

No. 676,942.

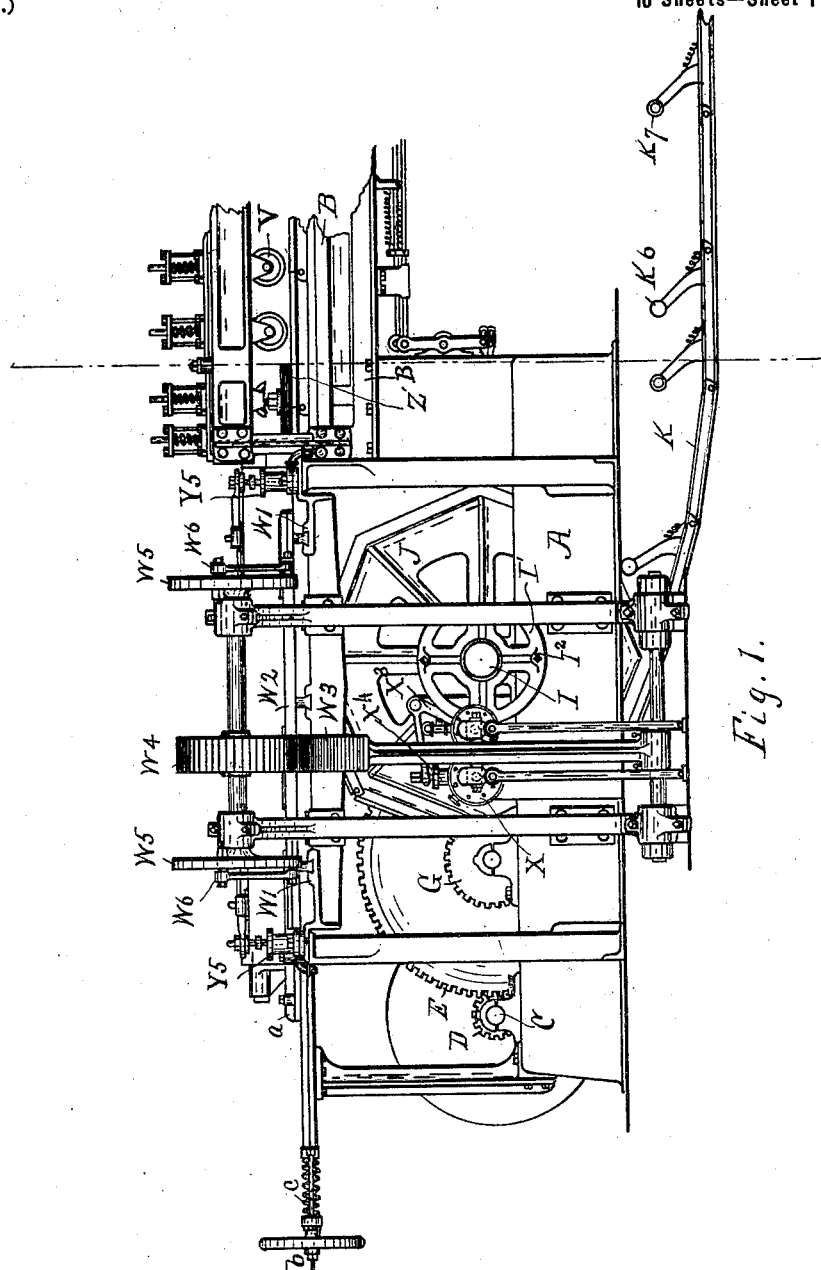
Patented June 25, 1901.

W. A. FIRSTBROOK.
MACHINE FOR JOINTING LUMBER.

(Application filed Feb. 26, 1900.)

(No Model.)

10 Sheets—Sheet 1.



Witnesses:
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10 Sheets—Sheet 2.

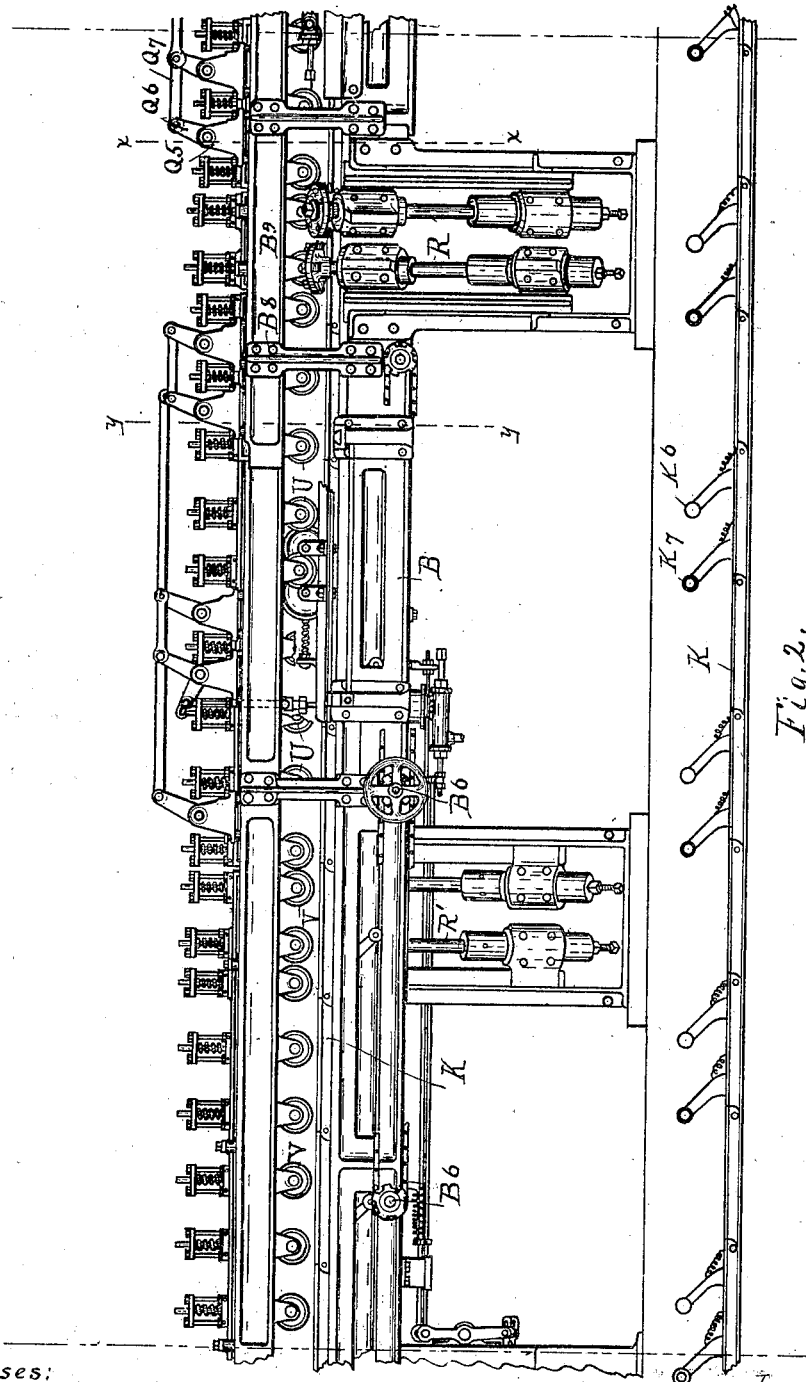


Fig. 2.

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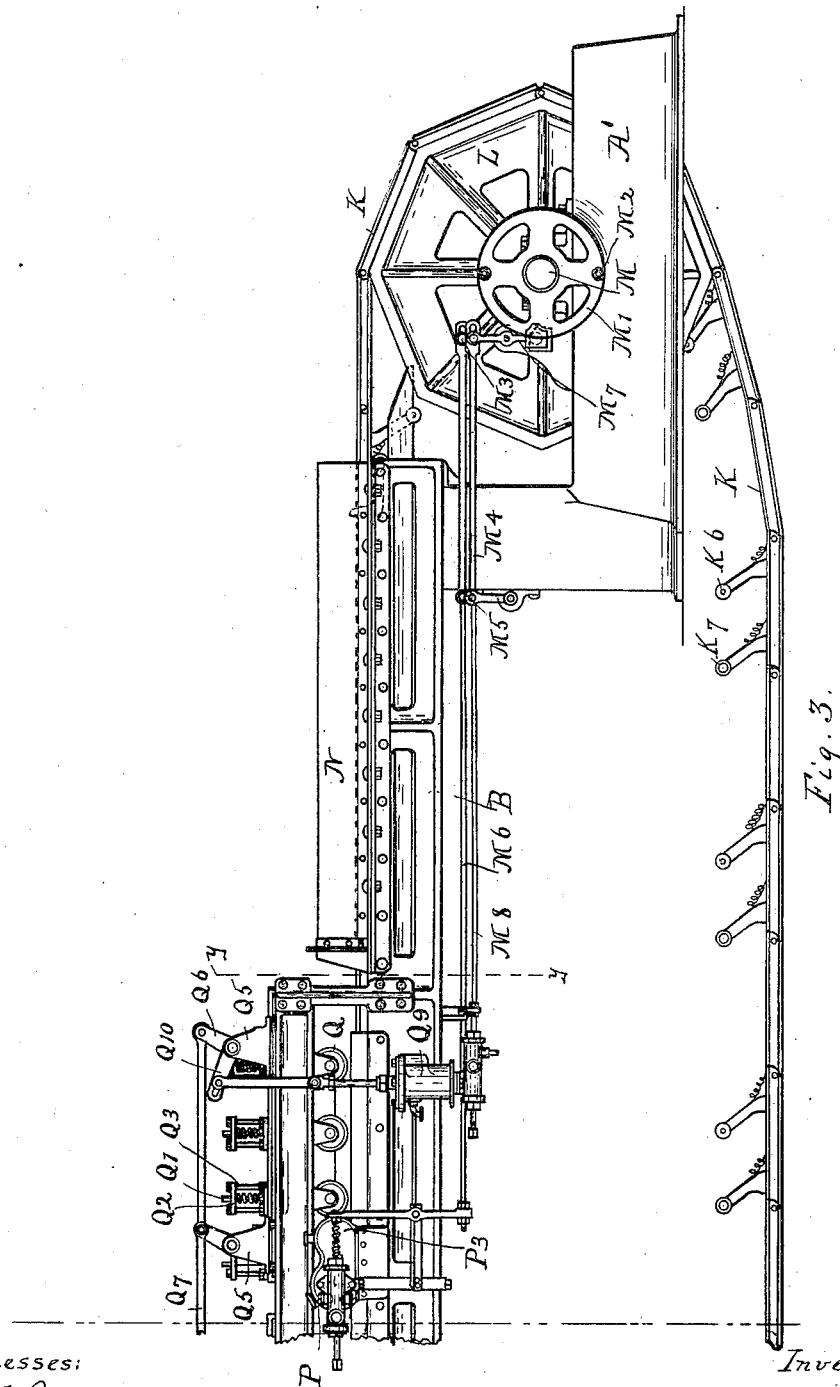


Fig. 3.

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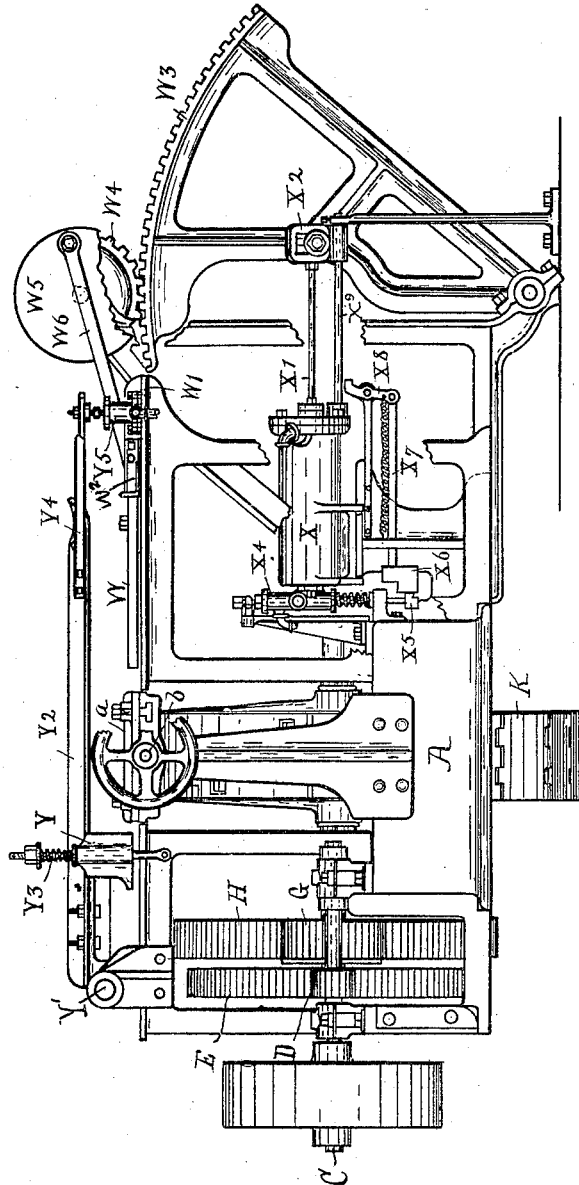
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10 Sheets—Sheet 4.



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W. A. FIRSTBROOK.
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10 Sheets—Sheet 5.

(Application filed Feb. 26, 1900.)

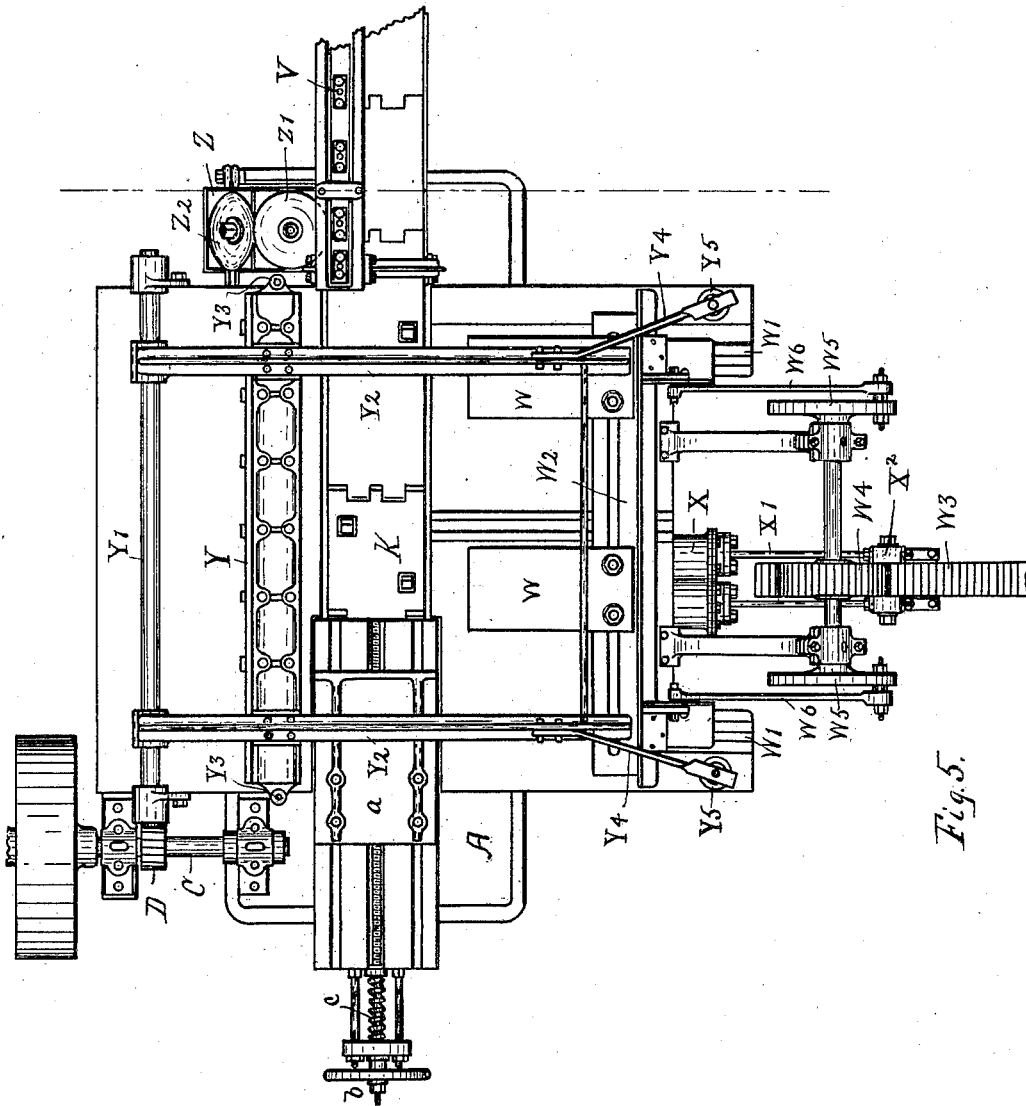


Fig. 5.

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10 Sheets—Sheet 6.

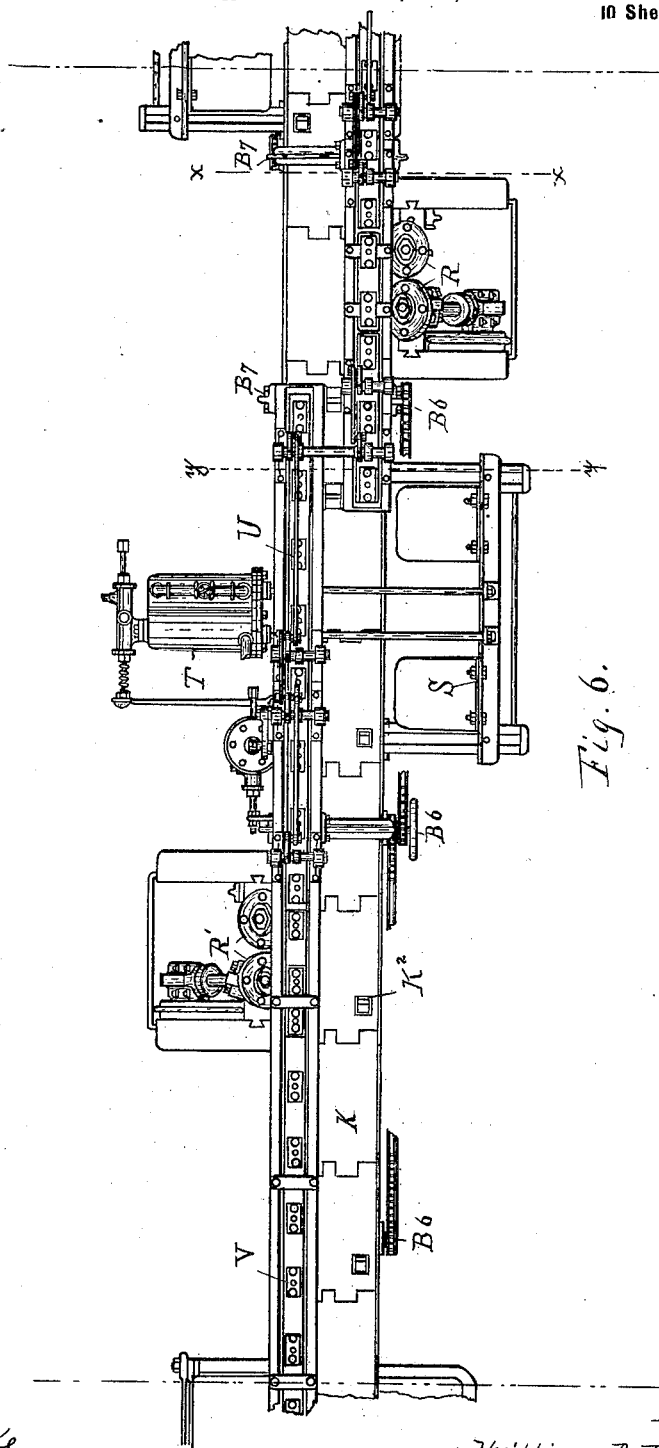


Fig. 6.

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10 Sheets—Sheet 7.

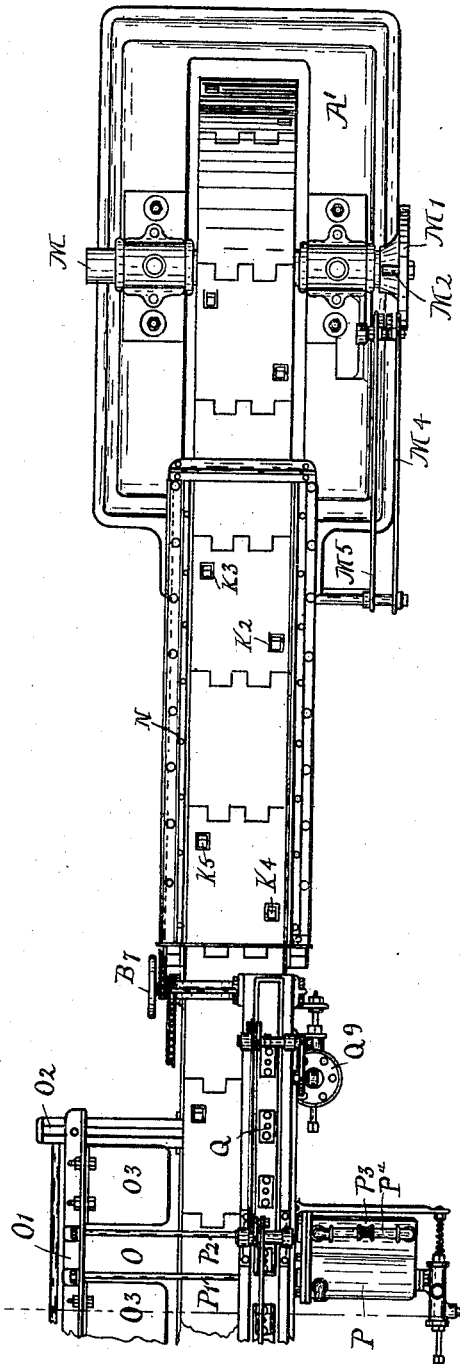


Fig. 7.

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10 Sheets—Sheet 8.

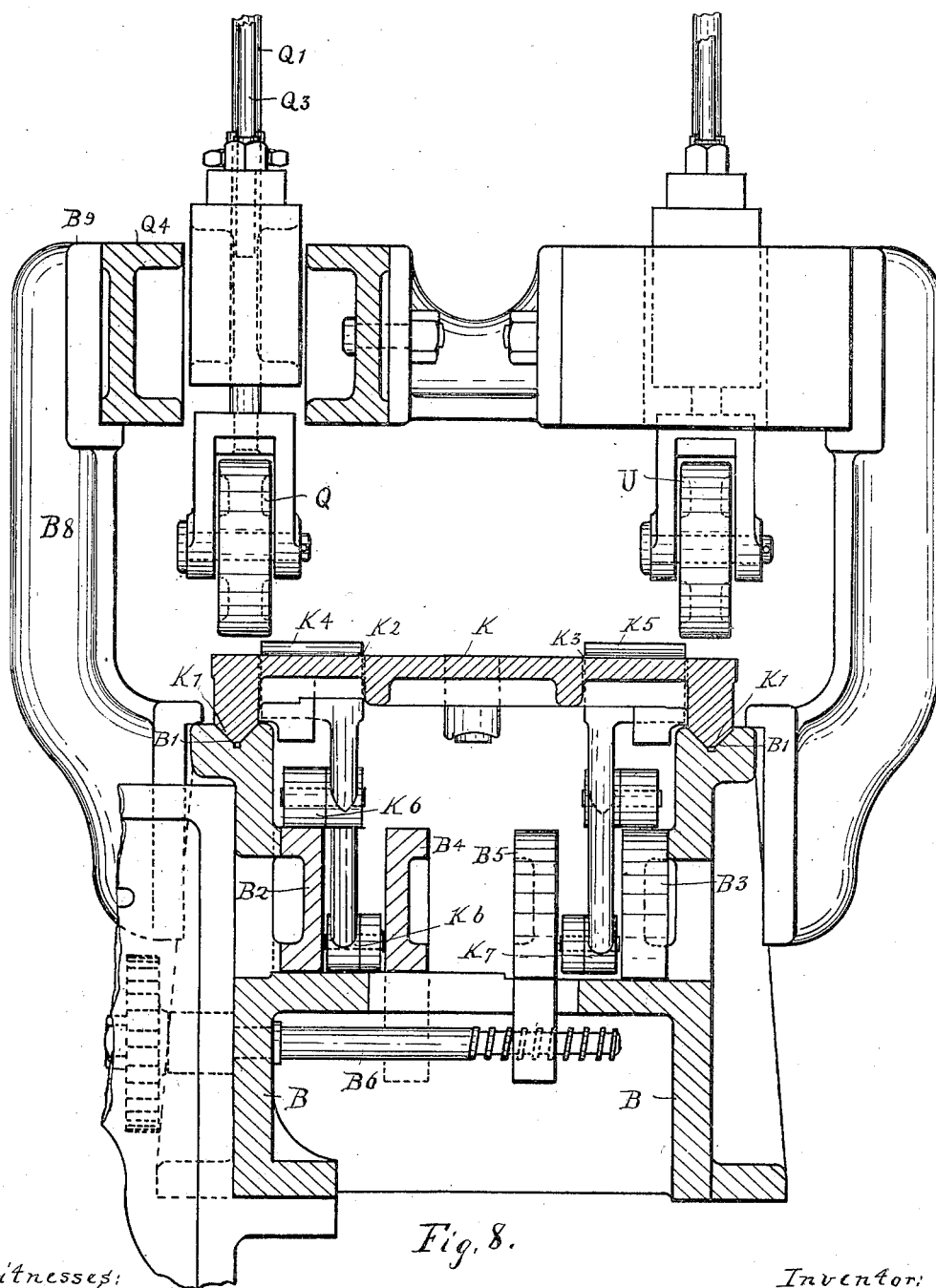


Fig. 8.

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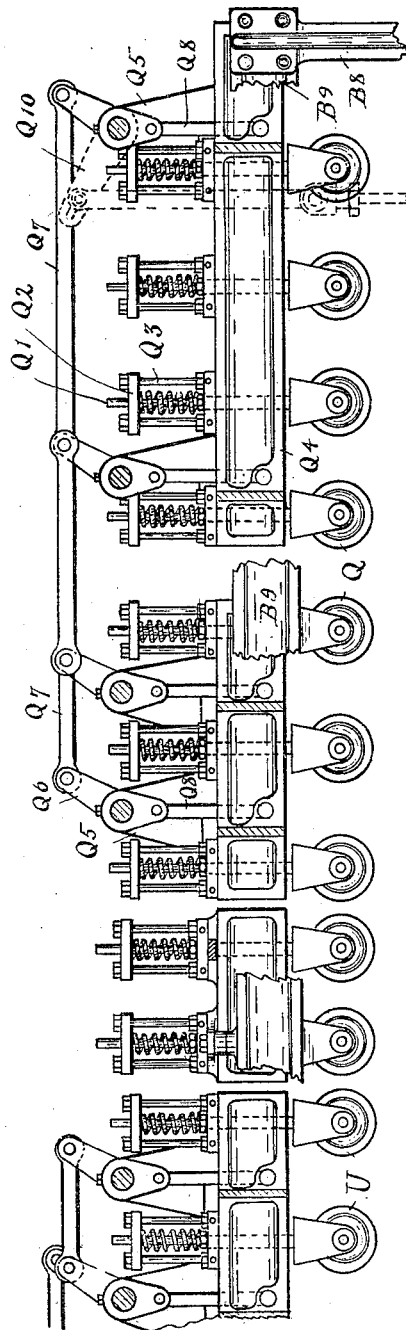


Fig. 9.

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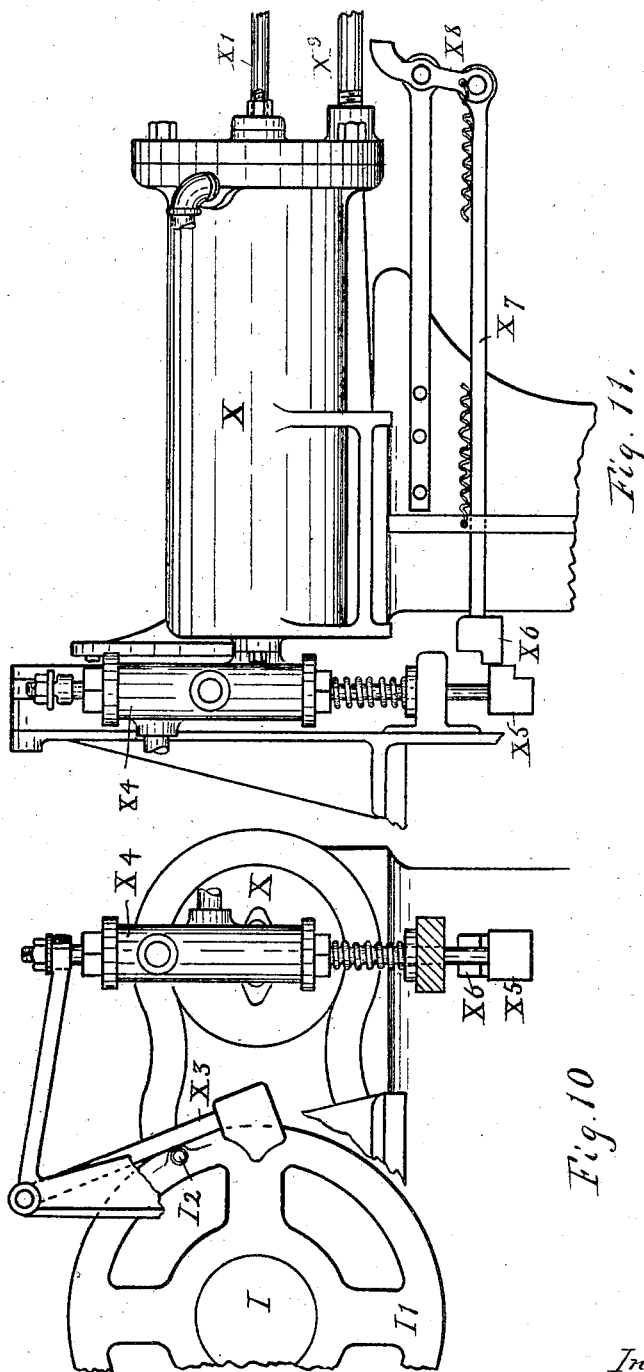
Patented June 25, 1901.

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(Application filed Feb. 28, 1900.)

(No Model.)

10 Sheets—Sheet 10.



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UNITED STATES PATENT OFFICE.

WILLIAM A. FIRSTBROOK, OF TORONTO, CANADA.

MACHINE FOR JOINTING LUMBER.

SPECIFICATION forming part of Letters Patent No. 676,942, dated June 25, 1901.

Application filed February 26, 1900. Serial No. 6,523. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. FIRSTBROOK, a citizen of the Dominion of Canada, residing at Toronto, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Machines for Jointing Lumber, of which the following is a full, clear, and exact description.

My invention relates to jointing-machines, and more particularly to machines for jointing lumber either by tongue-and-grooving or by dovetailing or similar means of union.

My invention further relates to jointing-machines wherein the sections or strips of lumber are automatically fed into the machines, dressed and jointed from the rough, and jointed so as to constitute a sheet of lumber the width of which is determined by the length of the sections or strips of lumber used, and the length of which may be indefinitely extended.

My invention relates also to a jointing-machine in which the lumber is jointed and glued in place.

To these ends my invention consists of the several combinations hereinafter described and claimed, whereby the strips or sections of lumber sawed to uniform length are automatically fed into the machine, one after another, dressed and prepared upon the one edge and then upon the other, and then successively united in the manner hereinafter described and, if desired, glued at the same time, the entire series of operations being successive, automatic, and constituting a substantially continuous process.

My invention further consists of such mechanism as is required to render the machine capable of utilizing lumber of varying widths and strips or sections in which the edges are not necessarily parallel and strips or sections of varying thickness.

The several purposes and advantages of my invention will be evident from the following description and reference to the drawings herewith, consisting of ten sheets, in which like letters refer to like parts.

Figures 1, 2, and 3, taken together, constitute a side elevation of the machine, the vertical broken lines indicating the points of union between the several sheets of drawings. Fig. 4 is an end elevation of the end shown

in Fig. 1. Figs. 5, 6, and 7, taken together, constitute a plan view of the machine, the transverse broken lines indicating the points of union between the several sheets of drawings. Fig. 8 is a vertical cross-section on the line *xx* of Figs. 2 and 6, omitting those parts which would normally show in elevation upon the view to avoid confusion of parts. Fig. 9 is an enlarged detail view of a portion of the tread-rolls, the casing or frame supporting the same being cut away the better to show the attendant mechanism. The broken lines shown upon this sheet correspond to those upon Figs. 2 and 6, marked *yy*. Figs. 10 and 11 are respectively detail end and side views of my double-acting air-cylinders, these views being of the cylinder which actuates the set-over mechanism shown in Figs. 1, 4, and 5.

In the drawings when expedient to do so unimportant parts of the construction have been cut away to show the mechanism otherwise hidden.

I will now proceed, first, to point out the several principal parts of the machine; second, to explain generally the several principal operations performed, and, third, to explain in detail the several parts of my mechanism and the method of operation.

First. The principal parts are as follows:

A and A' are respectively the end bed-plates.

B is a heavy truss mounted upon the bed-plates A and A', which, together with the bed-plates A and A', constitutes the general bed and frame of the machine. The truss B is supported also, as shown in Fig. 2, by the frames which carry the jointing mechanism hereinafter described.

Journaled to the bed-plate A is a driving-shaft C, which may be driven in any desired manner—as, for example, by belt and pulley, as indicated in the drawings. Keyed to this shaft is a spur-gear D, which meshes with a spur-gear E, which is keyed to a shaft F, which is also journaled to the bed-plate A.

Mounted in rotation with the shaft F is a spur-gear G, which meshes with a larger spur-gear H, which is keyed to a shaft I, journaled to the bed-plate A.

Mounted in rotation with the shaft I is a polygonal drum J, which, acting as a sprocket-

wheel, imparts motion to the endless traveling bed K. At the opposite end of the machine is a similar polygonal drum L, (clearly shown in Fig. 3,) which is mounted upon a shaft M, journaled in the bed-plate A'. This drum carries the endless traveling bed K. The traveling bed K is made up of sections pivoted together, each section corresponding in length to the length of the polygonal sections of the drums J and L. The traveling bed K passes over the fixed bed B and is thereby made to travel upon a horizontal plane as to its upper surface. This construction affords a continuously-traveling horizontal bed, upon which and by which the lumber is carried through the several operations.

N is a box or frame secured to the bed B at its sides and at its inner end having sufficient free space over the traveling bed K to allow a single section or strip of board to be carried forward by the traveling bed.

O is a set-over actuated by an air-cylinder P, which forces the strip or piece of incoming lumber up against stops secured to the bed B preparatory to being firmly gripped by the tread-rollers.

Q is a series of tread-rollers which hold the lumber down firmly in place upon the traveling bed while it is being dressed, dovetailed, or matched upon one edge.

R is a pair of jointers which dress and joint one edge of the piece of lumber as it is carried forward on the bed K.

S is a set-over actuated by an air-cylinder T, by which the piece of lumber, dressed and jointed upon one edge, is now forced over upon the traveling bed K until the undressed and unjointed edge rests firmly against stops secured to the bed B preparatory to being firmly gripped by a second series of tread-rollers.

U is a series of tread-rollers which hold the lumber down firmly in place upon the traveling bed while it is being jointed and dressed upon its second edge by the jointers R'. V is another series of tread-rollers which hold the section of lumber down firmly in contact with the bed K while it is being driven into joint with the preceding section of lumber, as hereinafter more fully described.

W is a set-over actuated by the air-cylinders X, by which a jointed section of lumber is set over until its first jointed edge is in mesh with the second jointed edge of the next following section.

Y is a pivoted clamp, which shuts down upon and holds each section while the next succeeding section is driven into joint with it.

Z is a gluing-roll which coats the edge of the incoming section as it is driven to place.

Second. The mode of operation is as follows: Power being applied to the shaft C, the traveling bed K is set in motion. A stack of lumber is placed in the box N. The bottom piece or section is carried forward and shoved up to place by the first set-over O, so that its edge, whatever its position with reference to the

opposite edge, will be dressed and jointed true. Thereupon it is held down firmly by the first set of tread-rollers, carried forward, and dressed and jointed by the first set of jointers. Then it is moved transversely by the second set-over until the opposite edge abuts against the stops, so that the second edge is in line to be dressed and jointed by the second set of jointers. It is then dressed and jointed by the second set of jointers while held down to place by the second set of tread-rollers. The piece or section is then carried forward under the third set of tread-rollers and the second jointed edge coated with glue, (if the pieces are to be glued together.) Thus carried forward, the second jointed edge of this piece or section is exactly in line or mesh with the first jointed edge of the preceding section, which has been shoved to place, as hereinafter described, and which is held firmly by the clamp Y. The forward action of the traveling bed K thus slides the two meshing joints together until the incoming section is even-ended with the section held down by the clamp. Thereupon the clamp releases its grip and the set-over W shoves the section just jointed over until its first jointed edge is in line with the second jointed edge of the next following piece, and the clamp grips it for the next jointing. Thus it will be seen in a general way how the operations proceed and that the several operations are automatically successive and continuous, the sections following each other rapidly and under such adjustment that great speed and economy are attained; but these features will appear the more clearly when the detail mechanism is indicated, the important features to be noticed being, in addition to those above noted, that the strips or pieces are not jointed to the edges, which are necessarily parallel, thus making a large saving in lumber.

Third. The details of the mechanism are as follows:

Referring to the endless traveling bed K, the sections are pivoted together, as heretofore mentioned. By reference to Fig. 8 it will be seen that these sections are provided with V-shaped projections K', parallel to their length, which travel in corresponding V-shaped grooves B' in the bed B. The traveling bed K is provided with openings K² and K³. The openings K² are in line with the series of tread-rollers Q, and the openings K³ are in line with the tread-rollers U. Pivoted in these openings K² and K³ are lugs K⁴ and K⁵, provided with lever-arms and trolleys K⁶ and K⁷. Helical springs secured to the arms and to the section of the bed K tend to throw the arms out of parallel with the bed-section, and consequently throw the lugs K⁴ and K⁵ downward in the openings K² and K³. Each series of lugs has its trolleys mounted alternately right and left, as clearly shown in Fig. 8. Secured to the bed B are fixed tracks B² and B³. These tracks will be mounted by the

approaching trolleys which are extended outwardly—that is to say, by every other trolley, so that these fixed tracks will throw up every other lug. The track B² begins at a point so as to throw the lugs K⁴ up above the surface of the traveling bed K in time to strike the rear end of a section of lumber in the box N, and this track terminates at a point where it will drop the lugs K⁴ down out of the way just as the second set-over S shoves the piece of lumber over in line with the lugs K⁵. The track B³ begins at a point where it will throw up the lugs K³ in time to engage the piece of lumber as soon as it is placed by the set-over S, and continues until the lugs have carried the piece to place in joint with the preceding piece. In this way only every other lug is thrown into use, and this is the method of operation where the length of lumber is long. When shorter sections are being jointed, the other lugs are thrown into action in this manner. Mounted upon the bed B are movable tracks B⁴ and B⁵. As shown in Fig. 8, these tracks are in this position when only every other lug is operating. Mounted rotatably, but secured against axial movement, upon the bed B are threaded rods B⁶ and B⁷. (See Fig. 6.) These threaded rods engage, respectively, with the movable tracks B⁴ and B⁵, and the several rods B⁶ are for convenience provided with sprocket-and-chain connections, so that they may be rotated simultaneously from a single hand-wheel, and the several rods B⁷ are similarly connected. Hence by these rods the movable tracks B⁴ and B⁵ may be moved transversely upon the bed B, so that the trolleys K⁶ and K⁷, which turn inwardly, will mount them, and thus throw all of the lugs into action.

Referring now to the set-over O, as clearly shown in Fig. 7, O' is a cross-head which travels upon the ways O², secured to the bed B of the machine. Secured to the cross-head O' are rectangularly-shaped shovers O³. The cross-head O' is so pivoted to guide-blocks upon the ways O² that in action it may depart somewhat from a position parallel to the bed K. The shovers O³ are calculated to pass freely over the surface of the bed K. Centrally to said cross-head is pivoted the extended end P' of the piston-rod of the air-cylinder P. A second piston-rod P² is similarly pivoted to the cross-head O' and connects with an oil dash-pot P³. The function of the dash-pot P³ is to prevent the too-rapid movement of the piston-rod P'. The dash-pot P³ has the ends of its cylinder connected by piping P⁴, through which the oil may pass over from one to the other, and which piping is provided with a valve which serves to regulate the rapidity of flow of the oil from one end of the cylinder to the other, and consequently regulates the rapidity of the action of the piston-rod P'.

Upon the shaft M is mounted a disk M', provided with inwardly-projecting lugs M².

Pivoted to the base A' is a double lever M³, which at its lower end comes in contact with said lugs M² and at its upper end is pivoted to a connecting-rod M⁴. This connecting-rod in turn, through an offset M⁵, connects with a rod M⁶, which trips the cut-off of the air-cylinder P. Thus the action of the cylinder P is synchronized to the action of the traveling bed K and at regular intervals actuates the set-over O, which intervals correspond to the frequency of entrance of sections of lumber to be brought to place. The lower end of the lever M³ is provided with a block or lug to engage with the lug upon the disk M', with a concave bearing-face of sufficient length to continue the throw of the rod actuating the valve of the cylinder P a sufficient time to permit of the complete forward action of the set-over. By doubling the number of lugs M² upon the disk M' the frequency of action may be rendered changeable to correspond with that of the lugs K⁴ and K⁵ and for like reasons. It will be noted that with the cross-head O' capable of a slight swinging action upon the ways O² and the piston-rod P' of the air-cylinder being pivotally secured thereto the pushers O³ will engage with the edge of an incoming section of lumber, regardless of parallelism or evenness of edges, and bring it to place ready for jointing upon the first edge. It will be understood, however, that a common supply of air-pressure, produced in any desired manner, actuates all of the valves.

Referring to the tread-rollers Q, it will be noted that each roller has an upwardly-projecting stem Q', which passes through a cross-head Q², which is secured to studs Q³, secured to the frame carrying said rollers. A helical spring is interposed between said cross-head Q² and the bearing-block of said rollers, which tends to force the roller down, giving it a constant tread upon the lumber passing underneath it; but it is at once evident that in order that the set-over O may operate the rollers Q must be raised bodily out of contact with the board strip traveling under them. This construction is seen by reference to Figs. 2, 3, and 9. A frame-support B⁹, supported on brackets B⁸, secured to the bed B, carries an internal frame Q⁴. The rollers are yieldingly supported in this frame, as before described. Mounted upon the frame B⁹ are brackets Q⁵, to which are pivoted bell-crank levers Q⁶, the upper members of which are connected by rods Q⁷. The lower members connect with rods Q⁸, which are pivoted to the frame Q⁴. By the action of these levers the entire frame Q⁴, carrying with it the rollers, frees the rollers from contact with the lumber.

Referring now to the disk M' upon the shaft M, a double lever M⁷ is actuated by the lugs M² and in turn actuates a rod M⁸. This rod M⁸ trips the cut-off of an air-cylinder Q⁹, which is connected to a lever-arm Q¹⁰, which is secured to one of the bell-crank levers Q⁶. The action of this cylinder being synchro-

nized to that of the bed K and the set-over O, the rollers are raised free from the lumber at the instant the set-over is to act, and by adjustment of the lever M⁷, as described with reference to the lever M³, the frequency of action may be coordinated thereto.

The jointers R and R' are of well-known construction. In the drawings I have shown jointers for making a dovetail joint. They consist of two cutter-heads in each instance mounted upon shafts in bearings properly adjustable and are provided with belt-pulleys. Power is applied in the usual manner, and any desirable form of joint may be made by proper construction of the cutter-heads.

The pair of tread-rollers adjacent to the jointers R should not be made to raise and lower with the rollers Q, but should have a continuous tread at all times. The same is true of the tread-rollers adjacent to the jointers R'. They should not be connected with the tread-rollers U, but have a continuous tread, as is the case with the series V.

The construction and operation of the tread-rollers U and of the set-over S are identical with those of O and Q. The rods tripping the valves of the air-cylinders are actuated by mechanism identical with that described in connection with the cylinders P and Q⁹, a disk on the shaft I serving the same purpose as the disk M' on the shaft M.

Referring now to the gluing device Z, Z' is a disk pivoted to a bracket on the bed B. The edge of this disk is grooved to conform to that of the edge of the lumber coming in contact with it. A second disk Z² is in frictional contact with the disk Z' and is pivotally mounted at an angle of forty-five degrees, with a bevel edge to the same degree. The lower side of the disk Z² dips into a glue-pot, which may be warmed in the usual manner. The friction of the disk Z' against the incoming piece of lumber is sufficient to rotate the same, and the friction of the disk Z' against the disk Z² is sufficient to rotate it and to cause it to carry up the glue from the glue-pot into which it depends; but any of the well-known forms of gluing mechanism may be substituted for the simple device which I have thus briefly described.

Referring now particularly to Figs. 1, 4, 5, 10, and 11, I will describe the detail construction of the set-over W and the air-valve actuating the same, and the clamping mechanism Y. The set-over mechanism consists of ways W', mounted transversely upon the body of the machine, which carry a cross-head W². Secured to this cross-head W² are shoving-blocks, which act the same as the shoving-blocks particularly described in connection with the set-over O. Pivoted to the frame of the machine is a rack W³, which meshes with a pinion W⁴, mounted upon a shaft journaled to the frame of the machine. Secured to the shaft carrying the pinion W⁴ are pitman-heads W⁵, to which are pivoted pitmen W⁶, which at their outer ends are pivoted to the cross-

head W². The piston X' of the cylinder X is secured to a slide-block X² upon the frame of the rack W³. Secured to the shaft I is a disk I', similar in construction to the disk M', already described, and provided with lugs I². A bell-crank lever X³, which is clearly shown in Fig. 10, engages with the lugs I² and is actuated similarly to the levers M³ and M⁷, heretofore described. The upper member of the bell-crank lever X³ is connected to the valve X⁴ of the cylinder X in such manner as to admit the air to said cylinder, so as to force the piston inwardly when the valve X⁴ is tripped by the lug I² coming in contact with the lever X³. The lower end of the piston of the valve X⁴ is provided with a block X⁵, which when raised by the action of the lever X³ locks with a block X⁶, secured to the frame of the machine and held inwardly by a spring action. The block X⁶ is mounted upon a rod X⁷, which is pivoted to a double lever X⁸, which is pivoted to a bracket secured to the frame of the machine. Secured to the guide-block X² of the rack W³ is a guide-rod X⁹. When the rack W³ is forced inwardly by pressure in the cylinder X, the guide-block X² is carried inwardly and strikes the upper arm of the lever X³, draws the rod X⁷ outwardly, and releases the locking-blocks X⁵ and X⁶, whereupon the piston of the valve of the cylinder X is carried downward by spring action, the air reversed, and the piston of the valve X is forced outwardly, carrying the rack outwardly to the position shown in Fig. 4. Thus it will be seen that the action of the rack is synchronous to the action of the shaft I, which is synchronized to the other parts of the machine through the endless bed K. It will be noted that the throw of the set-over by this construction is absolutely and accurately determined whatever the speed or throw of the rack W³, because if the action of the rack carries the pitmen W⁶ past the center it will result in the withdrawal of the set-over rather than to extend its action, and it will be noted that it is most essential and important that this action should be absolutely accurate in order that the piece of material driven to place is set over exactly to the line to receive and joint with the next incoming piece.

Referring now to the clamping mechanism Y, pivoted upon a shaft Y' are heavy arms Y², which extend transversely over the body of the machine and the under sides of which bear downwardly upon the clamping-block Y. At either end the clamping-block Y is provided with springs Y³, which add the necessary force to hold the material underneath it down firmly while the next succeeding or incoming piece is being joined to it. It is evident that this clamping device must be raised and lowered synchronously with the other portions of the machine—that is to say, it must be raised when the set-over W acts to shove the material over and must be lowered for the purpose of clamping the lumber before the next succeeding piece begins to come to

joint with the piece clamped. To perform this operation, I provide the outer ends of the arms Y^2 with arms Y^4 , which take over the upper ends of the pistons of the pair of cylinders Y^5 . These cylinders Y^5 are actuated by mechanism connecting with and actuated by the lugs I^2 upon the disk I' , substantially the same as the valves of the cylinders actuating the tread-rollers heretofore described are actuated and operated.

In order to prevent the incoming piece from being shoved too far by the lugs of the bed K , I provide a block a , which is mounted in ways upon a bed secured to the frame of the machine, so that the upper surface of the bed is in the same plane as the upper surface of the traveling bed K . This block a is provided with a hand-wheel and screw b , by which it may be moved lengthwise upon the bed to adjust it to the different lengths of materials which may be jointed, and it is also provided with a recoil-spring c , which will allow it to give a certain amount to meet the variations in lengths of the incoming pieces and prevent shock, which will occur if it is unyielding.

Having thus described my invention, what I claim is—

1. In a jointing-machine, a fixed bed, a traveling bed, means for actuating the same, means for holding the sections of lumber to be jointed longitudinally upon said traveling bed, comprising a plurality of tread-rollers, jointing mechanism for successively jointing the opposite edges of the lumber, and means for moving said lumber-sections transversely upon the plane of the bed to bring the edges of the sections successively into line with the jointers, substantially as and for the purposes set forth.

2. In a jointing-machine, a fixed bed, a traveling bed, means for actuating the same, means for holding the sections of lumber to be jointed longitudinally upon said traveling bed comprising a plurality of tread-rollers, jointing mechanism for successively jointing the opposite edges of the lumber, means for moving said lumber-sections transversely upon the plane of the bed to bring the edges of the sections into line with the jointers successively, and means for reciprocating said tread-rollers to permit of such transverse movement of the lumber-sections, substantially as and for the purposes set forth.

3. In a jointing-machine, a fixed bed, a traveling bed and means for actuating the same, reciprocating lugs for engaging the lumber-sections in their forward movement, reciprocating shovers for moving said lumber-sections transversely upon and in the plane of said moving bed into line with the jointers, jointers for jointing the opposite edges successively, a reciprocating shover for moving the jointed lumber-sections from said traveling bed to said fixed bed into line for jointing with the next following section, and means for holding said section on said fixed bed in

place while the next following section is being driven into joint with it, substantially as and for the purposes set forth.

4. In a jointing-machine, in combination with a fixed bed and a traveling bed a reciprocating shover and means for actuating the same for moving a section of lumber in the plane of and transversely from said traveling bed to said fixed bed to bring the edge first jointed into line with the second jointed edge of the next following section, and means for holding said section on said fixed bed while the next following section is driven to joint with it, substantially as and for the purposes set forth.

5. In a jointing-machine, a fixed bed and a traveling bed, a jointer for jointing the first edge of an incoming section, means for holding said section by pressure in contact with said traveling bed, means for moving said section transversely on said traveling bed after it is jointed upon the first edge, means for bringing the second edge into line with the second jointer, a jointer for jointing the second edge, means for holding said section by pressure in contact with said traveling bed while being jointed on its second edge, means for moving said section transversely from said traveling bed after the second edge is jointed to bring the first jointed edge into line to unite in joint with the next following section, and means for holding said section in place upon said fixed bed while the next following section is coming to place in joint with it, substantially as and for the purposes set forth.

6. The herein-described apparatus for jointing sections of lumber, consisting of a fixed bed, a continuously-traveling bed, jointers in continuous rotation, reciprocating mechanism for holding the lumber-sections by pressure in contact with the traveling bed while in process of jointing, reciprocating mechanism for bringing the edges of the lumber-sections in line for jointing, reciprocating mechanism for holding a jointed section in place upon said fixed bed while the next succeeding section is driven into joint with it, and reciprocating mechanism for bringing the first jointed edge of the section just driven to joint into line for jointing with the second jointed edge of the next succeeding section, the action of said reciprocating parts being governed by the action of said traveling bed, substantially as and for the purposes set forth.

7. In a jointing-machine, a traveling bed, a set-over for bringing the edges of the sections of lumber into line with the jointers, consisting of a transverse reciprocating head, an air-cylinder, the piston of said air-cylinder connecting with said cross-head, and a trip actuating mediately or immediately by the said traveling bed, timing the action of the set-over to the action of the traveling bed, substantially as and for the purposes set forth.

8. In a jointing-machine, a traveling bed, a set-over, consisting of a reciprocating transverse cross-head, an air-cylinder, a piston

connected therewith, a rotating disk, actuated by one of the drums carrying the traveling bed, lugs upon said disk and a pivot-lever, and connecting-rods communicating the
5 action of said lugs upon said disk to the valve of said air-cylinder, timing the action of said air-cylinder to the action of the traveling bed, substantially as and for the purposes set forth.

10 9. In a jointing-machine, a traveling bed, a series of tread-rollers, yieldingly mounted upon the frame of the machine, and calculated to travel upon the upper surfaces of the lumber-sections as carried forward upon
15 the traveling bed, and means for automatically raising said series of tread-rollers bodily out of contact with said lumber-sections, and means for returning the same to place, said actions being timed to the action of the traveling bed carrying the sections of lumber forward,
20 substantially as and for the purposes set forth.

10. In a jointing-machine, a traveling bed, a series of tread-rollers, yieldingly mounted
25 upon the frame of the machine, and calculated to travel upon the upper surfaces of the lumber-sections as carried forward upon the moving body of the machine, and means for throwing said tread-rollers bodily in and out
30 of contact with said lumber-sections, consisting of an air-cylinder connected by levers to said tread-rollers, and actuated by mechanism mediately or immediately operated by said traveling bed, timing the action of
35 said tread-rollers to the action of said traveling bed, substantially as and for the purposes set forth.

11. In a jointing-machine, a traveling bed, a series of tread-rollers, consisting of a series
40 of yielding tread-rollers, mounted movably upon the frame of the machine, a frame carrying said rollers, a lever pivoted to said frame and connected at one end with said frame carrying said tread-rollers, and at its
45 other end with a piston of an air-cylinder, an air-cylinder carrying said piston, and means for actuating said air-cylinder, consisting of a lever-arm and connecting-rods actuated mediately or immediately by said traveling bed,
50 substantially as and for the purposes set forth.

12. In a jointing-machine, a traveling bed, a clamping mechanism for holding the sections of lumber jointed in place while a
55 succeeding section is being driven to place, consisting of a clamping-section held down upon the upper section of the lumber jointed, and provided with transverse arms, air-cylinders for raising and lowering said transverse arms
60 and releasing and gripping said clamping mechanism, actuated mediately or immediately by said traveling bed and synchronizing in action thereto, substantially as and for the purposes set forth.

65 13. In a jointing-machine, a traveling bed, a set-over, clamp mechanism consisting of a longitudinal clamping-block, transverse arms

engaging said clamping-block and holding the same down in place and releasing the same,
70 air-cylinders for raising and lowering said transverse arms, actuated in connection with the air-cylinder actuating the set-over for lining up the jointed sections with the next succeeding incoming section, substantially
75 as and for the purposes set forth.

14. In a jointing mechanism, a traveling bed, a set-over for lining up the jointed sections of lumber with the next succeeding incoming section of lumber, consisting of a
80 transverse cross-head carrying shovers, and an air-cylinder reciprocating said cross-head, which air-cylinder is timed to the traveling bed and mediately or immediately actuated thereby, substantially as and for the purposes
85 set forth.

15. In the jointing-machine, a traveling bed, a set-over for lining up the jointed sections of lumber with the next succeeding section, and a clamping mechanism for holding
90 the jointed lumber while the next succeeding section is being driven to place, consisting of a cross-head reciprocating transversely over the traveling bed, an air-cylinder actuating the same, and means for actuating said air-cylinder connected mediately or immediately
95 with the said traveling bed, and a clamping-block and transverse arms secured thereto, and cylinders provided with pistons raising and lowering said transverse arms and connected directly for air-pressure with said cylinder actuating said set-over, substantially
100 as and for the purposes set forth.

16. In a jointing-machine, consisting of a fixed bed and a traveling bed, jointing mechanism adjacent to one edge of said traveling
105 bed for jointing one edge of the lumber-section, a jointing mechanism adjacent to the opposite edge of said traveling bed for jointing the opposite edges of said lumber-section, means for shoving the lumber-sections into
110 line with the first of said jointers, tread-rollers for holding said sections firmly upon said traveling bed while being jointed upon the one edge, a set-over for moving said lumber-sections transversely upon said traveling bed
115 and bringing the opposite edge of the lumber-section into line with the second jointing mechanism, and means for holding said sections firmly down upon the bed while being jointed upon the second edge, substantially
120 as and for the purposes set forth.

17. In a jointing-machine, a fixed bed, a traveling bed, jointing mechanism adjacent to the respective edges of said traveling bed, a set-over for shoving the lumber-sections
125 into line with the first jointing mechanism and tread-rollers for holding the same in line therewith, a second set-over for shoving the lumber-section into line with the second jointing mechanism, and tread-rollers for holding
130 the same in place while being jointed upon the second edge, said jointing mechanism having a continuous action, and said set-overs and said tread-rollers having intermittent ac-

tion, timed to the forward action of the traveling bed, substantially as and for the purposes set forth.

18. In a jointing-machine, a traveling bed, 5
a set-over for bringing the jointed sections of
lumber into line with the next succeeding or
incoming section, consisting of a reciprocating
cross-head and shovers, an air-cylinder, 10
timed in its action to the action of the traveling
bed, a rack pivoted to the frame of said
machine and actuated by the piston of said
air-cylinder, a pinion mounted upon a shaft
longitudinal to the body of said machine, carried
in bearings supported by the frame of 15
the machine, crank-heads secured to said
shaft, and connecting-rods connecting said
crank-heads with the cross-head of said set-
over, substantially as and for the purposes
set forth.

19. In a jointing-machine, a fixed bed and
a traveling bed, the traveling bed carrying
pivoted lugs upon the several sections constituting
said traveling bed, said lugs being provided with
arms carrying trolleys for 25
throwing said lugs in and out of operation,
the trolleys of said arms being mounted alternately
upon the inner and outer sides of said arms,
the one series of trolleys engaging over a track
rigidly mounted upon the fixed 30
bed of the said machine, a movable track,
movable transversely upon said fixed bed to
engage with the other set of trolleys when
thrown into line therewith, and means for
moving said movable tracks transversely, 35
substantially as and for the purposes set
forth.

20. In a jointing-machine, a clamp, means
for automatically actuating the same, constituting
a clamping mechanism for holding the 40
jointed sections in place while the incoming
section is being brought to place, and a stop
for limiting the forward action of the incoming
section of lumber, consisting of a block
yieldingly mounted upon a bed-plate of the 45
machine having its upper face in the plane
of the surface of the traveling bed, and means
for adjusting the position of said block to different
lengths of lumber, substantially as and
for the purposes set forth.

21. In a jointing-machine, a fixed bed and
a traveling bed, a set-over for lining up the
lumber-section with the first jointing mech-

anism, a jointing mechanism, a series of tread-
rollers, a set-over for moving the section of
lumber transversely upon the traveling bed 55
into line with the second jointing mechanism,
a second jointing mechanism, a series of tread-
rollers for holding the lumber in place, a gluing
mechanism for gluing the edges of said
lumber-sections successively as they are carried 60
to place, and a clamping mechanism and
set-over mechanism for successively jointing
said sections, substantially as and for the purposes
set forth.

22. In a jointing-machine, a traveling bed, 65
a set-over, consisting of a cross-head and shoving-
blocks, an air-cylinder, actuating said
set-over through its piston, and means for
timing the action of said cylinder to the action
of the traveling bed, and a second cylinder 70
having its piston connected with said
cross-head and constructed to act as a dash-
pot to limit the rapidity of the action of said
set-over, substantially as and for the purposes
set forth. 75

23. In a jointing-machine, the combination
of a clamp and means for automatically actuating
the same, constituting a clamping mechanism
for holding the jointed sections in place while the
incoming section is being brought to place, and a stop
for limiting the forward motion of the incoming
section, substantially as set forth. 80

24. In a jointing-machine, the combination
of a traveling bed adapted to carry pieces of 85
lumber to be jointed, tools for jointing the
opposite edges of the pieces of material arranged
to act in succession, and a reciprocating
shover, situated between the jointing-tools,
longitudinally, and arranged to move 90
transversely of the traveling bed, and to engage
with the edge of the piece of lumber which is
first dressed or jointed and to transversely
move the said material into position to be acted
upon by the second set of jointing-tools, and
means for actuating the said shover after the
first set of tools has finished its work, 95
substantially as set forth.

In witness whereof I have hereunto set my
hand in the presence of two witnesses.

WILLIAM A. FIRSTBROOK.

Witnesses:

D. B. TUTTLE,
MINNIE RHENISCH.