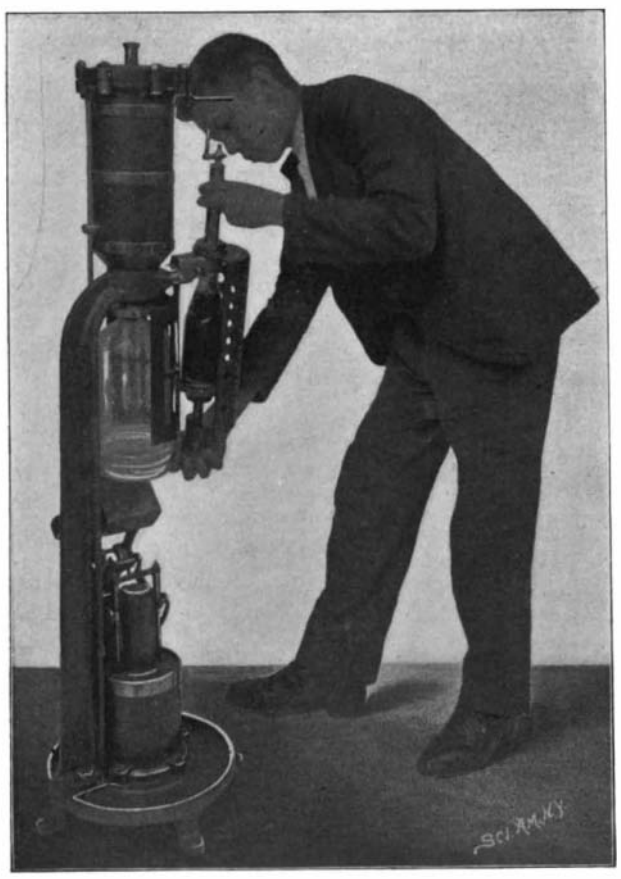
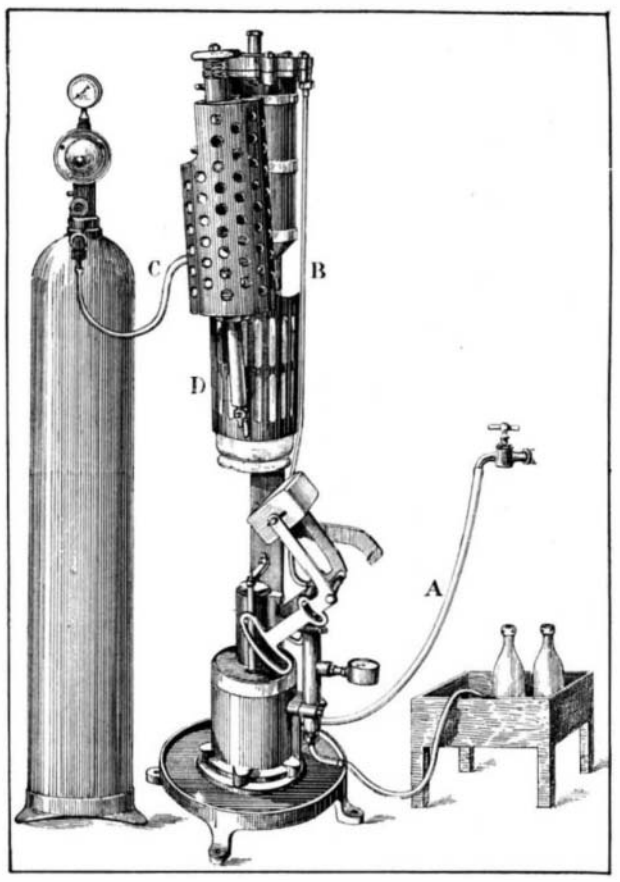
A NEW SODA-WATER MACHINE.

In the manufacture of soda and mineral waters, it is important that the water to be charged should come into contact with carbonic acid in the form of a fine spray or a thin film, in order that it may be thoroughly saturated. In the machine herewith illustrated, the water is spread out into a thin film by being forced through the unglazed porcelain walls of the chamber, and it there comes into contact with the carbonic acid which is held under a pressure of a few atmospheres. The water of a city supply system does not usually have sufficient pressure to force through the pores in the porcelain, and it is, therefore, necessary to raise the pressure by means of a transformer. The machine is, therefore, equipped with a water motor driven by the city water supply which multiplies the pressure several times. In one of our illustrations the supply pipe is indicated at *A* and leads from a faucet to the transformer at the bottom of the machine. From this point at a greatly increased pressure it is conducted up the pipe, *B*, to the top of the machine, where it passes through the porcelain walls of the carbonic-acid chamber. Within the chamber the water oozes out in tiny globules which trickle down the sides of the wall and are thoroughly saturated with carbonic acid, which is supplied from the tank, *C*. The saturated water then passes down into the reservoir, *D*, whence it may be drawn off into bottles as illustrated. The capacity of the machine depends largely upon the pressure employed. If local circumstances permit of artificially cooling the water, this, also, may add a great deal to the productive power of the apparatus; for it is a well-known fact that water of a low temperature absorbs a greater quantity of carbonic acid in the same space of time and under the same circumstances than it does at a higher one; for example, one quart of water at 0 degrees Cent., under a pressure of 5 atmospheres, will absorb 8.65 gallons of carbonic acid, and at 12 degrees Cent. will absorb only 5.15 gallons. The soda water obtained from this machine will be very pure; for on being passed through the unglazed portion the water deposits there not only all floating particles, but at the same time any disease germs it may contain. Where no water pressure is available for driving the water motor, a special form of machine is provided, in which the pressure of the carbonic acid is utilized to force the water into the saturating chamber. This form of machine will be especially useful at country resorts, on board ship or for army use, to afford an economical yet very efficient means for producing pure carbonic drinking water. The machine is the invention of Mr. Jan Frederik Beins, and is being introduced by B. F. Hagan, of Wijnstraat 116, Rotterdam, Netherlands.



FILLING A BOTTLE FROM THE SODA-WATER MACHINE.



DETAILS OF THE SODA-WATER MACHINE.

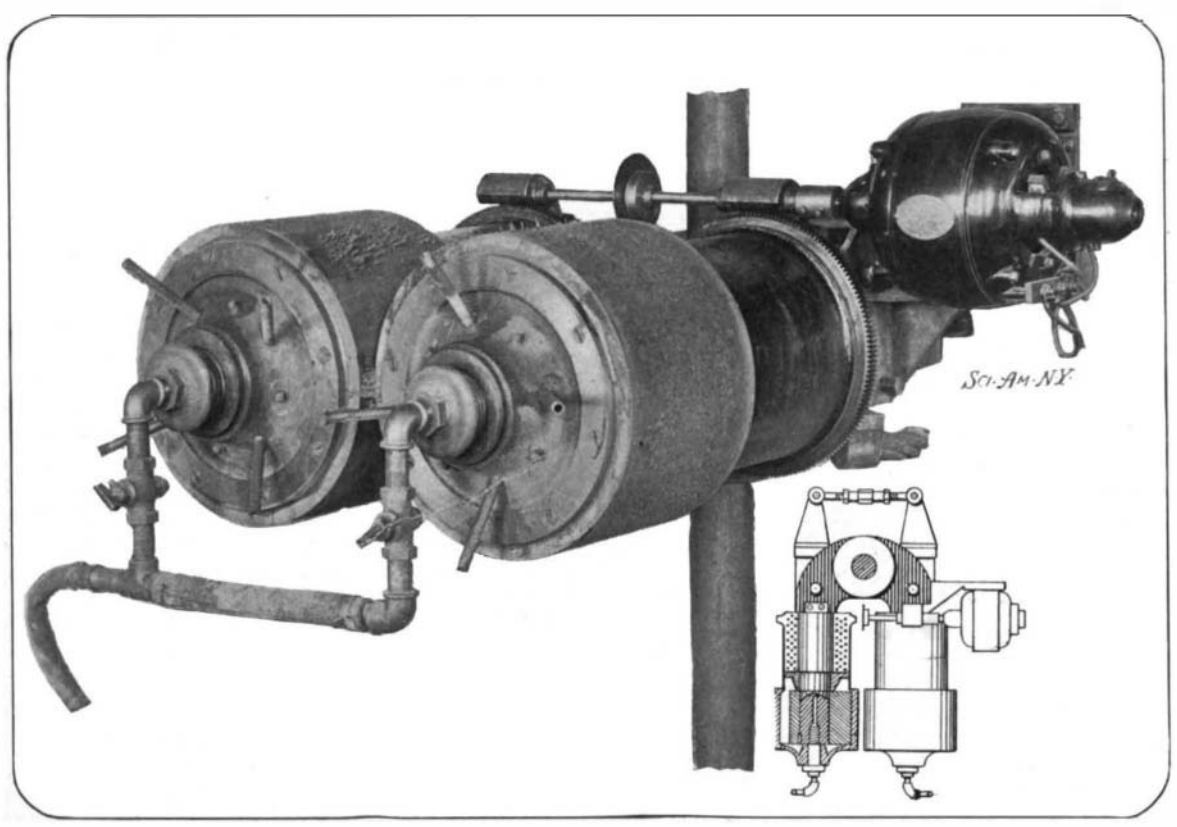
Cost of Warship Construction.

Owing to the general understanding between the various shipyards of Germany, whereby prices can be conveniently arranged, and inter-competition thereby averted, the Reichstag has passed a remarkable resolution to create competition between the various shipbuilding firms undertaking the construction of German war vessels, by which it is hoped the cost of building may be reduced. The gist of this resolution is that foreign firms be allowed to compete for the construction of vessels for the imperial navy, and the Reichstag emphasized its determination to force prices down by countermanding orders for two new boats, and reducing the sum of $500,000 for altering a cruiser to $125,000. An interesting comparison of the construction of German and British war vessels has been drawn up, whereby it is shown, although absolute relative costs, owing to slight variations in the sizes of the equipments of the vessels of the respective powers, are unavailable, that the English war vessels are built much cheaper than corresponding warships in the imperial navy. For instance, the German third-class type of cruisers of 2,665 tons, 8,000 horse power, and 21½ knots cost $837,500, while similar vessels in the British navy are built for $675,000—a difference of $162,500 in favor of the English builders. In connection with gunboats the difference is much more marked, the British vessels costing $200,000 less than the German gunboats, notwithstanding that the former, though 85 tons lighter, develop 2,300 more horse power and have a greater speed of 5¾ knots.

AN ELECTRIC ORE-REDUCING APPARATUS.

In order to facilitate the reduction of finely comminuted iron ore, it is necessary to agglomerate the ore into lumps of convenient size to be subsequently manipulated in the reducing furnace. Heretofore this has usually been done by mixing in some cementing medium and pressing this mixture into briquettes. However, this method is objectionable because the cement forms an additional impurity which must be subsequently eliminated. We illustrate herewith an apparatus invented by Mr. Marcus Ruthenburg, of Philadelphia, Pa., and which is calculated to accomplish the desired results without the use of any cementing material. The apparatus, which is mounted to swing over a series of soaking pits arranged in a circle about the supporting post, consists of a pair of carbon-faced bronze rolls slowly revolved by an electric motor through the intermediary of worm gearing. The frame on which the rolls are mounted consists of a heavy horseshoe magnet divided at the rear by an insulated hinge through which the supporting post passes. The magnet coils are wound on that portion of the magnet arms lying just back of the carbon-faced rolls. The poles, however, project within the rolls and are so shaped as to maintain an intense magnetic field between them at their line of nearest approach. The space between the rolls may be increased or decreased by operating the turnbuckle at the rear of the apparatus.

In operation the rolls are rotated toward each other at a rate of from one to four rotations per minute. The ore to be agglomerated is fed onto the rolls from an automatic feeder above, which is not shown in our illustration. The magnetic field serves to hold the ore from dropping off the rolls as they rotate, and in this position the ore forms an electric bridge of high resistance for a heavy current passed between the rolls. This serves to melt the ore and form it into lumps which drop into a soaking pit below. Four hundred and fifty kilowatt hours will melt one ton of product, or the continuous expenditure of 19 kilowatts will melt a ton in 24 hours. The rolls are water-cooled, so that the carbon-faces never become heated to a higher temperature than can be borne by the hand. Since the heat is engendered within the bridges, there is but little loss by radiation. Coal dust is usually mixed with the ore before it is introduced into the furnace so that a partial reduction takes place, and a further portion of oxygen is removed in the soaking pit, so that the product is then ready for melting in the open-hearth furnace as steel.



THE RUTHENBURG APPARATUS FOR AGGLOMERATING AND REDUCING IRON ORE.

All the trolley lines entering Cleveland, Ohio, have entered into an arrangement to engage in the freight and express business on a very extensive scale as direct competitors to the railroads of that vicinity. A large depot for the classification and handling of freight is being erected at a point in the city convenient to all the lines and it is expected that they will gather in a great deal of business. This method of handling the freight and express business has grown in such favor in some localities, particularly in the Middle West, that its merits are forcing themselves in those sections where the laws have heretofore protected the railroads. In Pennsylvania, for instance, there is talk of the introduction of a measure in the next legislature permitting electric transportation companies to engage in express or freight business, and although it will be bitterly fought by the railroad companies, the probabilities are the measure will become a law.