

A CURIOUS TREE GROWTH.

The accompanying illustration, reproduced direct from a photograph, represents one of those peculiar and unusual tree growths of which we have heretofore published several striking representations. The trees thus joined stand about twenty feet apart, are each over a foot in diameter, and it is impossible to tell which tree originally sent out the joining limb, which is about twelve feet from the ground. The trees are beeches, and we are indebted for the photograph from which our picture is made to Mr. Bert Ames, of De Ruyter, N. Y.

The Inconceivable Velocity of Arcturus.

Mr. Serviss, writing in the *New York Sun*, says: Arcturus, which exceeds our sun several thousand times, perhaps, in light-giving power, is apparently a runaway in the universe. As far as is known at present, Arcturus is both the largest and the most swiftly moving body in the stellar heavens. Its calculated velocity is no less than 375 miles in a second, or 32,400,000 miles in a day! The direction of its motion is such that it approaches the earth at the rate of 3,450,000 miles a day. But even if it were rushing at us in a straight line, 85,000 years would elapse before the encounter could take place. Nobody has been able to guess how Arcturus got started at its present rate of traveling, or where its journey will end. If it is only a gigantic visitor to our system of suns, then it will pass through the visible universe, and in the course of millions of years disappear from it. And if any member of our system should, through too close approach, become a satellite of Arcturus, it would inevitably be borne away a prisoner into the unfathomed and, by human eyes, unseen depths of illimitable space.

THE RUDOLF MULLER BOILER FURNACE ON THE STEAMSHIP GRIMM.

The application of improved boiler firing systems to ships is naturally an operation of considerable difficulty. The restricted space at disposal for the boilers makes many regenerative, gas and firing systems impracticable for use at sea. The motion of the vessel in a seaway is also a disturbing element which must be taken into account. There is, therefore, much interest attached to the arrival at this port of the steamship Grimm, of the Hamburg-American Packet Line, which vessel has just completed a voyage with an improved boiler furnace with most satisfactory re-

opening for the flames, directly opposite the original door aperture of the boiler. The chamber is built of boiler iron. On a level with the lower edge of the door of the boiler is the grate, of common horizontal type, which fills the entire horizontal sectional area of the chamber. The front of the chamber has three doors. One near its top is the coal or firing door; one on a level with the grate is the cleaning door; a third is near its bottom and opens into the ash pan. The

increases in depth and less air enters from above. As this damper is closed the reverse takes place, the hot bed of coal diminishes and a greater proportion of air enters from the upper damper. Analogous actions obtain for the dampers on the upper or firing door. It must not be understood that all the air which enters by the upper dampers finds its way through the coal unaffected. Much of its oxygen is consumed before it enters the boiler proper. But by setting the dampers in the required relation to each other the amount of oxygen left unconsumed can be adjusted so as to insure complete combustion of all gases before they leave the furnace chamber of the original boiler. Peepholes at the side are provided through which the flames can be watched. They appear almost as bright as an electric arc light.

The fire on the grate with a mass of coal above it is not a very hot one. This prevents the formation of slag, of which but a small quantity is produced. Most of the ashes appears as a sort of sand, and the slice bar has but little work to do. Handholes for cleaning out sediment are provided in the lower section of the water chamber.

The Grimm was provided with Scotch tubular boilers, with Fox corrugated furnace chambers. The Muller furnace was applied directly in front of these, their doors having been removed. The original boilers are left virtually intact. A saving of over thirty per cent of fuel, it is claimed, is secured on the Grimm. The firing is made much easier for the men, and the entire absence of smoke from the smokestacks is described as being very noticeable.

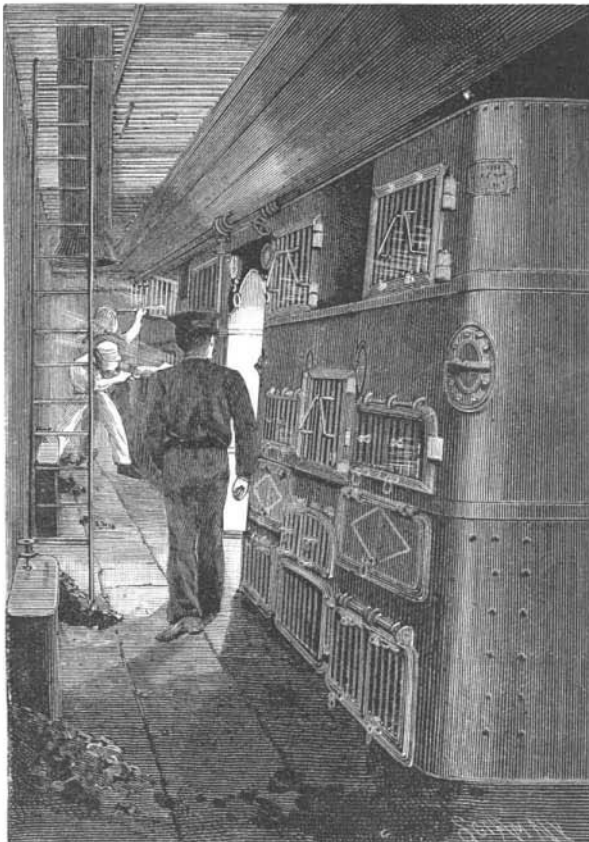
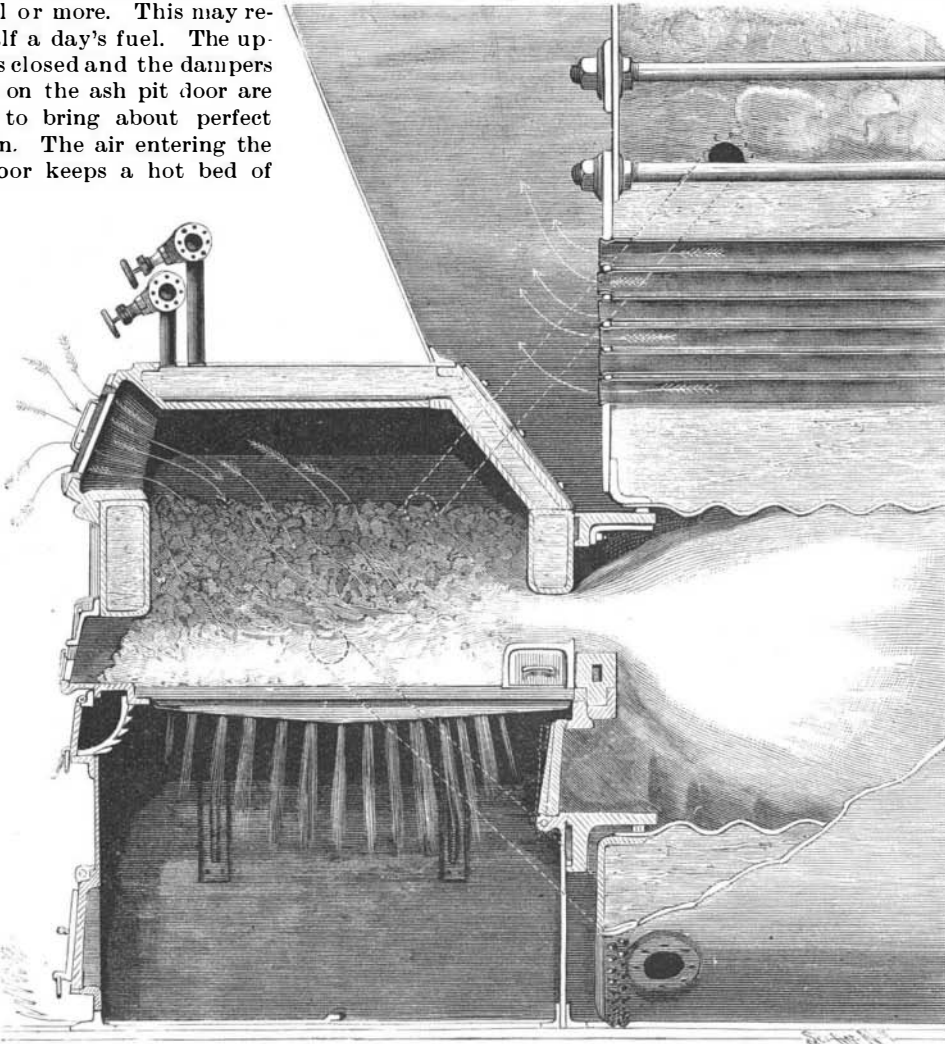
AN account is given in *Nature* by Mr. R. Philip, of Buenos Ayres, of an interesting instance of the use of a stone by a spider as ballast for his web. A web was noticed stretched between two trees, at a distance of about ten feet from one another. From it hung a thread about two feet long, and attached to its lower end was a small pebble about the size of a pea, the stone hanging free about four feet from the ground. The stone had evidently been made use of in this

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doors are provided with dampers to regulate the admission of air.

The double walls, the space between which is filled with water, are in two sections. The lower section, which is stayed, connects by two pipes with the boiler, so that the water in it circulates and forms part of the active contents of the system. The upper section is kept full of water, but does not connect with the boiler.

The fire is started on the grate as in an ordinary furnace. When a hot fire, six inches thick or more, has been produced, the firemen shovel coal into the upper door until the chamber is filled up to its level or more. This may represent half a day's fuel. The upper door is closed and the dampers on it and on the ash pit door are regulated to bring about perfect combustion. The air entering the ash pit door keeps a hot bed of

**THE MULLER BOILER FURNACE-FIRING ROOM ON THE STEAMSHIP GRIMM.****SECTIONAL VIEW OF THE MULLER BOILER FURNACE ON THE STEAMSHIP GRIMM.**

sults. The Muller furnace, which is the one alluded to, is not a new thing. It is in very extensive use on the Continent of Europe for stationary boilers. Its practicability at sea has now, it is believed, been established.

The apparatus is applied to the boiler, whose grate bars are removed. A rectangular chamber with double sides is fixed in front of the boiler with an

coal upon the grate. The air entering by the firing door penetrates the bed of coal and works its way down toward the grate. The gases produced enter the former furnace chamber of the boiler. Air which has drawn down from the upper door enters along with them and an intense combustion ensues, filling the space with a white hot flame. As the damper on the lower door is opened more widely, the hot bed of coal

special manner by the spider for the definite purpose either of keeping the web taut, or as ballast to give it stability against the wind; for on lifting the stone to remove the pressure, it was observed that the web became limp and slack, and was stirred out of position by the least breath of air. This was noticed by a score or so of members of the German Turnverein there, in the garden of whose premises the occurrence took place,