

quantity of fuel used, and the quantity of water, been carefully noted, the experiment would have possessed much greater value; as it is however, it is sufficient to excite enquiry. It is not improbable that electricity may exercise an influence in converting water into steam, which has never been assigned to it, and we may yet live to see the combined action of electricity with heat and water produce as great an extension of the application of steam power as was effected by the improvements of James Watt.

Mr. Harshman's theory is: that water contains a large amount of latent heat, which, under some circumstances is capable of being rapidly and dangerously developed, and under others, of being gradually freed without danger, and that to accomplish this it is necessary to establish an electric or galvanic equilibrium in the boiler. That an iron boiler, covered in all but its fire surface and flues, with a copper coating, generates steam very rapidly, saving half the fuel, and cannot be exploded. It may rupture by over-pressure and relieve itself by allowing an escape of steam, but it cannot explode. The correctness of this theory Mr. Harshman says he has illustrated by repeated experiments, in every one of which the result has been uniformly satisfactory. Having satisfied himself on this point, he is now taking measures to bring his discovery and invention to the attention of the public, very justly believing that it will be properly appreciated as soon as sufficient evidence is furnished of its efficacy to prevent the recurrence of a species of calamity highly destructive to life and property.

The following details of the experiments carried on by him are from the *Railroad Record* of the *Railway Times*.

"The experimental boiler employed was a small cylinder without flues, twelve inches long and eight inches in diameter. The cylinder was made of iron 29 inches thick, and the ends somewhat thicker. The seams were riveted and soldered, and the safety valve fastened to the boiler by solder. The furnace was of common construction, without return flue. The boiler was placed in a strong frame of iron, the ends being confined, one by a bar extending across the end, and the other by a square piece of iron in the centre. One half the surface of the cylinder was exposed to the action of the fire, the other half was covered with copper. The ends were also covered with copper. The safety valve was confined by a long wire attached to a spring balance. The fuel employed was hickory wood well dried. The boiler being placed in such a position that its explosion could do no damage, the fire was lighted, and the observers withdrew to a distance to ob-