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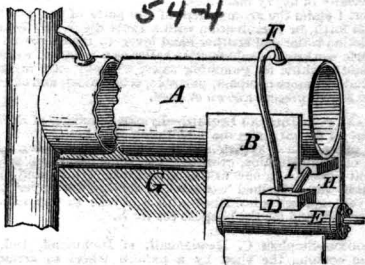
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Wethered's Steam and Stame Apparatus.

This figure is a vertical section of an invention for which a patent was granted to Chas. E. J. and Saml. Wethered, of Baltimore, on the 25th of May, last year, and respecting which a number of inquiries have been made of us recently, as it was applied to, but not used by the *Arctic*, when she left this port on her last voyage to Liverpool. It simply consists in the use of saturated and surcharged steam combined, in the cylinder of an engine. Saturated steam is common steam; surcharged steam is steam dispossessed of its moist character, and having a high temperature, hence it is sometimes named superheated steam.

Some years ago, the late James Frost, of Brooklyn, made some experiments with steam heated apart from water, and being led to believe, from the economical results obtained, that common steam entirely changed its character by being so treated, he named it *stame*, hence that term is now sometimes used, and for steam heated in the mode first adopted by him, it should always be so named, —that is steam heated apart from water.



DESCRIPTION OF THE FIGURE:—A is a common steam boiler; B is the side wall of the furnace—part of it being left open. F is a pipe which conducts the common steam from the boiler to the common steam box, D, of the cylinder, E. Another pipe rises at the back of the boiler, enters the smoke pipe, and passes through the furnace, G, from the front end of which it, the pipe, I, passes into the steam box, D. This pipe conveys steam from the boiler which becomes stame (is superheated) while passing through the furnace. It is for the use of these two kinds of steam that the above named patent was obtained, not the apparatus. If there is any economy in this mode of heating steam apart from water, the credit belongs to Mr. Frost. We believe he was mistaken in reference to the change which he supposed took place in the character of steam by being treated in the mode invented by him, and which we saw in operation conducted by himself.

In the experiments which were made with stame and steam on the steamboat *Jos. Johnson*, in this city, last winter, Chief-Engineer Isherwood, U. S. N., in detailing the results in the *Franklin Journal*, stated that there was a saving of sixty-five per cent. in the use of stame alone, over common steam; and a saving of one hundred and six per cent. in using steam and stame combined.

With a strong confidence in the conclusiveness of these results,—and they seemed to afford every security, so far at least as relates to economy in fuel, the Steamship *Arctic*, of the Collins Line, was fitted up to carry the invention into practical use, on her last voyage. Two large pipes were set to conduct the steam through each furnace, so as to super-heat and employ it as illustrated in the above engraving.

Some defect was discovered before the ill-fated *Arctic* proceeded on her voyage,

and as the ⁵⁴⁻⁵stame pipes could be filled with water, they were so employed, viz: as water tubes running through the furnaces.—Such an arrangement appeared perfectly safe, and was necessary, as the pipes would otherwise have been burned out. Common steam, in its nature, is a practical lubricator, hence we conceive that this is the reason why stame and steam combined produce a better effect than using the former alone.

As any one but an ignoramus might have anticipated, the laws of nature were too strong for the enemy. The first engagement took place between them in June last, immediately after the Cornish engine had been placed in position by the scientific gentlemen whose opinions were to govern the Common Council of Hartford. Some prudence was manifested in commencing the assault, and attempts were made to conciliate the water by gentle treatment. At first the engine was started at three strokes a minute—just to get the water used to it. To every stroke of the enemy, the water of course gave a hearty thump in return, just by way of reminding him that the joke had gone far enough. However, it would not do to submit without a struggle, and it was resolutely determined to raise the speed to *three and a half* strokes a minute. At this attempt of the enemy to violate the laws of its being, the water took its revenge, and a wreck followed in no time. The cast iron bonnet capable of enduring a pressure of at least two hundred pounds to the inch, was shattered, saving the rest of the concern from destruction; and the water was left master of the field. The enemy hauled off to repair damages, and it will be many a day before the attack is renewed. I have just come from the scene of the contest. The Cornish engine is laid up in white lead and tallow, and has not had steam since June. The fight lasted only about five days; but that settled stupidity for a while, at least. ⁵⁴⁻³

I am informed however that another campaign is to be begun. Reinforcements are needed; and an appeal has been made to the city of Phila. to appropriate five thousand and five hundred dollars to enable the enemy to carry on the war with renewed vigor. One branch of the city council has appropriated this supply, but the other hesitated. Some of its number feel a sympathy with the water and do not think it ought to be treated so; and others fear that a contest of this kind is too expensive even for a great city. The amount called for is to build a stand-pipe, but it is not sufficient—and when the stand-pipe is built it is not certain that the enemy will prevail yet. Cast iron and stupidity can do much no doubt, when backed by money enough; but in a fight where *gravity, inertia, and momentum* are all combined against them, they will find as formidable an opponent as Russia is to the Allies. The best thing that Philadelphia can do is to follow the example of Hartford, and to retire from a conflict in which nothing can be expected but broken bones—submitting to the first rather than a greater subsequent loss.

It may be satisfactory to the gentlemen who examined and reported upon the old engine at Philadelphia to know that they still are performing good service in the same building in which the Cornish engine fought its last battle and came off without any laurels; and that their condition is much improved by the care of better engineers than formerly—giving every indication of a long and useful career.

It will be readily perceived, that if the Cornish engine cannot run three and a half strokes a minute at Philadelphia, where the pipe is not much more than half the length of the Hartford one, it would not be able to run two strokes a minute at Hartford. It was calculated to run ten strokes in order to give the supply needed, and I suppose that all will agree, that the theory upon which the Council acted was correct, and that it would have been impossible for the machine to have done it.

Persuasion is better than force in the physical, as well as the moral world; and if water cannot be induced to flow up hill with a *uniform and constant flow, produced by the application of a uniform and constant power*, it is of little use to attempt to kick it up, by rushing at it ten times a minute with a great clumsy plunger loaded with cast iron, and stupidity.

It will, no doubt, be satisfactory to those gentlemen who voted with me, to know, that whatever may happen from their act, it cannot be a more complete failure than would have happened had they not taken the responsibility of deciding as they did; as it is gratifying to me to know that in leading them to take this responsibility, I made no argument or statement which experience has found to be fallacious.

The Cornish engines at Jersey City and Buffalo, have fallen far short of their promise, and are practically, failures. But of that, more hereafter.

Yours, very truly, EDW. N. DICKERSON.

No. 57 CHAMBERS ST., N. Y.,
54-1 September 3d, 1855.

Editor of *Hartford Times*:—Sir: It is now about a year since the Court of Common Council of the city of Hartford, resolved to rescind a contract which had been entered into by their immediate predecessors in office, for the construction of a Cornish engine to pump water into the city reservoir; and to pay the contractor an equivalent in money for the profits which he had hoped to earn by its execution. In taking this step the members of the Court assumed a great responsibility. The contract had been entered into by others than themselves—upon whom the law had imposed the duty of making it; who had been led to it by the example of many other cities, where great care had been taken to obtain the best machine; who had been deterred by the failure of others who had left the beaten track, from making new experiments; and whose course had been sanctioned by the approval of such men as Stevens of Hoboken, and Graaf of Philadelphia. The objections which were urged in the court against the contract, and its execution, were theoretical—sustained only by arguments drawn out of the principles of nature, and not by any facts whatever; while the friends of the contract supported it by the unanimous testimony of the books, and by an array of favorable opinions expressed by many practical men who were engaged in hydraulic engineering in the country.

Upon the trial of the question I took the ground that it was *physically impossible* for a Cornish engine to operate in the situation where the Hartford engineer had decided to place it; and upon that issue the court heard testimony and argument, and made their decision. It will, no doubt, be recollected, that I assumed the responsibility of saying, that the attempt to drive the column of water through the ascending pipe, leading from the Connecticut river to the reservoir, by the Cornish engine, at such a speed as would supply the needed amount, would be followed by an instantaneous destruction of the engine, and of the building in which it stood. That pipe is seven thousand feet long, and will contain about three hundred tons of water, when full. In reply to this, several witnesses were examined, who stated among other things, that in the city of Philadelphia, where the water was pumped through an ascending pipe of about three thousand feet in length, by double acting force pumps, the engineer had decided to substitute a Cornish engine, which was then in process of construction, because of the imperfect manner in which the old engines did their work; and it was agreed that this proved the capacity of the Cornish engine and the failure of other systems. I replied that it only proved the ignorance of the Philadelphia engineers; and the Common Council agree with me, by rejecting the Cornish engine, and leaving it to the skill of American engineers to find a better one.

The conflict was between science and empiricism; and there was enough intelligence in the Common Council of Hartford to decide as reason and demonstration required rational men to do. It is now an agreeable task to me, to show them the correctness of the argument upon which they relied; and to satisfy them of their wisdom in following it.

The Cornish engine was built in Philadelphia, as Dr. Hunt testified it would be. It was built in one of the best machine shops in the world—that of J. P. Morris & Co. The builders had sent to England to make sure that it should be as strong as possible, and had procured exact drawings from the most reliable sources there. No

pains were spared to make it succeed. It was to run ten strokes a minute; and to do it so cheaply that the City of Philadelphia was expected to be able to set up a coal yard with the coal they were to save. The errors committed in the Buffalo and Jersey city engine were to be remedied here upon the most approved English plan—just as my friend the Dr. testified. In short the laws of nature were to be ignominiously defeated; and a hundred tons of water was to submit patiently, without resentment, to be kicked up hill through a pipe about three thousand feet long to the height of one hundred and twenty feet, by the clumsy plunger of a stupid machine, rushing at it ten times a minute. ⁵⁴⁻²