chapter in the history of invention. In 1901, Mr. Acheson discovered first, that the clay which was used as a binding material for these crucibles the American manufacturers found it necessary to import from Germany, for the reason that the German clay was more plastic than the American. And he found next that a chemical analysis failed to account for the difference. Now, these German clays are what are called secondary clays—clays that have been transported from one place to another by the forces of nature, and they owe this property of plasticity apparently to this transference. Why? "Well," said Mr. Acheson, "possibly the increased plasticity is due to the solution of vegetable matter through which the clays are dragged." And so he ground his clay in an extract of straw! The result of this daring inference and consequent experiment was astonishing; the clay assumed a condition of fine division, it remained suspended in the water, and it was *plastic*. As Mr. Acheson was acquainted with the interesting record of how the Egyptians compelled the "children of Israel" to forego straw in the making of bricks, and as he believed that the benefits of the straw were due not to the fibres, but to the water extract, he called his clay so treated "Egyptianised clay," and so it took its place in the market. It turned out subsequently that the active principle in this extract of straw was tannin. Now, in 1906 he discovered a process of producing a fine, pure, unctuous graphite, which he was desirous of using in oil as a superior lubricant. But he found that the graphite so suspended in oil quickly settled out of it, and that it was only by grinding his graphite in water containing a little of this same tannin that it would remain in a homogeneous mixture. So treated, however, the graphite assumes a state of division so fine that its particles may almost be called molecular, and its suspension either in oil or in water is almost indefinite in duration. Deflocculated graphite, as this tannin-treated substance is called, has a wholly remarkable value as a lubricant, whether mixed with oil or with water. Through tests carefully carried out its remarkable power in that respect has been illustrated. Even when mixed with water to the extent of only 0.2 per cent., it has a good lubricating value, and with, also, the curious consequent effect that the water in which it lies does not rust the iron of the bearing.

"Monox" is produced by stealing the oxygen away from silica by heating it in the form of glass-maker's sand in contact with coke in an electric furnace. Under these circumstances the "silicon monoxide" flies out from the veritable volcanolike effect of the furnace reaction in the form of a voluminous brown smoke—so voluminous that when simply shovelled into a box it weighs only about two and a half pounds per cubic foot. So formed, it constitutes an extremely fine, silky-feeling, light-brown, opaque powder, whose properties bid fair to make it a new industrial agent. Thus it becomes powerfully negatively electrostatically charged on the slightest provocation, and because of this it becomes possible to collect it upon a fabric in such a fashion that while it will permit a gas to pass through the fabric unimpeded, it will definitely stop all fine particles, from tobacco smoke to germs. As a screen for sterilising air it seems, therefore, to have a broad field of application.

There exists in Germany a wide area of peat bogs that heretofore have been of little use; this for the reason that the amount of fuel required to evaporate the water in the peat is almost as large as the amount of dry peat obtained. But the discovery of the new process of electric osmosis, as it is called, suddenly raises the value of these great peat-fields to a high potential. To obtain the dry peat it is only necessary to convey the peaty water to a metallic caldron connected with one pole of a dynamo and to insert into the mater a metallic rod connected with the other terminal. Under these circumstances, the particles of peat rapidly migrate to the central rod, where they form a hard, caked mass which may be lifted out practically dry—and all this with the expenditure of an insignificant amount of energy. Recent patents by the aggressive experimenting industrial firms of Germany, such as Meister, Lucius, and Bruning of Hochst, foreshadow a wide general application of this entirely interesting phenomenon.

Ever since the dawn of the age of iron, men have desired to weld one metal with another—to weld, for example, iron and copper for the making of weapons and for the use of husbandry and building. Unable to accomplish this directly, they had to resort to the art of brazing, by which copper and iron might be joined together through a hard solder composed of brass and zinc. But such a joint was always imperfect, and sooner or later gave way to a severe stress According to Professor Simpson, of London, in order to weld a bar of iron to a sheet of copper it is only necessary to wrap the uncleaned copper closely about the bar, to bury the bar so wrapped in a crucible containing finely-ground retort-carbon containing a little sugar water to make it binding, and finally to heat the crucible in a furnace for half an hour to a temperature somewhere between the melting point of copper and iron. The result of this simple operation is a weld of extraordinary perfection and tenacity, tougher than either of the metals that constitute it.

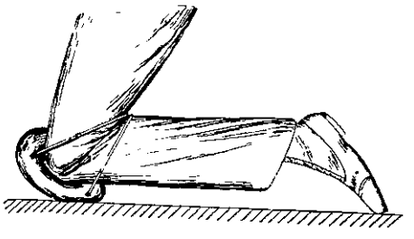
Most prominent among the oxidising patents are those concerned with the making of the peculiarly active modification of oxygen known as ozone. Since ozone when it has accomplished its work reverts to pure oxygen, it constitutes, if it could be prepared cheaply, the ideal oxidizer. It is formed from the oxygen of the air under the influence of an electric discharge, and it is in the arrangement of the circumstances under which this discharge takes place that the patent specifications are chiefly concerned. One man would pass his oxygen through hollow electrodes with fine openings into the ozonising chamber; another would employ an electrode consisting of sets of needles; and still another would discard electricity for ultraviolet light At present almost the only industrial uses for ozone are the production of vanillin from oil of cloves, as it is practised at Niagara Falls, and for the large-scale purification of water. But with the extraordinary activity of invention in this field we may easily forsee a rapid extension of the use of ozone in industry.

As for reducing agents, the new powerful sodium hydrosulphite, which, as the result of many years' work, is now appearing from the great German "Badische" firm, will percolate through numerous processes.

Altogether, outside of the significance which is integral to the subject-matter of each patent, there is the wide-sweeping significance of the application of pure science to industrial ends, and, therethrough, the entrance of efficiency into factory practice. That the one follows upon the heels of the other is best exemplified by reference to Germany. Fully three-quarters of all the patents of real chemical interest are German in origin, and it is of course in Germany that we find efficiency in factory practice the *sine qua non* to its operation. The manufacturer who does not realise in a practical way that he can no longer rely for success upon trade combinations, upon cheap raw material, upon an ultra-protective tariff, upon negligent government supervision, and so on and so on but that henceforward essentially he must stand or fall by the degree of efficiency he has obtained in his factory will bitterly rue his ignorance and his negligence

The "Gresham" Knee-Pad.

Why should not the people who have the misfortune to be obliged to scrub floors be as comfortable as those who have the happy privilege of being able to pay other people for doing the work? Some question of the sort appears to have induced Mr. Gresham to study the problem of finding relief from all the pains and aches incidental to one of the most irksome of the domestic duties.



GRESHAM KNEE-PAD.

He has invented a knee-pad which is calculated to draw blessings from all slaves of the scrubbing pail. The illustration speaks for itself, proclaiming the ease and comfort to which the domestic drudge is too often a stranger. The invention is not yet on the market, the patent rights being in the hands of Hector McLeod and Co., of King's Chambers, Willis street, Wellington, for sale.

The Rogotire Company.

The secretary of this company has received word by cable from the company's representative in America that United States patent rights have just been disposed of for 50,000 dollars. The object of the invention is to prevent the leakage incidental to the puncture of pneumatic tyres.

The Portable "Sun" Typewriter.

The Portland "Sun" Typewriter described in our issue of last month among the incidentals of the Office Appliances Company's show room is a portable machine.