EXPERIMENT IN CAPILLARY ATTRACTION.

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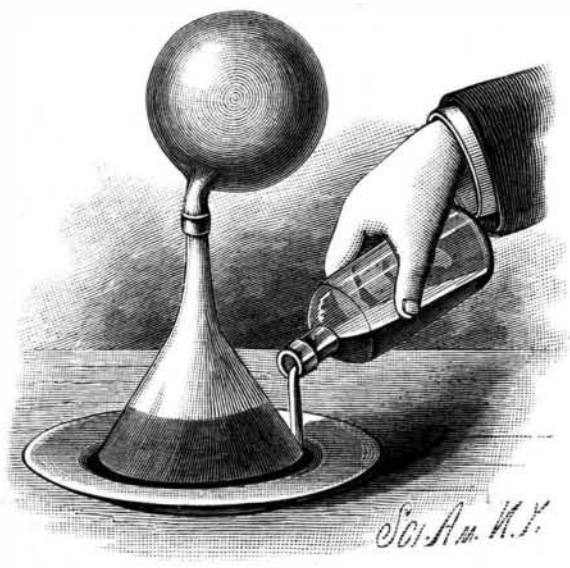
Few subjects are so fertile in simple experiments, requiring little or no special apparatus, as capillary attraction. Faraday, who was unrivaled as a popular lecturer, continually employed the simplest possible methods of illustrating the action of this subtile force. One of the most striking he performed thus: A pile of salt was placed upon a plate. The lecturer then poured into the plate a saturated solution of



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salt in water. The solution was colored to make it easily visible. As it was poured about the base of the salt, it was drawn up through the pores existing between the grains. By the operation of capillary force the colored solution gradually rose upward, coloring the salt as it ascended.

The clew to the success of this experiment is in the use of the salt solution instead of plain water. Were the latter used, it would rapidly disintegrate the pile of salt, by dissolving it. With the saturated solution the solid salt is quite unaffected.

In the illustration is shown a modification or development of this experiment. The apparatus required is a little more extensive, as, in addition to the plate, a glass funnel and an India rubber balloon are needed.

The balloon should be inflated to its largest size and kept so for some time, so as to stretch the rubber well. This is to enable it to fill at low pressure. The glass funnel should be as large as possible, as the demonstration is more satisfactory when executed on a large scale.

The funnel is filled with perfectly dry salt, well pulverized, which is pressed in as hard as possible. The funnel is completely filled with it, when supported mouth upward. The filling may be carried a little above the rim. The plate is then placed over its mouth so as to bear against the salt, and the whole is inverted. The object is to so conduct the operation that the salt shall not settle down or change its position, but shall remain in close contact with the walls of the funnel. All these precautions are quite essential to success.

The mouth of the balloon, whence the air has been expelled, is now sprung over the open end of the funnel as shown in the cut. It is not necessary to tie it on. The balloon must, of course, be perfectly empty.

The plate, funnel, and balloon are now ready for the experiment. A saturated solution of salt should have been prepared. This is made by shaking in a bottle an excess of salt with water. As salt is more soluble in cold than in hot water, this operation must be done at ordinary temperatures. As coloring matter, a little ferric salt with sulphocyanide of ammonium may be added, or any ink that is soluble in water may be used.

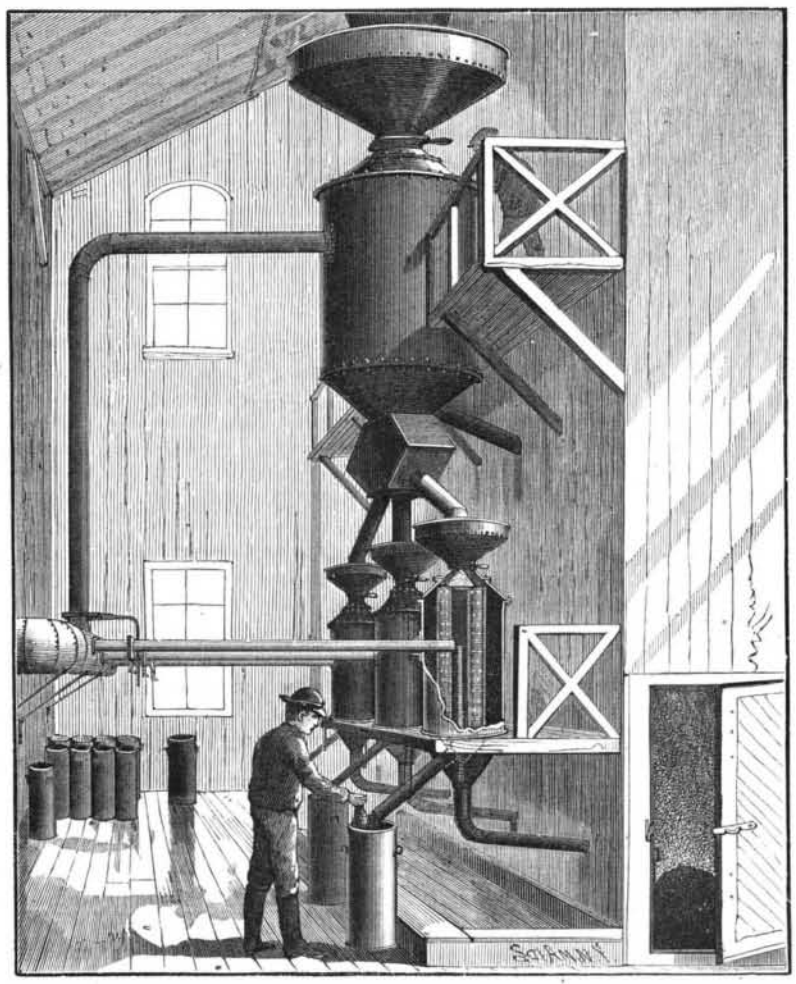
The solution is now poured into the plate so as to rise above the edge of the funnel and keep it immersed. It at once rises through the salt, coloring it as it ascends. As fast as it rises, it of course leaves the plate. Hence the experimenter must make repeated additions of solution. As the fluid rises, it drives out the air before it. This would escape from the mouth of the funnel. But the balloon which has been placed there intercepts its escape. The air enters and rapidly inflates it. The pressure thus produced is slight. It cannot do more than just fill the balloon. It cannot distend it But by having the balloon well stretched, its inflation can be made quite conspicuous.

If, by settling, the salt has left any space between itself and the walls of the funnel, the possible pressure, slight at the best, will be greatly diminished. If the balloon exerts the least back pressure, air will bubble out of the weak spots around the rim of the funnel.

By substituting a cone of porous clay for salt, a more permanent apparatus could be readily constructed.

AN IMPROVED BOLT.

An improved bolt or separator for cleaning bone black and other dry pulverized or powdered substances is illustrated herewith, and has been patented by Mr. George D. Murdoch, of No. 523 Clinton Street, Brooklyn, N. Y. Within a main cylindrical casing, having preferably a conical top and bottom, a small interior cylinder is centrally and vertically supported, beneath a hopper secured to the top of the casing, there being a slide in the bottom of the hopper to regulate the amount of material passing into the casing. The central cylinder has a solid conical cap covering its top, and is made of wire gauze or other open material, an aperture being formed in one side, above the center, in which a pipe is entered connected with any pressure blower, making this cylinder an air flue. Opposite the entrance of the pipe and surrounding it is a plate attached to the screen of the cylinder, whereby the air entering is disseminated throughout the cylinder, instead of being concentrated at one point. A second gauze cylinder surrounds the central one, the space intervening containing coils of wire, to act as deflecting rods and break up the material should it enter from the hopper in a mass. This outer cylinder is attached at the top to the upper cone, below the cap of the inner cylinder, so that material fed from the hopper will be guided into it by the cap, and extends downward below the inner cylinder, being provided at its base with an outlet pipe through one side of the lower conical head. The mouth of the pipe entering the inner cylinder from the pressure blower has a vertical semicircular partition, through which passes one end of a tube, that extends down through the inner cylinder, and below the bottom of the outer gauze cylinder, to a point just above the outlet pipe at the bottom of the cone-shaped lower end of the casing. In operation, as the air is forced through the meshes of the inner cylinder upon the material as it is dropped down over the spirals in the outer cylinder, the dust from the material is blown through the gauze meshes of that cylinder into the space between it and the outer casing, whence it falls to the outlet pipe at the bottom and is driven out. The material that is cleaned and separated by the blast as it passes over the spirals drops to the bottom of the outer gauze cylinder, and is thence conveyed by its outlet pipe to any convenient point. Our illustration shows one large bolt and three smaller ones arranged in connection with each other according to this construction, it being obvious that a number of successive bolts can be thus employed for the separation of material into different degrees of fineness according to the fineness of the meshes in the cylinders.



MURDOCH'S BOLT FOR CLEANING DRY PULVERIZED OR POWDERED SUBSTANCES.

AN IMPROVED NIGHT LAMP.

An invention providing means for regulating the flame of a lamp, so that when not in use the flame may be lowered and raised as required, has been patented by Mr. Theodor Bergmann, of Gaggenau, Baden, Germany, and is illustrated herewith, Figs. 1 and 2 being sectional views, and Fig. 4 showing its application as a cigar lighter. The invention consists of a regulating sleeve applied to the wick tube, which is secured to a top plate over the burning fluid by a thimble screwing into a bushing. Upon the wick tube is a sliding sleeve,

BERGMANN'S "ALADDIN" LAMP.

A, to which is secured a downwardly extending rod, B, passing through a tube in the fount, and carrying at its lower end a weighted block, D, adjustable on the rod by a screw thread. Near the angle of the bent part of the rod is a stop device, C, adjustable by means of a set screw, whereby the vertical movement of the rod is limited, and this may also be effected by adjusting the weighted block, when the stop device may be dispensed with. When the lamp is raised by the hand the weighted block drops so as to depend partly below the base, drawing down the sleeve to bring it even with the top of the wick tube, thus causing the flame to enlarge and rise up through the opening in the top of the hood. Upon placing the lamp on any suitable resting place, the depending block strikes thereon and rises, pushing up the sleeve by means of the connecting rod past the flame, so as to lower the flame without extinguishing it. The degree to which the flame is to be enlarged or lowered may be regulated by adjusting either the block or the stop device. It is said that large quantities of these lamps have been sold in the European markets.

For further particulars with reference thereto, address the owners, Gaggenau Iron Works, Baden, Germany.

The Great Yellowstone Geyser Now Active.

A dispatch to the Chicago *Tribune* says the Excelsior geyser in the Yellowstone Park is in operation. This geyser is in the great middle geyser basin, close to Fire Hole River. It is in the form of an immense pit 320 feet in length and 200 feet wide, and the aperture through which it discharges its volume of water is nearly 200 feet in diameter. Its general appearance is that of a huge boiling spring, and for many years its true character was not suspected. Its first eruption occurred in 1880, when it revealed itself as a stupendous geyser. The power of its eruptions was almost incredible, sending an immense column of water to heights of from 100 to 300 feet, and hurling with it rocks and bowlders of from 1 to 100 pounds in weight. Its present eruption is said to be a repetition of that of 1880. It is throwing its volumes of water 300 feet into the air, and Fire Hole River is reported to have risen two feet from its rushing floods. This is now conceded to be the most powerful geyser in existence.

The Edison Photophone.

The editor of the *Western Electrician* thinks the Edison photophone possesses such vast possibilities and its achievement has awakened an enthusiasm which has not been manifest since the introduction of the telephone. It may, he thinks, serve a thousand different purposes. It may aid the business man throughout the working hours and charm him in his leisure moments. Employed as it can be for both pleasure and business, it may revolutionize life in both these aspects.

THE South African diamond fields last year yielded gems valued at over $20,000,000.