 41. The links 49 may have loose slidable connection with the rod 48 so as not to prevent the lateral shifting of the tables through the operation of the rock shaft 28 above described. In the routing of shutter stiles, a sufficient number of crossheads having been put in place upon the runway, the tables will first be drawn toward the routing tools on the crossheads by means of the hand lever 29 as far as will be determined by the stop collars 37 and then the operation of the treadle 46 will cause the movement of the work in the direction of the slots 41^a, completing the entire series of grooves in both stiles.

The machine and its parts may be made of any suitable materials and the specific design thereof may be varied to a certain extent within the spirit of the claims hereinafter made. I do not desire to be limited with respect to specific construction except as may be required by the state of the art.

I claim:—

1. The hereindescribed crosshead comprising a narrow vertical frame having a crossbar, a pair of alined bearings below said

crossbar and terminating in a pair of lugs which extend outwardly and downwardly from said bearings and whose ends project toward each other, a pair of adjusting devices mounted in each of said lugs, and a tool shaft journaled in said bearings.

2. In a machine of the class specified, the combination of a main frame, a runway extending centrally and longitudinally thereof and comprising a pair of spaced oppositely extending flanges, a series of crossheads provided with lugs embracing said flanges and adjustable longitudinally and vertically with respect thereto, each of said crossheads including a shaft and a pair of tool holders secured to the ends of the shaft and serving to prevent longitudinal displacement thereof with respect to the cross head and means to rotate said cross head shafts in unison.

3. In a machine of the class specified, comprising a main frame, a series of crossheads including tool shafts journaled therein adjustably secured lengthwise of the frame, and means to simultaneously operate said tool shafts, the combination of a pair of work tables supported upon said frame, means to operate said tables in unison toward and from said crossheads, each of said tables including relatively movable and stationary parts, and means for moving the movable parts of said tables in unison with respect to the relatively stationary parts.

4. In a machine of the class specified, the combination of a frame, a crosshead connected thereto, said crosshead including a tool shaft, means to drive said shaft, a work table supported upon said frame, means to move said table toward and from said crosshead, said table including relatively movable and stationary parts, and means for moving the movable part with respect to the other, said latter means being located adjacent the aforesaid table operating means.

5. In a machine of the class specified, the combination of a frame, a crosshead connected thereto, said crosshead including a tool shaft, means to drive said shaft, a work table supported upon said frame, means to move said table toward and from said crosshead, said table including relatively movable and stationary parts, a set of slotted plates connected to one of said parts, a series of pins rigidly connected to the other of said parts and operating in said slots, and means to cause the said relatively movable part to be moved with respect to the other part according to the position of the slots in said plates.

6. In a machine of the class specified, the combination of a frame, one or more crossheads adjustable longitudinally thereof, a work table supported upon said frame, means to move said table toward and from the crossheads, said table including a part movable with respect to the other part, a set of plates having longitudinal slots, means to adjustably secure said plates to the relatively stationary table part, a set of pins fixed to the relatively movable table part and operative along said plate slots, and means to cause one table part to move relatively to the other, guided by said pins along said slots.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

HENRY BORGMANN.

Witnesses:

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G. L. BEELER.