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THE STATE OF MANUFACTURING.

Visits during the first half of May to the manufacturing towns in four counties of Connecticut show a condition of business activity much more favorable than the general reports in the newspapers, taken from all parts of the country, would seem to justify. Perhaps much of this difference is to be attributed to the varied character of the industries in those portions of the one State visited. Machine tools, guns, sewing machines, machine screws, bicycles, small tools, builders' hardware, bench hardware, nuts and bolts, screw taps and dies, butt hinges, pumps, drop and lever presses, steam, water, and gas fittings, and many other branches of productive work of which the general public are in continual need are in the usual demand. In no one department of productive industry is there evidence of a permanent falling off in demand, although there is a tendency to crowd down the prices. So, on the other hand, there is no unusual demand for the productions of any department. In some in- or to use the flux as a paste. Put it on as a powder, and stances the hours of labor have been temporarily shortened; plunge immediately into cold water. in others (two) the number of men has been curtailed. But is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT in the first instance a return to the original full time is shortly is issued weekly. Every number contains 16 octave pages, uniform in size, expected, and in the other the men were discbarged because with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, of a glut in the specialties they produced. One establishof a glut in the specialties they produced. One establishment that in early spring shortened its hours of labor is now working overtime in its most important departments.

Some annovance has been caused by the debates and de-· lays in Congress on the matter of a tariff on foreign produc tions as affecting home manufactures, and some of the manufacturers attribute the falling off of orders to the uncertainty which this state of Congressional business produced. But there is a better feeling than there was during the pending and threatening of the Morrison bill, and it seems possible that the old notion of a presidential election year prov-

PORCELAIN HEADED NAILS.

One of the familiar illustrations of the benefit of rapid machinery in producing articles of use combined with elegance. is in the manufacture of the ornamentally headed nails used for picture hanging and similar purposes. The heads of these nails are of porcelain or glass, held in a gilt brass setting, and the shanks are of iron wire. The heads are moulded from opaque porcelain or transparent glass, and located at 361 Broadway, cor. Franklin St. the settings are made from sheet brass in the dies of a press. A disk of brass is cut from a sheet, and a small hole made in its center. The disk is drawn down through the center of the die, forming a tube-like neck which is afterward tapped in a machine, thus forming a nut for the reception of the threaded head end of the wire shank.

> The press forms the setting into a cup shape for the glass or porcelain head, and this, when inserted, is held in position by having its edges turned in over the head by a press. The wire shank is pointed in a rotary press which draws the wire down to a point in dies or scores that form the pointed portion four sided. On two of these sides a film or sprew is left that is removed by a trimming press.

> The formation of the screw thread on the other end of the wire shank is somewhat interesting. The thread is not cut with dies-in fact, it is not cut at all. It is rolled up from the material of the shank, and the threaded portion becomes larger than the original wire. There is a fixed die in a press, the die having been milled on a slant to represent the V-threads of a certain pitch. 'The die is perfectly flat. and these scores are simply cuts of a V-form running diagonally across it. Another die exactly like the fixed one is attached to a reciprocating arm, so as to traverse across the fixed die. Between these dies the shank is passed under pressure, and the result is a perfect thread at the rate of at least one hundred gross per day, the only attendant being a

SOFTENING AND HARDENING CAST IRON.

Questions have lately been asked as to the possibility of altering the texture or changing the qualities of cast iron by heating and chilling. In the respect of resistance to the superficial changes which are induced on steel by heating and sudden chillings, cast iron stands alone. It is amenable to the gradual influences of heat, but it will not contract nor from heat to cold. And yet hard cast iron may be annealed, strength. 7017 as it is done daily by tons, the heat being supplemented by as is seen at the base of the blacksmith's anvil. It can be or dried negative. The action of the intensifier takes place annealed also, if the articles are small enough, by being in a few seconds, and the intensification is completed in two heated in a bituminous coal fire, and then buried until cool or three minutes. in a bed of the coal siftings. This sort of annealing is enin these cases only clean charcoal is to be used, any taint of bituminous coal is what is required. Some of the most inwhen packed with bone, lime, and charcoal, softened to usable condition by one heating in bituminous coal.

As to hardening of cast iron there is no ordinary process, water. that is generally convenient, except that of casehardening. In this the cast iron article should be polished as well as finished—the surface being made as homogeneous as can be -so that the flux of casehardening be given as large a surface for action as possible; for the composition of cast iron holy water font and a poor box.

is a honeycomb instead of a solid; and it is not even a series of layers of fibers, as is wrought iron, or of a network of fibers, as is cast steel, but it is a mass of material of which pure iron itself is not always the largest part. Recent improvements, however, have given the pure metal a preponderance over the foreign palpable matter and the air spaces. But this constitution is not common.

Even heating is necessary to caseharden cast iron; and yet the heat must be less than that allowed for wroughtiron and low steel, for at much less than the white heat for wrought iron or the "high heat" for carbonized steel, the cast iron would disintegrate. The cast iron should be heated to a soft red heat and then sprinkled with powdered prussiate of potash and sal ammoniac in proportions of two of prussiate and one of sal ammoniac, and then immediately plunged into a cold water bath. It will not do, in the matter of casehardening cast iron, to return the iron to the fire,

The Petroleum Industry.

From recent statistics it appears that there are 20,000 producing oil wells in Pennsylvania, yielding at present 60,000 barrels of oil a day. It requires 5,000 miles of pipe line and 1,600 iron tanks, of an average capacity of 25,000 barrels each, to transport and store the oil and surplus stocks. There are now nearly 38,000,000 barrels of oil stored in the region in tanks. This oil would make a lake more than one mile square and ten feet deep. The money actually invested in petroleum production since 1860 is estimated to be more than \$425,000,000, of which \$200,000,000 was capital from New York city. Since 1880 more than \$12,000,000 has been used in building iron tanks, and nearly as much in pipe lines, all by one corporation. The tanks cost on an average \$8,000 each. A 35,000 barrel tank is 90 feet in diameter and 28 feet high; 100 tons of iron are used in constructing one. The annual loss from lightning by the use of iron tanks is very great, as they form an attractive path to earth for electricity.

The speculative transactions in petroleum represent more than \$400,000,000 annually. The lowest price crude petroleum ever brought was 10 cents a barrel, in 1861. In 1859, when there was only one well in existence, Colonel Drake's Pioneer at Titusville, the price was \$24 a barrel. Besides the 5,000 miles of pipe line in use in the oil regions, there are in operation 1,200 miles of trunk pipe lines connecting the region with Cleveland, Pittsburg, Buffalo, and New York, and lines building to Philadelphia and Baltimore. In the line between Olean and New York 16,000 barrels of oil are transported daily. These lines are all the property of the Standard Oil Company, except one between Bradford and Williamsport, Pa. The Standard employs 100,000 men. The product of its refineries requires the making of 25,000 oak barrels of 40 gallons each, and 100,000 tin cans holding ever exported was in 1862. Charles Lockart, of Pittsburg, sent nearly 600,000 gallons to Europe in that year, and sold it for \$2,000 less than the cost of transportation. In 1883 nearly 400,000,000 gallons were exported, for which \$60,000,000 were returned to this country.

Simple Intensifier for Gelatine Negatives.

The mercury intensifier for gelatine plates, now largely used by photographers, has been somewhat improved by Mr. H. J. Newton quite recently.

The advantages claimed for it are its simplicity, speed, and in giving to the negative a good color. The intensifier, combining mercury, iodide of potassium, and hyposulphite of sodium, sometimes gives to a negative a yellow color, which makes it a slow printer. The solution will not keep well, but soon precipitates.

Mr. Newton's formula overcomes these objections. He first takes 10 grains of bichloride of mercury, pulverizes it in a mortar, and dissolves in 10 ounces of water. He next dissolves 190 grains of iodide of potassium in 3 ounces of water, and gradually pours the same into the mercury solution. A red precipitate occurs, but will be redissolved when the whole amount of iodide of potassium has been added.

The 13 ounces of concentrated solution thus formed is now diluted by the addition of 24 ounces of water. The inharden, like steel or wrought iron, under sudden changes tensifier will keep clear for a long time, and so retain its

To intensify, Mr. Newton pours a sufficient quantity of the pyrogenous oxide of iron, the hot oxidized scale, such the intensifier into a tray, and immerses in the same the dry

The plate is then washed and immersed for a few seconds tirely unlike that for hard wrought iron or obdurate steel, as in a very dilute solution of hyposulphite of sodium, again washed, and dried. Negatives in which there was very little sulphur being a source of injury. But in annealing hard detail in the shadows have been very easily brought up to cast iron the softening qualities of the sulphur contained in good printing density with this intensifier. It is essential that the hyposulphite of soda shall be eliminated from the tractable specimens of cast iron, no larger in diameter than plate before intensification. To avoid an extended washing a pipe stem, that refused to yield in a genial charcoal fire for that purpose, Mr. Newton quickly dissolves out the hypo from the film by pouring over the latter, after fixing, a solusion of 5 to 10 grains of nitrate of lead to the ounce of

> Its action is easily observed by the formation on the film of a milky precipitate, which may be easily washed off.

> Among the recent patents is one for the combination of a