

by other methods, produced cheaper and more rapidly by the new process, but a class of products can be made which it has hitherto been impossible to make. From the converter the metal can be poured into moulds, and castings can be made which have all the properties of wrought iron. They can be bent, hammered, welded, and in all respects treated as if they were the product of the forge and not of the foundry. This means a revolution in the building of machinery. Wrought iron is five to seven times as strong as the best cast iron. If, therefore, any piece of machinery requiring strength be cast of metal purified by the new converter, it can be one-fifth the present weight and of equal strength; or, if made of the present weight, of more than five times the present strength. There have been numerous attempts to increase the strength of castings, and to make what are known as malleable castings. The most successful has been the process of annealing. But this process has thus far failed in producing, for instance, heavy ordnance. If a highly carbonized metal from the new converter be cast, and the castings be permitted to cool slowly, it will be a soft steel, and part of which can then be tempered to any degree of hardness desired. The advantages of this are very great in the manufacture of such products as car wheels and heavy ordnance.

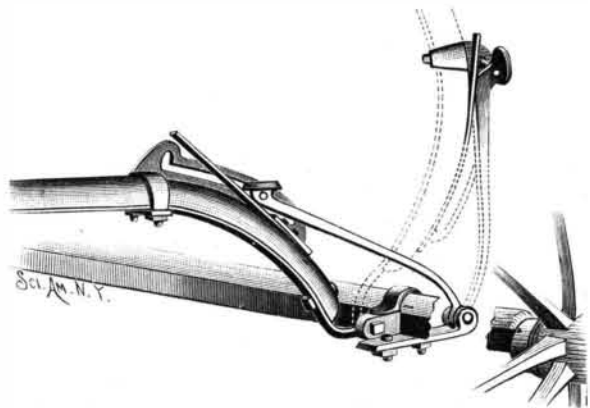
The present manufacturers of steel and iron can utilize nearly all their present plants—all except the puddling furnace—when they adopt the new system. The greater part of most of the existing manufacturing plants is as necessary for the new process as for the old ones; and the additional machinery required is not costly in comparison with the cost of Bessemer converters.—*Harper's Weekly.*

Learn a Trade.

The practical advantage to one who has learned a trade was exemplified the other day in the person of Patrick Gleason, Mayor of Long Island City. The appropriation for the maintenance of the water department having run short, a number of the men have been unpaid for some time. The other day they simply said that, if they didn't get their money, they would shut down the waterworks. Mayor Gleason, who has attained fame of late by his manful attack upon the fences and other obstructions of the Long Island Railroad, which he leveled single-handed with an ax, said that he didn't propose that Long Island City should be left without its water supply. He couldn't force the city officials to appropriate the money, but he hitched up his trotters, drove to the waterworks, and told the men on duty that if they wanted to leave they could leave, he could run the engine himself, with the assistance of one or two of his friends. As he is an old engineer, says *Fire and Water*, they all knew he could do what he said. Consequently, there was no strike, Long Island City was not deprived of its water supply, and since then, we understand, the salaries have been paid up. This is the kind of a mayor to have.

AN IMPROVED VEHICLE SHAFT SUPPORT.

The accompanying illustration represents a simple attachment whereby the shafts or poles of a vehicle may be supported in elevated position when the vehicle is not in use, the shafts being shown thus supported in dotted lines. This invention has been patented by Mr. James A. Peel, of Springport, Ky. An arm is pivotally connected with the forward axle of the vehicle, the outer end of the arm having a stud passing through a slot in a plate attached to the shaft, the forward end of this slot having a recess extending at right angles to the slot. To the plate attached to the shaft is riveted a spring bearing against the under side



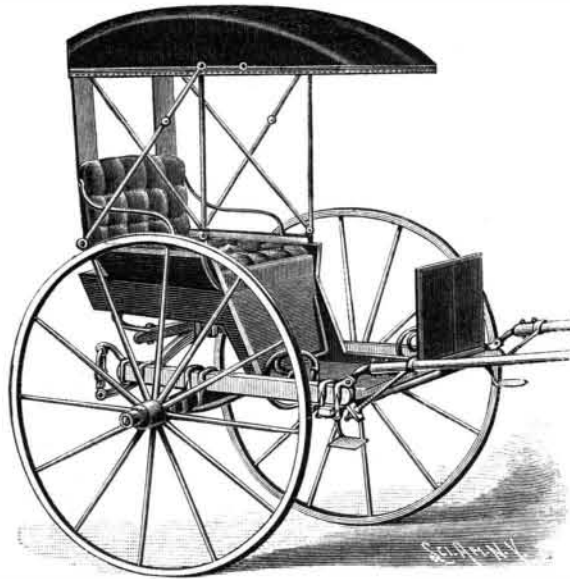
PEEL'S VEHICLE SHAFT SUPPORT.

of the forward end of the arm, and acting to throw the stud into the recess when the shaft is moved to the position indicated by the dotted lines. The shafts can then only be lowered by throwing the arm down against the tension of the spring, bringing the stud where it will slide in the slot of the plate attached to the shaft.

VALUABLE SEEDS.—Seeds of the most valuable varieties of cinchona bring \$1,000 per ounce in Ceylon. There are nearly 100,000 seeds in an ounce.

AN IMPROVED ROAD CART.

A vehicle designed to secure absolute freedom from horse motion, and in which the thills or pole may be adjusted to suit horses of different heights, is shown herewith, and has been patented by Dr. Lewis J. Lyman, of Manhattan, Kansas. To the rear ends of the side bars a rear spring is attached by flexible connections, such as heavy straps, which permit the spring to swing freely, the body being secured to the spring by a cross bar and irons. The front springs are circular, and are attached to the side bars by suitable inwardly projecting arms, the front of the body resting on a cross bar connected with the outer ends of the springs by flexible connections, so that the body is suspended



LYMAN'S ROAD CART.

and free to swing freely in all directions. The thills are coupled to the front ends of the side bars, and are held in elevated position by brace rods which pass through eye plates attached to the under surface of the side bars, the braces being screw-threaded and provided with nuts for raising and lowering the thills.

Self-acting Car Couplers Must be Employed.

At the recent session in Washington of the State Railway Commissioners with the Interstate Commerce Commission, Ex-Commissioner Coffin, of Iowa, now representing the Brotherhood of Brakemen, made an address which was received with marked attention. In the course of it he said, referring to the slaughter of men by the old link and link coupler and the hand brake: "Our commission in Iowa has caused a law to be made that has been on the statute books ten years, to the effect that the railroads shall report to the commissioner the accidents occurring along their lines, and it is shown that in ten years we have killed and maimed 2,424 men in the State of Iowa by these two causes alone.

"These are astounding facts. The average would be something like 240 a year. These reports commenced when we only had 5,000 miles of railway, while now we have 8,000. The commissioners' report last year shows that there were killed and wounded by these two causes alone 349. We think in Iowa our roads are managed as carefully as any roads. We are a temperance State, and our railway men are temperate and careful, and still last year there were over 349 men killed and maimed by the two causes I have spoken of.

"There are 150,000 miles of railroad in the United States, and over six thousand of their active, strong men were either killed or maimed for life from those two causes alone last year. I state these facts so as to inspire a sort of enthusiasm on the part of the Interstate Commerce Commissioners to induce them to use their influence to pass an act by the national legislature compelling the adoption of safety appliances. I have a table in my hand, in condensed form, showing that in all the great accidents in the last fifty years there were less killed and maimed than there were killed and maimed by the two causes I have spoken of last year. These facts are astounding.

"The resolution which you have passed looks toward national legislation in regard to these safety appliances. The only legislation needed, in my judgment—take it for what it is worth—is that in regard to couplers and brakes. The matter of heating cars will take care of itself. As a matter of advertisement, every main line will have these safety heating apparatus, but you and I will send our car load of hogs, or steers, or whatever it may be, on any train on any road that will take them, no matter if a half dozen brakemen are killed at a time in coupling the car in which our freight is to another car in a train that is to carry the load on.

"Let me give you another fact. Last year, in the State of Iowa, there were 29,435,846 passengers who traveled. Not one was burned by a fire heating stove. While at the same time we killed and injured in that State by the pin and link coupler 350."

A Lake of Petroleum.

The New York *Tribune* states that E. C. Beardsley, a well known oil and gas expert, of Pittsburg, was recently delegated by Booth & Flynn, R. C. Elliott, and other capitalists to visit Utah with a view to ascertaining what truth there was in the report that great fields of asphaltum containing hundreds of thousands of tons were to be found in that region. Mr. Beardsley has just returned, and in speaking of his visit said:

"Seven hundred thousand tons of asphalt seems like a large amount, yet a field near Vernial, Utah, contains fully that quantity. It was located and partially owned by Thomas Walley, a native of Armstrong County, Pa. This asphalt was formerly crude petroleum which escaped from natural openings in the ground, flowed into the plains, where it now lies, and there dried. The field is located some little distance from a railroad, but a line is being rapidly built—the Colorado and Midland—which will tap it. Asphalt is worth \$20 a ton. Ex-Senator Tabor, of Colorado, is interested in the company about to develop the field, and the capital is \$1,000,000.

"In Wyoming, near Fort Washita, is another big asphalt field. Timothy Mullin, of Pittsburg, is interested in the oil-producing fields of this district. There is actually a petroleum lake in that region. I was there and saw it. Mullin and George Graff, two Pennsylvanians, discovered a number of oil springs on Poison Spider Creek. They turned the course of the stream and formed a large natural oil tank out of what had once been the bed of Poison Spider Creek. They then turned the oil into this basin, and as it has been flowing at a fair rate for many months, a lake of petroleum has been formed. They have thousands of barrels of the fluid waiting for the railroad to come and haul it to the ocean. The long-expected railroad may reach that locality this summer."

Speed Trials of American Steam Yachts and Naphtha Launches.

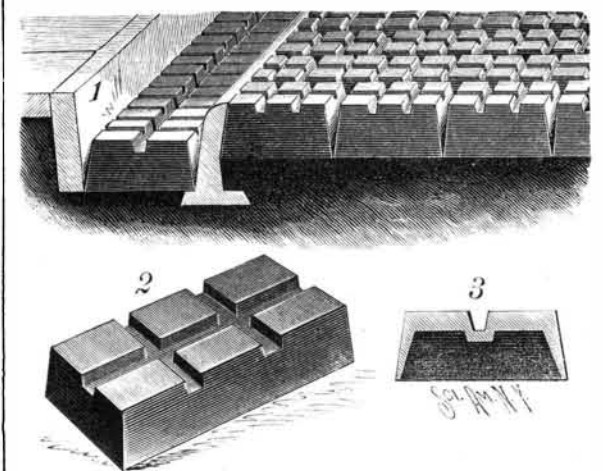
The ability of American steam yachts to maintain a high speed over a course of eighty nautical miles, with one turn, has again been tested in the races of the American Yacht Club during the past season. It seems that the required speed of sixteen nautical miles (18.44 miles), to win the Atalanta's challenge cup, was not reached by the contestants.

The fastest time made over the 80 knot course for the past four years is, for 1884, 4h. 42m. 57s.; 1885, 4h. 53m. 50s.; 1886, 4h. 34m. 57s.; 1888, 5h. 3m. 50s., which shows that the speed of the past season was considerably less than in former years.

The naphtha launch races also afford some interesting features in regard to the size and speed of this class of launches, the past season being the second of these races, over a course of 8 knots (9.23 miles), the fastest time over the course being 68.082 minutes, or at the rate of 8 miles per hour.

AN IMPROVED PAVEMENT.

A pavement designed to be strong and durable, and which may be readily taken up and replaced, has been patented by Mr. Johann E. Knoche, of San Jose, Cal., and is illustrated herewith. This pavement consists mainly of hollow metal blocks or shells, as shown in perspective and section in Figs. 2 and 3, these blocks to be either left empty or be filled with concrete or other material, and checkered on their upper surfaces. Substantially similar blocks are used both for the carriage-way and the gutter, but a flanged sup-



KNOCHE'S PAVEMENT.

port, as shown in Fig. 1, forms the edge of the gutter, the flanges bearing against the sides of the carriage-way blocks and bracing them and the gutter blocks. In laying such a pavement the blocks are arranged to break joints.

THE weight of the great smoke cloud daily hanging over the city of London, England, has been computed by Prof. Roberts at 50 tons of solid carbon and 250 tons of hydrocarbon and carbonic oxide gases for each day of the year, and its value at \$10,000,000 per annum.