

forged on, these barrels go into the gun trade at a cost of about 10s. 6d. each. Yet from "greys," "reins," or other faults, from sixty to seventy, and sometimes two hundred out of every thousand, are rejected at proof. With the new punched steel barrels, which are at least one-half better than iron, and which can be profitably made at the same price, there are no defects whatever in the metal, since no defective ingot will withstand the punch. Messrs. Deakin & Johnson's process is equally adapted to the manufacture of hollow steel shafts for marine engines, railway axles, etc. A hollow axle thus punched and rolled, and $5\frac{1}{2}$ inches in external diameter, has been tested upon three-foot supports, by a weight of 19 cwt. falling 25 feet, the blows beginning, however, with a 5-foot fall, rising progressively 5 feet at each blow. Under the highest fall, the axle was finally deflected $7\frac{1}{2}$ inches, but no sign of fracture was shown.—*Engineering*.

Prizes for Breech-loaders and Cartridges.

To stimulate inventors and manufacturers the British Government has offered a reward of £1,000 for the best and £600 for the second-best breech-loading fire-arm, and £400 for the best cartridge. These rewards refer only to non-repeating arms; for repeating rifles, a further reward of £300 is to be given for the best of its class. The Government has issued a set of conditions for the guidance of those who may desire to compete, from which we learn that the non-repeating rifle is not to weigh more than 9 lbs. 5 oz. without the bayonet, and to measure 51 inches long. Sixty rounds of the ammunition when made up are not to exceed 6 lbs. 4oz. in weight, and the cartridges must carry their own ignition. It is stipulated generally that the arm as a whole must be as little liable to injury by long-continued firing, rough usage, and exposure as the naval rifles converted to breech-loaders on the Snider system. They are also to be as capable of being used without accident by imperfectly trained men, and of being manufactured in quantities and of uniform quality. The Boxer cartridge is taken as a standard for the new ammunition, which must be as little liable to injury by rough usage, damp, and exposure in all climates as is that cartridge as made for the Snider-Enfield rifle. It must also be as little liable to accidental explosion, and as capable of being manufactured in large quantities. A finished specimen of the arm, as well as drawings, particulars of cost, and twenty rounds of ammunition, are to be sent to the War Office before the 30th of March, 1867. Such arms as are supplied will be tried, and a selection made of the most promising. Six of each of the selected arms and a thousand rounds of ball cartridge per arm are then to be supplied, for which the Government will pay £300 to each selected competitor. With these rifles the final trial will take place, and upon their performances the rewards are to depend. The Secretary of State intimates that he will take care that no ingenious novelty shall be adopted into the service without proper acknowledgment. An additional stimulus to invention is given in the promise that, if the rifle to which the first prize is awarded is adopted into the service, it shall bear the inventor's name. With regard to

magazine and repeating arms it is stated that they are not to be less in length than 48 inches, including the stock. The limit of weight for these arms is fixed at $9\frac{1}{2}$ lbs., exclusive of charges in the magazine. Such of these arms as are accepted for further trial will be paid for at the rate of £60 each, inclusive of one thousand rounds of ammunition per arm.—*Mechanics' Magazine*.

Itinerant Bell-founders.

WITHIN less than a century since there still existed in England a race of itinerant bell-founders. They were mostly found in the south-western counties, though we believe also in the few country and on the northeastern side of England. These men were reputed as gipsies. The rings of bells in several of the rural churches of Somerset and Devon were cast by these wild workmen. The writer's own father recollected traditions, the particulars of which, even to pointing out the site of the temporary bell foundry were, in his early life, handed down in his native parish in the north of Devon, respecting a ring of six church bells thus cast. There were three men, an older and two younger bell-founders, who went about with their families and tools in gipsy style. When they had bargained to cast a set of bells, they went about the country buying up old copper and pewter, chiefly old vessels and household stuff, much of which they got from Bristol; and though apparently poor, money for such purposes seemed always forthcoming from unknown boards. Having collected sufficient material in the case here referred to, the men and their families returned to the parish, and at the side of a high-banked Devon ditch, upon a small "moor" or bit of dry common land, established themselves. They built their own air-furnace from adobes, or sun-dried bricks of the loam on the spot, and made their loam molds of the same. The only roofed building was a "lining," as a lean-to-roof is called in Devon, of a few feet square, thatched with furze and straw to keep the molds from a chance shower, and this was all burnt to light and dry the furnace. When the great day came for casting the bells, all the little parish was in commotion, and collected to see the operation; and much entreaty was made by the artists for silver coin "to improve the metal;" and some, it was said, was actually thrown into the furnace mouth by the hands of the rustic donors, who had a shrewd suspicion that otherwise it would reach the pockets of the founders only. The six bells were cast, and with perfect success, and the writer has still in his ears their sweet though coppersy tone, as mellowed by distance they sounded on summer evenings in years gone by. These bells are small, the largest probably not more than six or eight cwt., but they are in perfect tune; and to produce even such a peal, with such appliances, would not be readily undertaken nor instantly done now by the best workmen in the great establishments of our Warners or Meyers. There are probably scores of rural parishes in England the bells of which were made in the same way as were those. With these wandering bell-casters one can scarcely doubt that there must have become extinct many means and methods resulting from that inventive mother necessity of great ingenuity, simplicity, and value.—*Practical Mechanic's Jour.*