

D. M. SPROGLE.

Apparatus for Hardening Stone Artificially.

No. 147,522.

Patented Feb. 17, 1874.

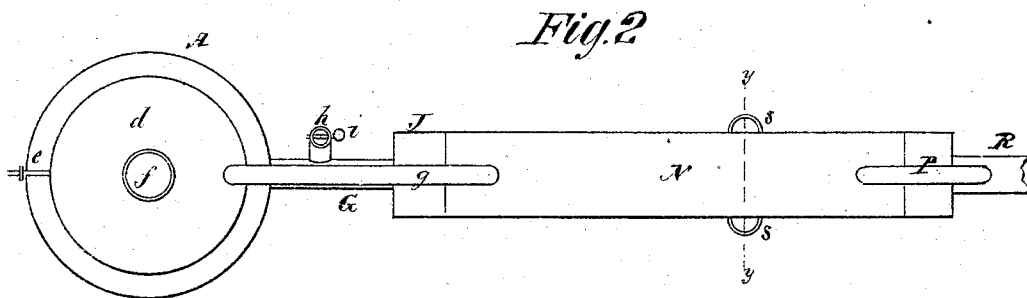
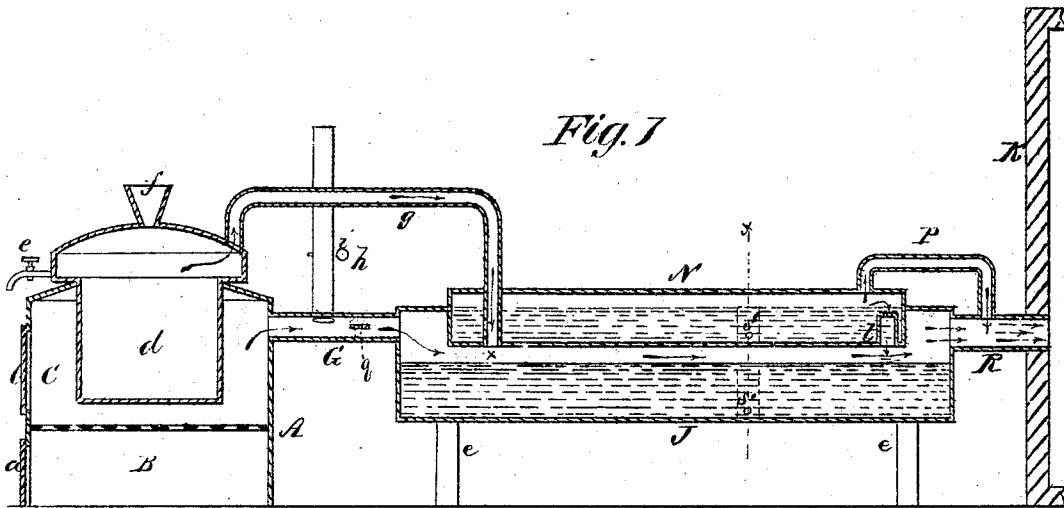
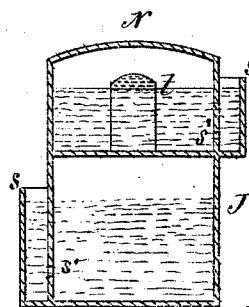


Fig. 3



Witnesses
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UNITED STATES PATENT OFFICE.

DANIEL M. SPROGLE, OF ANNAPOLIS, MARYLAND.

IMPROVEMENT IN APPARATUS FOR HARDENING STONE ARTIFICIALLY.

Specification forming part of Letters Patent No. **147,522**, dated February 17, 1874; application filed June 30, 1873.

To all whom it may concern:

Be it known that I, DANIEL M. SPROGLE, of Annapolis, in the county of Anne Arundel and State of Maryland, have invented a new and Improved Apparatus for Hardening Stone Artificially; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a section taken vertically and longitudinally through the center of my improved apparatus. Fig. 2 is a top or plan view of the apparatus. Fig. 3 is a section taken transversely and vertically through the apparatus, in the plane indicated by the dotted line *xx* on Figs. 1 and 2.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a new and improved apparatus which is designed for mixing carbonic-acid gas and steam, and introducing the two into a kiln or curing-chamber in a heated state, for the purpose of hardening cements having for their base calcareous matter, as will be hereinafter explained.

The following description of my invention will enable others skilled in the art to understand it.

In the accompanying drawings, A represents a furnace, which may be made of any suitable capacity and material. B represents the ash-pit, provided with a draft-door, *a*; and C represents a chamber, provided with a feed-door, *b*, which chamber is for the purpose of containing charcoal, from which carbonic-acid gas is generated. Inside of this carbonic-acid-gas generator extends a steam-generator, *d*, which is provided with a water-supply funnel, *f*, and a draw-off or test cock, *e*. The gas-generating chamber C communicates with a mixing-vessel, J, by means of a pipe, G, and the steam-generator communicates with the same vessel J by means of a pipe, *g*, which leads from the top of the enlarged portion of this steam-generator through a hot-water vessel, N, as shown in Fig. 1. The pipe G is provided with a damper, *q*, and also with a smoke-pipe, *h*, in which latter there is also a damper, *i*. When fire is first started in the gas-generator, the damper *q* is shut and the damper *i* opened, and after the charcoal is fully ignited the damper *i* is shut and the damper *q* is opened. By this means smoke is prevented passing from the furnace A through the mixing-vessel

J into the kiln. The hot water N forms the upper part of the mixing-vessel J, which also contains hot water, as indicated in Figs. 1 and 3. These two vessels, J and N, are provided on their sides with cups S S, which communicate with the interior of their respective vessels by means of apertures S' S'. It is by means of these cups that the vessels are supplied with water, and as the tops of the cups are level with the required water-lines in the vessels the water in the latter is prevented from rising above such lines. This feature is clearly represented by Fig. 3. The steam-pipe enters the vessel J at that end of it which is nearest the furnace A and the pipe G, so that the steam will absorb the gas at the point *x*. The carbonated vapor and superfluity of gas will then pass on between the bottom of the vessel N and the body of water in the vessel J, and just before the said superfluity of gas enters a pipe, R, to escape thereby into the kiln K, it is subjected to a fine shower of hot water from the vessel N, which falls from the upper perforated end of an overflow-pipe, *l*, as shown in Fig. 1. The pipe P is intended for conducting any vapor which may rise in the vessel N into the pipe R, where it is impregnated with carbonic-acid gas before entering the kiln K. By these means I subject the cement to the action of heated vapor, which is highly charged with carbonic-acid gas. I do not now cool the gas nor use dry steam, for the reason that I have found, by experiment, that dry steam and gas will not thoroughly penetrate the wet cement, but harden only the outside of the blocks, leaving the interior thereof comparatively soft.

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

1. The hot-water vessel N and mixing-vessel J, combined with steam-pipe *g*, gas-pipe G, and the pipe R, leading into the kiln, substantially as and for the purposes described.

2. The filling and overflow cups S S, applied to the vessels J N, in combination with the overflow spray-pipe *l*, substantially as described.

3. The pipe *g*, the pipe *l*, and the pipes P R, combined with and applied to vessels J N, substantially as described.

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Witnesses:

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