

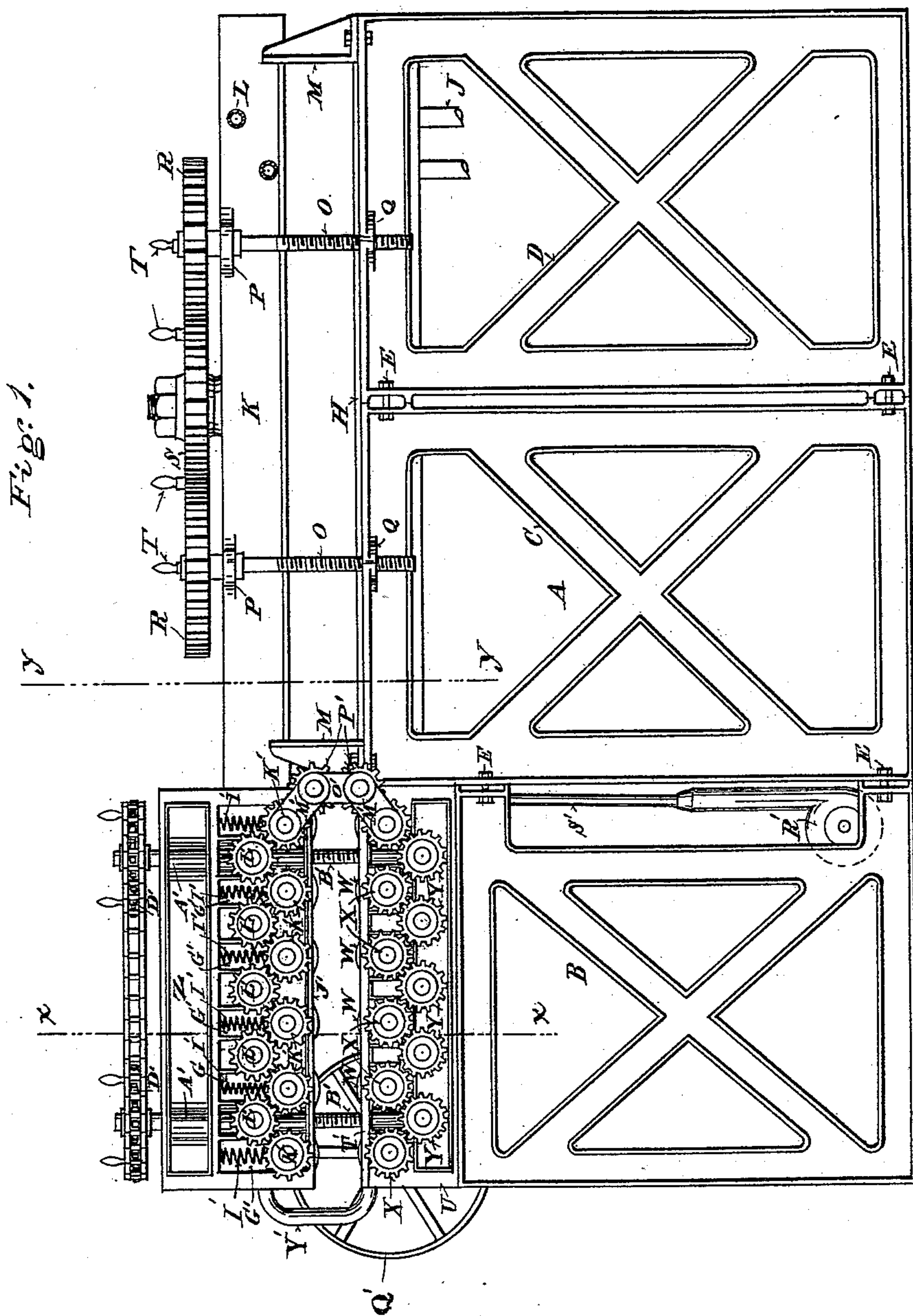
(No Model.)

2 Sheets—Sheet 1.

H. H. KING & B. F. K. JENNINGS.
METHOD OF VENEERING.

No. 424,484.

Patented Apr. 1, 1890.



WITNESSES

H. M. Plaisted.

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INVENTORS

Henry H. King and
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their Attorney.

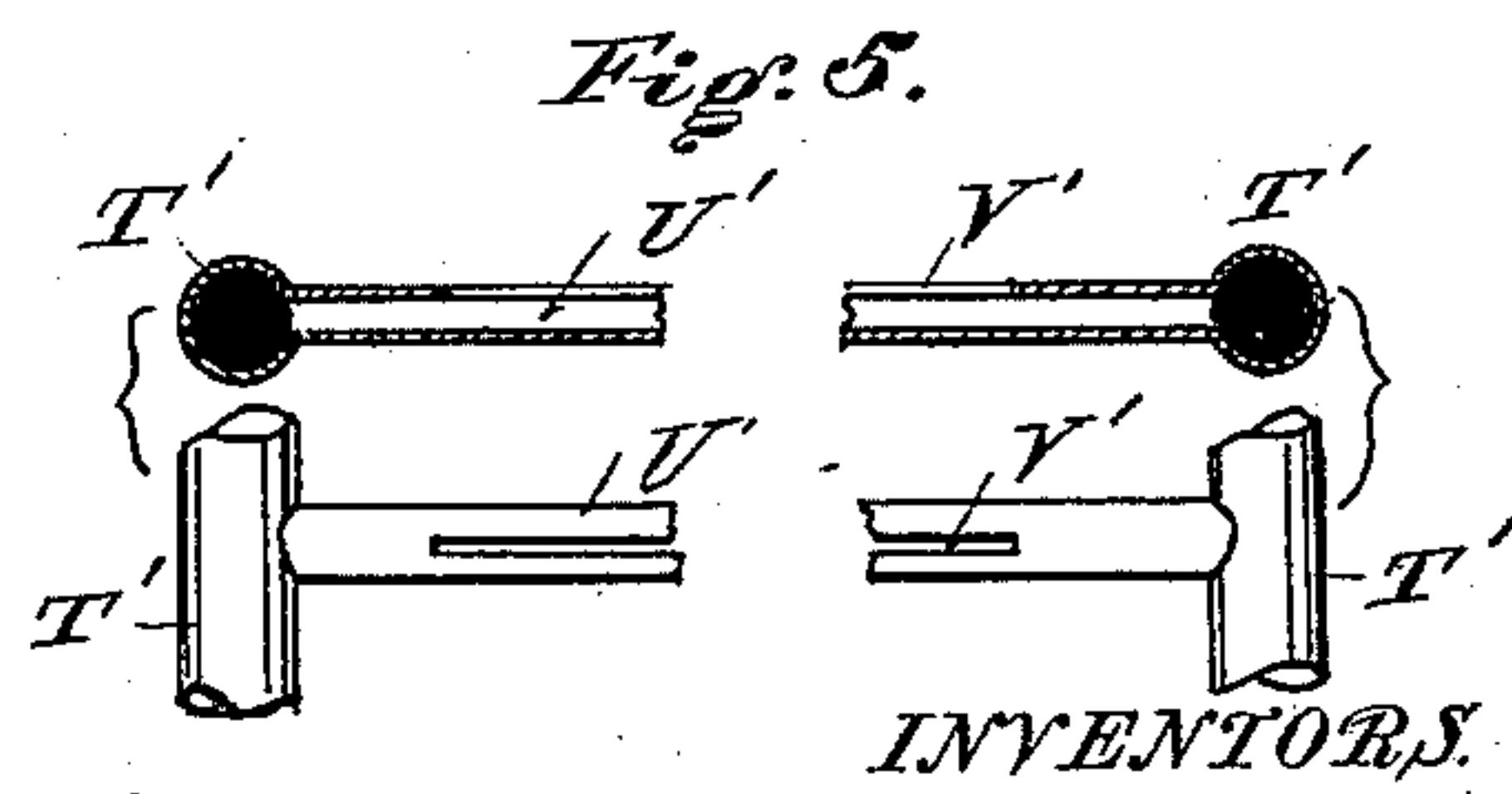
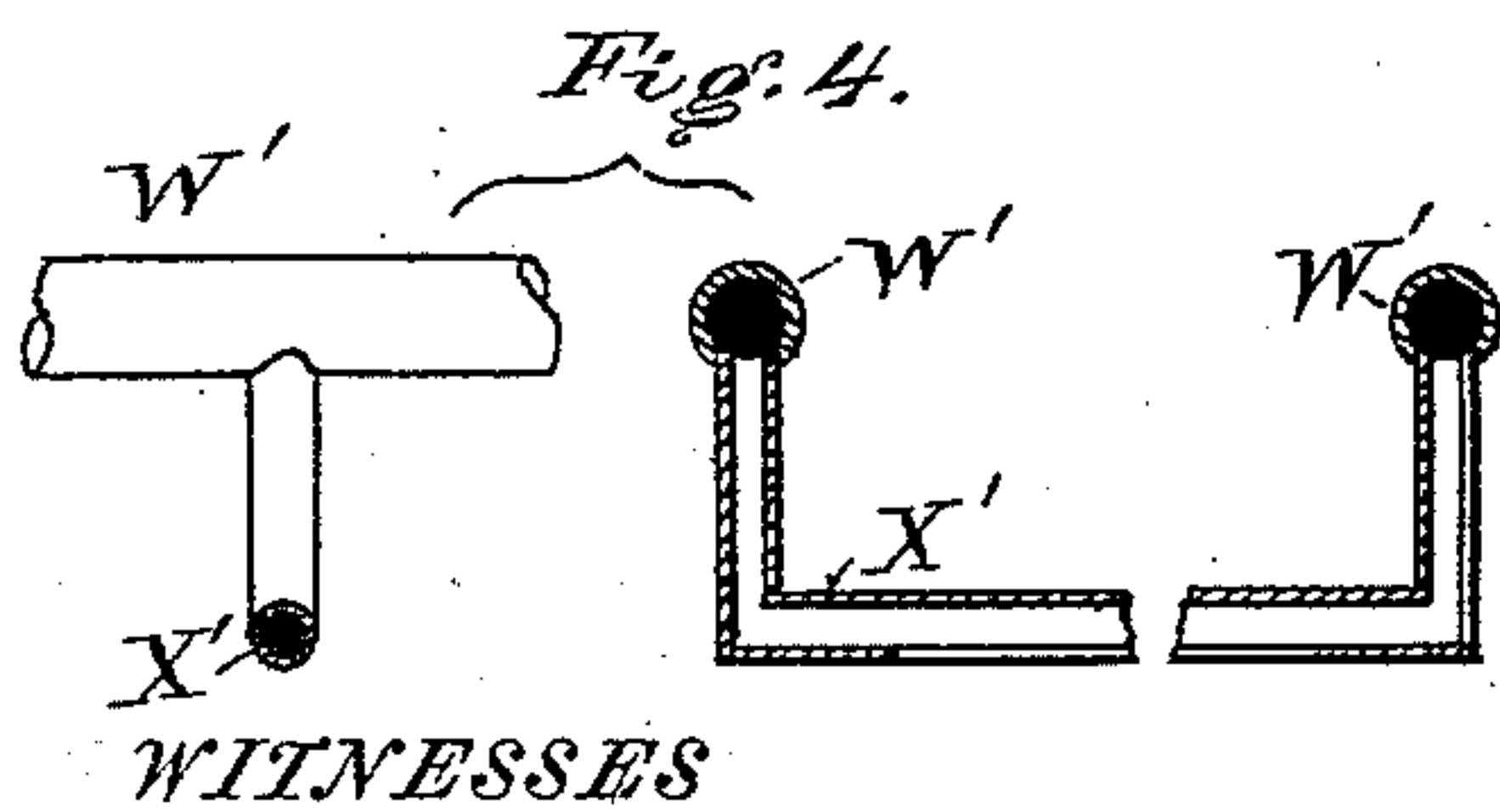
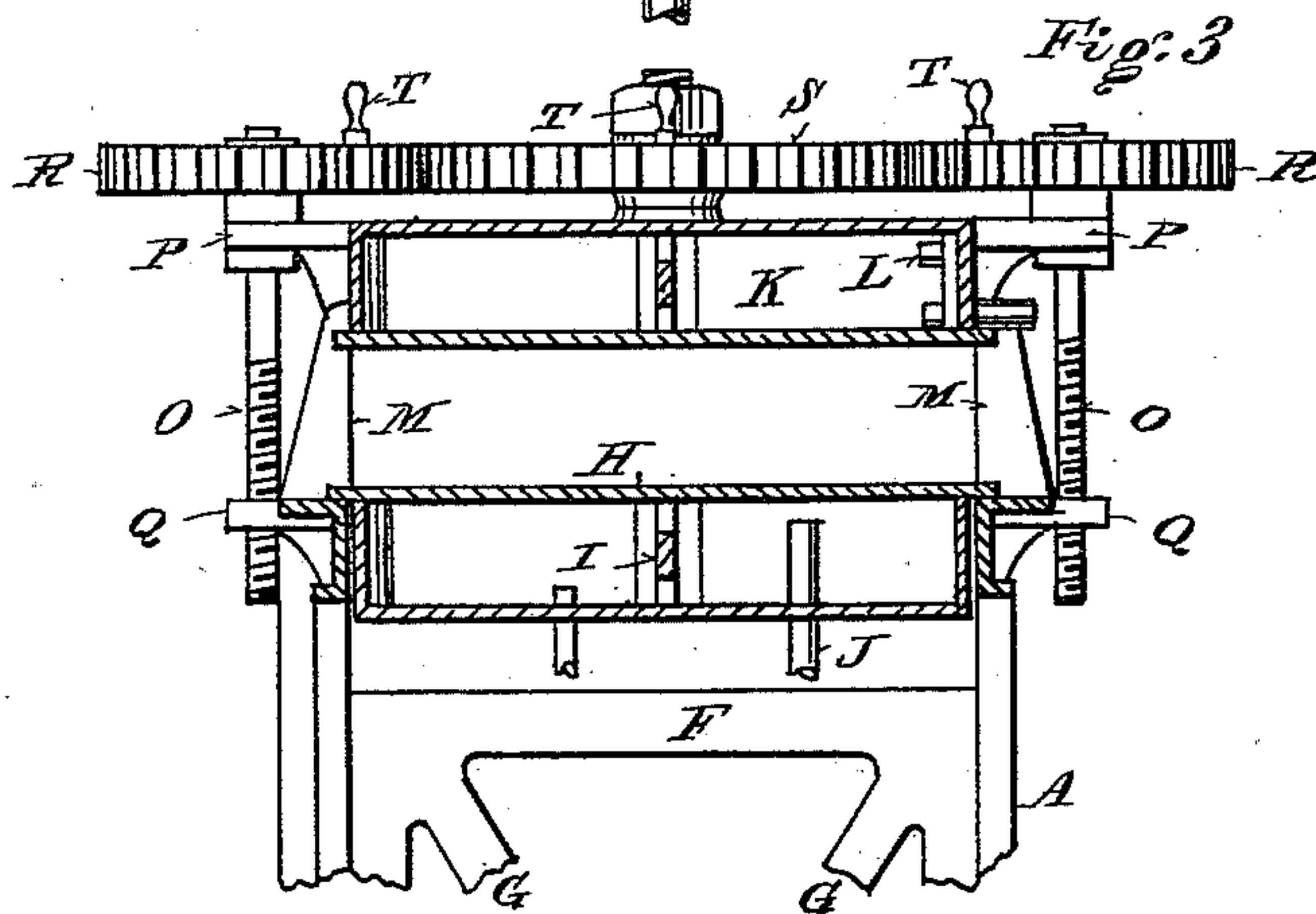
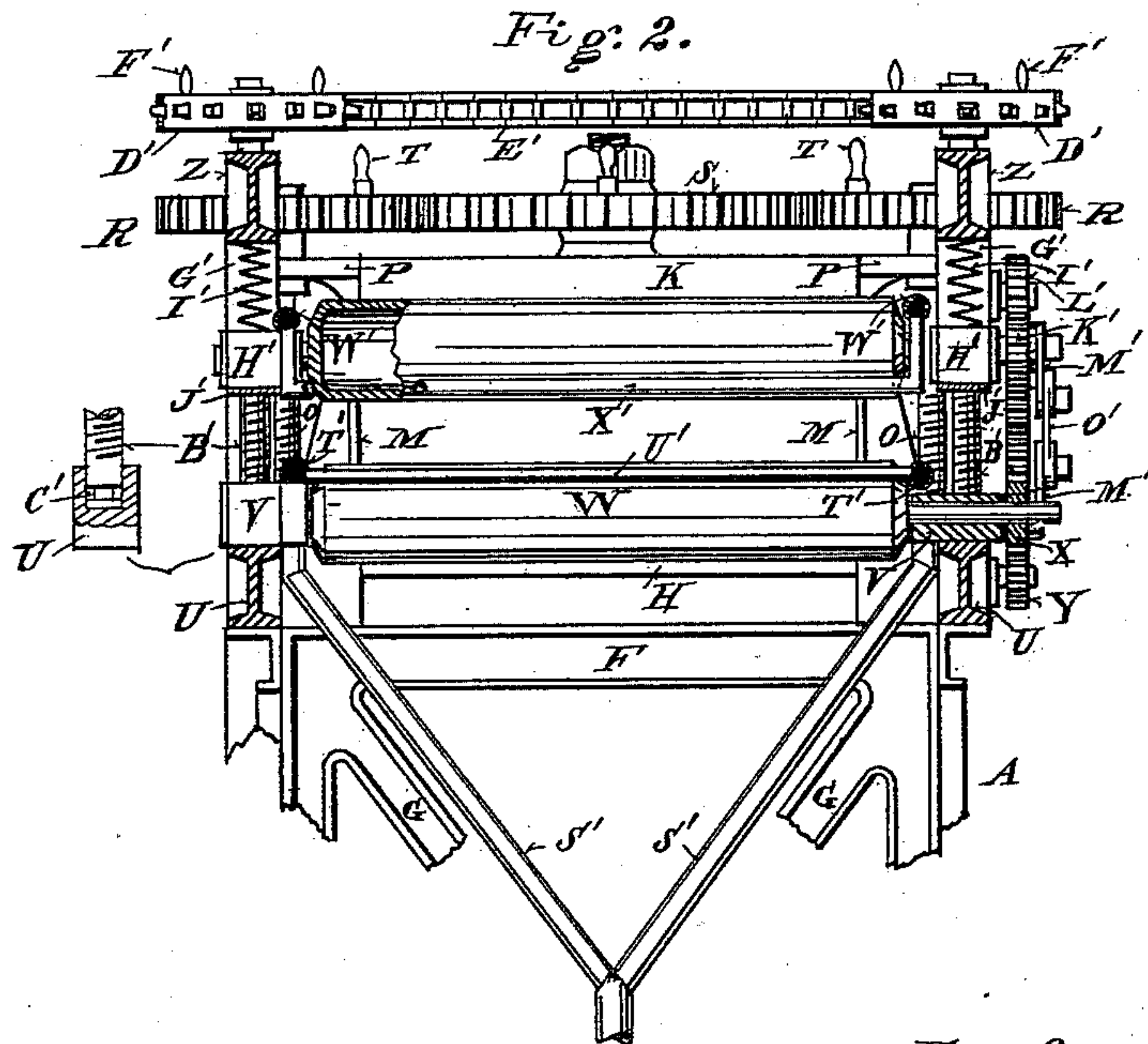
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UNITED STATES PATENT OFFICE.

HENRY H. KING, OF SPRINGFIELD, AND BENJAMIN F. K. JENNINGS, OF DAYTON, ASSIGNORS OF ONE-HALF TO RALPH A. WORTHINGTON, OF SPRINGFIELD, OHIO.

METHOD OF VENEERING.

SPECIFICATION forming part of Letters Patent No. 424,484, dated April 1, 1890.

Application filed July 17, 1889. Serial No. 317,819. (No model.)

To all whom it may concern:

Be it known that we, HENRY H. KING and BENJAMIN F. K. JENNINGS, citizens of the United States, residing, the former at Springfield, Clark county, and the latter at Dayton, Montgomery county and State of Ohio, have invented certain new and useful Improvements in Methods of Veneering, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in the art or method of securing thin sheets of veneers of costly and ornamental woods to a base or back of plainer wood.

Veneer-woods as usually found in stock are warped or crumbled into irregular shapes, as a result of the method by which they are manufactured, and owing to their thinness and fragile nature they have to be very carefully handled in applying them to a base or back in the manufacture of articles of furniture, &c. In view of this condition of veneers our invention is designed, among other things, to flatten the veneers in a rapid manner and without liability to cracking or breaking them.

Our method or art consists, essentially, in applying glue or other adhesive substance between or upon the surfaces to be united; in subjecting the veneers and the base with such substance intervening to the action and pressure of heat distributed upon and over the outer surface of the veneer, so as to flatten it and force the veneer and base into intimate contact and at the same time cause the adhesive substance to enter the pores of the two woods; in removing the woods from the heat or heat from the woods, and in continuing or maintaining the pressure, and in accompanying such latter pressure with the subjection of the woods to the cooling action of an atmospheric blast arranged to act upon substantially the entire surface of the veneers with practical uniformity, so as to set the glue and obtain substantially uniform contraction.

We will now refer more in detail to the several steps in our art or method. It consists in coating either the veneer or base, or

both, with glue or some suitable adhesive substance, and then applying one upon the other irrespective of the irregularities in the veneer, whether warped in part or throughout its entire body. For instance, the base and veneer or veneers are subjected to the simultaneous action of pressure and heat, the pressure being applied practically over the entire surface or in areas sufficiently broad to rapidly expel the warp from the veneer and flatten the veneer down upon the base. While this pressure is maintained the heat is operating to render the veneer more obedient and pliable, as well as to run the glue. When this two-fold action of pressure and heat has been continued as long as may be necessary under the particular circumstances of the kind of wood and the condition of the veneer, glue, &c., the material is removed from the heat or the heat from the material, and the pressure continued or reapplied in conjunction with the lowering of the temperature of the air immediately in contact with the material. The per cent. of the cooling effects compared to the agency employed to effect the cooling is very low when the intermediate surfaces are cooled and impact depended upon to cool the material. Our method differs from this in the particular now being explained, in that we utilize the direct influence and contact of the surrounding air, whose temperature is reduced, as the medium of cooling the material and setting the glue. This, besides economy of application, is more effective and more uniform and acts more quickly than by the impact method above alluded to. While the temperature of the air may be lowered in any suitable manner, we prefer to accomplish this by putting the atmospheric air in rapid motion, as by creating an air-blast and directing such blast against the material undergoing operation.

Under our method a veneer may be placed upon either one or both sides of the base and treated in the manner hereinbefore described.

In speaking of the simultaneous application of the heat and pressure, we do not mean to say that the pressure and heat shall take effect at the same time, but merely that they

shall be concurrent in their operations—that is, that while the veneer and base are being forcibly held together the action of the heat shall be in operation, so that the glue or other adhesive substance may readily enter the pores of the woods.

For the purpose of making known one type of machine by which our improved method can be carried into practical effect, reference is hereby made to the subjoined drawings, it being clearly understood that this is only one type of machine for this purpose, this machine being the subject of Letters Patent No. 415,276, dated November 19, 1889.

In the accompanying drawings, forming a part of this specification, and in which like reference-letters indicate corresponding parts, Figure 1 represents a side elevation of the machine entire; Fig. 2, a vertical sectional view on the line *xx* of Fig. 1; Fig. 3, a vertical sectional view on the line *yy* of Fig. 1; Fig. 4, detail elevation and sectional views of the upper air-pipe, and Fig. 5 detail plan view and sectional views of the lower air-pipe.

We will now proceed to describe the drawings in detail, to enable a perfect understanding of this the preferred machine for practicing our method, and will incidentally state the operation of the machine.

The letter A designates a stout frame of the type illustrated, in which the several sections B, C, and D are bolted together, as seen at E. These sections are suitably braced by the lateral and diagonal pieces F and G, as seen in Figs. 2 and 4.

The letter H designates a hollow bed, preferably made of cast-iron and fitted upon the frame A, as more clearly seen in Fig. 3. A central partition I may be employed to strengthen the bed. To this bed is connected a pipe J, through which steam, hot air, or other heating medium is conducted to the interior of the bed to raise its temperature and cause it to soften the veneer and make the glue more readily run into the pores of the wood. We contemplate veneering both sides of a body of wood at the same time, in which instance it is preferred to heat the bed H. When veneering but one side of a board, however, the bed may not be heated unless the veneer were placed beneath and the board above it.

The letter K designates a movable platen, also preferably constructed of cast-iron, and of the same dimensions and shape as the bed H. This platen is hollow and is provided with a pipe L, having a telescopic or flexible joint to compensate for the movements of the platen. Through this pipe steam or other heating medium is introduced. Standards M assist in guiding the platen, which is mounted upon stout screw-threaded rods O, which rotate in the lugs P on the platen and travel in the screw-threaded projections Q on the main frame. There are preferably four of these rods and each carries a pinion R, which meshes with a central gear-wheel S, mounted on a

stud carried by the platen. The central wheel is rotated either by power in any manner that may be preferred by the user, or is rotated by hand. For convenience, it is provided at intervals with handles T, which the operator may take hold of. This imparts uniform rotation to each of the rods O and manipulates the platen up and down in perfect alignment with the bed H.

When a base or back of wood shall have been coated with glue or other adhesive substance, and a veneer applied to either one or both sides of such base, the same are placed upon the bed and the platen gradually lowered upon them, flattening the veneer or veneers and bringing the several pieces into intimate contact. The heat of the platen or bed, or both, facilitates the flattening of the veneer and avoids breaking or cracking them, while the heat also causes the glue to unite with the pores of the wood. The material is kept under pressure and heat, according to the length of time necessary with different kinds of wood, to accomplish the above objects.

We will now describe the series of rollers and their adjunctive devices.

The letter U designates the upper part of the section B of the frame, and is fitted with a series of blocks V, in which are mounted the lower rollers W. There may be a greater or less number of these rollers, the number shown being ordinarily sufficient. From Fig. 1 it will be seen that the shaft of each roller at one end is provided with a pinion X, and that a series of idlers Y are mounted upon the studs projecting from the frame U, and serve to connect the rollers, so that they will rotate at uniform speed and in the same direction. The upper surfaces of these rollers are in the same plane as the bed H.

The letter Z designates a vertically-adjustable roller-frame, of which there is one at either side of the machine. These frames are provided with long screw-threaded sleeves A', as seen in Fig. 1, and in these sleeves are fitted threaded rods B', fitted to sockets C' in the frame U, as seen in Fig. 2. These rods serve to support the frames Z and to adjust them up and down, so as to accommodate the upper series of rollers to the thickness of the material to be veneered, and so as to increase and decrease the pressure of the upper rollers. The rods B' each carry a sprocket-wheel D', and a continuous sprocket-chain E' connects these wheels, so that they rotate in unison. They are to be rotated either by power or by hand in a similar manner to that described with reference to the gear-wheel S. Handles F' are provided for this purpose.

The frame Z is constructed with a number of vertical slots G', into which are slidably fitted bearing-blocks H', with spiral springs I' arranged to normally press the bearing-blocks downward against the plate J' of the frame Z. This construction affords a yield-

ing support for the upper series of rollers. Each of the upper rollers carries a pinion K' of the same diameter as the pinions X, and a similar series of idlers L' is also provided to connect the upper rollers. It is preferred that both sets of rollers shall be positively rotated, but at uniform speed, and therefore we have mounted plates M' upon the arbors of the first roller in the upper and lower series, connecting these plates by an intermediate plate O', and thus affording bearings for the intermediate idler-pinions P'.

In Fig. 1 will be seen a driving-pulley Q', designed to receive a belt, by which rotation may be transmitted to the two series of rollers.

We will now refer to the means for cooling the material being veneered. This consists of a rotary fan-blower R', of any of the approved types, preferably secured to the machine or in proximity thereto, and connected by branch pipes S' to lengthwise pipes T', located along and near the ends of the lower series of rollers, as seen in Fig. 2. At suitable intervals—say between each pair of rollers—a transverse pipe U' connects with the pipes T', and serves to discharge air-currents through a slot or a series of perforations V' beneath and against the under side of the material passing through this part of the machine. These air-currents spread and reach the entire surface of the material, acting to cool it with rapidity and uniformity. Similarly arranged with respect to the upper series of rollers are lengthwise pipes W', also connected together by transverse pipes X', which extend downward at the sides of the machine, and thence crosswise in a plane slightly above the lower plane of the upper series of rollers. These pipes discharge air upon and against the upper veneer in the same manner that the air is discharged by the lower transverse pipes. The lower set of longitudinal pipes T' are connected to the upper set by a suitable flexible tube or conduit Y', so as to compensate for the vertical adjustments of the frame Z. It will now be understood that the veneers, after having been firmly pressed against the base and after the glue by the application of the heat has been made to enter the pores, the platen is raised

and the material advanced within the grasp of the upper and lower rollers, which, being in motion, move the material on through the rollers, maintaining the intimate contact of the veneers and the base as the violent currents completely envelop, act upon, and rapidly chill the glue and fix the material in permanent union. While one piece of material is passing between the roller another piece or pieces may be under the operation of the platen and the bed. The fan is driven by a counter-shaft in any of the usual ways.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In the art of applying veneers, the herein-described method, the same consisting in applying an adhesive substance between the opposite sides of the base and the veneer to be placed one upon one side and one upon the other, in applying over substantially the entire surface a directly vertical flat pressure upon said veneer while stationary to force them against the base, and also simultaneously applying heat to them, in discontinuing the first pressure and the heat and continuing a pressure upon said veneer during a forward movement thereof, and in reducing the temperature of the atmosphere above and below said veneer simultaneously with the continuance of the latter pressure.

2. In the art of applying veneer, the herein-described method, the same consisting in applying an adhesive substance between the base and the veneer, in placing the veneer and the base in contact, in simultaneously applying heat and a flat pressure thereto, in discontinuing said pressure and the heat and passing the veneer under a continuing pressure, and in forcing air-currents against substantially the whole surface of the said veneer at once during the continuance of the latter pressure.

In testimony whereof we affix our signatures in presence of two witnesses.

HENRY H. KING.

BENJAMIN F. K. JENNINGS.

Witnesses:

JOHN F. GRAY,

OLIVER H. BOGUE.