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THE ECLIPSE STEAM GENERATOR.

We illustrate herewith an improved form of the Eclipse steam generator, a sectional boiler which was described in these columns several months since. The invention, as modified, is claimed to combine safety, durability, and economy with cheapness of construction and facility of repairs.

The boiler, we are informed, has been used for driving all classes of machinery with great success. The improved method of construction now adopted allows any tube to be easily removed, replaced, or entire sections detached or added, without interfering with other parts of the generator.

The water and steam chambers, A, are of ample size, made of semi-steel, and so formed that the steam can rise to the surface and the water freely return to the lower tubes. The tubes, B, are lapwelded, and the bends, C, are semi-steel. These parts, being exposed to the fire, are arranged so as to allow for expansion and contraction, and provide for complete circulation. The top or roof pipes, F, are used, the lower row for carrying a supply of water and the upper for drying the steam. There are hand holes, G, in the ends of each roof pipe, F, for the purpose of cleaning; also hand holes in the backs of all the chambers, A, so situated that any and every one of the circulating tubes, B, can be commanded their entire inside length, or detached if ever necessary, without disturbing the upright or main parts. The space between each tube will allow the removal of any < without disturbing another.

The object of giving the tubes the <, or angular, shape is to secure the greatest possible amount of heating surface of a continual upward incline, and to allow of unequal expansion. If one arm of the < becomes longer from the heat, the other will spring up or down to accommodate itself, without opening a joint. The water has a complete circulation, running up the inclined tubes, B, and falling down in the sections, A. This is caused by the steam and hot water rising to the surface, and the colder water rushing to its place. The upright return chambers, A, are large enough for the free passage of the water from the exhaust or top openings of the tubes to the lower. This secures a continued and uninterrupted circulation up through all the inclined tubes, B (which are immediately over the fire), and back down the sections, A, where there is larger volume and less effect from the furnace. The steam, as generated, escapes to the upper part of the boiler. The sediments settle in the drum, E, below the fire surface, where they can do no injury and can be readily removed. The heating surfaces are kept clean by this arrangement.

There are no chambers exposed to the action of the heat sufficiently large to cause a destructive explosion. The boiler is short, so that all parts are brought into close proximity to the fire. No packing or caulking is said to be necessary. The joints are ground iron to iron. The tubes are attached with improved lock nuts which can be unloosed at any time, and every part is easy of access for cleaning or repairs.

It is claimed that the bulk of the water, being carried in the upper part of the boiler, prevents the heating surfaces from becoming dry so long as any water remains in the generator. This obviates the necessity of having large water chambers for a reserved supply, while requiring but little attention to keep the water at a proper level.

For further particulars address the Eclipse Steam Manufacturing Company, Sharpsburg, Pa. Information can also be had at their branch office, 87 Wood street, Pittsburgh, Pa., or of the general agent, Isaac H. Shearman, 45 Cortlandt street, New York city, and 132 North 3d street, Philadelphia, Pa.

Electricity Produced in Mechanical Actions.

Certain phenomena of electricity of tension, observed in leather belting by M. Joulin, have recently been the means of directing the attention of that physicist to the subject forming the above heading. He has constructed machines in which the mechanical tension of the belt can be varied at will, and has used for conducting pulleys the following materials: Iron, brass, zinc, red copper, white iron, lead (the last four metals applied in thin laminae to wooden pulleys); the imperfect conductors, walnut wood, leather, hardened rubber, in sheets of 0.36 inch, applied to wood; cloth and silk fastened in form of cushions, also to wooden pulleys.

In the machines formed of metal and leather, in the latter

increase of temperature; but that though this might be true for solids, it did not follow that it was true for gaseous bodies. When one gas flame was placed behind another, the brightness was doubled, but the temperature remained the same.

Mr. Ranyard said that the speculations of spectroscopists as to the heat of Sirius were founded on the blueness of its light rather than on its general brightness.

Check Chains on Car Trucks.

At the recent session of the Master Car Builders, the merits, *pro* and *con*, of check chains were discussed. A large number of accidents were cited, in some of which the trucks

had the chains and in others no chains. Some of the members thought the chains were of no value, but the mass of the evidence was in favor of their use, and the report of the committee to that effect was adopted. Members believed that every truck ought to have four strong check chains. The committee say:

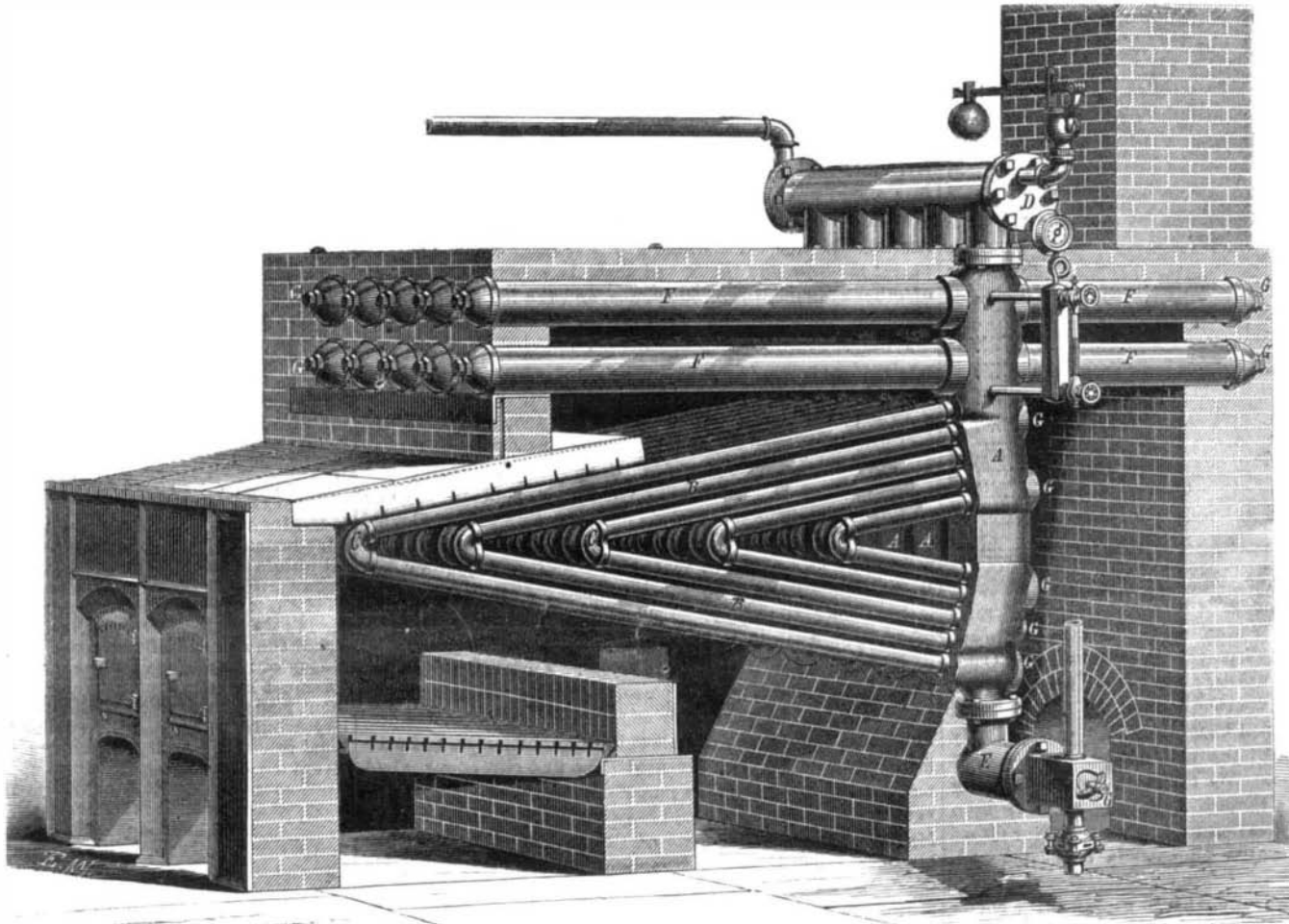
"Check chains, as usually applied, with eye bolts through the truck sides and sill of the car, are defective from being so placed that the full strength of the timber is not available, as the strain is down and sideways on the sill, and usually tears out the lower portion of it, leaving the upper part in place, and with the truck *vice versa*. Where hook or eye plates are bolted to the truck side and sill, the strain bears on the bolt nearest to the hook or eye, and the result is that either the bolts or timber break and

give way in detail; and in cases where lag or wood screws are used, the result is the same.

"In order to have check chains of value, they should be of such proportion that their strength will be equal to the resistance of the timbers to which they are attached, and the fastenings to the timber should be so constructed that the full strength of the timber would be utilized. The point of attaching chains to truck and car body, respectively, should be such that the chains would be at right angles to the body of the car when the chains are drawn taut, and the length of chain just sufficient to admit of running the shortest curves with safety.

"There are different methods of attachment to the sill or a special timber, so that the full strength of the timber can be made available. One method, which your committee would recommend, is to place an iron plate of suitable size and strength on the inside of the sill with an angle turned over, and extending half across the top of the sill, and an eye to receive a ring at the lower end of plate near the lower inside corner of sill; also a similar plate on the opposite side, with an angle extending half across the top, and another angle at the lower outside corner; the plate extending across the bottom of sill to near the inside corner, with an eye to receive the ring above referred to; then by bolting through the plates and sill, and the ends of the plates being drawn together by the ring passing through the eye near the ends, the sill or timber is securely inclosed, and, with the irons properly proportioned, its strength is fully utilized."

OIL TANK CARS.—On the Atlantic and Great Western Railroad, these tanks are made of three sixteenths iron, and are sixty-one inches in diameter. They hold eighty-five barrels. They resemble cylindrical boilers; are fitted with man hole, dome, filling and draw cocks, and are strapped down to platform cars by means of plate iron bands. The arrangement is cheap, safe, simple and durable. Pipe lines leading from the wells to the railroad stations convey the oil, which pours directly into the tank cars.



THE ECLIPSE STEAM GENERATOR.

body electric tensions of surprising intensity were found. Independently of the long sparks obtainable, a metallic wire brought near the belt was traversed with a continuous current powerful enough to deflect the needle of a galvanometer, with electricity of tension to weakly decompose water, and in slightly modified Geissler tubes to produce a distinct stratification of the electric light. The circumstances influencing the electric production may be referred to three causes: separation, more or less rapid, of the bodies; the complex mechanical action of incurvation, depending, in the case of leather, on the elastic state and dimensions of the pulley, and the number of incurvations in a given time; lastly, the common temperature of the two bodies or that of one of them.

Sirius.

At a recent meeting of the Royal Astronomical Society, a paper on Sirius, by Mr. J. M. Wilson, was read. His observations tended to confirm the speculations of spectroscopists that Sirius is intrinsically much brighter than the sun, and must, therefore, be of a higher temperature. His measures of the position of the companion of Sirius showed that it is now passing away from its periastron, and that the time of a complete orbital revolution is probably nearly two hundred years. Taking the parallax of Sirius as 0.22', the distance of the companion from the principal star is about fifty times the earth's distance from the sun. This would give the mass of Sirius as only 3½ times the mass of the sun, while the amount of its light is estimated at more than two hundred times the light of the sun. He therefore concluded, that, area for area, Sirius must be much more intensely luminous than the sun. He wished to direct attention to the companion of Sirius, and to point out that it is within the reach of instruments of only moderate aperture. The telescope with which his observations have been made is a refractor of 8½ inches. He has ordinarily used a power of 400.

Mr. Mattieu Williams said that it seemed to be assumed that increased brightness was necessarily an indication of