



The crowning feature in the Electrical Palace is the Tower of Light, a memorial to Mr. Edison and to his inventions, which have so perfected electric illumination. Every evening that the Exposition is open this tower is illuminated, and the fascination of watching it keeps a crowd of people constantly in the building. The colors change from one to another, chasing each other up the shaft, dazzling the eyes with its brilliancy. The tower is 82 feet high and is studded with six candle power lamps to the number of five thousand.

The Bell Telephone exhibit is a study, as in this pavilion is shown a full set of the models that were made by Mr. Bell, thus giving in complete detail the gradual development of this instrument. In addition to all these models are many of the latest improved telephones, and across one side of the pavilion is a model telephone exchange which is the "central" of the Exposition grounds. This exhibit is crowded at all times by people watching the young women make the connections on the switchboard.

Adjoining the Bell Telephone pavilion is the exhibit of the Western Electric Company, which is very complete and contains several features which have been revelations to the public as to what electricity can do in the way of lighting. The chief feature of this exhibit is a pavilion of Egyptian architecture, which is illuminated in the interior to show the soft and perfect results that can be obtained with electric light, and to at the same time display many of the smaller manufactures of this company. Adjoining this structure is the Tower of Lightning, as it is frequently called. This is a shaft studded with over 2,000 incandescent lamps, red, white and blue, which wind around the shaft from its base to the ceiling of the gallery above. From the top four lines of lamps containing the three colors branch out in different directions, each having a forked course like a streak of lightning. At the ends of two of these lines of light are large globes, also studded with colored incandescent lamps, while at the other two ends are clusters of lamps. The light begins at the bottom of the shaft, ascends with much rapidity to the top, splits into the four sections running along the rows of lamps over the zigzag course to the ends. When the light reaches the globes and clusters it becomes white, changes in an instant to red, then to blue. The instant the light disappears from these ends it begins again at the base of the shaft. The fascination of this exhibit is quite irresistible, especially as the automatic revolving switch, which controls the electrical current, is open to view by means of an open well, the switch being under the floor. There is nothing complicated or elaborate about this switch, and the majority of visitors who study it for a minute go away feeling quite content with themselves that they have for once comprehended the manner in which electricity is controlled. Another exhibit by the Western Electric Company is the electric finger, which writes, and as it writes illuminates, a series of letters spelling out, letter for letter, "W. E. Co.," in colored lamps.

The General Electric Company occupies by far the largest amount of space in this building, and makes a complete exhibit of dynamos of all kinds and motors which will be intensely interesting to students in electricity because of the advancement shown by the many models of early types of these machines. Either in this or in other exhibits are models of nearly all of the types of dynamos that have been made since the old Farmer dynamo, which is exhibited by the Ansonia Electric Company in the north gallery. An attractive feature of the General Electric and other exhibits is that of arc lamp poles, many of which are very artistic in design, and which give hope that the time is not far distant when the ungainly-looking poles now seen so frequently in use for street lighting purposes will give way to something more artistic. In this same exhibit is shown the development of the incandescent lamp, beginning with the very earliest experiments of Mr. Edison and ending with an infinite variety of these lamps as now made. This includes miniature lamps in every conceivable shape and design, and lamps of all candle powers from a mere speck of light to 250 candle power.

The Westinghouse Electric and Manufacturing Company occupies a large space and exhibits a complete line of machines, lamps, and other electrical apparatus and devices. The pavilion occupied by this company is one of the most attractive ones in the building. It is decidedly artistic in design, is colored with rare taste, and, when illuminated in the evening,

presents a beautiful effect. But to the average electrical man the main interest in the exhibit of this company will be in the display of dynamos made in the power plant in the Palace of Mechanic Arts. This exhibit includes six dynamos of a maximum capacity of 15,000 lamps each, three of which are direct-connected as has before been described in these columns. The switchboard which controls this incandescent lighting plant is a piece of workmanship both in effective design and in electrical conception that has probably never been equaled because of the enormous capacity of the plant.

The exhibit in the Palace of Mining that attracts the most attention is probably that of the De Beer's Consolidated Diamond Mines, Kimberley, South Africa. This exhibit faces the central aisle and is in the southern end of the building. At stated times each day, and usually for a period of two hours, of which notice is given beforehand, the process of diamond washing is fully shown. Tons of diamondiferous ground have been brought from the mines of this company, and each day part of this ground is crushed and washed and the work carried on in the same manner, though not on the same scale, that it is done in the mines themselves. The pavilion containing this exhibit is mostly of glass, so that the whole operation can be fully observed. In the end of the pavilion facing the central aisle, Tiffany & Co. of New York have several men at work cutting and polishing the stones, and there is a constant crowd of people watching this operation. In one corner of the pavilion is quite a pile of ground showing the diamonds in the matrix and the diamondiferous ground. There is also a fine exhibit of diamonds cut and uncut. The largest uncut diamond that is shown weighs 282 carats. The mineral exhibit of the Cape Colonies is immediately back of this diamond exhibit. In this exhibit there is also shown considerable diamondiferous ground together with coal, copper, and other minerals from these colonies. The display of crocokolite is particularly fine. This beautiful mineral is wrought into charms and ornaments in great variety, also into knife handles, medallions, etc.

In the Oregon display is another exhibit that attracts much attention. It includes a working model of a gold placer mining outfit. A large amount of gold-bearing dirt is at hand for demonstrating the whole process of panning out the gold and at stated intervals the plant is put into operation. This exhibit is not surrounded with glass, and it is an amusing sight to see people hunting over the sand and dirt for particles or appearances of gold.

The latest achievements in the construction of railway rollingstock for passenger service in Europe and in North America are fully shown by an exhibit which stands nearly in the center of the annex to the Transportation building. Here are two trains of cars with engine attached. One is exhibited by the London and Northwestern Railway, the other by the Canadian Pacific. The engine attached to the English train is the Queen-Empress, and it has a record for high speed. It is a compound engine of the Webb type, the one low pressure cylinder being in the saddle and the two high pressure cylinders being on the outside, located as usual on engines. This engine has a pair of drivers on each side 7 feet 1 inch in diameter. It is severely plain and much resembles in effect the type of engine illustrated on the front page of the SCIENTIFIC AMERICAN of May 27. Two cars are shown with this engine. One is a compartment car of the English type, the other is a sleeping saloon. These cars are finished in dark blue on the exterior, while the interior of the several compartments is finished in different colors and qualities of material, according to the class. The doors to the cars are open, so that sight-seers can look in, but people are barred from entering the cars.

On the track adjoining the one on which this English train is shown is the train exhibited by the Canadian Pacific Railway. This consists of engine No. 625 and a train of five vestibuled cars. The engine is a monster weighing 213,000 pounds and having three coupled drivers, each 69 inches in diameter, on each side. The engine and cars were constructed in the shops of this company. The cars are heated by steam and lighted by electricity. The exterior finish of each car is of highly polished mahogany. Immediately back of the engine is the baggage car, next comes the second-class car, upholstered in leather and finely finished in natural wood. In arrangement it is like an ordinary sleeper and it is fitted with smoking compartment, lavatory, etc. The third car is a day coach finished in white mahogany and plush of copper red, while the smoking room is finished in old oak and olive corduroy. Then follows the dining car, fitted with tables for four people on one side of the aisle and for two people on the other side. This car is finished in white mahogany and old oak and upholstered in leather. The last car on the train is a sleeper finished in white mahogany, bronze metal work and paneled ceilings; the upholstery is sage green plush. In addition to the berths there are two state rooms, a bath room and a large smoking room, together with the other usual accommodations.

Nothing can be much more instructive in the Transportation building than these two exhibits which stand side by side. They need not call out comparisons, because of the entire difference of the service for which each was designed. The English train runs on as perfect a roadbed as can be made, is designed to make high speed and has no sharp curves to turn. The Canadian Pacific train has a much less perfect roadbed, is designed to make the trip across the continent from ocean to ocean if need be. It must make sharp curves and the engine must have capacity to haul this train up any grade and at the same time be able to make long runs at a speed of 60 miles an hour without overstraining. This train is open to the public inspection.

June 13 was the last day spent by the Infanta in Chicago. During it she visited the Fair, and her visit thereto was signalized very appropriately by the dedication of the Spanish building in her presence, and on the same day the Spanish exhibit in the Manufacturing building was formally opened to the public. On June 14 a special train left Chicago for New York, carrying the Infanta and her suite. It made a run of 514 miles in a fraction under 11 hours, maintaining a speed, exclusive of stops, of 50 miles an hour, a very remarkable achievement for so long a distance. Another interesting incident connected with her visit was the attention bestowed by her on E. D. Libbey, the proprietor of the Libbey Glass Works, who is said to have been made official glass cutter by the Infanta. On the same day, at 5:40 P. M., the great cowboy race was started from Chagron, Nebraska. At the pistol shot, and witnessed by a thousand people, nine riders started on the long race, the World's Fair being the terminal point. They are to complete the ride, each man on the same horse, and a prize of \$3,000 is to be given to the winner. In addition a special prize for bringing their horses through in good condition is included for the riders.

On June 14 Signor V. Zeggio, the Royal Italian Commissioner for Liberal Arts, formally opened his section. The magnificent exhibit of jewels of Tiffany & Co. was opened the same day. It includes the two largest yellow diamonds in the United States, in addition to the very remarkable strings of pearls and other mineral objects which were seen and admired by so many people in this city before the exhibit left.

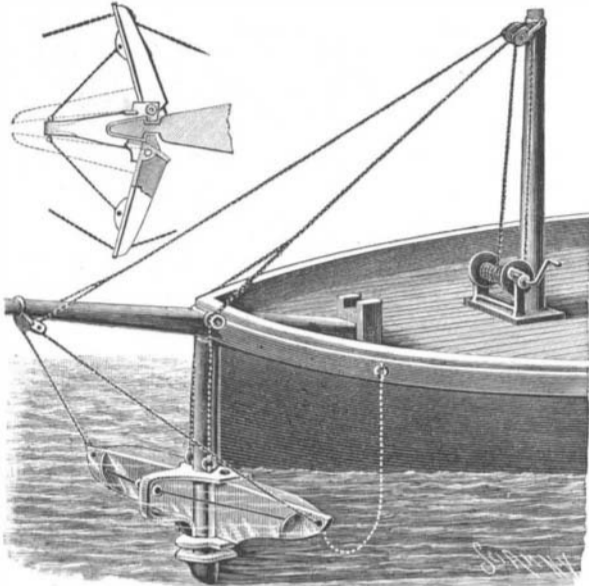
The great Ferris Wheel is now rapidly approaching completion, and is to be opened on the 22d. It has cost about \$250,000, and it is hoped that it will be as great a success in its way as was the Eiffel Tower in Paris. On June 15 the Fair had what was, up to the present period, its greatest day. The dedication of the Indiana and Arkansas State buildings and the opening of the interesting Java Village took place on that day, but while these would have been enough to signalize an ordinary day, they were minor matters compared with the German celebration. The day was termed the German day, and from all sides the railroads unloaded great crowds of representatives of the German nation, and the crowds poured into the park in such numbers that there was difficulty in getting them in fast enough. The German government building was, of course, the center of attraction, and next to this came the Midway Plaisance. Speeches, music, an immense procession, and gymnastic exhibitions by the Turner societies were among the special features of the occasion. At last all the witnesses seem to have settled on the conviction that the Fair for one day proved itself an absolute success. Hitherto there has been a tendency to criticize the management and to be very severe on anything partaking of an unfavorable aspect; but on Wednesday the Fair seems to have redeemed itself in the eyes of all, and it now looks as if, with large attendance and reduced expenses, the Fair might be made, comparatively speaking, a financial success.

Its expenses so far have been very heavy; the salary list for May reaching the total of \$850,000, divided among 6,000 employes. This is recognized as far too great, and the Director of Works, it is announced, has decided to drop 3,000 men from the pay rolls. The attendance is rapidly increasing, and it looks as if the daily average would soon be 100,000. On Wednesday naturally the largest attendance took place, aggregating nearly 200,000 paid admissions, and a total attendance of about that number. Some interesting comparisons with the attendance at the Centennial Exposition at Philadelphia have been made. During May, 1876, the average attendance of the Centennial Exposition was 19,945 per day; at Chicago during May, 1893, the attendance was 36,060. At Philadelphia the attendance for June and July was nearly identical; August showed an increase of nearly fifty per cent, while September and October showed an immense increase, the total attendance aggregating over three times that for the months of June and July. For November there was of course a large falling off. It follows that for Chicago everything is to be hoped in the future three months. The arrangement of concessions in Chicago has been admirably conceived. From them

an enormous sum will be received by the Fair managers to be devoted to the expenses of the Exposition. It is impossible, therefore, to say whether or not the Exposition will pay expenses, but it seems a very safe prediction that from a proper point of view it will be far from a failure. It has been calculated that any attendance over a daily average of 100,000 will represent the profits of the Exposition, and there is every reason to believe that such an attendance may be realized.

**A VESSEL STOPPING DEVICE.**

The illustration represents an improvement designed to facilitate the quick stopping of a vessel moving in dangerous places, or in danger of colliding with another vessel, an iceberg, etc. The invention has been patented by Mr. Pedro Samohod, Nazarenas 145, Lima, Peru. A vertically sliding frame on a post at the bow of the



**SAMOHOD'S VESSEL STOPPING DEVICE.**

vessel has on its sides pivoted wings adapted to expand transversely to offer resistance to the forward motion of the vessel in the water when the frame is in its lowermost position. The wings are held in extended position by means of chains attached to a forward projection of the frame, and, to prevent accidental closing, other chains connect the free ends of the wings with the sides of the vessel. The frame is raised and lowered by chains or ropes leading upward over pulleys on the bowsprit to a common chain passing over a sheave on the mast and thence to a winch on the deck. To close the wings, chains connected to their outer ends pass over sheaves near the outer end of the bowsprit, thence to a common chain passing over a sheave on the mast and to the winch, the operation of which closes the wings, as indicated by dotted lines in the small figure, simultaneously with the raising of the frame and its wings out of the water. The winch is preferably provided with a locking mechanism under control of the officer in charge, on the bridge or other place, so that the frame may be quickly released, the chains rapidly unwinding as the frame drops to place of its own weight, the wings at the same time spreading out.

**EXPOSITION AT LYONS, FRANCE, IN 1894.**

Arrangements are being rapidly pushed forward for holding an Exposition at Lyons next year. The fair is to be opened on April 26, 1894, and the accompanying engraving, issued by the official bulletin of the Exposition, shows the plans for the principal building.

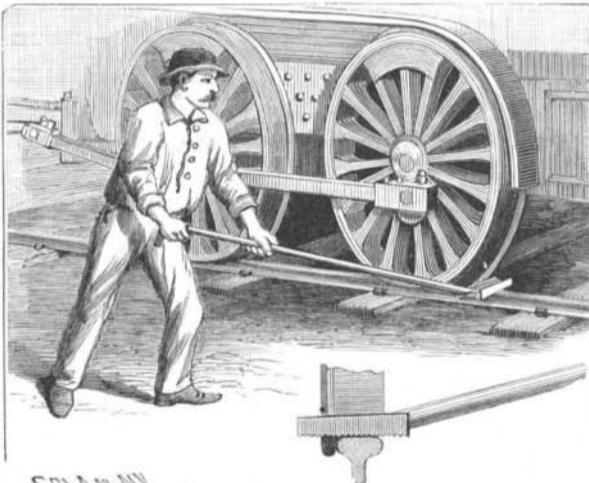
It is to be polygonal in shape, with a lofty central dome which will rise to a height upon the interior of some 180 feet. It rises in a graceful curve, the structure being strengthened by means of the airy lateral supports which resemble the flying buttress of a Gothic cathedral. The work is being carried on from designs of Messrs. Claret & Grenier, the engineers in charge. The building will be 760 feet in diameter, and will cover a space of nearly 500,000 square feet. The total weight of the entire structure will be only about 2,480 tons.

**Economies Wrought by Chemistry.**

Chemists turn scrap iron into ink, old bones into lucifer matches, the shavings of the blacksmith's shop into Prussian blue, fusel oil into oil of apples and pears, the drainings of cow houses into fashionable perfumery, beggars' rags into new pilot coats, cesspool filth into ammonia, and tar waste into aniline dyes and saccharine. In Paris they first utilize rats to clear the flesh from the bones of carcasses, then kill the rats, use up their fur for trimmings, their skin for gloves, their thigh bones for tooth picks, and their tendons and bones for gelatine wrappers. These are a few of the things *Iron Industrial Gazette* names among the products converted into use by the chemist and inventor.

**AN IMPROVED PINCH BAR.**

This bar is especially adapted for moving locomotives and railway cars, or for turning a wheel thereof, when there is no other power convenient, its construction being such that it may be conveniently used when at right angles to the track and wheel, the bar being made to pinch upon the flange and not upon the tread of the wheel. The improvement has been patented by Mr. John McDonald, of Tokio, Japan (*Railway Shinbasi*). As more distinctly shown in the side view, representing the bar applied to a rail and wheel, the foot is practically rectangular in cross section, and both its upper and lower surfaces are dished to produce central longitudinal depressions, with knife-like side edges on the top, while the under side edges form flat side ribs, which may be smooth or roughened, or have serrations or teeth produced in them. The upper

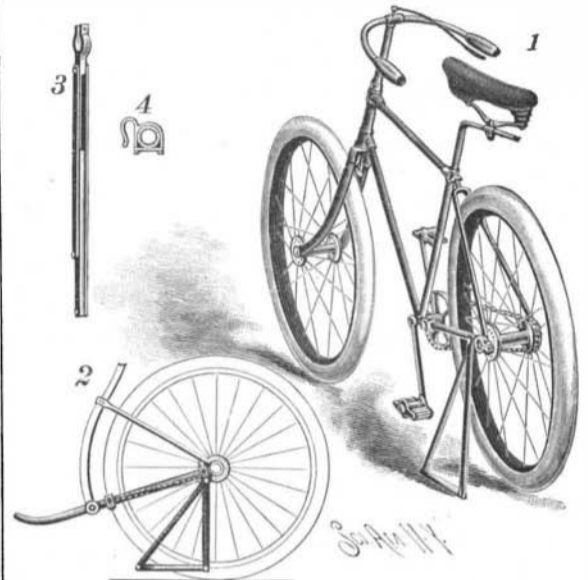


**McDONALD'S PINCH BAR.**

knife edges engage with the flange of the wheel, and the ribs rest transversely on the tread of the rail. The handle is bent downward at its outer end, forming a protection for the hands in case the bar should slip, and also has a ring, by which the bar may be hung up. The bar may be quickly and conveniently manipulated, and is designed to afford a much more powerful leverage than that obtainable with the old form of bar.

**A CONVENIENT BICYCLE STAND.**

The illustration shows a very cheap and convenient stand, readily applied to any bicycle, which may be carried about without inconvenience, and at any time dropped into position to sustain the wheel without compelling the rider to hunt around for a fence or other support. It has been patented by Mr. Clayton J. Whipple, Nos. 270 and 272 Wabash Avenue, Chicago, Ill. Fig. 1 shows the stand in open position attached to a man's bicycle, Fig. 2 showing its application to a woman's wheel, and Fig. 3 being an edge view of it in collapsed position. It has two swinging side pieces, one longer than the other, and at their upper ends is pivoted a clamp with a socket to receive the axle or step of the rear wheel of the bicycle, or to receive the side bar of the frame, the clamp being made fast by a screw or bolt. The base of the stand consists of a flat slotted rod pivoted at the lower end

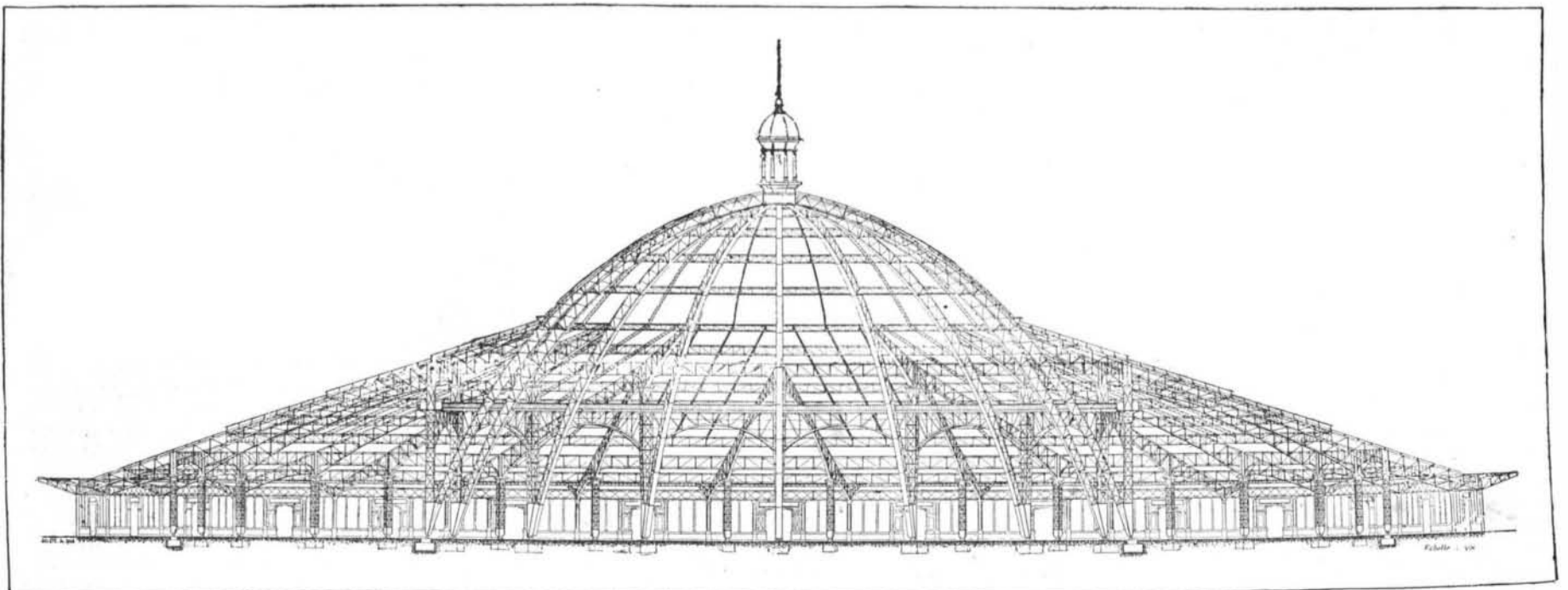


**WHIPPLE'S SAFETY BICYCLE STAND.**

of one side piece, a pivot pin on the lower end of the other side piece passing through the slot, so that the three pieces fold together in parallel position, and when open assume a triangular shape, giving great strength in proportion to its weight. When applied to a man's bicycle, and swung up into folded position parallel with the side bar of the frame, it may be thus retained by any suitable fastening device, a simple form of clip for such purpose being shown in Fig. 4. When the stand is released from the catch and dropped down it opens of itself, allowing the bicycle to lean slightly upon it, but forming a secure support therefor. For a woman's wheel the clamp is preferably applied to the side bar of the frame adjacent to the rear axle, as it is not convenient to secure the clamp to the axle.

**Steel Rails Very Cheap.**

Mr. Andrew Carnegie says: "The robber baron has ceased to rob, and is now being robbed. The eighth wonder of the world is this—two pounds of ironstone purchased on the shores of Lake Superior and transported to Pittsburg, two pounds of coal mined in Connellsville and manufactured into one and one-quarter pounds of coke and brought to Pittsburg, one-half pound of limestone mined east of the Alleghenies and brought to Pittsburg, a little manganese ore, mined in Virginia and brought to Pittsburg, and these four and one-half pounds of material manufactured into one pound of solid steel and sold for one cent."



**THE FRENCH UNIVERSAL INTERNATIONAL AND COLONIAL EXPOSITION AT LYONS, 1894.**