ingredients sufficient to completely neutralise the excess of alkali which the silicate contains, to wit, grease, oil of any kind, tallow, resin, or any of these, combined with flour or starch of any kind, and prepare them by heating the grease, oil, tallow or resin, as the case may be, to about seventy degrees Centigrade, at which heat I add the alkaline silicate prepared as above, and mix thoroughly by stirring for a short time. Next, I mould the mixture in frames and allow it to cool. If I use flour or starch in the combination, I mix it in a dry state with the melted grease or fatty matter before adding the silicate. If the excess of alkali in the silicate is mostly caustic, the soap thus made will, in the course of three or four days, be fit to cut up, or to be formed into bars, either for use or sale. Should the alkali be mostly a carbonate, the mass should be re-heated, in a day or two, to about eighty degrees Centigrade, and next it should be framed, after which (in about two days) it will be ready to be cut or formed into bars. In this way I obtain a very fine neutral soap, in a much cheaper manner than by any other process.

"The excess of alkali in the silicate completely saponifies the ingredients used to neutralise it, and these ingredients in the process of saponification absorb all the excess of water with which we are obliged to dilute silicates in order to render them sufficiently fluid to combine with soaps. Therefore a soap made in this manner will not shrink in weight as much as a soap in which silicate is mixed after the soap is finished; for such soaps have already taken up about 40 per cent. of water from the hydrated alkali with which they are boiled, and the extra water in the silicate only tends to impair their value. Another advantage which this process ensures to the soap is, that the glycerine, having an affinity for the moisture contained in the atmosphere, prevents the soap from becoming too hard by age, as silicated soap is liable to do.

"I claim as my invention, and as an improved manufacture, a soap made in the improved manner hereinbefore described, viz., of a hot fatty matter or matters and a solution of alkaline silicate, combined at one operation, without the process of being boiled after the addition of the solution of silicate to the hot fat."

A patent (re-issue) was also granted to George E. Vanderburgh, of New York, on March 10, 1863, for a silicated soap, which is described in the specification as follows :—"I take any kind of common soap, reduce it to a fluid state, and add thereto any desired proportion of dissolved alkaline silicate, which contains by analysis less than one-half as much potash, or less than one-third as much soda or silica, and then, after thoroughly incorporating this mixture of soap and silicate, whilst they are kept at a proper temperature, I run the mixture into frames to harden, and afterwards cut the same into merchantable shapes."

The claim is "the use of a dissolved alkaline silicate as an ingredient in, and component of, soap; but this I only claim when the dissolved alkaline silicate thus employed contains, by chemical analysis, less than one-third as much soda, or less than one-half as much potash as silica."

The soap manufacture is of great importance as a branch of the useful industrial arts. Some philosophers have held that the quantity of soap consumed by a nation may be taken as an index of its civilisation; and this is not a chimerical idea, when it is considered that it is chiefly employed to promote cleanliness in person and clothing. But whether the use of silicates, resin, and other substances or mixtures with genuine soap, composed of oil, grease or tallow and alkali, is an improvement, is another question. Many persons believe that these are foreign mixtures which only increase the quantity.—*Grocer.*

TURBINES.

The class of water wheels known by the general term "turbine" supplies us with, perhaps, the most practically perfect means to be met with in the arts of obtaining the highest results from given mechanical effects. To all intents and purposes, the turbine is, if properly constructed, a perfect motor, capable not alone of working under all sorts of circumstances and under the most variable conditions, but of invariably giving out a high co-efficient of useful effect as well. Perhaps invented, at all events first rendered effective and economical, by Fourneyron, in 1837, it has gradually worked its way into general favour solely by its own merits. It is not easy to say how many of them are at work in Great Britain at the present moment. Messrs. Williamson, Donkin, Schiele, the North Moor Foundry Company, and many other firms, have, we believe, full employment found them in their construction; while abroad their use is even more extended than it is here in the fatherland of the steam engine—the giant who will scarcely brook the presence of a competitor within his territorial domains. In France and Germany the turbine enjoys great favour; the comparatively high price of fuel acting to some extent as a bar to the habitual use of steam machinery. In America the ordinary vertical water-wheel was exclusively employed—the breast wheel being considered best—until 1844. In 1843, Mr. Elwood Morris communicated to the Journal of the Franklin Institute, a translation of Morin's experiments on turbines, which attracted considerable attention. The year after, Mr. Boyden, an engineer experienced in the manufacture of hydraulic machinery, designed and constructed a horizontal water-wheel for the Appleton Company's mill, near Lowell, in Massachusetts, which at once embodied several improvements on the Fourneyron arrangement, and may be regarded as the first instance of this application of water-power in the States. In 1846, the same gentleman constructed three turbines, of about 190 horse power each, on the same general principles; the particular design being somewhat modified and improved. It is said that the mean maximum effect of two of these was found by careful experiment to equal 88 per cent. of the theoretical power due to the fall—a statement which, probably, contains a slight exaggeration. The general principles and mode of formation which distinguish the Fourneyron wheel are so well understood that it would be superfluous to dwell on them individually at length. The water, distributed in horizontal jets by peculiarly curved vanes or guides, issues from the circumference of an inner fixed wheel, composed of two discs kept apart by the guide plates, and passing through an outer annular wheel, fitted also with