

(or its equivalent in potash) in caustic solution, for an hour, in an iron boiler, (Keen's patent boiler preferred), at a temperature of about 280° Fahrenheit, the boiler to be heated in any convenient manner, and the mass of flax to be kept under the solution while boiling. The quantity of alkali used is from one-quarter to three-quarters of a pound of dry soda ash to one pound of flax, according to the condition of the latter. After boiling, the mass is blown through the manhole under pressure into a tank, and then the solution is drained off, evaporated, and burned for repeated use. About eighty per cent. of the alkali is saved. The stock, after draining, is washed with hot water until all traces of the alkali disappear. It is then bleached by the use of bleaching liquid percolated through the mass, after which it is washed, squeezed and dried. If long stock is used, it is formed into hanks and put into wire cylinders, which are then placed in the boiler, and, when boiled sufficiently in the solution, the latter is gradually drawn through an opening in the bottom of the boiler, and evaporated and burned as before. The hanks in the cylinders, on being taken from the boiler, are washed, bleached and dried. After drying, both kinds of stock are to be separated by machinery. He has not yet constructed machinery (except models) for reducing the disintegrated fibres or cells to uniformity of length, or for separating them longitudinally, but is experimenting in that direction, and expects soon to accomplish the desired result. His process and product were patented in January, 1864.

"The contributions of Messrs. Fuller & Upham were also cottonized from unretted, tangled straw (which they much prefer to retted), dressed by one passage through Mallory & Sanford's brake. This brake, Fuller & Upham say, removes about ninety per cent. of the shives. These gentlemen, instead of depending on flax-disintegrating, shortening, and cleaning machinery located in flax-growing districts, take the stock from the brake and pass it through a shive-cleaning machine of their own invention, which consists of a series of card cylinders placed in a frame over each other. The stock is fed upon an apron at the bottom, and is carried from the first cylinder to the others successively to the top, where it is delivered from the machine. These cylinders act upon each other as workers and strippers. They are in a screen of zinc placed within three-sixteenths of an inch of the card teeth, having apertures for the discharge of the remaining shives and dirt by the centrifugal force of the cylinders. The latter are all enclosed in a case reaching below the cylinders that receives the waste, which is removed at the bottom. The stock is then placed in a vat with water kept at 90° Fahrenheit for twenty-four hours. The water is then drawn through a grate bottom, and the vat is again filled with water containing one barrel of soap to one thousand pounds of dry fibre, and boiled twelve hours by steam at 212° Fahrenheit, when the water is again drawn as before, and pure water is percolated through the mass the remaining twelve hours. There are two of these vats, that the soaking may be done one day, and the boiling and washing the next, in the same vat, without removing the flax until it is ready for the steaming process. The stock is next transferred in rail cars from the vat to a horizontal iron cylinder having an adjustable head and a perforated movable piston operated by a screw and gears. It also has a large escape-valve at the rear head near the top, and is supplied with steam from a boiler through pipes. It likewise has a pipe to draw off the water and extractive matter. The flax being placed in the cylinder, and the head screwed on, steam at ninety pounds pressure is let on for twenty minutes, when the perforated piston is run towards the head of the boiler, squeezing the stock into a compact 'cheese.' The water-pipe is then opened, and the water with the glutinous matter in solution, that has been pressed through the perforated piston, is blown off. The pipe is then closed, the piston is drawn back, and the escape-valve opened, which permits the steam to escape through the apertures in the piston, and out of the cylinder. Instantly this valve is opened, the steam in the fibres expands, overcoming the cohesion of the softened intercellulose, and filling the cylinder with disintegrated ultimate fibre or cells of the flax. The explosion is recommended to be only sufficiently powerful to disrupt the fibres and leave them measurably in parallel lines; for if they are entirely separated, many of them would be broken, and become, like immature cotton, too short to be profitably spun into yarn. The fibre is then taken from the cylinder, and, when partially cooled, is passed through a compound wringer, consisting of a cylinder eighteen inches in diameter and twelve inches in length, having several rubber rolls that revolve, with the flax passing between them and the cylinder. In connexion with the wringer there is a series of differently speeded drawing rolls that passes the stock between them, drawing it into a thin sheet to facilitate drying and to equalize the lengths of the filaments and fibres. The stock is then put into a box with a grate bottom, under which is a coil of heated steam-pipes.