## GUN COTTON.

As a specimen of the articles in the "New American Cyclopædia," we publish the following extracts from the one on gun cotton:—

"Gun cotton, an explosive preparation produced by the action of dilute nitric acid and sulphuric acid upon cotton, brought to public notice in 1846, by Professor Schonbein, of Basel, Switzerland. Different methods are given of preparing gun cotton. That proposed by Thomas Taylor, of London, in 1846, is recommended as one of the most convenient, though it is best to adopt the exact strength and proportions of the acids as since given by Edward Hadow, and presented below. Mr. Taylor's process is to mix into any convenient glass vessel 1½ ounce, by measure, of nitric acid (sp. gr. 1.45 to 1.50) with an equal quantity of sulphuric acid (sp. gr. 1.80), and, when the mixture has cooled, place 100 grains of fine cotton wool in a Wedgwood mortar, pour the acid over it, and, with a glass rod, imbue the cotton as quickly as possible with the acid; as soon as the cotton is completely saturated, pour off the acid, and, with the aid of a pestle, quickly squeeze out as much of the acid as possible; throw the mass into a basin of water and thoroughly wash it, either in successive portions of water or beneath a tap, until the cotton has not the slightest acid taste; finally, squeeze it with a linen cloth and dry it in a water bath. Mr. Hadow obtained the best results by mixing 89 parts, by weight, of nitric acid (sp. gr. 1.424) with 104 parts, by weight, of sulphuric acid (sp. gr. 1.833). The sulphuric acid has no direct action upon the fiber; its effect is to take up the water from the cotton, and prevent the nitric acid from dissolving the compound, which it does in part when employed alone. Professor Ellet steeped the cotton in a mixture of niter and sulphuric acid. The cotton is not altered in appearance by being subjected to this process, but it has gained about 75 per cent in weight, and acquired several new properties. It is harsh to the feel, and crepitates when pressed in the hand. It is electrically excited by drawing the fibers through the fingers. When freshly prepared with particular care, it is soluble in ether, and forms the adhesive liquid already described under 'Collodion.' If this solution be poured upon cold water, the ether evaporates and leaves an opaque film, which, taken off and dried, is an explosive paper. At the temperature of 370° Fah. (or lower, according to Dr. Marx), gun cotton explodes; but it produces so little heat that a wisp of it may be ignited in the open hand without injury, and if upon a heap of gunpowder it is carefully brought to the explosive temperature, it may flash off without firing the powder. When confined, it exerts in exploding a much greater power than gunpowder, but so instantaneously that it is not found applicable to the purposes served by the latter material. Guns are liable to be burst by it before the exit of the ball can give room to the expansive force of the gases produced; and, in blasting, the rock is not shaken by it at a distance from the charge. Its action is too much like that of the fulminates to admit of the useful applications at first anticipated. It is, like these, moreover, exceedingly dangerous to prepare and keep in any considerable quantity, and is open to the further objection of rapidly absorbing moisture from the atmosphere to the extent of nearly its own weight, which must be expelled by drying before the material can be employed. It also decomposes spontaneously when kept for some time. The products of its combustion are carbonic acid, water and nitrogen, and, when not very carefully prepared, nitrous acid also. This and the water are opposed to its use in fire-arms. Its freedom from smoke would strongly recommend its use in mines, but its cost, compared with that of gunpowder, and the other objections named, have caused it, after several trials in different countries, to be given-up."

## REMOVING SILVER FROM INJURED PLATED WARE

Among the many branches of manufacturing at Nuremberg in Germany, that of metals into various articles has attained considerable importance. They include silver-plated ware of different styles and quality, which necessarily produce large quantities of spoiled material and clippings, the recovery of which has hitherto been very imperfectly accomplished, thus causing annually a considerable loss. The reason of it was, the want of a method by which the silver might be removed without much expense, and the copper thus freed from its coating used again.

Repeated experiments have led to a very simple process by the action of concentrated nitric acid on silver and copper when present together. If these metals are placed into common commercial acid (sp. gr. 1.47) they will both be strongly acted on, but a separation of the two is unattainable, since the copper, so long as any remains undissolved, will precipitate the silver from its solution, by galvanic action. Nitric acid of the highest specific gravity (1.5), however, acts on the silver but not on the copper; it renders the copper more electro-negative than before, less oxydizable, and deprives it of the property of decomposing the acid, and precipitating the silver.

To produce this passive condition of copper, it is not absolutely necessary to employ directly acid of that specific gravity; for any concentrated nitric acid can be made to answer the purpose by the addition of a sufficient quantity of the oil of vitriol, which deprives it of a portion of its water, and thus contributes to make it stronger. A mixture of one volume of nitric acid (sp. gr. 2.47) and six of oil of vitriol does not dissolve copper at the temperature of boiling water, but with a smaller proporiton of sulphuric acid, evolution of nitrous oxyd takes place. The same end, and much cheaper, is obtained by employing a mixture of oil of vitriol and nitrate of soda, which are the materials used in practice. The following is the method now generally employed:—Oil of vitriol, together with 5 per cent of nitrate of soda, is heated in a cast-iron boiler, or better, a stoneware pan, to 212° Fah. The silver-plated clippings are placed in a sheet iron bucket or colander, which is fastened to a pulley that it may be moved about in the acid. As soon as the silver is removed, the colander is raised, allowed to drain, then immersed in cold water, and emptied to be again used in the same manner. When the acid bath is fresh, the de-silvering proceeds very rapidly, and even with heavy plated ware takes but a few minutes; with the gradual saturation of the bath more time is required, and it is readily perceived when the acid must be renewed. The small amount of acid solution adhering to the copper precipitates its silver when brought into the water. To obtain its complete removal, the clippings, when raised from the de-silvering bath, and before immersion in water, may be dipped into a second bath prepared in the same manner, which is afterwards to be used in place of the first.

The saturated bath, on cooling, congeals to a crystalline semi-fluid mass of sulphate of copper and of soda. The silver is removed by chloride of sodium, which is added in small portions at a time, while the solution is yet warm. The chloride of silver separates readily, and is washed and reduced in the usual manner. The acid solution contains but a very small portion of copper, hardly enough to pay for recovering.—*Drug. Circular.*

## AMERICAN CLOCKS AND WATCHES.

American clocks have long enjoyed a world-wide reputation, and American machine-made watches have now become "fixed facts." *When* the art of clockmaking was introduced into this country, we cannot tell, but certainly we know that David Rittenhouse, F. R. S. of Philadelphia, constructed one of the most ingenious astronomical clocks in the world; that it gained him a great name in Europe and at home, before the Revolution; and that it "ticked" time for many years in Princeton College, both before and after the struggle for Independence. It is also known that John Fitch, the earliest of steamboat inventors, was a clockmaker and worked at his trade in 1761; and yet we find the following, regarding the origin of American clocks, related in a cotemporary paper, and its authorship attributed to Mr. Camp, president of the New Haven Clock Company, as having been uttered in a speech at a supper given not long ago, to the employees in his establishment. He said:—

"Clockmaking was commenced about 1815, by Elias Terry, of Plymouth, who made wooden clocks, whittling out the wheels with a knife. The running was regulated by a heavy bag of sand, and was wound up by a ball at the other end of the cord. Terry used to make two clocks, swing them across his horse, and ride off in search of a market. Very soon he introduced the use of brass movements, using old kettles, because brass was scarce. When he undertook to make 200 clocks, people laughed at him; they thinking it would be impossible for him to sell them. In 1828, Hon. Chauncey Jerome commenced the business, and with progressive improvements the business now stands more perfected than any other in the country. In 1829 a wooden clock cost $11—now a much better one can be bought for $1.50. The business previously transacted by C. Jerome & Co., is now done by the New Haven Clock Co. In 1857 the company commenced making casings. Then it was thought wonderful that it turned out 75,000 clocks. In the year just ended, the company turned out 150,000 complete clocks and 170,000 finished movements."

The above statement about the origin of American clockmaking certainly requires correction. A very useful work on clock and watchmaking has just been published by J. Wiley, of this city; it is principally a translation from the French, with illustrations by M. L. Booth. From its appendix we learn that there are eight separate clock manufactories in Connecticut, which State seems to engross nearly the entire business. Although we have exported clocks to other countries for a number of years, we have (until very lately) imported all our watches from England, Switzerland and France; but there seems to be a fair prospect, now, of not only supplying ourselves, but of ultimately furnishing those articles (as we do clocks) to almost every nation. In 1850 A. L. Denison, an ingenious American watchmaker, associated himself with several others to manufacture watches in a systematic manner in a manufactory, with improved machinery for executing most of the works previously done by hand labor. This factory was first put up at Roxbury, Mass., but was finally moved to Waltham, where after a number of vicissitudes, it is now being successfully conducted. About 200 operatives are employed in it, and 12,000 watches are turned out annually. These vary from the simplest form of the lever movement to the adjusted chronometer balance. Their movements are of one uniform size, and are constructed after the English fashion. The English patent lever escapement is used, wisely modified after the Swiss method, by the omission of the main wheel fusee and chain; the power being communicated direct from the barrel to the train. The chief distinctive feature of this system is the duplication of every part of the watch by machinery. Steam power is employed, and four-fifths of the work is done by it, while in the establishments of Europe, only about one-fifth of the work is executed by machinery. These American watches have proved to be very good time-keepers, and are equal to the same class imported from abroad.

Patent Laws—Important to Inventors.—The Committee on Patents, in the Senate, have prepared a new patent bill, which we will endeavor to procure at the earliest opportunity for publication. At present we can only state that it provides for some very important changes, among the number of which is a clause compelling the attendance of witnesses in cases of interference before the Patent Office. Another section authorizes an Appeal Board of Examiners, and from their decision final appeals to the Commissioner himself. As we intend to review the prominent points of this bill at the proper time, we will add no more on the subject at present.