#### AMERICAN INDUSTRIES.-No. 24

SOAP MANUFACTURE.

no one can tell when or where it originated. Specimens of it were found in the ruins of Pompeii, together with the apparatus for its manufacture. It is not our purpose to give a detailed history of this industry nor to describe generally the processes by which the great variety of soaps now found in the market are made, but to give the reader an idea of the apparatus and processes employed in the largest soap manufactory in this country, if not in the world.

Crossing the North River on one of the ferries one cannot fail to notice in the lower portion of New York city a build-creasing popular demand, by introducing an elegant arti-heel, which is so constructed that they will allow the ing much higher and wider than any of the others, upon cle of toilet soap which is entirely free from artificial odor curve of a French heel to be continued across the edge of which is displayed in huge letters the name of B. T. Babbitt. of any kind. It is made from the finest of vegetable oils, the revolving part, and that will give no indication to a The stranger might be at a loss to know whether the great by new and original processes. "Baby Soap," as this new casual observer that there is a revolving part. manufacturer had chosen this as a conspicuous place to post article is called, is peculiarly suited to the delicate skins his advertisement after the modern fashion, or whether it of infants, children, and ladies. It preserves, softens, and really designates the spot from which emanate the products smoothens the skin, and is an elegant toilet luxury, not twenty-three city lots, 25x100 feet each. This immense sur- but recently been put upon the market, it bids fair to become face is covered with substantial brick buildings, ranging one of the most popular of Mr. Babbitt's manufactures. from three stories to five and eight stories in height. The aggregate floor space devoted to manufacturing is 300,000 widely known and so well appreciated that it is unneces-Nos. 64 to 84 inclusive, and on West street Nos. 41 to 51 in-

and in connection with the establishment there is a large restaurant, where employes of the works can procure meals at reduced prices and without loss of time.

The power used in these works is furnished by twenty-five steam from four boilers of Mr. Babbitt's own invention, article is weighed and packed. ranging from 500 horse power to 60 horse power. By this arrangement long lines of shafting are avoided and the power is applied directly.

For carrying out his plans for the construction of boilers and machinery, Mr. Babbitt has extensive machine shops at and mechanical skill with business talent of the highest because sufficient thought is not given to the matter. Whitesboro, N. Y. Everything connected with the establishment is upon such a grand scale that it is impossible to realize the extent of the works without personal inspection.

The amount of raw material consumed in these works titors. is astonishing. The annual consumption of some of the leading materials includes upward of 70,000 barrels of the purest white tallow, received principally from Texas; 40,000 barrels of resin from the Carolinas; immense quantities of potash are imported from England, and vegetable fluence. Tribes and individuals far removed from hearing being that the power to propel a vessel in water is great, oils and other ingredients are consumed in proportion. All of the materials are selected with the greatest of care, and nothing but the first quality is ever bought. Notwithstand-passing events always improves and advances in knowledge; or in other words, the pressure of the air, the power coning the immense quantity of materials used in this establishment, one cannot discover the slightest disagreeable odor best interests. Well did the old Greeks know the value of paratively low rate of speed. If it were practicable to in making a tour of the entire works, and the most scrupu- obtaining new information. When voyagers and travelers spread sufficient canvas, a vessel could be propelled in water lous cleanliness is everywhere observable.

enormous caldrons made of boiler iron; the largest, which seen and heard abroad. The influence of this custom, be- is small compared to spread of canvas, and the friction is shown in one of the views on our first page, is 25 feet in fore the art of printing was discovered, was like that of our slight, so that the power obtained, transformed to speed, diameter and 57 feet in depth, holding 1,800,000 pounds at modern newspaper; it tended to excite the people, and lead gives a resultant velocity in some cases greater than the a single boiling. The aggregate capacity of these huge them to achieve reputation in all that was held worthy of wind. receptacles exceeds 3,500,000 pounds. The average cost of being distinguished. the raw materials for filling each kettle for a single boiling is \$36,000, while the value of the contents of the largest caldron reaches the enormous sum of \$125,000. Everynothing neglected. The gigantic operations proceed with Wherever possible machinery has been perfect regularity. introduced to save labor.

The foundation of nearly all varieties of soap is pure white tallow, which is received in barrels or casks. It is the barrels in line upon a platform with the bung downward, and introducing steam pipes, the steam from which quickly melts the tallow, when it flows into large reservoirs, and thence to the kettles. The lye, composed of potash and lime, is prepared in large iron tanks, and conducted through pipes to the kettles. After the tallow and lye are thoroughly and permits the soap to float on the surface of the liquid. to the throw of the animal's feet. It requires several days to complete this process. When it

The average daily production of the works is about 1,500 boxes of soap, each containing 75 pounds.

The soap frames above alluded to are shallow iron boxes, made separable to facilitate the removal of the soap. Each frame holds about 1,500 pounds. After the soap has hardened sufficiently it is cut into bars by means of wires, and is afterward pressed into oblong cakes, with rounded corners, without loss of weight, and at the same time receives its imprint of 'Babbitt's Best Soap,' a brand which is universally recognized as a guarantee of excellence.

The description given above is applicable to the manufacture of nearly all varieties of hard soap, except the Thayer, of Randolph, Mass., is designed for the use of retail | wind.

Soap is by no means a modern invention; it is so old that it. Olive, palm, and cocoanut oil are the most generally desired quantity and without drip or waste, and prevents used for fine soaps. A considerable portion of Mr. Babbitt's any escape of odors into the room. establishment is devoted to the manufacture of toilet soaps, and in this, as in the manufacture of ordinary bar soaps, nothing but the best materials are used.

for a wholesome soap free from such objections. Mr. Babbitt, with his characteristic enterprise, met this in-

The other articles made in this establishment are so The business offices of the concern occupy a large floor, ing the fused potash into the iron moulds which give it its amounting to 200,000,000 feet a year. spherical form. Each ball, after casting, is given a protective coating of melted resin.

Saleratus, an important article of trade and commerce, is made in large quantities here. One of the lower views engines placed wherever power is needed, and supplied with in the engraving represents the department in which this To the Editor of the Scientific American:

> It is difficult, with a limited number of engravings, and Babbitt's establishment. The great success of this concern is due so the fact that Mr. Babbitt combines inventive order. He has been enabled to originate new and valuable processes, and to devise labor-saving machinery, by means

### Vehicles of Intelligence,

Newspapers, like nations, have a historical existence. They "go to and fro" in the world and exert a powerful in- boats using sails, whether in water or on ice, the difference what is transpiring among men are always ignorant and degraded. That person who uses means to obtain a record of vessels in water the result is a great weight moved slowly, the man who is dead to such influences is dead to his own verted to the motion of the vessel, is represented by a com came to their ports and cities they were taken to their public faster than the wind. In the manufacture of soap Mr. Babbitt employs six marts and requested to recite an account of what they had

and nations great, we take occasion to solicit the favor of tables we find the pressure on such surface to be 2 lb. for our constant readers in extending the circulation of a each square foot, with wind moving 20 miles an hour, and thing here is subject to regular system. Nothing is wasted, paper devoted to disseminating such information among the with the velocity increased to 60 miles an hour the people as is useful and elevating. We urge our friends to pressure increases to 18 lb., so that with an exposed surface doubt but there are a great many mechanics, manufacturers, must give great speed, and the boat rushes forward until and others who would become subscribers were our paper the equivalent of the power is obtained in speed. The transferred to the soap kettles by placing a large number of brought to their notice, and its character and advantages pressure due to the wind velocity being obtained, that pointed out by those who know it well.

# SOME RECENT INVENTIONS.

an adjustable toe weight for horseshoes, which consists of a trebled, the pressure then runs up to 18 lb., nine times that weight with a longitudinal dovetailed groove, which engages required before; we then have an actual force which must mingled, steam is admitted to the kettles, and the boiling an inclined bar rising from the edge of the shoe. In the be expended to increase the speed of the boat until an begins. At a certain stage in the process common salt is groove is a spring pawl adapted to engage holes in the equilibrum is established. The query that naturally arises added, which, dissolving in the lye, increases its density, bar, whereby it can be fixed at different points to adapt it here, is this: Will not the pressure cease the moment the

Upon elevated and other steam railways the platforms a being given until all the gates are closed.

been patented by Mr. Benjamin L. Newhall, of Lynn, Mass. greater force, but at the same speed. The invention consists in a process of re-enforcing button holes by inserting a blank coated with "compo" in the flap weight in that case taking the place of the elasticity of the and setting it thereto by pressure, in the peculiar construct air as a constant force. There is the same difference in tion of the blank, and in the mode of combining the blank character of operation between a current water wheel and with the flap.

choicest kinds of toilet soap, in which pure vegetable oils dealers in oils and other liquids, corporations, factories, take the place of tallow, or are used in combination with etc., which allows the oil or other liquid to be drawn in any

An improvement in loom shuttles has been patented by Messrs. Adna B. Roberts and Le Roy Lyons, of Manchester, N. H. The object of this invention is to furnish shuttle The frauds which have been perpetrated under the cover spindles so constructed as to hold the bobbin upon them of perfumes by unprincipled manufacturers have created a when lowered into the shuttle, and allow the bobbin to be distrust of the highly scented soaps, and made a demand readily put on and taken off when raised out of the shuttle.

Messrs, Gideon B. Massey and Edward E. Spencer, of New York city, have patented an improved revolving shoe

## Minneapolis (Minn.) as a Milling Center.

The substitution of "St. Paul" for "this city," in a stateso familiarly known all over the world; but the latter is cor-only well adapted to the use of ladies and children, but ment of milling operations at the Falls of St. Anthony, rect. B. T. Babbitt's soap works occupy an area equal to equally well adapted to gentlemen's toilet. Although it has given on the authority of the Pioneer Press, of St. Paul (Sci-ENTIFIC AMERICAN, October 25), was the means of doing unintentional injustice to the rival city of Minneapolis. As a business center the latter has outstripped her older but less favorably situated sister; and now the mills of Minneapolis square feet. These buildings are located on Washington and sary to add anything to the universal verdict as to their have, it is claimed, something like five times the capacity of West streets; the numbers on Washington street comprising merits. Potash balls, so well known in the market, origing those of St. Paul. When mills now building are finished nated in this establishment. One of the upper views in her capacity will reach 15,000 barrels of flour a day. Anthe engraving shows the workmen in the operation of pour-other of her great industries is the manufacture of lumber,

# Correspondence.

### Ice Boat Propulsion.

Referring to the subject of the propulsion of ice boats by sails, recently revived, it seems to be accepted as a fact brief article, to convey a just idea of the magnitude of Mr. that such boats may travel faster than the wind, without any serious effort being made to solve the problem. It ought not to be mysterious to scientific men, and is only so

The error in this question consists in considering the velocity of the wind at all, except as the means for proof which he has secured great advantages over his compeducing the pressure by which the boat is propelled. Given the weight to be moved, power required to overcome inertia and friction, and speed desired, the extent of sail, surface, and the wind pressure required to propel the boat may be very nearly calculated. The principle is the same with all while but little power is required with ice boats. With

With an ice boat the conditions are changed: the weight

The wind pressure on a plane surface exposed to its As attainments in the useful arts make men distinguished direct action is much greater than usually supposed. From give us their assistance in presenting the claims of the Sci- of 1,000 square feet there will be a constant pressure of ENTIFIC AMERICAN to their acquaintances. We have no 18,000 pounds. This applied to force an ice boat forward velocity may be eliminated from the problem. As an example, suppose it requires a wind velocity of 20 miles, or a pressure of 2 lb. per foot, to propel the boat at the rate of Mr. Ernest W. Noyes, of Bay City, Mich., has patented 20 miles an hour. Now, suppose the wind velocity be boat exceeds the wind in speed? If air was a non-elastic fluid, that would be the result: but air is elastic: its pressure is finished, the liquid soap is drawn off, and forced by means usually fitted with gates, which are opened to permit passen- on the sails is due not only to its momentum but to its of powerful steam pumps into large iron reservoirs, from gers to pass out and closed when the train is in motion, and elasticity by compression against the exposed surface, and which it is drawn through pipes into the soap frames to the signal to the engineer for starting the train is given by this elasticity is a constant acting force, which, exerted cool and harden. The kettles are filled in regular rotation, means of a bell rope when all the gates are closed. There under the favorable conditions provided by an ice boat, so that while one is boiling, the process has nearly ap- is always a liability of the signal being given before all the gives the result of a great speed. Were this not so, there proached completion in another, while a third is being passengers are off, and of the occurrence of serious accidents would be a limit to the size of vessels which could be by starting the train too soon. Mr. J. Charles E. Ohlen-propelled in water by wind pressure, and a large spread of schläger, of New York city, has patented an improved electroanyas would have but slight advantage over a smaller extric signaling apparatus, which prevents the signal from posure. This can be illustrated by a boat floating with the current of a stream: its speed could not be increased by An improvement in button holes for boots and shoes has wings projecting at each side; it would move forward with

The same principle is seen in a turbine water wheel, the a turbine as there is between an ice boat moving with a An improved oil cabinet, patented by Mr. James M. gentle breeze and one sailing under pressure of a high