No. 689,317. Patented Dec. 17, 1901.

G. F. LEBIODA.

APPARATUS FOR IMPREGNATING WOOD.

(Application filed June 4, 1901.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

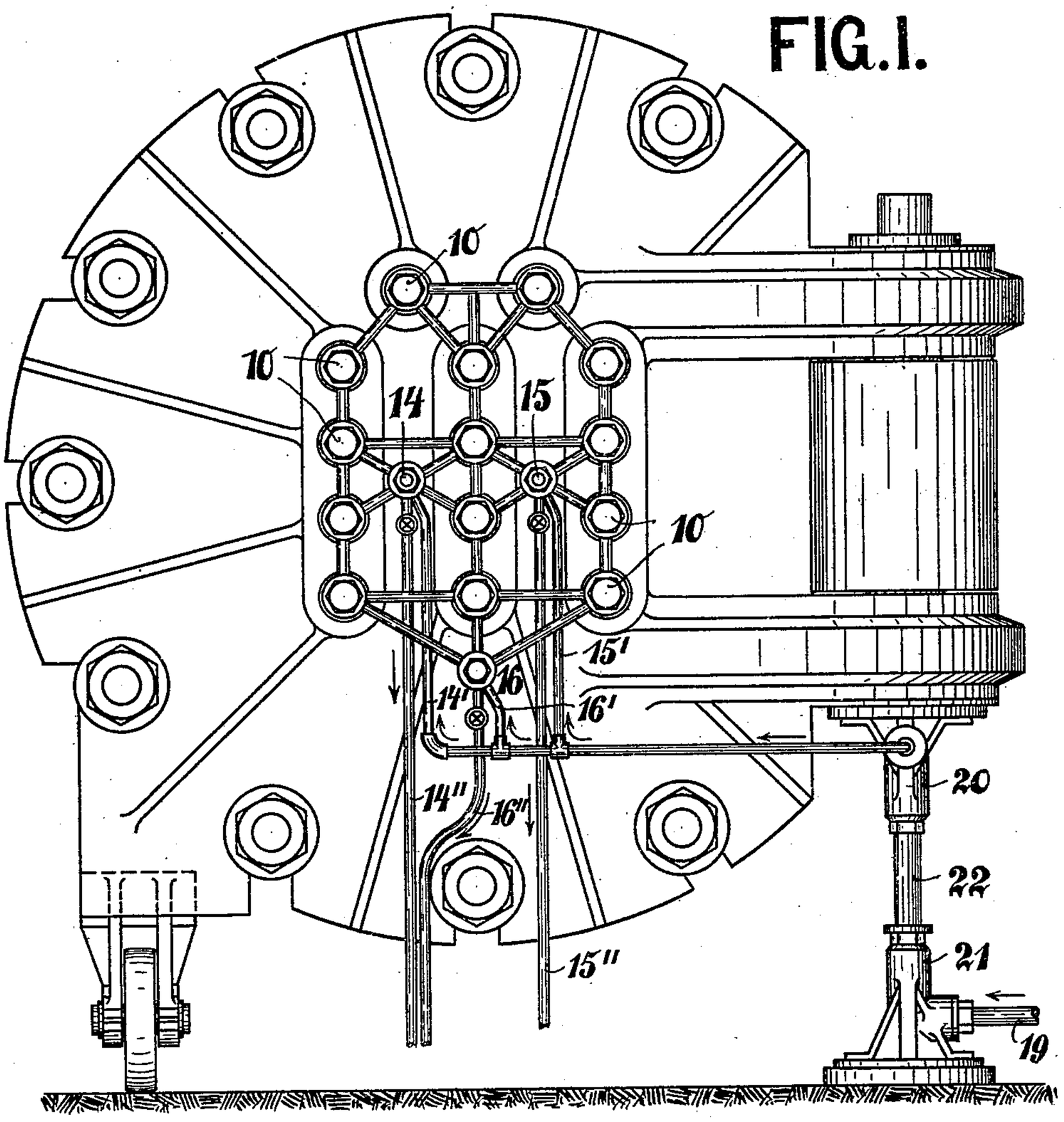
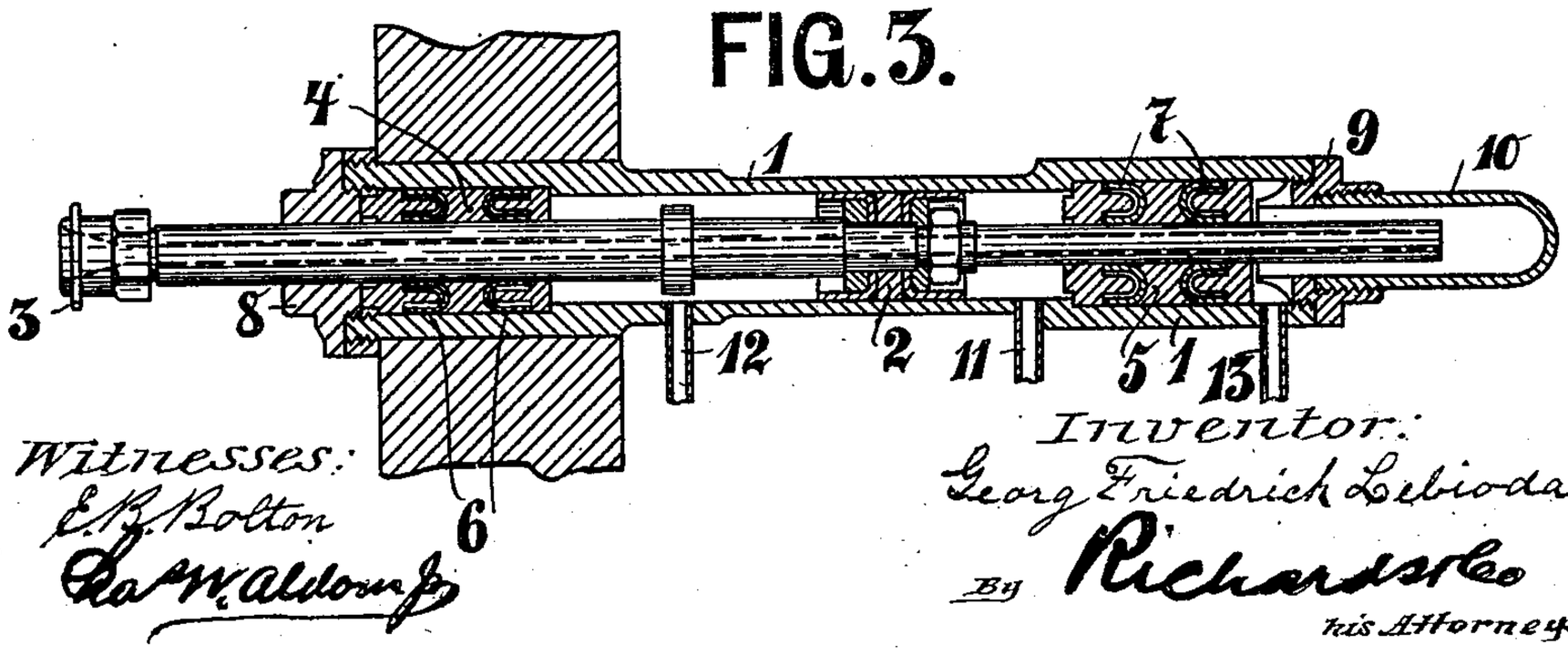


FIG. 3.



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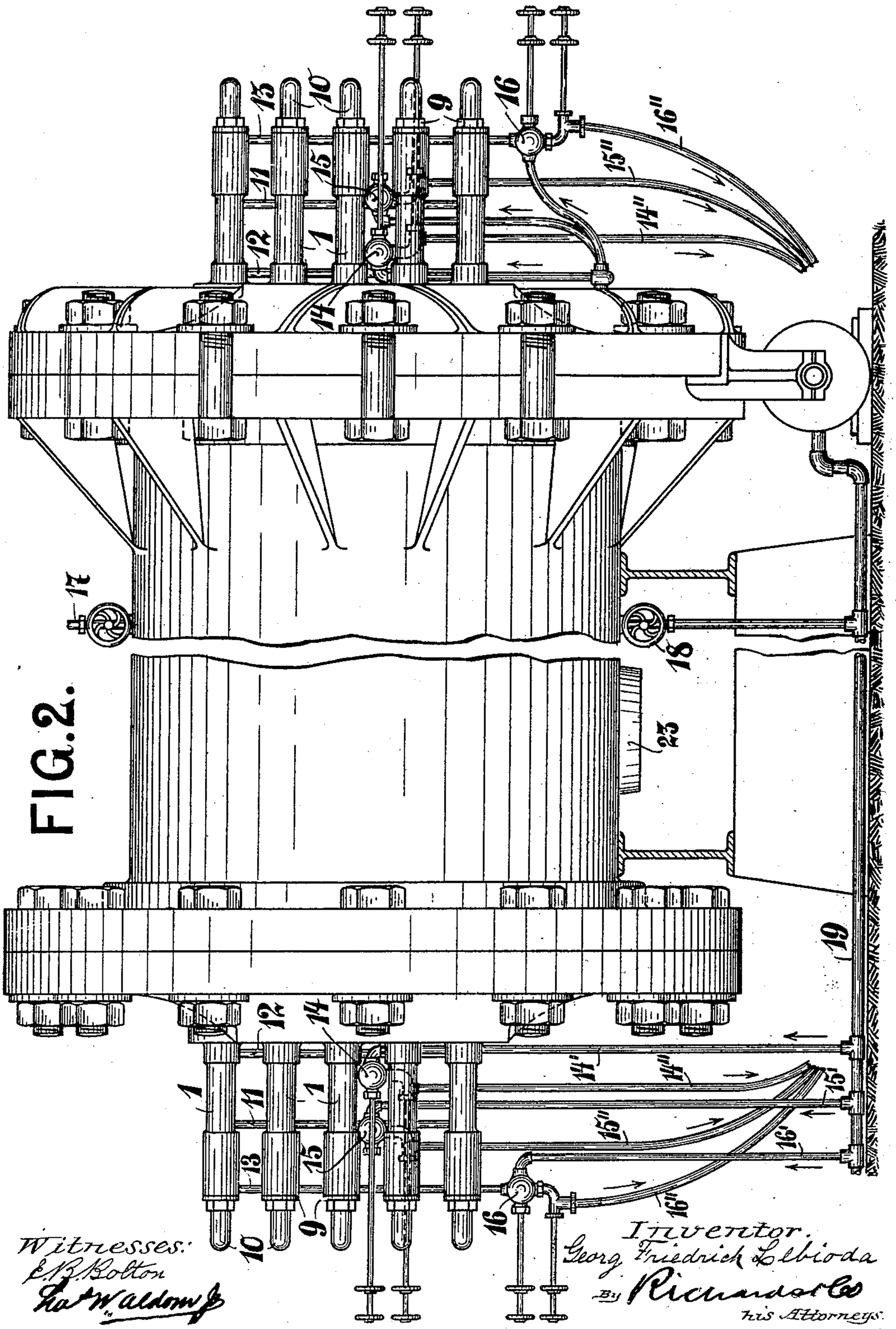
(No Model.) 3 Sheets—Sheet 2.

FIG. 2.



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(No Model.) 3 Sheets—Sheet 3.

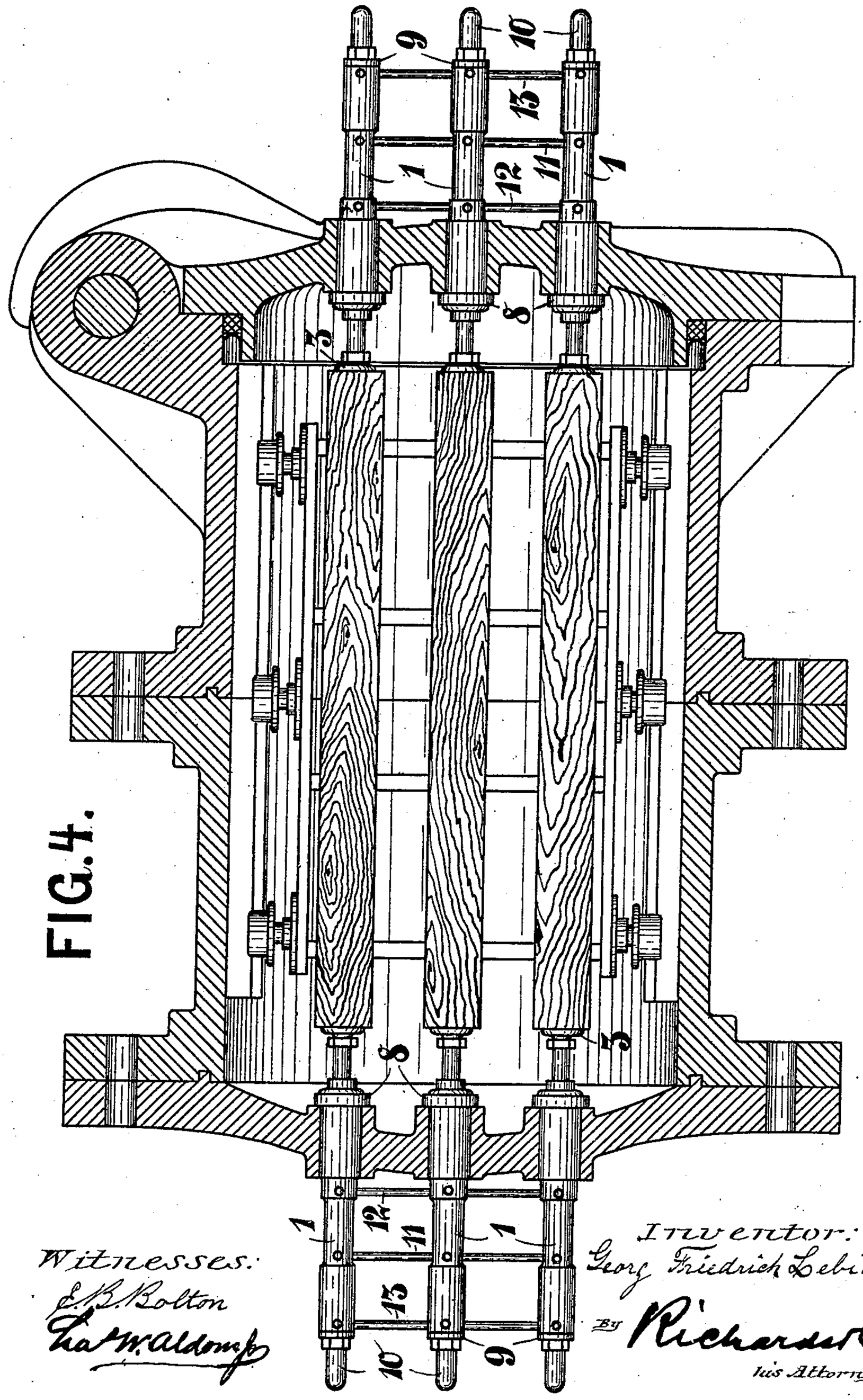

FIG. 4.

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UNITED STATES PATENT OFFICE.

GEORG FRIEDRICH LEBIODA, OF BOULOGNE-SUR-SEINE, FRANCE.

APPARATUS FOR IMPREGNATING WOOD.

SPECIFICATION forming part of Letters Patent No. 689,317, dated December 17, 1901.

Application filed June 4, 1901. Serial No. 63,100. (No model.)

To all whom it may concern:

Be it known that I, GEORG FRIEDRICH LEBIODA, a subject of the King of Prussia, German Emperor, residing at the city of Boulogne-sur-Seine, in the Republic of France, have invented certain new and useful Improvements in Apparatus for Impregnating Wood, of which the following is a full, clear, and exact description.

The present invention relates to improvements in apparatus for impregnating wood, with special references to the invention described in Letters Patent No. 655,788. These improvements comprise, first, the construction and operation of the bell-shaped cutters which are patented in the above-said Patent No. 655,788, and, second, an apparatus which enables the wood to be impregnated from both ends of the cylinder without it being necessary to take the conducting-pipes apart when the cover of the apparatus is opened for the purpose of introducing the wood.

In the apparatus described in Patent No. 655,788 the pistons which set in motion the bell-shaped cutters are all combined in a single chamber. Should one of them require repairing, owing to its becoming dirty or the bursting of the leather washer, it is necessary to unscrew the whole head of the apparatus. This is a tedious and difficult operation quite disproportionate to the frequently trifling repairs needed. In order to obviate this drawback, according to the present invention each cutter, with its piston, is isolated in such a manner that in case of repairs being required only the part concerned has to be taken apart.

An apparatus for the simultaneous impregnation of fourteen wooden beams according to the present invention is illustrated in the accompanying drawings.

Figure 1 illustrates the apparatus viewed from the side on which the wood is put in. Fig. 2 shows the apparatus in side elevation with central part broken away. Fig. 3 illustrates a cutter with its operating-piston. Fig. 4 shows a horizontal section of the apparatus.

In the new apparatus, Figs. 1, 2, and 4, there are as many apertures in each cover as there are pieces of wood to be impregnated. For instance, in the example illustrated there are fourteen. Into each of these holes is introduced a tube 1, Figs. 3 and 4, which is preferably secured by means of a flange or a cone-socket. In the tube 1, of steel or any other suitable metal, works a piston 2, the rod of which is hollow throughout its whole length and bears on its inner end a bell-shaped cutter 3, as described in the aforesaid patent. The piston-rod passes through iron rings 4 5, near each of its ends, which, together with the leather washers 6 7, form stuffing-boxes. On the inner side of the apparatus the tube 1 is closed by a screw-block 8, through which the piston-rod passes. Another block 9, which is shut off by the tube 10, is placed on the other end of the tube 1. The free end of the piston-rod passes into the cavity of the tube 10. According as the impregnating liquid is let into the tube 1 through the hole 11 or through the hole 12 the piston 2 is moved either forward or backward, which results in the cutters either being driven into the wood or withdrawn therefrom. A third hole 13 serves for introducing the impregnating liquid into the tube 10, from whence it is pressed through the perforation of the piston-rod into the wood, Fig. 3.

When it is required to replace the leather washer 7 or piston 1, the cutter 3 and the piston can then be simply drawn out and the block 9, with the tube 10, are unscrewed. The leather washer and the piston removed, as of course the iron ring 5 is now no longer firmly fixed. By means of this simple operation the piston and the leather washer can be examined in a few minutes and repaired or replaced. After unscrewing the block 8 and the cutter 3 the leather washer 6 and the piston can be pushed out toward the interior of the apparatus.

All the tubes 1 communicate with each other and at three different places—first, all the spaces in front of the piston (consequently those into which the apertures 12 lead) communicate with each other by a set of pipes; secondly, the spaces behind the piston, and, thirdly, the cavities of the tubes 10 are similarly connected. Each of these three sets of pipes is supplied from a distributing-reservoir. The reservoir 14, Fig. 1, communicates with all the apertures 12, the reservoir 15 with all the apertures 11, and the reservoir 16 with all the apertures 13. These three reservoirs are in the form of a sphere or a cylin-

der. The pipes leading to the vicinal tubes 1 are joined direct to the reservoir, while the circulation of the rest of the tubes 1 takes place from one to another. The liquid is conducted to the reservoirs 14, 15, and 16 through the pipes 14′ 15′ 16′, respectively, and it is conducted from said reservoirs through the pipes 14″ 15″ 16″, respectively. A valve is inserted in both the admission and discharge pipes of each reservoir.

The method of working is as follows: When the apparatus has been charged and the lid fastened down, the discharge-valves of the reservoir 14 are first opened on both sides. Next the admission-valves of the reservoir 15 are opened, so that the liquid enters through the apertures 11 behind each piston and presses the cutters 3 into the front surface of the wood. The apparatus is then filled with liquid by means of a suitable valve arranged on the bottom of the vessel on the flange 23. This valve is not shown in the drawings; but its function will, however, be easily understood. When the liquid enters through said valve, the air-outlet 17, Fig. 2, is opened. When the large hollow space of the apparatus containing the wood to be impregnated is in this manner filled with liquid, the air-outlet is closed and the valve 18, Fig. 2, opened, which communicates with the high-pressure pipe 19. The pressure will then begin to act in the cylinder. The injection is first commenced at one end of the apparatus. For this purpose the admission-valve of the reservoir 16 on one side of the apparatus is opened and the discharge-valve on the same side closed. At the same time the discharge-valve on the other side of the reservoir 16 is opened and its admission-valve opened. The liquid will consequently penetrate through the wood and flow off through the opened discharge-valve on the one side. As soon as it is considered that the impregnation has been sufficient and it is desired to reverse the direction of the impregnating-current it is only necessary to open the closed valves of the reservoir 16 and to close the open valves. When the impregnation of the wood is completed, the apparatus is emptied by aid of the already-mentioned valve on the bottom of the vessel, while the air-valve 17 is once more opened and the high-pressure valve 18 closed. By injecting from both ends of the apparatus a better distribution of the liquid in the wood is attained.

In order to avoid the troublesome screwing on and off of the conducting-pipes by opening the cover from the supply side of the apparatus, according to the present invention the whole system of pipes of the reservoirs 14 15 16 is movable together with the cover, by which the following arrangement serves to admit the liquid: A sleeve 20 is fixed to the lower part of the hinge of the cover, Fig. 1, and a similar sleeve 21 to the bottom. The two sleeves are connected by a tube 22, which is packed in them by means of suitable stuffing-boxes. The sleeve 21 communicates with the high-pressure pipe 19, while the admission-pipes for the reservoirs 14 15 16 are joined to the sleeve 20. This device rests exactly underneath the center of the hinge of the cover, so that the latter can be raised or lowered without thereby impeding the circulation of the liquid.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for impregnating tree-trunks and lengthy pieces of wood comprising a vessel having covers, removable tubes carried thereby, pistons in said tubes having hollow piston-rods for the passage of the liquid, bell-shaped cutters carried on the forward ends of the piston-rods and reservoirs and connecting means between the reservoirs and piston-cylinders for supplying liquid in front of or behind the piston or through the hollow piston-rod, substantially as described.

2. In combination, a cylinder having two covers, removable tubes carried by each cover, a piston guided in each tube having a hollow piston-rod, a packing in rear of the piston, said hollow piston-rod being extended through said packing, a bell-shaped cutter carried on the forward end of each piston-rod, connections from the spaces in front of the piston, from the spaces behind the piston, and from the spaces behind the packing with suitable reservoirs, admission and discharge pipes connected with said reservoirs, and a tube for conducting the liquids having its ends packed in sleeves arranged in the axis of rotation of the cover, the tubular connections of the reservoirs being on the cover of the apparatus whereby said cover may be removed or replaced without disconnecting the conducting-pipe, substantially as described.

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

GEORG FRIEDRICH LEBIODA.

Witnesses:
EDWARD P. MACLEAN,
GEORGE E. LIGHT.