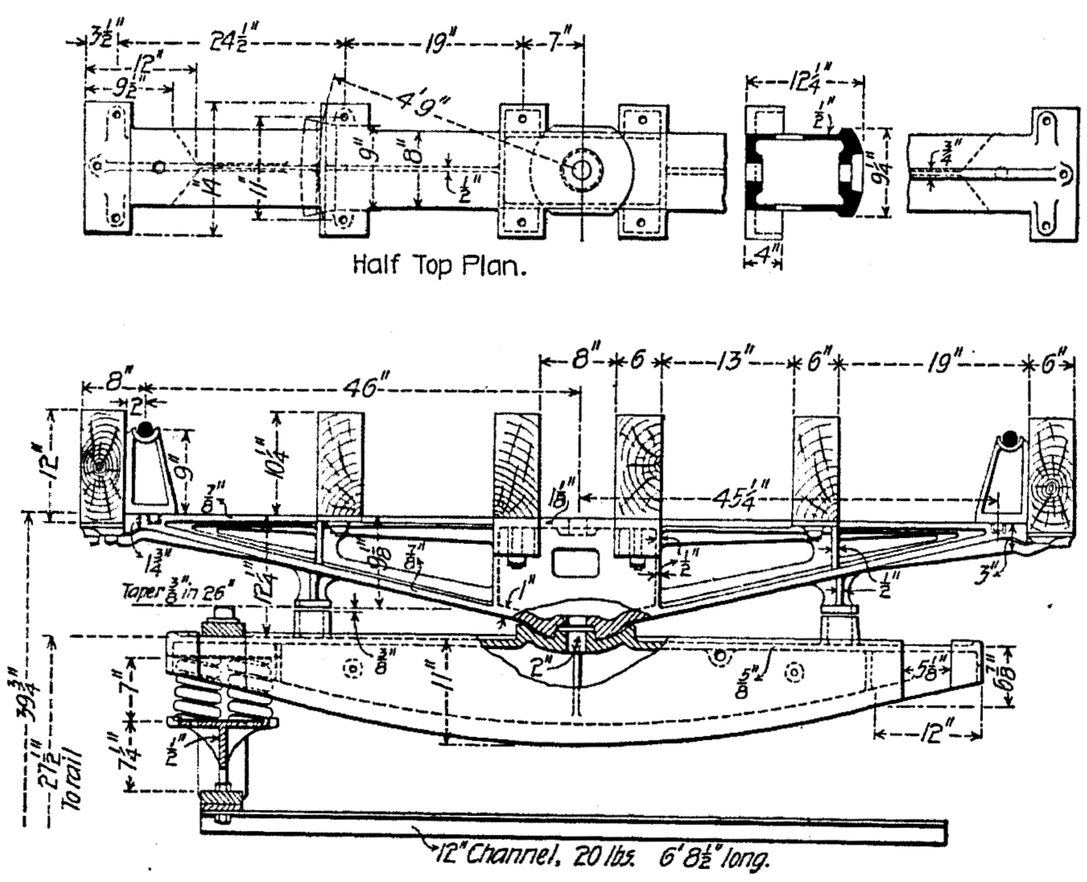
TRUCKS FOR 80,000-POUND CARS.

Cast Steel Truck and Body Bolsters.

Delaware & Hudson Canal Company.

Through the courtesy of Mr. R. C. Blackall, Superintendent of Machinery of the Delaware & Hudson Canal Company, we are enabled to illustrate the design of trucks with cast steel truck and body bolsters, used under a number of gondola cars of 80,000 pounds capacity.

This truck is of the arch bar type, with the column guides and spring seats combined in steel castings. The spring plank is in the form of a 12 by 20-inch channel. The whole arrangement was designed with a view of reducing the number of separate pieces to the minimum and at the same time to produce a structure that would be sufficiently strong to permit of carrying the load entirely upon the center plates. The bolsters and other steel castings were designed and furnished by the American Steel Foundry Company of Granite City, Illinois, and these parts are guaranteed to outlive the cars without excepting wrecks. They are giving satisfaction to the officers of



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the road, which is manifested by orders for large quantities. In describing similar trucks by these manufacturers for the Seaboard Air Line in our issue of September, 1898, we quoted from a letter received from Mr. W. T. Reed, Superintendent of Motive Power of that road, as follows:

"The idea of applying such bolsters to freight cars is to dispense with the many parts which require additional labor on trucks used previously of the same pattern as far as the arch bars were concerned, with fitch plate bolsters. . . . The time has now arrived when mechanics can readily see the advantages to be gained in the minimum number of pieces in any part of a truck or other machinery, and it is to this end that I find it most advantageous. What we need is a truck that will stand all abuses possible after derailments, so that the trucks may be replaced on the tracks and continue their journey, while others must be taken apart."

The reason why English locomotive builders have not captured and held the locomotive business for South America, Africa and other fields, against American competition, is stated by "The Engineer" to be that the builders "insisted on supplying, so to speak, chronometers, when a 'Waterbury' was the thing wanted." In other words the English locomotive is too good a machine to be run on ordinary railroads.

IMPROVEMENTS IN BOILER MATERIAL.

Improvements in steam engine practice in the direction of higher steam pressures have caused equally marked advances in boiler construction, and particularly in the quality of the materials, without which higher pressures would be dangerous and entirely impracticable. About 20 years ago pressures rose from 50 to 100 pounds, and since that time the water-tube boiler has brought about the use of 250 pounds, reduced to 200 pounds at the engines. This development and the improvements in materials which rendered it possible, are discussed in a valuable paper printed in the "Journal of the American Society of Naval Engineers."

The general reliability and uniformity of mild steel has been an important factor in this progress. This is due chiefly to the fact that purchasers of boiler material have insisted that it must meet severe requirements, and the thorough inspection and tests of the Bureau of Steam Engineering of the Navy Department has exerted powerful influences in this direction. Nickel steel commands a great deal of attention for braces and rivets may be made with a tensile strength of 75,000 pounds and an elastic limit of 40,000 pounds. This means that smaller rivets may be used and the strength of joints increased by reason of cutting away less material for the rivet holes. The strength, toughness and uniformity renders nickel steel particularly desirable for braces and rods. An example illustrated in the paper is spoken of as being as tough as steel can be made. It is very uniform and exceedingly reliable. When subjected to a drop test it tears a grain at a time, holding together during many blows after fracture. In several cases where bars 4 inches in diameter, of this composition (carbon 0.23, sulphur 0.017, manganese 0.61, nickel 3.22 and phosphorus 0.021, with average tensile strength over 80,000 pounds, and elastic limit over 55,000 pounds, and an elongation of more than 23 per cent. in 8 inches) have been tested under a 1,640-pound weight, dropping 44 feet, the bars being supported at the ends and turned over after every blow, it required 40 blows to cause the first fracture and 40 more to complete the break.

Comparisons between the requirements of the material by the Bureau of Steam Engineering in the boilers of the "Maine," built in 1888, and those for torpedo boats, monitors and battleships commenced in 1898, give an excellent idea of the progress that has been made. Ten years ago shell plates were required to have tensile strength between 58,000 and 67,000 pounds, an elastic limit of 32,000 pounds and elongation of 22 per cent. To-day the requirements are: Tensile strength, 74,000 to 82,000 pounds; elastic limit, 40,000 pounds; and elongation, 21 per cent. In 1888 rivets and stays were required to have a tensile strength of 50,000 to 58,000 pounds, and now they must have 75,000 to 85,000, and other properties in proportion.

The increased steam pressures require corresponding increase in the care and watchfulness, steel having been improved sufficiently to be generally used. The pipe in present use is nearly all steel, and lap welded. It is made so well that flanges can be turned cold without causing cracks or flaws. Seamless drawn pipe is also used, and flanges are welded to their ends, the most recent development in this direction being the upsetting of the ends of the tubes and forming the ends themselves into flanges that are integral parts of the tubes. Wrought steel pipe fittings are also available for steam pipes, and it is clear that the boiler, through the increase of steam pressure, is recognized as the vital factor in the cheapening of the cost of power.

Selected timber to the extent of 950,000 feet, board measure, was shipped to the German Government from San Francisco recently for use in the new war vessels. The pieces were from 24 to 54 feet long and 4 by 4 feet in section. They were absolutely free from knots and blemishes and cost 4.66 cents per foot, as compared with 2.75 cents per foot in the same market for ordinary lumber.