W. MAYNARD.

APPARATUS FOR THE MANUFACTURE OF HYDRATED SULPHUROUS ACID.

No. 180,901. Patented Aug. 8, 1876.

Fig. 1.

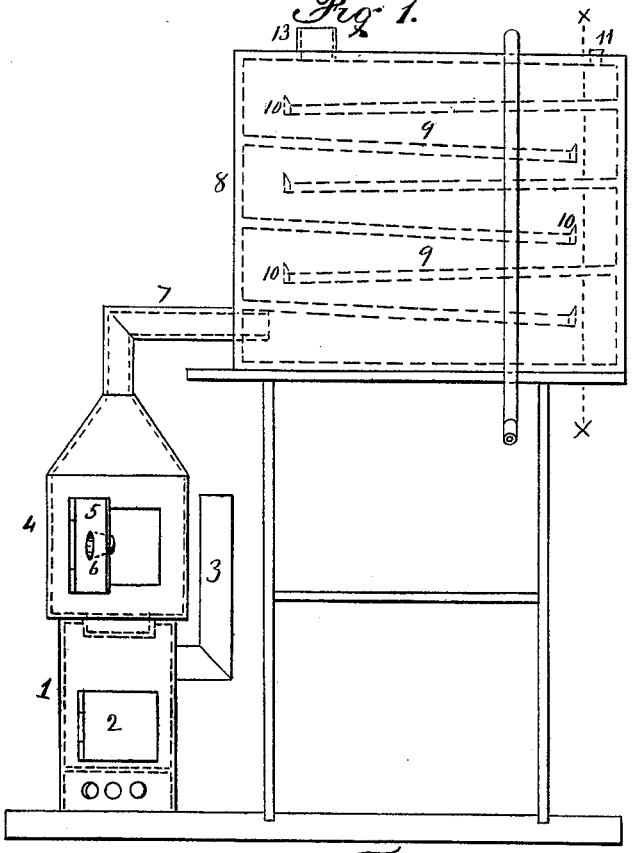


Fig. 2.

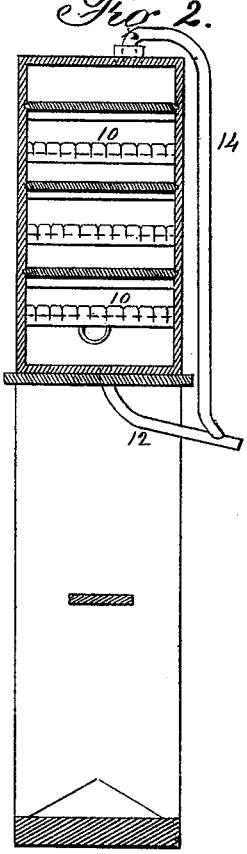
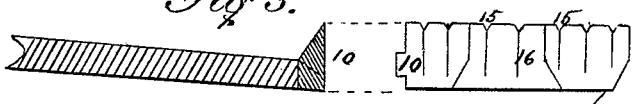


Fig. 3.



Witnesses.
Benjamin b. Pole
J. Dennis Jr

Inventor:
William Maynard

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON D. C.

UNITED STATES PATENT OFFICE.

WILLIAM MAYNARD, OF SALEM, MASSACHUSETTS.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF HYDRATED SULPHUROUS ACID.

Specification forming part of Letters Patent No. **180,901**, dated August 8, 1876; application filed February 23, 1875.

To all whom it may concern:

Be it known that I, WILLIAM MAYNARD, of Salem, Essex county, in the State of Massachusetts, have invented an Improved Apparatus for Generating Hydrated Sulphurous-Acid Gas; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in apparatus for generating and hydrating sulphurous-acid gas; and it consists in the particular construction and arrangement of the condenser or chamber in which is effected the absorption of the gas by the water, the said chamber being provided with an inlet for the water above, and an inlet for the gas below, and fitted interiorly with alternating inclined imperforate shelves, which are provided with ledges or cleats at their lower ends, notched and sawed down to form slits or scores, the said cleats serving to hold a surface of water upon the shelves for the absorption of the gas, which water gradually weeps or trickles over the edge of the cleats from one to the other of the shelves, while the said scores permit the draining of the shelves when the apparatus is not in operation, all as hereinafter more fully described.

In the accompanying drawings, Figure 1 is an elevation of my improved apparatus. The interior is shown by dotted lines. Fig. 2 is a section on the line *x x*, Fig. 1. Fig. 3 is a section and end elevation of the shelf.

In the drawings, 1 is a furnace provided with a grate for fuel, and a door, 2, for supplying fuel; also a smoke-pipe, 3, to convey the products of combustion. This furnace has an opening in the top for the cast-iron retort 4, which has a bottom to sit in the furnace, made separate from the upper part, and a door, 5, to supply sulphur to be burned, with a draft-hole, 6, provided with a conical tube, to supply air to burn the sulphur. The smoke or sulphurous-acid gas formed in the retort passes through the pipe 7 into the condenser 8, which consists of a wooden box five feet long, eight inches wide, and four feet high inside. This condenser is made of pitch-pine plank, matched or grooved and tongued together. The sides and ends are fitted to grooves in the top and bottom, and the whole held together by clamping bars and bolts on the outside, without the use of iron or metal in any portion of the condensing-box where the gas and water would come in contact with it. The sides and ends of this condenser are grooved to receive the inclined shelves 9 9, which are half an inch thick, and held in position by fitting in the grooves. The cleats 10 across the ends of the shelves have the grain of the wood vertical, and are dovetailed to the ends of the shelves, and the tops of the cleats should be as high as the opposite end of the shelf, to hold the water all over the top of each shelf. These cleats are notched at 15, and scores or slits 16 are sawed from the notches down to the shelf with a very thin saw, so that when the process is stopped the water will all run through the cleats, and not leave any in the condenser.

The water is allowed to weep or percolate through the scores sawed in the cleats, and drop with a splash into the water on the shelf below, the water being admitted in the top at 11, and weeps or percolates from each shelf to the next, until it reaches the bottom of the condenser, and passes out through the pipe 12 into the receptacle prepared to receive it.

To use my apparatus I charge the retort 4 with sulphur, and make a fire in the furnace, and heat the retort to burn the sulphur, the product of which rises, and is conducted into the condenser. I then let in a supply of water at 11, which covers the shelves, passes very slowly, weeping or percolating from one shelf to the next, and absorbs the sulphurous-acid gas, forming sulphurous-acid gas hydrated, which passes out of the condenser through the pipe 12, while the azote and other impurities not absorbed by the water pass off through pipe 13. If, however, it is inconvenient to let the azote escape at 13, it may be made to pass over, in the pipe 14, from the top of the condenser, and pass down and out with the sulphurous-acid gas hydrated. When the sulphur gets to burning, the fire in the furnace may be allowed to go out, and the sulphur is fed into the retort, so as to continue to burn as long as quired.

In charging water by my improved process I get rid of, or avoid, any admixture of any foreign or deleterious substance; also,

any lighter azoted air, which passes out at the top of the condenser, and which, if mixed with the water, would injure the texture, fiber, or tints of color in the articles to be bleached, plumped, or tinted, as the case may be.

When the process is stopped the water should all be allowed to run out of the condenser, and the scores in the cleats should be cut deep enough to completely drain the shelves, for if any water remains it absorbs oxygen from the air, and the sulphurous-acid gas becomes converted into sulphuric acid, and is useless for the purpose intended. Now, as this sulphurous-acid gas hydrated becomes weak by age, or becomes a sulphuric-acid solution, if long exposed to the air, and is also too bulky to be transported, it is important for each consumer to have an apparatus to make it just as he needs it for consumption; and my improved apparatus costs very little, and can be so easily managed that any person of ordinary capacity can soon learn to use it with facility and success.

It is important to start this apparatus with a quick, strong fire, so as to raise the heat above the point of sublimation, up to the point of gaseous decomposition, at which it should be kept during the whole time the process is carried on.

In defining the limits of my invention I would have it understood that I do not claim, broadly, the alternately-arranged inclined shelves, as these have been employed in the manufacture of illuminating-gas, and also in beer-coolers and vinegar apparatus; neither do I claim, broadly, the shelf having a ledge or cleat, as a horizontal perforated shelf, having such a ledge, is shown in Patent No. 101,011, for the same purpose set forth in my invention; and an imperforate horizontal shelf with such ledge is also shown in Patent No. 65,458, for making vinegar; but I do not know that a ledge or cleat has been employed with alternately-arranged shelves which are inclined and imperforate, and the new result that grows out of this construction and arrangement is, that it effects the double result of, first, holding a comparatively still surface of water upon the shelves, which is necessary, for the reason that a rapidly-passing sheet of water would beat down the heavy rising gas; and, secondly, of draining the shelf, and securing a tapering horizontal chamber for the gas, which, as it passes laterally, is driven by the upper shelf against the surface of the subjacent and nearly still water, bringing it into more direct contact with the water, and condensing it at the very point where the water drops from the next shelf above. This effects in a better manner the absorption of the gas, and facilitates the ascent of the same by the displacement which the falling water produces.

Having thus described my invention, therefore, and pointed out its distinguishing features, what I claim is—

1. In an apparatus for hydrating gases a condenser, 8, having an inlet for the water above, and an inlet for the gas below, and having also inclined imperforate shelves 9, arranged alternately in the same, provided with ledges or cleats 10, as and for the purpose described.

2. The combination, with the imperforate shelves 9, arranged alternately in the condenser, of the cleats 10, having notches 15 and slits or scores 16 sawed down therefrom to a level with the upper surface of the shelf, substantially as and for the purpose described.

WILLIAM MAYNARD.

Witnesses:

J. DENNIS, Jr.,

THOMAS C. CONNOLLY.