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FINISHING BY PRESSURE.

Under this heading a paragraph appeared in the SCIENTIFIC AMERICAN of March 29, 1884, stating that drop forged articles of Norway iron had yielded to a permanent compression of one four-hundredth of an inch under a pressure of 800 tons. The result of this compression is to change the character of the material to a considerable depth, compacting its fibers so that the surface is almost a perfect one, requiring but a slight amount of polishing to bring out its clean, bright characteristics.

More noticeable results have been obtained on articles of malleable cast iron, the honeycombed, loose fiber of the reheated casting being forced in on itself, so as to greatly change its character. Under a pressure of 500 tons the malleable iron yields almost one-sixteenth of an inch, and becomes almost as solid as steel. Wrenches for agricultural implements, and for ordinary farm, stable, and home use, cast and made malleable by heating in boxes packed with pyrogenous oxide of iron, come out so soft and yielding in texture that they are almost like pewter. But put under this pressure they come to a rigidity that is surprising, resembling that of tempered steel.

A press for this work has recently been built which produces the pressure by the well known toggle joint or knuckle joint. The machine weighs seven tons; the head under which the pressure is given is re-enforced from the base by two five inch steel bolts; the dies are adjusted by screws moving an inclined plate or wedge that provides a solid bearing at all times and at every stage of adjustment. The throw of the die is one and a half inches, and is produced by the toggle joint driven by a lever from an eccentric, the shaft of which carries a gear wheel that is driven by a pinion which is to the wheel as one to six. The lever from the eccentric does not engage with the toggle joint at its center, but by a connecting bar above the center, thus giving greater leverage than by the ordinary method.

THE BARFF PROCESS FOR PRESERVING IRON.

The process known by the above name, of coating finished iron and steel with a permanent oxide, is being practiced in Hartford, Conn., with very gratifying results.

The method of producing the oxidized surface is quite simple. The articles to be treated are first highly finished and polished, cleansed from oil, and placed in a muffle, or oven, of boiler iron and heated to a red heat. Into the oven is projected the end of a steam pipe with rose nozzle or minute spray holes. This pipe lies in the furnace or in an adjacent oven in a coil, and is kept red hot and fed with boiler steam. This superheated steam is turned on to the red hot articles, and after an exposure of an hour a perceptible change has taken the place of the bright polish. Three hours produces a change similar in its penetration to the analogous casehardening of iron. There is not the slightest roughening of the surface; the first finish is all there, but the bright polish has given place to a dull, slaty smoothness, and this pleasant tint will remain in storm and sun, under steam and ice. But beyond this it is a beautiful finish; it would be elegant for the apron of a lathe or the cross head of a planer.

The articles thus coated resist acids and all the changes of temperature from steam at high boiler pressure—80 to 100 pounds to the inch—to freezing, and they resist all changes by weather exposure. The oxidized surface is as smooth as the original surface, however highly polished, but it is of a slaty black color, without any glisten. No prolonged tests have been made as to its permanence when worked metal to metal; but from other tests it is believed the wear will be inconsiderable when so tested. It is noticed that with cast iron this method of oxidizing appears to slightly permanently expand the article treated, and yet the oxide does not appear to be a superficial coating, but a chemical change of the surface of the iron, the expansion being probably due to the degree of heat employed.

PORTABLE MACHINE TOOLS.

Portable machine tools are growing in favor in shops where heavy machinery is built. The Stow flexible shaft is a familiar illustration of the use of a rotary power at changing distances and changing angles from the driver, and the suspended weight and wire rope arrangement for producing rotary motion away from the driving shaft is also well known. But for heavy work, as driving a large boring bar, hand and ratchet labor has been used for years. Yet it is quite possible to do such work by power whatever the position or the distance, within reasonable limits, of the work from the driving shaft.

The boring bar is fitted with two or more gears of different numbers of teeth, which are driven—one at a time, according to the speed desired—by a pinion on a shaft that carries a pulley. A simple clutch engages the pinion with either one of the gears, the pinion and pulley shaft being moved by a lever through a curved slot in the frame to suit the differing diameters of the driven gears. The frame containing this shaft with pulley and pinion is attached to the work by means of a clamp just as in the using of a ratchet drill or a Scotch drill. In this there is nothing novel, but the novelty of the device consists in the attachment of the counter shaft to the ceiling. This shaft is driven by a round belt received on a scored pulley from any flat faced pulley on the main or on a counter shaft, and, by means of idler wheels on an angled arm, may be run in any direction. The entire counter and fixtures is held in place by a central bolt on which it swings, the bolt having a gimlet

thread, like that of a coach screw, and being secured into the flooring timber overhead or into a flooring plank. This central screw permits the plank holding the counter to be swung in any direction, and when it is properly placed it is held by two similar screws at each end. A weighted idler may be used if required, when the distance between main and counter shafts is very great.

An excellent hand feed for a boring bar may be made by having a sliding collar on the boring bar, threaded a portion of its length on the outside, to receive a nut. The collar is held at any point on the bar by one or two set screws, and the periphery of the nut is either drilled with holes for the reception of a holding pin, or is furnished with fixed handles. The outer faces of nut and collar are trued off in the lathe and both of them are cylindrical. The traverse of the nut on the threaded collar may be any distance desired—from one to three inches perhaps is a useful limit—and to feed the bar forward as it bores, the nut should have a bearing against some temporary obstruction, as a piece of scantling or timber, a washer intervening between the face of the nut and the timber. The boring bar, the collar secured to it, and the nut all rotate together until the nut is held by the pin or a handle a portion of a revolution to force it forward. The collar may be moved and reset to place at will.

POISONOUS COFFEE.

Most people think if they buy coffee in the berry, roast and grind it at home, they are sure of having obtained a healthy article—the Simon pure Java. But it may be they have been both deceived and poisoned. In Brooklyn the health inspectors recently found several well known coffee dealers who were in the habit of doctoring cheap Central American coffee so as to make it resemble and sell for the true Java. This was accomplished by polishing the coffee berries in rotating cylinders, with the addition of such stuffs as chromate of lead, Silesian blue, yellow ochre, Venetian red, drop black, burnt umber, charcoal, soapstone, chalk, and Prussian blue. Some of these substances contain lead, copper, and arsenic, and when the doctored coffee was subjected to chemical test these metals were found in poisonous quantities. The Health Board promptly ordered the discontinuance of this mode of coffee adulteration, and the enterprising dealers will now have to move across the river into New Jersey or some other State where their nefarious traffic may be conducted without interference of the authorities.

The Successes and Tragical End of a Genius.

The career of M. Volkmar, the banker and speculator of Paris, who committed suicide in that city on July 22, was in many respects a remarkable one. A gentleman of New York who was connected with the Faure Electric Storage Company, in speaking of the late financier, said to a *Telegram* reporter to-day, July 24: "It is true that Volkmar began as a workman in M. Faure's electrical factory in Paris. While there he studied the Faure patent for the storing of electricity, which was a leaden plate immersed in a chemical bath, and he conceived the idea of manufacturing the accumulator on his own account. Leaving M. Faure's employment he went to England, where in 1883 he endeavored to get a patent for a so-called improvement of the Faure apparatus, his improvement consisting merely of a perforated plate instead of a solid one. The British Patent Office, however, refused to grant letters patent on so small an improvement, and, besides, there was doubt as to whether the additional surface gained by the perforation was a new idea. Notwithstanding his failure to obtain a patent, he formed a partnership with Mr. Sellon in the same year, and they began manufacturing the Volkmar-Sellon improved plate. They did well, and I imagine that Volkmar took out of the enterprise \$500,000. Then his partners, disliking his methods of business, offered him a small sum to withdraw from the firm or threatened to force him out. He took the small sum and went to Paris.

The possession of so much money troubled him, so he consulted with M. Philpart, the most famous speculator who has appeared in Europe since George Law's day. Philpart gave him some points, and he speculated on the Paris Bourse. On the whole he was fortunate in this venture, and soon acquired a reputation for great strategic powers. Volkmar was active until his death, but lately he suffered so many severe losses that he became despondent. Volkmar's methods were peculiar, and his reputation for cunning caused him to be viewed with suspicion. He never failed to get into difficulties with all his confreres, except Philpart, with whom he did not dare to trifle. His is a remarkable life. Beginning without trade or profession, then becoming an electrician, appropriating his employer's ideas and making a vast fortune on them in a foreign country. A speculator, first successful and then a loser, and finally dying by his own hand. His system of storage is in general use even now in England and the United States."

[The body of Volkmar, formerly a resident of this city, was found in the Seine on the 22d ult., with a bullet through his head and his pockets rifled. He is supposed to have been murdered, as his own pistol was found in his house. The affair created a great sensation in the French capital. He visited New York in 1881.]

SOME recent trials show that very thin blades, as flat springs and cutlery blades, can be effectively hardened and tempered by heating them and thrusting them into a mass of mineral wax—crude paraffine. The needles of sewing machines and small drills have also been so treated successfully