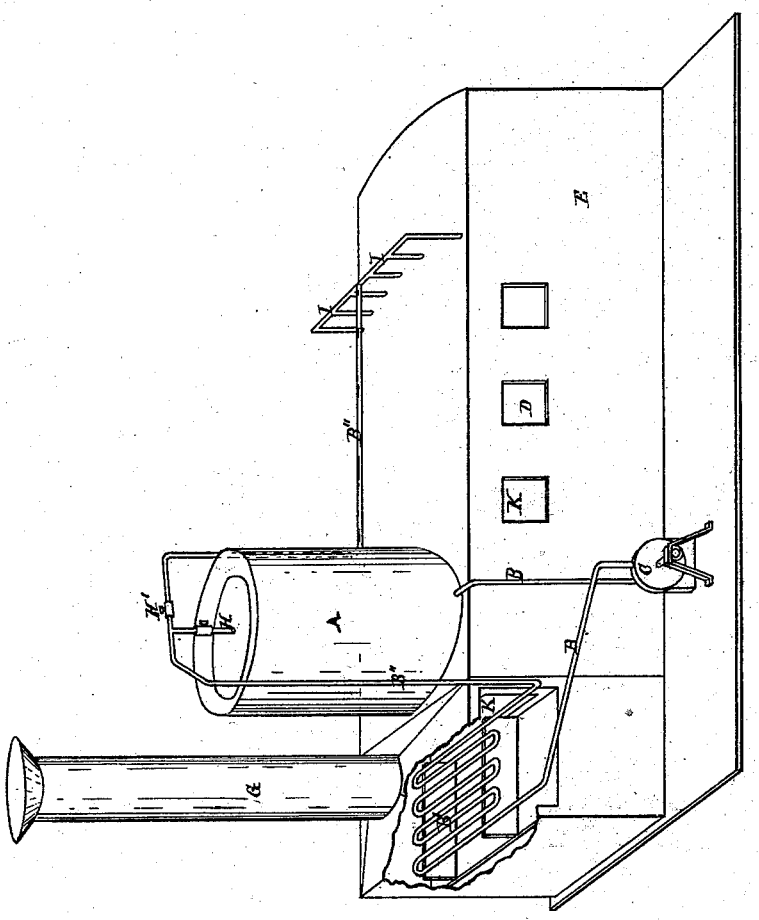
J. W. DIXON.

APPARATUS FOR RECOVERING WASTE ALKALIES.

No. 187,751. Patented Feb. 27, 1877.



Witnesses

Albert S. Gacherle

Joseph P. Fahy

Inventor.

John W. Dixon

by George D. Buckley

his atty.

UNITED STATES PATENT OFFICE.

JOHN W. DIXON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR RECOVERING WASTE ALKALIES.

Specification forming part of Letters Patent No. **187,751**, dated February 27, 1877; application filed September 7, 1876.

To all whom it may concern:

Be it known that I, JOHN W. DIXON, of the city of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Saving Soda-Ash used in reducing vegetable fiber to paper-pulp; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

My invention consists of the combination of the evaporating-pan, and a coil of pipe placed in the fire or heat-passage, said coil connecting at both its ends with the evaporator, a pump upon said coil, a furnace, and a heat-passage, the latter passing under the evaporating-pan to heat its contents; also, of the combination of a heat-passage, a coil of pipe placed in said passage, a pump upon said coil, an evaporating-pan, under or in contact with the shell of which the heat-passage passes, and an incinerating hearth and furnace, both opening into said passage.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the drawings, A is the evaporator; B, a pipe, attached to the bottom of it, upon which is located pump C. B′ is a coil of pipe situated in the fire-passage K—that is, in the passage through which the fire or heat passes to the chimney; B″, a pipe leading from the coil B′ over the top of evaporator A to the spray-head I, which passes through the top of the oven, and points toward the incinerating-hearth D. This spray I is here shown as consisting of a number of small tubes from pipe B″. E is that part of the apparatus containing the furnace; G, the chimney.

The apparatus is to recover the soda used in reducing vegetable fiber to paper-pulp, by rescuing it from the waste liquor resulting from that operation. The waste liquor is introduced into evaporator A by any convenient means. A pipe from the digester or vessel containing it may be used to conduct it into evaporator A. The platform or hearth D extends to a point beneath spray I, so as to invariably receive all the liquor coming therefrom, either by drip or in force; and the fire from the furnace located at E passes through the space above the hearth.

The liquor having been placed in evaporator A, the fire is started, and pump C also. the liquor flowing down pipe B is driven forward by pump C through coil B′ and pipe B″ (cock H being closed, and cock H′ open) to the spray-head I, from which it is thrown in several sprays onto the incinerating-hearth, and in its sprayed condition between the spray-head and the hearth it is compelled to pass through the intense heat of the direct flame from furnace E, which evaporates it very rapidly. There are thus three agents at work in evaporating, though the heat is from one fire—to wit, the evaporator A, and the fire-space through which the spray from spray-head I has to pass to reach the incinerating-hearth D. This operation is continued until a sufficient charge is placed upon the incinerating-hearth. In that case cock H′ is closed, and H is opened, thus directing the liquor from coil B″ back into the evaporator A as fast as it is received. The branch H throws the liquor with all the force from the pump C, causing the surface of the liquor in evaporator A to be much disturbed, and thus assisting in the evaporation. A spray-head may be placed upon the delivering-nozzle of the branch pipe containing cock H, so as to spray the hot liquor, thus allowing the hot liquor to expel its contained steam. This will assist evaporation. If it is ever found that the liquor in evaporator A is too thick for spraying, or to pass through the pipes to the spray-head, it may be raked directly or allowed to run from a hole in the side of evaporator A down through the oven-top through a tube or trough upon hearth D. The spray-head I may be employed in various forms. A rose-head might be used, or a long tube with openings at intervals of its length. This last-named form would possess the added advantage of being placed right in the oven above the hearth, and so would become itself highly heated, and would heat the liquor contained in it before it became sprayed; or, the pipe B″ might be carried inside the oven, and the liquor leaving it might be projected against an opposing surface to scatter or

spray it. A long tube might be placed inside and along the length of the oven, having openings at intervals of its length to throw diverging series of spray or diverging sheets of liquor.

Instead of coil B′, which is an elongated coiled chamber, a series of chambers or an ordinary box-chamber alone might be used, as very little pressure is to be withstood by it. After the partially-evaporated liquor reaches hearth D, all foreign matter is finally burned out of it by the fire from furnace E.

It will be seen from the drawings that the heat-passage K leads directly from the furnace E to the stack G, and passes over the incinerating-hearth D, under the evaporating-pan A, and that the coil B′ is situated in its course. When a charge is ignited upon hearth D, its heat unites with the furnace-heat to heat evaporating-pan A and coil B′.

I have described one style of apparatus in my Letters Patent numbered 179,536, dated July 4, 1876.

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

1. The combination of a furnace, E, heat-passage K, evaporating-pan A, over the passage K, coil of pipe B′ placed in said passage, and having upon it a pump, C, to circulate the liquor from the evaporating-pan A through the coil and back to the said pan A, whereby one furnace is used to heat the evaporating-pan and the coil containing the liquor in circulation, substantially as described.

2. The combination of a furnace, E, incinerating-hearth D in the heat-passage K, evaporating-pan A over the passage K, coil of pipe B′ placed in said passage, and having upon it a pump, C, to circulate the liquor through the coil from and to the evaporating-pan A, whereby the united heat from the furnace E and the hearth D, through passage K, heats both the evaporating-pan A and the coil B′ containing the liquor in circulation, substantially as described.

JOHN W. DIXON.

Witnesses:
W. W. DOUGHERTY,
GEORGE E. BUCKLEY.