Nevertheless, he commenced work in his master's celebrated shop at ten shillings a week, and worked his way up from the bottom to the top of the ladder in his own walk of art. This ingenious man may be said to have been called forth by Brunel's gigantic design for the Great Eastern steamship. It was originally proposed to propel this vessel by the paddle, but the shaft for this purpose would have been so large that no forging tools then in existence would have been able to turn it out. Brunel accordingly appealed for help to Nasmyth, who responded by sending a drawing, by return post, of his famous steam-hammer. It was, nevertheless, determined to substitute the screw for the paddle, and the drawing was forgotten. Some years afterwards, however, Nasmyth was visiting a celebrated iron foundery in France, and, noticing a piece of forged work that he knew could not have been accomplished by the ordinary means, was curious enough to inquire how it had been produced. The answer was, "Why, with your steam-hammer, to be sure." The Frenchman had been shown the drawing, and rightly estimating its value, he had one made. Large designs call forth large tools, and large tools, in their turn, call forth large designs. Had it not been for Nasmyth's hammer, there would have been no such things as iron-clads, neither would there have been any of the monster cannon built upon the coil system, as they are at present. The steam-hammer enables us to undertake Cyclopean tasks, which we should never have dreamed of otherwise.

The last and best known machinist of the goodly band that issued from the establishment of Messrs. Maudslay & Field is Joseph Whitworth. This celebrated iron worker improved upon Clements planing machine, in his Jim Crow planer. This machine works with a cutter, which reverses itself, cutting backward and forward without losing any time. It was at work, it will be remembered, in the Industrial exhibition of 1862. Whitworth is, perhaps, best known by his rifle gun, the rifling of which is the very perfection of art. Accuracy of work, learned by him from the traditions of the shop in which he was taught, led Whitworth to contrive various machines for the furtherance of that object. He has invented one machine which detects variations of a millionth of an inch. It is very likely that this contrivance will be but rarely used, but the influence of the practice of its inventor must have immense effect upon the trade, and help to keep up a standard of excellence which less known men, if they would succeed, will have to attain. The use of machinery has now become so general, that the perfection of workmanship is almost a necessity. Such contrivances as those we have drawn attention to, would have been beyond the reach of the simple hammer and file of our forefathers; and if the world were reduced once more to the hand of the craftsman for the production of its machinery, all its great operations would gradually be brought to a standstill. Yet it is but little more than half a century since the hand was all we had to depend upon in the world of mechanics. If the reader wishes to measure the difference between the old work and the machine work of the present day, he has only to look down the hold of any small steamer at one of Penn's marine engines, or to behold the splendid specimen on board the *Warrior* iron-clad. This engine was designed, also, by the Messrs. Penn; and the perfection of its workmanship may be estimated by the fact, that, when its five thousand pieces were assembled together for the first time, such was the mathematical accuracy of their fit, that as soon as steam was got up, it began to move with the utmost smoothness. Let the reader, we say, compare this splendid piece of work with the old Newcomen engine in the South Kensington Museum, and he will at once see the ages of mechanical genius we have traversed since Watt took the latter in hand, and by patient thought built up out of it the present steam engine. Yet it is not more than a century ago that the machine represented the most powerful motive engine we possessed, and was as fair a specimen of work as the eighteenth century could turn out. Such are the differences that have been brought about by half a dozen able men carrying out the traditions handed down by Henry Maudslay,—mere workshop traditions, which now are acted upon throughout Europe wherever the machinist's skill is known.—*Cassell's Magazine.*

SCARCITY OF PAPER MATERIAL.

The scarcity of paper stock, felt almost immediately after the inauguration of the late war, is not singular. In Bishop's "History of American Manufactures," we learn that in 1748 a similar scarcity existed in the Massachusett's Colony. Thomas Fleet, who (copying his public notice) was "Printer at the Heart and Crown, in Cornhill, Boston," advertises thus:

CHOICE PENNSYLVANIA TOBACCO PAPER TO be sold by the Publisher of this Paper (the *Boston Evening Post*), at the Heart and Crown; where may also be had the Bulls or Indulgences of the present Pope Urban VIII., either by the single Bull, Quire, or Ream, at a much cheaper rate than they can be purchased of the French or Spanish Priests.

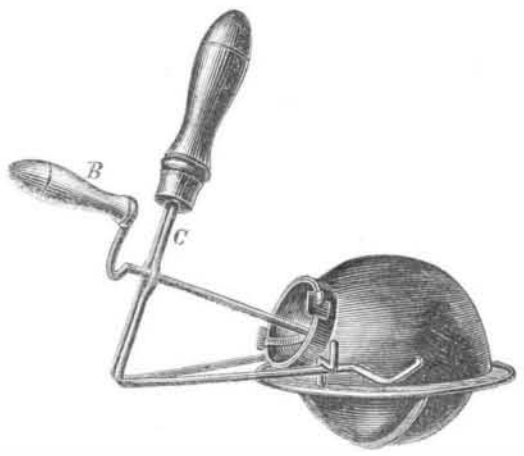
This selling of Papal indulgences and bulls, in Puritan New England, seems odd, but the facts of history account for it. Several bales of the indulgences, printed on one face or page of a small sheet of very good paper, had been taken in a Spanish ship captured by an English cruiser during the war with France and Spain in 1748, of which Mr. Fleet purchased a large quantity. He made use of them for printing ballads, the back of each copy of the bull being large enough for two songs, as "Black-Eyed Susan," etc. "To what base uses do we come at last."

In cutting some timber in Omaha, a few days since, a bullet was found imbedded in the trunk of a rock elm. The grains which had overgrown it show that it must have been deposited there sixty-two years ago, a time when the country had not yet been visited by any white men, except the explorers Lewis and Clarke.

SIMPLE DEVICE FOR ROASTING COFFEE.

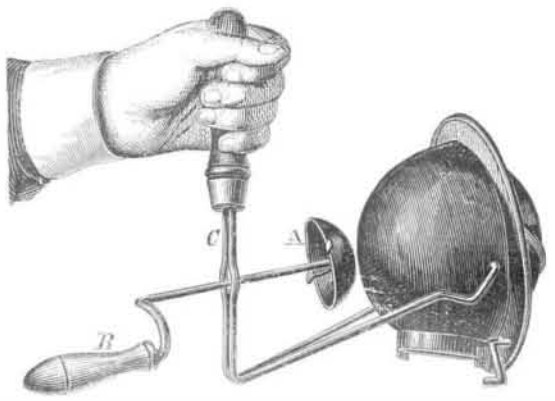
The adulterations perpetrated in the preparation of coffee ready ground for the use of the family have greatly stimulated the sale and use of household devices for the preparation of the berry. One of the best coffee roasters we have seen is that illustrated in the accompanying engravings. It is a hol-

Fig. 1



low globe of cast iron with a circular opening for the reception of the berries, closed by a convex or cup-shaped cover, A, attached to the handle, B, and furnished with lugs engaging with ears on the globe, by which the globe is revolved over the fire. This globe or receptacle turns in a hemispherical cap that is furnished with a flange fitting over the opening in the stove or range. A forked lever, C, the arms of which project on each side of the globe and act as springs, engages with catches fixed on the circular flange to hold the globe in place while being used. A simple movement of the levers, B and C, disengages the cover and reverses the globe, thus discharg-

Fig. 2

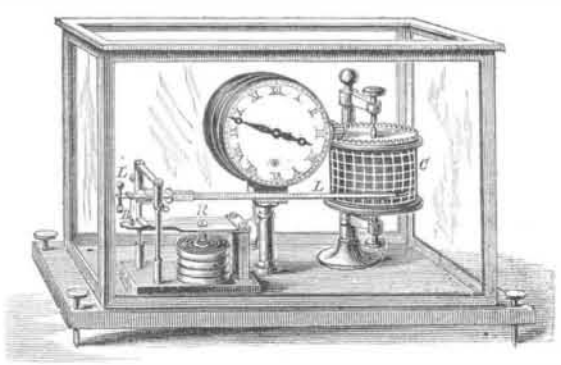


ing its contents. The action of the hand on the lever, C, removes the cover, disengages the catches, and reverses the position of the globe. While in operation, the catches of the lever, C, hold the globe in position for operation.

This improvement was patented by Fred Max Bode, through the Scientific American Patent Agency, July 28, 1868, and assigned to C. G. Mueller, No. 12 Theater Platz, Hanover, Prussia, to whom all communications should be addressed.

A NEW REGISTERING BAROMETER.

THE following is a description with an engraving of the Barometrograph, recently invented in France. We do not believe it to be as delicate as the Self-regestering and Printing Barometer invented by Prof. Hough Astronomer in Charge at



the Albany Observatory, but it seems to be less complicated and expensive.

It is usual in taking barometrical and thermometrical observations for the purpose of registration, as regards changes of weather and for foretelling weather, to take them at stated and regular intervals, so that the variations at those periods may be noted and, if required, plotted out on a chart. Indeed for obtaining quick and useful comparisons, there is nothing compared to the plan of projecting the curves of atmospheric variation on the charts specially prepared for that purpose; it enables one at a glance to see the variations of the barometer during the past day—saving the bother and calculation necessary where the observations are simply noted down as so many figures. But there is one great objection attendant upon observations of this nature; however carefully they may be recorded or described on charts, they are but observations of the time only, and show nothing more. For instance, the hight of the barometer at the two usual times of observing, in the morning and evening, are recorded, and a line drawn on the chart from the one point to the other is assumed to show the variation between those times. True, it does to some extent, but only to the extent of the difference of the two. In stormy or unsettled weather the rise and fall of the barometer may be considerable between the two periods of observation, and yet it is possible that at the two periods the observed indication will be precisely the same. The chart would consequently show an even state of pressure, whereas the opposite would be really the case. Accurate results can, therefore, only be obtained when the observations are made hourly, or, at least, at very frequent intervals. This is, as far as regards personal observation, quite impracticable for the generality of observers; and to give a true and faithful record of the variations of the barometer from minute to minute and from hour to hour we can only look to mechanical means for bringing about this much-desired result.

Among the plans suggested but very few have been ever practically carried out, and of those we have seen their great expense proves an almost insurmountable barrier to their adoption. The "barometrograph" depicted in the accompanying illustration, seems to combine simplicity with cheapness, and accuracy with ease of observation. The records are continuous and comparable, and are produced by the variations of the barometer known as the aneroid. The pressure of the atmosphere affects four metallic boxes, as in the ordinary aneroid, having their upper and under faces undulated; a vacuum is made in each of them separately, and they are attached together in one series, so that for an equivalent variation of pressure the movement is four times greater than it is for one box only. A very strong flat steel spring, R, acts upon the barometric boxes in an opposite direction to the atmospheric pressure. This spring controls the indicating lever, L L, by means of a connecting piece at the point B; this connector receives the action from the extremity of the spring and communicates it to the lever, L L, at a point very close to its axis, from whence it follows that a considerable multiplication of movements is the result.

The indications of the movements of the lever are registered in the following simple manner: A cylinder, C, is revolved by the regular movement of an ordinary pendulum time piece; it makes a complete revolution in one week, and carries a glazed paper, which has been smoked black by means of a candle. At the extremity of the lever is a very fine spring pointed at the end, which rests upon the cylinder and traces a white line upon the black ground. At the end of each week the paper is changed for a fresh one, the old one being prevented from having its record destroyed by having a coat of varnish. The whole operation takes but a little time, including the attachment in a book, or, when required, the record of one week to that of the preceeding, so that the indications might be continuous. The barometrical arrangement of this instrument is far less liable to error than the ordinary aneroid, where so many movements and acessories are required to translate the changes of the barometric box to the indicating needle on the face of the instrument. In order to render the indication recorded useful for comparison, the paper can be divided into equal parts, representing the days of the week, and again subdivided to represent the principal divisions of the day; this has been done in practice, and instruments similar to what we have just described have been in use some time, earning great approbation for the fidelity and utility of the observations recorded by them.

Reducing Tin for Coating Metals.

THE *Mechanics' Magazine* contains a description of a new method for coating metals with tin which has been recently patented in England. This invention relates to the application of the electro-plastic process for the reduction of pure tin in a metallic state of all thicknesses, so as to render it cohesive, ductile, and of such density that it may be stamped up, drawn, and rolled, and may also be deposited in molds in the same manner as copper by the galvano-plastic process, or on metals, especially lead and its alloys, for coating or plating the same. This reduction is effected whatever may be the nature of the hot or cold alkaline or acid baths used, provided that the salts, oxides, or acids of the tin employed are chemically well prepared, which is an essential condition. The tin reduced by the electro-plastic process, according to this invention, is rendered sufficiently ductile, malleable and cohesive to assume any form by chasing, embossing or engine-turning without cracking, which is the case when tin used as a plating on lead in thin sheets in ordinary use is stamped up in a similar way.

The tin produced in the manner herein described, may also be applied, first, for forming a relief surface on a plain ground for capsules, covers, and other articles for the purpose of obtaining greater firmness and a more elegant appearance. The relief surface is obtained by stamping or embossing, in the ordinary way, with a male and female die, or when the metal is sufficiently ductile only one die is needed, which would produce an impression or embossed surface in a similar manner to that made by a seal on wax; second, for reproducing figures and ornamentation, such as objects of art, or others, by embossing or stamping in imitation of metal castings by the aid of a die or dies, in the manner above described. Many attempts have been made to produce in metal trade and other distinguishing marks on the corks or stoppers of bottles and other vessels, or on other articles, either by embossing, coloring, or printing, in imitation of those produced in wax or metal capable of receiving an impression. The result has been, however, to produce an inferior impression, the design being obtained on a plain surface, and bearing but an imperfect resemblance to a wax seal.

In order to obtain a mark of a perfect nature, the inventor