

UNITED STATES PATENT OFFICE.

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APPARATUS FOR RECOVERING TURPENTINE OR OTHER PRODUCTS FROM WOOD.

SPECIFICATION forming part of Letters Patent No. 792,934, dated June 20, 1905.

Application filed November 9, 1904. Serial No. 232,010.

To all whom it may concern:

Be it known that we, ROBERT ALEXANDER SIBBITT, residing at Carleton Place, and ARCHIBALD K. McLEAN, residing at Ottawa, in the Province of Ontario and Dominion of Canada, citizens of Canada, have invented new and useful Improvements in Apparatus for Recovering Turpentine or other Products from Wood, of which the following is a specification.

Our invention pertains to apparatus for recovering turpentine and certain by-products from resinous woods; and it contemplates the provision of a simple and inexpensive apparatus through the medium of which turpentine, creosote, and tar may be recovered from resinous woods, more particularly the roots and stumps of pine, spruce, and other trees, and reduced to a pure state, and this in an economical manner and with but a minimum amount of effort and attention on the part of an attendant.

The invention will be fully understood from the following description and claim when taken in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view, partly in vertical section and partly in elevation, illustrating the several elements embraced in the present and preferred embodiment of our invention as properly connected together; and Fig. 2 is a vertical central section of the tar-boiler comprised in the apparatus.

Similar letters designate corresponding parts in both views of the drawings, referring to which—

A is a primary retort—*i. e.*, a retort in which the wood from which the turpentine and by-products are to be produced is treated. The said retort comprises a casing *a*, of fire-brick or other suitable material; a shell *b*, arranged in the casing so that a space *c* is formed between the two and having the usual door *b*³ and strainer *b*⁴; a furnace *d*, arranged in the casing at one side of the shell *b* and communicating with the space *c*, and an uptake *e*, formed in the casing at a diametrically opposite point with reference to the furnace *d* and also communicating with the space *c*.

The arrangement of the furnace *d* and the uptake *e* relative to the shell *b* assures the flames and other products of combustion passing entirely around the shell *b* and facilitates the heating of the latter. The said shell *b* is provided with a large cover *f* in order to permit of the ready introduction of stumps and other irregular pieces of wood, and its bottom *g* is pitched or inclined downwardly toward the center to facilitate the discharge of tarry liquids and creosote. Below the said bottom *g* is arranged a worm or coil of pipe or other receptacle *h*, through which cold water is circulated with a view of precluding burning of the turpentine.

B is a condensing-receptacle connected, through the medium of a pipe *i*, with the interior *l* of the primary retort and arranged to be kept cool by water or any other suitable agent circulated through a jacket *j*.

C is an ordinary worm-condenser, D a gravity-separator having a faucet *k*, and E and F are two elements of a purifying device, steam being supplied to the element E from a generator G. The worm-condenser C is connected with the top of the receptacle B, while the gravity-separator D is interposed between and connected to the said condenser C and the element E of the purifying device. From this it follows that when the apparatus is in operation turpentine, creosote, and water will be driven off through the pipe *i*, while tarry liquids and the like will be discharged from the shell of the primary retort at the bottom of the shell. In the receptacle B the creosote will be condensed into a liquid and will drop to the bottom of the receptacle and be thereby separated from the turpentine-vapor. This latter will pass to the condenser C, in which it will be liquefied and from which it will pass into the tank D, where it will be separated from the condensed steam and heavy impurities by gravity. When desirable, the said impurities may be drawn from the tank D through the faucet *k* and used to advantage as a spray for sheep or to wash fruit-trees. From the upper portion of the tank D the turpentine is led to the retort *g'* of the purifier, where it is commingled with steam and there-

by vaporized, and in the form of vapor the steam is led to the condenser F, where it is restored to a liquid state and is then ready for use.

5 H, Figs. 1 and 2, is a tar-boiler. This tar-boiler is provided at a slight distance above its bottom with a wall or diaphragm *l*, between which and the bottom is formed a chamber *m*, designed to contain water with a view
10 of preventing cinders from setting fire to the tar. Communicating with the chamber *m* and extending upwardly from the diaphragm *l* is a tube *n*, provided with a grate *p* and designed to contain the fire for heating the tar.

15 Intermediate the shell *b* of the primary retort A and the tar-boiler H are tanks I J. These tanks are connected together by a pipe *r* and to the tar-boiler by valved pipes *s*, and the tank I is connected to the bottom of the
20 shell by a pipe *t*. The pipe *t* and the pipe *r* are surrounded by jackets *u*, through which water or any other suitable cooling agent is circulated. In virtue of this construction it will
25 from the shell *b* of the primary retort will be cooled *en route* to the tanks I and J. It will also be noted that a portion of the tar will be condensed and will fall in liquid form into the first tank I and the remainder will be condensed
30 and will fall in liquid form into the second tank J. While but two tanks I J are shown, as many may be employed as are desirable. The tar may be conducted from the said tanks I J to the boiler H through the
35 pipes *s*, and in the said boiler the tar is gradually boiled until the vapor impurities are driven off. Any water that may remain in the tar after the boiling operation may be drawn off through the faucet *u'*, with which the boiler
40 is provided.

The creosote deposited in the receptacle B may be used to advantage for paving and other purposes, although we prefer to treat it further in a still K, connected with the lower portion
45 of the said receptacle through the medium of a pipe *v*. In this latter treatment the creosote in a pure form is separated from other ingredients, such as tar-pitch, by evaporation and subsequent condensation in the condenser
50 of the still, the tar-pitch and heavy oils remaining in the retort of the still, whence they may be drawn through the faucet *w* and put to any use to which they are applicable.

In order that tar may be further treated in
55 the boiler H for the separation of oil of tar from the pitch, we connect a still M with the lower portion of the tar-boiler through the medium of a valved pipe *x*. In the retort of

the said still the tar is heated to a higher temperature than in the tar-boiler, and the oil of
60 tar passes in the form of vapor into the condenser of the still, while the pitch and heavy oils are deposited in the lower portion of the retort, whence they may be removed through
65 the medium of the cock *y*, with which the said retort is provided.

It will be appreciated from the foregoing that our novel apparatus is adapted to produce in an economical manner pure turpentine, creosote, and tar-oil; also, that the appa-
70 ratus is so constructed that a certain amount of impure turpentine, impure creosote, and commercial tar is produced, which by-products may be used to advantage in several con-
75 nections.

It will further be appreciated that the apparatus requires but a minimum amount of attention on the part of an attendant or attendants, which conduces materially to economy in the production of the turpentine and
80 by-products.

We have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present embodiment of our invention in order to impart a
85 full, clear, and exact understanding of the said embodiment. We do not desire, however, to be understood as confining ourselves to such specific construction and relative arrangement of parts, as such changes or modi-
90 fications may be made in practice as fairly fall within the scope of our invention as claimed.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—
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In an apparatus for recovering turpentine and other products from wood, a retort comprising a shell having its bottom pitched or inclined downwardly toward its center and there provided with a discharge, a receptacle
100 for a cooling agent arranged immediately below said bottom of the shell, a casing surrounding the shell so that a space is afforded between the sides of the two, a furnace arranged in the casing at one side of the shell
105 and communicating with said space, and an uptake leading from the said space at an opposite point, with reference to the furnace.

In testimony whereof we have hereunto set our hands in presence of two subscribing wit-
110 nesses.

ROBT. ALEXANDER SIBBITT.
ARCHIBALD K. McLEAN.

Witnesses:

ANDREW HAYDON,
LOTTA BARBER.