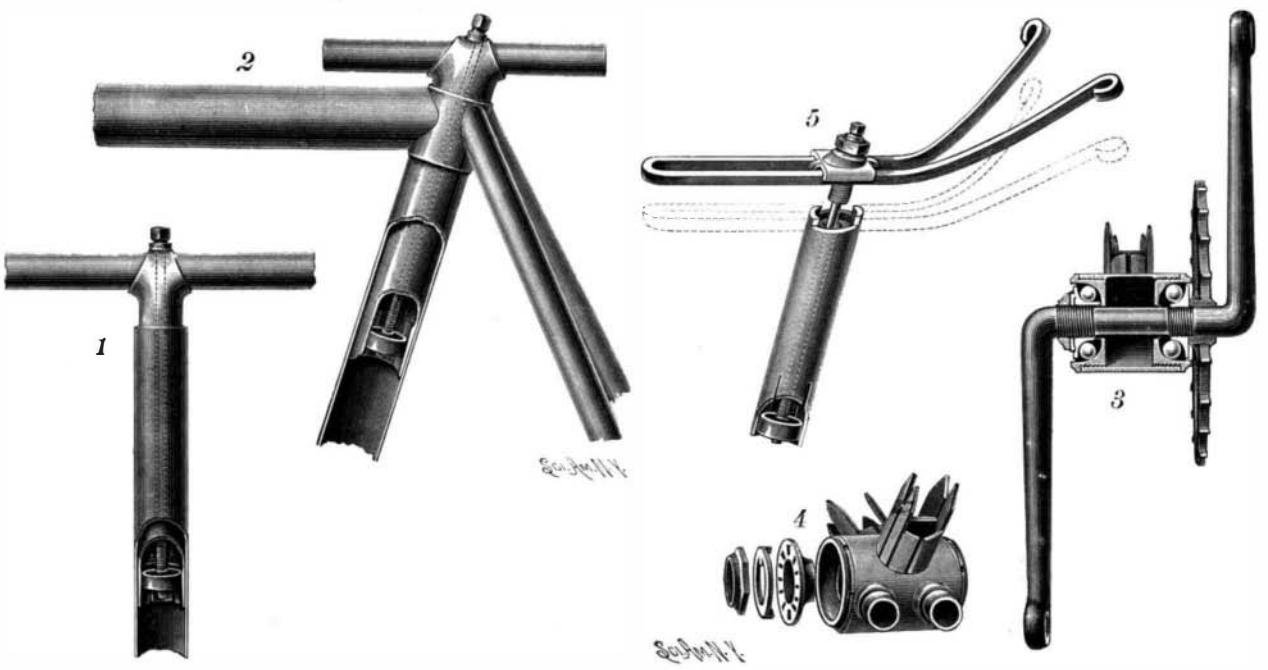
BICYCLE FRAME IMPROVEMENTS.

The accompanying illustrations show the methods used in putting together the sheet steel frame connections and the continuous crank shaft and cranks of the 1896 bicycle of the Barnes Cycle Company, Syracuse, N. Y. These frame connections are made by punching from a fine grade of drawing steel the necessary blanks, and forming them with special tools in press, so they will fit inside of one tube, going through a slot in the tube, the outer end to be formed so as to fit in another tube which is milled out the proper form to butt up against the first tube. These connections have pointed continuations which act as reinforcings, stopping the vibration, and lessening the chance of broken frame tubes from this cause. Besides these connections there are other pieces formed up to fit in each half of the main connection so as to give a brazing surface at the bottom, and one entire side also on the curved side, which, after being brazed up with the other pieces, form the strongest possible joint in use. All of these connections are riveted together and riveted to the tubes before being brazed, and are put together in such a manner that they would hold, if necessary, without being brazed. This pattern of connection is used in both heads, seat pillar and bottom bracket connection, as shown in Figs. 2 and 4. The rear fork connection also of this machine has an internal joint which is left smooth on the outside, and is made entirely of sheet steel formed and brazed as in one piece. The handle bar and seat post fastenings of this particular machine are made by reaming out the lower end with a taper reamer, and inserting a brass and taper nut, which, when drawn up by the long screw seen in the cuts, spreads the lower end of the tube, which is slotted, and holds it firmly in position. After a few seasons' use this has proved to be a most satisfactory method of fastening the handle bar and seat posts. In the lower end of the seat posts, the tube of which is lighter in gage than the handle bar post, a reinforcing tube is first brazed in, making the tube at that point of double thickness, this being reamed out with a taper reamer and not allowing any chance of spreading the seat pillar tube in the frame.

The saddle (Fig. 5) is held on the straight seat post by a hollow screw and clamp which holds the springs firmly on the upper end of the post, which is milled out the proper shape to fit the springs after the necessary reinforcings have been brazed in. The long, slim screw which tightens the brass nut at the lower end of the seat post passes through the hollow screw, which holds the saddle in position on the post, both of these screws being operated by an ordinary monkey wrench, a flat spanner or a T-shaped socket wrench.

The crank shaft forging is made of a high grade crucible steel in one piece, and the bearings are all of crucible steel, hardened, tempered and ground afterward, so they are perfectly aligned. The stop cone on the crank shaft (Fig. 3) is on right-hand thread, which is self-tightening against the sprocket when machine is running forward. The adjusting cone on the opposite end is slotted, and the washer has two small projections, as shown in the cut, engaging these slots, and, in connection with the projection on the inside of the washer, which fits a slot milled on the crank shaft, prevents the cone from working tight or loose, and keeps the bearings perfectly adjusted. One of these machines has been ridden for some time with the lock nut merely turned up with the fingers, which held it firm enough to not loosen, although the lock nut is intended to tighten up with a wrench perfectly solid.

The bearings cases are screwed in the bottom bracket, the right one having a right-hand thread, and the left one having a left-hand thread, so they both remain screwed up tight and are not affected by the revolving motion of the bearings. These machines are made in several patterns, including the Special, the White Flyer, the Superba, the Racer and the White Flyer Tandems.



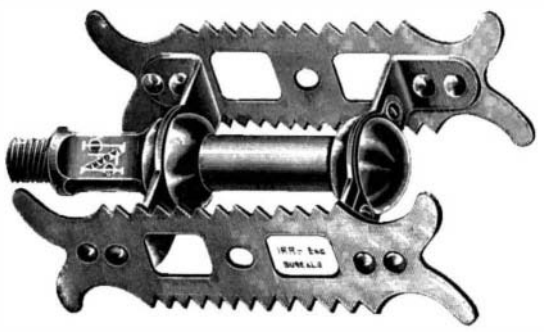
BICYCLE FRAME IMPROVEMENTS—HANDLE BAR, SEAT POST, CRANK AND SADDLE CONNECTIONS.

JAPAN is going to build up her commercial navy by giving subsidies to shipbuilders for every ton above 1,000, and to shipowners for all ships of 1,000 tons that can make ten knots an hour, the subsidy being increased for every 500 tons additional burden or every knot additional speed.

"NIAGARA" BICYCLE PEDALS.

The manufacture of bicycle pedals has become an industry separate and apart from everything else connected with the wheel. Until a few years ago the pedals used by the general trade outside of the great factories were brought from Europe, but American manufacturers are now turning out these goods in large quantities. The Niagara Cycle Fittings Company, of Buffalo, make a line of pedals which have been well known since 1891, as their "Niagara" is now represented by some 500,000 pairs in daily use.

We illustrate one of the many styles of pedals turned out by this company, the "Niagara Middleweight," especially designed for hard work on road wheels. It is of the improved central bearing pattern,



THE "NIAGARA" BICYCLE PEDALS.

a long space being left between the inner bearings and the crank, and this portion of the pedal pin or shaft being square. Nothing is so annoying to the bicycle rider as to have his pedal constantly coming loose, and to avoid this, the Niagara is arranged to admit of screwing the pin into the crank with a big wrench, making it practically impossible for it to unscrew. The foot plates are fastened to the frame with a series of separate rivets. On their lighter pedals it is customary to rivet the two portions of sheet steel on forgings together direct, but in case of accident or breakage this requires new parts to supplement the old ones, while by the use of separate rivets the repair of the broken pedal is greatly facilitated. For riders who desire to save their shoe leather from the saw teeth of the pedal plate, a rubber with an H-shaped washer to hold it in place is provided for each pair of pedals, and can be attached and detached at pleasure. The bearings are covered, the outer one by a cap and the inner one by a collar, to protect them thoroughly from the dust, and the center between the bearings is covered with a nickel plated brass tube. The daily product of these pedals at the factory of the company sometimes runs as high as one thousand pairs.

A New Star in Centaurus.

A new star in the constellation Centaurus was found by Mrs. Fleming on December 12, 1895, from an examination of the Draper Memorial photographs. Its approximate position for 1900 is in R A. 13h. 34·3m., Dec. —31° 8′. Attention was called to it from the peculiarity of the spectrum on Plate B 14,151, taken at Arequipa on July 18, 1895, with the Bache telescope, exposure 52m. The spectrum resembles that of the nebula surrounding 30 Doradus, and also that of the star A. G. C., 20,937, and is unlike that of an ordinary nebula or of the new stars in Auriga, Norma, and Carina. This object is very near the nebula N. G. C. 5,253, which follows 1·28s, and is north 23′. No trace of it can be found on fifty-five plates taken from May 21, 1889, to June 14, 1895, inclusive. On July 8, 1895, it appeared on a chart plate, B 13,965, and its magnitude was 7·2. On Plate B 10,472, taken July 10, 1895, its magnitude was also 7·2. On December 16, 1895, a faint photographic image of it, magnitude 10·9, was obtained with the 11 inch Draper telescope, although it was very low, faint, and near the sun. On this date, and on December 19, it was also seen by Mr. O. C. Wendell with the 15 inch equatorial as a star of about the eleventh magnitude. An examination with a prism showed that the spectrum was monochromatic, and closely resembled that of the adjacent nebula. Although the spectrum is unlike those of the new stars in Auriga, Norma, and Carina, yet this object is like them in other respects. All were very faint or invisible for several years preceding their first known appearance. They suddenly attained their full brightness and soon began to fade. Like the new stars in Cygnus, Auriga, and Norma, this star appears to have changed into a gaseous nebula.—Harvard College Observatory Circular.

New Submarine Boat.

The Goubet resembles a whale in shape, being spindle shaped and measuring 26 feet in length and about 5 feet 6 inches in diameter in the middle, with a capacity of 10 tons. It is cast in three sections of gun metal, which are bolted together. The middle section is surmounted by a dome, also of gun metal, about 1 foot high, by which access is obtained to the interior. The hull is about 1 inch thick in the middle and about one-third of this only toward the ends, but this gives sufficient resistance to navigate at any depth in the English Channel. The boat is propelled by a screw, which also serves the purpose of a rudder, the shaft being jointed to enable of its being moved right or left. The horse power is extremely small (one or two), this, it is said, being sufficient under water, where there is no wave making, to give seven or eight knots. The motive power is supplied by an electrical battery. The boat may be rowed backward or forward by a pair of fin-like arrangements to the fore. When the boat is in harbor the dome emerges. When this is closed, and the boat sets out on the warpath, water is let into compartments in the lower part of the boat, which gradually sinks. The quantity of water is regulated by very ingenious automatic apparatus, and when the Goubet is sunk to any required depth, at that depth it remains, the screw propelling it in a horizontal plane.

American Fruit Packages.

American fruit packages are becoming more and more popular in the Mediterranean trade. It is believed that the fruit producers of Italy will adopt the more modern fruit packages used in the United States. An importer of fruit, resident in New York, has recently visited Italy, and was present at a conference held by the ministry of agriculture of Italy, and he showed them the various boxes, crates, baskets, and the like which are used in the United States. The Italians had never before seen such packages, and their complaint was that they had neither the wood nor the machinery to manufacture them. The New York merchant told them that, as the United States produces the shooks to make boxes for their oranges and lemons, it would be an easy matter for the same country to supply the same packages, at a nominal cost. If these are generally adopted, the United States lumber interests will be benefited. In any event, as the Italian fruit grower becomes acquainted with our modern appliances, he will either purchase the manufactured article in this country or will buy proper machinery and wood here to develop that industry. At all events, it means an enlarged demand for hard wood fruit packages from the United States, either in the form of wood or the manufactured article.—N. E. Lumberman.

Aluminum Coffins.

Coffins are now made of aluminum. Like the modern square burial casket, the aluminum coffin is made of uniform width, with square ends and vertical sides and ends. It is finished with a heavy moulding around the bottom and at the upper edge, and with pilasters at the corners, and has a rounded moulded top. It is provided with extension bar handles. The aluminum casket is not covered, but finished with the metal surface burnished. It is lined in the usual manner. The weight of a six foot aluminum coffin is 100 pounds. A six foot oak casket weighs about 190 pounds, and a cloth casket of the same size with a metal lining about 175 pounds. Other metallic caskets weigh from 450 to 500 pounds. The cost of aluminum coffins is from $750 to $1,000.