NEW INVENTIONS.

Mr. Benjamin Houts, of Junction City, Kan., has patented improvements which relate to combined girder and suspension bridges, wherein the girders rest at both ends upon the abutments and are sustained between the ends by cables. The invention consists in combining girders and grooved abutments with cables, screw bolts having nuts and hooks, suspenders, braces, and stays.

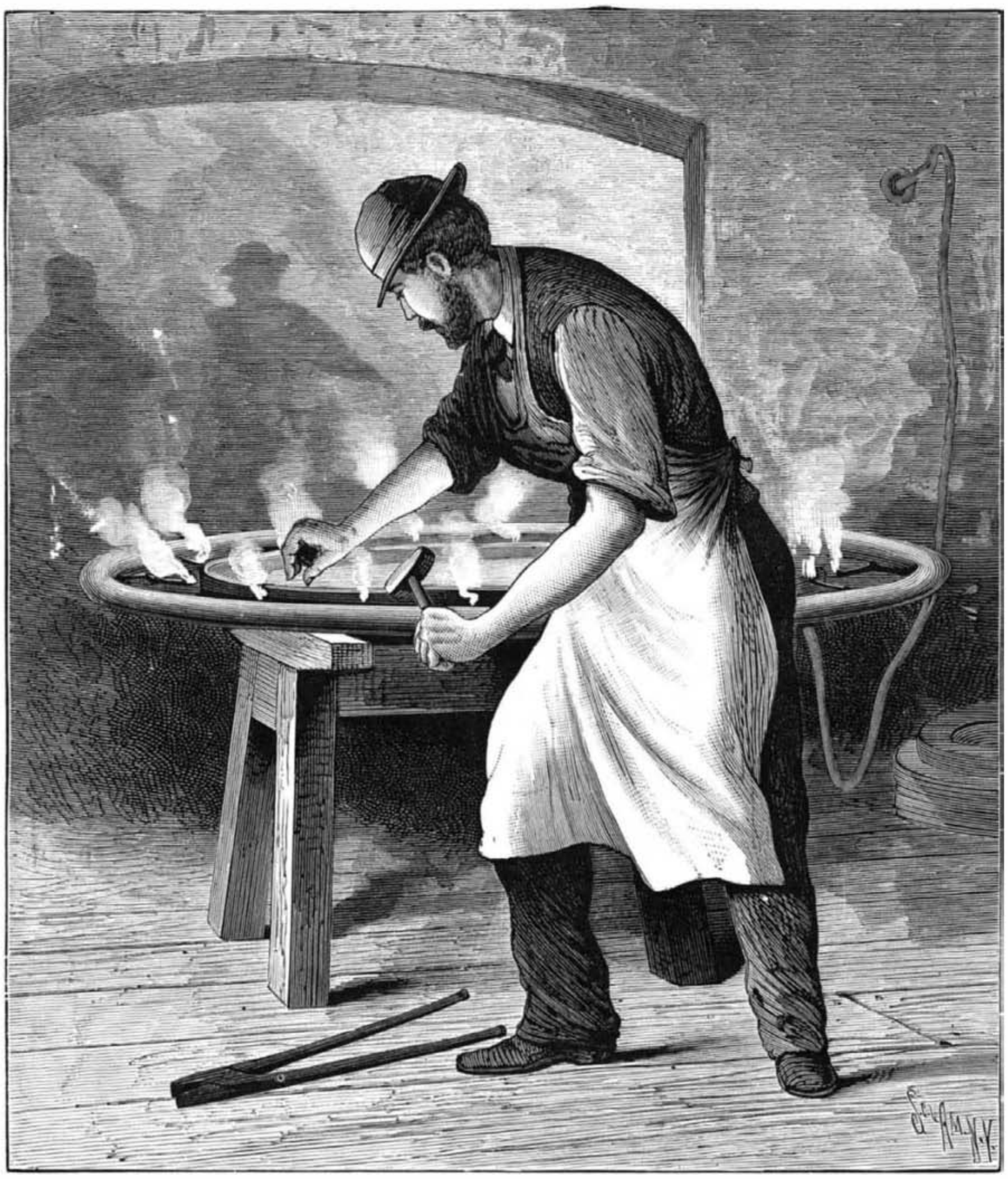
Mr. William J. Holman, of Fort Wayne, Ind., has patented an improved compound rail for railroad tracks. This invention relates to three-part rails so formed in passing through the manufacturing rolls that they will require no other device, appliance, or attachment to make perfectly secure rails than to place them together and spike them to the cross-ties.

HEATING TIRES BY GAS JETS.

Some time since we gave an illustrated description of the extensive carriage manufactory of Messrs. Brewster & Co., of this city, and in that establishment we find a simple piece of apparatus for heating carriage tires which we do not remember seeing elsewhere. Our engraving conveys a correct idea of the device, and it will require little description to make clear its construction and operation.

A ring of iron pipe is connected by a flexible tube with a gas supply pipe, and projecting from its inner surface there is a number of gas burners, which are articulated so that they may be moved to accommodate tires of different sizes. The tire to be heated is laid upon an iron frame inside the circular pipe, and the gas jets directed against the periphery of the tire. When the tire is sufficiently heated it is removed and set on the wheel in the usual way, another tire in the meantime having been placed within the circle of gas jets.

The efficiency of this device is proved by the fact that a single series of gas jets arranged in this way is sufficient to heat all of the tires which are set in this great establishment.



APPARATUS FOR HEATING TIRES.

Artesian Wells.

Mr. George H. Andrews, a member of the firm of Wm. D. Andrews & Bro., proprietors of the patent for the American tube or driven wells, says that there are over a million driven wells in the United States. In New York and Brooklyn there are over two thousand in leading hotels, factories, breweries, stables, marble-cutting establishments, etc., all of which are reported to us as giving satisfaction. Some idea of their actual value to their owners may be gained from the testimony recently given in court by the president of the New York Gaslight Company, that his corporation was saving $8,000 per annum by the use of the driven well; that he believed $10,000 to $12,000 would be within the mark, but as he wished to keep far within bounds he would say $8,000. Hecker & Brother save from $4,000 to $5,000 by its use in their large flouring mills. Smith's ale brewery gets 60,000 gallons per diem from driven wells; D. Jones' two breweries, 50,000 gallons; F. G. & I. N. Van Fleet, maltsters, of Newark, 75,000; Williamsburg Brewing Company, 30,000; Rubsam & Horrmann, 35,000; N. Leitz & Sons, 20,000; Otto Huber, 20,000; George Bechtel, 20,000; Gluck & Scharmann, 12,000; Myer & Bachman, 15,000—and all these amounts are obtained in only ten hours' pumping.

Some time since it was found necessary to increase and improve the water supply of Newark. Something less than one hundred of these driven wells were put down within an area of four acres, and from them 2,700,000 gallons of water per diem have, during the past six months, been poured into the reservoirs. This water is obtained at a temperature of 53°, is soft, and clear as a diamond. The Newark Aqueduct Board, on the evening of December 26, adopted a resolution settingforth that upon the most careful analysis this water was found to be of excellent quality, and had been of great advantage in improving the city's supply; that 250,000,000 gallons had been furnished by these wells in four months of dry weather without material diminution of the resources; that it was "indispensable to adopt some plan to avoid the dangers arising from the continued use of river water, and also to save the enormous cost of the works necessary to procure a supply from a distant source;" and finally, that it was "expedient and desirable to make arrangements to continue the driven well system on a larger scale," with a view to bringing it into full operation before next summer.

All that has been achieved in Newark is practicable in New York, and in the inexhaustible supply in the depths of the earth beneath our city lies the easiest solution of the problem so frequently recurring of late years, how to make the water supply here adequate to the increasing demands. The average cost of sinking a two inch tube well on Manhattan Island is about $300. That would yield, if required, six to eight thousand gallons of water in twenty-four hours. For a supply of Croton to that amount, by meter, the consumer would have to pay $360 to $480 per annum.

In driving a well at the Passaic Rolling Mills, Paterson, N. J., a remarkable bed of quicksand was lately struck at the depth of 1,180 feet. Mr. Watts Cooke gives in a recent issue of the *Paterson Press* a long and interesting account of the progress of the work. The first 565 feet was through red sandstone, then the drill passed through 44 feet of red shale; that was followed by 6 feet of red sandstone, 30 feet of red shale, and then red sandstone and shale in alternate beds from 6 to 12 feet thick, until the quicksand was struck. The quicksand appeared to be but a few inches thick. The intention is to sink the well from 2,000 to 2,500 feet.

The great artesian well at Buda Pesth, begun in 1868, is now reported finished. The total depth is 3,200 feet, and the temperature of the water is 165° Fah. The temperature of the mud brought up by the borer was taken every day, and was found to increase rapidly, in spite of the loss of heat during the ascent, down to a depth of 2,700 feet. Beyond this point the increase was not so marked. At a depth of 3,000 feet the temperature was 177°, giving an increase of 1° for every 23 feet bored. Water first began to well up at a depth of 3,070 feet, its temperature then being 110°. From this point onward the quantity and temperature of the water rapidly increased. Thus at 3,092 feet its temperature had risen to 150°, and the yield, in twenty-four hours, from 9,500 to 44,500 gallons. Finally, when the boring had reached 3,200 feet, at which point it was stopped, the temperature of the water as it burst from the orifice of the tube was 165°, and the quantity 272,000 gallons in the twenty-four hours. The yield was afterward reduced to 167,200 gallons, in consequence of the bore being lined with wooden tubes, which reduced its diameter.

Ignorance Regarding Machinery.

The general ignorance regarding machinery is surprising when it is considered that machines, in some form or another, enter so largely into the economies of our daily life. The Boston *Journal of Commerce* hinks that newspaper men are especially open to this charge of ignorance, which in their case is the less excusable, as they are expected to "know something about everything." When such mechanical appliances and chemical operations are combined, as in the experiments of Edison, perhaps a lack of definite knowledge may be overlooked; for only a comparatively few specialists are *au fait* on electricity, an agent but recently introduced into our every-day life. But the steam engine—its office and work, and its prominent parts—has been a common possession for generations, and the ordinary tools of the mechanic—the lathe, planer, screw-cutting machines, and other common appliances—are to be seen everywhere, and ought to be familiar to all. Yet the news paper notices of machinery and tools are seldom correct unless written by a practical mechanic, and sometimes are laughable from their absurdity. A short time ago, in a notice of the derailment of a locomotive by the breaking of a connecting bar between the drivers, it was stated that the piston rod broke, and the end, falling to the ground, lifted the engine from the track! Another account told of the breaking of "the crank of the truck." Latterly we had an account of the "explosion of a steamboat's chimney," and "explosions of engines" are frequently mentioned. One account of a boiler explosion that tore the boiler house and engine room to pieces, gave as a reason why the engine was comparatively uninjured that the engine was not running at the time! The bursting of a fly wheel by the breaking of the governor belt, which stopped it, and allowed the full pressure from the boiler to enter the cylinder unchecked, was accounted for by the too rapid velocity of the governor! The collapse of a flue was called the "bursting of the crown sheet," and the worst explosion of all was the "explosion of a rivet." A notice was recently made of the cracking of the walking beam of a large engine, and the statement was made that the works would stop until a new "shaft" could be cast. A notice of a new marine engine stated that the piston rod ran in ball-thrust bearings—alluding probably to the thrust bearing of the propeller shaft! A description of a large boring lathe conveyed the information that the live cone ran in "rabbeted boxes," meaning, evidently, that the live or head arbor ran in Babbitt metal boxes. A new planer was described as having "ways that run on V frames;" and a screw machine which made machine screws from bars was credited with "threading the heads of the screws," and that process was described as done *after* the screw was cut off the bar. "A solution of bicarbonate of soda" was employed on the screw-cutting tool.

These inaccuracies are in some cases inexcusable, but, in most, a superficial knowledge of a machine, or a smattering of natural philosophy found in common school text books, would have prevented errors so egregious as to raise the laugh of ridicule.

To Remove Nitrate of Silver Stains.

Dr. Kraetzer, of Leipsic, proposes, as a substitute for potassium cyanide in the removal of stains made by lunar caustic or silver nitrate, the following mixture: 10 grammes ammonium chloride, 10 grammes corrosive sublimate, dissolved in 100 grammes of distilled water, and preserved in a glass stoppered bottle. He says that with this solution the black stains may be removed from linen, woolen, and cotton goods perfectly without injury to the goods. It will also remove stains on the skin, but, although less poisonous than the cyanide, it must not be forgotten that it is a corrosive poison. For the skin we prefer to apply tincture of iodine, or a solution of iodine in iodide of potassium, followed by strong aqua ammonia; if slower it is safer both to use and to keep in the house.