

(No Model.)

L. HANSEN & A. SMITH.  
WOOD PRESERVING APPARATUS.

No. 322,819.

Patented July 21, 1885.

Fig. 1

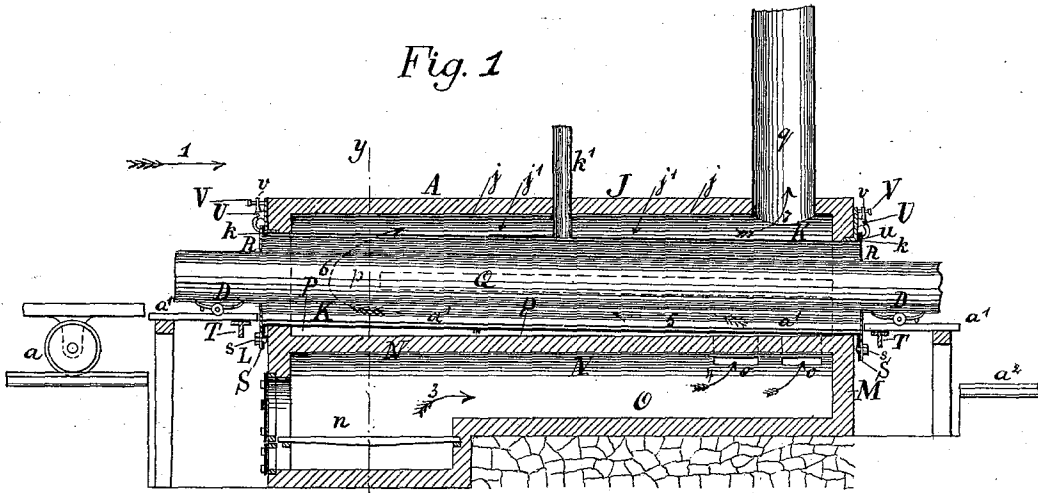


Fig. 2.

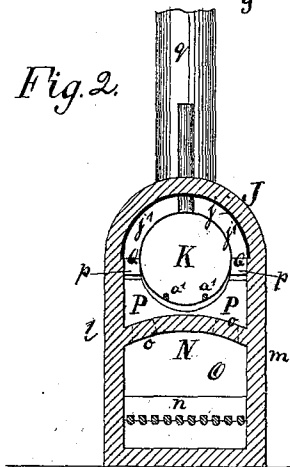


Fig. 5

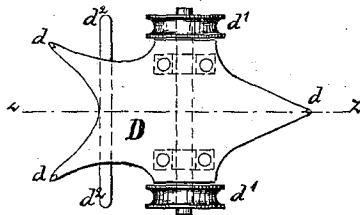


Fig. 6

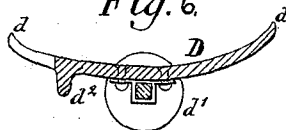
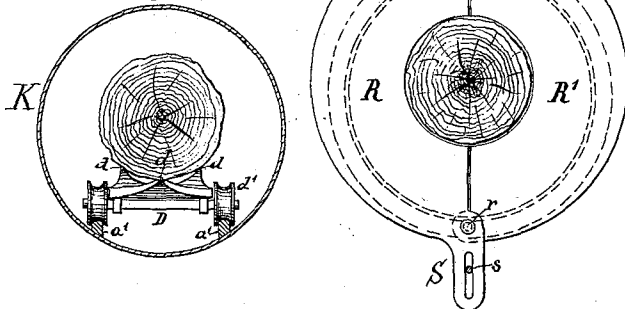


Fig. 4.

Fig. 3



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# UNITED STATES PATENT OFFICE.

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## WOOD-PRESERVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 322,819, dated July 21, 1885.

Application filed February 2, 1885. (No model.)

*To all whom it may concern:*

Be it known that we, LUDVIG HANSEN and ANDREW SMITH, citizens of the United States, and residents of Wilmington, in the county of New Hanover and State of North Carolina, have invented certain new and useful Improvements in Apparatus for Charring Wood, of which the following is a specification.

Our invention has for its object to provide improved means for the rapid and thorough preservation of timber, such as used for piling and other constructions in which the wood is exposed to decay or to the ravages of destructive insects; and the invention consists in the peculiar combinations and the construction and arrangement of parts, hereinafter more fully described, and specifically pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of the carbonizing furnace and cylinder. Fig. 2 is a vertical cross-section of the same, taken on the line  $y y$  of Fig. 1, and seen in direction of arrow 1. Fig. 3 is a cross-section of the carbonizing-cylinder. Fig. 4 is an end view of the same. Fig. 5 is a top or plan view of one of the small trucks on which the log or timber is supported while being carbonized. Fig. 6 is a vertical section of the same, taken on the line  $z z$  of Fig. 5.

In charring timber we have hitherto used the apparatus described in United States Patent No. 282,395, under which we are working, and to which we refer for comparison, the difficulties attending the use of the same having led to our present improvements. We have found that to uniformly heat a charring-cylinder of sufficient length to be practical and profitable is impracticable by the apparatus referred to, which applies the flames direct and leaves the cylinder ends open, the timber becomes scorched or burned in some places, while not even charred in others. To pull or push the log through the heated cylinder and then lift its forward end to place it upon the stationary roller outside of the cylinder is heavy and difficult work, and if supported within the cylinder it will be burned instead of charred at the places of contact. These difficulties we have successfully overcome by our present improvements.

After these preparatory remarks we will describe the construction of our apparatus and the mode of using it.

Referring now to the details of construction, 55 A represents a furnace of masonry, having an arched semicircular roof, J, provided with an interior lining,  $j$ , of iron, which forms an annular space around the charring-cylinder K. This latter is supported at its ends and fitted 60 tightly in the end walls, L M, of the masonry structure, and instead of being horizontal, as heretofore, is set at a downward inclination from L to M. It is also provided with annular end flanges,  $k$ . The curved roof N of the 65 fire-place  $n$  extends through the whole length and width of the furnace, thus forming a fire-flue, O, bordered by the said roof and the side walls,  $l m$ , of the furnace. The width between the side walls,  $l m$ , is greater than that of the 70 cylinder K, and the latter is placed a little distance above the roof N of the furnace  $n$  and flue O, leaving a space, P, along the lower semi-cylinder of K. The space P communicates with the flue O by flues or openings  $o$  in 75 the roof N at the end of the said flue O, but is separated from the upper annular space,  $j'$ , by partitions Q, which run along opposite sides of the cylinder K from the end wall, M, to within a short distance of the end wall, L, thus 80 making of the space P a flue, which, by the end openings,  $p$ , in the partitions Q, communicates with one end of the upper space,  $j'$ , the other end of which connects with the smoke- 85 stack or chimney  $q$ .

It will thus be seen that the fire does not impinge directly upon the cylinder K, but upon the fire-place roof, and the gases of combustion first pass along the flue O to the openings  $o$ , heating the entire partition-roof N; 90 then back through the flue P along and in contact with the entire lower half of the cylinder K to the openings  $p$ ; then returning again through the space or flue  $j'$  along the entire upper half of the cylinder to the chimney 95  $q$ , or in the course indicated by arrows 3, 4, 5, 6, and 7 in Fig. 1.

The cylinder K has a pipe,  $k'$ , passing up through the furnace-arch J, to allow of the escape of the steam and other gases driven out 100 of the inclosed timber by the charring heat.

At the entering end of the charring-furnace

is a track, *a*, below the level of the charring-cylinder, which cylinder is provided with a track, *a'*, having extensions at each end, as shown, resting on suitable beams or supports, as *T*, and separated from the inside portion, to allow of the closing of the end shutters, which shutters consist each of two sections, *R* and *R'*, formed of sheet or cast iron, as may be preferred, and having a central opening to suit the size of the log. The two sections are hinged together at *r*, and one of the sections has slotted arms *S*, by which and a bolt, *s*, passing through the said slot, it is fastened to the end of flange *k* of the cylinder. The object of the slot is to allow of adjusting the position of the end cover so that its central opening will correspond with the position of the log. To suit logs of different diameters we have interchangeable covers with openings of different sizes. It is evident that for a log of larger diameter the upper edge of the end cover, when closed, will be at a higher elevation than for one of smaller diameter. In order, nevertheless, to simultaneously clamp the parts *R R'* together and to the end flange, *k*, we have provided the following simple and efficient device: A lever-clamp, *U*, is fulcrumed between lugs upon a bracket attached to the furnace-wall, and has at one end a toe, *u*, adapted to be depressed upon the end cover at the adjoining edges of the parts *R R'*, and through the other end, *v*, an adjusting-screw or set-screw, *V*, which, when tightened up against the bracket, depresses the said toe *u* of the former end upon the said cover.

To prevent the possibility of lateral slipping under a moderate grip, the adjoining edges of the halves *R R'* are provided with ribs or ridges *w*, as shown in Fig. 4, and the end of the toe *u* has a corresponding notch to embrace them, as is shown at the top of Fig. 4.

The log-carriage *D*, Figs. 5 and 6, consists simply of a cast or wrought metal plate having three upwardly-projecting points or prongs, *d*, arranged about as shown in the drawings, to retain the log, and provided with an axle and two wheels, *d'*, adapted to run on the track *a'*. To prevent the carriage, when free, from toppling over so far as to prevent the convenient placing of the log thereon, the heavier end has arms *d''*, which support it on the rails, and thus render it unnecessary to use more than two wheels.

The mode of operation is as follows: The log to be charred is preferably brought by a truck, *t*, on the track *a* to the mouth of the charring-furnace, and then one of the small carriages or trucks *D* is placed under the forward end of the log upon the outside section of track *a'*. The rear end of the log is then raised slightly, and the track *a'*, being slightly inclined, will cause the log and carriage to travel along easily through the cylinder *K*. Before the rear end of the log is off the truck *t* another carriage, *D*, is placed in position to receive it, and thus the log while in the cylinder is supported entirely by its ends upon

the carriages *D* outside the cylinder, as shown in Fig. 1, leaving no portion thereof in contact with the hot iron of the cylinder. While in this position the ends of the cylinder are closed by means of the shutters *R R'* being placed around the log, by which the heat is confined at the ends, and then, owing to the peculiar arrangement of the furnace, cylinder, &c., the log is evenly and thoroughly charred without scorching. When the log has been charred, the shutters are opened and the log is removed by running it out onto a truck preferably placed on the track *a'*, after which the cylinder is ready to receive another log.

We deem it important that the cylinder be set inclined or at a varying distance from the flue, for by this means the cylinder is heated substantially of a uniform temperature for its whole length, as the inclined position causes that portion of the flue that is the coolest to be nearest the cylinder, and thus equalizes the heat transferred by radiation from the flue to the cylinder. Moreover, the cylinder, being inclined, allows of the track being readily set inclined also, which inclination of the track not only allows of the ready insertion or removal of the log, but also admits of the inclined rails being set directly upon and secured to the bottom of the inclined cylinder, whereby the rails and cylinder mutually support each other under the weight of the log as it is passing through the cylinder.

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

1. In a charring-furnace, a cylinder provided with annular sectional stoppers constructed to open laterally and approximately fitting the log to be charred, substantially as set forth.

2. In combination with the charring-cylinder *A*, the furnace, and its flue *O*, arranged beneath the same, said flue having its top set beneath said cylinder at a varying distance from the same, substantially as and for the purpose specified.

3. In combination with the charring-cylinder *K*, the end cover having a central opening and made in two parts, *R R'*, hinged together and adapted to be clamped around a log and to the end of the said cylinder, for the purpose set forth.

4. The combination of the charring-cylinder *K*, the log-inclosing end-cover made in two parts, *R R'*, hinged together and provided with the slotted projection *S*, and the pivoted clamping-lever *U*, having toe *u*, and set-screw *V*, substantially as and for the purpose set forth.

5. The combination of the charring-cylinder *K*, the log-inclosing end-cover made in two parts, *R R'*, provided with the ribs or ridges *w*, and the pivoted clamping-lever *U*, having set-screw *V*, and notched toe *u*, substantially as and for the purpose set forth.

6. The combination of the inclined charring-cylinder *K*, having gas-discharge pipe *k'*, with the furnace *A*, having the fire-place *n*, flue *O*, with end openings, *o*, flue *P*, with end openings,

*p*, and flue *j'*, with end chimney, *q*, the said flues *P* and *j'* being separated by partitions *Q* along oppositesides of the cylinder, all arranged substantially as and for the purpose set forth.

5 7. In a charring-furnace, the combination of the open-ended cylinder *K*, inclosed in and extending from one end of the furnace to the other and over a flue, *O*, starting from a fire-chamber at one end of said furnace and communicating with the space *P*, surrounding said  
10 cylinder at the other, the partition *Q*, dividing the space *P*, and the stack *q*, arranged over the

passages between the flue *O* and the space *P*, substantially as described.

In testimony that we claim the foregoing as 15 our invention we have signed our names, in presence of two witnesses, this 24th day of January, 1885.

LUDVIG HANSEN.  
ANDREW SMITH.

Witnesses:

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