working of the locomotive which arise from condensation, and the large quantity of water which is carried with the steam into the cylinders, causing loss of power by back pressure, Mr. Martin has brought into use a superheating apparatus, which, after severe and protracted trials, is found to work admirably. The value of the superheating process, as applied to marine engines, has long been known; but though the most eminent writers on this branch of engineering have repeatedly dwelt upon the desirableness of applying the process to the locomotive, the object aimed at has not hitherto been attained. Amongst those who have dwelt upon the subject most emphatically, is Mr. Kinnear Clarke, perhaps the ablest and most widely known writer on railway machinery, and who has just been appointed by the English Commissioners Superintendent of Machinery in the approaching Exhibition. For though superheaters have been tried in the smoke-box of the locomotive on other railways, they have virtually been failures; an inability to prevent the choking of the draft producing an aggravation of the very evil which engineers have desired to remedy. To Mr. Martin belongs the credit of having perfected an invention which realizes the great desideratum—a diminished consumption of fuel—and yet avoids the drawbacks which have baffled other inventors.

"An examination of the working returns of near a score of engines, running on the Grand Trunk Railway, shows that in no instance has Mr. Martin's superheater failed to improve the engine, as well in actual hauling power as in steaming qualities. It is impossible, without diagrams, to illustrate the construction and working of the apparatus. We may nevertheless be understood by mechanics, when we say that inasmuch as the position of the bottom of the superheater acts as a vacuum-chamber, an equalization of the draft is secured, and there is consequently always an abundance of steam. The economical result is remarkable. In some engines, where the smoke-box was sufficiently capacious to admit of the largest superheater, a saving of thirty per cent. has been effected. Mr. Martin is modest, however, and contents himself with claiming on the average a saving of twenty per cent.; a reduction in the outlay upon fuel which railway managers will know how to appreciate. As a natural result, the quantity of water consumed is largely diminished. We may mention that the saving effected by the superheater is rendered all the more noticeable by the fact, that the engines furnished with the apparatus were originally fitted with the American Petticot pipe, which is admitted to be a good equalizer of the draft.

"The superheaters used on the Grand Trunk are usually made of cast iron, three-eighths of an inch in thickness, with wrought iron tubes of sixteen wire gauge. Some are of copper, with copper tubes. No ferules are employed. The steam pipes are joined with the loose brass ring used in ordinary practice; and although some of the engines, with the apparatus, have run two years, no trouble has been experienced from leaky joints or tubes, or in the working of the valves or pistons. The cost of the apparatus, when applied to a number of engines, is, we learn, $75 per set. And to secure to himself the profit of his invention, Mr. Martin has taken out patents in this Province, in the United States, and in England and France."

INKS.

Indestructible Ink.—1. Powdered copal 25 parts; oil of lavender 200 parts; lamp-black 2 parts; indigo 1 part. Dissolve.

2. Asphaltum 1 part; lamp-black ¼ part. Melt, then add oil prepared for printers' ink, by boiling and burning until sufficiently stringy, 1½ part. Mix together, and add spirits of turpentine 3 or 4 parts. We would propose this ink, made with less turpentine, so as to be sufficiently thick for stamping, as the most perfect preventive of fraud, as when applied to the surface of an engraving, or letter-press, nothing will remove it that will not also discharge the ink of the stamp. It will stand the action of the alkalies, chlorine, acids, &c., even in a heated state, when they will at once destroy the texture of the paper.

Lithographic Ink.—1. Take Venice turpentine 1 part; lamp-black 2 parts; tallow 6 parts; hard tallow soap 6 parts; mastic in tears 8 parts; shellac 12 parts; wax 16 parts. Melt, and pour it out on a slab.

2. Take dry tallow soap 5 parts; mastic in tears 5 parts; Scotch soda 5 parts; shell-lac 25 parts; lamp-black 2 parts. Fuse the soap and lac, then add the remainder.

For use, this ink must be rubbed down with water in a saucer (warmed), until an emulsion is formed of a proper consistence to flow easily from a pen or pencil.

Blue Writing Fluid.—1. Ferrocyanide of iron, powdered, and strong hydrochloric acid, each 2 parts. Dissolve, and dilute with soft water.

2. *Indestructible.*—Shell-lac 4 parts; borax 2 parts; soft water 36 parts; boil in a close vessel till dissolved: then filter, and take of gum-arabic 2 parts; soft water 4 parts. Dissolve, and mix the two solutions together, and boil for five minutes as before, occasionally stirring to promote their union; when cold, add a sufficient quantity of finely powdered indigo and lamp-black to color; lastly, let it stand for two or three hours, until the coarser powder has subsided, and bottle for use. Use this fluid with a clean pen, and keep it in glass or earthen inkstands, as many substances will decompose it while in the liquid state. When dry, it will resist the action of water, oil, turpentine, alcohol, diluted sulphuric acid, diluted hydrochloric acid, oxalic acid, chlorine, and the caustic alkalies and alkaline earths.

Red Ink for writing.—Boil over a slow fire 4 ounces of Brazil wood, in small raspings or chips, in a quart of water, till a third part of the water is evaporated. Add during the boiling 2 drachms of alum in powder. When the ink is cold steam it through a fine cloth. Vinegar or stale urine is often used instead of water. In case of using water adding a very small quantity of sal-ammoniac would improve this ink.

Fine Black Writing Ink.—Take 2 gallons of a strong decoction of logwood, well strained, and then add 1½ pounds blue galls in coarse powder; 6 ounces sulphate of iron; 1 ounce acetate of copper; 6 ounces of well ground sugar; and 12 ounces of gum arabic. Set the above on the fire until it begins to boil, then set it away until it has acquired the desired black.

Black Ink Improved.—To 1 pint of common black Ink add 1 drachm of impure carbonate of potassa, and in a few minutes it will be a jet black. Be careful that the ink does not run over, during the effervescence caused by the potassa.

Green Ink.—1. Cream of tartar 1 part; verdigris 2 parts; water 8 parts. Boil until reduced to a proper color.

2. Crystallized acetate of copper 1 ounce; soft water 1 pint. Mix.