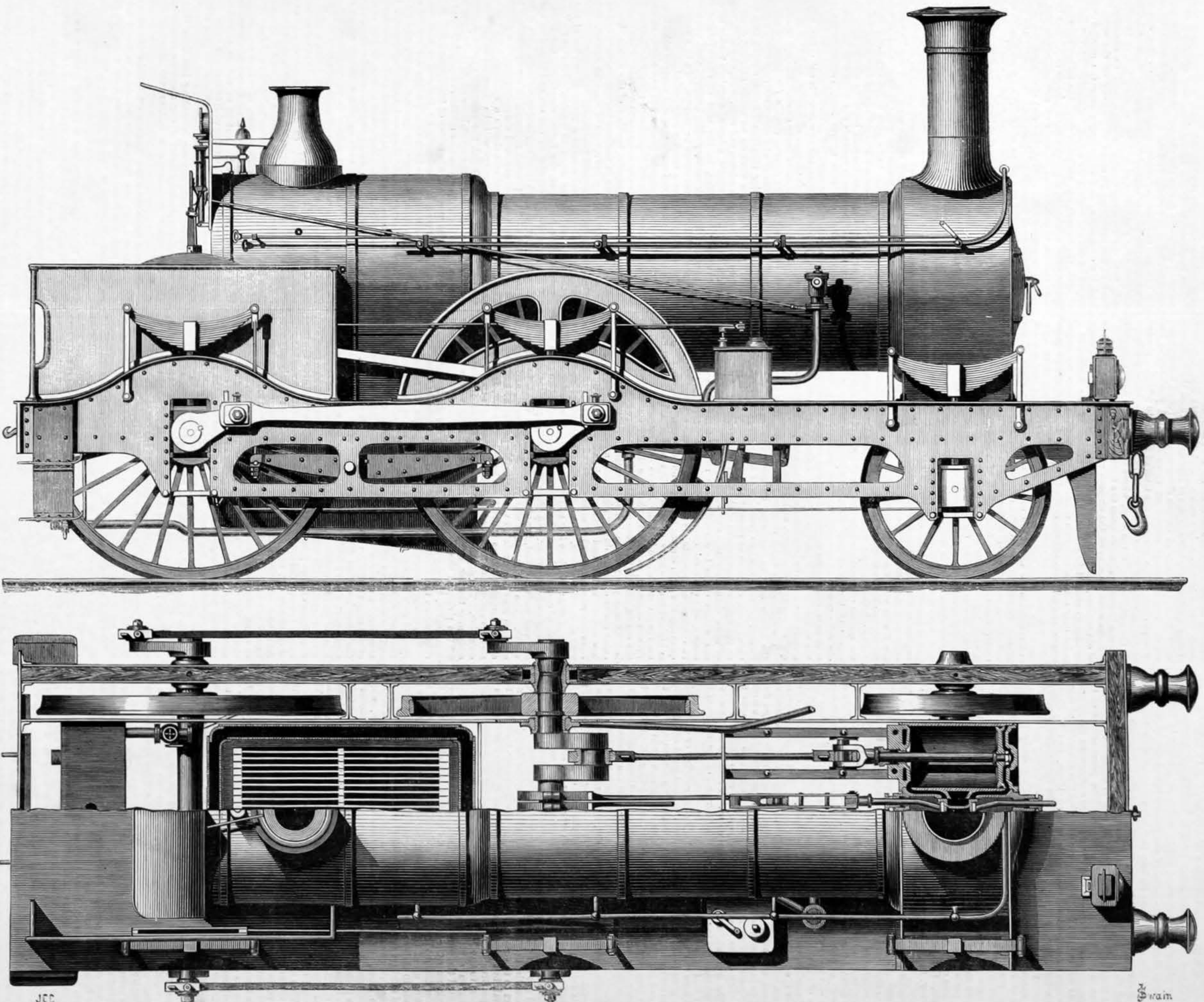


GREAT NORTHERN EXPRESS ENGINES, CONSTRUCTED BY MESSRS. JOHN FOWLER AND CO., ENGINEERS, LEEDS.



In the accompanying engraving we give a side elevation and sectional plan of one of the engines recently supplied to the Great Northern Railway Company, by Messrs. J. Fowler and Co., Leeds, which are specially designed for running the heavy express trains on that line of railway. These engines have recently completed the journey from King's Cross to Peterborough, a distance of seventy-seven miles, in one hour and twenty-eight minutes, although they had to contend with heavy gradients for forty miles of the distance, and with twenty carriages behind them. The leading dimensions of these engines are as follows, viz.:—The driving and trailing wheels are 7ft. in diameter and coupled together; the leading and tender wheels are 4ft. 3in. in diameter throughout; the barrel of the boiler is 10ft. 1in. long by 3ft. 10in. in diameter inside in the smallest part; the fire-box casing is 6ft. 4in. long by 4ft. wide outside; the cylinders are 17in. diameter, with a stroke of 24in.; the heating surface in box is 1144 square feet, and in the tubes 907 square feet, making a total heating surface of 10211 square feet, with a grate surface of 194 square feet; the tender holds 2500 gallons of water and two tons of fuel; the propelling power of the engine is equal to 12,000 lb., and the adhesion on the rails may be taken at 11,700 lb. The designs are by Mr. Sturrock, the late locomotive engineer of the Great Northern Railway, and the engines were built at Messrs. John Fowler and Co.'s Works at Leeds, by Mr. Frederick Parker, the late manager of the works of the Great Northern Company at Doncaster, who has recently joined the firm, and has the entire management of their works. The engines are fine specimens of English workmanship and finish.

THE SNIDER RIFLE. We are sorry to learn on good authority that the trial of the new, converted Enfield rifles to breech-loaders

(Snider pattern), which took place at Aldershot during the past week by two companies of the 66th and 81st Regiments, for the purpose of testing their accuracy and rapidity in shooting, is not very favourable, and has shown a great many defects either in the arms or ammunition. In firing for accuracy, which took place at 500 and 700 yards by twenty men of the best shots, the figure of merit obtained was not nearly as good as with the Enfield rifle before conversion to a breech-loader, and, in some instances, some of the men failed to hit the target out of five rounds. Another great fault found was that almost in every instance in which the men did not oversight their rifles it was ascertained that the bullet dropped short of the distance. In firing for rapidity the time taken to fire ten rounds was, as near as possible, one minute and forty seconds, but in this practice the figure of merit obtained was very low. In a great many instances the men after firing expended considerable difficulty in removing the case which contained the powder and bullet from the breech; a large number of the cartridges burst, therefore the effect of their fire was lost; besides, in some instances it was found impossible to ignite them. The ball-cartridge used on this occasion is different from what was first issued for use with the breech-loader, and is considered much better; the difficulty found in extracting the ammunition case from the breech, the bursting and non-explosion of some of the cartridges, is considered attributable to the imperfect construction of the arms.—*Army and Navy Gazette.*

FLAT HEADXD SHOT.—The following letter has been addressed to the editor of the Times:—"Sir.—Major Palliser has addressed you a letter on the subject of his dispute with Mr. Nasmyth, and he states, as 'proved by him in May, 1863, that flat-headed shot, even when fired through, were practically useless when fired against the same target through which his conical-headed shot

passed with the greatest ease.' I hope Major Palliser is more precise as to the statement of his own claims against Mr. Nasmyth than he is about flat-headed shot. It was six years before the date given by him that, after perfecting my small-bore rifle, I began to make experiments to determine what was the best form and the best material for the penetration of different substances, and I have given my best attention to the subject ever since. I then found that the flat-fronted form was superior to all others for the penetration of armour-plating at various angles, and that it was the only form that would penetrate through water. The conical-headed cast-iron shot made from cold blast mottled pig iron, whether cast in a chill or otherwise, I admit is effective, when fired at right angles, because the point of the cone, as it enters, is directly supported by the mass behind. The iron in the target is displaced laterally, and allows the free entrance of the shot into the wood backing, but when fired at an angle both the conical form and the hard brittle cast iron are comparatively useless. I maintain that sound, well-tempered steel shell, which I have been able for some time to produce with certainty, with flat fronts, are the only projectiles that can be relied upon under the varied conditions of naval warfare. If naval commanders should place themselves in the worst position for attack, then by all means try the conical-headed cast iron cheaper projectile, but they will naturally prefer to expose their armour to an enemy's fire at an oblique angle, and as they have the perfect power to do so, these are the only true conditions for testing the real value of form and material in projectiles. I am prepared at any time to maintain the reputation of my flat-fronted shell, which were the first that penetrated armour, against all rivals.—I am, Sir, yours most obediently,"

"29, Pall Mall, Feb. 22nd."

"JOSEPH WHEWORTH."