

D. M. ROSE.
WOODWORKING MACHINE.
APPLICATION FILED JULY 15, 1912.

1,095,233.

Patented May 5, 1914.

5 SHEETS—SHEET 1.

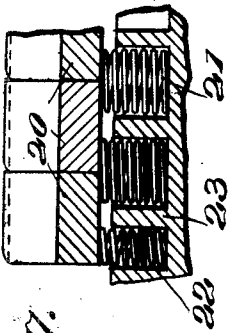


Fig. 7.

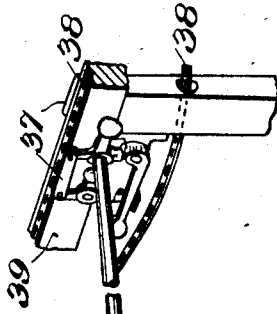


Fig. 6.

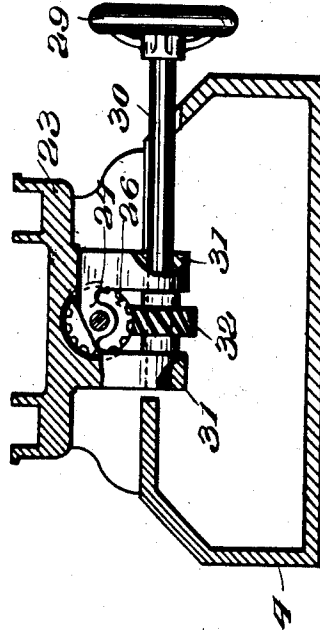
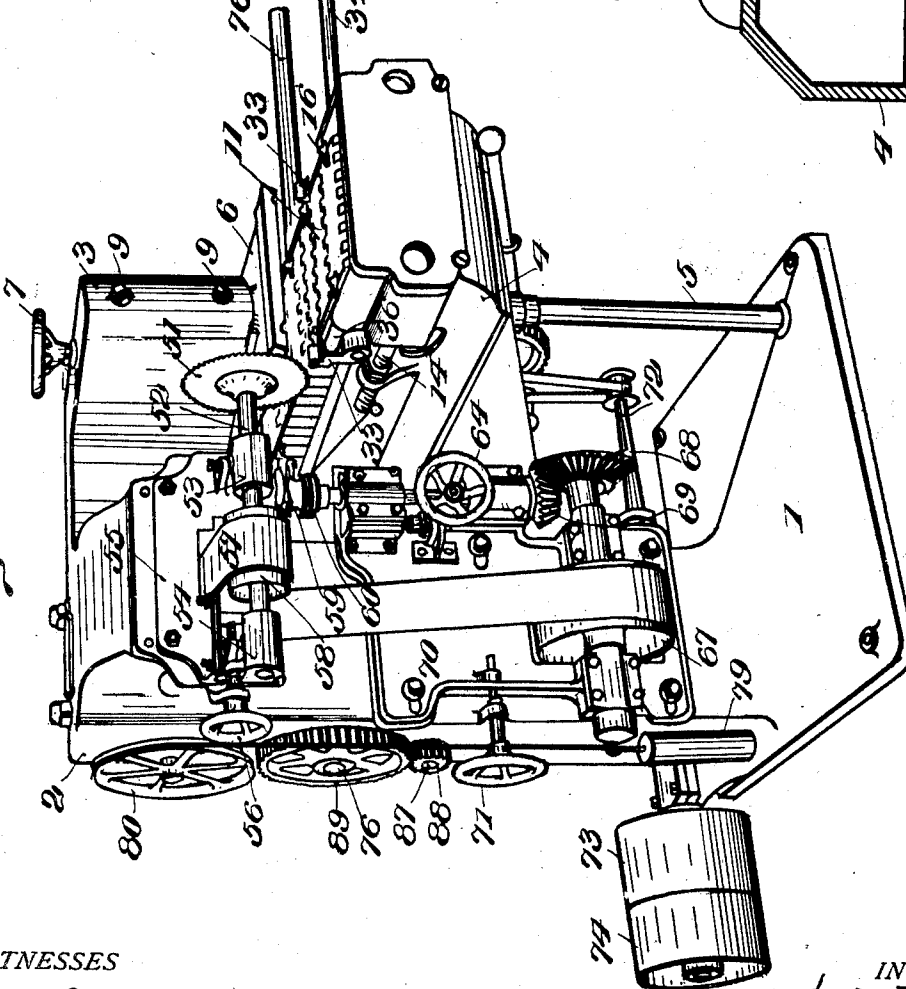


Fig. 1.



WITNESSES

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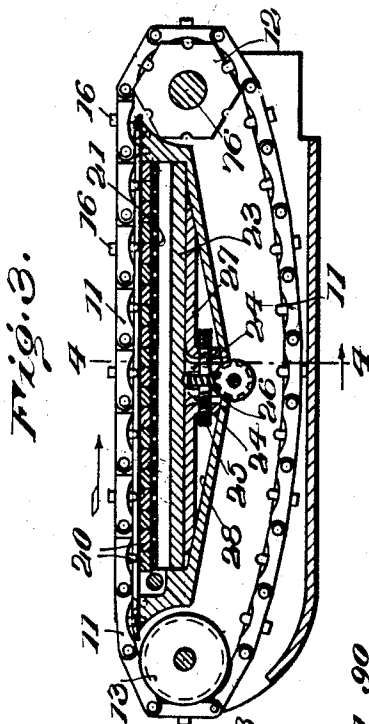
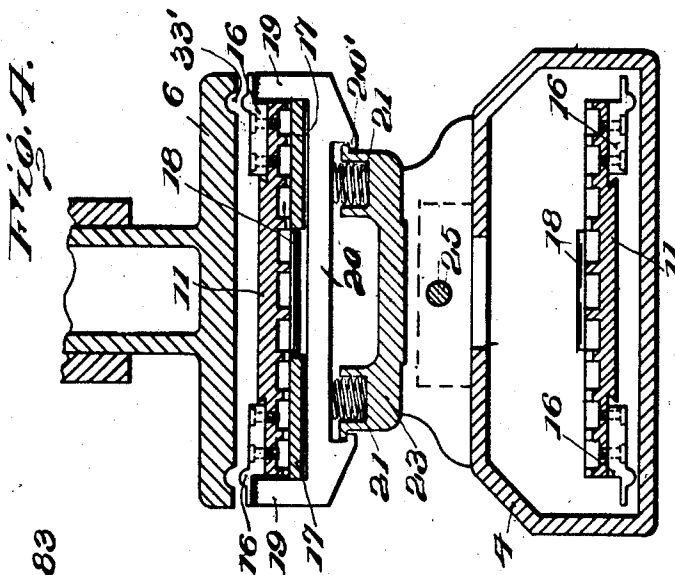
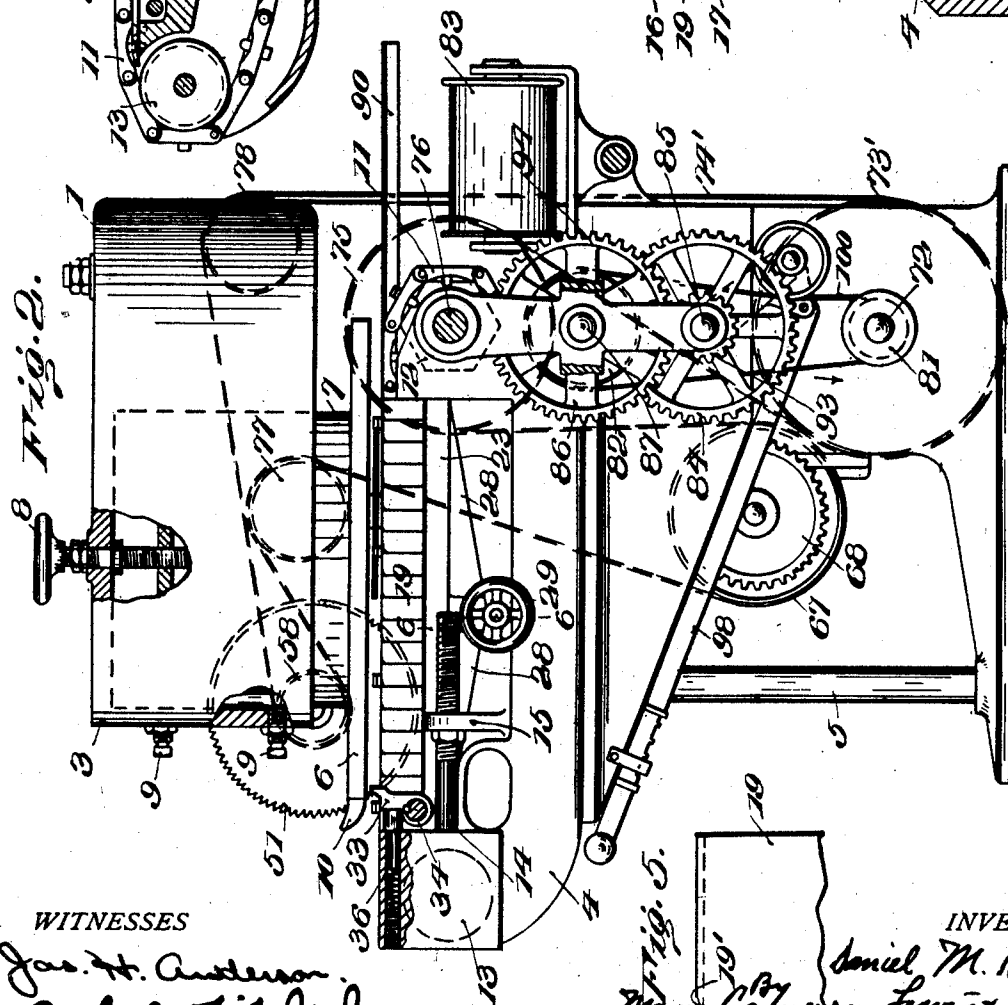
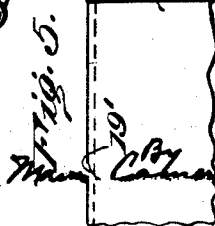
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5 SHEETS-SHEET 2.



WITNESSES

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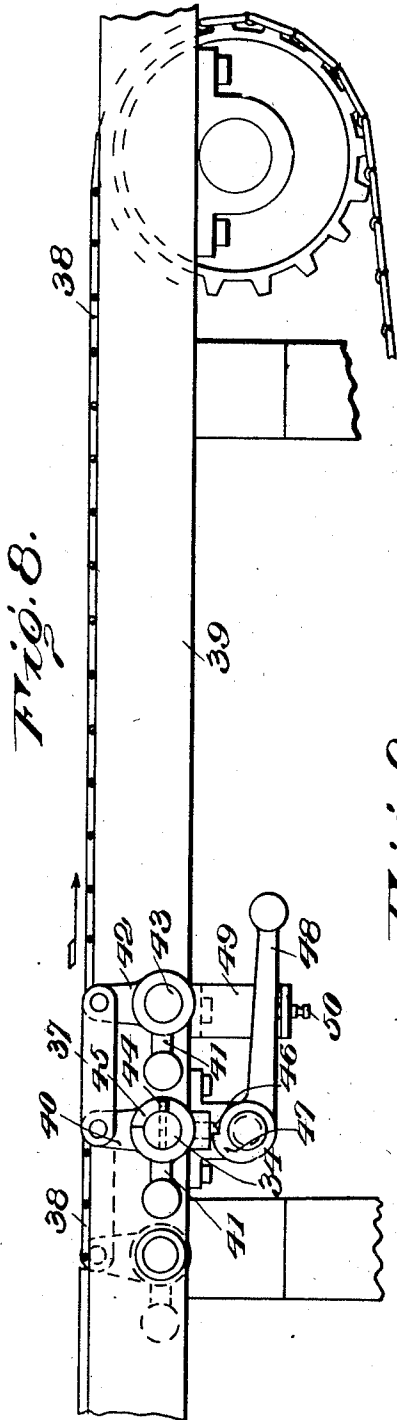
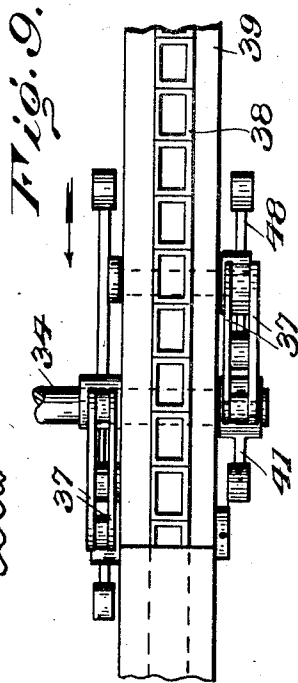
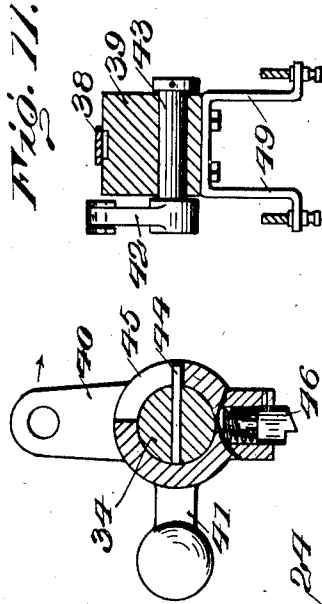
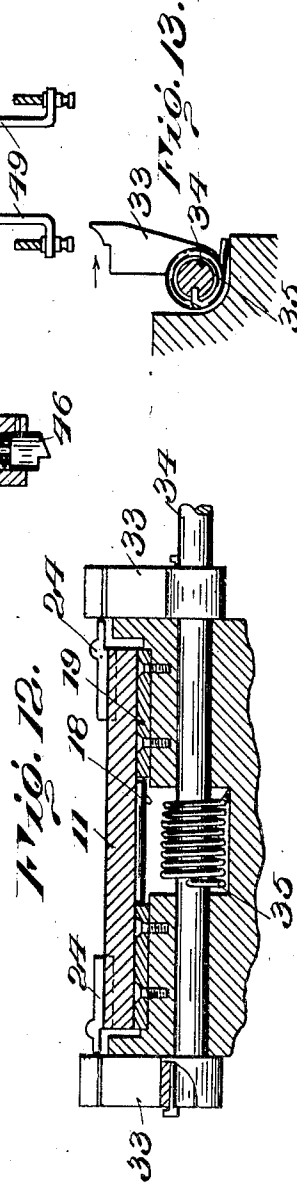
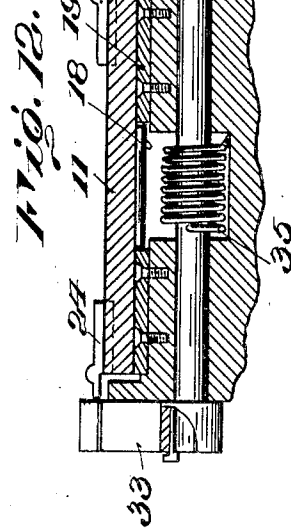
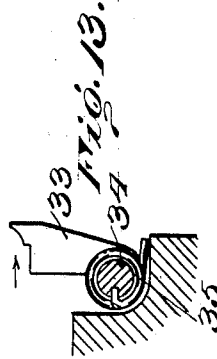
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5 SHEETS—SHEET 3.



WITNESSES

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5 SHEETS—SHEET 4.

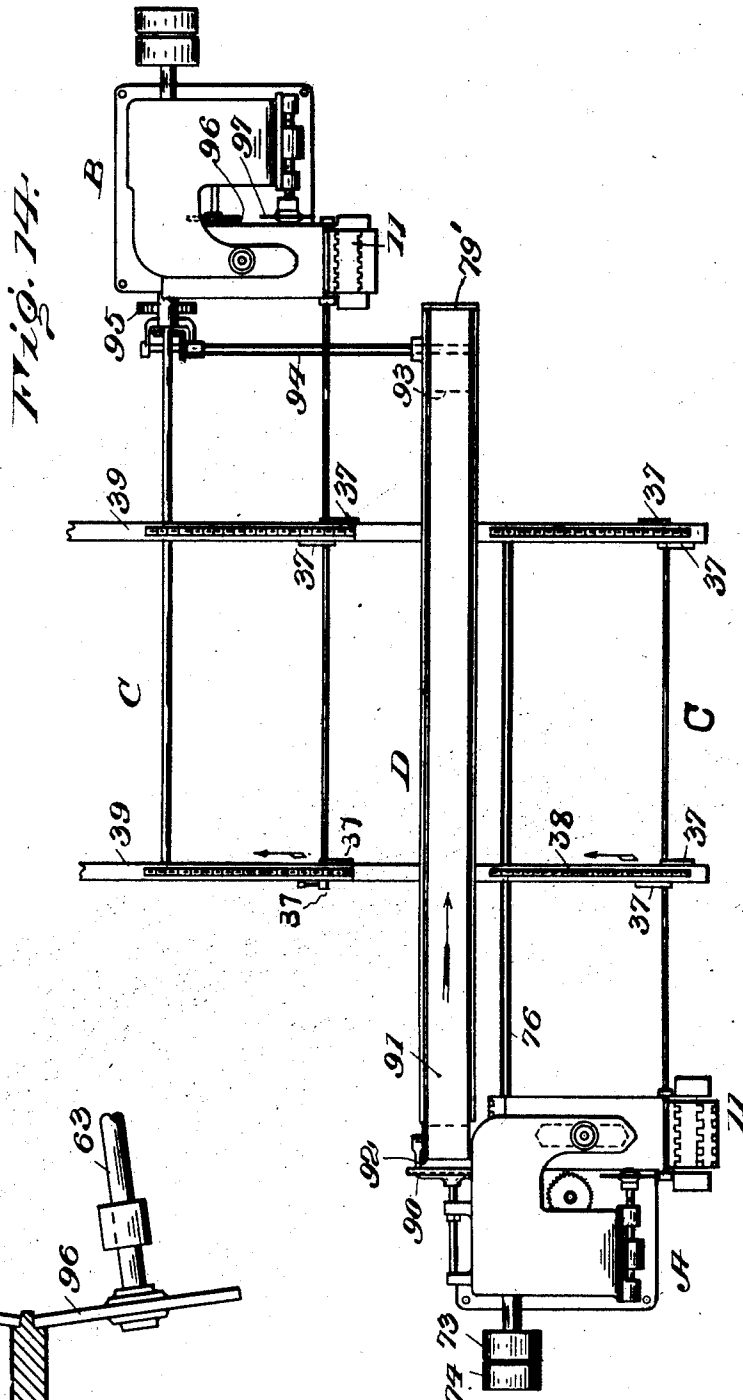
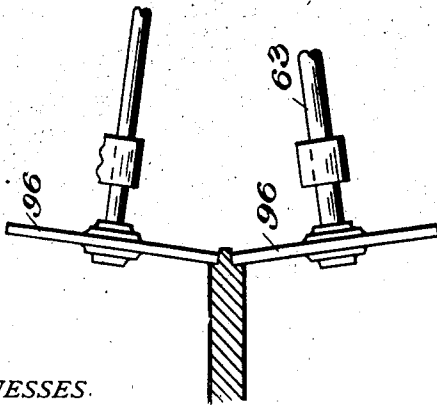


Fig. 15.



WITNESSES.

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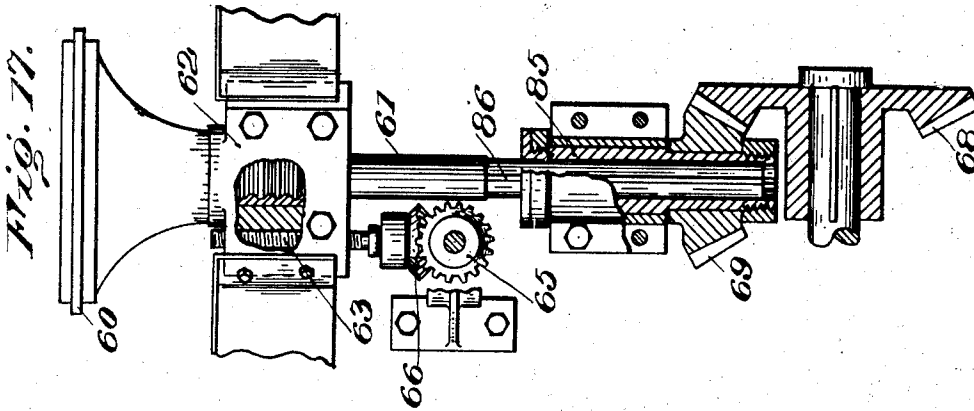
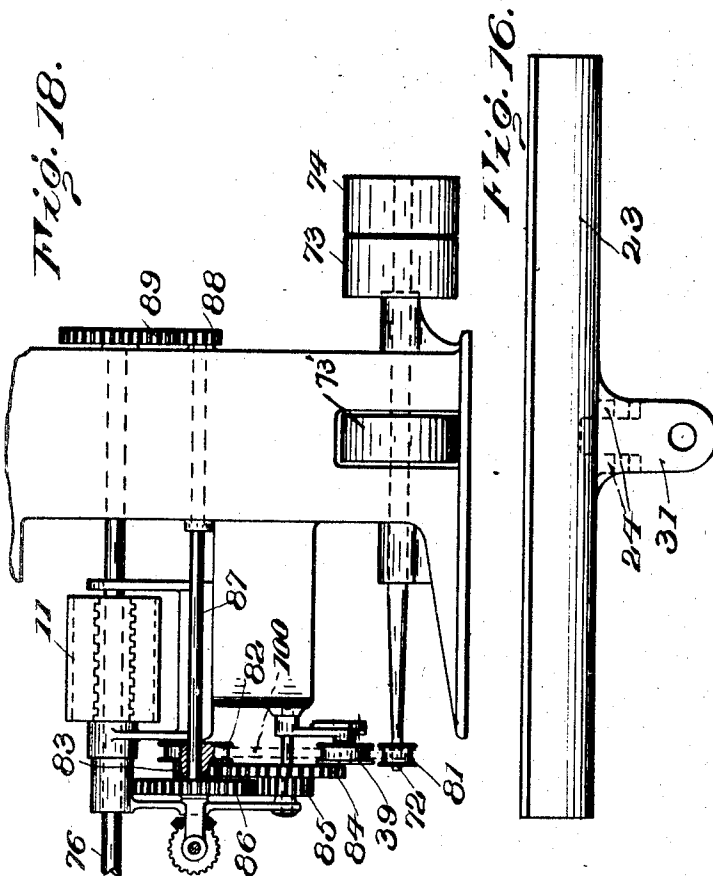
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5 SHEETS—SHEET 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

DANIEL M. ROSE, OF KNOXVILLE, TENNESSEE.

WOODWORKING-MACHINE.

1,095,233.

Specification of Letters Patent.

Patented May 5, 1914.

Application filed July 15, 1912. Serial No. 709,464.

To all whom it may concern:

Be it known that I, DANIEL M. ROSE, of Knoxville, Tennessee, have invented a new and useful Improvement in Woodworking-Machines, which invention is fully set forth in the following specification.

This invention relates to wood working machines, and particularly to machines of that general class designed for end matching material such as strips for flooring, ceilings and the like, and has among its principal objects to provide an end matching machine which will seize and automatically position strips of different lengths on the carrier mechanism and successively advance them past the trimming and matching cutters whereby one end of the material is provided with a tongue or groove and is then automatically conveyed to another similar machine where the opposite end of the material is matched.

A further object is to provide a matching machine which is adapted to operate on boards face side up and cut long strips apart for sorting or grading and match the resulting short pieces together with the other long strips in the same machine.

A further object is to provide a traveling support which will cooperate with the feed devices of the tongue and groove machines to advance long strips in a direction at right angles to the length of the strips and to provide a conveyer for transporting short strips in the direction of their length, whereby both long and short strips after leaving one machine are automatically delivered with their unmatched ends to the second machine into which they are fed by an operator, and undergo cutting, trimming and matching in a manner similar to their treatment in the first machine. The operator is thus enabled to place a piece of material in the machine of any length and then turn his attention to the next piece.

A further object of the invention is to provide improved means for holding and passing the pieces through the matching machines, said means also providing for warped pieces whereby the ends which are being matched may be cut square with the edges and parallel to the face of the piece at its immediate end and without interference with other pieces.

Further objects are to generally improve

the detailed structure of machines of this class whereby cutting, sorting and end matching and handling may be materially facilitated and the quality of work done materially improved without increasing the number of operators.

The invention in its general features comprises three sections, a sorting, and grooving section, a duplex conveyer section, and a sorting, and tonguing section, all so arranged that an operator may insert a strip of flooring of any length into the sorting and grooving machine whereupon the piece is automatically gripped and brought into correct position to be cut across square with the length at its immediate end by the trimming saw. Cut off ends are sorted or rejected. Short pieces suitable for flooring are fed by the operator to the grooving machine. Long pieces fed to the machine have their outer ends supported and carried on a conveyer. Short pieces go through the machine without the aid of such traveling support. On leaving the end grooving machine the long pieces travel sidewise of their length by aid of a conveyer, while short pieces are taken lengthwise by a conveyer to the sorting and end tonguing machine. The second operator stationed at this machine feeds the pieces to the tonguing machine which operates similarly to the first machine except the pieces are trimmed at the opposite end and receive a tongue instead of a groove. Short pieces cut off and sorted at the tonguing machine may be returned to the first operator by a conveyer or by hand and these receive a groove and pass through to the second operator who places them in his machine to receive a tongue.

With this general description of the combination and arrangement of parts of my invention, I will now describe its detail improvements and in order that the invention may be more readily understood reference is had to the accompanying drawings which illustrate, by way of example, one embodiment of the invention.

Figure 1 is a perspective view showing an end matching machine embodying certain of my improvements. Fig. 2 is a side elevational view of the same machine with parts broken away to show interior construction. Fig. 3 is a longitudinal central sectional view showing the adjustable work support

and feed chain. Fig. 4 is a vertical transverse sectional view taken on line 4—4 of Fig. 3. Fig. 5 is a detail of a pressure bar. Fig. 6 is a sectional view on the line 6—6 of Fig. 2 showing the means for adjusting the work support. Fig. 7 is a detail view of springs under the work supporting bars. Fig. 8 is a side elevational view of one of the chain carriers and loading tables. Fig. 9 is a plan view of a portion of the carrier and loading table. Figs. 10 and 11 are detail views of parts of the loading table. Figs. 12 and 13 are details pertaining to the gage device. Fig. 14 is a diagrammatic plan view of the system of tongue and groove machines and conveyers connecting the same. Fig. 15 is a detail view of a pair of matching tools. Fig. 16 is a detail view and Fig. 17 is a view partly in section and partly in elevation showing means for adjusting the matching tools. Fig. 18 is an elevational view with certain parts removed to show the driving gear for the feed device.

Referring to the drawings, Fig. 14 shows diagrammatically the general arrangement and construction of the devices for carrying out the operations of grooving and tonguing, in which A designates the sorting and end grooving machine; B designates the sorting and end tonguing machine; C, the carriers for supporting the free ends of long pieces which pass through machines A and B, and D is a carrier for short pieces which are to be transported from the end grooving machine to the end tonguing machine in the direction of their lengths.

In describing the means for end matching the boards, the description will be confined more particularly to the first machine which in the illustration is a grooving machine. The same description will also apply to the tonguing machine except as hereinafter pointed out.

Referring to Fig. 1, the sorting and end grooving machine is provided with a base 1 rising from which is a main standard 2 which supports the driving mechanism and end matching tools. From the standard 2 extend two sections 3 and 4, the forward part of the latter resting on a column 5. The upper section 3 supports the upper adjustable plate 6 secured to the lower end of a member 7, Fig. 2, adapted to be raised and lowered for different thicknesses by a hand-operated screw 8 engaging the top part of the member 7. Set screws 9 are arranged to lock the plate in the desired position. The forward end of the upper plate is provided with an upturned nose 10 for the purpose of enabling the ends of the pieces or boards to more readily pass under it. Below the upper plate 6 are located the work gaging and feeding devices. In connection they grip and position the end of the board on the support in proper relation for the cut-

ting and matching tools while the feeding device advances the board under the upper plate 6 and past the tools.

The feed device, illustrated in detail in Figs. 3 and 4, comprises an endless chain 11, running over a chain driving pulley 12 and over a tension pulley 13 which is provided with a taking-up device such as a threaded rod 14 working in a stationary lug 15, Fig. 2. Each link of the chain is made of a flat solid piece as indicated in Fig. 4. Disposed at the sides and top of each link are secured detachable lugs 16 which are adapted to come into engagement with the rear edge of the board and feed it forward sidewise. The upper branch of the chain is kept in a horizontal position by means of bars 17 extending between the pulleys 12 and 13, their ends secured to the frame of the machine. On these bars 17 the links of the chain slide and by them are kept from sagging. Sidewise movement of the chain is prevented by lugs 18 located on the central underpart of the links and between the bars 17. While the boards are advanced by the lugs 16 they are supported out of contact with the links of the chain by the upturned ribbed end members 19 of pressure bars 20. The receiving edge of each bar is slightly rounded to facilitate passage of the board from one bar to the next. This is more clearly shown in Fig. 5 at 19'. The ribs on the ends of members 19 act to indent and to guide the board over the pressure bars 20 and keep it to its proper path as it is advanced by the chain lugs 16. The pressure bars 20 are provided with yielding supports, such as springs 21, which are placed near the opposite ends of each bar and so positioned relatively to the sides of the bars that each spring acts to support parts of two bars. The springs under the ends of the bars on the cutter side are made stronger than those on the side away from the cutters to better hold the work to receive the cut. This arrangement is clearly shown in Fig. 7 in which is also shown, at the left of the figure, small springs 22 which are placed under each of the end bars of the series to support the outer edges of these bars. The springs under each pressure bar rest in depressions provided in a vertically adjustable plate or member 23. For this adjustment, plate 23 is provided with depending lugs 24, Figs. 6 and 16, forming bearings for a right and left handed screw 25 on which is mounted a worm gear 26. Engaging the opposite threaded ends of screw 25 are slidable wedge members 27 which are adapted to move to a limited extent on stationary doubly inclined surfaces 28. The worm gear 26 is operated through a gear 32 by a hand wheel 29 mounted on a shaft 30 which is supported in bearings 31 hanging from plate 23. Mounted on shaft 30 is a gear 32 meshing with worm gear 26. Rota-

tion of the hand wheel 29 imparts rotation to the right and left hand screw 25 through shaft 30, and gears 32 and 26 whereby the wedges 27 move up or down the inclined planes 28 and thereby raise or lower the plate 23 and the pressure bars 20 for supporting the work. To provide passageway for chain 11 and lugs 16, the upper plate 6 is recessed or grooved at 33'. The bars 20 are preferably provided on their undersides with retaining shoulders 20' which engage corresponding shoulders on plate 23. The springs are thus locked in their sockets and the bars are retained in position.

15 The gage device which coöperates with the top plate, the first pressure bar and the lugs on the chain to position the boards for entrance on the pressure bars, comprises a pair of levers 33 keyed on a shaft 34 having bearings in the body of extension 4. The ends of the levers 33 project above the tops of the arms 19 of the bars 20 as shown in Fig. 2. Levers 33 are normally held in an upright and yielding position by a spring 35 on shaft 34, Fig. 12, and spring-pressed plungers 36. The gage levers are arranged in relation to the first pressure bar and the upper plate so that the nose 10 of the plate and the levers coöperate to position the work at right angles to the direction of feed under plate 6 before passing into the bars and before rotation of the gage levers. In order that the free ends of boards having considerable length may be supported while the opposite end is passing through the matching machine and at the same time offer no drag on the board to shift its position relative to the feeding device, the shaft 34 is extended beyond the side of the machine and operates a loading table 37 for temporarily supporting and then depositing the free end of the board onto a lugless chain 38. Referring to Figs. 8 to 11, the outer end of the shaft 34 is supported in the top horizontal member of a frame 39 which is arranged parallel with the machine and at a distance therefrom suitable for the length of boards. Several of these frames may be provided two of which are shown in Fig. 14. While several loading tables 37 are also shown the description of one will suffice for all since their construction is the same. Loosely mounted near the end of shaft 34 is a lever 40 provided with a weighted arm 41. The upper end of lever 40 pivotally supports one end of table 37, the other end of the table being pivotally supported on a lever 42 having a weighted arm 41 and mounted on a stub-shaft 43 and parallel with the first lever. Normally the table takes a resting position above the chain carrier 38. When the levers are tilted the table travels with the feed and lowers while remaining in a horizontal position. This tilting action is effected by shaft 34 acting through a pin 44

projecting from the shaft and entering a slot 45 formed in the side of the hub of lever 40. The table is yieldingly locked in an upright position by means of a spring catch 46 which engages a shouldered cam 47 provided with a weighted arm 48 resting in its lowest position in a stirrup 49 secured to the frame 39. To adjust the position of the lever 48 an adjusting screw 50 is provided in the foot of the stirrup. When one end of a board of sufficient length enters the machine, its free end will rest on the loading table 37. The advance of the board over the gage lugs 33 by chain 11 rocks shaft 34. The pin 44 presses on the lower shoulder of slot 45 and tilts the levers 40 and 42 and table 37. The end of the board is thus first carried with the feed and then deposited on the endless chain 38 which travels at the same rate as the feed chain 11 in the matching machine. The spring catch 46 is released from the shoulder of the cam 47 during this operation and the weighted arm 48 falls back to rest in its stirrup 49. When the board is moved by chain 38 away from table 37 the latter returns to normal position under action of the weighted arms 41 and spring 35 on shaft 34 has already returned to its original position and the catch snaps into locking position to hold the table upright for the reception of the next board.

For the purpose of trimming the ends of the board or for cutting the boards into grades for sorting, a saw 51 is provided which is driven from a shaft 52 having bearings 53, 54 mounted on a plate 55 on the upright part of an extending arm on the front of the frame of the machine. By means of a hand wheel 56, bearing 54 may be longitudinally adjusted and with it the shaft 52 for the purpose of properly positioning the saw 51. Power to drive the shaft of the saw is applied through a belt 57 and pulley 58. The cutting or lower edge of the saw is arranged to move in the same direction as the feed chain 11, thereby making a finishing cut in the face of the board, and also enabling the material with its finished surface up to be fed to the machine under the inspection of the operator who can thus inspect and grade the material for cutting and sorting.

The groove in the end of the board is made by a saw 59 mounted on a cutter head 60, Fig. 17, mounted on a vertical shaft 61 supported in an adjustable bearing 62 which is adjusted by means of a screw 63 operated by a hand wheel 64 through bevel gears 65, 66. The cutter head 60 is driven by the belt driven pulley 67 through bevel gears 68, 69. The lower part of the cutter head shaft is splined to the hub of gear 69 and is slidable thereon. The depth of the groove made by the saw is regulated by the adjustment of the face plate 70 which supports the cutter

head 60 and its adjusting and driving means just described, in connection with cut off saw 51. A hand wheel 71 having a threaded spindle engages a lug on the plate and enables this adjustment to be made.

Power to drive the machine is applied to power shaft 72 which is provided with the usual fast and loose pulleys 73, 74. Inside the column 2 and mounted on main driving shaft 72 is a large pulley 73' around which passes a belt 74' to an idler 75 on main feed shaft 76, thence down and around pulley 67 on the drive shaft for the cutter head 60, up and around idler 77, around pulley 58 driving saw 51 and thence around idler 78 to pulley 73'. The machine is provided with an automatic take-up operated by a weight 79 suspended by cable over a sheave 80. As this device is no part of the present invention, no further reference to it is deemed necessary. The feed shaft 76 which drives feed chain 11 takes its power from shaft 72 through belt pulleys 81, 82 and a train of gears 83, 84, 85, 86, shaft 87 and gears 88 and 89, Fig. 18. Belt pulley 82 carries a gear 83 both loose on shaft 87. Gear 85 is fast to gear 84 and both are loose on their shafts. Gears 86, 88 and 89 are fast on their shafts. At the delivery end of the grooving machine is a rail 90 extending beyond the machine and opposite the end of a belt 91 running over pulleys 92, 93, the former of which is adjustable to tighten the belt when desired.

Power to drive the belt is taken from the drive shaft of the tonguing machine and is transmitted to the belt pulley 93 through shaft 94 by suitable gear transmission 95. The top surface of the belt runs below the top of the lugless chains 38 and forms the bottom of a trough 79' into which short pieces fall as delivered from the grooving machine.

The sorting and tonguing machine B has been diagrammatically illustrated in Fig. 14 and in the construction of its gage and feed device is the same as that described in respect to the grooving machine. Instead of having a groove cutter, it is provided with a pair of tonguing cutters as diagrammatically shown in Fig. 15. The cutting blades or saws 96 are preferably inclined to each other whereby a reëntering shoulder and a tapering tongue are formed to insure a closer fit and to facilitate ready entrance of the tongue into the end groove of the next piece. The top saw is so driven as to produce a finishing cut and is therefore driven with its lower cutting edge moving with the work. The trimming saw 97 in the tonguing machine does not produce a finishing cut and therefore for convenience is rotated with its top moving with the work. The free ends of the long boards are supported initially on loading tables at the left of the

tonguing machine and are deposited on a lugless chain carrier moving with the feed chain in the machine as heretofore described in connection with the grooving machine.

The machine as thus far described operates as follows: An operator stands facing the receiving end of the first machine or, in the illustration, the grooving machine and with his right hand takes, for example, a long piece of flooring face up and places the left hand end of the piece on the front extensions 4 of the machine, resting the right hand end on the loading table 37. In the meantime, he inspects and locates defects on the face side of the piece or board and passes the left-hand portion just beyond the cut-off saw 51. The board is shoved sideways toward the yielding gage by the operator. The feed chain as it advances brings up from the rear two lugs 16 against the rear edge of the board and forces the board against the gage levers and against the yielding pressure bars 20 and plate 6, thereby automatically squaring the piece into position for the cutting tools. At this moment the board is moved under the upper plate by the lugs 16 of the chain 11 and depresses gage levers 33 over which the board rides and passes onto and depresses the first spring-pressed bar 20 having its rounded edge toward the advancing edge of the board. The ridges on members 19 penetrate into the underside of the piece and assist in guiding and keeping the piece square as it is advanced by the chain. Owing to the peculiar disposition of the springs under the pressure bars as previously described, the rounded receiving side of the first bar tilts down as the advancing edge of the board moves against it depressing spring 22. But as the advancing edge of the board approaches the farther edge of the first bar, the next spring has been depressed to receive this advancing edge because the meeting edges of two bars rest on the same springs. The boards thus readily pass over the pressure bars while the latter press and hold the board against the upper plate and also guide the boards by their ridges while undergoing cutting and grooving. The chain merely advances the boards by its lugs without supporting them, thereby avoiding the possibility of chips, dust, etc., from collecting between the boards and their supports and thereby throwing out of adjustment the cutters, nor does any dirt accumulate between the chain and its supports to in any way affect the adjustments of the cutters since the chain does not support the boards. The trimming saw cuts off defective ends and also cuts apart different grades. The latter pieces so obtained are run through the machine together with the long pieces to be end matched and in this capability of handling different grades as

to length lies one of the many advantages of my machine. The depression of the gage lugs 33 rocks shaft 34 which carries with the feed, then lowers the loading table 37 and thereby deposits the right hand end of the long board into the chain carrier 38 which moves at the same rate as the feed chain 11. The lugs and table then rise to normal position.

From the explanation previously given of the loader, the description of its operation will be readily understood and its description need not be repeated. When the board reaches the delivery end of the grooving machine the left-hand end is supported on the rail 90 face up and the right-hand end slides on the end of the conveyer trough. The right-hand end of the long board is now in position to be grasped by the left-hand of the operator at the second or tonguing machine. This operator now inspects the right-hand portion of the piece, face side up; and introduces it into his machine in the same manner as did the first operator. Pieces cut off by the trimming saw, however, are either cast aside or passed back to the first operator who passes them through the grooving machine with the other short pieces. Pieces not long enough to be supported by the end of the trough on leaving the grooving machine are pushed onto the belt conveyer. The right-hand end of the piece drops first onto the belt which then pulls the board off the rail 90 face up and carries them to the second or tonguing machine. The feed chain 11 is set into movement by means of a power controlling lever 98, one end of which is adapted to shift a pivotally mounted pulley 39 against a belt 100 running over pulley 81 on drive shaft 72 and a pulley 82, Fig. 18, thereby tightening the belt and causing the rotation of the drive shaft 72 to be imparted to pulley 82 and thence through the power transmitting gears 83 to 89 above described to the chain drive shaft 76.

While the machines for grooving and tonguing may be placed apart at any desired distance, it is convenient to so locate them that twelve foot pieces leaving the first machine are in line with the left edge of the second machine and the distance between trimming saws about 13 feet. Stuff shorter than this falls into the conveyer trough while pieces longer than this travel sidewise and are supported on rail 90 and the end of the carrier trough. In order to enable the loading table to accommodate crooked pieces in either direction the crooked end may fall following each other closely; the table is preferably constructed in sections one on each side of the frame supporting the lugless carrier chain as clearly appears in Fig. 9 each section righting itself as soon as cleared. The levers 33 preferably have their ends cut

away to clear the tongue on the board and permit the edge of the board to square itself against the lugs. The sectional pressure bars may and preferably do rest on stronger springs at the end next the end of the piece being machined in order that this end of the piece whether the board is warped or not may always lie flat against the upper bed plate and insure accurate end matching.

It will be at once apparent to those skilled in the art that there may be certain changes in the relative arrangement of the parts and in the mechanical form of the various elements entering into the structure, without departing from the spirit of my invention, and such variations are meant to be included in the claims. Furthermore, while the mechanism has been especially designed for and described with relation to end matching flooring, it is not restricted to such use and may for example, with appropriate modification be used to cut up material; also parts of the mechanism may be used without necessarily employing other parts shown, for example, the end matching machine may be used without the loading tables, particularly where the materials are not too long.

What is claimed is:—

1. In an end matching machine, the combination of end matching tools, a yielding sectional support for the material, a gage adapted to yield to pressure in the direction of feed, means for advancing said material against said yielding gage to position the material on said support, and a pressure plate for holding the material against said support as the material is advanced over the same.

2. In an end matching machine, the combination of end matching tools, a yielding sectional support for supporting one end of the material and a moving support for the opposite end of the material, a rock shaft yieldingly held against rotation and provided at one end with gage members and at the other end with a tilting support, means for advancing the material against the gage members to position one end of the material on the sectional support and to rock the tilting support which deposits the other end of the material on the moving support, and a pressure plate for holding the material against the sectional support as the material is advanced past the said tools.

3. In an end matching machine, the combination of means for advancing material through the machine, a support for one end of the material traveling with the advancing means, a gage in operative relation with the advancing means adapted to position the material in the machine, and a tilting support operated by said gage and adapted to deposit one end of the material on said traveling support.

4. In an end matching machine, the com-

5 bination of an upper plate, and a plurality of spring pressed bars below the same arranged transversely of the feed of the machine; each bar having upturned ends for supporting the material, means for vertically adjusting said bars, and an endless chain provided with lugs and running between said upturned supports for advancing the material resting on said supports.

10 5. In an end matching machine, the combination of an upper plate and a plurality of upwardly spring-pressed bars below said plate arranged transversely of the feed of the machine, each bar having upturned ends for supporting material to be matched and provided with guiding ribs running in the direction of feed adapted to enter the under surface of the material and direct its course through the machine and means advancing 20 the material over the ribs.

6. In an end matching machine, the combination of an upper plate and a plurality of pressure bars below said plate for supporting the work and arranged at right angles to the direction of feed, springs on each of which parts of two bars rest and other springs on each of which parts of one bar rests, and means for advancing the work through the machine.

30 7. In an end matching machine, the combination of an upper plate and a plurality of pressure bars below said plate for supporting the work and arranged at right angles to the feed, springs under the ends of said bars, those under the bars supporting the ends of the boards to be matched having a greater resiliency than those at the opposite ends of the bars, and means for advancing the work through the machine.

40 8. In an end matching machine, the combination of a support on which one end of the work is adapted to slide, an endless chain provided with lugs for sliding said work on its support, a rock shaft having at one end a gage cooperating with said lugs for positioning the work, an endless chain moving with said first named chain for supporting the free end of the work, and a loading table normally raised above the supporting chain and operated by said gage through said shaft to lower the work on said chain.

55 9. In a machine for matching the ends of boards, means for advancing one end of the board through the machine, an endless carrier for supporting the free end of the board, a loading table having its ends pivotally mounted on lever arms normally held in position to keep the table and the free end of the board above said carrier, and means operated by the advancing means through said board to lower said table and deposit the free end of the board on said carrier.

10. A device for supporting the free end

of a board while the opposite end passes 65 through a machining operation, said device consisting of an endless carrier, a table, a lever pivoted to said table, means normally holding said table in raised position, and a power shaft having a lost motion engagement with said lever to depress the table and lower the free end of the board onto the carrier.

11. A device for supporting the free end of a board while the opposite end passes 75 through a machining operation, said device consisting of an endless carrier, a table, a lever pivoted to said table, means normally holding said table in raised position, a power shaft having a lost motion engagement with said lever to depress the table and lower the free end of the board onto the carrier, and a yielding means for locking said table in raised position.

12. In combination, an upper holding 85 down bar or plate and a lower bed or work support arranged to receive and guide the work between it and the said upper plate and comprising two or more bars spaced transversely of the travel of the work, 90 springs supporting said bars, the springs for one bar nearer the operating cutter being stronger than those for the more remote bar or bars.

13. In combination, an upper holding 95 down bar or plate and a lower bed or work support arranged to receive and guide the work between it and the said upper plate comprising a plurality of spring-pressed bars spaced transversely of the travel of the work for holding work against said plate and having upturned work receiving and supporting ends provided with ridges arranged in the direction of feed of the work.

14. In combination, an upper plate having an end with an upturned under edge, a pair of gage lugs below said end adapted to yield in the direction of feed, and a support receiving work passing over said lugs.

15. In combination, an upper holding 110 down bar or plate and a lower bed or work support arranged to receive and guide the work between it and the said upper plate comprising a plurality of upwardly spring-pressed bars spaced transversely of the travel of the work and having upturned work receiving ends provided with ribbed faces and edges cut away on one side for the purpose described.

16. In combination, an upper plate, a pair of yieldingly mounted gage lugs below said plate each lug having a cut-away portion on the work receiving side to accommodate the contour of the work.

17. In combination, an upper plate, a plurality of spring-pressed bars below said plate supporting the work, means advancing

the work over said bars, and means for vertically adjusting said bars.

18. In combination, an upper plate, a plurality of bars yieldingly mounted and having upturned ends to support the work under said plate, an endless chain guided between said ends and provided with lugs to advance the work over said bars.

19. In combination, an upper plate, a plurality of bars yieldingly mounted and having upturned ends for supporting work under said plate, an endless chain guided between said ends for advancing the work over said bars, and members for supporting the chain and for guiding the up and down play of said bars.

20. In combination, an endless chain and a table for supporting one end of a board above said chain and provided with means for depressing the same operated by the opposite end of the board.

21. In combination, an endless chain and a table for supporting one end of a board above said chain and provided with means for depressing the same operated by the opposite end of the board, and means auto-

matically operating to restore said table to its elevated position.

22. In combination, an upper holding-down bar or plate and a lower bed or work support arranged to receive and guide the work between it and said upper plate, said support comprising a rigid section on which one end of the work is first placed and yielding sections on which the work slides, an endless chain provided with lugs for sliding said work on its support, a rock shaft having at one end a gage cooperating with said lugs for positioning the work, an endless chain moving with said first named chain for supporting the free end of the work, and a loading table normally raised above the supporting chain and operated by said gage through said shaft to lower the work on said chain.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

DANIEL M. ROSE.

Witnesses:

ROY V. MYERS,
WILLIAM WHALEY.