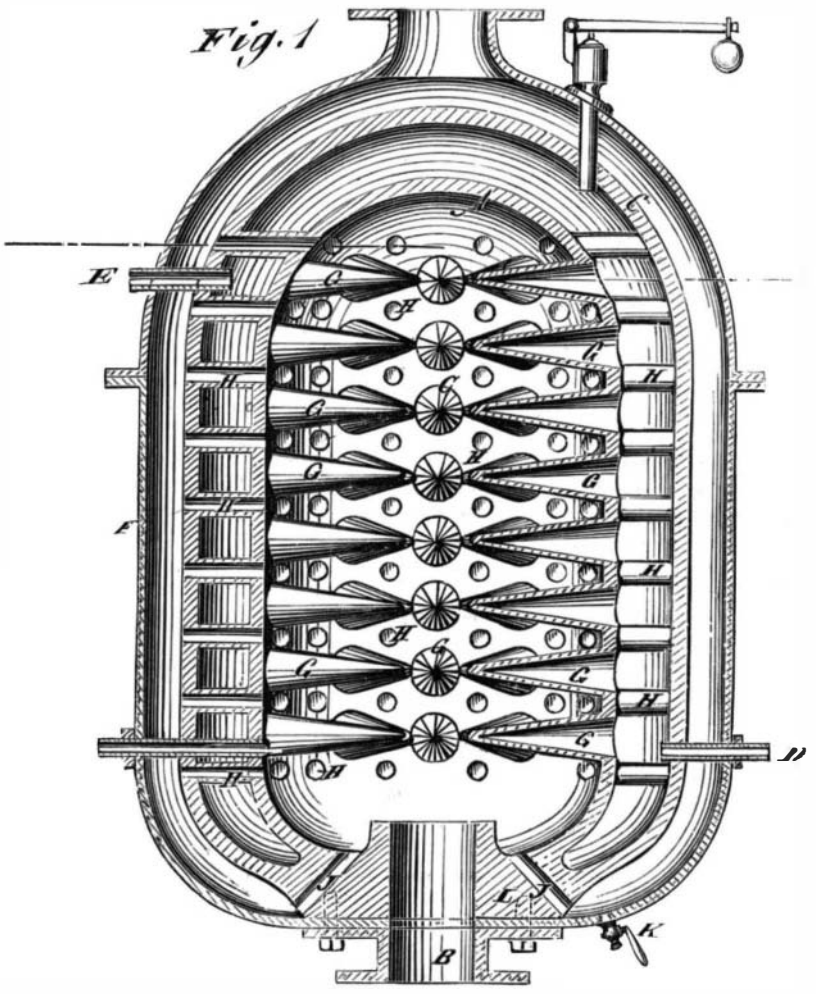
IMPROVED FEED WATER HEATER.

We illustrate herewith a new feed water heater, so constructed as to avoid risk of fracture by contraction or expansion, and also to afford an efficient application of heat without obstructing the escape of steam.

Fig. 1 is a sectional elevation, and Fig. 2 is a horizontal section. A is the inner cylinder into which the steam is discharged from the engine, by the pipe, B. C is the water cylinder, inclosing the cylinder, A, and having inlet and outlet pipes, D, E; and F is the steam jacket surrounding the water cylinder. The hollow conical studs, G, radiate from the shell of cylinder, A, to its center, or nearly so, and conduct the water into the steam space from cylinder, G, so as to distribute the application of the heat very efficiently. The small exit steam pipes radiating outwardly from said cylinder, A, make another efficient distribution. Both the hollow studs and the exit pipes are distributed uniformly, or as nearly so as is necessary for producing uniform effects throughout the heater, and the capacity of the pipes, H, is regulated to that of the exhaust pipe, B. This pipe is prolonged a little above the bottom of the cylinder, A, to make a kind of trap to prevent the water of condensation from flowing back in it, and passages, J, are made for it to flow into the steam jacket, F, from which it may be drawn from a cock, K. Cylinders, A and C, are cast in connection together at L, making a substantial base, to which the jacket, F, is also connected, so as to seat the heater on the top of the pipe, B, or any other suitable support. Conical studs are provided, instead of tubes connected at both ends, with express reference to the changes of temperature to which the heater will necessarily be subjected when in use.

Patented February 22, 1876, through the Scientific American Patent Agency, to Mr. Timothy W. Hayes, of Trenton, N. J.



HAYES' FEED WATER HEATER.

Tin in Tuscany.

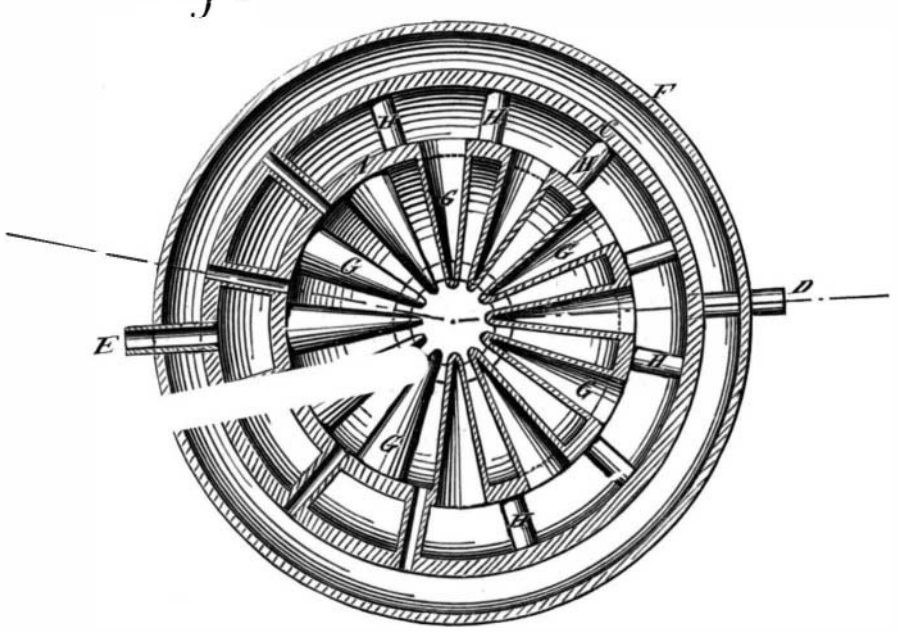
At a meeting of the Paris Society of Civil Engineers, a paper was read on a discovery, said to have been made in Tuscany, of a vein of bioxide of tin. The vein is reported to be situated about a mile and a quarter southwest of the town of Campiglia Marittima, in Tuscany, at a place called Cento Camerelle, upon the western side of the Fumacchio, a spur of the Monti Calvi, a chain celebrated for its mineral deposits. The Cento Camerelle (Hundred Chambers) consists of a series of excavations attributed to the Etruscans, and dug out horizontally in the side of the mountain. The concretions with which they were filled have been removed in the course of ironstone mining. The tin was stumbled upon some yards from the Cento Camerelle in following up a vein of brown hematite. The tin ore is very compact, of a yellowish gray color, and of granular fracture. Specimens yielded from 58 to 72 per cent.

Fargier's Carbon Process.

According to the *Moniteur de la Photographie*, Fargier's new carbon process may be summed up in a few words. A sheet of paper is allowed to float upon a solution of five grains of chloride of iron and a similar amount of citric acid, which are dissolved in one hundred grains of water. This paper is afterwards dried in the dark, and placed under a negative to print, until a weak image is produced. This print is taken and floated upon a bath of colored gelatin solution, when it is found that the gelatin attaches itself to the portions of the surface that have been acted upon by light. There remains nothing but to wash the sheet in water, and the picture is finished. If, instead of a colored solution of gelatin in water, softened tissue were employed, the printed chloride of iron paper being pressed into contact with the same, warm water being used subsequently to separate the two surfaces again, there would perhaps be a step further gained in the simplification of the carbon process, for the pictures would be visible at once during the printing operation, and could therefore be controlled. Dr. Liesegang, writing in the *Archiv*, is of opinion that an improvement in the carbon process may be effected in this direction, and that the Fargier method indicates a branch of the subject which might be investigated with advantage.—*Photographic News.*

Pig Iron Pavement.

Twenty different kinds of paving have been tried in Paris; wood paving has been judged, gutta percha paving is too dear, in bitumen paving there is room for improvement, and now paving by pig iron is to be tried in a few days. A bed of mortar is first laid down, which is covered by a strong layer of asphalt; it is in this layer that the iron cakes, which are about 1·6 inches thick, are set. These cakes it appears, preserve the homogeneity of the bitumen, and prevent its depression, and render the asphalt less slippery for horses. This pavement will cost more, assuredly, than the compressed asphalt, but it is estimated that this mode of paving will save 50 per cent upon the repairing expenses, which are very considerable. The end desired is to avoid, by the adoption of a kind of pavement, the depressions in roads over which a great deal of traffic passes. To attain this, it does not suffice to pour bitumen upon a well prepared ground lightly covered with a coat of lime; the resistance of the ground should equal that of an old macadamised bank; and a very thick bed of mortar, which should be very homogeneous, should be laid before the asphalt is laid.



HAYES' FEED WATER HEATER.

Spectrum of the Electric Arc--A New Experiment.

In general, the electric light refers to the light coming from the incandescent carbon points, as well as from the space between them. Now, in this sense, the spectrum of the electric arc is a very common lecture experiment. But the words electric arc, in the strict sense of that term, belong to the arch of light between the points. This light is but slightly luminous, and is of a pale blue or violet color. Ordinarily, with a battery, the distance between the points is so small that the pure arc itself cannot be had separated from the points, and so its spectrum cannot be separately projected. But, during a recent lecture experiment by Professor G. F. Barker, at the Stevens Institute, with the arc of the Gramme machine, the experiment was successfully performed, the carbon lines being plainly produced on the screen. This, we believe, has never been done before as a distinct experiment; at any rate, we call to mind no record thereof. It should, however, be stated that, in the ordinary use of the spectrum of the electric light, the carbon lines occasionally flash out for an instant from a lateral discharge.

Man's Allotted Span.

The determination of threescore and ten years as the allotted period of human existence is doubtless in a considerable degree owing to that period having been adopted by the royal psalmist; but modern science, while it has postponed somewhat the average termination, has also still more largely prolonged the hypothetical duration of life. Flourens, reasoning from the time required for the full physical development of a human being, as compared with that taken by other animals, fixes the natural limit at 100 years, and this is also the period fixed by Dr. Farr as man's natural death time, although at present he finds, as the result of ten years' approximately accurate and complete registration, that this limit is scarcely reached by one English child in a hundred thousand. In some districts, of which the town of Liverpool is an exceptional example the proportion is much below this. In this, however, as in many other respects, we are far in advance of our ancestors. The early English poets fix the appearance of the signs of approaching senility much earlier than we are now accustomed to notice them, and Dr. Farr shows that, while two hundred years ago the mortality of London was about 8 per cent, and one hundred years afterwards 5 per cent, it is now only 2·4 per cent. And there is good reason to believe, says *Iron*, that it may be still further reduced—very much of the existing mortality depending upon the preventible causes, such as impure air and impure water, negligence on railways, on shipboard, in mines, in street police, and in many other ways. What is also of equal importance is the fact that any decrease in the mortality from these causes will be necessarily accompanied by the absence of disease, and an increase to survivors of that good health without which length of days is scarcely a boon. The economical results will be no less important. Disability from sickness is a source of pecuniary loss not only to the sufferer but to the entire community; while the longer old age, that one incurably malady, can be staved off, so much will be gained, for when the season of effective work is over, the individual, in ceasing to contribute to the general wealth, becomes a pensioner upon it. Thus, according to Dr. Farr, the Norfolk agricultural laborer, worth $25 at his birth and reaching at the age of twenty-five years his maximum value of $1,230, sinks at eighty to $205.

The Time to Plant.

It is useless to put seeds in the ground, *The American Garden* sensibly says, before the soil becomes warm and dry. For this reason no particular time can be specified for planting—everything depends upon the location, soil, and temperature. A very good guide is the taking up of a handful of the loam and closing the fingers tightly upon it. If, on opening the hand, the soil remains in a hard lump, and retains the imprint of the fingers, it is too wet; while if it falls apart in an irregular heap, it may be deemed in a condition for the seeds. Another reminder, and one that will prove a guide in all latitudes, is the forest tree. When trees put forth their young leaves, all nature is ready for active work. Seeds planted then germinate at once, and seldom fail to come up and grow vigorously. Nothing is gained by very early planting. Better be a grain too late than too early.

Save your Soapsuds.

Who would throw away a barrel full of soft soap or a box of hard soap? Were it not otherwise useful, it would be of great value as a fertilizer, if spread, in its raw state, about our fruit trees or berry bushes. But, after being dissolved in water and passing through the wash tub, gleaning the imperceptible elements of the best manure from soiled linen, its fertilizing power is vastly increased. Indeed we may almost say that the average soapsuds from the kitchen and laundry is worth more than the soap which produces it. Do not, then, allow your soapsuds to run away wasted, while you have trees which it might benefit.

A Good Lacquer.

A preserving lacquer for brass or bronze, which gives a beautiful gilding to the articles, is also mentioned in the same paper. It is prepared simply by dissolving in 332 parts of rectified spirit 16 parts of shellac, 4 parts of dragon's blood, and 1 part turmeric root. The metal to be lacquered is warmed, and the varnish applied means of a sponge. Brasswork becomes beautifully gilded by this application. As the liquid is a spirit solution, it is necessary, of course, to keep it in a well stoppered bottle.—*Photographic News.*