UNITED STATES PATENT OFFICE.

A. H. EMERY, OF NEW YORK, N. Y.

IMPROVEMENT IN OBTAINING SPIRITS OF TURPENTINE, OIL, ROSIN, AND OTHER PRODUCTS FROM PINE WOOD.

Specification forming part of Letters Patent No. **46,092**, dated January 31, 1865.

To all whom it may concern:

Be it known that I, A. H. EMERY, of the city, county, and State of New York, have invented a new and Improved Mode of Manufacturing Spirits of Turpentine, Oil of Turpentine, Rosin, Wood-Spirits, Pyroligneous Acid, Tar, Charcoal, &c., from Pine Wood; and I do hereby declare that the following is a full and exact description thereof.

The nature of my invention consists in the method of using steam in these manufactures.

To enable others skilled in the art to make use of my invention, I will proceed to describe the precise operation.

Heretofore steam has been used in the manufacture of spirits of turpentine, oil of turpentine, rosin, tar, wood-spirits, pyroligneous acid, and charcoal from wood by using the steam in two ways: First the pine wood is placed in steam-tight tanks and steam let on to it, there being no outlet. Water may or may not be let in with the wood at the outset, but if not I soon have it by condensation of the steam. The steam is let into the tank in this way several hours, when the supply is shut off, and the water, spirits of turpentine, &c., at the bottom of the tank drawn off, and another process separates the spirits from the rest of the compound. The other way used is to let superheated steam into the tank, which is freely open into the condenser. The heat of the steam or its equivalent brings off the spirits, while the rosin flows out, and afterward the oil, wood-spirit, and pyroligneous acid, while the tar flows out, the rosin and tar in this case being drawn out at the bottom of the retort separately, the rosin first and tar afterward. In this case the retort is heated on the exterior. The heat applied to the exterior of the retort and the heat from the superheated steam both act to drive out rapidly the spirits of turpentine, which passes over and condenses in the condenser, while the rosin runs out and is simultaneously drawn off at the bottom, after which the increased heat drives off the oil of turpentine into the condenser, together with the wood-spirit and pyroligneous acid, &c., while the tar is drawn off at the bottom.

The disadvantages of the first process are that the distillation of the wood is very incomplete, and all the materials which are extracted by steam are drawn out together and must be separated, after which the wood is removed and the tar extracted therefrom in the ordinary way.

The disadvantages of the second process are also several. In heating the retort from the exterior while the superheated steam is let into it the wood is heated very irregularly, the oil and tar being driven off from some parts, while the spirits of turpentine and rosin are being driven off from the other parts, at the same time some pieces near the sides of the retort charred. In this way all the products are smoky, as in the case of dry heat alone, to which the addition of superheated steam approximates, and the rosin and tar both flow off together to some extent to the injury of the rosin, the spirits and oil of turpentine also being partially mixed, while the quantity of spirits is not nearly as great as it should be.

My plan is this: The wood is placed in a retort which is heated on the exterior to any degree required. At the same time steam (not superheated at first) is let into the retort, and passes around and through the wood, and, becoming charged with the spirits of turpentine, passes through a valve-opening into the condenser, where the pure spirits are condensed with the steam. The heat of the exterior at this stage of the progress is simply sufficient to keep the steam which is passing from the boiler to the retort from condensing on the inside of the retort. The pressure in the boiler should be sufficient to give the requisite heat to the steam to drive off the spirits only and to let the rosin run out. The valve between the retort and the condenser may be weighted to give sufficient pressure of steam in the retort to cause it to rapidly permeate all the wood therein. Besides, the increased density of the steam resulting from the pressure will more surely equalize the heat through the whole of the wood, especially in cases where the heat applied to the exterior of the retort is not uniformly distributed. In this case the yield of spirits of turpentine is large and nearly pure, and entirely free from smoke; and the rosin, which is deposited in the bottom of the retort and afterward drawn out, is very pure, and a large yield is obtained. When the spirits of

turpentine have all passed over, the heat is increased, and the oil of turpentine then passes over, followed by the pyroligneous acid and wood-spirit, while the tar is condensed at the bottom of the retort and is drawn out therefrom. Both the rosin and spirits of turpentine will be much nicer if this last part is performed in a separate retort, the wood being removed thereto for this purpose. After the rosin and spirits have been removed in the first retort superheated steam may be used, if desired.

I do not claim the use of steam or superheated steam in the manufacture of spirits of turpentine, rosin, &c., from pine wood; but

What I do claim, and desire to secure by Letters Patent, is—

1. Passing a current of ordinary steam over and through the wood into a condenser in the manufacture of spirits of turpentine, rosin, &c., from pine wood.

2. In the manufacture of spirits of turpentine, rosin, &c., directly from pine wood, subjecting the steam, either ordinary or superheated, to a pressure while it is in the retort and passing therefrom into the condenser.

A. H. EMERY.

Witnesses:
C. F. EMERY,
A. J. RICHARDSON.