Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 1

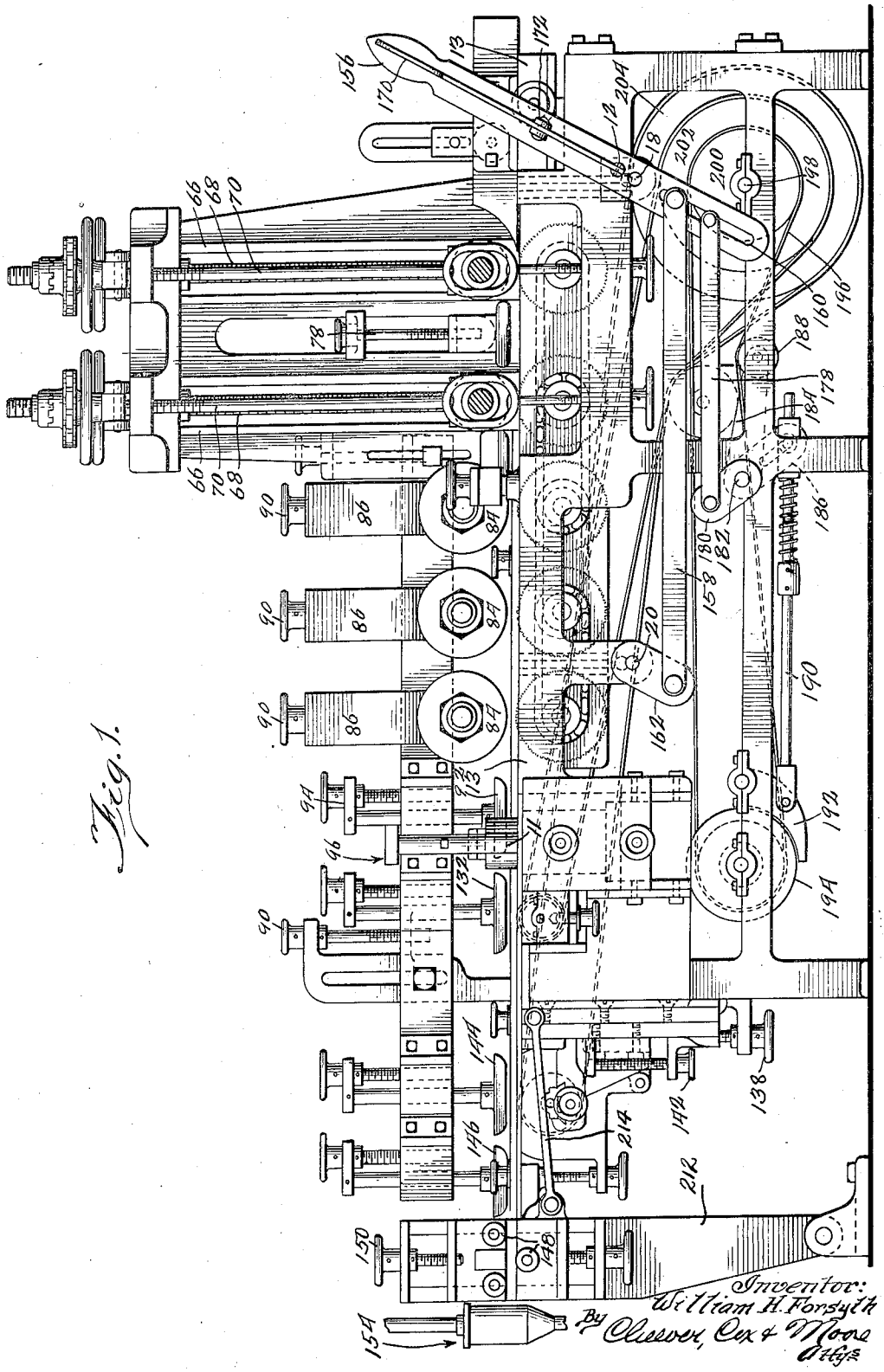


Fig. 1.

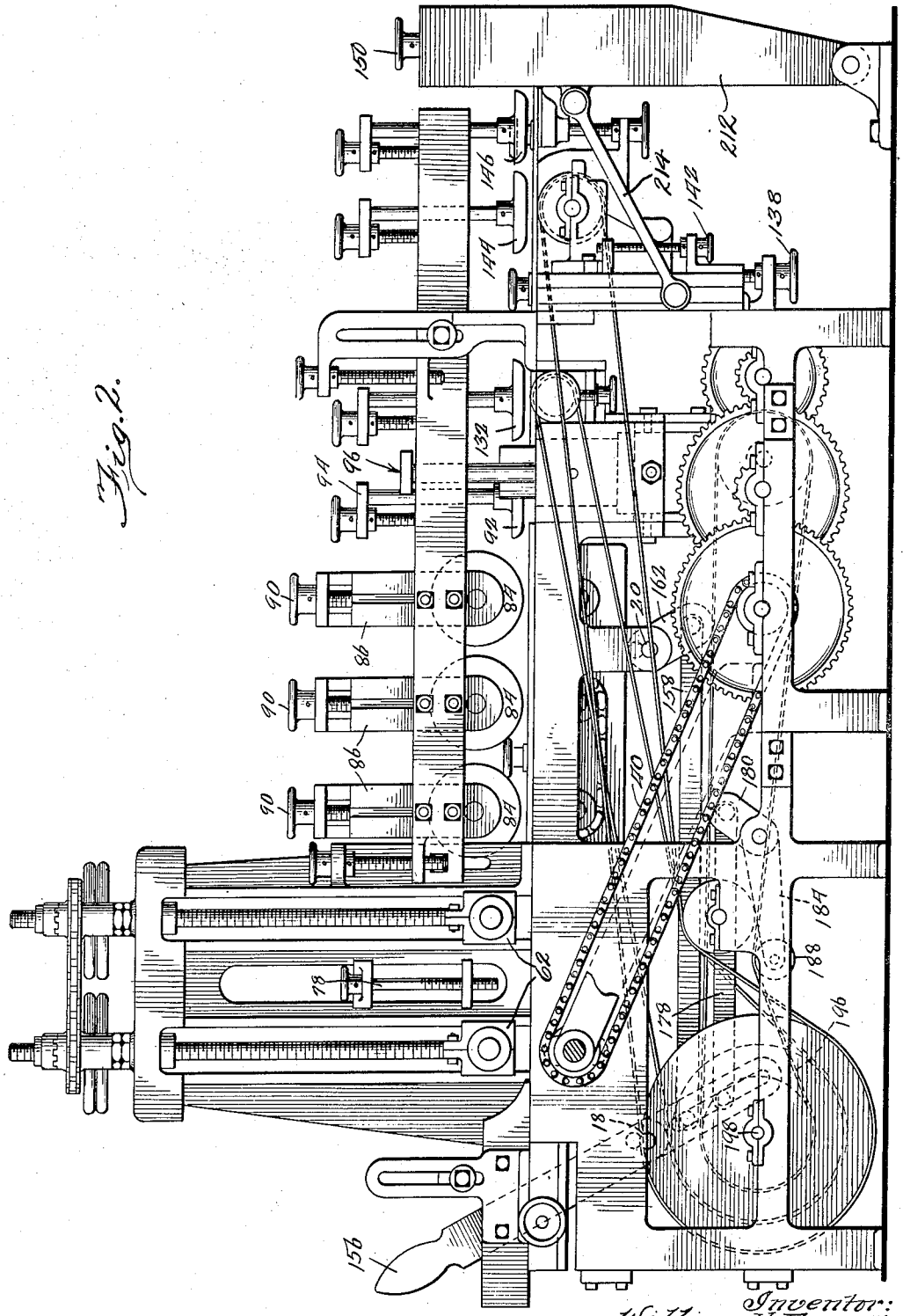
Inventor:
William H. Forsyth
By Cleaver, Cox & Moore
Attys

Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 2

Fig. 2.



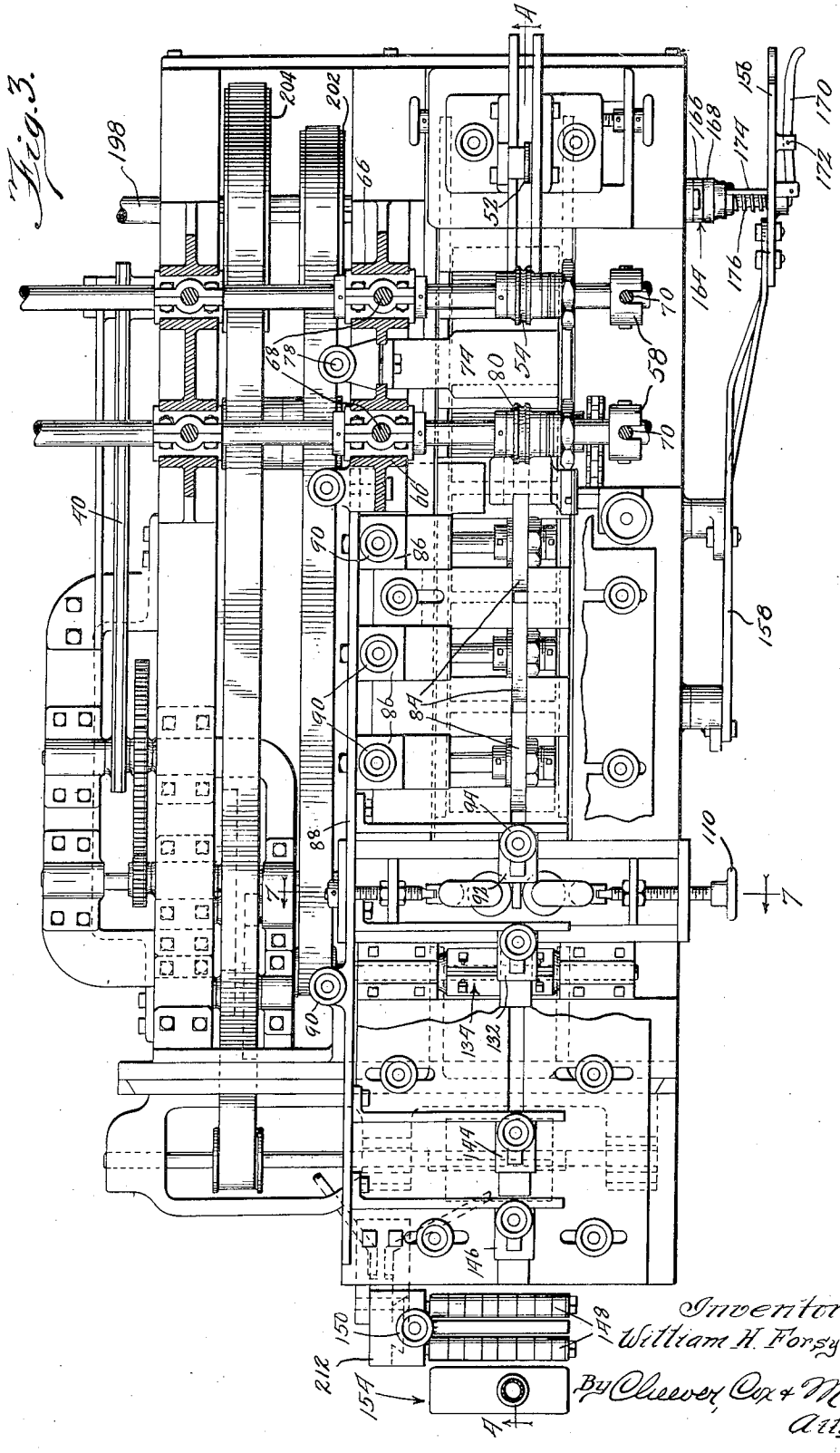
Inventor:
William H. Forsyth
By Cleaver, Cox & Moore
Attys

Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 3

Fig. 3.



Inventor:
William H. Forsyth
By Olsewey, Cox & Moore
Attys

Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 4

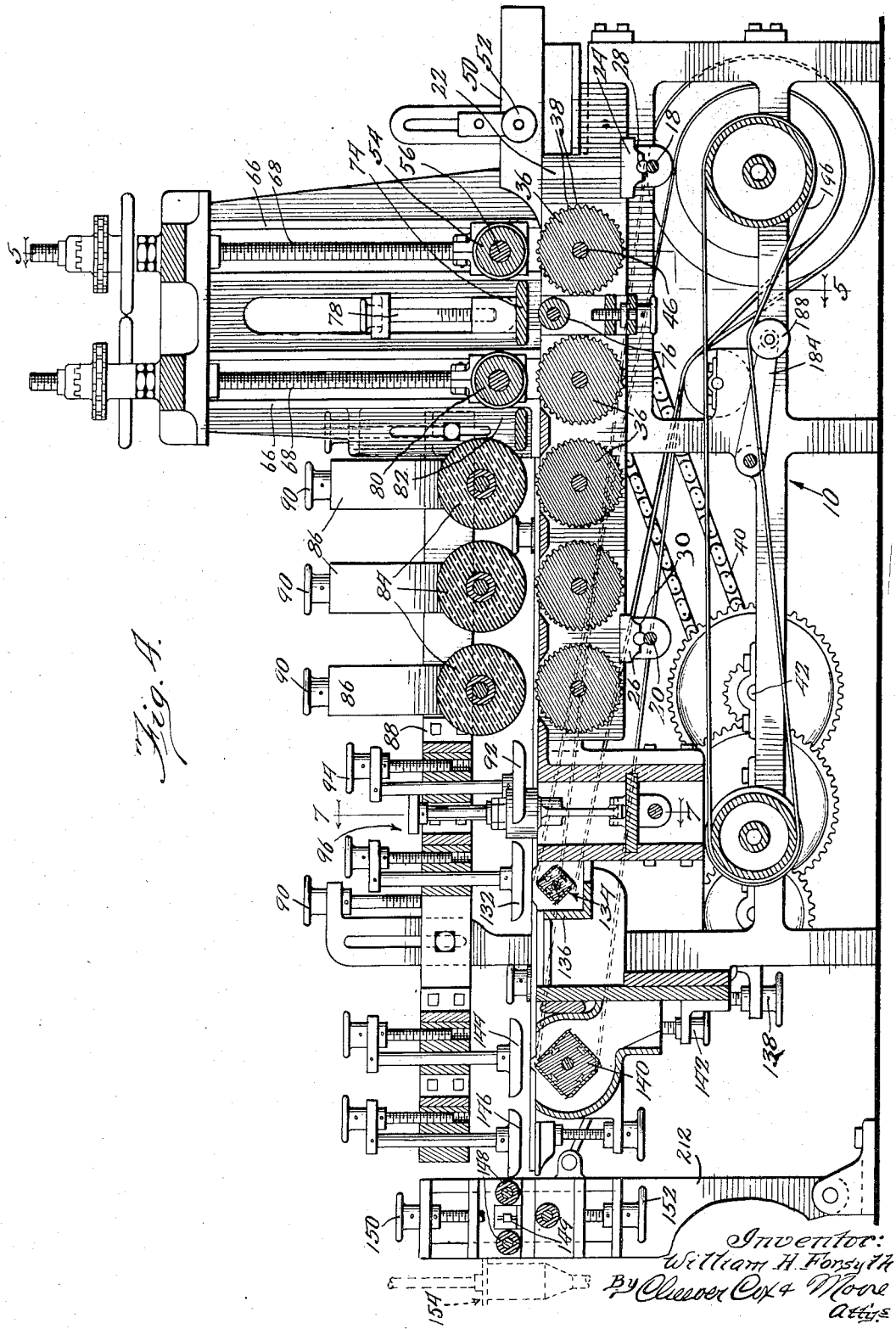


Fig. 4.

Inventor:
William H. Forsyth
By Cleaver Cox & Moore
Attys.

Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 5

Fig. 5.

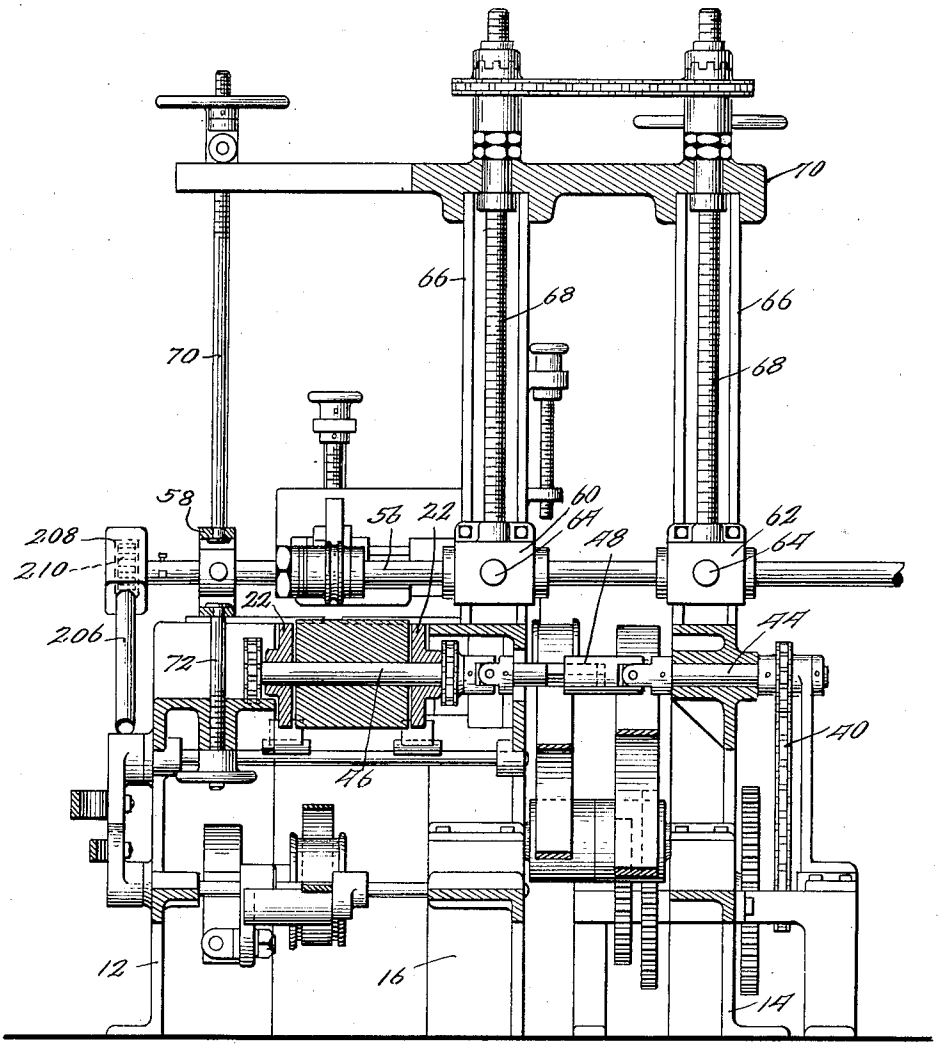
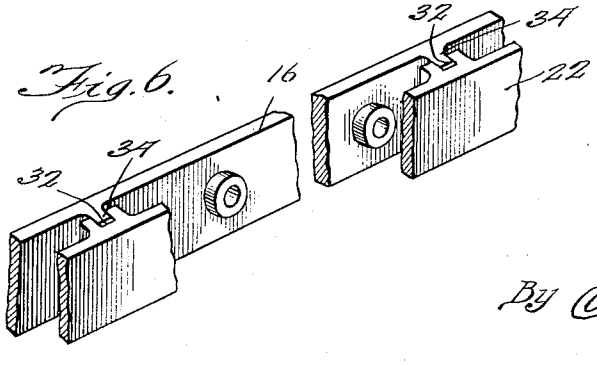


Fig. 6.



Inventor:
William H. Forsyth
By Oliver, Cox & Moore
Attys.

Dec. 26, 1933. W. H. FORSYTH 1,941,394

WOODWORKING MACHINE

Filed April 26, 1929 6 Sheets-Sheet 6

Fig. 7.

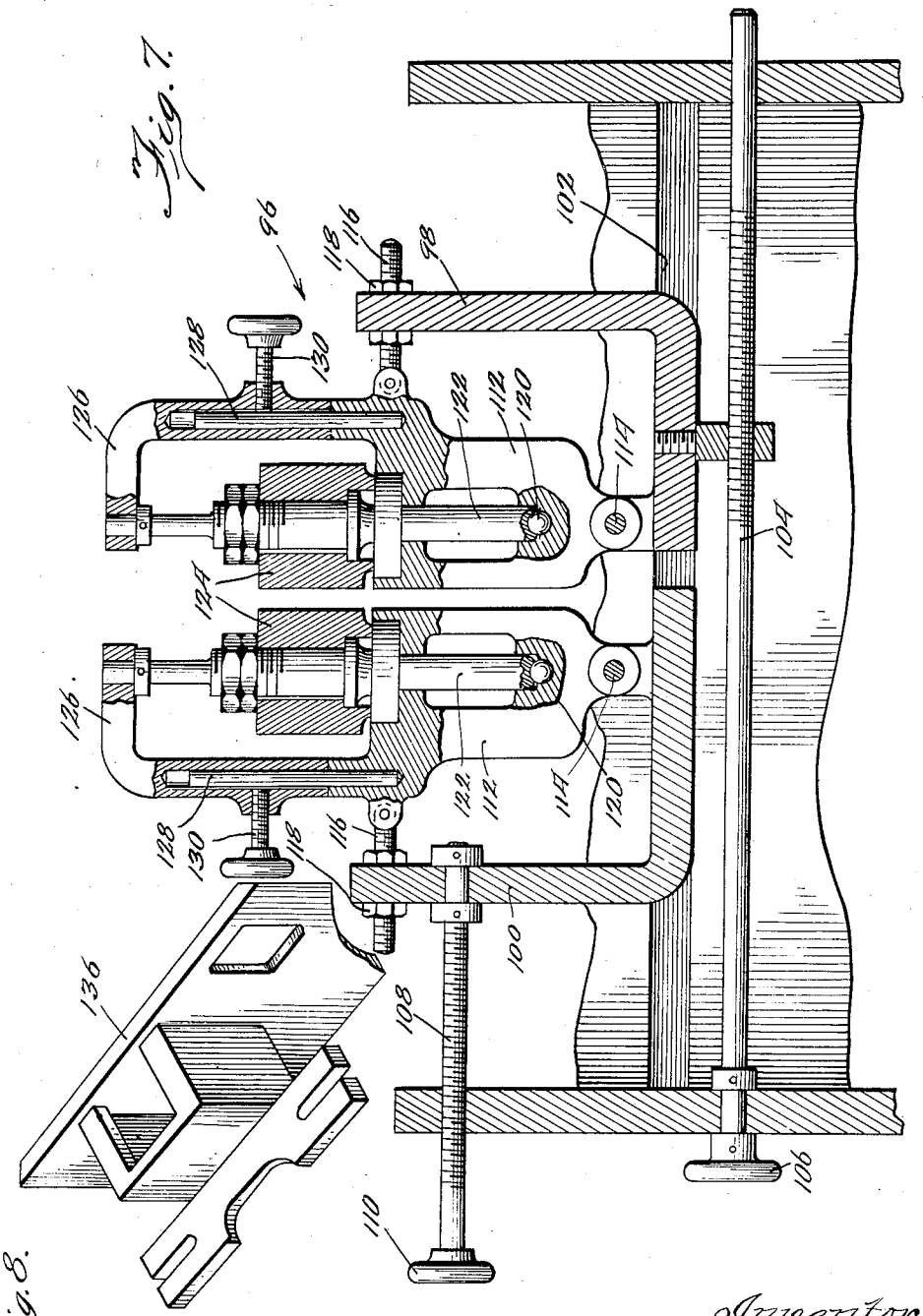


Fig. 8.

Inventor:
William H. Forsyth
By Cleaver, Cox & Moore
Attys

Patented Dec. 26, 1933 1,941,394

UNITED STATES PATENT OFFICE

1,941,394

WOODWORKING MACHINE

William H. Forsyth, Chicago, Ill.

Application April 26, 1929. Serial No. 358,232

6 Claims. (Cl. 41—1)

My invention relates generally to woodworking machines and more particularly to methods of and apparatus for forming moldings and materials of like nature.

One of the primary objects of my present invention is to provide a machine of improved practical construction whereby wooden strips such as moldings may be embossed and planed in a single operation without any tendency for said strips to be distorted or bent as the result of the engagement therewith of forming devices.

Another object of my invention is to provide a strip forming device for embossing moldings and the like in which the work may be instantaneously and positively released or disengaged so as to prevent jamming.

Still another object of my present invention is to provide in a machine of the nature above set forth, improved means for variously adjusting the position of the work engaging elements so as to enable the machine to be used for embossing moldings and the like over a wide range of sizes and shapes.

My invention also contemplates the provision of apparatus and methods whereby moldings may not only be effectively embossed and planed but also treated so as to present a satinized surface to the moldings.

Still another object of my present invention is to provide, in combination with an embossing mechanism, a plurality of planers which may be independently adjusted or adjusted together as a unit to vary the degree of cutting action.

These and numerous other objects and advantages will appear in the following description, when considered in connection with the accompanying drawings, wherein:

Figure 1 is a side elevational view of an apparatus embodying features of my invention whereby my improved method of woodworking may be effectively practiced;

Figure 2 is an elevational view of the side of the machine opposite from that disclosed in Figure 1;

Figure 3 is a plan view of the device shown in Figure 1, certain portions of the upper structure being broken away to more clearly disclose the functional characteristics of the machine;

Figure 4 is a vertical longitudinal sectional view taken substantially along the line 4—4 of Figure 3;

Figure 5 is a transverse vertical sectional view taken substantially along the line 5—5 of Figure 4;

Figure 6 is a fragmentary detailed perspective view of the side mounting of the bed frame;

Figure 7 is a transverse sectional view taken substantially along the line 7—7 of Figure 3; and

Figure 8 is a detailed perspective view of the supporting frame for one of the cutter heads.

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various figures, it will be observed that a machine which is representative of one embodiment of my invention includes a machine frame indicated generally by the numeral 10 which includes two outer upright frame sections 12 and 14 and an upright section 16 positioned intermediate the sections 12 and 14. A pair of shafts 18 and 20, Figure 4, interposed between the frame sections 12 and 16 serve to horizontally support a bed frame 22. The lower edges of the bed frame 22 rest upon a pair of supporting blocks 24 positioned at the forward end of the bed frame and a pair of similar supporting blocks 26 at the other end of said bed frame. These supporting blocks 24 and 26 are in turn mounted upon companion eccentrics 28 and 30 respectively, which eccentrics are rotatable with their respective shafts 18 and 20. When these eccentrics are positioned as shown in Figures 1, 4 and 5, the bed frame 22 will occupy its uppermost position. Longitudinal displacement of the bed frame 22 is prevented by reason of the tongue and groove connection between the upper portions of the frame sections 12 and 16 as clearly shown in Figure 6. It will be seen that the bed frame 22 is provided with vertical grooves 32 which are adapted to receive vertical tongues 34 formed integral with the frame sections 12 and 16. The supporting blocks 24 and 26 are slidable upon the lower edges of the bed frame 22 and hence vertical displacement may be imparted to said bed frame without causing the same to be horizontally displaced.

A plurality of positively driven feed rolls 36 are spaced along and supported by the bed frame 22 and when said bed frame occupies its operative or uppermost position, the upper portion of the periphery of said feed rolls will project above the plane of the upper surface of the bed 22 so as to engage the work. Each of these feed rolls 36 are provided with a plurality of peripheral work engaging teeth 38 which are adapted to be successively carried into operative engagement with the lower surface of the work as will later be described. These feed rolls 36 are positively driven through the agency of a drive chain 40 which connects a drive shaft 42 with a driven shaft

44, Figure 5. This driven or stub shaft 44 is rotatably mounted within the upright frame 14 and is coupled with a shaft 46 of one of the feed rolls by means of a slidable or splined connection 48. The opposite extremities of this splined connection 48 are connected by suitable universal joints to the extremities of the shafts 44 and 46. It will be apparent that this universal and splined connection between the shafts 44 and 46 is provided in order to permit the feed rolls 36 to be driven regardless of the vertical position of the shiftable bed 22. The other feed rolls are driven from the shaft 46 by means of suitable chain connections as shown in Figures 1 and 5. Thus, all of the feed rolls are positively driven. When the work is initially fed into the machine it is positioned between a pair of guide bars 50 and beneath a roller 52, Figure 4. The underside of the work is moved into association with the upper peripheral teeth of the first feed roller 36 and beneath an embossing die 54. This rotary embossing die 54 is mounted upon a shaft 56. The shaft 56 is supported by means of three bearing blocks 58, 60 and 62. The bearing blocks 60 and 62 have trunnions 64 and are slidably mounted within upright guides 66. Screws 68 are rotatably mounted at their upper ends in a cross frame 70 and these screws serve to angularly adjust the position of the shaft 56. The angular adjustment of the shaft 56 enables the embossing die 54 to be adjusted in accordance with the nature of the work which is to be embossed. It will also be apparent that the screws 68 as well as the screws 70 and 72 which support the bearing block 58, serve to vertically adjust the position of the die with respect to the feed rolls. For a more detailed description and understanding of the means for angularly adjusting this embossing die 54, reference is made to my Patent No. 1,486,288, dated March 11, 1924.

After the work or molding has been pressed between the embossing die 54 and the first feed roll 36, the same is advanced beneath a pressure bar 74 and above a friction roll 76. This pressure bar 74 is vertically adjustable by means of a suitable screw 78 and serves to effectively prevent the work from being distorted in response to the engagement of the embossing rod 54 therewith. In other words, the pressure bar or frame 74 and the roll 76 operate to straighten the work. In this connection it will be understood that when the work passes beneath the embossing die 54 there is a tendency for the work to curl upwardly on each side of the die. This bending tendency is counteracted by the engagement of the teeth 38 of the initial feed roll 36 with the underside of the molding. In a sense the teeth 38 imbed themselves within the underside of the work or molding and thereby cause a shortening of that side so as to counteract the bending tendency in the opposite direction which is caused by the pressure of the die 54 on the upper surface of the work. I provide a second pressure roll 80 which is adapted to engage the work after it has been passed between the pressure bar 74 and the friction roll 76. This pressure roll 80 is mounted upon screws in a manner similar to that described in connection with the embossing die 54. I find it preferable in some instances to construct the pressure roll 80 of suitable hard rubber. This roll 80 serves, with the feed roll 36 positioned immediately therebeneath, to straighten the molding. In some instances it may be desirable to supplant the hard rubber roll 80 with another embossing die. From this point the work passes between another pressure bar or subframe 82 and this frame 82 serves also to straighten the work and provides a guide for directing the work beneath the first of a series of rubber rollers 84. One of the feed rolls 36 is positioned immediately beneath each of these rollers 84 and these rollers are carried by brackets 86. The brackets 86 are carried by and vertically adjustable upon a horizontally disposed pressure bar frame 88. The vertical adjustment of the brackets 86 is accomplished by means of adjusting nuts 90. These rollers 84 co-operate with their companion feed rolls 36 to insure the straightening of the molding. After passing beneath the last roller 84, the work is fed beneath a vertically adjustable pressure bar 92. This pressure bar is supported by the horizontal frame 88 and is vertically adjustable by means of a suitable screw 94. From this point the work is fed into association with a side embossing mechanism which I have designated generally by the numeral 96 and which is shown in detail in Figure 7.

This side embossing mechanism includes a pair of frames 98 and 100 which are mounted within guideways 102 extending transversely of the machine frame. Horizontal displacement of the frame 98 within the guideways 102 is accomplished by means of a screw 104 which carries a wheel 106 and similar displacement of the frame section 100 is occasioned by means of a screw 108 which carries a hand wheel 110. Each of the frames 98 and 100 support side embossing units which include frames 112 pivotally supported at 114. These frames 112 are secured against lateral displacement by means of threaded pins 116 which are pivotally connected at one extremity to said frames and which extend through the frames 98 and 100 at their opposite extremities. Lock nuts 118 are mounted upon the threaded pins 116 and serve to variously adjust the vertical positions of the frames 112. Vertically mounted within the frames 112 and supported by suitable ball bearings 120 are shafts 122 to which are keyed a pair of adjacently positioned embossing rolls 124. The upper ends of these shafts 122 are rotatable within overhanging arms 126. These arms 126 are detachably mounted upon the frames 112 by means of pins 128 which are secured in position by means of set screws 130. In this manner a very convenient means is provided for detachably mounting the side embossing rolls so as to enable said rolls to be conveniently removed for purposes of repair or replacement without disturbing any of the other parts of the machine. The work is advanced from the side embossing mechanism 96 beneath a vertically adjustable pressure bar 132 and above a planer head 134.

This planer head 134 is mounted within a frame 136 and this frame 136 is vertically adjustable by means of an adjusting screw 138, Figure 4. A second and larger planer head 140 is provided which is vertically adjustable independently of the planer head 134 by means of the adjusting screws 142. From the foregoing it is to be understood that the adjusting screw 138 serves to elevate both of the planer heads 134 and 140 while the screw 142 serves to vertically adjust the larger planer head 140 independently of the head 134. This arrangement enables the work to be properly planed. Thus, for example, it might be required to remove an amount of stock from the work which could not be cut away during a single passage of the work over one planer head. In such instances my improved arrangement enables an initial cut to be taken by the smaller

planer head and a final or finishing cut to be made by the larger planer head. By having the planer heads so arranged that the same may be raised and lowered as a unit, enables one setting of the heads to be employed for cutting various sizes and types of moldings. I provide a pair of pressure bars 144 and 146 which serve, in addition to the pressure bars 92 and 132, to maintain the work in a straightened condition. Upon leaving the pressure bar 146, the work passes between three straightening rollers 148 which operate to impart the final straightening action to the work. These rollers are vertically adjustable by means of suitable adjusting screws 150 and 152. Interposed between the two upper rollers 148 is a pressure bar 149 which serves to engage the upper surface of the work and thereby prevent said work from breaking in response to the reverse bend imparted by the rollers 148. After leaving the rollers 148 the work is then passed through a sand-blasting device indicated generally by the numeral 154. This sand-blasting device may be of any conventional design which is adapted to receive the molding or strip material and to cause said material to be subjected to a sand-blasting operation. In most instances the embossing dies are applied in a heated condition to the work and in the event that the work is scorched as a result of the application of these hot dies, this sand-blasting operation serves to remove such unsightly scorches. Sand-blasting the work serves to give the same a satinized surface finish which is very attractive and very smooth. It will be apparent that sand-blasting the scorched surfaces considerably lightens the color of said surfaces and thereby causes the grain of the wood to be brought out. This can be more readily observed by applying a coat of shellac to the scorched surface of one piece and then applying a coat of shellac to a similar surface which has been subjected to a sand-blasting operation. A comparison of the two pieces of wood will show conclusively that my improved method of sand-blasting the wood surfaces not only causes said surfaces to partake of a satinized finish, but also facilitates the clarifying of the grain in the wood.

I will now proceed to explain the mechanism for controlling the operation of the apparatus just described. This control mechanism includes a control lever 156 which is mounted upon and rotatable with the shaft 18. A link 158 is interposed between a slot 160 in the lever 156 and the outer end of an arm 162 which is secured to and rotatable with the shaft 20. Thus, when the lever occupies the position shown in Figures 1 to 3 inclusive, the eccentrics 28 and 30 will occupy the position as shown in Figure 4 so as to retain the feed rolls and the bed frame which supports the same in an elevated position. To prevent these eccentrics from being tilted so as to vertically displace or lower said feed rolls, I employ a clutching device indicated generally by the numeral 164, Figure 3. This clutching device includes a clutch member 166 which is secured to the side of the frame 12, and a companion clutch member 168 which is keyed to and slidable longitudinally of the shaft 18. The longitudinal movement of the clutch member 168 is controlled by an auxiliary lever handle 170 which is pivoted to the lever 156 at 172. The lower extremity of this auxiliary handle 170 is connected with the clutch member 168 by means of a rod 174. A spring 176 is interposed between the clutch member 168 and the handle 156 so as to yieldingly urge said clutch member into operative engagement with its companion member 166. When these clutch members 166 and 168 are in operative relation as disclosed in Figure 3, the feed rolls and bed frame 22 will be secured in elevated position because the eccentrics 28 and 30 will be locked in position. A second link 178 connects the lower extremity of the control lever 156 with the upper end of an arm 180 which is carried upon a shaft 182. This shaft 182 also carries an arm 184 and an arm 186. The outer extremity of the arm 184 carries an idler 188 and the outer extremity of the arm 186 is connected to a brake-rod 190. This brake-rod 190 is pivotally connected to a brake-shoe 192 which is adapted to operatively engage a brake-drum 194. Thus, when the control lever 156 occupies the position as shown, the idler 188 will be forced into frictional engagement with a drive belt 196 and the brake-shoe 192 will be positioned out of engagement with the brake-drum 194. However, when the lever 156 is swung to the left, Figure 1, the idler is released from the belt and the brake-shoe is carried into engagement with the drum so as to cause the instantaneous stopping of the machine. The brake-drum 194 is connected to a series of driving gears shown in Figures 2 and 4 and hence when the brake-shoe is applied the actuation of the entire mechanism is immediately arrested.

From the foregoing description it will be apparent that my invention contemplates the provision of a woodworking machine which presents numerous advantages and improvements over other types of woodworking machines heretofore employed. In the operation of the machine, power is applied from any suitable source to a main drive shaft 198 which carries a plurality of driving pulleys 200, 202 and 204 as clearly shown in Figures 1 and 3. Rotation is imparted to the planer heads 134 and 140 by means of suitable belts connected with the pulleys carried by the drive shaft 198 and power is transmitted to the feed rolls 36 through the agency of the belt 196 which is interposed between a pulley mounted upon the brake-drum shaft and the pulley 200 carried by the drive shaft. This rotation is imparted to the feed rolls when the lever 156 is moved to the right, in which instance the idler 188 is moved into engagement with the belt 196 and the brake-shoe 192 is disengaged from the drum 194. The work is positioned beneath the friction roll 52 and is introduced between the first feed roll 36 and the embossing die 54. As the lever 56 is moved to the right, Figure 1, said first feed roll is elevated so as to carry the work into engagement with the embossing die. The rotation of the feed roll causes the work to be advanced from the position beneath the embossing die into a position between the pressure bar or frame 74 and the vertically adjustable straightening roll 76. From this point the work is advanced into engagement with the subsequent feed rolls and beneath the rolls 80 and 84. Then the work passes between the side embossing dies 124 and is subsequently planed, first by the smaller planer head 134 and then by the larger head 140. Then the work passes between the three straightening rollers 148 and is finally advanced through the sand-blasting mechanism 154. In some instances it may be desirable to impart an initial advancing stroke to the work in order to insure the proper engagement of the embossing die 54 therewith. To accomplish this I provide an auxiliary operating handle or lever

206 which extends outwardly from a casing 208 mounted at the outer extremity of the shaft 56. Within this casing 208 is a suitable pawl and ratchet mechanism 210, Figure 5, which serves to enable the operator to impart an initial partial rotation to the shaft 56 and consequently to the embossing die 54.

By means of my improved woodworking apparatus work such as strips of molding and the like may be embossed without the slightest possibility of the work becoming distorted or bent. In other words, I provide improved straightening means which positively counteract any tendency for distortion which results from the engagement of the hot embossing die with the work. The feed rolls being provided with peripheral teeth or configurations, imbed themselves within the work so as to counteract the above mentioned bending tendency of the embossing die. By having the rolls and pressure bars mounted upon a unitary and vertically adjustable frame, I am able to produce a very practical arrangement. By means of this arrangement all of the super-structure may be removed when desired with a minimum amount of effort on the part of an operator. The manner in which I employ a plurality of independently adjustable planer heads represents a decided improvement over woodworking devices which have heretofore been used. Treating the embossed molding to a sand-blasting operation completely removes any scorches and applies a very attractive, smooth, satinized finish to the product. The novel arrangement of the side embossing dies enables double as well as single moldings to be treated in a single operation and hence makes for acceleration in production. The improved control mechanism for actuating the frame bed which supports the feed rolls enables the machine to be instantaneously stopped and the work instantaneously released. It would also be noted that to facilitate access to the larger rotary planer 140, I pivotally mount a frame 212 which supports the rolls 148. This frame 212 is held upright by means of suitable bracket arms 214 and when it is desirable the bracket arms 214 may be detached and the frame 212 swung to the left, Figure 4, so as to expose the planar mechanism.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In woodworking apparatus of the class described, an embossing die, means for feeding work tangentially of said die, and a sand-blasting mechanism positioned in the path of and adapted to receive work advanced from the embossing die so as to apply a satinized finish to the embossed work.

2. The method of forming strips of wood such as molding material which consists in advancing the strip along a predetermined path, embossing the same during its advancement, and then applying a satinized finish to the embossed portion of the strip.

3. The method of forming strips of wood such as molding material which consists in advancing the strip along a predetermined path, embossing said strip during its advancement, and then treating said embossed portion to a blast of sand so as to apply a satinized finish to the strip.

4. The method of forming strips of wood such as molding material which consists in advancing a strip along a predetermined path, embossing said strip during its advancement by means of heat and pressure, and then treating said embossed portion with a blast of sand so as to remove scorched portions and applying a satinized finish to the work.

5. The method of treating strips of wood such as moulding material which consists in advancing a strip along a predetermined path, embossing said strip during its advancement by feeding the strip past an embossing die, and contemporaneously subjecting the embossed strip to a blast of sand as it is moving in the above mentioned predetermined path.

6. The method of treating strips of wood such as moulding material which consists in advancing a strip along a predetermined substantially horizontal path against the underside of an embossing die, then against the surface of a side embossing die, and then subjecting the strip as it emerges from the side embossing die to a blast of sand so as to remove scorches which may be present on said strip, all of said steps being contemporaneously performed during the advancement of said strip.

WILLIAM H. FORSYTH.