Dec. 21, 1926. 1,611,177

O. C. FENLASON

VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 1

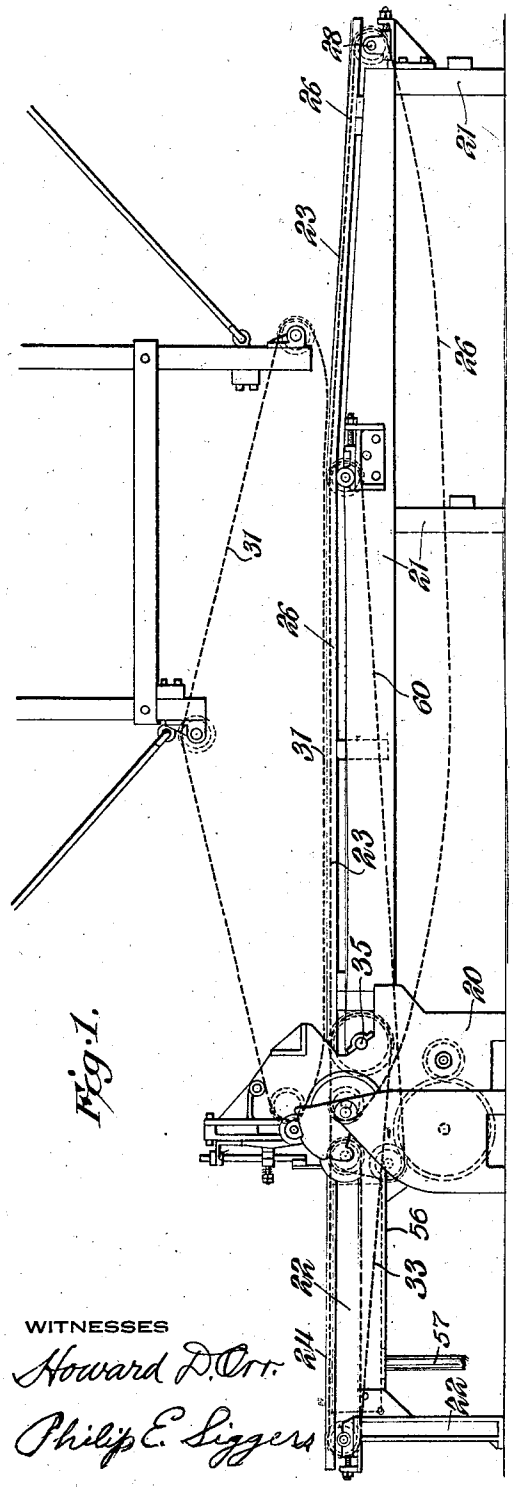


Fig. 1.

WITNESSES

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Dec. 21, 1926. 1,611,177

O. C. FENLASON

VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 2

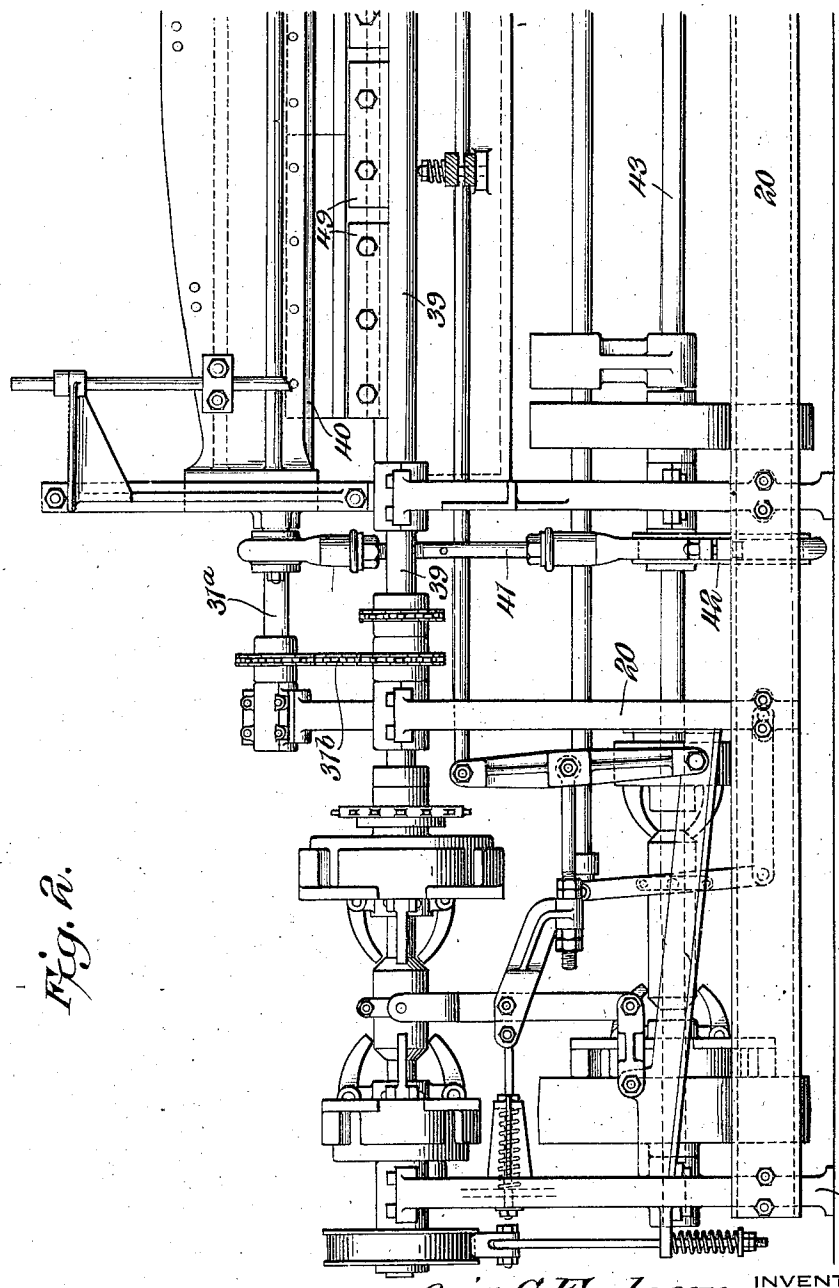


Fig. 2.

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VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 3

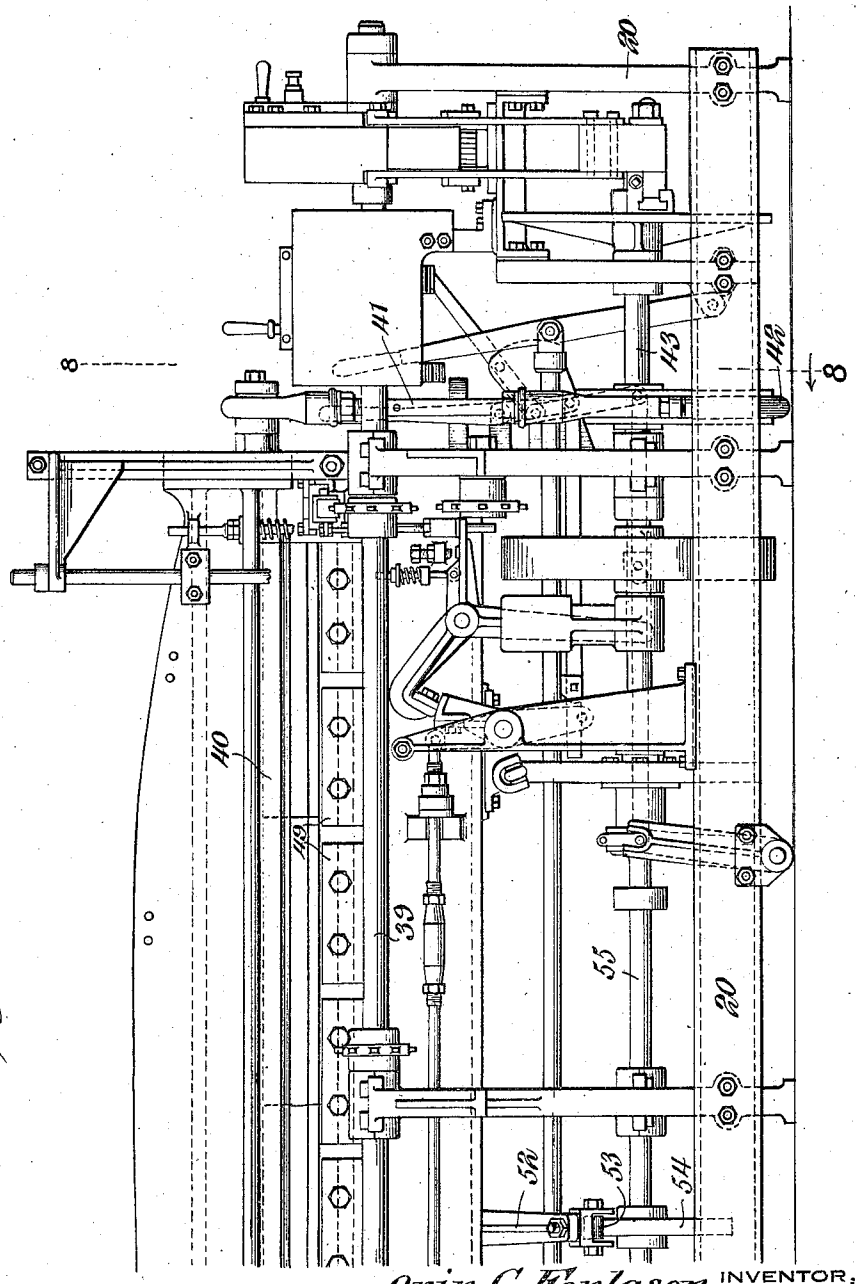


Fig. 2a

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WITNESSES

Howard D. Ott.

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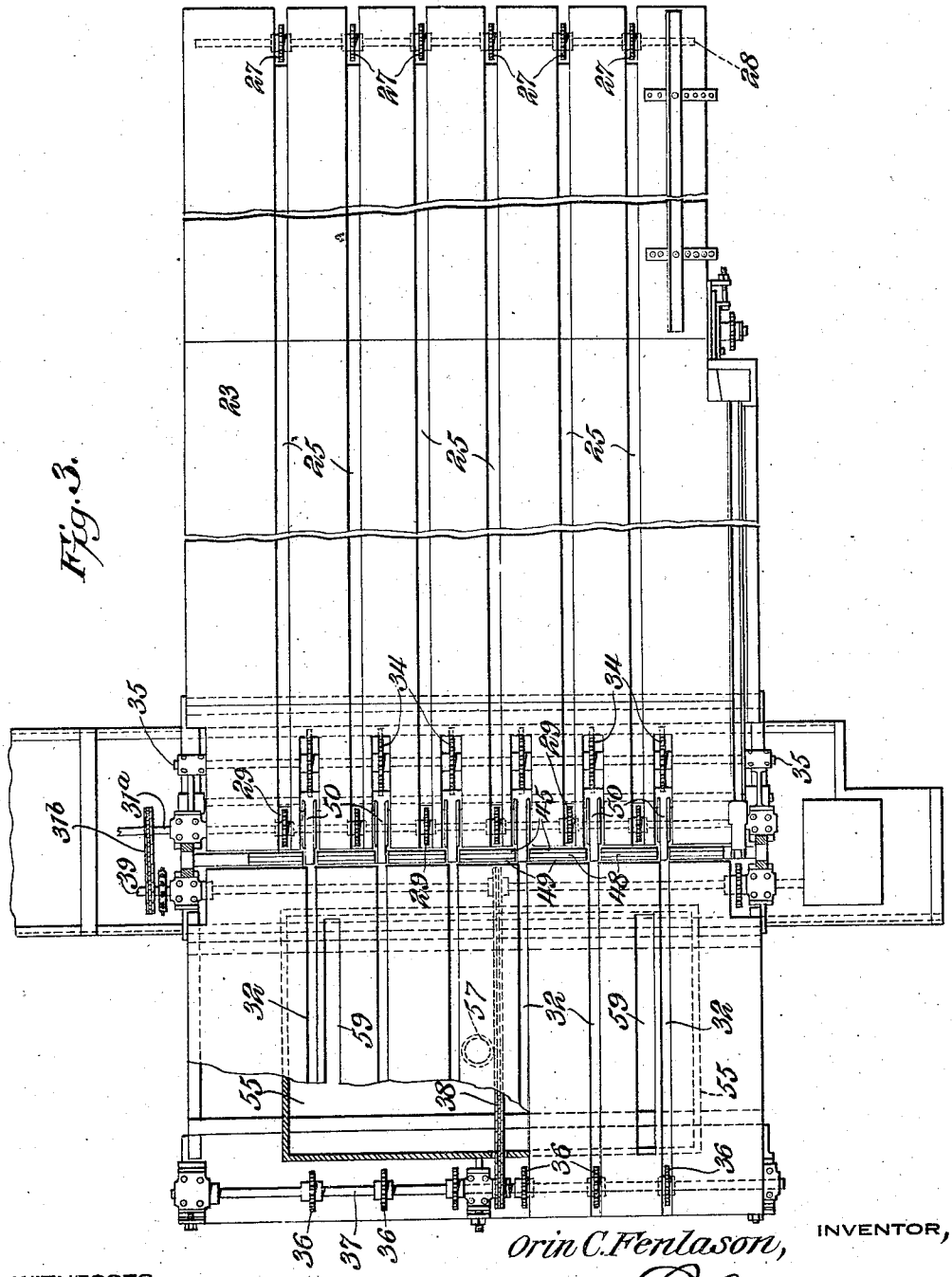
Dec. 21, 1926. 1,611,177

O. C. FENLASON

VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 4

Fig. 3.



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Dec. 21, 1926. 1,611,177

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VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 5

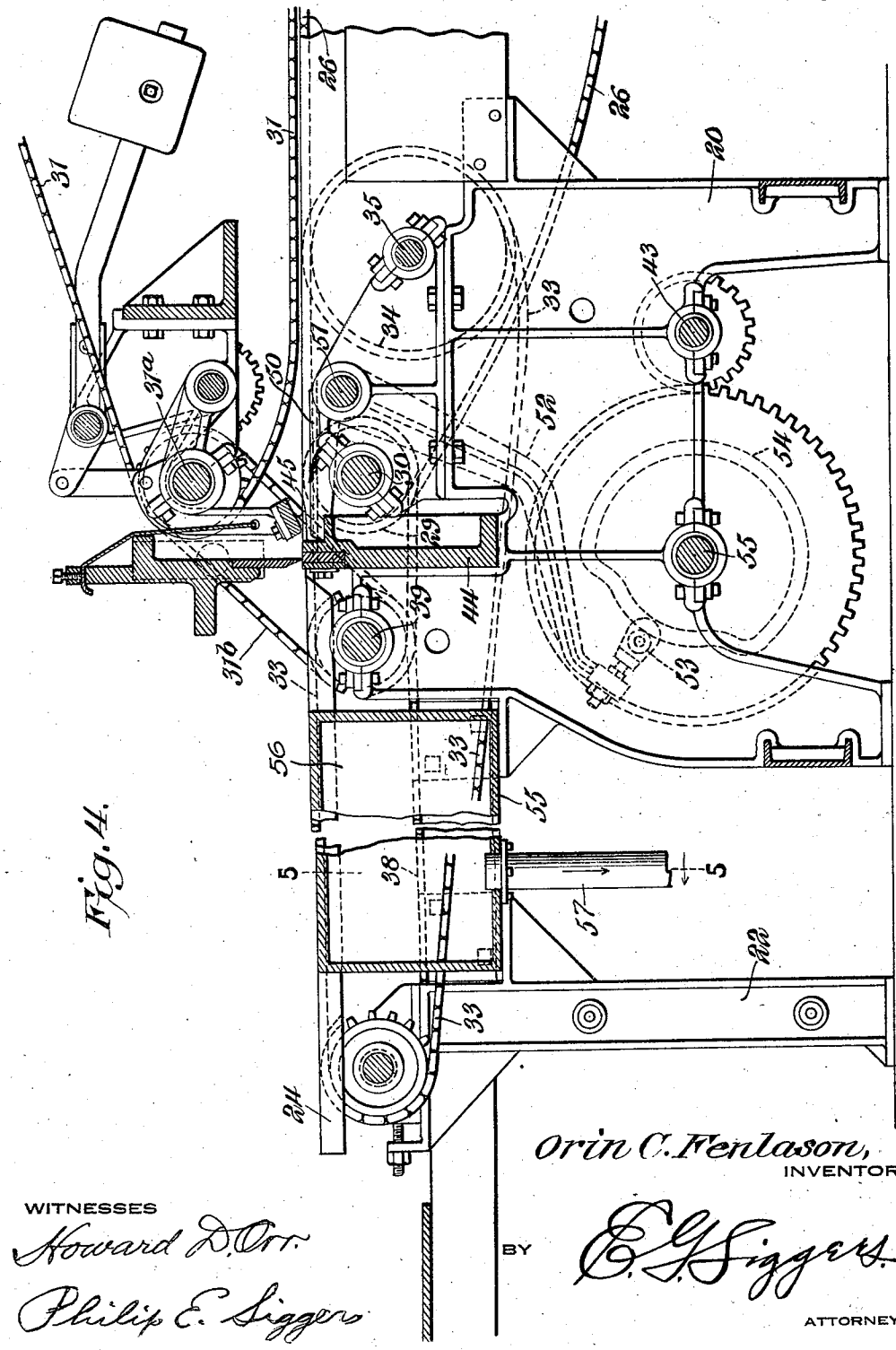


Fig. 4.

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Dec. 21, 1926. 1,611,177

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VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 6

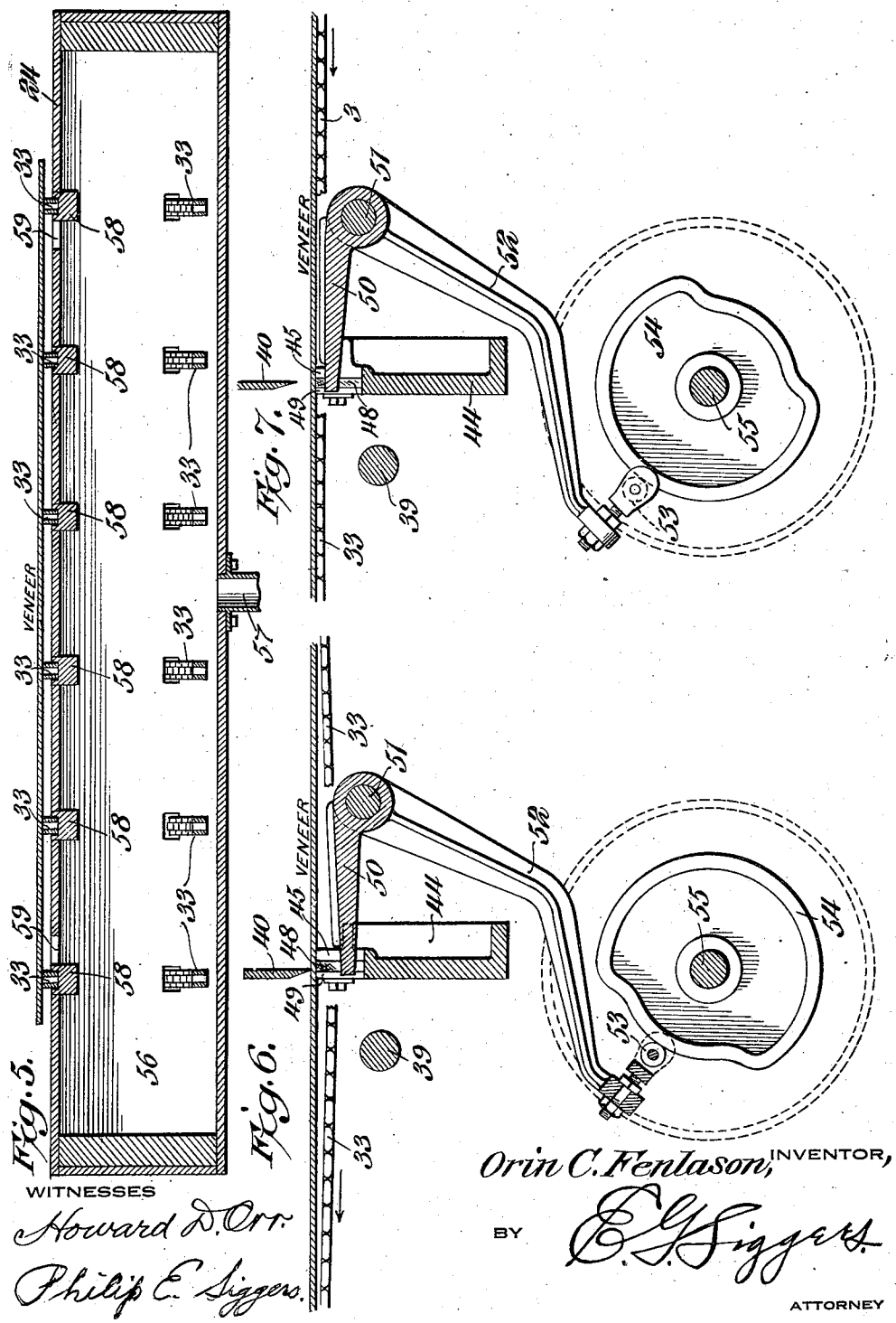


Fig. 5.

Fig. 7.

Fig. 6.

WITNESSES

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Dec. 21, 1926. 1,611,177

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VENEER JOINTER

Filed Oct. 14, 1922 7 Sheets-Sheet 7

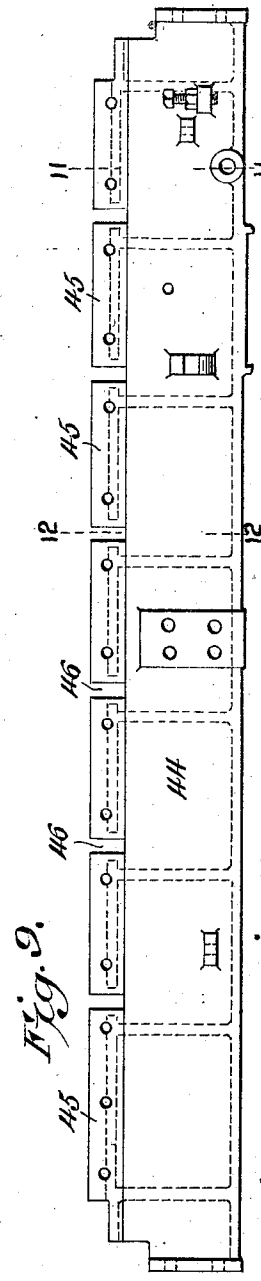


Fig. 9.

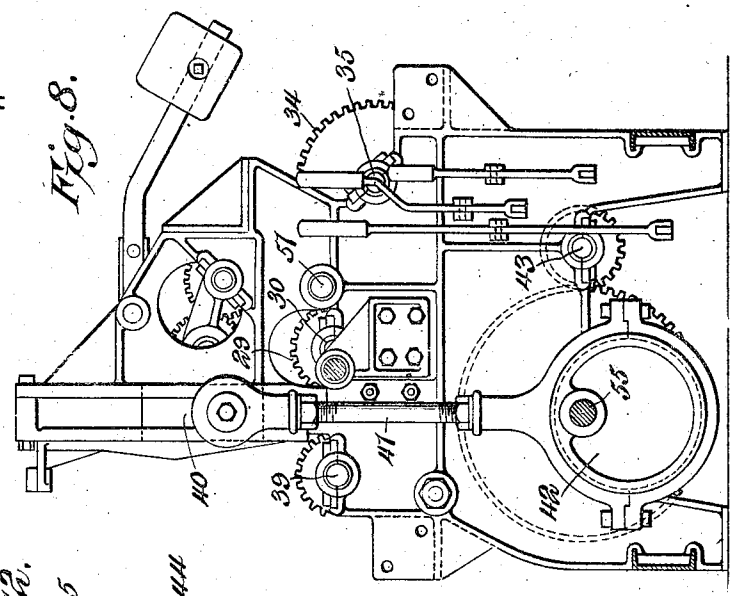


Fig. 8.

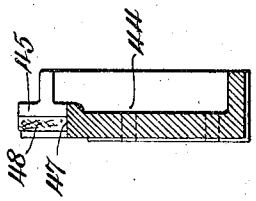


Fig. 12.

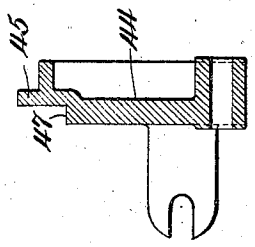


Fig. 11.

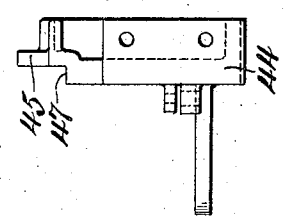


Fig. 10.



Fig. 13.



Fig. 14.

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WITNESSES

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Philip E. Siggers.

BY E. G. Siggers.

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Patented Dec. 21, 1926. 1,611,177

UNITED STATES PATENT OFFICE.

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VENEER JOINTER.

Application filed October 14, 1922. Serial No. 594,552.

This invention relates to veneer jointers, and aims principally to improve the feeding-out mechanism of such machines.

Veneer jointers as commonly constructed include a knife, a feeding-in mechanism designed to convey the sheets of veneer up to the knife, and a feeding-out mechanism adapted to carry the jointed or cut sheets away from the knife. Ususally conveyor chains running horizontally are employed in connection with a vertically reciprocating knife.

The present invention is novel, so far as I am aware, in a number of particulars. First, the conveyer chains for the feed-out run under the jointer knife. Second, the conveyer chains are guided by movable races so that the chains are moved out of contact with the cutting edge of the knife. Third, air suction is employed to hold the sheet of veneer down firmly on the chains.

These are some of the principal features of my invention. There are various other features and advantages which will appear in the following description of a preferred embodiment of the invention.

In the accompanying drawings forming a part of this specification there is shown for illustrative purposes one of the many forms which my invention may take.

Referring more specifically to the drawings—

Figure 1 is a somewhat diagrammatic side elevation of the improved veneer jointer;

Figures 2 and 2ª taken together form a vertical transverse sectional view on a section line near the knife;

Figure 3 is a plan view;

Figure 4 is a vertical longitudinal sectional view of that part of the machine adjacent the knife, and of the off-bearing table;

Figure 5 is a vertical transverse section on the line 5—5 of Figure 4, showing a sheet of veneer held upon the off-bearing table;

Figures 6 and 7 are detail views showing two portions of the mechanism by which the conveyer chain races are lowered before jointing and raised thereafter;

Figure 8 is a vertical section substantially on the line 8—8 of Figure 2;

Figure 9 is an elevation of the cutting bed;

Figure 10 is an end elevation looking from the right side of Figure 9;

Figure 11 is a section on the line 11—11 of Figure 9;

Figure 12 is a section on the line 12—12 of Figure 9;

Figures 13 and 14 are both perspective views of respectively a backing bar and a filling strip used upon the cutting bed;

The drawing illustrates as the preferred embodiment of the invention a veneer jointer comprising, as shown best in Fig. 1, a main frame 20, a feeding-in conveyer support or frame 21, and a feeding-out conveyer frame or support 22. The frames 21 and 22 are of the nature of tables having tops 23 and 24 respectively, and may hereafter be referred to as such. The table top 23 has longitudinal openings, grooves or the like 25, for receiving the feeding-in chains 26, and chains meshing with idler sprockets 27 mounted loosely on a common shaft 28 at the feeding end of the machine, and being driven by sprockets 29 all on a power actuated shaft 30 journaled in the machine frame 20 near the knife bed, so that sheets of veneer laid on chains 26 will be conveyed under the knife for jointing, as will be described.

In order better to hold the sheets of veneer upon chains 26 and prevent slipping, several chains 31 (Figs. 1 and 4) may be supported above table 23 so that their lower courses run adjacent to and are driven synchronously with the feeding-in chains by means of shaft 31ª which is driven by sprocket chain connection 31ᵇ (Fig. 2). Instead of such hold-down means, various other arrangements may be employed, one of which will be described later.

The feeding-out or off-bearing table 24 is inclined as shown in Figure 4 and has slots or chain races 32 (Fig. 3) for the feeding-out chains 33. The latter are meshed with idler sprockets 34 loosely mounted on a shaft 35 journaled in frame 20 and disposed on the feeding-in side of the knife. The chains 33 are driven in the same direction as chains 26 by sprockets 36 fixed on shaft 37; and shaft 37 is rotated by means of a sprocket chain 38 (Fig. 3) driven from the power shaft 39.

It has been noted that the feeding-out chains travel under the knife, which is indicated at 40. The knife 40 is reciprocated vertically by any suitable mechanism such as

eccentric arms 41 (Figs. 2 and 8), pivotally connected at their upper ends to the knife, and joined to eccentrics 42 on the power driven shaft 43. Vertical guides for the knife are provided as seen in Figs. 2 and 2ª.

The cutting bed for the knife is shown in elevation in Figure 9 and comprises principally a cast iron frame 44 having a vertical flange 45, broken by slots or gaps 46, through which the feeding-out chains run. The flange 45 projects upwardly intermediate the side faces of the frame 44 so that a ledge or seat 47 is provided for hardwood filler strips 48 held against flange 45 by bolts or the like and backing bars 49. There is one filler strip 48 secured between each pair of slots 46, and these filler strips serve as an anvil for the knife when it descends to cut the veneer, as best shown in Fig. 6. Thus the knife edge is not blunted or turned by jointing.

It will be evident that the feeding-out chains 33 must be removed from the path of the knife before each cut, and one of the many mechanisms for effecting this result is shown in the drawings, Figs. 4, 6 and 7. For each chain 33 there is provided a guide or race 50 secured to shaft 51. This shaft is rocked axially by means of a rock arm 52 mounting a roller 53 which rides over a cam 54 secured upon shaft 55. The shaft 55 is rotated only during ascent and descent of the knife, and the cam 54 is so placed that it causes the race or guide 50 to rock counter-clockwise when the knife moves downwardly, and to rock clockwise when the knife moves upwardly. The rocking of races 50 causes the chains 33 to move down out of the way of the knife before the cut is made.

The described means for moving the chain races 50 is merely illustrative. Obviously the same result may be obtained by imparting to the races a rectilinear or reciprocatory movement, or even by employing rotary motion. The essential thing is that the feeding-out chains, which run directly under the knife, be removed from any possible contact with the knife edge.

Veneer jointers employing conveyer chains adapted to move the veneer toward and from the knife are so constructed that the knife is stationary, except when the operator causes it to descend to make a cut; and when the knife is put in motion, the conveyer chains are stopped so that the knife joints a stationary sheet of veneer. My invention is to be employed with such a machine. Now when the chains 33, 26 are started and stopped, the sheets of veneer resting on them must partake of their motion as nearly as possible as though the veneer were attached to the chains; yet any actual attachment would be impractical. I prefer to use air suction means to hold the veneer sheets firmly on the feeding-out chains 33, and may employ air suction in connection with the feeding-in chains, in substitution for the hold-down chains 31. Air suction has been found to prevent slipping of the veneer sheets on the chains. For an understanding of my improved suction means, Figs. 4 and 5 should be noted.

The off bearing table is constructed so as to support a vacuum chamber 56 below its top 24. In order to maintain a partial vacuum in chamber 56, a pipe 57 may lead from the bottom thereof to an exhaust fan (not shown), or a vacuum pump could be employed. Preferably the top of the vacuum chamber 56 is formed by the table top 24, and said top carries races 58 to support and guide the conveyer or feeding-out chains 33. Now while wire cable or narrow belts could be used in place of link chains as the feeding-out means, I find that chains are much to be preferred, particularly those having flat links, so that the sheets of veneer can rest flat on them with no appreciable spaces between the under side of the veneer sheets and the upper sides of the chains. Preferably adjacent the two outermost chain races 58 are openings 59 extending the full length of the vacuum chamber, so that the suction of said chamber acts on the sheet of veneer carried by the chains to hold the sheet firmly, whereby when the chains start and stop, as they do during the operation of the jointer, the veneer sheets start and stop also. In other words, the suction of the exhaust fan overcomes the momentum of the veneer sheets, and permits accurate control of the positions of said sheets, hence accurate jointing. Obviously, as many openings 59 may be employed as are necessary to hold the veneer firmly on the conveyer chains.

The present invention is an improvement on the veneer jointer described and claimed in my co-pending application, Serial No. 520,104, filed December 5th, 1921 which has eventuated in Patent 1,440,383, dated January 2, 1923.

In the operation of the present machine, the knife is reciprocated continuously as long as the machine is in operation. The movment of the knife is controlled by a clutch and when the knife clutch is disengaged, the machine stops operating. When the knife has advanced preferably about 1½ inches on its up stroke, the clutch controlling movement of the veneer conveying chains is engaged, and the veneer is fed under the knife until the knife is within 1½ inches of the cutting bed of the machine, when a trip finger disengages the clutch that drives the veneer feed chains. The particular mechanism by which these results are obtained forms no part of the present invention.

An important feature of this invention is

that the conveyer chains run under the jointer knife. The feeding-in chains bring the veneer sheets only up to the knife; and feeding-out chains as previously used have had their inner ends spaced from the discharge ends of the feeding-in chains. My arrangement, unlike others known to me, puts the veneer sheets, regardless of their size, always in contact with the conveyer chains, and the veneer sheets are started and stopped when the conveyer chains are started and stopped. This makes it possible to joint the last piece of veneer that is being jointed from a veneer sheet as accurately in width as any of the other pieces. In short, my improved machine gives an operator perfect control of the jointing operation.

While I have described in some detail a preferred embodiment of my invention, obviously I am not to be limited to the illustrative apparatus disclosed.

What is claimed is:—

1. In a machine of the class described, comprising a pair of conveyors, a knife above one of said conveyors, one of said conveyors arranged to conduct material to be cut toward the knife, and the other conveyor arranged to conduct the material under the knife to be severed and then to conduct the severed pieces away from the knife, and independent means to hold the material against slipping on each of said conveyors, said means including suction apparatus arranged below the conveyor for conducting the several pieces under and away from the knife.

2. A veneer jointer comprising, in combination, a supporting frame, a knife mounted on the frame, a feeding-in conveyor arranged to conduct material to be cut toward the knife, means to hold the material against slipping on the feeding-in conveyor, an intermittently movable feeding-out conveyor having a portion arranged under the knife and adapted to conduct the material under the knife to be severed and then away from the knife, and suction apparatus operatively arranged below the feeding-out conveyor to hold the severed sheets against slipping when the conveyor is started or stopped.

3. In a veneer jointer, a reciprocatory knife, a pair of intermittently movable feeding-out conveyor chains for conducting severed sheets away from the knife, and a source of suction arranged between and beneath the conveyor chains to hold the sheets against slipping on the links of the chains when the conveyor is started or stopped.

4. In a veneer jointer, a reciprocating knife, an intermittently movable, endless conveyor under the knife and arranged to conduct the severed sheets away, and air suction means independent of the conveyor operative to hold the sheets stationary on the conveyor while the knife is functioning and to prevent slipping when the conveyor is started.

5. In a veneer jointer, a bearing off table, an intermittently movable conveyor running over said table, and a source of suction arranged below the table and independent of the conveyor operative to hold severed veneer sheets on the conveyor while traversing the table, whereby to overcome the inertia of said sheets and to prevent slipping when the conveyor is started and stopped.

6. In a veneer jointer, a knife, means for conveying a sheet of veneer up to the knife, an endless conveyor for carrying the veneer away from the knife, and independent means associated with each conveyer means for preventing slipping of the veneer sheets when the conveyer means are started and stopped.

7. In a veneer jointer, a knife, means for conveying a sheet of veneer up to the knife, means for carrying the veneer away from the knife, a hold-down chain running above the first conveying means to prevent slipping of the sheets of veneer thereon, and air suction means associated with the second conveyer means for the same purpose.

8. In a veneer jointer, the combination of a vertically reciprocatory knife, feeding-in mechanism operating to deliver veneer sheets adjacent the knife, feeding-out mechanism including an endless conveyor adapted to support the sheets where the feeding-in mechanism drops them and to carry the sheets under the knife to be cut and then out of the machine and means to move the endless conveyor out of the path of the knife when the knife is actuated.

9. In a veneer jointer, a feeding-in conveyer chain, a knife reciprocatory adjacent the delivery end of said chain, and a feeding-out conveyer chain movable under the knife and adapted to carry the veneer both before and after jointing.

10. In a veneer jointer, a feeding-out veneer conveyer normally moving in the path of the jointer knife, and means for moving said conveyer out of the path of the knife when the latter is actuated.

11. In a veneer jointer, chains adapted to carry veneer sheets under the jointer knife and out of the machine, means for supporting said chains directly under the knife, and means for moving the chain supports, whereby the chains are removed from contact with the knife when it descends to joint the veneer.

12. In a veneer jointer, a feeding-in conveyer chain, a knife reciprocatory adjacent the delivery end of said chain, and a feeding-out conveyer chain movable under the knife and adapted to carry the veneer both

before and after jointing, and means for causing said feeding-out conveyer chain to descend out of the path of the knife when the latter is actuated.

13. In a veneer jointer, a feeding-out veneer conveyer normally moving in the path of the jointer knife, air suction means operative to prevent slipping of the veneer sheets on said conveyer, and means for moving said conveyer out of the path of the knife when the latter is actuated.

14. In a veneer jointer, chains adapted to carry veneer sheets under the jointer knife and out of the machine, air suction means operative to prevent slipping of the veneer sheets on the chains when started and stopped, means for supporting said chains directly under the knife, and means for moving the chain supports, whereby the chains are removed from contact with the knife when it descends to joint the veneer.

15. In a veneer jointer, a vertically reciprocable knife, a plurality of horizontally running conveyer chains adapted to support and carry veneer sheets up to a point adjacent the path of the knife, and a plurality of synchronously driven chains, each disposed directly over one of the conveyer chains and adapted to hold down the veneer sheets upon the conveyer chains to prevent slipping when the chains are suddenly started and stopped.

16. In a veneer jointer, a vertically reciprocable knife, a plurality of veneer conveying chains adapted to support and carry sheets of veneer up to the knife and there discharge them, and a plurality of feeding-out conveying chains having their inner ends between the discharge ends of the feeding-in chains and passing under the knife.

17. In a veneer jointer, a vertically reciprocable knife, a plurality of veneer conveying chains adapted to support and carrying sheets of veneer up to the knife and there discharge them, and a plurality of feeding-out conveying chains having their inner ends between the discharge ends of the feeding-in chains, each of the feeding-out chains running under the knife and adapted to pick up the veneer sheets before they leave the feeding-in chains.

18. In a veneer jointer, a vertically reciprocable knife, a plurality of veneer conveying chains adapted to support and carry sheets of veneer up to the knife and there discharge them, a plurality of feeding-out conveying chains having their inner ends between the discharge ends of the feeding-in chains, and independent means associated with each conveyer for preventing slipping of the veneer sheets when the conveyers are started and stopped.

19. In a veneer jointer, a plurality of veneer conveying chains operable to carry jointed sheets of veneer away from the jointer knife, a vacuum chamber under said chains, and openings in the top of said chamber, whereby the suction of said chamber operates on the veneer sheets to hold them upon the chains without slipping.

20. In a veneer jointer, a table, a plurality of veneer conveying chains movable over the top of the table, a vacuum chamber under the table, said chains having flat links whereby the veneer sheets rest flat on the tops of the chains, and openings on each side of the table adjacent the outermost chains and leading to the interior of the vacuum chamber, whereby the suction thereof holds the veneer upon the chains.

21. In a veneer jointer, a jointer knife, a table, a vacuum chamber having its top formed by the table, races provided in said top, feeding chains supported and guided by said races and projecting above the top of the chamber, said chamber having openings extending the full length of the vacuum chamber, and means for producing a vacuum in said chamber.

22. In a veneer jointer, a jointer knife, a veneer conveying chain movable under the knife, a race adapted to support a part of said chain, and means for causing the race to move out of the path of the knife.

23. In a veneer jointer, a jointer knife, a veneer conveying chain movable under the knife, a race adapted to support a part of said chain, and means for causing the race to move out of the path of the knife, said race moving means being operated synchronously with the knife.

24. In a veneer jointer, a jointer knife, a conveying chain for veneer sheets normally moving in the path of the knife, a support for the chain disposed beneath the knife, means whereby the knife descends to joint the veneer when the chain is stopped, and means for moving the chain support to remove the chain from the path of the knife when the knife descends.

25. In a veneer jointer, a jointer knife, a conveying chain for veneer sheets normally moving in the path of the knife, an oscillatory chain race for the chain disposed beneath the knife, means whereby the knife descends to joint the veneer when the chain is stopped, and means for moving the chain race to remove the chain from the path of the knife when the knife descends.

26. In a veneer jointer, a jointer knife, a conveying chain for veneer sheets normally moving in the path of the knife, a support for the chain disposed beneath the knife, means whereby the knife descends to joint the veneer when the chain is stopped, and means for moving the chain support to remove the chain from the path of the knife when the knife descends, said latter named means comprising a shaft mounting the race, a rocker arm joined to the shaft, and a rotary cam actuated when the knife is moved

to cause swinging of the rocker arm and consequently oscillation of the chain race.

27. In a veneer jointer, a knife, means for vertically reciprocating the same, feeding-out chains traveling under the knife, a race adapted to support a part of the chains adjacent the knife, means for stopping the chains before the knife descends to joint the veneer, and means for actuating the race to cause the chains to move down out of the way of the knife before the cut is made.

28. In a veneer jointer, a knife, a cutting bed for the knife consisting of a frame having a vertical flange provided with slots, feeding-out chains running in said slots, a seat between each pair of slots adjacent the flange, a wooden filler in each seat, and means for holding each filler against said flange.

29. In a veneer jointer, a vertically reciprocating knife, an intermittently movable feeding-in conveyor including a plurality of parallel endless chains operative to bring the sheets under the knife, the feeding ends of the chains terminating in front of the knife, and a plurality of endless chains arranged above the first-mentioned chains for holding the sheets against slipping when the conveyor is started and stopped.

30. In a veneer jointer, a table, a reciprocating knife supported above the table, an intermittently movable, endless feeding-in conveyor arranged to engage the under side of veneer stock on the table top, driving mechanism for said endless conveyor below the table top, and means for holding down the stock to prevent slipping on said feeding-in conveyor including an endless conveyor above the table having its lower strand engaging the veneer stock.

31. In a veneer jointer, a reciprocating cutter, a feeding-in table adjacent to the cutter, a plurality of parallel endless conveyors associated with said table each having a portion guided to travel along the table top and arranged to engage the under side of a sheet of veneer stock, hold-down means cooperating with said endless conveyors on the table including flexible endless conveyors arranged entirely above the table and each having a lower span or stretch above the corresponding conveyor on the table, said hold-down endless conveyors being slack to permit said lower stretches to rest freely upon the upper side of the veneer stock, and means for driving all of said conveyors at the same speed.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

ORIN C. FENLASON.