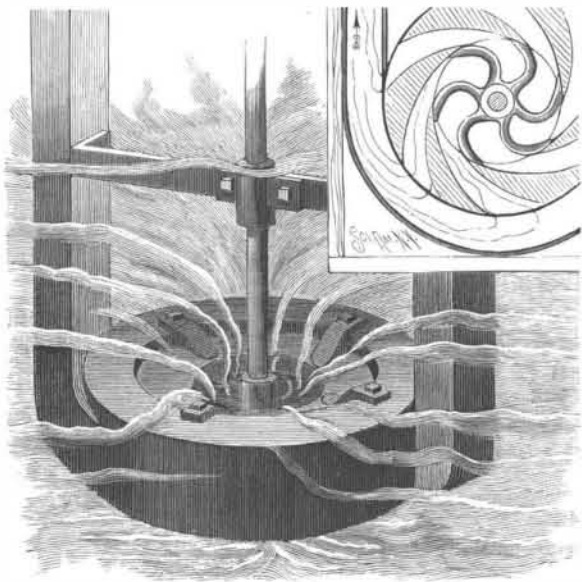


AN IMPROVED ROTARY PUMP.

A pump designed to work with but little friction, and which is not liable to be impeded in its operation by sand and silt in the water, is shown in the accompanying illustration, and has been patented by John S. Attenhofer, of No. 4936 Laurel Street, New Orleans, La. Upon the outer ends of curved spokes are curved buckets, whose passages are substantially equal in cross section, as shown in the small view, and an annular plate covers the sides of the buckets and the annular space within which they lie. The annular plates have on their outer sides recessed annular spaces, designed to retain a thin layer of air to reduce the friction between the wheel and the casing. The center of the wheel is entirely open within the annular spaces occupied by the buckets, and surrounding its periphery is a discharge casing from which rise one or more discharge pipes. In the periphery of the wheel are grooves in which are packing rings bearing against smooth surfaces upon the inner face of the discharge casing, preventing leakage by the edge of the wheel. The wheel is designed to be suspended in the water and not to rest upon the bottom unless it is to be used for pumping sand, and the



ATTENHOFER'S ROTARY PUMP.

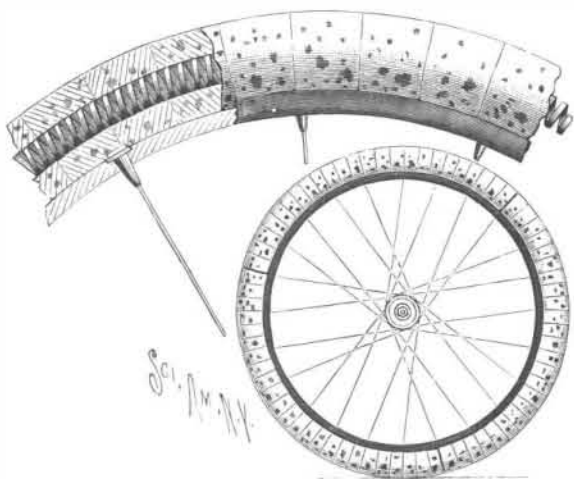
casing of the annular bucket portion above and below prevents the friction due to the contact of the revolving portions of the wheel with the surrounding water.

The Height of Trees in Summer and Winter.

It has, perhaps, occurred to few of us that the boughs of trees occupy a very different position in summer and winter respectively, but Miss Agnes Fry, says Public Opinion, has made careful measurements of the height from the ground of branches of both walnut and mulberry trees in August and December, and she finds that in some cases there is a difference of as much as thirty-one inches in the height of the same branch from the ground in these two months. One particular figure was obtained with a branch of a mulberry tree, and it was found that in December a weight of thirty-five pounds was not sufficient to lower it to its summer position. In other cases there were differences of from thirteen inches to nineteen inches in the distance in summer and winter respectively of branches from the ground. No wonder, then, that the diagnosis of a tree in winter from its general outline is so difficult a task.

A CORK TIRE FOR BICYCLES.

The illustration represents a bicycle tire made of three separable segmental sections of cylindrical pieces



BURTON'S BICYCLE TIRE.

of cork, each having a central opening, and the pieces forming the sections being cemented together with these openings in alignment, forming a central tubular passage through the sections entirely around the tire. The improvement has been patented by John A. Burton, of Skaneateles, N. Y., and, as will be seen by the

sectional view, an endless coil spring is inserted in the continuous passage formed by the three sections placed together. The tire may thus be readily placed in position on the rim, the spring holding the sections together, and the sections may be readily drawn apart sufficiently to allow of the removal of the tire, as may be desired.

THE WORDEN HICKORY FRAME BICYCLE.

Among the greatest improvements which have been effected in modern bicycles is the abolishment of vibration. The original bone shaker with its iron tired wheels was exceedingly hard upon the rider. The improvement which played the greatest part in the creation of the modern bicycle was the introduction of the solid India rubber tires. Even with these the vibration was so troublesome that many people more or less delicate in constitution could not ride. Then the pneumatic tire made its appearance, and in the face of much opposition became universal, attempts to supplant it by the less resilient cushion tire being failures. The tendency is now to dispose of the residual vibrations of the bicycle. In this direction could be named the use of the wooden rims for the wheels which have now almost universally taken the place of the metal ones and the wooden handle bars which at the present day are so much in favor with the riding public. The introduction of wood into the construction of the bicycle may be termed one of the great movements of the day, and one of the most recent efforts in this direction is shown in our cut; it is the substitution of hickory for steel tubes in the frame and is manufactured at the Worden Hickory Frame Cycle Works, Syracuse, N. Y.

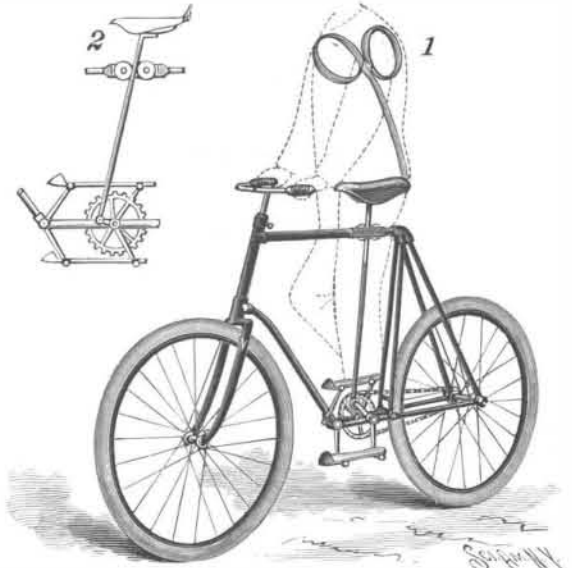
The cut is self-explanatory. The wooden bars are drilled out at the ends to a depth of about six inches. To the metal junction pieces of the frame short metal tubes are cast in which enter the holes in the wooden bars. The ends of the wooden bars then enter a socket with a thread cut on its outside, which sockets are part of the junction pieces. A wire ring is sprung into a groove between two and three inches from the end of the wooden bars. A thimble whose end is spun in so as to fit tightly the diameter of the bar, and thus cannot pass over the steel ring, is screwed over the outside of the socket, drawing the wooden bar down into the socket, making a species of union joint. In this way the most rigid construction is secured, and instead of the easily bent steel tubes, we have unbendable and well nigh unbreakable bars. This is not all; by unscrewing the thimbles, the frame can be taken apart and reassembled by anybody. In case of damage it can be repaired for a nominal sum, as there is no question of re-enameling or brazing. It is believed, however, that such repairs will very rarely be required. The logical sequence of the wooden handle bars which have become popular is the doing away with the vibrations by the adoption of the wooden frames, which is a further step in the same direction.

Montreal Bridge.

The Montreal Bridge scheme, says the Montreal Gazette, has received considerable impetus as the result of a conference between Premier Flynn, of the Province of Quebec, and a deputation of interested citizens from the south shore of the St. Lawrence. Resolutions were adopted and presented by the deputation advocating the speedy erection of a bridge across the St. Lawrence River at Montreal. In answer to questions from Mr. Flynn, Mr. C. N. Armstrong, managing director of the Montreal Bridge Company, stated that the estimated cost of the bridge proposed by his company was \$6,000,000, and the company asked 15 per cent from the Dominion government, 15 per cent from the city of Montreal, and a like amount from the Quebec government. He added, however, that the company would be disposed to go on with the work even with a grant from the province slightly reduced from this figure. The capital of the company was said to be \$3,000,000, with \$700,000 subscribed, and 10 per cent of the latter sum paid up. He said a New York syndicate was ready to build the bridge on the terms named and spend an additional \$2,000,000 on terminal facilities. It was understood that the grants asked from the Dominion and the city governments were to extend over twenty years, with the first payment due only upon the completion of the bridge. Premier Flynn said that without giving a definite promise, he was disposed to aid the enterprise as far as the resources of the Province of Quebec would justify. He approved of a railway along the south shore of the St. Lawrence and a bridge at Montreal; but the province had paid out \$24,000,000 for railway construction since confederation, and, while it was rich in resources, the province must realize on these resources and act in a prudent and economical manner.

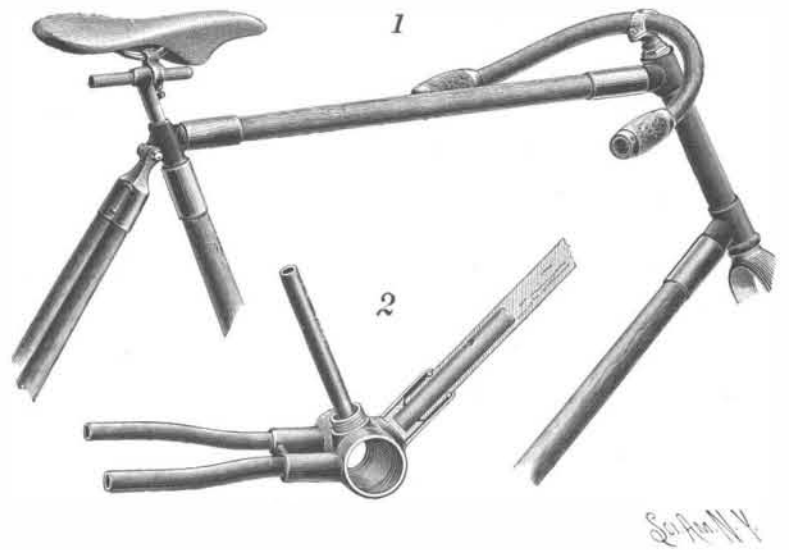
A NOVEL THREE CRANK BICYCLE.

The illustration represents a bicycle designed to facilitate utilizing the weight of the rider, in addition to the pressure ordinarily produced by the feet, for the propulsion of the machine, thus augmenting the total propelling power and giving the body of the rider a movement similar to that of a pedestrian. In this bi-



MERRILL'S BICYCLE.

cycle are embodied the elements of three inventions, one patented in 1881, one in 1884, and one for which a patent has just been issued, the inventor being Nelson Merrill, of Altamont, N. Y. The pedal crank of this machine is a three crank shaft, dividing the circle into three parts instead of two, as is the ordinary practice, thus obviating all dead centers, and the third crank is connected with a vertically sliding saddle post or standard which moves freely up and down between grooved rollers arranged in a boxing in the top bar of the frame, as shown in Fig. 2. The arrangement is such that, while the pedals are rising, the crank with which the saddle standard is connected makes its downward movement, the weight of the body being thus applied to assist propulsion. There is also a second or idle crank connected with and six inches in front of the pedal crank, there being a shoelike connection between the pedals of the cranks, this feature being designed to afford more freedom and a better support for the feet, in connection with the movement of the saddle, which has a slight fore and aft as well as an up and down motion. To the rear of the saddle are connected shoulder



THE WORDEN HICKORY FRAME BICYCLE.

straps, adapted for application as shown in the full and dotted lines of Fig. 1, so that when the rider presses down upon the pedals, and raises his body, he will exert an upward pull on the crank with which the saddle standard is connected. The improvement is also designed for application to tricycles and all forms of foot propelled vehicles.

Starch Luster.

Heat together 90 parts of spermaceti, 50 parts of gum arabic, 50 parts of borax, 120 parts of glycerine, and 750 parts of rain or distilled water, with constant stirring until complete solution is achieved. Let cool, and fill into suitable bottles, which must be thoroughly stoppered. Directions: Take 1 ounce of good starch, and add just enough cold water to make a paste, carefully rubbing with a spoon until all lumps are broken down. To 1 pint of boiling water add 5 tablespoonfuls of this liquid, pour the whole over the starch paste, and boil for not less than half an hour. These proportions are intended for collars, cuffs, and fine shirt bosoms. For other articles less of the liquid is required.—National Druggist.