

SCIENTIFIC AMERICAN

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AMERICAN INDUSTRIES.—No. 46.

THE MANUFACTURE OF UNIVERSAL CHUCKS.

Probably no single tool used in the machine shop has effected so great a saving of labor as the Universal Chuck, and there is none requiring more painstaking and careful labor in its manufacture. It is a tool that must be well adapted to hard usage, and at the same time its construction must be such as to neither wear out of true nor get out of order. In the well known manufactory of the E. Horton & Son Company, of Windsor Locks, Conn., universal chucks are made which fulfill all these requirements, and which are ranked as the standard. It would be superfluous to say a great deal in favor of these chucks, as they are well and favorably known throughout the world.

When Eli Horton invented the chuck known as the Horton lathe chuck, there were but a few iron chucks in use of any kind, and they were very imperfect and unreliable, giving great dissatisfaction, so much so that in many instances large establishments would use only the old method of fastening wood plank to the face plate of the lathe, which was very expensive. Mr. Horton, then a machinist of over thirty years' experience, in want of a good lathe chuck, invented the chuck which has since borne his name.

There are many thousands of these chucks in use in the best shops in the country, and a single instance is not known

where a party has purchased these chucks and afterward changed to any other kind.

By means of the gearing in the Horton lathe chucks, the jaws can be adjusted to a true circle within one hundredth part of an inch, to counterbalance any wear of parts. We know of no other chuck that can be so closely adjusted as this.

The castings are made of a fine quality of iron, and the jaws are made of the very best wrought iron; the racks are made of wrought iron; the pinions and screws, of the best cast steel, with wrenches of wrought iron, case hardened.

It was proved by testimony taken at the Patent Office that the Horton lathe chucks make a saving in time (taking the time of cleaning and adjusting other kinds of chucks into account) of over one hour each day while in use. This was the lowest time given, while some witnesses testified that from one to two hours each day were saved.

These chucks cost, in the first place, no more than other kinds of chucks, and they can be used either as independent or universal chucks, really making two chucks combined in one. This taken in connection with its other good features makes it the cheapest tool of the kind in use.

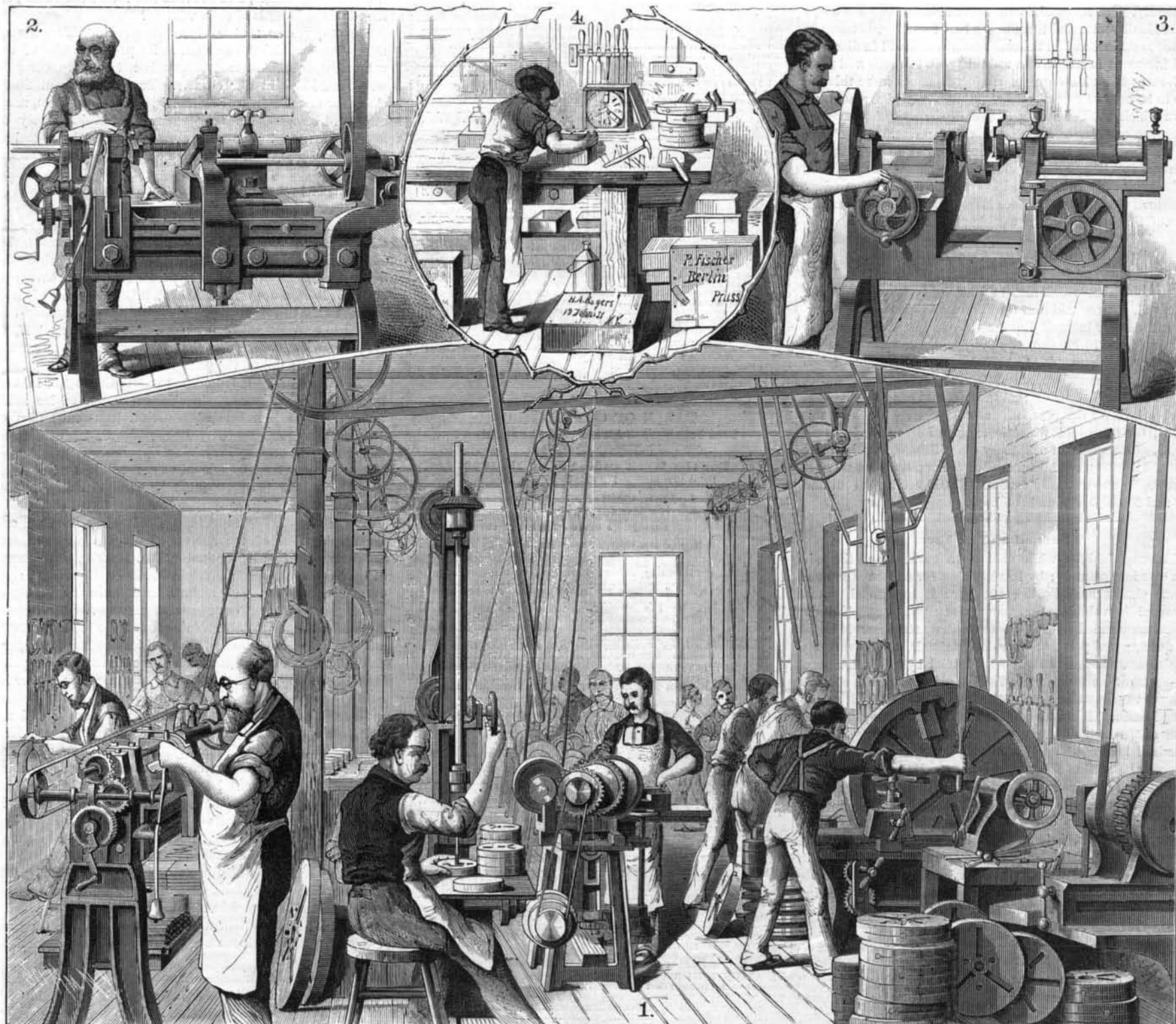
Both three and four jawed chucks are made, as well as reverse jaw chucks and milling machine chucks. The three jawed chucks vary in size from six to thirty-six inches, and the four jawed chucks range from six to thirty inches. An improved jaw is used in these chucks, which admits of being

ground perfectly true after all the parts are assembled. This operation is rendered necessary by the liability of iron to change its form during the process of case-hardening. In this establishment, nothing but the Horton chuck is made, and only the best machinery and best workmen are employed.

The larger view in our engraving represents the general machine shop, in which the greater portion of the work is done. The machines in which the operations of turning, boring, drilling, and screw cutting are carried are shown in the foreground of the view. Fig. 2 shows the machines for cutting the screws employed to operate the jaws of the chucks. Fig. 3 shows the machine for grinding the jaws of the chucks after they are put together; and Fig. 4 represents the department in which the chucks are packed preparatory to shipping them to all parts of the world.

The manufacture of these chucks was commenced in 1855 by Messrs. E. Horton & Son, and was continued by that firm until the death of the son, when the style of the firm was changed to The E. Horton & Son Company, E. Horton being chosen president, and E. B. Bailey, secretary and treasurer.

In March, 1880, owing to the death of Mr. E. Horton, the inventor of the chuck, the company was reorganized, Mr. J. H. Hayden being elected president, Mr. E. B. Bailey, secretary and treasurer, and Mr. Dwight Slate, of Hartford, Conn., superintendent of the mechanical department.



THE MANUFACTURE OF UNIVERSAL CHUCKS.—THE E. HORTON & SON COMPANY WINDSOR LOCKS, CONN.

The company is constantly making improvements and adopting anything that is new and calculated to improve the value of the chucks. Their foreman, Mr. Knight, has given the benefit of a long experience in this line of manufacture, and attends personally to the difficult parts of the work.

The officers of this company are all well known business men, and it is their determination to keep up the standard and reputation of the chucks.

We are informed that the number of orders is increasing from year to year, and that these goods are sent to all parts of Europe, to China, India, Japan, South Africa, South America, and Mexico.

GREAT YIELD OF A BLAST FURNACE.

Furnace B of the plant now in process of completion at the Edgar Thompson Steel Works, Pittsburg, Pa., has recently made a record unparalleled by any blast furnace in the world. The following is the yield in pig metal for seven consecutive days in May: Saturday, 148 tons; Sunday, 156 tons; Monday, 184 tons; Tuesday, 168 tons; Wednesday, 165 tons; Thursday, 166 tons; Friday, 154 tons. Total, 1,141 tons, or an average daily (24 hours) production of 163 tons. Furnace B is 80 feet high and 20 feet in the bosh, and in general design does not differ materially in its lines from other blast furnaces. In its appointments, however, furnace B is especially notable for the heating capacity of the stoves and the power of its blast. The ores used were not especially rich, averaging less than 60 per cent during the period of this enormous run. Hitherto the best record of the "Lucy" furnace, Pittsburg, Pa.—142 tons—was considered a remarkably good day's work, but furnace B, to use a Western expression, "takes the horns." During March last the product of the rail mill of the above steel works was 9,588 tons finished steel rails, or just about 1,000 miles.

A Shower of Railroad Spikes.

The great demand for railroad spikes has called into existence a remarkable machine, now in successful operation at the establishment of Dilworth, Porter & Co., Pittsburg. It is the invention of the late Mr. James Swett, and comprises a series of "continuous" rolls handling the material automatically. The material, in the form of billets two and a half inches in diameter and three and a half feet long, is taken in by the machine, and in thirteen seconds reduced in diameter and increased in length to a rod thirty-six feet long and nine-sixteenths of an inch square. In forty seconds more this rod has to be cut in two and passed through two spike machines, from which finished spikes shower at the rate of forty tons every ten working hours. By working "double time" five of these machines have turned out eleven hundred kegs of railroad spikes per day, each keg containing one hundred and fifty pounds, or thirteen kegs to the ton. The product of ordinary rolls and machines is from two to two and a half tons of finished spikes per working day of ten hours.

The Brewers' Association.

In his annual address as president of the American Brewers' Association, which met in Buffalo, N. Y., June 2, Mr. Henry H. Rueter said that the revenue collected from brewers and dealers in malt liquors during the last fiscal year amounted to \$10,729,320, or nearly \$800,000 more than for the year preceding. Since 1863 the internal revenue tax on malt liquors has amounted to \$120,446,863.67. A committee report was read showing that the decrease of importation of foreign beer for the year 1879, as compared with 1875, was over 1,269,000 gallons, while the exportation of American beer for 1879 exceeded that of 1875 by over \$216,000 in value; also that the brewing establishments of the country now number over 3,000, and annually consume 35,000,000 bushels of barley and 35,000,000 pounds of hops.

Charcoal and its Uses.

Charcoal, laid flat while cold on a burn, causes the pain to abate immediately; by leaving it on for an hour the burn seems almost healed when the burn is superficial. And charcoal is valuable for many other purposes. Tainted meat, surrounded with it, is sweetened; strewn over heaps of decomposed pelts, or over dead animals, it prevents any unpleasant odor. Foul water is purified by it. It is a great disinfectant, and sweetens offensive air if placed in shallow trays around apartments. It is so very porous in its "minute interior," it absorbs and condenses gases most rapidly. One cubic inch of fresh charcoal will absorb nearly one hundred inches of gaseous ammonia. Charcoal forms an unrivaled poultice for malignant wounds and sores, often corroding away dead flesh, reducing it to one-quarter in six hours. In cases of what we call proud flesh it is invaluable. It gives no disagreeable odor, corrodes no metal, hurts no texture, injures no color, is a simple and safe sweetener and disinfectant. A teaspoonful of charcoal, in half a glass of water, often relieves a sick headache; it absorbs the gases and relieves the distended stomach pressing against the nerves, which extend from the stomach to the head. It often relieves constipation, pain, or heartburn.

Rapid Cabling.

A press dispatch of eleven words, announcing the result of the recent Derby race, was filed at the office of the Direct Cable Company in London at 10:43 A.M., New York time, and reached this city at 10:43:25, the time of transmission from London to New York being 25 seconds.

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NEW YORK, SATURDAY, JUNE 19, 1880.

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THE PROBLEM OF THE ICE SUPPLY FOR NEW YORK CITY.

The actual cost of cutting and storing ice during an ordi- nary winter is said by experienced Hudson River ice men to average about twenty cents a ton. There is a considerable shrinkage while the ice remains in the store house. In breaking out and loading a further loss is experienced. A third loss occurs in the course of transportation to markets; still another in transferring the ice to the delivery wagon; last, though by no means the least, comes the wastage during delivery, especially to small consumers. When the handlings are many, the transportation far, and the weather warm, the loss by melting and breaking reduces the original stock one half. In bringing ice from a distance by sea in schooners of three or four hundred tons burden, such as are employed in the transportation of ice from Maine to this city, the wastage on the voyage amounts to about one-third. It must be remembered also that ice is bulky and heavy as well as cheap, and freightage soon equals the original cost. And with a commodity so perishable, the shipper's margin of profit must be large to cover the risk.

Accordingly the small consumer of ice must expect to pay, under the most favorable circumstances, several times the first cost of it. And unfortunately the conditions of the trade are such that a few large companies, too often a single company, may have a practical monopoly of the trade of a city, and will take every opportunity to put the price up to the highest that individual consumers can be made to pay. Thus the Knickerbocker Ice Company was able, a few years ago, to charge large consumers twenty dollars a ton and families twice as much, or two dollars a hundredweight. The open winter just past is made the occasion of something like an ice famine in this city, and the price is pushed up to ten dollars a ton, though excellent ice is sold at the store houses of the Kennebec for one dollar a ton, and twice as much more will bring it to this city and deliver it with profit, allowing an ample margin for transportation, wastage, and risk.

At such times of high prices, whether due to a real failure of the ice crop or to the natural disposition of monopolists to make the most of their opportunities, the question of artificial production usually comes up. New York manufac- tures ice making machinery for use in other places; why is it not employed here, and the trade, or rather the public, re- lieved of the hazards of open winters?

The only reason that we can discover for this state of things is the sufficient one that, in its present state of de- velopment, ice-making machinery is not able to compete with Jack Frost in our climate. To be successful finan- cially the manufacture of artificial ice, it would seem, must at present be carried on only where natural ice rarely or never forms, where water is abundant and cheap, and at points so distant from the sources of supply of natural ice, or so unfavorably situated with respect to transportation facilities, as to make natural ice practically unattainable, or at best, very dear.

From the best information that we have been able to ob- tain the cost of artificial ice has never, under the most favor- able conditions in actual practice, been reduced below one dollar a ton, and two dollars is probably nearer the actual cost. It is even doubtful whether a process capable of yield- ing ice at the lower rate given could be successfully em- ployed to compete with natural ice in this market. If, to save transportation and shrinkage, the work were attempted within the city limits, the price of the water necessary to be employed would go far by itself to cover the cost of natural ice in an ordinary season; since for every ton of ice made there would be required from fifteen to twenty tons of croton water simply to carry off the heat to be withdrawn from the water frozen.

And it must be remembered that the production of arti- ficial ice as an industry must be able to compete with nature, not merely in exceptional seasons, but at all times.

By the adoption of artesian well-water for freezing, and the employment of the current of the East or the North River for cooling, as proposed by Mr. Rankin, this element of the cost of artificial ice might be materially reduced; yet even then there are grave reasons for doubting the ability of existing machinery to compete in cheapness with nature, especially when we take into account the liberal ground space required in the manufacture of ice on a large scale, and the high rental charged for such space and for wharf privi- leges in this city. The question is not merely whether ice could be made here so as to sell at a profit at the present market rate, but whether the same investment would not bring a larger quantity of natural ice from northern New York or from Maine, where the crop is always abundant and sure. And the same comparison must be borne in mind with regard to seasons less favorable to artificial ice, and they are the great majority, when the Hudson yields its usual supply and the market price is correspondingly low. The ice trade of the north, however, is an enormous one; and, though our ice-makers are unable as yet to wrest it from the harvesters of the natural crop, it is well worth working for. The production of ice-making machinery is still in its infancy; and so long as it is theoretically possible to make ice for less than a dollar a ton in or near our great cities, just so long inventors will have in this a promising field to work in.

The obvious advantage of an ice manufactory near the market place, in saving the expense and loss incident to winter storage, transportation, and repeated handling, makes it possible for artificial ice to compete successfully with winter ice, even when the first cost is several times that