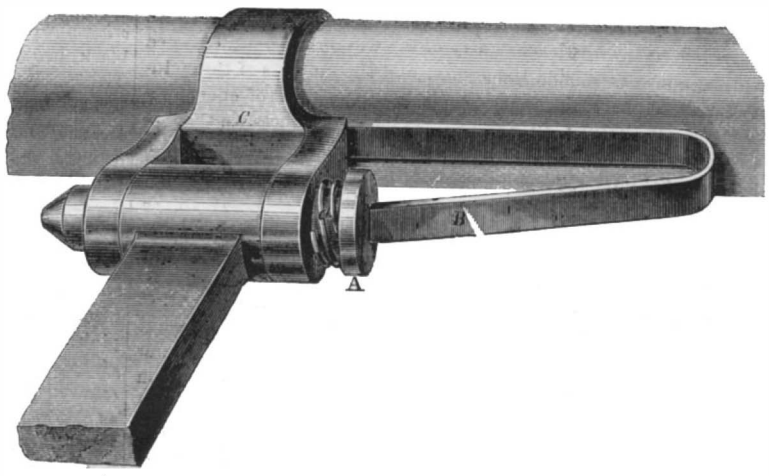
Anti-incrustation Composition.

The incrustation of boilers is a matter just now engaging much attention, and the usual result shows itself in a multiplication of special patents. Mr. Alexander Delrue, of Dunkirk, France, has taken out a patent for compositions to prevent and remove incrustations. The compositions are composed entirely of vegetable matters, and are prepared by dissolving or infusing in hot water the bark of the oak and pine, as well as the leaves of the sumach tree, ground and reduced to the state of a coarse powder; this decoction is concentrated to a density of about 10° Beaume, and to it is added a quantity (say from 15 to 30 per cent.) of cream of tartar (bitartrate of potassa) and spirit of turpentine. In employing this liquid to prevent incrustation, a quantity of it is introduced from time to time into the steam boilers. The quantity of the liquid required varies according to the capacity of the boiler, three pints of the liquid being generally sufficient for every thousand pints of water in the boiler, to prevent incrustation forming for about ten days.

Improved Carriage Shaft Fastening.

The annexed engraving is a representation of an improved method for connecting shafts of carriages to the axletree. It dispenses with the nut and screw, usually employed for that purpose, and provides for the speedy detachment of the shafts from any vehicle to which they may be affixed. The invention consists of the bolt, A, and the spring, B, secured firmly to the jaw, C. The end of this spring bears against the bolt, and keeps it in its place. There is also a small spiral spring, *a*, inserted between the head of the bolt and the jaw, which prevents that rattling of the parts so annoying to nervous persons and also to the horse. The bolt is removed by simply depressing the spring, B; it can then be withdrawn and the shaft or tongue of the carriage removed. The apparatus is at once simple and efficient. This invention was patented November 11, 1862, by Nathaniel Richardson, Byberry, XXIII. Ward, in the city of Philadelphia. Further information may be had by addressing Samuel Comly, at the same place, or Geo. De B. Keim, 162 North Third street, Philadelphia.



RICHARDSON'S PATENT SHAFT COUPLING.

HISTORY OF ANILINE COLORS.

The beautiful red, violet, lilac and other anlline colors which are now so common on silk and fine woolen fabrics are of but recent origin, and may be ranked among the highest achievements of organic chemistry. A peculiar scientific value is attached to them, on account of their strictly artificial character, they being manufactured chiefly from the products of coal tar. A very interesting little treatise has just been produced by Dr. F. R. Hoffman, 47 Fulton street, this city, on the origin and nature of aniline colors, forming a succinct history of their discovery and manufacture. Although we have already presented much information in the SCIENTIFIC AMERICAN respecting those beautiful colors, the following, which is condensed from Dr. Hoffman's treatise, will still be found instructive to our readers who are engaged in chemical pursuits:—

Until 1826 all the organic bases which had been discovered existed in nature, principally in parts of vegetables ready formed, and were not volatile, excepting when they were decomposed. In that year, however, Otto Unverdorben, of Berlin, Prussia, discovered a volatile liquid in the dry distillation of indigo, and this was the first artificial organic base. It was called "krystalline," from its property of forming salts readily with acids. This liquid artificial organic base was the very substance which was destined, thirty years after its discovery, to serve as the material for preparing aniline colors, and to become of such high importance in industrial chemistry. From 1830 to 1836 F. Runge, of Oranienburg, near Berlin, Prussia, was occupied in an investigation of the component parts of coal-gas tar, and he published the results of his researches in 1837. Among the constituents of tar he eliminated an oleaginous volatile base, which he called "kyanol," on account of its property of forming various colors, from red to a deep blue. In 1839, J. Fritzsche, of St. Petersburgh, Russia, discovered anthrallic acid, a product of the action of caustic potassa lye on indigo. By decomposing it at a high temperature, the product he obtained was carbonic acid and a colorless basic oil, which latter formed crystallizable salts with the acids, and which he termed "aniline," from the generic name of the species of plants furnishing indigo. The three bases thus discovered by these three chemists were held to be distinct and different until 1840, when Prof. O. L. Erdman, of Leipsic, proved them to be one and the same substance, for which he retained the name "aniline." In 1842, A. Zinin, of Dorpat, in treating nitrobenzole with an acid and alcohol, obtained a volatile base, which he called "benzidam," which was also found to be aniline. But this was an advancement in the line of manufacture, as it was made from a special derivative of coal tar. In 1845, A. W. Hoffman and J. S. Muspratt, of London, produced aniline by passing the vapor of salicylamin over red-hot quicklime; and from this time forward the study of the secondary products of aniline was continued by several chemists, foremost among whom was Prof. A. W. Hoffman. Through his researches and published essays aniline soon became one of the most closely-examined organic bases. These studies which were undertaken and continued through many years, merely for scientific purposes, led to a more practical application in 1856, by William H. Perkins, of London. None of the mentioned methods which had been employed to obtain aniline is at present used to furnish the material for aniline colors, hence the history of the practical part of aniline, as applicable to manufactures, commenced in 1856. Aniline is ready formed in coal tar, but it is generally prepared from benzole, which exists in greater quantities in coal oil; it is made by first converting the benzole into nitro-benzole with nitric acid, then it is reduced with the acetate of protoxide of iron, according to the mode first proposed in 1853 by A. Bechamp, of Paris.

Aniline is one of the organic derivitives of ammonia, and it may be viewed as an ammonia in which one equivalent of hydrogen is replaced by the compound radical, phenyl. It consists of 77.7 per cent. carbon, 7.5 per cent hydrogen, 14.8 per cent. nitrogen. The basic character of aniline is well developed. It combines with all acids, forming a series of salts which are the perfect analogues of the corresponding salts of ammonia. In general they are colorless, but assume colors varying from red to blue by exposure to the air. The aniline colors, red, blue and their mixtures, purple and violet, are neither salts of the alkaloid aniline, nor are they simple compounds of uniform composition. They take from aniline salts only their origin and name. Their formation has not yet been fully elucidated or brought to a scientific conclusion.

In 1856, while W. H. Perkins was treating the sulphate of aniline in Prof. Hoffman's laboratory, with the bicromate of potash, he obtained a dark resin, which was found to be soluble in alcohol and yielded a deep violet color. He prepared this resinous coloring matter, and in the same year introduced it first as a violet dye, and soon afterward as a blue dye, and he obtained the first patent in England for aniline coloring products on February 2, 1857, and one for France on April 8, 1858. Near the close of 1857, Prof. F. Crace Calvert and Charles Lowe, of Manchester, England, prepared aniline red colors for dyeing, but did not publish the process nor introduce the color for industrial purposes, because it was then too expensive. Prof. Calvert delivered a lecture on Feb. 18, 1858, before the London Society of Arts, in which he stated that he had prepared colors from the products of coal tar, that were applicable to calico printing. A complete and detailed method for the preparation of aniline red was first communicated by Prof. A. W. Hoffman, to the Royal Society, London, on June 17, 1858; and also in a memoir to the Academy of Sciences, in Paris. He used 3½ parts, by weight, of anhydrous aniline, and 1 part of bichloride of carbon, and submitted them for 30 hours to a heat of 338° Fah., and obtained a resinous product, which, when treated with alcohol, &c., yielded a rich crimson color. William H. Perkins was the first person who prepared and introduced aniline colors, and to him belongs the chief credit of their application to the industrial arts. The honor of the discovery of aniline red colors, however, belongs justly to Prof. Hoffman, who first published the method of preparing them; and it was his method that was first employed in France by A. Verguin, of Lyons, in 1859. Messrs. Renard Freres, of France, took out a patent for the manufacture of aniline colors in April, 1859; they having engaged A. Verguin as their chemist, and they have been extensive manufacturers of such products ever since. Dr. Hoffman asserts that they cannot be considered as having any part in the discovery or improvements of such colors.

Most of the aniline red is at present prepared in England, France and Germany with arsenious acid. The use of this substance was introduced and patented by R. Heilman, December 10, 1859.

A definite method of preparing aniline blue was first made public by Horace Köchlin, of Glasgow, in 1860. It was obtained by the action of bichromate of potassa in a mixture of aniline and hydrochloric acid. In 1861 the aniline color called *Bleu de Paris* was made by Persoz de Luynes and Salvetat, of Paris. It is formed by the action of bichloride of tin on aniline, at the boiling point of the latter, in a hermetically-sealed tube. Since that period quite a number of patents have been taken out in France and England for the manufacture of aniline blue.

The favor with which aniline colors were received upon their first introduction in 1856, led scientific and practical chemists to pursue their study with a zeal that has no parallel in the history of chemical industry, and at the present moment cnemists are still busily engaged upon their investigation, because there is yet much that is obscure connected with the action of the substances that are employed to vary their shades. These colors will undoubtedly retain a permanent place in the manufacturing arts, and it appears to us that they can be manufactured here as well as in Europe, from whence we have hitherto imported all that has been used by our dyers and printers. Their chief source is the product of distilled bituminous coal, and this can be obtained in unlimited quantities from our Western coal fields.

THE Providence (R. I.) Tool Company have a contract for 50,000 rifled muskets of the Springfield pattern, and 7,000 have already been delivered. All the parts—locks, stocks, barrels and bayonets—are produced by the above-named company, who employ 650 men in the manufacture of muskets.

IT is claimed by agriculturists that Minnesota is a great State for the culture of flax, and as linen can be substituted for cotton almost wholly, the dominion of King Cotton might be disturbed by its cultivation.