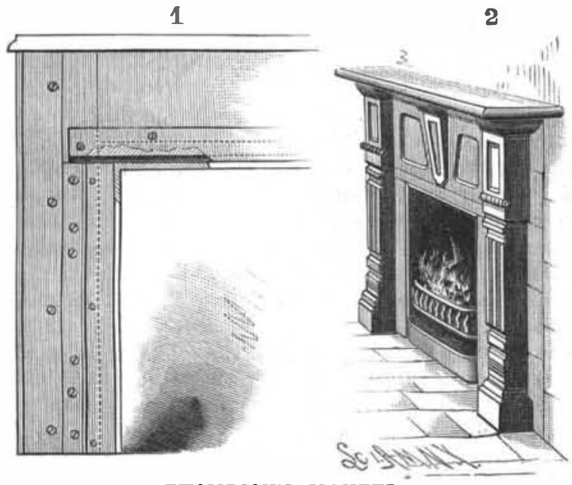
AN IMPROVEMENT IN MANTEL CONSTRUCTION.

A method of constructing mantel frames whereby one size may be readily and accurately fitted to fireplaces of different sizes has been patented by Mr. Robert B. Thompson, and is shown in the accompanying illustration. A wooden or other lintel having a longi-



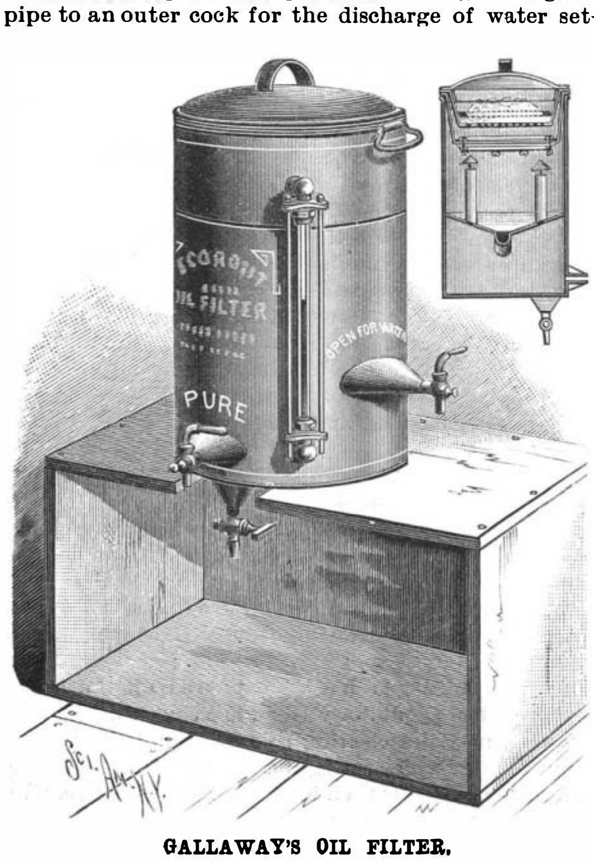
THOMPSON'S MANTEL.

tudinal groove in its lower edge is fastened along the back of the frieze, with its lower edge extending enough below it to make the opening the desired height, as shown in Fig. 1. Jambs having tongues on their upper ends to fit the groove in the lintel are cut to the desired length, and fastened to the backs of the side columns at the desired distance from the center line of the fireplace. The inner edges of the jambs and lintel, when properly adjusted, are lined with fire strips.

For further information relative to this invention address Messrs. Schuette & Co., corner of 18th and Mary Streets, Pittsburg, Pa.

AN IMPROVED FILTER FOR WASTE OIL.

A convenient filter for oil as it drips from bearings, or oil that has been made impure by the admixture of any foreign substance, has been patented by Mr. George W. Gallaway, of No. 322 Pearl Street, New York City, and is illustrated herewith, the main view also showing the shipping box, which is adapted to serve as a stand on which to set up the filter. As shown in the sectional view, there are two removable filtering pans in the top of the can, the bottom of the upper pan being perforated and covered with cotton, held in place by a metallic ring. Around the bottom edge of the lower pan are two flanges, adapted to hold in connection with rings two parallel layers of felt in position, the felt being firmly secured by thumb nuts and bolts. A partition with central depression separates the upper part of the can from the bottom, a central bottom opening in such partition leading through a pipe to an outer cock for the discharge of water settling to the bottom of the filtered oil. Two stand pipes in this partition allow for the overflow of oil into the lower compartment of the can, when the oil rises sufficiently. The pure oil is withdrawn through the lower cock in front, the bottom cock being for the removal of water, should any pass into the lower compartment, or for cleaning the filter. A glass gauge at the side indicates the amount and purity of the filtered oil standing in the filter. As the waste oil is poured on the cotton in the upper filtering pan, all the larger foreign particles of matter are retained there, the remaining finer particles being removed by the felt. The construction allows for the ready removal of the filtering material for cleansing.



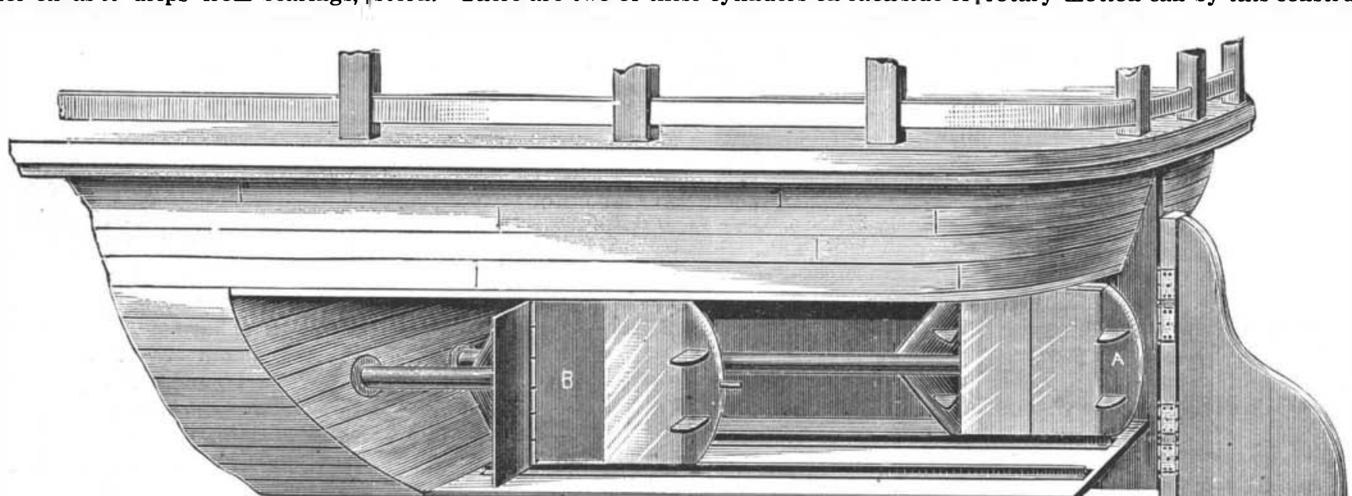
GALLAWAY'S OIL FILTER.

Ballooning with Natural Gas.

The first balloon inflated with natural gas ever sent up arose from Riverside Park, near Anderson, Ind., August 14. It has been a question as to whether or not natural gas would float a balloon to any considerable height, says a writer from that town. This one was filled from a pipe from a well until the gauge indicated that the silk, which was inclosed in a strong netting, was bearing twenty pounds pressure, when George Ayers, an amateur aeronaut, climbed into the basket, and the balloon was cut loose. It rose steadily until an altitude of about 2,500 feet was reached, when a current of air was struck which bore the balloon and its single passenger away to the southeast, since when nothing has been seen or heard from him.—*Progressive Age.*

A NEW METHOD OF BOAT PROPULSION.

The system of propelling boats herewith illustrated has been devised by Mr. J. Eckhardt, corner of 25th and Palm Streets, St. Louis, Mo. Four cylinders, each connected with an engine in the vessel, are mounted to be reciprocated through a waterproof packing in recesses made below the water line in each side of the hull, and extending a short distance forward from the stern. There are two of these cylinders on each side of the vessel, and on their outer ends are up and down flanges, on which vertical steel paddles are hinged, one on each cylinder for forward and one for backward movement. The cylinders are each coupled to a crosshead running on slides in a horizontal direction the full length of the stroke, the connection being such that with every revolution of the driving shaft the two outside cylinders, with square open paddles, pass out, while the other two cylinders, with closed paddles, pass in, and *vice versa.* There is a rod in each cylinder, by which the paddles may be reversed as desired, without stopping the engine, whereby the vessel may be turned in about its own length.



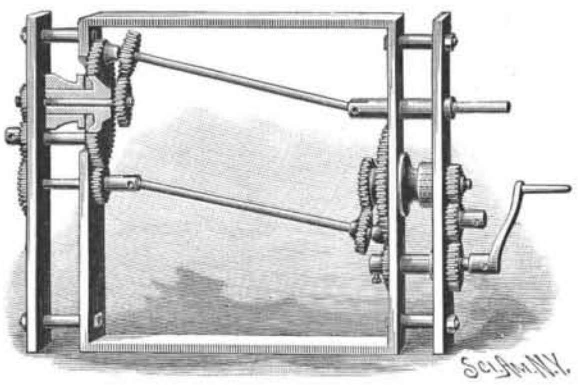
ECKHARDT'S SYSTEM OF PROPELLING BOATS.

Frieze from Susa.

The frieze of the archers of the guard which M. and Mme. Dieulafoy brought from Susa is composed of bricks 14 inches by 7 and 9 inches thick. They were cast in moulds, and perhaps worked on while still moist. The glaze on their faces has not always held, and it was necessary to subject them to treatment, or they would never have reached Europe. The frieze once decorated a wall in a side porch of the throne room of the palace of Darius. A correspondent of the *Athenæum* writies: "The warriors are portrayed marching in single file, each holding a spear, as in the attitude of 'attention,' and having large quivers slung at their backs, and their bows at their left arms. Their close-fitting helmets are bound round with a roll of green linen. They wear tunics reaching to the ankles, also an inner garment with long sleeves, and laced shoes. The color of the dresses varies, a white tunic and yellow underdress alternating with a yellow tunic and manganese purple underdress. The tunics are elaborately ornamented, the point of special interest being that the white tunics are sprinkled with a design representing a castle (the citadel of Susa ?), the triangular battlemented towers being yellow on a purple ground. The guards wear gold earrings and bracelets. They are brown-skinned. Their curled black beards, bush of black hair pushing out below the helmet, and strongly accentuated features combine to form an appearance singularly resolute and martial."

AN IMPROVED GEARING FOR TRANSMITTING MOTION.

In the gearing herewith illustrated, which has been patented by Mr. Ole O. Kravik, of St. Carl, Dakota Ter., a short shaft, having on its outer end a crank arm, is mounted in a suitable frame, a gear wheel on the shaft and next to the crank meshing into an inter-

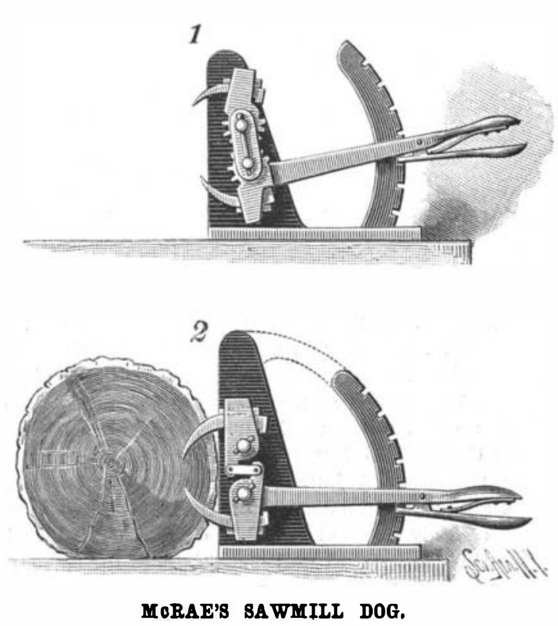


KRAVIK'S GEARING.

mediate gear wheel mounted above on a stud, the latter wheel meshing into a higher gear wheel on a shaft rotating in the end standards, and carrying on its inner end a bevel gear wheel. The latter meshes into a bevel gear wheel secured to the lower shaft held in inclined position and secured at its outer end to another shaft mounted to rotate in suitable bearings. The inner end of the lower inclined shaft has its bearing in a lug secured to the face of a large gear wheel rotating loosely on the shaft carrying the higher gear wheel above the crank arm, this large gear wheel meshing in a gear wheel secured to the inner end of the shaft operated by the crank arm. A very rapid rotary motion can by this construction be given to the first or lower inclined shaft, to be used for driving suitable machinery, or the same arrangement, as shown to the right in the illustration, may be duplicated as represented in the standards to the left and the upper inclined shaft, giving proportionately accelerated speed to the operating shaft.

AN IMPROVED SAW-MILL DOG.

The simple and effective device herewith shown, which has been patented by Mr. John B. McRae, of Mount Holly, Ark., has an upwardly projecting knee in the forward end of a suitable base, a segmental rack being attached to the opposite end, or cast integral therewith. Fig. 1 shows aligning blocks pivoted to one face of the knee, their contiguous surfaces having intermeshing teeth, and their outer ends being recessed to receive outwardly extending curved dogs, secured by keys. From the lower block extends a lever arm adapted to slide upon the side of the rack, and having at its handle end a spring latch adapted to engage the recesses of the rack. Fig. 2 shows a modified form of the device, in which the intermeshing teeth on the blocks are dispensed with, and the blocks have on their contiguous portions lugs, between which a link connection is formed.



McRAE'S SAWMILL DOG.

Fast Time on American Railroads.

The liveliest interest was manifested by railroad men in the recent account of the race between the "Flying Scotchman" and the "West Coast Flier" from London to Edinburgh, in which 400 miles were covered by the winner in 7 hours and 25 minutes. This was an average of something over 53½ miles an hour. There was a general jogging of memories and overhauling of the records of fast railroad trains on American lines. And much comfort was found by many in going over those records. For they show that, although the British and French roads admittedly make much better time habitually than is made on any of the American lines, some astonishing and sustained rates of speed have been attained here, when special efforts were expended with that end in view.

The best run on record in this country which can be fairly compared with the English run was made over the West Shore road, from Buffalo to New York, on July 9, 1885, when 426 miles were covered in 7 hours and 27 minutes. Quite a large number of railroad men, including officials of the Baltimore & Ohio, Wabash, Grand Trunk, and West Shore roads, happened at Buffalo together *en route* for New York. It was decided to see how quickly they could move over the new road. At the start the railroad men had their watches out, and soon the mile posts were flying past every 43 seconds. That speed was held so steadily that the greater part of the run was made at the rate of 45 seconds to the mile, or from 70 to 83 miles an hour. From East Buffalo to Genesee Junction, 61 miles, took 56 minutes; from East Buffalo to Newark, 93·4 miles, 97 minutes; from Alabama to Genesee Junction, 36·3 miles, 30 minutes. The 97 minutes to Newark included stops of 9 minutes, making the actual running time for the 93·4 miles, 88 minutes. From Newark to Frankfort, where the conditions for running were not so good as before, the run of 108·3 miles was made in 134 minutes, including 17 minutes for stops. From East Buffalo to Frankfort, 202 miles, the time was 240 minutes, of which 35 minutes were consumed in stops. There was only a single track at that time on the road a good part of the way between Buffalo and Syracuse, and that journey had to be made at reduced speed, especially over the switches. The journey was timed with the utmost care for the purpose of tabulation. In the table there are marked several miles which were made at the speed of 78 miles an hour, one at 84 miles, and the next, between Genesee Junction and Chili, at 87 miles. New engines took the train at Buffalo, Newark, Frankfort, and Coeymans.

On October 8, 1885, over the same road, a burst of speed was tried for 11 miles, between Genesee Junction and East Buffalo, to satisfy Superintendent J. E. Layng, who was on the train. The run occupied 512 seconds, an average rate of 74 miles an hour. Three of the miles were made at the rate of 80 miles an hour, 1 at 77, and 1 at 75.

On the New York Central road a newspaper train with two cars, weighing 60 tons, hauled into Syracuse, Sunday morning, August 8, 1886, at ten o'clock, an hour late. The train was booked to go from New York to Buffalo in 9½ hours. Orders came to try to make up the time on the further run of 148·7 miles to Buffalo. John W. Cool, one of the best engineers on the road, mounted his cab, bound to obey the order. He started out at 54½ miles an hour. At the end of the three miles his speed increased to 66 miles an hour, and then to 74½. He stopped at Rochester for water, and slowed up after passing Crittenden. His average speed from Syracuse to Rochester was 67¼ miles per hour, from Rochester to Buffalo 63·72 miles per hour, and from Syracuse to Buffalo 65·6 miles an hour. The run of 148·7 miles was made in 136 minutes.

The most remarkable long distance run on record was when the Jarrett-Palmer combination went from New York to San Francisco in half time, or 3½ days. Their train left the Pennsylvania station in Jersey City at 12:53 on the morning of June 1, 1876. They were not to make a stop until they reached Pittsburg. An engine and bagage car, on the approach of the special to Harrisburg, got up a speed of about 50 miles and passed mails to the special by running along an adjoining track for several miles, while the mail bags were thrown from train to train. The run to Pittsburg, 438½ miles, took 10 hours and 5 minutes, an average of 43½ miles an hour, notwithstanding the Alleghanies. From Pittsburg to Chicago, 458·3 miles, took 11 hours and 6 minutes, an average of 42·1 miles, including 25 stops and 4 changes of engines. From Chicago to Council Bluffs, 491 miles, took 11½ hours, an average of 42·6 miles, although there was a record for part of this journey of 62·2 miles. Over the Union Pacific the run of 1,032·8 miles from Omaha to Ogden was made in 24 hours and 14 minutes, at an average of 41 miles and a maximum of 72 miles an hour. The brakes became worn at Ogden and hand brakes had to be used, retarding the onward journey somewhat, as the men feared they might lose control of the train. San Francisco was safely reached at 12:57 on June 4, quite in time for the dinner that had been ordered for the company for that day. The last stage of the journey was run at an average of 37 miles. During the entire run 20 engines were used, there were 72 stops, and the running time for 3,313½ miles was 84 hours 17 minutes, an average of 40 miles an hour.

On the Pennsylvania road 45 miles an hour is not uncommon, and there are level stretches where a speed of a mile a minute is attained. Samuel Carpenter, the general agent of the road for this city, said recently, that if there was any need of making time to compare with the new English schedule, it could be done. On the New York Central road the run of 80 miles from Rochester to Syracuse has been made in 80 minutes when it was necessary to make up lost time. Assistant Superintendent Voorhees, of the New York Central, said that he stood ready any day to send a party from New York to Buffalo, 440 miles over that road, in the same time made by the English racer for 400 miles, if the party would pay $2 a mile to get there in 7 hours and 25 minutes.—*N. Y. Times.*

Milk for Infants.

BY FREDERIC M. WARNER, M.D., VISITING PHYSICIAN TO OUTDOOR DEPARTMENT OF BELLEVUE HOSPITAL (DISEASES OF CHILDREN), NEW YORK.

A problem which occurs to every general practitioner to solve, with greater or less frequency, is the successful rearing of children which have been, from some cause or other, deprived of the maternal nourishment; to this end various foods have been devised—some good, others bad, and all expensive.

After experimentation with, and trial of, most of these, I have come back to cow's milk, properly prepared, as the best substitute at our command.

This summer the bottle-fed children under my care have, with the exception of an occasional slight diarrhœa, done uniformly well, and this has tested, to my complete satisfaction, the method employed to render their food digestible and aseptic.

Since the publication of Dr. Jeffries' * interesting article, I have caused the milk consumed by all my artificially reared children to be prepared in the following manner: Into an ordinary cooking steamer, which can be bought at any hardware store, a couple of inches of water is put and brought to the boiling point; the milk which is the infant's allowance for the next twenty-four hours is placed in as many nursing bottles as are used during that length of time. These bottles, having been previously placed in an oven for a quarter of an hour, are now stoppered with cotton-wool, and put on the perforated plate in the steamer, not touching each other, the cover shut tightly down, and the whole allowed to steam for half an hour.

As will be readily seen, by this method all germs are destroyed, and if the milk is left stoppered and in a cool place, it will keep a long time. In the course of some experiments which I have been making, I find that, to-day, milk which was steamed exactly five weeks ago is perfectly sweet and good.

When feeding time comes, the woolen cork is removed and lime water and sugar of milk are added. A nipple taken out of boiling water is put on, the bottle warmed, and the child's food is ready for administration.

Until six weeks old the proportions of lime water and milk are half and half, with a teaspoonful of sugar of milk. About three ounces of this mixture will be taken every two hours; from six weeks to three months, one-third lime water, and from this time gradually diminish the amount. I prefer using the ordinary cooking steamer to the somewhat elaborate and costly apparatus of Soxhle tfor the sterilization of milk, for the reason that it is inexpensive, easily kept clean, and does not bewilder the overtaxed mother or nurse with elaboration of detail.

In closing, I wish merely to emphasize the fact that a bottle must be used but once; immediately after the child has nursed all it will, the remainder of its contents must be thrown away, the bottle washed, and placed in the sun and air.—*Medical Record.*

* *American Journal of the Medical Sciences*, May, 1888.

Inoculation for Cholera.

Dr. Gamaleia, of Odessa, who has studied the prophylaxis of hydrophobia in Paris under M. Pasteur, and under whose direction several institutions for the treatment of that disease have been founded in Russia, has communicated to the Paris Academy of Sciences (through M. Pasteur) a paper on the cure of cholera by inoculation. The procedure is similar to that adopted by M. Pasteur in hydrophobia, and experiments with the choleraic virus upon animals have been successful. As M. Pasteur himself has apparently concurred in the value of the results obtained by Dr. Gamaleia, the procedure in question may be assumed to be more firmly supported by rigid scientific facts than were the inoculations with which a few years ago Dr. Ferran's name was associated. It will be remembered that, although Dr. Ferran averred that his method was based on Pasteurian principles, M. Pasteur himself did not concur in his practice, nor had any practical result followed from the investigations pursued in Egypt by the French commission, one of whose members, Dr. Thuillier, lost his life from cholera during the inquiry. Moreover, in course of time it was abundantly proved that Ferran's inoculations were untrustworthy. Dr. Gamaleia's method is based on his discovery that pigeons inoculated with the blood of guinea pigs which have been inoculated with cholera virus die from "dry cholera," with detachment of the intestinal mucosa, and that, moreover, the virus which has thus passed through the pigeon gains in intensity, so that it will kill pigeons in from eight to ten hours, and even destroy guinea pigs. But when a pigeon was inoculated with the uncultured virus in the breast and in the abdomen, it became refractory to the cultivated virus of the highest intensity of virulence. By heating the culture broth to 120° C., and inoculating pigeons on successive days with small quantities, they became refractory to cholera. "The vaccine is sure and inoffensive when given in small doses and successively, and it is to be hoped that whole populations may be saved by this method from Asiatic cholera." The *Times* correspondent (August 21), in forwarding an abstract of Dr. Gamaleia's paper, adds the following interesting details: "M. Pasteur, after reading the note, stated that Dr. Gamaleia had expressed his readiness to repeat the experiments at Paris, in presence of a committee of the Academy of Sciences, and to try on himself the inoffensive and sufficient dose for human vac ination. He is ready to undertake a journey into countries where cholera prevails to prove the efficacy of his method. M. Pasteur added that he need scarcely say that he accepted, with the greatest satisfaction, the offers to conduct the experiments in his laboratory made by Dr. Gamaleia. The letter was referred to the committee, which has a prize of 100,000f. in its hands for a cure for cholera, and it was arranged that the experiments should be postponed till November." It will be interesting to hear what Professor Koch has to say upon these experiments, and the sanguine anticipations based on them.—*Lancet.*

Induration of Stone.

The rendering soft stones hard, and the protecting the surfaces from the weather when worked and set, has been the subject of great investigation. A. Ashpitel, in the *Architect* (London), says:

The idea of the latter seems to have originated with the late well known John Sylvester, who tried the method of washing over the faces of stone walls with first a solution of soap and then of alum. Another method was that of washing with what was called water glass, or silicate of potash, both of which are said to have failed. The next idea was to soak the stone, or in some way to cause the surface to imbibe a quantity of oily or fatty matter, to throw off the wet, as well as to harden the stone itself. The first patent was taken out by Mr. Hutchison, at Tunbridge Wells, in 1847, and was applied to the new sandstone there. The stones, when worked, were boiled in a solution of resin, turpentine, wax, oil, etc., and sometimes, we believe, pitch, till they were impregnated a sufficient depth from the surface.

In 1851 Mr. Barrett took out a patent something like the preceding, but far more elaborate. The main elements, however, were resins, fats, and tallows, some of which were mixed with gutta percha, unslaked lime, copperas, and a number of other ingredients. In April, 1856, Mr. Daines took out a patent, not so much to indurate stone, but to preserve stone or cement walls from damp and efflorescence. His process was to apply, first, a solution of sulphate of zinc, or solution of alum, to the wall, and then a composition of sulphur dissolved in oil. In the same year, and in the next month, Mr. Page took out a patent for a similar purpose. His material was wax dissolved in coal tar, naphtha, or, for more delicate work, in camphine.

Mr. Ransome's process was deduced from his experiments on the artificial stone. It consists of treating the surface of the stone, first, with a solution of silicate of potash or soda, and then with a solution of the chloride of barium, or chloride of calcium, by which means an insoluble silicate, either of barium or lime, is deposited in the pores of stone. The most extraordinary results, however, are promised by Mr. Szerelmey's process. It will not only entirely protect the surface of stone or brick or cement, but of iron. As a proof, an anchor coated with it was sunk in the sea for many months, and raised again without trace of oxidation.

Clearing Negatives.

Sometimes by prolonged development negatives become stained, and usually clearing solutions are employed after the negative is fixed.

Mr. T. Bedding, in the *British Journal of Photography*, advises the use of an alum and citric acid bath, one part of citric acid to thirty of alum; before fixing. When the developer has been poured off the negative, the latter should be washed in a couple of changes of water, and the clearing solution applied for a few minutes, after which it may be returned to the bottle for future use. It is then important that the negative be carefully washed prior to immersion in the fixing bath.