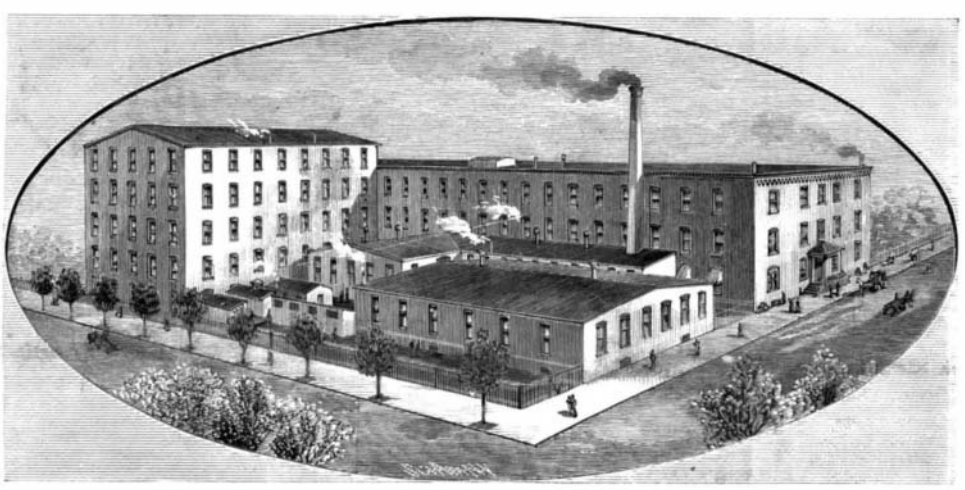
THE TRIBUNE BICYCLE.

Within the past three years, the American bicycle industry has grown up to dimensions which fairly entitle it to be considered representative of the country and of the day. Every day sees hundreds of wheels of high and low grade made in the factories of this country for the American and foreign market. Three years ago the English bicycle was considered by many the best wheel, and the possessor of such was apt to consider himself better equipped than his friend who rode one of American manufacture. Now, all is changed. A visitor to England or to the Continent, if a cycling enthusiast, cannot fail to be impressed by the superiority of American wheels as contrasted with the foreign ones, and no wheelman really au fait in his subject would dream of buying his wheel abroad, so superior is the American make. The industry has brought about an enormous development in the manufacture of special tools and of parts of bicycles.

Many assumed bicycle manufacturers simply buy these parts and do their own assembling. But for the production of the absolutely high grade American bicycle, a factory is required which will turn out practically all the parts of the wheel manufactured, for unless such is done one concern cannot be answerable for the perfection of the whole machine.

We select as the representative of such a factory the works of the Black Manufacturing Company, of Erie, Pa., a company which produce the highest grade of wheel and which put it on the market purely on its merits without the adventitious advertisement of paid riders. The wheel made by this company, the "Tribune Bicycle," embodies the best possible practice and is correspondingly free from structural variations of unproved merit.



VIEW OF EXTERIOR BUILDINGS—BLACK BICYCLE MFG. CO.

The tubing, whose walls are of 20 gage thickness, is of American make, the company having found that English tubing could not be obtained of sufficiently even quality. At the junctions of the tubes forged connections are employed. These are received in a solid state and are machined out, drilled and turned, until only a shell of the original material is left. Each connection has projecting nipples which enter the ends of the tubes, and the whole is so accurately made that when the ends of the tubes are placed over the nipples the frame will hold itself together without further fastening. The tubes are of uniform diameter throughout and are simply cut of proper length, so that their natural strength is unaffected. The most striking instance of the preparation of the forged connections is in the crank bracket. This is received as a massive forging weighing 3 pounds 2½ ounces, in general shape a cylinder, with four solid projections. This is put into the finishing machine and finished. It comes out with the solid cylinder drilled out so as to present a large aperture through which the crank shaft is to go, and its ends faced off and finished for the reception of the ball races. The four projecting nipples are drilled out and are also turned down on the outside so as to fit accurately the outside of the tubing. The bracket now weighs 8 ounces; all the rest has been converted into drill chips. One of the typical connections is that used for the head of the rear forks, which forging we specially illustrate, in order to show how solid a construction is given to this vital point.

The frame has now to be brazed together. The pieces are placed in a massive iron jig or template, adapted to receive them and retain them in position, and which holds horizontally the entire frame. This template is mathematically accurate. While held therein, holes are drilled through the connections and tube ends and pins are driven in, pinning all the parts together. When removed from the jig the frame is perfectly rigid. It now goes to braziers, who, with the best quality of brass with large gas blowpipes, braze all the parts, quid spelter penetrating all the joints and running out around the pins. The frame oes to the filers, after the borax has been off it, who, with file and emery paper, go e connections and over the tubing, polishing removing every excrescence, which, it will be gives the frame an absolute hand finish over ace.

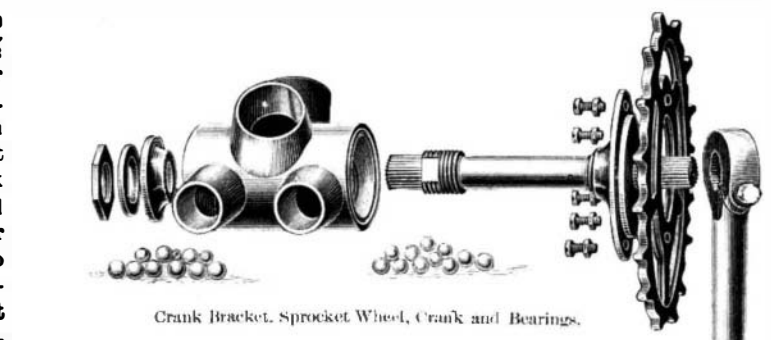
s taper toward the end, and to produce this taper cold swedging is employed. The swedging machine carries a heavy head like a lathe head or chuck, which rotates in a horizontal axis, and within which are eight hammers, which by the action of the machine move in and out in radial directions. A piece of cold tubing pushed into the machine and fed up by hand is subjected to a multiplicity of blows and has its diameter rapidly reduced, the workman being able to give it any desired taper. The metal thus tapered is flattened and bent to the proper curve to give one side of the fork.

The cups and cones for the ball bearings are made on automatic turret lathes, the turret carrying in some cases as many as five tools. A bar of tool steel which may be 20 feet long is introduced into the machine and is gradually and automatically fed up to the tools, which shape and cut off from it bearing after bearing, which drop from it every few seconds without any attention from the workman. A liberal supply of oil is kept in constant circulation through the machine, falling upon the cutting tools. The bearings thus finished are purposely left 0·005 of an inch too large. They are then screwed on a mandrel in a special lathe and the final finish is given by hand. They are then tempered by secret process with sperm oil and polished, coming out with a beautiful straw color, equal in finish to any steel tools made.

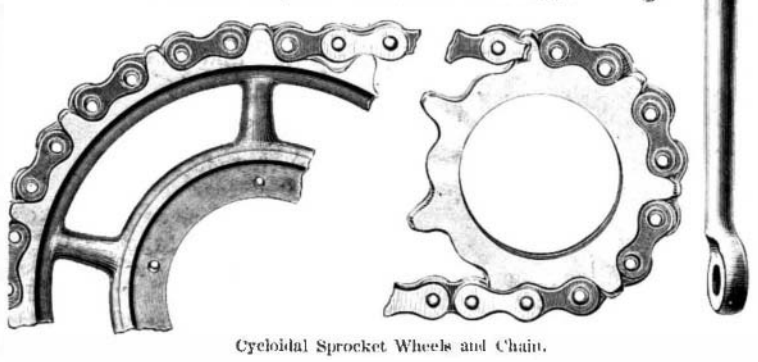
The standard finish of the machine is black enamel and nickel plate. The enamel is put on in four coats, two of Inda rubber enamel and two polishing coats, the frame being rubbed down with rottenstone between the applications. This gives a finish equal to that of a piano body. To secure evenness the enamel is applied by dipping in a tank of the compound, after which the parts are hung up and allowed to drip to remove the surplus before baking. All nickel plated parts are first copper plated. This prevents water or moisture getting under the nickel and rusting the steel and thereby causing a separation of the coating.

Handle Bar.

Head of Rear Forks.



Crank Bracket, Sprocket Wheel, Crank and Bearings.



Cycloidal Sprocket Wheels and Chain.

DETAILS OF THE TRIBUNE BICY

The aim of the constructor of this typical American wheel has been to secure simplicity and produce an absolutely standard article. Its criterion is its quality pure and simple. There are, however, some novelties introduced that are especially worthy of illustration. One of these affects the crank and crank shaft mechanism, the crank being secured to the shaft in a new way. V-shaped teeth are formed upon the crank shaft and upon the aperture in the pedal arm. This aperture in the pedal arm is split and provided with a tightening screw. To attach the crank arm to the shaft, it is thrust over the end of the shaft and the tightening screw is turned up, when it is secured as rigidly as if all were one piece of metal. Those who have struggled with the old-fashioned cotter will realize the advantage of this crank, which is instantly released with two or three turns of a screw.

The handle bar is made adjustable by an arrangement of equal simplicity and efficiency. The socket in the head which receives it is threaded. On the center of the handle bar is brazed a sleeve threaded with the same pitch of screw. The socket is split and provided with a tightening screw. The screw is loosened, the handle bar thrust through the socket and screwed into place. When at the desired angle the screw is tightened and the whole becomes practically one piece of metal. By reversing the handle bars, they can be used in up-turned or down-turned position.

The sprocket wheels ought not to be spoken of as a novelty now. They are cut to the cycloidal or theoretically correct curve, which avoids all friction of the chain against the teeth. This has long been the specialty of the Black Manufacturing Company, but now the system has spread among other companies, and cycloidal sprockets are characteristic of several other first-class wheels.

We also illustrate the system of truing up the wheel. Each wheel is mounted on a gaging frame, and the workman, by setting up and loosening the nipples, brings the rim into an absolutely perfect plane. The steering arrangement of the tandem machine deserves attention. Sprockets are carried by the front and rear steering posts, and these sprockets are connected by chains and rods so as to insure unity of steering action between the front and rear handle bars.

Wood Preserving in Switzerland.

A simple, effective, and cheap way of preserving wood from decay is practiced in Switzerland in the preparation of posts for the telegraph service. A square tank, having a capacity of some 200 gallons, is supported at a height of 20 feet or 25 feet above the ground by means of a light skeleton tower built of wood. A pipe drops from the bottom of the tank to within 30 inches of the ground, where it is connected with a cluster of flexible branches, each ending with a cap having an orifice in the center. Each cap is clamped on to the larger end of a pole in such a manner that no liquid can escape from the pipe except by passing into the wood. The poles are arranged parallel with one another, sloping downward, and troughs run under both ends to catch drippings. When all is ready, a solution of sulphate of copper, which has been prepared in the tank, is allowed to descend the pipe. The pressure produced by the fall is sufficient to drive the solution, gradually, of course, right through the poles from end to end. When the operation is ended, and the posts dried, the whole of the fiber of the wood remains permeated with the preserving chemical.—Work.

Oil of Cassia as a Refractive Medium.

Oil of cassia has a higher refractive index than cedar oil, and Dr. H. G. Piffard finds it brings objects examined in it into sharper contrast. In a paper read before the New York Academy of Medicine, he stated that he had worked with a sample having a refractive index of 1·593. Bacilli examined in this oil exhibited an unrivaled brilliance and sharpness of contour. The minuter details also, such as spores, flagella, etc., are shown with a distinctness impossible in cedar oil. The oil of cassia, like the oil of cloves, tends to abstract the color from bacilli stained with some of the aniline dyes, a disadvantage not shared by cedar oil, but it is stated that this does not take place with sufficient rapidity to interfere with the diagnostic examination.

Ice Caves of Japan.

A correspondent to the London Field gives the following account of a wonderful cave in Japan:

Some eight or nine miles from Shoji, in the woods, is the entrance to the great ice cave we had come so far to see, a natural circular depression or basin in the ground in the middle of the forest, some thirty yards across and about forty feet deep. At the foot of one of the sides is a dark opening in the lava, a few feet down which may be seen the top of a wooden ladder. This is about twenty feet long, and at the foot of it are a heap of blocks of lava, down which we scrambled for some thirty or forty feet more, till a floor of solid ice, more or less flat, was reached. Very careful progress along this had to be made to avoid slipping down and extinguishing the torches. For the first fifty yards frequent blocks of lava rise through the ice of the floor, while further on there is nothing but ice. The lava roof is sometimes thirty or forty feet above one's head, sometimes only four or five feet from the floor. The light of the torches glanced continually on icicles many feet long pendent from the roof. Presently we passed some large blocks of ice, which had been cut by the country people for sale at Kofu, some miles off. At nearly four hundred yards from the entrance about twenty wonderful ice stalagmites, from two to five feet in height, rose from the floor close to a lava wall forming apparently the end of the cave, to meet icicles hanging from the roof from which water at this time of the year continually drops on to them. The tops of these stalagmites form hollow bell-shaped cylinders, giving out a faint note like a gong when struck; they are partly filled with the water which drips on to them from the icicles above. Soon by the side of them, on the left, a low arch in the lava on the level of the floor, about three feet high, may be seen. Down this is a strong current of air; there is a rapid descent for some thirty-five feet, and thence the course of the cave has been followed for another two hundred yards or so, but owing to the strong current of air which constantly extinguishes the torches, and the smallness of the passage, which slopes down rapidly from the entrance, no detailed description of it can be given; but undoubtedly the cave runs on for some distance, perhaps to another outlet, for the current of air is very strong at the extreme point to which any one has yet penetrated.

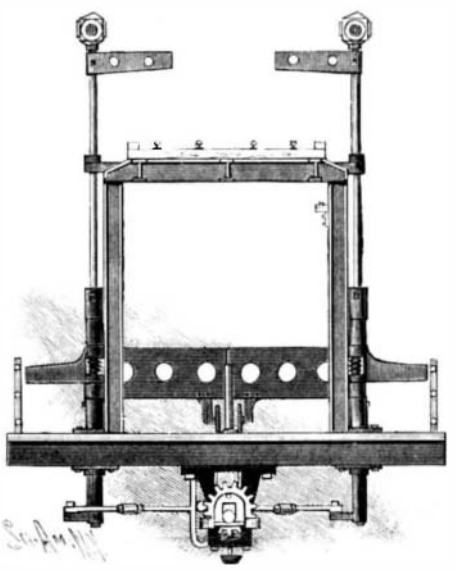
The ice has probably remained frozen in the cave from the winter months, the action of the higher summer temperature being insufficient to do more than affect the surface of the ice floor, form a few pools of water, and melt part of the ice stalactites and stalagmites. The temperature of the cave in summer seldom exceeds 35° Fah., and that in the declivity or basin in the ground at the entrance some 10° or 12° higher; on going up from the latter to the level of the ground in the wood, a rise of some 20° on a warm day is at once experienced.

The Argentine Cruiser Buenos Aires.

The latest cruiser turned out by the Elswick firm for a foreign government has just made her trials and has made a speed which, if not altogether unprecedented, is most creditable to her designers, and must be satisfactory to her owners. The length between perpendiculars of this ship is 396 feet; her beam 47 feet 2 inches; and normal draught 17 feet 7 inches; the displacement being rather over 4,500 tons. It has the usual protective deck and in general design resembles all the cruisers that have been turned out by this firm. The guns, carried in protective positions fore and aft, are two of the new 8 inch quick firers, while between these, in the open battery, are ten other quick firers, four of them being 6 inches and the others 4·7. In addition, there are sixteen three-pounders and eight one-pounder guns, with five torpedo discharge tubes. The machinery, supplied by Humphrys & Tennant, consists of two pairs of inverted direct acting, compound engines, steam being supplied by four double-ended and four single-ended boilers. The power used on the run was 14,000 H., the steam pressure being about 15·5 pounds and the vacuum 28 to 29 inches. The speed attained was 23·2 knots with natural draught.

IMPROVED DRAWBRIDGE GATES OPERATING MECHANISM.

To simplify and cheapen the opening and controlling of the gates of drawbridges, where the mechanism is actuated by the opening and closing of the drawbridge, the improvement represented in the accompanying illustration has been patented by George F. Ryan, and is being introduced by Joseph L. Duplissis, of Nos. 6357 and 6359 Champlain Avenue, Chicago, Ill. The large engraving is a side view of one end of a



DRAWBRIDGE GATES OPERATING MECHANISM—END VIEW.

bridge on which the improvement is applied, and over which is also carried an elevated railway, the adjacent abutment, the gates and the operating and controlling mechanism being shown, and a portion of the abutment being broken away to show the parts beneath the roadway.

The drawbridge, which revolves about an axis at its center, has curved ends, there being a corresponding curve in the abutment, and on each side of the roadway is a gate post, preferably surmounted by a lamp with lenses of colored glass for signaling purposes, the post being suitably stepped to maintain it firmly in place. Immediately beneath the lamp, on each post, is a short arm or plate, for use as a signal, as such device may be operated for the elevated railway simultaneously with the gates. For the driveway and sidewalks the gates are so mounted as to yield when they meet obstructions, and the driveway gate is attached to sleeves fitting loosely on the post. The movement of the gate is limited by an adjustable stop, in connection with a coiled spring, preventing injury to a person who may be caught between the gates as they are closing. The sidewalk gates are yieldingly held by coiled springs attached to the post and engaging opposite sides of each gate.

In opening or closing the gates the posts are turned in opposite directions, each post being moved a quarter of a revolution by a toothed rack carried by the bridge engaging a pinion on a shaft which has at its other end a crank arm, a wrist pin on this crank arm engaging a rod pivotally connected with crank arms on the posts. This rod is made up of a number of parts, made endwise adjustable by turnbuckles, and has at its middle a loop or eye into which projects the wrist pin. The pinion shaft is carried by a pair of hangers, one of which permits partial movement to the end of the shaft carrying the pinion, enabling the latter to accommodate itself to changes in the vertical position of the end of the bridge, the end of the shaft being normally upheld by a coiled spring. A cam on the under side of the bridge also engages an anti-friction roller on a bracket embracing the pinion, whereby the latter and its connected parts are depressed, when necessary, to the proper position for engagement with the rack. Provision is also made for closing the gates as desired, when the bridge is closed and at rest.

RYAN'S IMPROVED MECHANISM FOR OPERATING DRAWBRIDGE GATES.

Where Pennies are Coined.

It is not generally known that all the minor coins of base metal, such as pennies and nickels, are made at the Philadelphia mint, and that nearly 100,000,000 pennies are coined here every year. This large number is occasioned by the fact that thousands of pennies are lost annually, and the government has some difficulty in maintaining a supply. The profit of the government on their manufacture is large. The blanks for making them are purchased for $1 a thousand from a Cincinnati firm that produces them by contract. Blanks for nickels are obtained in the same way, costing Uncle Sam only a cent and a half apiece.

Gold is coined in Philadelphia and San Francisco. Not enough of it comes into the mint at New Orleans to make the coinage of it worth while. Gold pieces are the only coins of the United States which are worth their face value intrinsically. A double eagle contains $20 worth of gold without counting the one-tenth part copper.

Extraordinary Railroad Into the Black Hills.

A remarkable piece of engineering is to be seen on what is known as the Spearfish branch of the great Burlington Railroad system in the Black Hills, over which a Chicago Record reporter recently traveled. This branch runs from the little town of Englewood, ten miles south of Deadwood, in a northwesterly direction, to the town of Spearfish, a distance of thirty-one miles. For a greater portion of the distance after leaving Englewood the road is steep up-grade, the grade being at several points three and four feet to the hundred, finally reaching the very summit of the Black Hills, after passing around innumerable curves of so abrupt a nature that passengers are led to wonder how the train can keep the track, and through numerous cuts that have been blasted out of the solid rock.

At one or two of the most dangerous places on this remarkable road safety switches are in use. In descending the grade, should the train get beyond control, these switches will carry it around the points of mountains and up a steep grade, enabling the engineer to regain control of the train. The road is ballasted with broken rock, not even a shovelful of dirt being visible on the entire roadbed.

The cost of constructing the thirty-one miles of road was $1,750,000. The engines in use are 100 ton engines, but, owing to the steep grades, they are unable to haul more than three loaded ore cars.

At one point the road makes a curve of seven miles to reach the higher grade, and, if the tracks were on a level, the upper one would be within a few hundred feet of the lower track of the "loop."

Notwithstanding the dangers attendant upon railroading on this winding mountain road, but few accidents have occurred. At intervals trains are stopped for the purpose of testing the air brakes, and the utmost care is taken to prevent disasters. On the entire thirty-one miles of road there is not more than two or three hundred feet of continuous straight track.

THE deepest artesian well is at Budapest. Depth, 8,140 feet.