

Aug. 11, 1936.

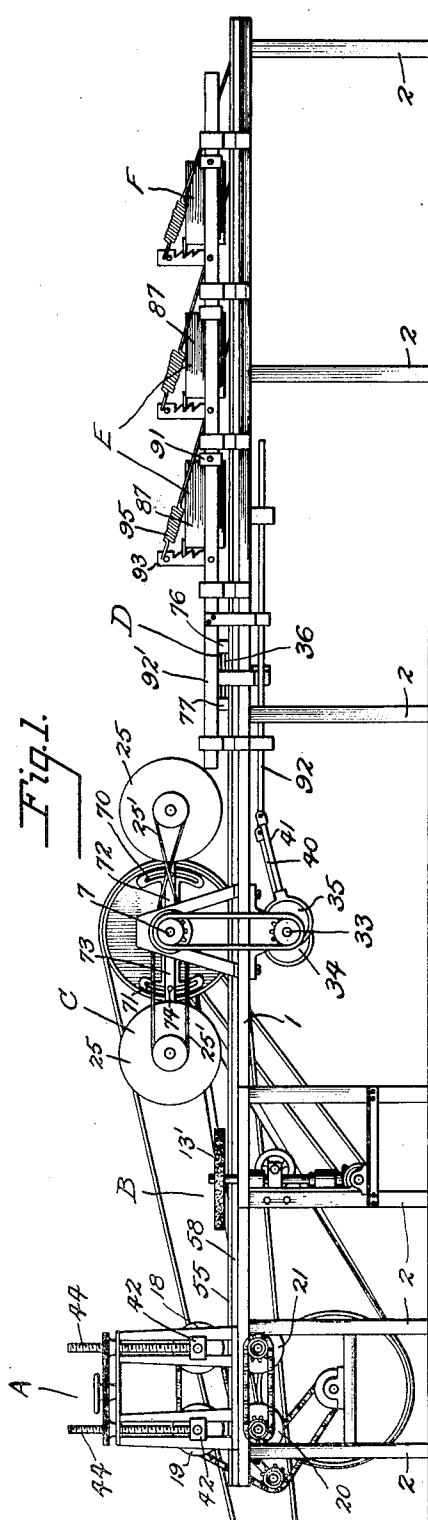
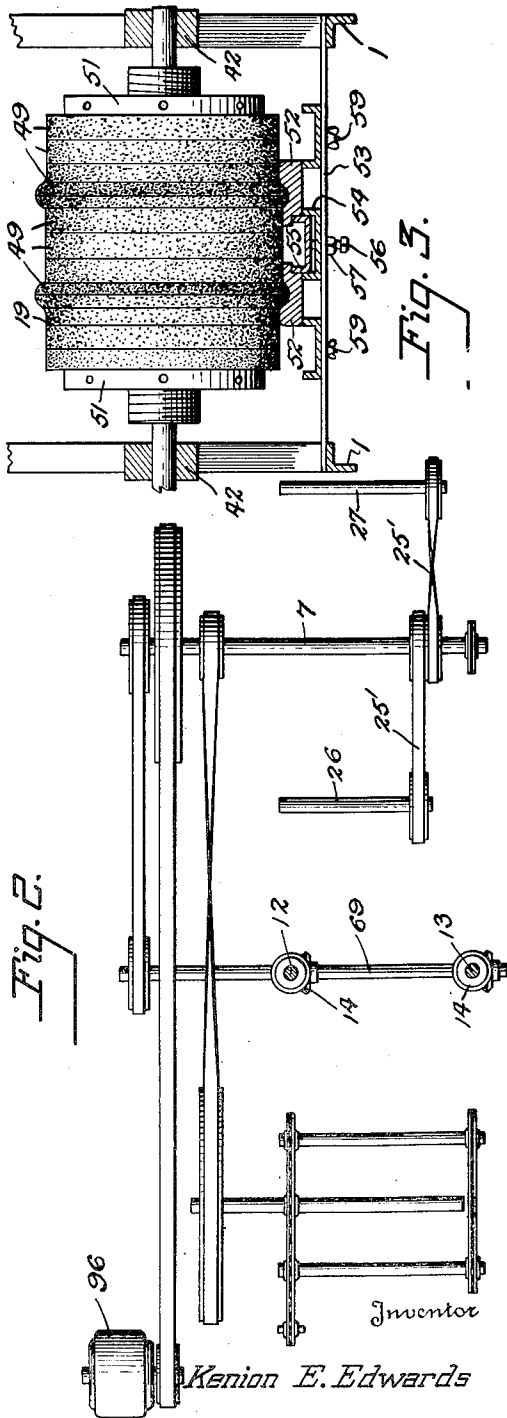
K. E. EDWARDS

2,050,295

SANDING, POLISHING, AND FINISHING MACHINE

Filed Feb. 27, 1936

3 Sheets-Sheet 1



Kenion E. Edwards
By *Mason Fenwick & Lawrence*
Attorneys

Aug. 11, 1936.

K. E. EDWARDS

2,050,295

SANDING, POLISHING, AND FINISHING MACHINE

Filed Feb. 27, 1936

3 Sheets-Sheet 2

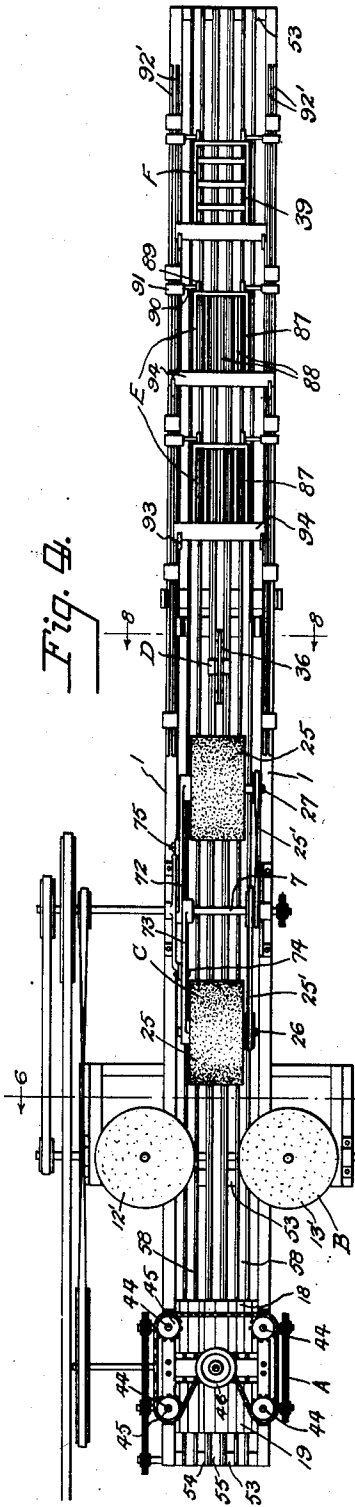


Fig. 4.

Fig. 6.

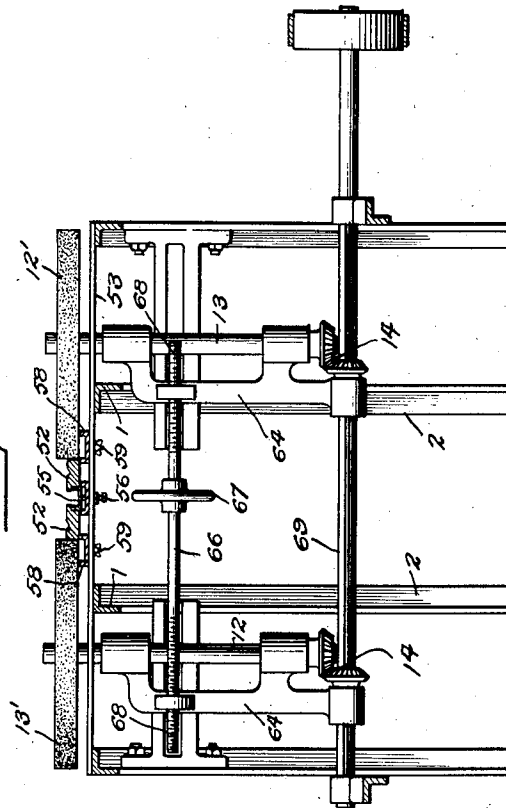
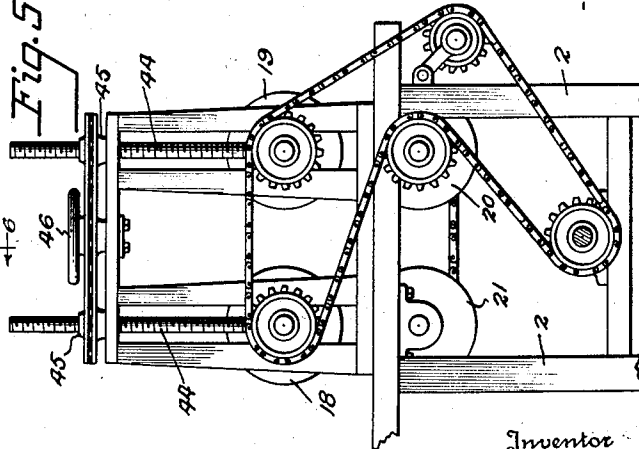


Fig. 5.



Inventor
Kenion E. Edwards

By *Mason Fenwick Lawrence*
Attorneys

Aug. 11, 1936.

K. E. EDWARDS

2,050,295

SANDING, POLISHING, AND FINISHING MACHINE

Filed Feb. 27, 1936

3 Sheets-Sheet 3

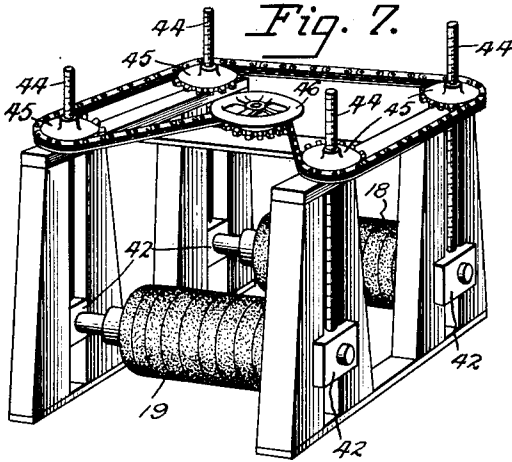


Fig. 7.

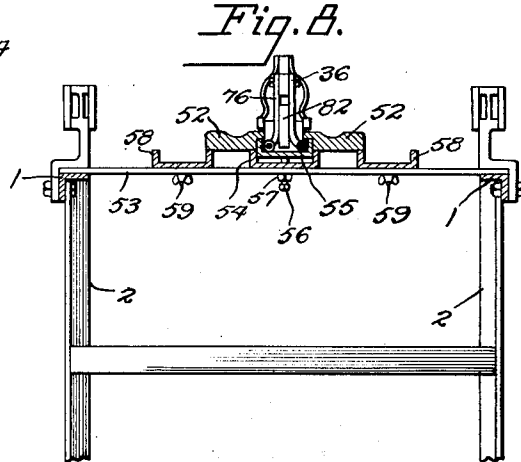


Fig. 8.

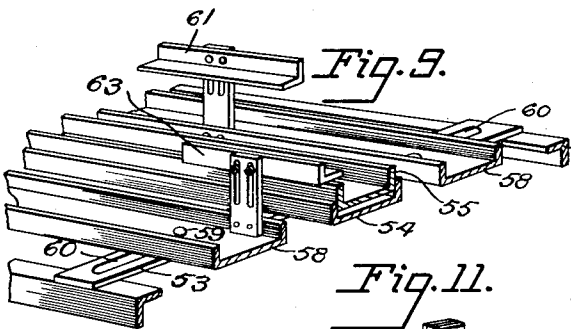


Fig. 9.



Fig. 11.

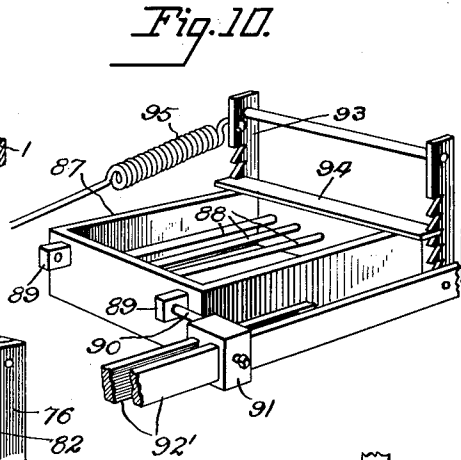


Fig. 10.

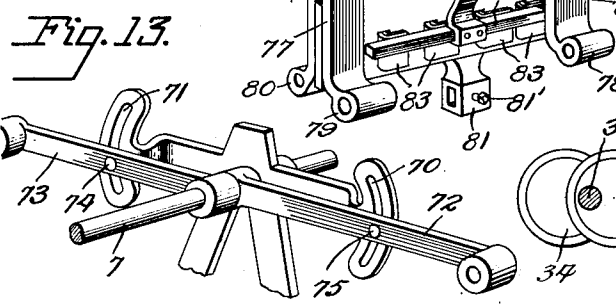


Fig. 13.

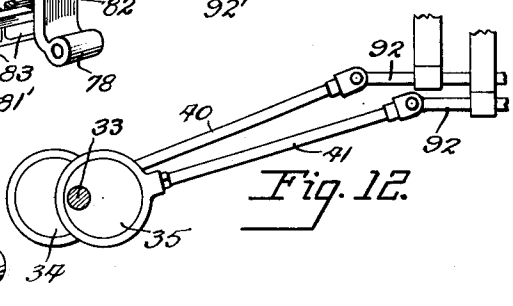


Fig. 12.

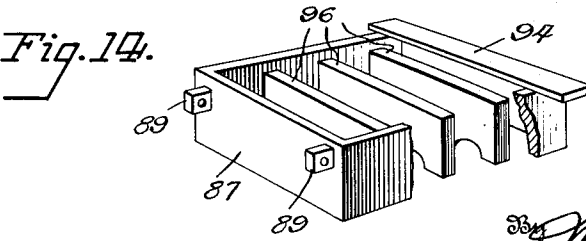


Fig. 14.

Inventor
Kenion E. Edwards

Mason Fenwick + Lawrence
Attorneys

UNITED STATES PATENT OFFICE

2,050,295

SANDING, POLISHING, AND FINISHING
MACHINE

Kenlon E. Edwards, Atlanta, Ga.

Application February 27, 1936, Serial No. 66,119

11 Claims. (Cl. 91—13)

This invention relates to wood-working, and in particular to a combined machine for sanding, polishing and coloring in a continuous operation, shaped wooden moldings, especially such as are used in making picture frames. The present application is a continuation-in-part of my application for patent Serial No. 752,497, filed November 10, 1934.

Picture frame molding is characterized by having a right-angular rabbet extending along one edge, which in the completed frame, forms a seat for the glass, picture and the backing.

It is most important, from the standpoint of saleability of the product that the faces of this rabbet, as well as the rear side of the molding, shall be kept clean and uncolored, free from runs, smears or accumulation of stain, paint or other coloring material.

The present invention has for one of its objects, the provision of a system of adjustable supporting rails for underlying the lengths of molding, and with which the several combined devices of my apparatus cooperate through distributed pressure both topwise and laterally applied to keep the rails in sealing contact with said molding, so as in the latter portion of the track, to exclude the color from the lower face of the molding including the faces of the rabbet, and in the anterior part of the track, to prevent abraded particles coming between the molding and track, the presence of which particles would prevent the parts coming together sealingly and permit the color liquid to spread to the faces of the molding where it is not wanted.

More specifically stated, it is an object of the present invention to provide an adjustable track-age or rail system on which the stock may be guided through the machine in such manner that the outside of the stock will be flush with the face of a transversely adjustable rail, while the rabbet of the stock will rest on a vertically adjustable rail, with superposed instrumentalities having primary wood-working functions, and the secondary function of keeping the stock pressed against the rails, also lateral wood-working devices for pressing the stock laterally against certain stops, thus assuring the maintenance of the stock in correct longitudinal alignment with the rails upon which it rests.

Another object of the invention is to make the rails trough-shaped whereby to retrieve the excess coloring liquid which may drain from the coloring applying device or from the stock itself.

A further object of the invention is to ensure uniformity in the feeding speed of the stock and

to prevent unevenness in the sanding or finishing operation by compensating each major movement in one direction by a corresponding movement of equal magnitude in the opposite direction.

Still another object of the invention is to provide polishing and finishing frames located above the stock with gratings therein suitable for maintaining sponges or material similar to metal wool or both of the aforementioned materials in contact with the stock.

The desired paint or other finishing material is carried in these frames and delivered to the stock continuously.

A further object of the invention is to provide a stationary rubbing element at the end of the train of moving instrumentalities for obliterating any lap resulting at the end of the range of travel of the next preceding wood-working member.

While the type of rotary sander employed in the present combined machine has been broadly covered per se in my Patent No. 1,949,565, it is one of the objects of the present invention to provide such sanders as operate horizontally upon the stock with an adjustment by means of which the centers of the vertical shafts of the horizontal sanders may by a single manipulation be shifted to suit varying widths of stock.

Other objects of the invention relate to the use of a plurality of vertical sanders of the type described in my said patent, certain of which rotate in one direction while other such vertical sanders rotate in the opposite direction with means for raising the centers of any two such vertical sanders to provide for different heights of stock, such raising of the centers to be about a common axis so that it will not be necessary to vary the length of the driving connections each time this adjustment is made.

Other objects of the invention will appear as the following description of a preferred and practical embodiment of my invention proceeds.

In the drawings throughout the several figures of which the same characters of reference have been employed to designate identical parts:

Figure 1 is a view in side elevation of a sanding and polishing machine constructed in accordance with the present invention;

Figure 2 is a detail view principally in top plan, showing the drive mechanism for the horizontal and vertical sanding wheels, and for reciprocating frames;

Figure 3 is a detail view showing means of mounting and of adjusting the material of the upper feeder rollers lengthwise on the shaft so

that the face of the roller will conform to the varying shapes and contours of the stock;

Figure 4 is a view in top plan thereof, letters B and C indicating centers of horizontal sanding wheels similar to that described in my prior patent;

Figure 5 is a detail view in vertical section through the feed rollers and adjacent parts of the machine;

Figure 6 is a view in vertical transverse section through the machine, taken substantially on the line 6—6 of Figure 4 and showing elevation of mechanism for adjustment of centers of horizontal sanding wheels;

Figure 7 is a view showing upper feeder rollers and method of simultaneously adjusting the upper feeder rollers;

Figure 8 is a view in vertical transverse section through the machine, taken substantially on the line 8—8 of Figure 4 and showing adjustable track or rail system;

Figure 9 is a view representing part elevation of track and showing side guides and top guides for the stock;

Figure 10 is a view showing polishing and finishing frame;

Figure 11 is a view showing the reciprocating sander for smoothing the inner edge or the inner edges of the stock;

Figure 12 is side elevation showing eccentrics and rods for reciprocating the polishing and finishing frames; and the reciprocating sander;

Figure 13 is a side elevation showing method of raising centers of vertical sanders; and

Figure 14 is a view showing the rubbing frame.

Referring now in detail to the several figures, the numeral 1 represents the longitudinal frame members of the machine which, as shown in Figure 3, are of angular construction. The frame is supported at intervals by legs 2. Extending longitudinally along the median of the frame is the bed rail 54, suitably fixed to the transverse frame members 53. The bed rail acts as a guide for the vertically adjustable rail 55. The last named rail may be raised or lowered in the bed rail 54 by means of studs 56 threaded through the bed rail and being located in any position of adjustment by means of the lock nut 57.

It will be observed from Figure 8 that two lengths of molding 52 are adapted to be passed through the machine in parallel relation and thus simultaneously treated. The vertically adjustable rail 55 is in the form of a channel, the side flanges of which rest against the lower surfaces of the rabbets formed along the inner edges of the pieces of stock.

A pair of laterally adjustable rails 58 is provided, said rails resting upon the transverse frame members 53, said rails 58 being provided on their lower sides with studs 59 extending through slots 60 (see Figure 9), and being secured by suitable wing nuts. The bed rail 54 and the lateral adjustable rails 58 have adjacent side flanges of the same height engageable with the flat lower sides of the stock.

It will be clearly understood from Figure 8 that the lateral adjustable rails can be adjusted so that the adjacent side flanges of said rails and the bed rail will be exactly the width of the lower side of the stock and that the vertically adjustable rail 55 can be so adjusted as just to contact the lower face of the rabbet, thereby accurately allocating the pieces of stock relative to the rail system.

It will be observed from Figure 9 that there are

certain adjustable stops 61 and 63 secured with respect to those flanges of the laterally adjustable rails which support the stock and it will be later explained how these stops cooperate with an intermediate lateral sander for maintaining the stock in true position with respect to the rails.

Referring now to Figures 1 and 4, it will appear that six instrumentalities or groups of the same are distributed along the length of the rail system. To the extreme left is the feeding unit represented in general by the reference character A. Next come the lateral rotary sanders B operating against the outer sides of the stock. Next in order come the vertical sanding unit C, the reciprocable sander D, which operates against the inner sides of the adjacent lengths of stock, and then comes the group of similar devices which may be regarded either as polishers or finishers represented by the reference character E, and finally, the stationary rubbing member F which obliterates lap.

All of these instrumentalities are suitably driven preferably from a common source, such as the motor 96, shown in Figure 2, and in view of the obviousness of the driving connections, it is not thought necessary to describe them herein excepting insofar as they contribute to the peculiar and novel functioning of the apparatus.

The feeding unit comprises a pair of lower feed rollers 20 and 21, which as shown, are mounted in non-adjustable manner with respect to the frame. Upper rollers 19 and 18 cooperate with these, said upper rollers being mounted in blocks 42 which are vertically adjustable in suitable guide wires by means of threaded rods 44. All of the threaded rods 44 are so connected as to be moved in unison in adjusting the height of the upper rollers. An exemplary connecting arrangement is illustrated in Figures 7 in which each of the rods 44 is provided with a sprocket 45, the hub of which forms a nut rotatable with respect to the rods which they surround. A chain connects all of the sprockets and also embraces a sprocket on the hand wheel 46. By turning this hand wheel, rotary movement is imparted to the sprockets 45, causing the rods 44 to rise or fall according to the direction in which the sprockets are turned.

My invention is designed primarily to handle stock of very irregular shape or contour, hence I prefer that the upper feeding rollers consist of a series of soft and resilient disks such as rubber disks 49 mounted on a threaded spool and clamped thereon by threaded or tapped disks 51 so that disks 49 may be adjusted longitudinally along said threaded spool so that a disk of comparatively large diameter may be located to contact the depressions in the stock and so that a disc of comparatively small diameter may be located to contact the elevated portions of the stock. It is customary to process a minimum of 10,000 ft. of stock of a specific shape or contour at one time hence there is an advantage in shaping the upper feeder rollers to exactly contact the upper face of each specific shape of stock and I make my feeder rollers of such material and mounted in such manner that a piece of stock 52 of desired contour, after being covered with abrasive material, is held in a fixed position, temporarily, while the upper rolls 18 and 19 rotate thereby grinding the faces of upper rolls 18 and 19 to such shape as to conform exactly with the shape or contour of the stock 52 thereby enabling the regular run of stock to be positively

fed through the machine regardless of the degree of irregularity in the shape of the stock.

The horizontal sanders 12' and 13', best shown in Figure 6, are first encountered by the stock as it is moved forward by the feeding rollers 18 and 19. The horizontal sanders may be of the type disclosed in my aforementioned patent, but they are not restricted to this type. As shown, they are rotatably mounted on shafts 12 and 13 mounted in bearings carried by frames 64 slidable axially along a splined shaft 69. The said frames carry bevel gear sets 14 transmitting the torque of the shaft 69 to the shafts 12 and 13. The frames 64 are made relatively approachable so as to effect an adjustment of the distance between the sanders 12' and 13' to accommodate stock of varying widths. The lateral adjustment is accomplished by means of a rod 66 having reversely threaded ends 68 passing through nuts carried by the frames 64. The rod 66 is rotated by a suitable hand wheel 67.

Next in order come the rotatable sanders 25 which work upon the top surface of the stock. These sanders also may be similar to those described in my patent but they are not necessarily of this type. As shown, they consist of drums rotatably mounted upon shafts 26 and 27 carried at the ends of independently adjustable frames 72 and 73 oscillatable about the axis of the shaft 7 through which both of the sanders 25 are driven. The frames 72 and 73 have lateral studs 74 and 75 which play in arcuate slots 70 and 71 formed in brackets fixed to the frame. Nuts screw upon the studs 74 and 75 to hold the frames 72 and 73 in adjusted position.

In view of the fact that the frames 72 and 73 oscillate about the axis of the drive shaft 7, it is not necessary to change the length of the driving belts 25' (see Figure 2) in adjusting the sanders.

It will be observed from the belt connections 25' that the sanders 25 rotate in opposite directions and whereas the direction of one against the stock would tend to accelerate the rate of feed, the equal friction of the other in the contrary direction neutralizes this tendency.

As will be later more fully explained, it is very essential that the rate of feed be constant so as to avoid laps and irregularities in the surface of the finished molding and also to prevent the flexible molding from buckling up between the several wood-working devices and leaving a space between itself and the stock which may give access on the one hand to the abraded particles so as to prevent a perfect sealing between the stock and rollers, and on the other hand, to give access of the coloring matter to those under surfaces from which it is desired that it should be excluded.

Since the lateral sanders 12' and 13' operate against the outer sides of the moldings which are of relatively small area, the effect of their friction upon the feed is negligible, and it is not necessary to compensate it. This is also true of the reciprocable sander 36 which operates upon the thin inner edges of the molding.

The sander 36 consists essentially of two end frames 76 and 77, formed at their lower ends with guide sleeves 78, 79, and 80, said guide sleeves reciprocating on their guide rods intercalated in the vertically adjustable rail 55. Between the end frames 76 and 77 a resilient strip or block 82 is mounted, said block being provided with a plurality of vertical slots extending therethrough in which strips of abrasive material 83 are inserted. The strips are held in place by

spring clamps 85 which can readily be spread to facilitate the renewal of the strips of abrasive material.

Both the bed rail and vertically adjustable rail are slotted to allow for the reciprocation of an extension 81 having an eye at its lower end through which passes one of the connecting rods 92, the sander being secured thereto by means of a suitable set screw 81'.

Next in sequence come the polishing or finishing frames 87 which are alternative in function since whether they merely polish or finish the stock depends upon whether they apply a fine abrasive such as steel wool, or sponges saturated with the coloring liquid.

The polishing frames 87 may be similar in construction. Figure 10 shows that the frame 87 is a box-like structure having lugs 89 at one end through which pass pintles 90 that in turn are connected to slotted blocks 91 operating slidably on guide rails 92', there being two on each side. One pair of guide rails 92', that is to say, one pair on each side, is connected to one of the connecting rods 92, while the other pair of guide rails is connected to the other connecting rod 92. Said connecting rods by means of suitable pitmans 40 and 41 are connected to eccentrics 34 and 35 having their throws angularly displaced through 180° and rotating about the axis of the shaft 33, the result being that the connecting rods 92 and the rails 92' to which they are connected reciprocate in opposite directions so that the polishing frames 87 simultaneously move in opposite directions over the stock. If their frictional drag were not thus compensated, the rate of feed would be accelerated in one direction of reciprocation and the feed would be retarded by reciprocation in the opposite direction so that the stock might buckle up, destroying its sealing relation to the rails on which it is supported.

While I have herein by way of illustration shown only two of the polishing frames 87, moving with a simultaneously opposed motion, it will be understood that the invention contemplates, if desired, the use of a greater number of polishing and finishing frames with the understanding that they shall be coupled in opposed relation.

Figure 10 shows that each of the polishing or finishing frames 87 may have a plurality of rods or wires 88 extending longitudinally, forming a grid. The steel wool or the colored saturated sponges, as the case may be, is placed beneath this grid. To do this, it is necessary to raise the frame 87 from the stock. With this end in view, one end of the frame is left free from the rails 92' and the entire frame hinges about the axis of the pintles 90 so that the opposite end can be raised from the stock permitting the sponges to be inserted. The frame is then set down over the sponges or steel wool and the free end is held in place by means of a cross bar 94 fixed to the free end of the frame 87 and retained beneath the faces of teeth formed on the hinged latch 93, a pair of latches 93 being pivotally connected to each of the rails 92'.

To release the frame 87, the latch 93 may be forced back against the tension of a spring 95, one end of which is fixed to the frame. The spring normally holds the latch in position of engagement with the cross bar 94, the spring alternately contracting and expanding under the reciprocating movement of the rails 92'.

An alternative form of polishing frame is 71

shown in Figure 14 in which the rods or wires 88 are substituted by transverse combs 96 of flexible material, the bottom edges of which are shaped so as to approximately conform to the irregular shape of the surface of the stock.

It will be apparent to those skilled in the art a color lap would be formed at the end of the reciprocatory movement of the final finishing frame to avoid which I have provided a stationary wiper 39 which may be in all respects similar to the polishing or finishing frame 87, but is fixed with relation to the main frame of the apparatus and beneath which its stock passes, receiving a continuous unidirectional rubbing action from the wiper. Thus the frictional resistance of this wiper to the feed is constant; it is not necessary to compensate it.

It will be observed from Figure 1 that in the arrangement of the several wood-working devices relative to the stock upon the track that they exert a pressure upon the stock at close intervals, holding it in firm contact with the rails and that certain laterally operating devices, such for example, as the sanders 12', 13' and the sander 36, act in cooperation with stops such as the lugs 61, to keep the stock longitudinally aligned with the rails, notwithstanding that the stock may come to the apparatus more or less warped and with a natural tendency to deviate from the rectilinear.

It is also clear that the purpose of keeping the stock against the rails in the anterior portion of the apparatus is to prevent particles of wood or particles of the abrasive from getting between the stock and the co-acting rail edges and which would keep the stock raised from the rails sufficiently far to permit color to penetrate between the rails and stock when the latter comes to that region of the machine in which the coloring substance is applied.

It is also obvious that close contact between the rails and stock must be maintained throughout the length of the machine.

While I have in the above description defined what I know to be a preferred and practical embodiment of my invention, the specific details of construction and arrangement as disclosed, are to be regarded as by way of example and not as limiting the scope of the invention which is to be determined by fair and liberal construction of the appended claims.

What I claim is:

1. Machine for the continuous production of smoothed and finished molding comprising a frame, parallel rails extending longitudinally along said frame adapted to contact the underside of the molding in spaced relation to one another, one being vertically adjustable and the other horizontally adjustable to cooperate with moldings of different height and width, overlying feeding means for imparting movement to said molding along said rails, and overlying wood-working devices adjacent the anterior and the posterior portions of said rails for pressing said molding into sealing contact with said rails.

2. Machine for the continuous production of smoothed and finished molding comprising a frame, parallel rails extending longitudinally along said frame adapted to contact the underside of the molding in spaced relation to one another, one being vertically adjustable and the other horizontally adjustable to cooperate with moldings of different height and width, overlying feeding means for imparting movement to said molding along said rails, and overlying wood-

working devices adjacent the anterior and the posterior portions of said rails pressing said molding into sealing contact with said rails, the anterior wood-working device being of abrading character and the posterior device applying color in liquid form to the surface of said molding not included between said rails.

3. Machine for the continuous production of smoothed and finished molding as claimed in claim 2, the rails being trough-shaped to catch excess coloring liquid.

4. Machine for the continuous production of smoothed and finished molding comprising a frame, parallel rails extending longitudinally along said frame adapted to contact the underside of the molding in spaced relation to one another, one being vertically adjustable and the other horizontally adjustable to cooperate with moldings of different height and width, overlying feeding means frictionally engaging the molding for imparting movement thereto along said rails, and a pair of overlying wood-working devices frictionally engaging the top of said molding and simultaneously moving in opposite directions for neutralizing their frictional effect upon the uniformity of feed.

5. Machine for the continuous production of smoothed and finished molding comprising a frame, parallel rails extending longitudinally along said frame each including a channel having upstanding flanges, said rails including a middle rail and lateral rails, the former being vertically adjustable and the lateral rails transversely adjustable to cooperate with the undersides of a pair of moldings, overlying feeding means for imparting movement to said moldings longitudinally of said rails, overlying wood-working devices adjacent the anterior and posterior portions of said rails pressing said moldings into sealing contact with said rails, and wood-working means located between the lateral rails operating simultaneously upon the adjacent edges of said moldings and cooperating with stops at the outer sides of said moldings for maintaining them in longitudinal relation to said rails.

6. Machine for the continuous production of smoothed and finished moldings as claimed in claim 5, the anterior wood-working device being of abrading character and the posterior device applying color in liquid form to said moldings.

7. Machine for the continuous production of smoothed and finished moldings as claimed in claim 5, the wood-working devices both anterior and posterior, being arranged in pairs moving simultaneously in opposite directions for neutralizing any effect of their frictional pressure upon the uniformity of feed.

8. Machine for the continuous production of smoothed and finished moldings comprising a frame, parallel rails extending longitudinally along said frame each including a channel having upstanding flanges, said rails including a middle rail and lateral rails, the former being vertically adjustable and the lateral rails transversely adjustable to cooperate with the undersides of a pair of moldings, overlying feeding means for imparting movement to said moldings longitudinally of said rails, a pair of overlying oppositely rotating wood-working devices adjacent the anterior portion of said rails, a pair of overlying oppositely reciprocating wood-working devices adjacent the posterior portion of said rails, said pairs of wood-working devices pressing said moldings into sealing contact with said rails, and by the oppositeness of their motion nullifying their

frictional effect upon the uniformity of feed of said moldings.

9. Machine for the continuous production of smoothed and finished molding comprising a
5 frame, parallel rails extending longitudinally along said frame each including a channel having upstanding flanges, said rails including a middle rail and lateral rails, the former being vertically adjustable and the lateral rails trans-
10 versely adjustable to cooperate with the undersides of a pair of moldings, overlying feeding means for imparting movement to said moldings longitudinally of said rails, a pair of overlying
15 oppositely rotating wood-working devices adjacent the anterior portion of said rails, a pair of overlying frames adjacent the posterior portion of said rails, oppositely reciprocating rods parallel to said rails each in driving relation to one of said overlying frames, said anterior wood-
20 working devices and said oppositely reciprocable frames pressing said moldings into sealing con-

tact with said rails, and by the oppositeness of their motion nullifying their frictional effect upon the uniformity of feed of said moldings.

10. Machine for the continuous production of smoothed and finished molding as claimed in
5 claim 9, said frames being hingedly mounted with respect to their driving means giving access to the space between said frames and moldings for the selective insertion of color pads or abrasive masses into said space, and means for latching
10 said frames in operative relation to said moldings.

11. Machine for the continuous production of smoothed and finished molding as claimed in
15 claim 9, including a fixed overlying frame at the ends of said rails opposite said feeding means adapted to press a wiping instrumentality into contact with said moldings and to effect final sealing contact between said moldings and said
20 rails.

KENION E. EDWARDS.