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LUMBER POSITIONING MECHANISM

Filed March 24, 1931

6 Sheets-Sheet 1

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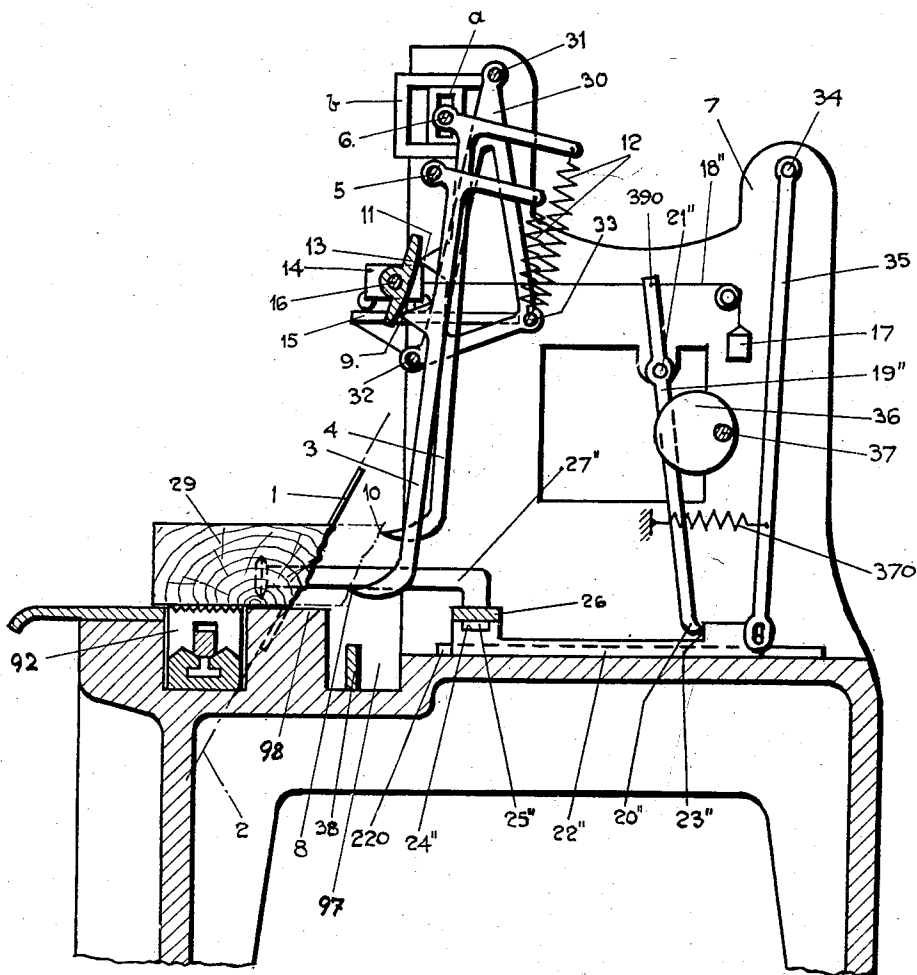
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LUMBER POSITIONING MECHANISM

Filed March 24, 1931

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Fig. 2.



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LUMBER POSITIONING MECHANISM

Filed March 24, 1931

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Fig. 3.

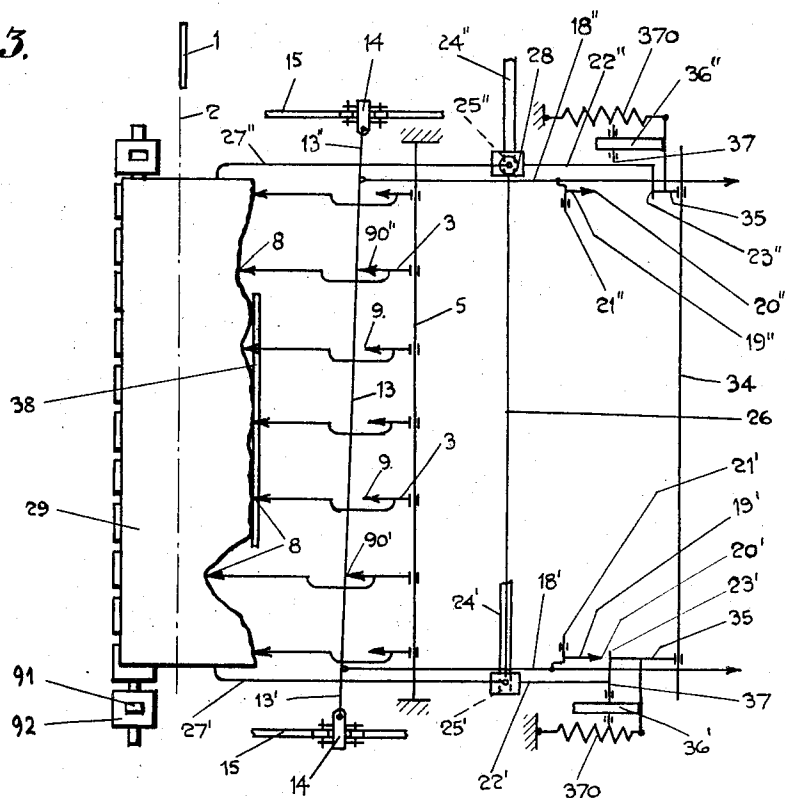
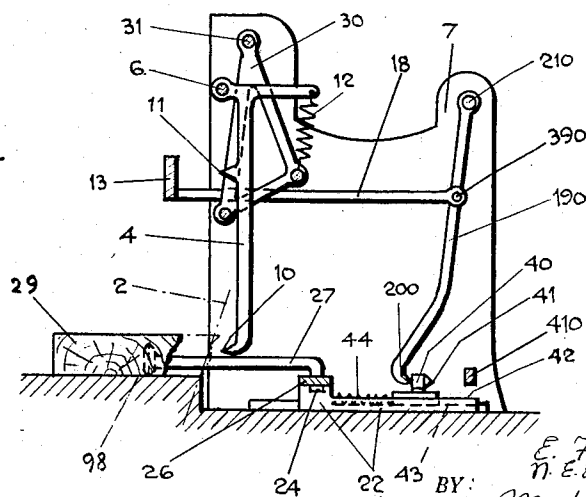


Fig. 5.



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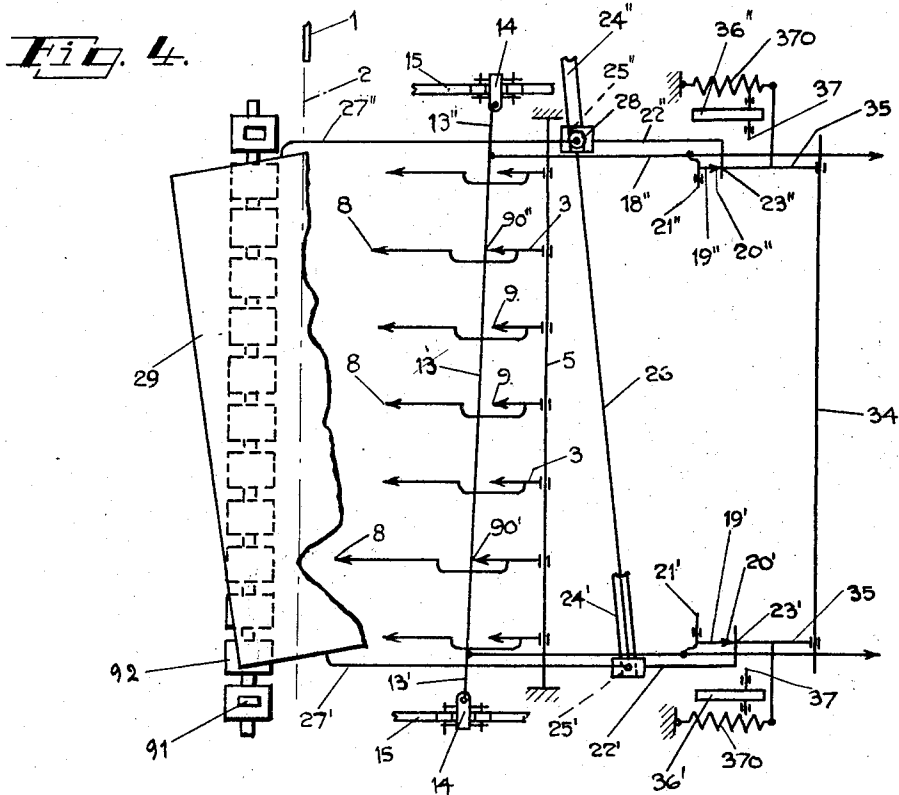
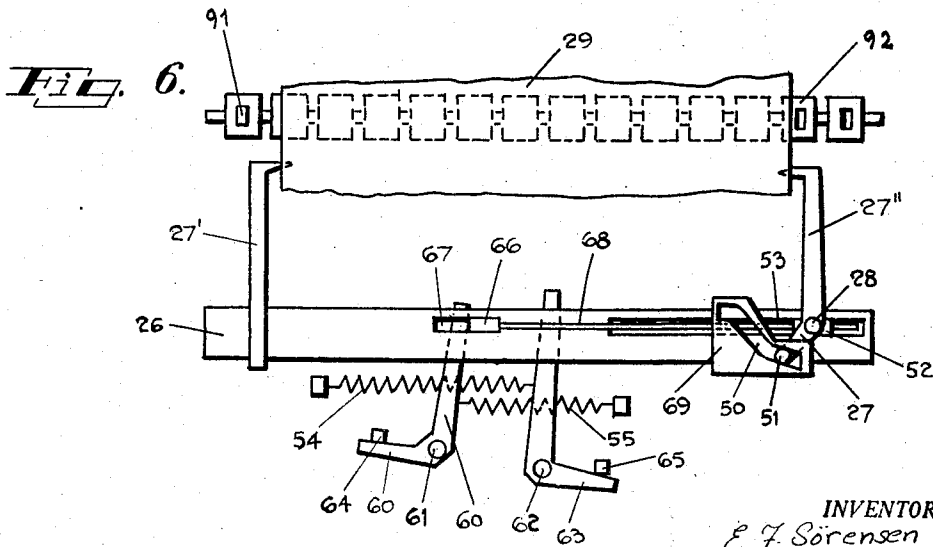
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1,824,381

LUMBER POSITIONING MECHANISM

Filed March 24, 1931

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Sept. 22, 1931.

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1,824,381

LUMBER POSITIONING MECHANISM

Filed March 24, 1931

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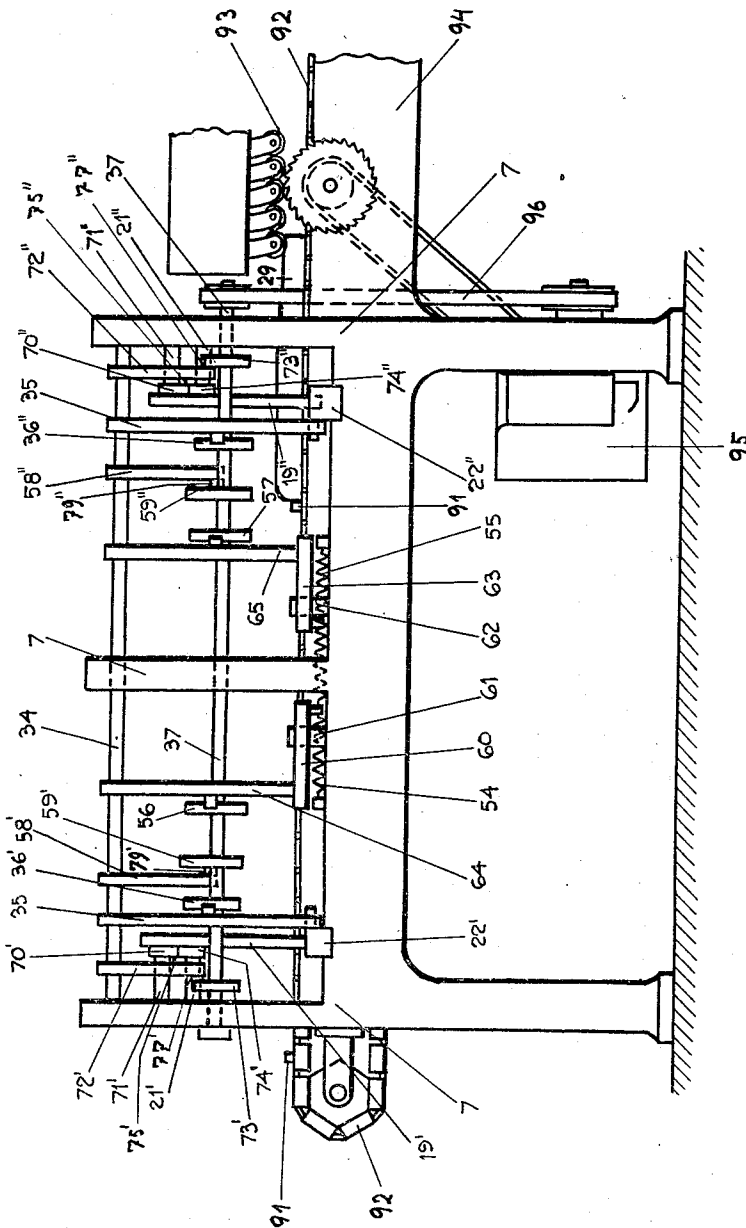


Fig. 7.

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LUMBER POSITIONING MECHANISM

Filed March 24, 1931

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Fig. 8.

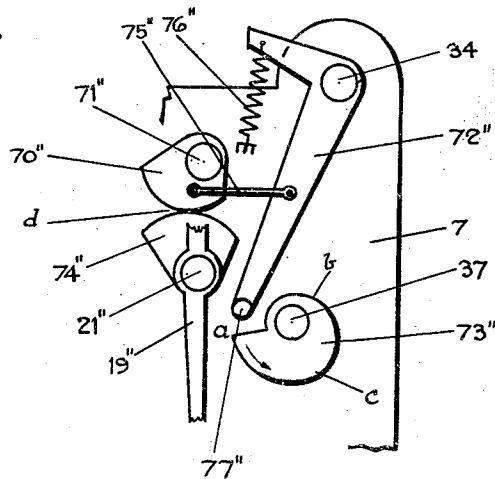
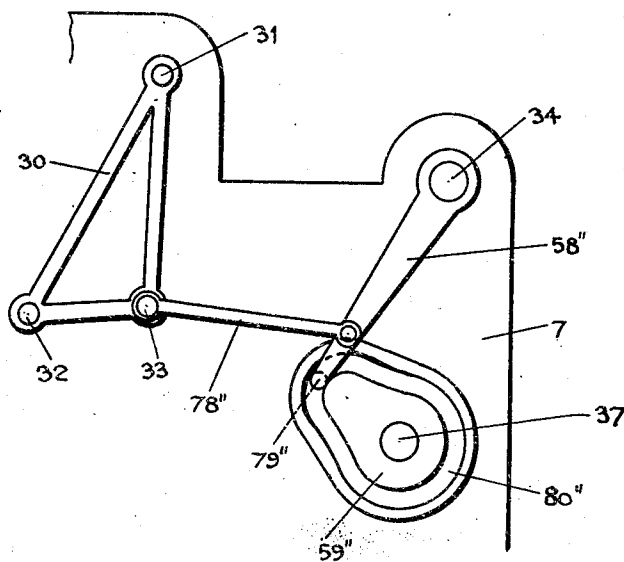


Fig. 9.



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LUMBER POSITIONING MECHANISM

Application filed March 24, 1931, Serial No. 524,968, and in Sweden September 27, 1929.

This invention refers to the manufacture of battens or boards and particularly to trimming of their edges. More especially this invention concerns an apparatus for adjusting the lumbers when supplied into an edging machine such that they when trued may be cut along their edges with the slightest possible waste of material.

The main object of this invention is to save timber when edging lumbers cut from trunks of trees with the natural rough outer surfaces present. Another object of this invention is to make the positioning of the battens or boards into the edging machine free from the degree of carefulness of the man in charge and to ensure automatically a wasteless truing of the lumber.

A further object of this invention is to increase the capacity of the edging machine by reducing the time and dead spaces between the supply therein of two consecutive specimens of blanks.

It is already proposed to bring about an effect similar to that aimed at by this invention, whereby mechanically operated selectors are brought into contact with the uneven edge of the lumber, and bring about a lateral shift of the lumber, or in another mechanism both a lateral shift and a change in inclination of the length of the blank to the plane of cut, the object aimed at being to set the lumber such that the shaping saw will cut it along a plane which touches the bottom of the deepest irregularity in the first half of its length, and the bottom of the deepest irregularity in the rear half of its length.

All mechanisms known for this object are such in which the adjustment of the lumber is effected directly by the selectors in dependence on the amplitude of their movement into contact with the cavities in the edge of the work piece; and the work piece must move during the operation of the selectors, either longitudinally in front of the selectors, the points of which slide along the edge of the work piece, and operate as they pass over the irregularities thereof, or laterally to or from the selectors, the selectors being pushed backwards by advancing work piece, or forced forward by springs against

the receding work piece, the variable depths of the irregular edge of the work piece limiting the amplitude of movement of the various selectors. There are no mechanisms known before, which can properly adjust the work piece to the slope of the direction of feed which causes the least waste of material. Experience has shown that it is difficult to secure satisfactory performance of such operations, especially on account of the extraordinarily short time allowable for the operation of the selectors.

The present invention solves the problem more perfectly by a modification of the method, by which ample time can be allowed for the operation of the mechanism, and this facilitates the operations and simplifies the mechanism by which the method is carried out.

If the irregularities in the edge of the work piece are fairly small, or have substantially the same depth throughout the entire length of the work piece, the lumber has to pass the saw or shaping tool substantially in the direction of its length; but if the irregularities are more extensive or more uneven, it is necessary to alter the direction of forward feed of the lumber and have it pass the saw or shaping tool in a somewhat oblique direction, in order that the plane of cut may touch the bottom of the two cavities, one on each side of the mid point which are deepest in proportion to their distance from the mid point; in other words said plane may touch the surface of the rough edge at two points, one point on each side of the middle point, and cut it nowhere. The expression "touch" here includes also such a case, where said plane of cut is directed towards a point at the one end of the lumber but fails to contact the actual surface of the edge for that reason only, because said point of contact is disposed at the very end of the work piece. The plane of economical trimming so defined is hereinafter called the tangential plane. The present invention has for its object mechanically to determine with greater precision and certainty than was formerly achieved not only the extent of lateral displacement of the work piece required but

also the proper slope of the direction of feed so that the plane of cut will be the best possible, i. e. will cause the least waste of material.

It is often desirable that the finished edge of the work piece shall not be square to the flat sides but more or less sloping, for instance in conformity with the natural taper of the cross-section of the lumber arising from the round surface of the trunk of tree from which the lumber is cut out. The adjustment of the work piece under such circumstances must take into account the angle of taper if the least waste of material is to result.

A characteristic of the method of the invention is the setting up beside the work piece of an inverted or relief facsimile of the cavities in the edge of the work piece, the actual cavities in the work piece being represented in the relief facsimile by prongs or projections which facsimile subsequently is used to govern the adjustment of the lumber. This inverted facsimile is conveniently used to determine the position of a ruler, which is caused to contact with the projecting prongs of the facsimile, or with auxiliary members the position of which is controlled by the facsimile, and the ruler in its turn determines or limits the lateral shift and inclination of the lumber.

The invention may be carried out in various ways which differ in their details, and by means of different mechanisms, and it is not possible to describe them all. However, all have the above mentioned common feature viz: that the cavities in the edge of the work pieces are mechanically reproduced in relief in a facsimile which is used for adjusting through the intermediary of a ruler.

The inverted facsimile of the work piece edge best can be set up by means of a plurality of arms or pins, so called selectors, which are movable laterally relatively to the work piece, and are caused to touch its edge, the extent of their movement being transmitted to other members which, when properly adjusted, constitute the facsimile. This co-action between workpiece and selectors can be achieved either by pushing each of the selectors per se against the work piece by springs or other yielding mechanical means, or by moving the work piece laterally against the selectors until they are all in touch with its edge.

The expression "facsimile" does not necessarily mean that the facsimile made up by the implements outside of the work piece is an exact copy of the actual work piece, but that the unevennesses of the edge of the work piece are to be found in the facsimile in such a way that the relative extensions of the cavities and the projections are identical notwithstanding on a somewhat different scale. Thus the length may be the same in the facsimile

as in the actual work piece, but the scale of the projections and cavities of the unevennesses may be smaller in the facsimile than in the actual work piece. Also it is not necessary to copy the whole length of the work piece, but some single points thereof may suffice. In the preferred form of the carrying out of this invention we limit ourselves to procure the facsimile of two points only of the edge of the actual work piece, viz. the bottom points of the two deepest cavities, one of each side of the middle point of said work piece edge.

The invention can be carried out in accordance with three somewhat diverse principal embodiments which all are substantially adequate in their main features.

1. The ruler is stationary and disposed in or parallel to the plane of cut. Adjustment is effected by pushing the work piece together with the inverted facsimile of the cavities in the edge of the work piece laterally against the ruler until two prongs of the inverted facsimile, one on each side of the middle point of the work piece—or other stops, the positions of which are controlled by the prongs—abut against the ruler as the result of which the work piece is set, if necessary at a slant in relation to the plane of cut, so that the cut will pass along the tangential plane when the work piece is fed forward in that position.

2. The ruler is made laterally adjustable to the cutting plane or to a plane parallel therewith. In this case the edge of the work piece will be imitated before it has reached the plane of cut whereupon the ruler is moved to the cutting plane or to the plane parallel therewith, and moves the facsimile and with it the work piece, also by pressing against the two most projecting prongs of the facsimile, one on each side of the middle point of the work piece, at the same time slanting the work piece (if required) in relation to the plane of cut until said plane coincides with the tangential plane.

The ruler is movable in the same plane in which the work piece is supplied into the machine or in a plane parallel thereto. The work piece is locked in that position in which it is to be imitated, and the ruler is brought into contact with the two most projecting prongs of the facsimile, one on each side of the middle point of the work piece, or in contact with two stops which previously have been adjusted in conformity with said two prongs; when so moving, the ruler adjusts two auxiliary members which are locked in that position into which they are brought when the ruler abuts on the two prongs or stops whereupon the work piece is moved laterally, and, if requisite, slant-wise so that the plane of cut will coincide with the tangential plane if the work piece is fed forward in that position.

In all the three above mentioned cases adjustment may be effected in relation to an-

other plane than the plane of cut if such other plane is so related to the plane of cut that the cut will pass along the tangential plane when the work piece is fed forward to the shaping tool. Adjustment in relation to another plane than the plane of cut is useful when the work pieces are supplied into the machine in a plane other than that of feed to the shaping tool. Adjustment in such another plane has the advantage that adjustment of one work piece can be effected immediately when the foregoing work piece has been started on its way to the shaping tool, whereby a work piece adjusted in any other plane has only to be moved a rather small distance to come in position to be fed forward to the shaping tool. By this scheme the work pieces can be fed forward in closer succession, and more time be allowed for the operation of the adjustment means, which imparts some mechanical advantages.

As already mentioned this invention can be performed in various ways, and the means suited for such a performance can be varied so extensively that it is not possible to describe them all. To facilitate the understanding of this invention one embodiment of a machine suited to accomplish the improved method is illustrated diagrammatically in the accompanying drawings, but we are anxious to declare that we do not want to limit ourselves to the use exclusively of a machine of the specified type shown in the drawings.

Fig. 1 shows an end view partly in section of a selector machine with a movable ruler and two rows of selectors at a certain instant in the adjusting operation.

Fig. 2 shows the same view when adjustment is finished and the work piece has been moved laterally into position for edge shaping.

Fig. 3 is a purely diagrammatic plan view of the same embodiment showing the position of the one row of selectors when the facsimile has been completed.

Fig. 4 is the same plan view as in Fig. 3 after the work piece has been adjusted and moved laterally to the cutting plane ready to be fed forward to the shaping tool.

Fig. 5 is an end view of the same character as Figs. 1 and 2 but showing on a decreased scale another embodiment of the invention with a movable ruler.

Fig. 6 is a plan view showing how the grippers lock the work piece to the cross-rod.

Fig. 7 is a side view of the machine showing how the eccentrics on the main driving shaft actuate the machine by intermediance of levers.

Fig. 8 is an end view showing the levers which limit the lateral displacement of the work piece, and means for fixing said levers in the position wanted.

Fig. 9 is an end view showing the triangular frame which controls the movement of the

selectors, and means for transferring the movement of the main driving shaft on to said triangular frame.

The third of the three principal embodiments of the invention mentioned above, viz. that with a movable ruler which adjusts auxiliary members, has proved to be the simplest to carry out mechanically; hence this embodiment only will be described here in detail with reference to the drawings.

In front of the shaping tool 1 and beside its plane of cut 2 are two rows of selectors 3, 4 consisting of levers pivoted on shafts 5, 6 respectively, parallel to the plane 2. Shaft 5 is below shaft 6, and the selectors 3 alternate with the selectors 4. The shafts 5 and 6 are supported at each end in the frame of the machine in such a way that the vertical and horizontal distance between the two shafts can be varied. To exemplify such an adjustment, the upper shaft 6 is shown supported in a vertical guide frame *a* which is movable within a horizontal guide frame *b*.

The selectors 3 and 4 have each two points 8, 9 and 10, 11 respectively so positioned that a straight line through the two points 8, 9 or 10, 11 of a selector intersects the centre line of the shaft 5 or 6 on which that selector is pivoted. The distance of the points 8, 9 of the lower selectors 3 from the centre line of their shaft 5 are proportional to the distances of the points 10, 11 of the upper selectors 4 from the centre line of their shaft 6; for instance the ratio of the distances from shaft 5 to points 8 and 9, and that of the distances from shaft 6 to points 10 and 11 may be as 3 to 1. Springs 12 tend to swing the selectors 3 and 4 toward the plane of cut 2.

Parallel to the shafts 5 and 6 is a ruler 13, the ends of which are supported in trucks 14, movable on horizontal rails 15 transversely of the plane 2. The ruler 13 is so connected to the truck 14 that it can pivot round its horizontal midline 16 or a line parallel thereto, as well as incline lengthwise to the plane of cut by causing the truck at the one end to move nearer to the plane of cut than the truck at the opposite end. The object of pivoting the ruler 13 about centre line 16 is to adjust the inclination of the ruler in conformity with the inclination of the plane of cut 2. The surface of the ruler 13 facing the selectors may be plane, when squared lumbers are to be dealt with, and convex for rough lumbers, the edges of which are portions of the natural rounded trunks of the trees.

Weights 17, springs or similar appliances pull upon the trucks 14. The movements of the trucks 14 against the pull of members 17 determine the throw of the ruler 13. A cord or pull rod 18', 18'' extends from each end 13', 13'' of the ruler 13 (or from each truck 14) to the one end 390 of a double-armed lever 19', 19''. At the opposite end said levers carry stops 20', 20'', and the levers are

pivoted in the frame 7 of the machine on pins 21', 21'' parallel to the plane of cut 2. The lengths of the two arms of the levers 19', 19'' have the same ratio as the aforesaid ratio of the distances from the two points of selectors 3 or 4 to the center of their respective shafts 5 or 6, viz. as mentioned 1 to 3.

In front of each lever 19', 19'' there is a slide 22', 22'' movable in guides 220 in the frame 7 at right angles to the line or plane of cut 2. Each slide has a stop 23', 23'' as also a slot or guide 24', 24'' at the end adjacent the plane 2 which slots or guides are parallel to that plane 2, and in said slots pins 25', 25'' move, supporting a cross-rod 26. Thus said cross-rod not only can be moved parallel to itself but also inclined in a horizontal plane to the line or plane of cut 2. The cross-rod 26 is provided with two gripping arms 27', 27'', the latter of which being pivoted on a vertical pin 28 fixed to a slide 52 movable lengthways in a guide 53 in cross-rod 26, see Fig. 6. A rod 68 is fixed in a bearing in slide 66 and screwed through slide 52 thereby allowing the adjustment of the distance from slide 66 to pin 28. Slide 66 is movable in a guide 67 in cross-rod 26. A stop on slide 66 projects under cross-rod 26. Two double-armed levers 60 and 63 are pivoted on vertical pins 61 and 62 on the frame 7 of the machine. The longer arms of these levers project under cross-rod 26 and actuate the movement of slide 66 by pressure on the abovesaid stop projecting from slide 66 below cross-rod 26. The shorter arms of levers 60 and 63 are connected to the lower ends of single levers 64 and 65 pivoted on shaft 34, see Fig. 7, and actuated by cams 56 and 57 mounted on shaft 37. Springs 54 and 55 are fixed with one end in the frame 7 and the other end in levers 63 and 60. The gripper 27'' is designed as a double-armed lever, the shorter arm 27' of which is provided with a roller 51 running in a slot 50 made in a flat piece of iron 69 fixed on cross-rod 26. Gripper 27' and plate 69 can be fixed on cross-rod 26 closer to or further from each other to suit the length of the work piece. The gripping arms 27', 27'' project towards the plane 2 and have hooks or points to engage and retain between them a work piece 29 supplied into the machine.

At each end of the machine there is a triangular frame 30 pivoted at its upper corner on a common shaft 31 parallel to plane 2. The lower corners of the frames 30 are joined by rods 32, 33, one of which, 32, limits the advance of the selectors 3 and 4 towards the plane 2 and withdraws the selectors from said plane after use, whilst the other rods 33 are attached to the lower ends of the springs 12.

Lengthways through the machine and parallel to the plane of cut 2 there is the main driving shaft 37 and intermediate shaft 34. Shaft 37 actuates the movements of the

various parts of the adjusting machine. For this purpose the following eccentrics are mounted on shaft 37 and corresponding levers pivotable on shaft 34. Said levers are provided with rollers or pins running against the peripheries of, or in grooves in the eccentrics which actuate them.

At each end of shaft 37, see Fig. 7, eccentrics 73', 73'' are mounted against which the rollers 77', 77'' on the longer arms of levers 72' and 72'', pivotably mounted on shaft 34, are pressed by springs 76', 76'' Fig. 8. The object of eccentrics 73', 73'' is to lock the levers 19', 19'' which limit the lateral movement of the work piece, since said levers by pullrods or cords 18', 18'' have been positioned in accordance with the inverted facsimile, and to keep the levers 19', 19'' locked in said position until the gripper 27'' has released the adjusted work piece. For this purpose eccentrics 73', 73'' are shaped along the lines shown by way of example in Fig. 8. From its highest point "a" the eccentric falls straight down to a smaller circle which keeps on to "b", where it starts rising until at "c" it has reached the same radius as at "a".

On sector a—b levers 19', 19'' are locked, and on sector c—a they are free. Levers 72', 72'' by rods 75', 75'' are pivotally connected with eccentrics 70', 70'' which eccentrics are pivotally mounted on pins 71', 71'' fixed on the frame 7 of the machine. Eccentrics 74', 74'' are fixed on levers 19', 19''. As long as rollers 77', 77'' are pressed against section c—a of eccentrics 73', 73'' by springs 76', 76'', eccentrics 70', 70'' are kept swung to the left, and consequently levers 19', 19'' can be swung into any position wanted. When shaft 37 (which revolves in the direction of the arrow) has turned eccentrics 73', 73'' so far that rollers 77', 77'' have passed by point "a", levers 72', 72'' are swung to the right until the edges of eccentrics 70', 70'' hit the edges of eccentrics 74', 74''. As the tangential point between these two eccentrics which in Fig. 8 is marked "d", is situated to the left of a line drawn through the centers of pins 21 and 71, levers 19', 19'' are locked against swinging to the left. There is no need of locking them for swinging to the right as there is no force this way.

Against the eccentrics 36' and 36'' levers 35 are kept pressed by springs 370 towards plane 2, Fig. 1. Said levers are pivotally connected with the rear end of each slide 22', 22'', and therefore push these slides in the same direction when the revolving of shaft 37 has positioned eccentrics 36', 36'' so as to allow such movement. When eccentrics 36', 36'' by further revolving of shaft 37 swing back levers 35 against the tension of springs 370 to the right, this motion causes slides 22', 22'' which carry cross-rod 26 to be pulled back also to their initial position.

Further eccentrics on shaft 37 are 59', 59'' against which levers 58', 58'' have rollers 79', 79'' running in grooves. Fig. 9 shows details of this co-action, and is taken in the moment when lever 58'' has swung its maximum to the left thus having caused frame 30 by means of link 78'' to swing to the limit of its movement to the left. That portion of groove 80'' which roller 79'' has reached in the position shown in Fig. 9 is for about 10 degrees shaped as a circle with the same centre as shaft 37. Whilst the roller passes these 10 degrees, frame 30 remains in the same position, and consequently also the selectors controlled by frame 30, which selectors form the inverted facsimile. As a consequence ruler 13 and levers 19', 19'' also keep their position during this time, whilst the levers 19', 19'' are locked in their momentary positions as above described.

On the left half in Fig. 7 of shaft 37 there is mounted also an eccentric 56 against which a lever 64 which is pivotally mounted on shaft 34, is pressed by the spring 55 which tends to swing the double armed lever 60, see Fig. 6, pivotally mounted on pin 61 on frame 7 of the machine, to the right, the shorter arm of which lever acts on the lower end of lever 64. The shape of eccentric 56 is not specifically shown in the drawings, as it is shaped on the same principles as eccentric 73'' in Fig. 8, the only difference being that sections *a-b* and *b-c* together take only about 90 degrees of the circle. When eccentric 56 has revolved so far that the end roller of lever 64 has passed by the slopping point on said eccentric, nothing prevents the end of levers 64 from swinging forward against plane 2, Figs. 6 and 7. Lever 60, consequently, is released, and the tension of spring 55 swings said lever to the right, whereby its longer arm forces slide 66 the same way until slide 52 also by the intermediality of rod 68 is forced so far to the right that gripper 27'', actuated by the roller 51 which is fixed on its shorter arm and runs in groove 50, has been swung so far to the left that the sharp point at the end of its longer arm has entered into the end of the work piece.

The angle of the right hand portion of groove 50 with guide 53 must be less than the friction angle, say less than some 13 degrees. Consequently any pressure from the work piece onto the end of the gripper 27'', the point of which has entered into the end of the work piece, cannot force the gripper 27'' to swing to the right, and thus the work piece is rigidly secured to cross-rod 26 between the gripping arms 27' and 27''. The eccentricity of eccentric 56 then on further revolving of shaft 37 causes lever 64 to swing back from the plane of cut 2. The lower end of lever 64 thereby forces lever 60 to swing to the left against the tension of spring 55, the longer

arm of lever 60 leaving its contact with slide 66.

On the right half in Fig. 7 of shaft 37 there is mounted an eccentric 57 acting on lever 65, which is pivotally mounted on shaft 34, in the same way as eccentric 56 actuates lever 64 described above. Eccentric 57 is shaped just as eccentric 56 with the exception that the former has a larger eccentricity to allow a more extensive movement of lever 65. Lever 65 actuates lever 63 with its spring 55 in the same way as lever 64 actuates lever 60, however, allowing lever 63 a more extensive movement. The larger amplitude necessary for lever 63 is due to lever 63 having for its object firstly to release the work piece by forcing gripper 27'' to swing back to the right in the proper moment, and secondly to pull cross-rod 26 back endways to the left into its initial position.

Fig. 6 shows the position of the various means for locking the work piece to cross-rod 26 just as this locking has been performed. When the work piece has been adjusted, and the catch 91 on the feeding chain 92 engages the work piece and feeds it towards the shaping tool 1, the work piece must still be kept locked to cross-rod 26 until the work piece is seized by the press rollers 93 of the edging machine 94 which then undertake the task of keeping the work piece in position. Then at first the work piece is released from cross-rod 26 by gripper 27'' being forced to swing back. Consequently cross-rod 26 is caused to follow this forward motion of the work piece which movement is allowed by means of elongation of the slot or guides 24', 24'' as diagrammatically indicated in Figs. 3 and 4 by the irregular parallel lines 24' and 24''. Thus before gripper 27'' is swung back, cross-rod 26 and slide 66 have moved to the right so that slide 66 is quite close to the longer arm of lever 63 which lever as described before is mounted on pin 62, fixed to the machine frame 7, and consequently it does not follow the forward movement of cross-rod 26. When eccentric 57 has revolved so far that lever 65 can swing forward towards plane 2, lever 63 is released and swung to the left by the tension of spring 54. Lever 60 as described then has already been forced to swing back to the left. When lever 63 swings to the left, its longer arm hits the stop of slide 66 which projects below cross-rod 26, and forces slide 66 to the left. By intermediality of rod 68 slide 53 which carries the pivot for gripper 27'' also is forced to the left. Roller 51 which runs in slot 50, hereby causes gripper 27'' to swing back to the right thus releasing the work piece.

When slide 66 has been forced to the left in guide 67 as far as it can, the continuous swinging to the left of lever 63 forces cross-rod 26 endways back into its initial position.

tion. As soon as the swing of lever 63 to the left is performed eccentric 57 by means of levers 65 swings it back again to the right till it reaches the position shown in Fig. 6.

The eccentrics mounted on main shaft 37 as above described are positioned in such a way that they act in the following order:

1. Eccentric 56 releases lever 64 which in its turn releases lever 60 which causes gripper 27'' to swing to the left and grip the work piece.

2. Eccentrics 59', 59'' by means of levers 58', 58'' swing frame 30 forward towards the plane 2 and keep it there during the time shaft 37 takes to revolve about 10 degrees, and then swing it back into its initial position.

3. Eccentrics 73', 73'' release levers 72', 72'' while frame 30, during the 10 degrees of shaft's 37 revolution, is kept in its most forward position, and thus lock arms 19', 19''.

4. Eccentrics 36', 36'' release levers 35 in the moment as frame 30 is brought back into its initial position.

5. Eccentric 57 releases lever 65 as soon as the work piece is caught by the press rollers 93 of the edging machine 94, thus releasing the work piece from cross-rod 26.

In the example shown in the drawings, the selector machine is combined with an edging machine 94 of a known type (see Fig. 7) in which machine the work piece is fed forwards to the shaping tool 1 by a link chain 92 with disappearing jaws or catches 91. Said link chain 92 is driven from the driving motor 95 of the edging machine, and the main shaft 37 must be driven by the same motor as exemplified by chain 96 in Fig. 7, or by adequate means which make the shaft 37 revolve in synchronism with the operation of the link chain 92 so that shaft 37 makes one revolution for each operative catch 91. There will thus be synchronism in the operation of the edging machine and the adjusting mechanism, so that a work piece will be adjusted ready for feeding forwards to shaping tool each time, one of the disappearing catches is made operative to catch and feed a work piece.

The operation of the adjusting mechanism is as follows: The lumber 29 is pushed into the machine between the open gripping arms 27', 27'' until the edge to be shaped comes into contact with a ruler 38, see Fig. 1, parallel to the line or plane of cut 2 and adapted to be lowered into a groove 97 in the machine table 98, see Fig. 2, when the selectors 3, 4 are ready to swing out to perform their task. The ruler 38 is well beyond the plane 2 so that the edge of the lumber to be shaped must pass beyond that plane before it contacts with the ruler. If the adjusting mechanism and edging machine operate normally, there will be no catches 91 in the feed conveyor 92 in operative position ready to engage the work piece

in this position but the movable gripping arm 27'' actuated, as described, from the shaft 37 is now caused to grip the lumber between itself and arm 27' and hold it stationary relatively to the cross-rod 26.

The continuous revolution of shaft 37 causes frames 30 to swing to the left in Figs. 1 and 2, springs 12 thus forcing the selectors 3, 4 towards the work piece until they are stopped by their lower points 8, 10 abutting against the lower respectively upper portion of the edge of the work piece. During this motion, the upper points 9, 11 of the selectors are in contact with the ruler 13 and push it to the left against the resistance of the two weights (or springs) 17. The mounting of the ruler enables it to assume an inclined position in relation to the line or plane of cut 2 corresponding to the tangential plane of the edge of the work piece, because the ruler will be pushed to the left as long as any of the selectors has not yet been stopped by the work piece, that is, has not reached the bottom of the cavity in the edge of the work piece which lies in front of said stopper. In such a position of the selectors in which points 8 and/or 10 of two selectors contact the bottom of the two deepest cavities in the edge of the work piece, the ruler 13 will be moved because the upper points 9, 11 of the two selectors most deflected proportionally to their distance from the mid point of the work piece, control the position of the ruler 13. Fig. 3 shows such displacement of the ruler 13, those points of the selectors which control the displacement being designated 90' and 90'' respectively. In the Figures 2 and 3 the cavities in the edge of the work piece intentionally are designed rather exaggeratedly, but that is done with the object to clearly demonstrate the operation of the selectors. Through the cords or pull rods 18' and 18'' the ruler 13 tilts the levers 19', 19'' so that their lower ends 20', 20'' move to the right, the throw of said ends being proportional to the displacement of the corresponding ends of the ruler 13.

As soon as frame 30 has swung its maximum towards plane of cut, making all selectors abut with their lower points against the edge of the work piece, thus keeping the inverted facsimile formed by their upper points as well as levers 19', 19'' positioned and controlled by them through the intermediane of ruler, stationary levers 19', 19'' are locked in their actual position as described before and shown in Fig. 8 or by any other suitable means. The continuous revolution of shaft 37 causes eccentrics 59', 59'' through the intermediane of levers 58', 58'' to swing the frames 30, and with them the selectors in direction from plane 2 into their initial position after which the eccentrics 36 on the shaft 37 release levers 35, and the springs 370 are free to pull the levers with the slides 22', 22''

to the left until the stops 23', 23'' on said slides make contact with the corresponding lever ends 20', 20''. Each of the slides 22', 22'' will be moved more or less to the left until its stops 23' or 23'' contact with the lever end 20' or 20'', and consequently the cross-rod 26 may be inclined to the plane 2, and the gripping arms 27', 27'' then will similarly incline the work piece 29, so that said work piece is moved laterally backwards to the plane of cut and inclined until the tangential plane of the edge of the work piece coincides with the cutting plane 2. Fig. 4 illustrates this position diagrammatically.

The gripping arms 27', 27'' retain their hold of the work piece until the next operative catch 91 on the feeding chain 92 engages the work piece and feeds it towards the shaping tool 1 when it is seized by the press rollers 93 of the edging machine which feed it past the tool 1. At this moment, the lever 63 is released, and gripping arm 27'' is opened as already described, releasing the work piece which now will continue its forward motion without change in its lateral position. Until the arm 27'' is free of the work piece, the cross-rod 26 is caused to follow the forward motion of the work piece, the movement being permitted by elongation of the slots or guides 24', 24'' as diagrammatically indicated in Figs. 3 and 4. Having released the work piece, the cross-rod 26 is pushed back endwise into its initial position by lever 63 as described, the levers 25 are pushed backwards by the eccentrics 36 taking with them the slides 22', 22'' with the cross-rod 26, the levers 19', 19'' are released, the ruler 13 moved to the right by the weights 17, and the machine is ready to receive the next work piece.

The embodiment of the invention now described and shown will be used when the work piece is pushed into the machine so far that the edge to be shaped passes the plane of cut 2, so that the work piece must be pushed backwards when the adjustment of its position has been performed.

Fig. 5 illustrates another embodiment of the invention in which the work piece is stopped before its edge reaches the plane of cut, so that it must be pulled further into the machine when the adjustment of its position has otherwise been completed. To make the drawing more simple only one row of selectors is shown in this embodiment, though here also two such rows can be used as in the former embodiment. In respect of the selectors 4 (and 3 if two rows are present), the frame 30, ruler 13, pull-rods 18, cross-rod 26, slots or guides 24 and gripping arm 27, the present embodiment does not differ from that already described. The principal difference is that the levers 190 corresponding with the levers 19 in the previous embodiment are pivoted at their ends on pins 210. The pull-rods 18 act upon their respective lever 190 at in-

termediate points 390, and the lever ends 200 co-act with projections 40' of slides 42 on the side remote from the work piece, said projections having points 41 in line with pivots 390 and 210. The slides 42 move in guides 43 in the slides 22 extending towards the work piece 29, and springs 44 tend to pull the slides 22 towards the work piece, and so keep projections 40 in contact with the ends 200 of the levers 190.

By means not shown, as for instance by levers actuated by eccentrics mounted on driving shaft 37, the slide 42 can be locked in any desired position on slide 22 in similar way as described for the previous embodiment.

The distances between the members 41—210 and 390—210 are proportional to the distances between the selector points 10, 11 and the centre of their shaft 6 with the result that the points 41 will follow exactly the throws of the selectors as transmitted to the ruler 13. The straight line which joins the two points 41 after deflection of the selectors will thus be parallel to the straight line that joins the two selector points 10 which touch the tangential plane supposed to go in the edge of the work piece. Immediately these deepest cavities have been measured and thus the largest deflection of the points 41 reached, the slides 42 are locked to their respective slides 22, the selectors 4 are removed from the work piece by the frame 30, and the work piece 29 is pulled laterally by the slides 22 further forward to the plane of cut 2 until the points 41 contact with a stationary ruler 410 or similar member parallel to the line or plane of cut and disposed at a certain distance from said plane. When the points 41 are stopped by the ruler 410, the tangential plane in the edge of the work piece has been moved so far to the right (in Fig. 5) that it coincides with the plane 2, and the work piece is in due position for shaping.

As already mentioned, various modifications may be made in the constructional details which cannot be shown nor mentioned here. Our invention includes all the features which are set forth in the accompanying claims, and the previous description with drawings has for its single object to exemplify how our invention can be materialized.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and means for causing them to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the latter series by the former

series that they define an inverted facsimile of the contour registered by the selectors, and means for positioning said work piece with reference to said trimming plane, controlled
5 by members of the second series.

2. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and
10 means for causing them to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the latter series by the former series that they define an inverted facsimile
15 of the contour registered by the selectors, and work piece positioning means controlled by the members of the second series operable to laterally shift and incline the work piece with reference to the trimming plane.

3. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and means for causing them to adapt themselves
25 to a contour of a work piece, a second series of members and means for so controlling the position of the latter series by the former series that they define an inverted facsimile of the contour registered by the selectors, a
30 displaceable member moved according to the positioning of the second series of members, and work piece positioning means controlled by said displaceable member for positioning the work piece with reference to the trimming
35 plane.

4. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and
40 means for causing them to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the latter series by the former series that they define an inverted facsimile
45 of the contour registered by the selectors, a displaceable member moved laterally and inclined, with respect to the trimming plane, according to the positioning of the second series of members, and work piece positioning
50 means controlled by said displaceable member and operable to laterally shift and incline the work piece with reference to the trimming plane and in accordance with the lateral shift and inclination of the displaceable
55 member.

5. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising means for initially positioning
60 a work piece in the mechanism, a series of selectors and means for causing them to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the
65 latter series by the former series that they

define an inverted facsimile of the contour registered by the selectors, and means for positioning said work piece with reference to said trimming plane, controlled by members of the second series.

6. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a shiftable gripping device for holding a work piece, a series of
70 selectors and means for causing them to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted
75 facsimile of the contour registered by the selectors, and means for positioning the gripping device and the work piece engaged thereby with reference to said trimming plane, controlled by members of the second
80 series.

7. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and
85 means for causing said selectors to adapt themselves to a contour of a work piece, said selectors including work piece engaging members and a series of members adapted to define an inverted facsimile of the contour
90 registered by the selectors, and means for positioning said work piece with reference to said trimming plane, controlled by the second mentioned members.

8. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and
95 means for causing said selectors to adapt themselves to a contour of a work piece, said selectors including work piece engaging members and a series of members adapted to define an inverted facsimile of the contour registered by the selectors, a displaceable
100 member moved according to the positioning of the second mentioned members, and work piece positioning means controlled by said displaceable member for positioning the work piece with reference to the trimming plane.
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9. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a series of selectors and
110 means for causing said selectors to adapt themselves to a contour of a work piece, said selectors including work piece engaging members and a series of members adapted to define an inverted facsimile of the contour registered by the selectors, a member movable
115 laterally of and at an inclination with respect to the trimming plane according to the positioning of the second mentioned members, and work piece positioning means controlled by said laterally movable member for
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positioning the work piece laterally of and at an inclination to the trimming plane.

10. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, and means for positioning the gripping device and work piece carried thereby with reference to said trimming plane, controlled by the second series of members.

11. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, adjustable stop members for limiting the movement of the gripping device, and means for positioning the stop members to arrest the movement of the gripping device and work piece carried thereby, controlled by the members of the second series.

12. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, adjustable stop members for limiting the movement of the gripper device and the work piece carried thereby, means for positioning the stop member in accordance with the positioning of the members of the second series, and means to shift the gripper device into engagement with the stop members to position the work piece with reference to said trimming plane.

13. A mechanism as claimed in claim 1, characterized in that said selectors are arranged in groups with the selectors of each group pivoted for movement about a common axis substantially parallel to said trimming plane.

14. A mechanism as claimed in claim 1, characterized in that said selectors are arranged in groups with the selectors of each group pivoted for movement about a common axis substantially parallel to said trimming plane, each selector having projections located at different points from the pivotal axis thereof, the distance between corresponding projections and the pivotal axis of the selector being the same throughout the selectors of the several groups.

15. A mechanism as claimed in claim 1, characterized in that said selectors are arranged in groups with the selectors of each group pivoted for movement about a common axis substantially parallel to said trimming plane, and means for mutually adjusting the selectors of the several groups.

16. A mechanism as claimed in claim 1, characterized in that said selectors are arranged in groups with the selectors of each group pivoted for movement about a common axis substantially parallel to said trimming plane, each selector having projections located at different points from the pivotal axis thereof, the distance between corresponding projections and the pivotal axis of the selector being the same throughout the selectors of the several groups, and means for mutually adjusting the selectors of the several groups vertically and horizontally.

17. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a plurality of groups of selectors and means for causing said selectors to adapt themselves to a contour of a work piece, the selectors of the several groups being adapted to engage the work piece at different points, and groups of members associated with the groups of selectors and means for controlling the position of the groups of members by the groups of selectors whereby they define an inverted facsimile of the contour registered by the selectors, and means common to and controlled by both groups of members for positioning said work piece with reference to said trimming plane.

18. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a plurality of groups of selectors and means for causing said selectors to adapt themselves to a contour of a work piece, the selectors of the several groups being adapted to engage the work piece at different points, and groups of members associated with the groups of selectors and means for controlling the position of the groups of members by the groups of selectors whereby they define an inverted facsimile of the contour registered by the selectors, and means common to and controlled by both groups of members for positioning said work piece with reference to said trimming plane, the

last mentioned means including a member actuated by the groups of members and having a configuration substantially corresponding with the configuration of the work piece prior to trimming thereof.

19. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a plurality of groups of selectors and means for causing said selectors to adapt themselves to a contour of a work piece, the selectors of the several groups being adapted to engage the work piece at different points, and groups of members associated with the groups of selectors and means for controlling the position of the groups of members by the groups of selectors whereby they define an inverted facsimile of the contour registered by the selectors, and means common to and controlled by both groups of members for positioning said work piece with reference to said trimming plane, said last mentioned means including a member engaged by the groups of members and adjustable to correspond with the configuration of the work piece.

20. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, adjustable stop members for limiting the movement of the gripper device and controlled by the second series of members, and means to secure the stop members in adjusted position following the positioning thereof.

21. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, means normally tending to move the gripper device and the work piece carried thereby, and stop members for limiting the movement of the gripper device and controlled by the second series of members.

22. Mechanism for governing the positioning of lumber for operation by trimming means having a predetermined trimming

plane, comprising a work piece gripping device movable laterally of and at an inclination with respect to the trimming plane, a series of selectors and means for causing the selectors to adapt themselves to a contour of a work piece, a second series of members and means for so controlling the position of the second series by the first series that they define an inverted facsimile of the contour registered by the selectors, means normally tending to move the gripper device and the work piece carried thereby, stop members for limiting the movement of the gripper device and controlled by the second series of members, and means normally holding the gripper device against movement and actuating to release the latter following positioning of the stop members.

In testimony whereof we have affixed our signatures.

EINAR F. SÖRENSEN.
NIELS E. E. SÖRENSEN.

CERTIFICATE OF CORRECTION.

Patent No. 1,824,381.

Granted September 22, 1931, to

EINAR F. SÖRENSEN ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 9, lines 73 and 91, claims 14 and 16, respectively, after the comma insert the words the proportion of; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 23rd day of February, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.