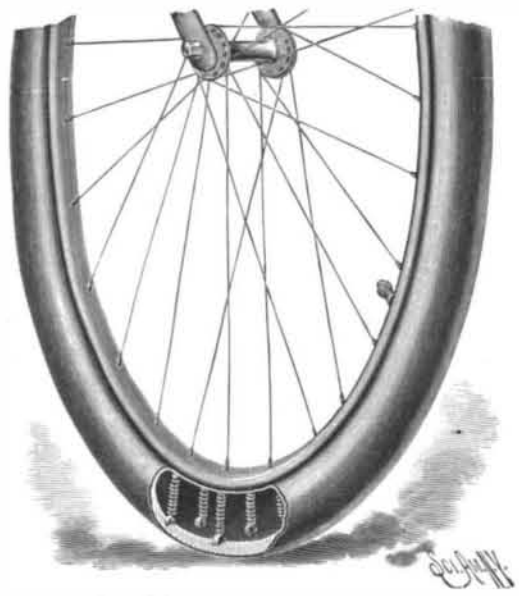
A DURABLE BICYCLE TIRE.

The illustration represents a bicycle tire which will not be readily punctured, and which will not collapse when punctured. It has been patented by Dr. Emil Christiansen, of Leavenworth, Kansas. The tire is of the hose pipe pattern, preferably of rubber or a combination of rubber and fabric, and has a valve for its inflation, of any approved construction. The tire is much thicker at its tread than at its side and inner surface, such increased thickness forming a cushion preventing the puncturing of the tire by tacks, pieces of glass, etc. On the inner surface of the tire are lugs,



CHRISTIANSEN'S PNEUMATIC TIRE.

preferably made of rubber, and the lugs are connected by springs of such length that, should the air escape from the tire, the springs would hold it distended and enable the tire to be used when not inflated almost as well as when inflated.

The Electrical Conductivity of Aluminum.

In an article appearing in the London Electrical Review, Mr. G. L. Addenbrooke announces that, according to researches of Lord Kelvin, the conductivity of pure aluminum is 68·5 per cent of that of pure copper. The usual conductivity, as given in the books, hitherto has been 56 per cent that of copper. Lord Kelvin's research has, therefore, raised this by 21 per cent, so that the conductivity of a wire of pure aluminum of the same section, instead of being a little over a half that of a copper wire of similar section, is more than two-thirds the conductivity. Consequently, the diameter of an aluminum wire of the same conductivity as a given copper wire will be only 15 per cent greater or less than one-sixth greater than that of the copper wire. This is a small fraction, and it is evident that for such a small increase of diameter the extra cost of insulating aluminum conductors to the same thickness as copper ones, and to secure the same conductivity, will present no serious obstacle.

Looked at in another light, copper is about 3·3 times the weight of aluminum; on Lord Kelvin's figures the conductivity of wire of equal weights of copper and aluminum will therefore be as 100:22·6, so that the weight of an aluminum wire of the same conductivity as a copper one would be four-ninths of the latter, or considerably less than one-half.

It would be difficult to say what extra cost would be entailed in manufacturing aluminum of this purity, but it may be assumed that before long the resources of metallurgy will be equal to it at a moderate cost.

As aluminum is just as pliable and easy to work as copper, it goes without saying what an advantage it would be in constructing heavy cables, and how much less strain on the insulating material it would impose. For overhead conductors for the supply of power the advantages of obtaining a conductor of equal conductivity, with a trifling increase in diameter and of half the weight, are also manifest.

As a conductor, aluminum is now about twice as costly as copper; but as by the electrolytic process the price has already been reduced in eight years from 90 cents per ounce to 35 cents per pound, it is abundantly clear that, with the inevitable improvements which are taking place, the difference in price between aluminum and copper, which still exists, will be more than obliterated before long.

Unsafe Petroleum Lamps.

Starting out with the impression that something should be done to put a stop to the loss of life and the fires caused by "lamp accidents," the London Lancet has been experimenting with a number of lamps—almost all of the cheap sorts—purchased at shops in the poorer districts of London. Even the cheap oils were found to be reasonably safe and were found to pass the flashing test of 73 degrees. Out of the whole number of twenty-two lamps which were tried, two only were probably safe, and of the rest six were "very dangerous," nine "dangerous," and five "uncertain." It was found very difficult—almost impossible, indeed—to cause even the cheapest of these lamps to explode, although efforts were made to bring about the result. Even when the temperature of the oil and reservoir was 100 degrees, blowing down the chimney simply extinguished the flame. Generally speaking, the conclusion is that a great majority of accidents arise from the faulty construction of the lamps.

The reservoir should be of metal or non-fragile material. It should be fixed firmly in the base, and not rest loosely, as is the case with many beautiful and artistic lamps, in a cup-shaped stand.

The lamp should have a base heavy enough to minimize the risk of upsetting.

The burner should be connected to the reservoir by a screw with well cut thread, requiring at least three entire turns before it becomes detached from the reservoir. It should be made tight to the reservoir by means of a washer. Bayonet joints, or pin and slot joints, not to say the mere fitting on of the burner like a cap on the mouth of a reservoir, should be prohibited.

The wicks should be constructed of material of good quality, and should fill the space of the wick tube. The wick should be replaced by a new one as it gets worn and diminishes in size. Circular wick tubes should never be fed by a flat wick, the edges of which are not likely to close up in the wick tube. The wick in these cases should be a complete cylinder.

The wick tube should be made to descend in the reservoir within at least a quarter of an inch of the bottom. Assuming the screw of the burner to be free from defect, it would be impossible for oil then to escape—the source of most of the danger of lamps, nearly all of which have their wicks hanging unguarded in the reservoir. This arrangement would also render it impossible for flame to travel into the reservoir space.

SKIRT PROTECTING SCREEN FOR BICYCLES.

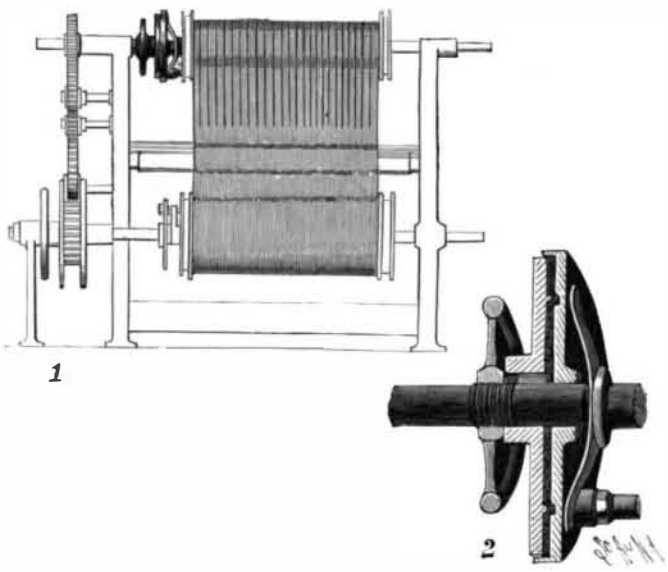
The illustration represents a folding screen attached to the front end or head of a lady's bicycle, there being a screen at each side of the head, adapted to be folded up against it or unfolded and extended past the pedals, to protect the feet and ankles from view when mounting or riding, and to prevent the skirts from being blown about the limbs. The improvement has been patented by Theron R. Cherry, of Buckhannon, West Va. The folding, fanlike screens are secured by suitable clips or brackets to each side of the head, the

CHERRY'S SCREEN FOR LADIES' BICYCLES.

rods of which each screen is composed being covered by any suitable fabric and pivoted together at their lower curved ends, while extending down upon the forward arm of each screen there may be, if preferred, a light leather casing into which the screen may be folded and held in compactly folded position by cords or straps. The curvature of the arms causes the screens to extend outwardly a sufficient distance to avoid the pedals and not interfere with their operation by the feet of the rider. The invention also provides for a front screen, not shown, slotted to straddle the front wheel, and close the space and prevent draught between the side screens.

A WARP SIZING MACHINE ATTACHMENT.

The illustration represents an attachment to the ordinary slasher, to enable the operator to size and put on the beam a small number of ends—or large, if required—but particularly for double beam work, where the double or top beam only requires a small



WOODMAN'S WARP SIZING IMPROVEMENT.

number of ends, the same to be done at one operation, and at the same time that the regular warp threads are being sized which are to constitute the main body of the fabric. The attachment has been patented by Alvin Woodman, No. 32 Wilder Street, Brockton, Mass. This attachment is for supporting and operating an auxiliary beam on a slasher on which a portion of the warp threads are to be wound, having a fixed spindle on one side and a rotating spindle at the other, driven by gears in connection with draught roll gear of slasher. The latter spindle being provided with a fixed and a loose disk, the latter having the usual stud or pin for driving the auxiliary beam, and the speed being regulated by frictional contact between the two disks. This contact can be so finely adjusted that just the exact amount of tension and speed required can at all times be maintained for either a large or small number of ends. Fig. 1 shows arrangement of gearing and Fig. 2 section of friction disks, with spring and hand wheel regulating nut. The concentric rib on one disk and a groove on the other are for properly holding in place either a large or small friction pad, for either a large or small number of ends. By this improvement, therefore, after sizing and passing over the drying cylinders all the threads required for both the regular and special weave, they are separated at the measuring roll, and wound on separate beams at one operation. This machine has been in very successful operation for more than one year.

Fine Crushing and the Leaching Process of Gold Extraction.

In the earlier days of gold mining, when the common method of recovering the gold was by the use of the amalgamated plate, the stamp battery was used almost exclusively for reducing the ore to pulp of the desired fineness. With the introduction of the leaching process came the demand for finer crushing, and a more perfect separation of the precious metal from its inclosing material, so that the chemicals might penetrate the pulp with a more searching effect. The demand has brought out various forms of crushing machinery, and some of the mills have shown remarkable results, both in capacity and in the fineness of the crushing.

An interesting test of the comparative efficiency of the new methods of crushing was recently had at Nevada, where the rock is of the hardest kind, and has proved very destructive to most forms of pulverizers. Pulp from a Griffin mill, with a capacity of 25 tons of rock a day, showed on an average of from 89 cents to $1.65 per ton in the tailings. The test was made by Capt. J. R. De Lamar, of New York City, and, as a result of the experiment, he is adding a dozen of these mills to the plant.

Chrysoprase in California.

A rich vein of chrysoprase, a rare variety of chalcedony of great value, has been discovered in Tulare County, Cal., by Curator Wilcomb, of the Park Museum. Chrysoprase in its perfect state has been found in limited quantities in lower Silesia, California, and Oregon, and an inferior grade is found in Vermont; but the present find of chrysoprase is of the finest quality, and the gems when cut command a high price.