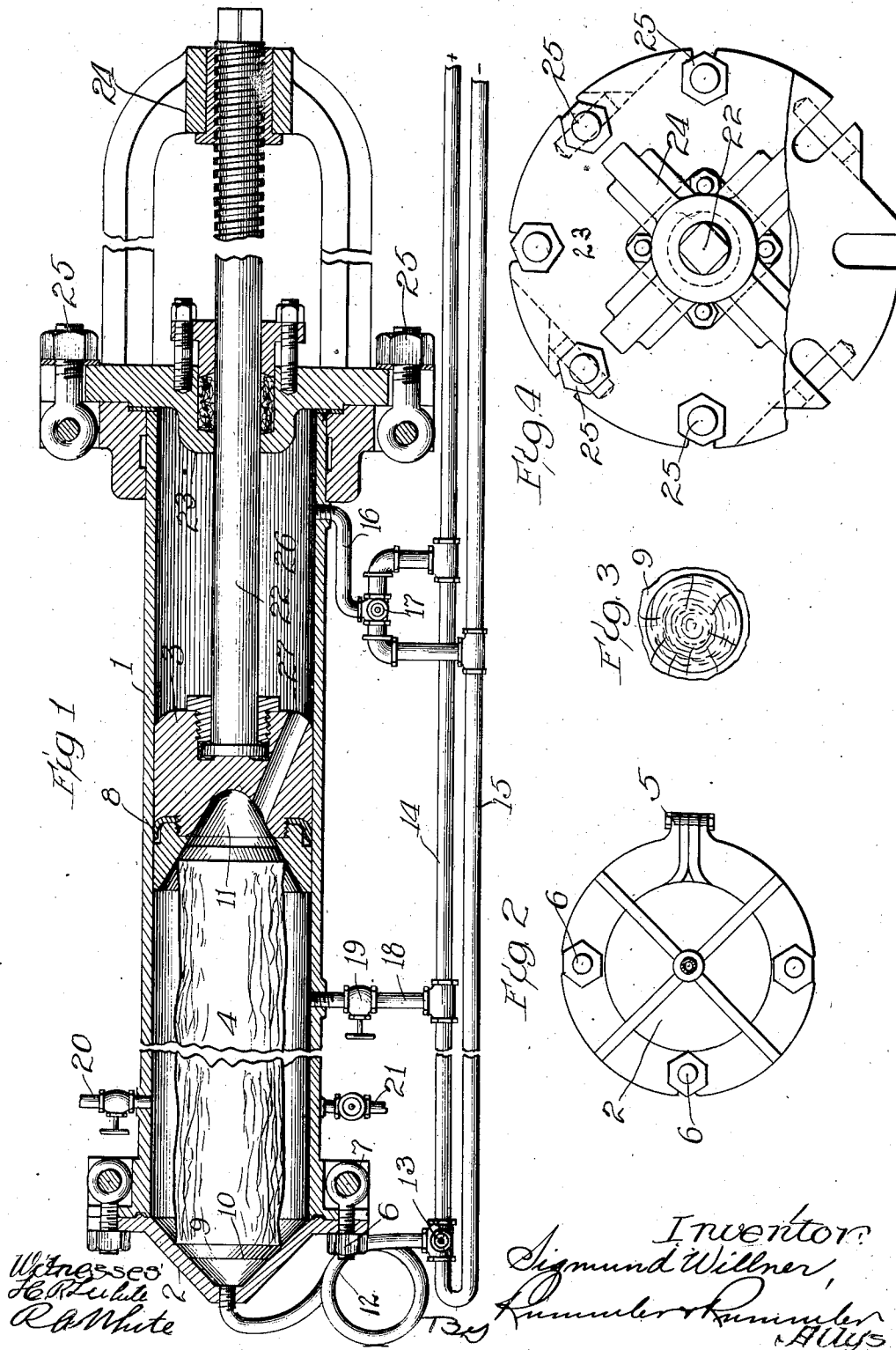


S. WILLNER.
 APPARATUS FOR IMPREGNATING TIMBER.
 APPLICATION FILED AUG. 8, 1910.

976,715.

Patented Nov. 22, 1910.



UNITED STATES PATENT OFFICE.

SIGMUND WILLNER, OF CHICAGO, ILLINOIS.

APPARATUS FOR IMPREGNATING TIMBER.

976,715.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed August 8, 1910. Serial No. 576,193.

To all whom it may concern:

Be it known that I, SIGMUND WILLNER, a subject of the Emperor of Germany, and a resident of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Apparatus for Impregnating Timber, of which the following is a specification.

The main objects of this invention are to provide an improved form of apparatus for injecting chemicals, coloring matter or other fluids into logs; to provide a device of this class which is particularly adapted for treating the logs under high pressures without straining the material of the logs; and to provide an improved construction for preventing spilling and waste of the chemicals during the process of treating the logs.

A specific form of apparatus for carrying out this invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section, partly diagrammatic, of an apparatus designed according to this invention for injecting coloring matter, chemicals or other fluids into the sap channels of a log. Fig. 2 is an end view showing the manner of mounting the removable head on the casing or cylinder. Fig. 3 is a diagram representing in outline the transverse section of a tree, and the position of the heart wood therein. Fig. 4 is an end elevation of the head which is at the right of Fig. 1, the same being shown partly broken away to illustrate the construction of the flange to which said head is secured.

In the form shown in the drawings, the apparatus comprises a cylinder or casing 1, preferably mounted with its axis horizontal upon suitable supports, not shown, and provided with relatively movable heads 2 and 3, adapted to support a log 4 between them in the manner shown in Fig. 1.

The head 2 is hinged at 5 to one end of the cylinder and is secured in liquid tight engagement therewith by means of a plurality of bolts 6. These are preferably hinged at 7 to lugs on the cylinder, and extend through radial slots in the head so that they may be thrown back out of the way without entirely removing the nuts from the bolts. The head 3 is in the form of a piston slidably fitting within the cylinder and is provided with suitable packing rings 8 to form a fluid-tight fit with the walls of the cylinder. The opposed faces of the heads 2 and 3 are provided with axially alined conical sockets or cavities

which are each adapted to have fluid-tight fit with the periphery of the adjacent end of a log, regardless of the diameter of the log when the end of the log is trimmed so that it has a frusto-conical bearing surface 9 shaped to fit the conical surfaces of the heads 2 and 3. The ends of the logs are, of course, trimmed so as to provide as large an exposed area as possible at the end of the log, and at the same time insure a continuous bearing on the head around the entire periphery of the log.

When the log is in position as shown in Fig. 1, there will be a space 10 and 11 respectively between each head and the adjacent end of the log. A flexible pipe 12 connects the space 10 in the head 2 with a 3-way valve fitting 13 which has branches leading respectively to a pressure pipe 14 and a suction pipe 15. A second pipe 16 is connected through a 3-way valve fitting 17 with the suction and pressure pipes 14 and 15, and communicates with the space 11 of the socket in the head 3, as will be hereinafter described. A pipe 18 connects the pressure pipe 14 with the cylinder at a point between the heads 2 and 3. This pipe is controlled by a valve 19. The cylinder has also connected thereto a pair of valved pipes 20 and 21, for the purpose of washing the interior of the cylinder by causing water or another liquid to circulate through it. The head 3 is movable in the casing by means of a rod 22 which may be moved by any suitable mechanism.

In the form shown, the rod 22 has swiveled connection with the head 3 and extends through a stuffing box in the part 23, which forms a closure for the adjacent end of the casing 1. The outer part of the rod 22 is threaded and extends through a yoke 24, and its end is squared or otherwise arranged so that it may be rotated for shifting the head 3. The part 23 is bolted to the casing by means of pivoted bolts 25, similar to those which secure the head or member 2.

The pipe 16 communicates with the space or chamber 26 between the head 3 and the part 23, and there is a passage 27 connecting the socket in the head 3 with the chamber 26.

The operation of the device shown is as follows:—The head 2 is first swung back out of the way on its hinge 5 so as to permit the log to be inserted into the casing. The head 2 is then closed and securely bolted

by means of the bolts 6 to prevent leakage. The head 3 is now forced inward toward the head 2 so as to center the log and support it between the two heads in the manner shown in Fig. 1, it being understood that the ends of the log have been previously trimmed to provide conical surfaces fitting the heads.

Assuming that the apparatus is to be used for injecting coloring matter into the log, the first step is to force through the sap channels of the log potassium hydroxide (KOH), potassium carbonate ($K_2CO_3 + 2H_2O$) or another suitable fluid chemical for removing the sap and resinous matter from the pores of the wood. This is done by manipulating the valves 13 and 17 so as to cause the fluid to flow from the pressure pipe 14 into the space 10 within the head 2, while the air or fluid in the space 11 is exhausted by the suction pipe 15. In order to prevent the pressure of the liquid within the log from bursting the log, the valve 19 is opened to admit the fluid under pressure into the space around the log. As the pressure in the space 11 is lower than that in the space 10, the fluid will be forced along the sap channels toward the space 11 and will dissolve the dried sap and resinous matter and carry them with it. After this operation has continued for a suitable length of time, the valve 13 is set so as to open communication between the pipe 12 and the suction pipe 15, and the valve 17 is set to connect the pipe 16 with the pressure pipe 14 and cut off its connection with the suction pipe. This causes a flow of chemical through the log in the opposite direction. After the log has been treated by the sap removing chemical, the chemical contained in the various spaces in the cylinder and in the system of piping is drained off. The coloring matter is now forced in liquid form into the pressure pipe 14, and as the valve 19 is open, it flows into the space around the log, as well as into one of the heads. The coloring matter is forced into the log first in one direction, and then in the other in the same manner as has been hereinbefore described in connection with the chemicals. After the completion of the operation of coloring the log, the head 3 is drawn back so that the log is no longer held in liquid-tight contact with the two heads; and all of the liquid is finally drained off. There is no waste of the liquid, as any of it which is confined in the spaces 10 and 11 would run down into the cylinder and be drained off. The log may then be washed by water passed into the cylinder through the pipe 20 and drawn off through the pipe 21.

To remove the log, the bolts 6 are loosened and the head 2 is swung back on its hinge so as to permit the log to be withdrawn from the open end of the cylinder.

Although but one specific embodiment of

this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted, within the scope of the following claims, without departing from the spirit of this invention. For example, it is obvious that the liquid in the space around the log need not necessarily be the same as that which is injected into the log, and under certain conditions it may be preferable to have a lower pressure in the space around the log than at the injecting head.

I claim:—

1. A device for injecting fluids into logs, comprising a cylinder having a head at one end, a second head slidably mounted in said cylinder and having a fluid-tight joint therewith, means for forcing said movable head toward said first head for supporting a log between them, one of said heads having therein a conical socket so formed as to have fluid-tight engagement around the edges of the adjacent end of the log when trimmed to conical form, and means for forcing a fluid into one of said heads through the log and withdrawing it at the other head.

2. A device of the class described, comprising a cylinder, a head removably mounted at one end of said cylinder, a movable head in the form of a piston fitting within said cylinder and slidable along said cylinder, pipes connected with said heads and adapted to permit a fluid to be forced into one of said heads and be withdrawn from the other, and means for equalizing the fluid pressure in said cylinder and one of said heads, said heads having therein opposed conical sockets adapted to have a wedging fit around the outer edges of the ends of a log when trimmed to conical form.

3. A device of the class described, comprising a cylinder, a pair of heads mounted at opposite ends of said cylinder and adapted to engage opposite ends of a log, one of said heads being movable toward and away from the other, each of said heads having therein a socket adapted to fit fluid-tight around the periphery of the log and provide a fluid chamber within said head at the end of the log, a fluid pressure pipe, a suction pipe, individual pipes connected with the sockets in said heads and each having connection with said fluid pressure pipe and said suction pipe, valves controlling said pipe connections and adapted to cause fluid to flow in either direction through the log without disturbing the other parts of the device, and a pipe connecting said pressure pipe with said cylinder between said heads.

4. A device for injecting fluids into logs, comprising a cylinder having a head at one end, a second head slidably mounted in said cylinder and having a fluid-tight joint therewith, means for forcing said movable head toward said first head for supporting

a log between them, each of said heads having therein a conical socket formed to have fluid-tight engagement around the edges of the adjacent end of the log when trimmed to conical form, and means for forcing a fluid into one of said heads through the log and withdrawing it at the other head, the concave surfaces of said sockets being extended so as to substantially meet the walls of the cylinder whereby a log in said cylinder will be lifted and centered in said sockets so as to be properly supported between the heads through the act of moving said movable head toward the other.

5. A device for injecting fluids into logs, comprising a cylinder having a head at one end, a second head slidably mounted in said cylinder and having a fluid-tight joint therewith, a stationary part secured to said cylinder adjacent to said slidable head, means interposed between said stationary part and slidable head for forcing said heads together for supporting a log between them, one of said heads having therein a conical socket formed to have fluid-tight engagement around the edges of the adjacent end of the log when trimmed to conical form, and means for forcing a fluid into one of said heads through the log and withdrawing it at the other head.

6. A device for injecting fluids into logs, comprising a cylinder having a head at one end, a second head slidably mounted in said cylinder and having a fluid-tight joint therewith, a stationary part secured to said cylinder adjacent to said slidable head, a threaded shaft interposed between said sta-

tionary part and slidable head for forcing said heads together for supporting a log between them, one of said heads having therein a conical socket formed to have fluid-tight engagement around the edges of the adjacent end of the log when trimmed to conical form, and means for forcing a fluid into one of said heads through the log and withdrawing it at the other head.

7. A device for injecting fluids into logs, comprising a cylinder having a head at one end, a second head slidably mounted in said cylinder and having a fluid-tight joint therewith, a part secured to and forming a closure for the end of the cylinder adjacent to said slidable head, means acting between said movable head and said part for forcing said movable head toward said first head for supporting a log between them, said heads each having therein a conical socket formed to have fluid-tight engagement around the edges of the adjacent end of the log when trimmed to conical form, and said movable head having a passage connecting said socket with the space behind said movable head, suction and pressure pipes connected with said first head and the space behind said movable head, whereby fluid under pressure may be forced through the log in either direction.

Signed at Chicago this 4th day of August 1910.

SIGMUND WILLNER.

Witnesses:

EUGENE A. RUMMLER,
EDWIN PHELPS.