

"I have yet to learn the first case of deterioration of the core that has passed under my inspection."

Among the larger users of okonite cables are the following:

Western Union Telegraph Co., all parts of the country, New York; New England Telephone and Telegraph Co., Boston; Metropolitan Telephone and Telegraph Co., New York; Delaware and Atlantic Telephone Co., Philadelphia; New York and New Jersey Telephone Co., Brooklyn; Bell Telephone Co. of Canada, Montreal; City of Brooklyn; Thomson-Houston Electric Co.; City of Cleveland, O.; City of Chicago; Underground Electric Light and Power Co., Philadelphia; United States Torpedo Station, Newport, R. I.; Commercial Cable Co., New York, and many others, including most of the licensees of the American Bell Telephone Co.

Mr. Charles A. Cheever is the president and Mr. Willard L. Candee treasurer of the Okonite Company, whose general office and storeroom is at No. 13 Park Row, New York, the factory we illustrate being at Passaic, N. J.

Aluminum in Flowering Plants.

At a recent meeting of the scientific committee of the Royal Horticultural Society, Professor Church called attention to the apparently general presence of aluminum in flowering plants. He said it was known to exist in the Lycopodiaceæ; it had been shown by a Japanese chemist to be present in the Japanese lacquer tree (*Rhus vernia*), and it had been found by himself in cherry tree gum, gum arabic, tragacanth, etc.; it had been stated also in the *Analyst* for January to be invariably present in the gluten of wheat in the form of phosphate. Professor Church assumes that it is probably absorbed accidentally by the roots, and that it plays no part in vegetable physiology.

Motive Power by Compressed Air.

M. Victor Popp is making good progress with his system of distributing compressed air for motive power purposes. The works for compressing the air in the Rue St. Fargeau, at Menilmontant, are of considerable magnitude. They cover an area of 15,000 square meters, of which an extent of 2,000 meters is roofed over. There are already fixed and in operation seven steam engines of 400 h. p. and two of 100 h. p. each, a total of 3,000 h. p. The conduits have already been laid over the whole area comprised between the line of the boulevards and the Rue de Rivoli. These are sometimes laid in trenches cut for the purpose, and sometimes in the sewers. The total length of pipes laid was, at the end of last December, a little over thirty miles. This source of power is used for working electric light machinery in a large number of establishments, among which may be mentioned the Cafe-Americain, the Cafe de Paris, the Cafe Anglais, the offices of the *Figaro*, and the Jardin d'Hiver.

A CHAIR FOR OUT-DOOR USE.

A chair which may be conveniently moved from place to place, and wherein the occupant may be protected from sun and wind, or may throw the chair open at top and sides at will, has been patented by A. Bunn, of Birdsborough, Pa., and is illustrated herewith. The

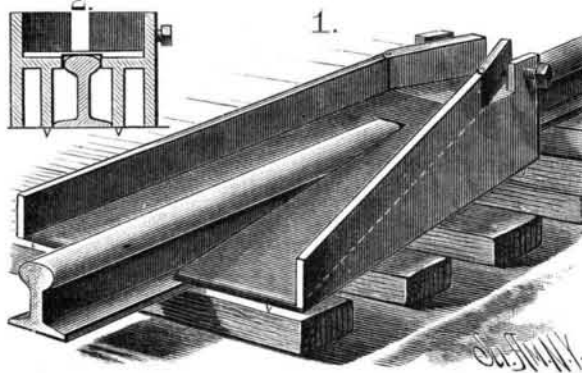


BUNN'S COVERED CHAIR.

curved side pieces constitute the legs of the chair and support the frame, being secured together by cross pieces, which support the seat. The front is inclosed from the seat to the bottom, and is fitted with a foot rest, which may be withdrawn. The side walls have openings to serve as windows, and have sliding panels, and there is a sliding top corresponding with the curved top of the chair. The chair is mounted on wheels to facilitate moving it from place to place, a pin fitted in the frame being adapted to engage with the wheel spokes, to prevent the chair from moving of its own accord when placed upon an inclined surface.

AN IMPROVED CAR REPLACER AND PORTABLE SWITCH.

A simple and durable appliance for replacing on the tracks derailed cars or locomotives, or for transferring them from a main track to a spur track, has been patented by Mr. Thomas Holliday, and is illustrated herewith, Fig. 2 being a cross sectional view. An upper plate is supported by two outer plates at about the height of the tread of the rail above the ties, the outer plates flaring outward and inclining downward as they recede, interior plates being also arranged under the first named plate, and inclining downward. To the upper inclined edges of the two pairs of plates are secured top plates having flanges on their outer edges, which are continued at their upper ends by adjustable deflect-



HOLLIDAY'S CAR REPLACER AND PORTABLE SWITCH.

ing plates, arranged in connection with set screws, by which they are moved toward or from a central space between the edges of the plates, just wide enough to admit the tread of the rail. That the device may be held against accidental displacement when adjusted, downwardly extending spurs are arranged at one or both ends of the replacer. In replacing a derailed car the device is applied just in advance of the wheels of the car, the construction permitting the car to be replaced from either side of the track and guided properly to the rails by the deflecting plates.

For further particulars in reference to this invention address Mr. Thomas M. Murphy, Sanborn, Dakota Ter.

Cobwebs and how they are made.

Every one has noticed the cobwebs which hang upon each shrub and bush, and are strewn in profusion over every plat of grass on a fine morning in autumn; and, seeing, who can have failed to admire? The webs, circular in form, are then strung thick with tiny pearls of dew, that glitter in the sun. No lace is so fine. Could any be wrought that would equal them in their filmy delicacy and lightness, it would be worth a prince's ransom. But for such work man's touch is all too coarse. It is possible only to our humble garden spider, known to scientific people by the more imposing name *Epeira diadema*. These spiders belong to the family of *Arachnida*; and the ancients, who were great lovers of beauty, observing their webs, invented the pretty fable of Arachne.

Arachne was a maiden who had attained to such expertness in weaving and embroidering that even the nymphs, leaving their groves and fountains, would gather to admire her work. They whispered to each other that Minerva herself must have taught her; but Arachne had grown vain as she grew dexterous, and, overhearing them, denied the implication with high disdain. She would not acknowledge herself inferior even to a goddess, and finally challenged Minerva to a trial of skill, saying: "If beaten, I will bear the penalty." Minerva accepted the challenge, and the webs were woven. Arachne's was of wondrous beauty, but when she saw that of Minerva she knew that she was defeated; and, in her despair, went and hanged herself. Minerva, moved by pity for her vain but skillful opponent, transformed her into a spider; and she and her descendants still retain a portion of her marvelous gifts of spinning and weaving.

Now, let us see how the garden spider uses its inherited talent. Each individual is endowed with a spinneret, or natural spinning machine, through which can be drawn innumerable strands, so fine that they can be seen only under a powerful microscope (Leeuwenhoek claims that it takes four millions of these strands to make a thread as thick as a hair from a man's head).

First, our spider begins to draw from out her spinneret a cord of as many of these strands as seems to her good, and fastens it to some leaf or twig, then runs on another leaf, spinning all the while; fastens again to that; and to another and another; continuing until a circle is formed inclosing as large a space as she designs for the outer boundary of her web. Then she passes back and forth over her work, adding fresh threads, and strengthening this outer line, which she secures to every possible object. Finally she stops, fastens her thread with special care, and begins to run around the circle, spinning as she goes; but now carrying her fresh thread carefully raised upon one hind foot, thus keeping it from touching the older strands and becoming

glued to them. When half way round she stops, pulls her thread tight, fastens it very strongly, and a firm line is drawn straight across the center of the circle.

She runs down this center line to the middle, fastens another thread to it there, carries it to a new point upon the outer edge, fastens it, and we now see that she is engaged in making those lines in the web that look so like the spokes of a wheel. She repeats this operation again and again, until all the radii or spokes are formed. When they are done she carefully tests each thread by pulling, to make sure that it is firm and strong; and, if one proves unsatisfactory, she either strengthens or remakes it altogether.

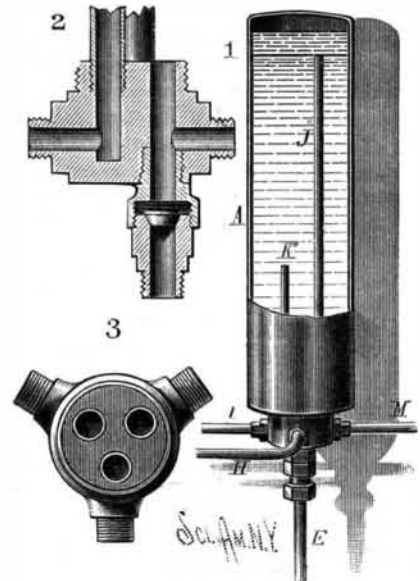
Now that the main lines are built, our spider goes once more to the center point, and begins to spin again—this time in circles—fastening to each radius as she passes. At first these circles, or more correctly spirals, are placed quite close together, but she leaves ever a wider and wider space between, as she approaches the outer edge. The outer circle and the radii were spun of a silk which becomes dry directly after leaving the spider's body, is of great strength, and very firm; but these spirals are formed of a substance which differs essentially. When first drawn from the spinneret it is extremely glutinous—a most important property, as by this it is enabled to adhere tenaciously to the radii—and it is, besides, so highly elastic as to be capable of being pulled far out of place without breaking.

When the spirals are finished, the spider returns again to the center, and proceeds to bite off the points of all the radii close to the first encircling line, by which she much increases the elasticity of her web. It is in or beneath this central opening that the spider usually sits and watches for the coming of her prey.

But while these circular creations are perhaps the most beautiful, they are by no means the only cobwebs. You have probably seen, or rather felt, the long gossamer threads that sometimes draw across the face, as one walks beneath the trees on a summer evening. At certain seasons they are very numerous. They float in the air; they fall upon the grass; they gather on the trees. These are all cobwebs. They are made by spiders, and in a manner so marvelous as to be almost incredible. The spider spins the silk from its spinneret, pushing it off into the air. It is so light that it does not fall; it rather rises in the air. It grows a longer and longer thread, until it is carried by some current against an object, often at a surprising distance, to which it attaches itself. This spider's slack rope is quite strong enough to serve the little spinner as a bridge, over which it can pass at its pleasure. Indeed, in the tropics, spider's webs are found of gigantic size, sometimes even spanning streams; and of a strength so great that humming birds are caught and held by them, as flies are by the cobwebs of our own land.—S. L. Claves, *Swiss Cross*.

A PIPE COUPLING FOR KITCHEN BOILERS.

A pipe coupling especially adapted for use in connection with the ranges of kitchen boilers, whereby only a single opening in the boiler is utilized through the coupling to connect the various pipes to the boiler, is illustrated herewith, and has been patented by Mr. James Hollinger, of No. 2163 Second Avenue, New York City. The coupling, shown in plan and section in Figs. 2 and 3, is screwed into the bottom of the boiler, and has a vertical passage receiving the



HOLLINGER'S PIPE COUPLING FOR BOILERS.

screw-threaded end of the water supply pipe, E, in which is a valve to prevent back flow of water. From a side port leads the pipe, H, for conducting cold water to the range, I being the return pipe, communicating with a vertical passage, to which is secured the pipe, K, projecting a short distance up into the boiler, for directing the hot water upward. J represents a pipe reaching nearly to the top of the boiler and communicating through a horizontal outlet port with the pipe, M, leading to a sink or other place of use. By this arrangement the water drawn out is taken from the top of the boiler, where it is the hottest.