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## THE EAGLE BICYCLE.

When one stops to consider what marvelous ingenuity has been expended in the past on the problem of transportation for the masses it is truly surprising to think it should have been only of recent years that practical methods for assisting persons to cover long distances with ease and speed have been devised.

It is still more wonderful when one considers the simplicity of the piece of mechanism with which the result is accomplished—the modern light weight bicycle.

So many prominent men in all walks of life have now become devotees of the wheel that at the present time the question of individual transportation may truthfully be said to have become one of the greatest factors, not only in the development of trade, but in the increased growth of our cities and towns where good highways abound.

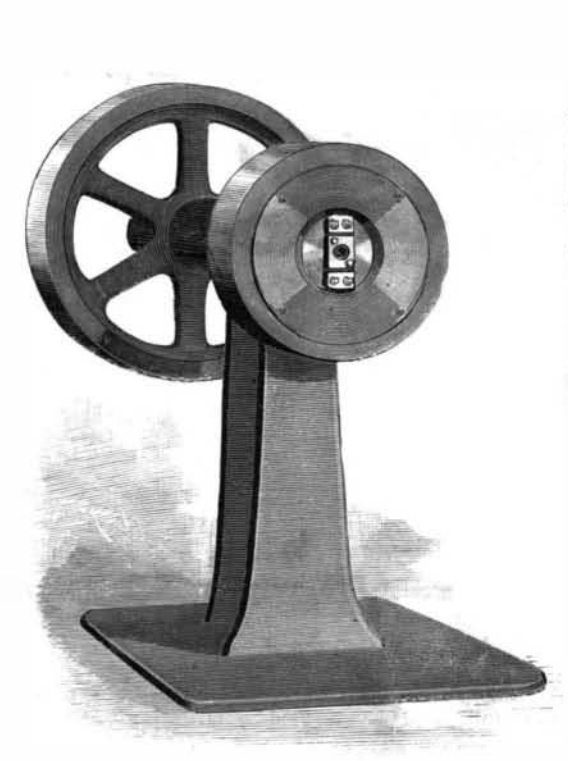
It is also claimed that no manufactured article is used by so many different classes of society as is the bicycle, and there certainly has been no exercise, sport or pastime which has proved more beneficial to the human race or given greater relaxation and pleasure than a spin upon the wheel.

There is far more interest shown by purchasers and riders regarding the mechanical features and methods of construction used in bicycle manufacture than in any other article made or sold to-day. If a man could acquire as much knowledge by investigation and inquiry regarding his watch as his bicycle, there would be fewer worthless watches sold.

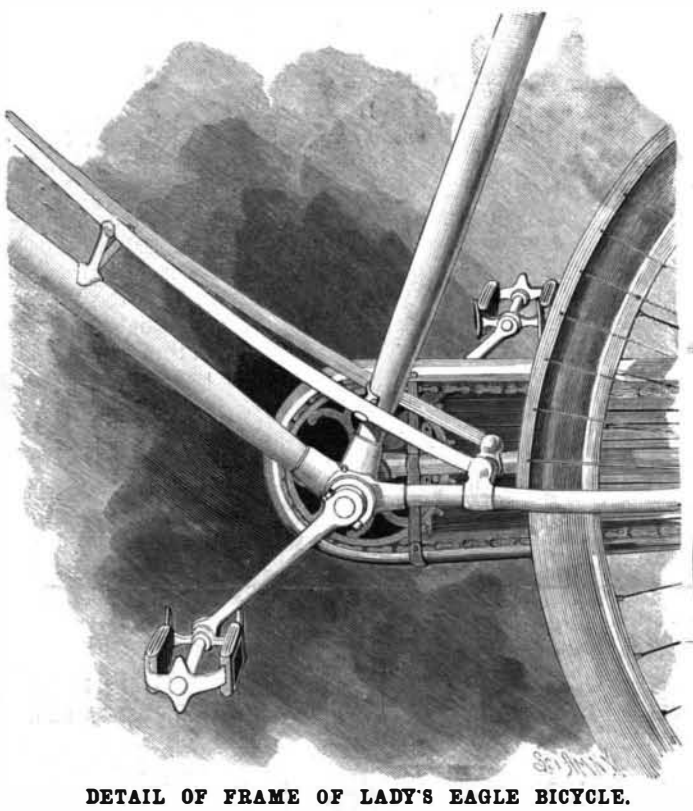
In 1888, before the advent of the now universal type of safety bicycle, and when ordinary high bicycles were really too dangerous for use by conservative riders who desired to enjoy the delight of cycling, the Eagle high wheel appeared to be the coming wheel, as the liability of headers had been entirely eliminated by the small front or steering wheel, this result having been accomplished without the use of gears or clutches, which were then in a very crude state of advancement.

With the appearance of the safety bicycle, and immediately upon its general acceptance by the riding

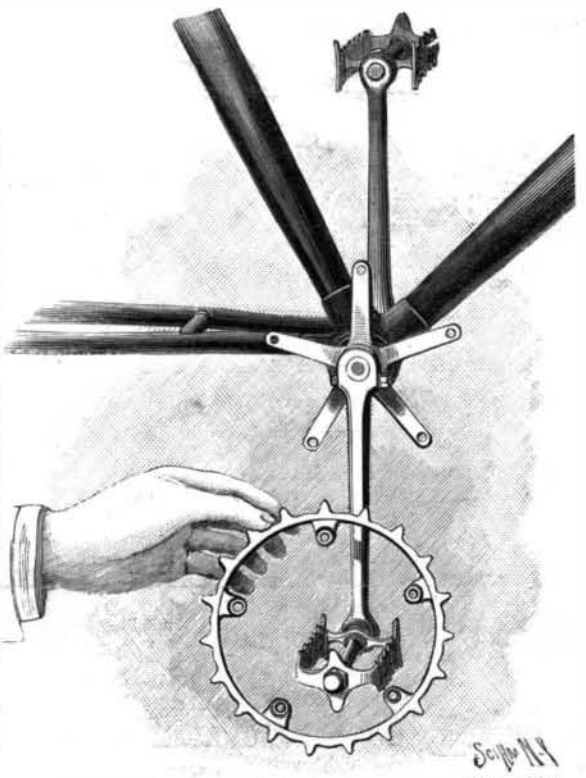
(Continued on page 20.)



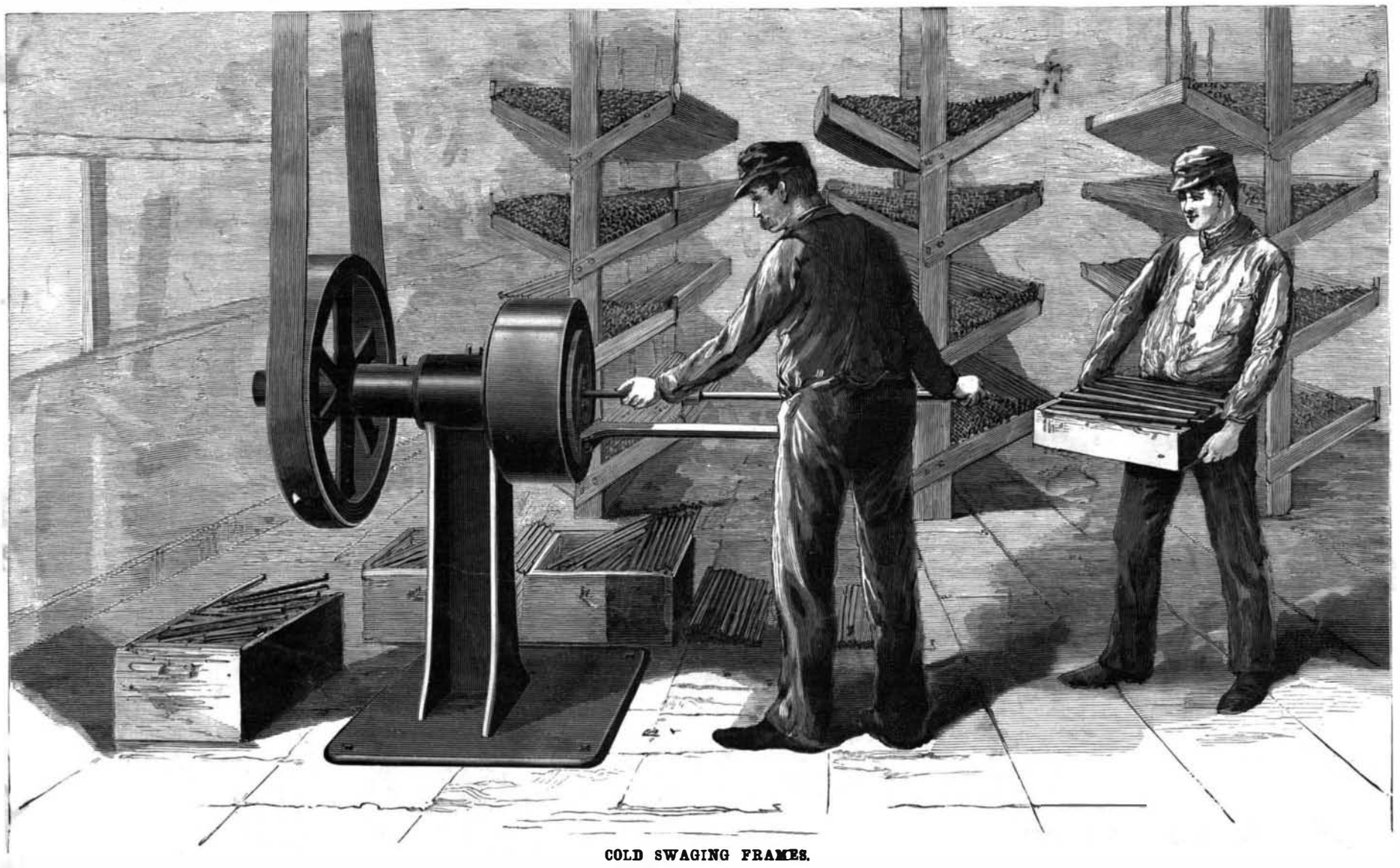
COLD SWAGING MACHINE.



DETAIL OF FRAME OF LADY'S EAGLE BICYCLE.



DETACHABLE SPROCKET OF EAGLE BICYCLE.



COLD SWAGING FRAMES.

THE EAGLE BICYCLE—ITS MANUFACTURE AND CONSTRUCTION.

## THE EAGLE BICYCLE.

(Continued from first page.)

public, the Eagle Bicycle Manufacturing Company produced a strikingly handsome machine of this type. Its makers have since been guided by the same progressive views, tempered with proper conservatism as in the early days.

The Eagle bicycle of to-day is a typical American wheel, and our illustrations will serve to show our readers some of its distinguishing features of construction.

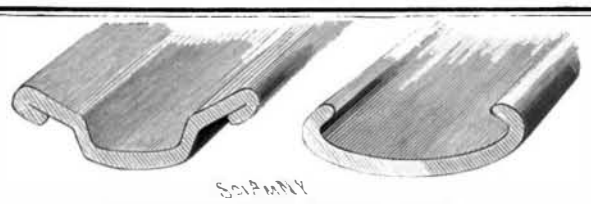
During the year 1895 a number of new factories have been built especially designed for the manufacturing of bicycles. The last, and perhaps the largest, of the new plants erected is that of the Eagle Bicycle Manufacturing Company, of Torrington, Conn., a cut of whose new factory we herewith show. It is situated in a valley devoted almost entirely to the manufacture of metals into various articles and devices, the infinite variety of which is probably unequaled in any other one section of equal area in the country. Torrington is located between the cities of Bridgeport and Winsted, the two terminal points of the Naugatuck Railroad, covering a distance of hardly fifty miles, and there are fully 100.000 people engaged in the various manufacturing plants of this remarkable valley.

The new factory is situated directly on the line of the railroad and will have its own switch therefrom for shipment of wheels and reception of coal and stock. The large shops are built on the most approved plan, the roof with numerous vertical windows, giving a perfect light for machine rooms. The best possible construction of countershafting is employed, one man being able to keep a line of it in motion by pulling at the belt, so perfect is its alignment. The new enameling ovens are worthy of special mention from their size and completeness. The factory has its own gas and electric plant, so that all operations are under its own control. From the main office, the entire area of the main shop is visible. The offices with draughting and rooms devoted to correspondence only, occupy two full floors of the office building.

In the Eagle bicycle cold swaging is extensively applied. The spokes are also cold swaged from the best imported wire, and have thickened ends, giving perfect immunity from breakage, a trouble of frequent occurrence in the past and giving unlimited annoyance to the rider. The ends of the tubes are reinforced by a cold swaging process, introduced by the Eagle Company some three years ago, patents on which are now pending. Into the ends of each main frame tube a section of smaller tubing some three inches long is tightly inserted. This alone, in conjunction with the brazing, would be a good reinforcement. But in addition the end is inserted into the cold swager and is by the rain of blows rapidly and evenly reduced one quarter or one eighth of an inch in diameter. This brings the outer tube and its reinforcement into perfect contact, by cold swaging, reducing both in size and consolidating the steel, so that they practically represent one piece of metal. When brazed in place the whole is virtually one. All ends of the main frame tubes are thus treated, and the value of such reinforcement cannot well be overestimated. The tapering of the ends also gives a most graceful effect to the frame.

The fork sides are made from round, seamless tubing, tapered also in the cold swager. A mandrel is next used in further forging them into the proper flattened contour. They are then curved in a powerful press, so that they receive an identical outline in all cases.

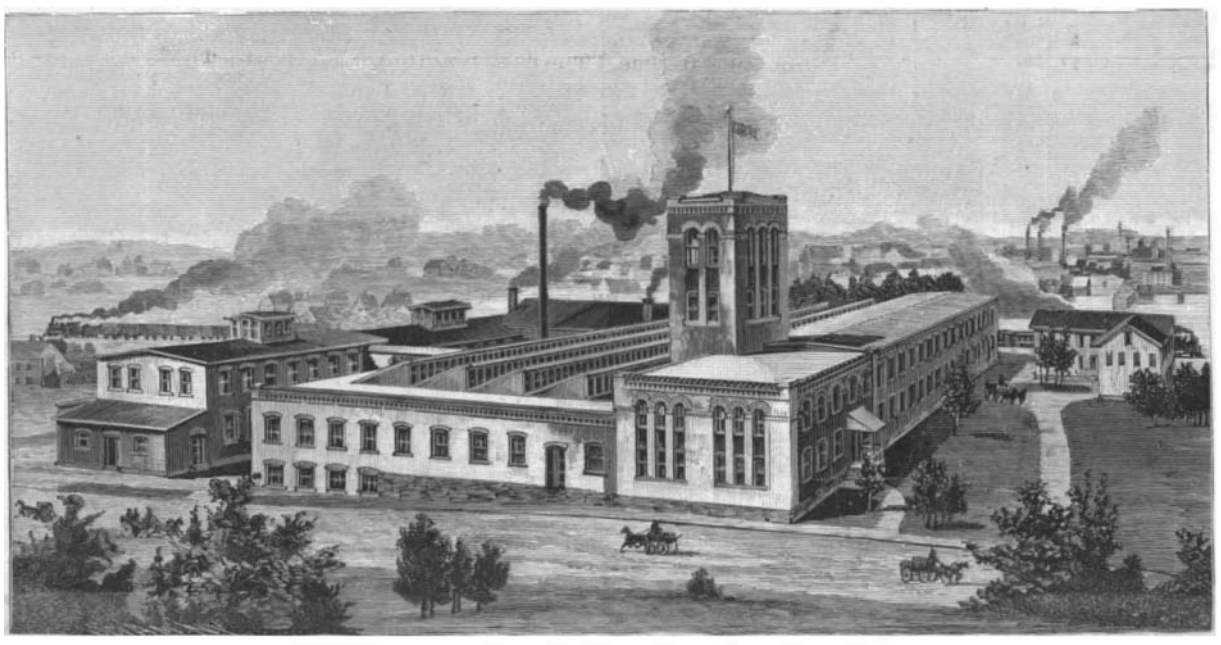
The assembling of the frame is an interesting process. The pieces being assembled in a heavy metal frame, called the "jig," are drilled and pinned together and are brazed, being subjected to operations of alignment between the brazing operations. Then, when all is put together the wheels must stand in precisely the same vertical plane, and their axles must not only be parallel to each other, but must be vertical to the plane of the wheel.



SECTIONS OF ALUMINUM RIMS.

ALUMINUM RIMS.

REINFORCING THE FRAME TUBES.



FACTORY OF EAGLE BICYCLE MANUFACTURING COMPANY.

EAGLE BICYCLE AFTER A COLLISION.

The variation of a sixteenth or even a thirty-second of an inch in cutting off the tubing used in the construction of a bicycle frame, or an equal amount of variation in pinning the frame together on the "jig," will cause the wheels, when fitted, to be entirely out of line with each other. In riding, they would not track, and the bicycle would run harder in consequence.

A common method of obviating this difficulty is to bend or twist the frame so that the wheels may be made to track. The detrimental results from such a remedy are obvious. It is not so with the frames used in Eagle bicycles. After each primary operation and before the frames are ready for re-enameling, they are lined up, not only by the inspector of the frame department, but later by the inspector of the assembling room. When a frame is found to be out of line, the work on it is immediately stopped, and such portions as are wrong are taken apart, unbrazed, the pins are driven out, and the frame is again set up—this time correctly.

Three characteristic features of the Eagle wheel are the aluminum rims, the detachable sprockets, and the three tube loop frame of the ladies' wheel. The aluminum rims are rolled from heavy sheet aluminum in the works of the company. New sections have been adopted. The one is for cemented or for Dunlop tires, and, by its beading, this rim is made very stiff. The other is adapted for clincher tires, especially the G. & J. tire, and is the ideal rim for this kind. Steel rims rust and injure the tire. Copper plating is sometimes resorted to for protection from this trouble. Wooden rims have given much trouble by splitting under the strain of clincher tires. The aluminum rim represents the combination of its own incorrodibility with the strength of steel and lightness of wood. It is really somewhat lighter than wood, and, like all metal rims, bends in accidents where a wood rim would break and be destroyed. It is calculated that $40,000 per annum represents the additional expense on an output of 20,000 wheels with aluminum rims.

The detachable front sprocket has its rim carried by five arms of a spider brazed to the crank axle. Five screws hold the rim in place, but the ends of the arms are received in depressions in the arms of the sprocket rim, so that the driving strain comes on the shoulders of solid metal and not on the screws. The rear sprocket screws bodily on the hub with a right handed thread, and is secured by a jam nut with left handed thread. Thus anyone can change the rear sprocket.

The loop frame we illustrate in a special cut. The original loop frame or ladies' wheel of the early days had but one tube. If this broke, a fall was the inevitable result. Then a second tube was added, placed almost universally directly above the lower one. In the Eagle loop frame the straight lower tube is supplemented by two curved tubes, placed above it and to right and left, so as to spread some three inches laterally. This operates to greatly increase the stiffness of the wheel and makes it even stronger against lateral strain than is the regular diamond frame. The Eagle ladies' wheel is unique, and is equipped throughout with aluminum dress and mud guards.

A bicycle which was run over forms one of the Eagle's trophies. While a complete wreck, not a tube, spoke or rim was broken, testifying to the perfection of the machine that can be bent but will not break.

It is needless to say that the hubs and bearings are turned out of the solid bar. One tendency of the factory which is always immediately noticeable to a visitor is the constant use of hand finish, not trusting too implicitly to automatic machinery.

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OWING to the talk of assessing bicycles in the State of Maine, the State Assessors called for an estimate of bicycles ridden in the various counties. The reports of the local assessors show a total of 9,663 bicycles in use at a valuation of $500,000.