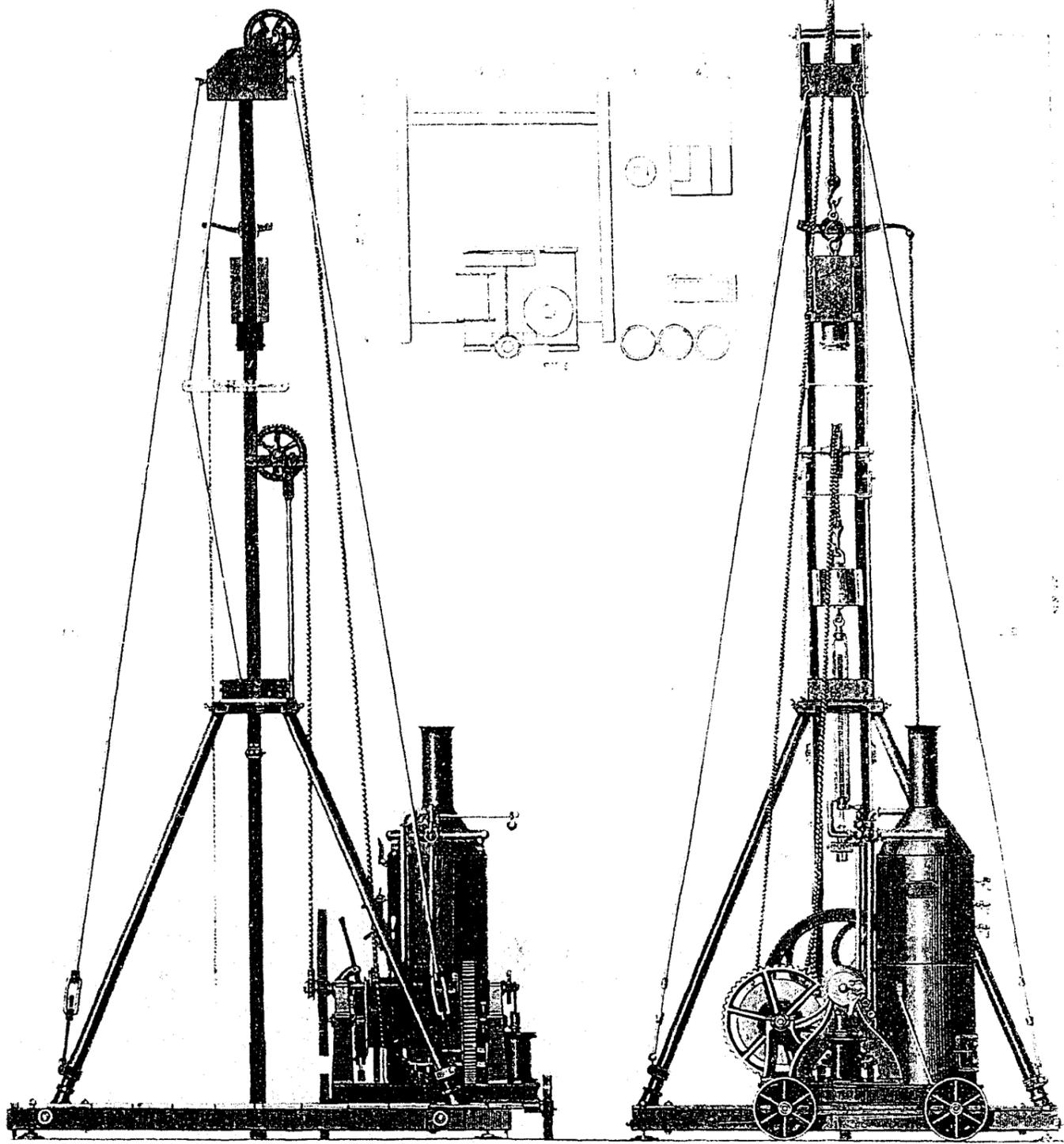


PORTABLE BORING MACHINE.

We illustrate on this page a portable boring machine, constructed for the Department of Docks in New York, and designed by Mr. Isaac Newton, assistant engineer. It has been employed for the purpose of making borings along the water front of Manhattan Island, in order to determine the position and general character of the bed rock. The drills were in all cases driven far enough to ascertain that it was the rock itself, and not boulders merely, that had been reached. The design of the machine will be clearly understood from the engraving, in which it will be seen that the framing is of the lightest form possible, and that it can be easily taken apart and reerected. It was found more convenient to do this than to employ a heavier and less easily shifted apparatus. The time required to take down the machine, and to pack it into a truck for removal, is forty minutes. The means provided for working the boring rods consists, as will be seen, of a rope attached to an eccentric on the flywheel of the steam-worked winch, and which passing over a pulley running in a bracket on the frame, is secured to the weight and coupling rod, to which the rope carrying the boring tool is fastened. In addition to this the machine can be used as a pile-driver, or for sinking tubes to serve as linings for artesian wells. In this case

SCIENCE AND MECHANICS.



PORTABLE BORING MACHINE, FOR THE DEPARTMENT OF DOCKS, NEW YORK.

DESIGNED BY MR. ISAAC NEWTON, ASSISTANT ENGINEER.

the boring gear is removed, and the drop weight shown at the top of the machine is employed.

The apparatus has been in full and successful use for more than a year, and reflects much credit on its designer.

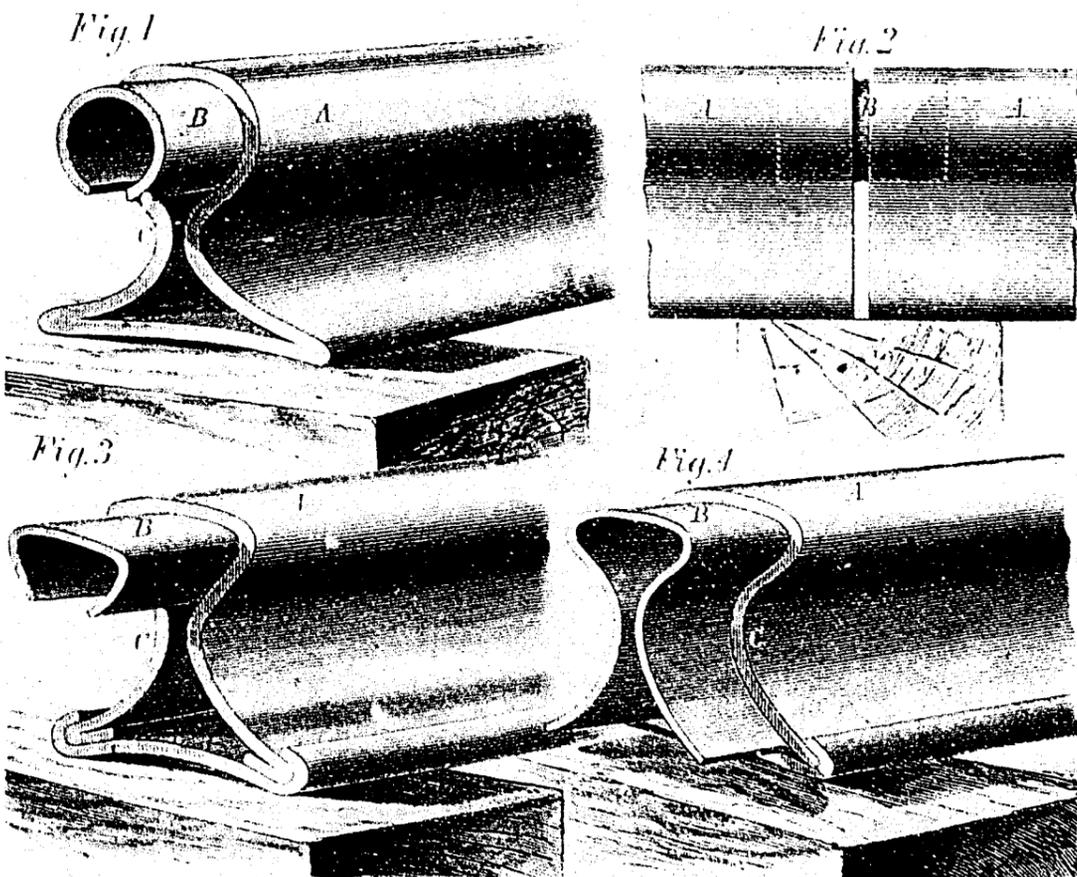
SANBORN'S RAILROAD RAIL

(From the Scientific American.)

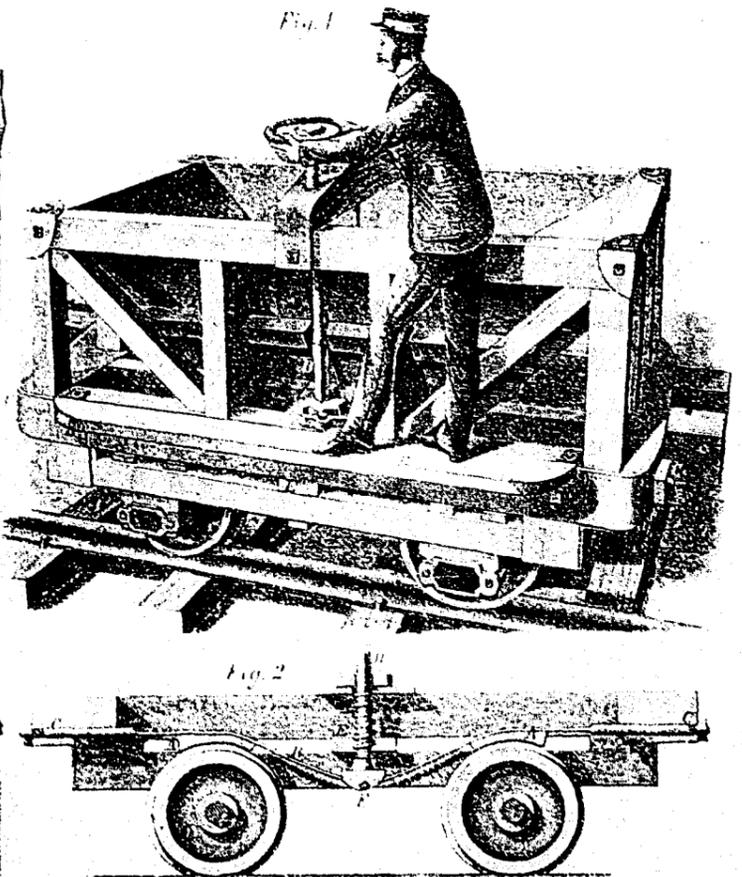
The improvements in railroad rails, which we this week illustrate, are designed to give to the rail that degree of elasticity which will enable it to bear all the pressure and shocks to which it may be subjected with the least possible amount of wear and tear to itself and the rolling stock which passes over it. To effect this much to be desired object, the inventor relies on the merits of the form and construction of his rail, the material of which it is made, and his method of joining the ends of adjacent lengths. Several designs for the rail are shown in our engraving, where generally, A is the rail and B the connecting piece, all of which are secured by letters patent.

The first patent granted to the inventor, Mr. Rufus S. Sanborn, of Rockford, Ill., dated August 8, 1871, was for the rail and joint shown in Figs. 1 and 2. It will be seen that the rail is tubular, the upper part being nearly cylindrical and the lower somewhat of a triangular figure. The material of which it is formed

(See page 58.)



SANBORN'S RAILROAD RAIL.



CANFIELD'S RAILROAD CAR BRAKE.