NEW INVENTIONS.

Mr. Frank W. Mix, of Terryville, Conn., has patented a novel lock case, designed to meet the requirement of that type of indicator padlock in which the bolt mechanism and indicator mechanism are arranged in different planes, with a supporting plate between the same. The object sought is to combine economy in the manufacture of the case with intrinsic merit in its structure, the principal points aimed at being the largest amount of room for the indicator mechanism in the smallest compass of case, and such a structure of a three-part case as will avoid strain on the rivets.

A simple, inexpensive, and efficient means for holding the sashes of a window at any desired adjustment, and locking them when closed, has been patented by Mr. Edwin L. Barber, of Larwill, Ind. The invention covers certain peculiar features of improvement upon that form of sash holder in which a bar is attached to the horizontal upper portion of the stationary window frame and depends to the upper edge of the bottom sash, and passes through a notch in the meeting rail of the same, each sash being provided with an attachment to the rod, which permit the sashes to be adjusted up or down upon the rod to open or close the window.

An improvement in the class of table frame whose rails and legs are connected by metal clamps having flanges that enter a groove in the legs, has been patented by Mr. James Pleukharp, of Columbus, Ohio. The improvement consists in providing the legs with vertical grooves which are inclined transversely toward each other, and the rails with grooves that incline toward the legs, and in locking the legs and rails together by means of metal clamps having flanges that enter the grooves.

An improved tire setter has been patented by Mr. Fredric P. Beucler, of Charleston, Iowa. The object of this invention is to facilitate the setting of wagon and other tires, and the adjustment of felly and spokes. It consists of a revolving swinging head carrying a central ring, which is provided with pivoted radial arms that can be retracted or extended to suit wheels of varying diameters, and is vertically pivoted in a block rocked on a vertically adjustable standard by levers from a horizontal to a vertical plane, and *vice versa*, whereby a wheel on the machine may be plunged into and withdrawn from a water tank.

An improved oiler has been patented by Mr. Alexander McMullen, of Ottumwa, Iowa. The object of this invention is to facilitate the oiling of pulley bearings, journal bearings, and other wearing surfaces, regulate the amount of oil applied, and prevent the escape of oil when not required.

Mr. William S. Bright, of Letart, West Va., has patented a stalled stock car, whose stalls can readily be enlarged or reduced in size to accommodate the largest number of animals, and the car is fitted so that the animals can be conveniently supplied with water.

An improved furnace for ventilating mines has been patented by Mr. John R. McBroome, of Woodville, Pa. This invention consists in a furnace of novel construction, placed in an arched passage within the mine, so that the furnace arch is surrounded at top and sides by an air space. The furnace arch and air space enter a vertical ventilating shaft at one point.

Mr. James Smith, of Philadelphia, Pa., has patented an improved apparatus for elevating bricks and mortar in hods It consists in features of construction for rendering the operation more perfect, and in a safety stop for preventing the hods from being carried over the upper wheels

Lead Poisoning by Cosmetics.

The death of a young lady in this city from lead poisoning by the excessive use of cosmetics has called out from Dr. Hammond the statement that the case was not an uncommon one.

"Lead poisoning," he said, "occurs more frequently than is generally thought. The public rarely hears of such cases. It is only once in a while that cases like that of Miss Blanchard attract the attention of the public outside of the medical profession. The use of any kind of cosmetics, even if not habitually indulged in, is attended with danger. There are very few, if any, that do not contain white lead. This poison is used in the manufacture of face powders, face washes, and hair dyes. Minute particles enter the skin and are taken up by the blood and communicated to the system. It produces various effects. Paralysis, colic, prostration of the nervous system, and insanity are among the most frequent results of its introduction into the system. A very distressing case came under my notice a few years ago, in the wife of the Governor of one of the Western States. She had been in the habit of using a certain hair dye—I forget the name at the present moment—which contained white lead in a large proportion. She became hopelessly insane, and death ensued finally. Another case was that of a young lady who used a so-called 'bloom of youth.' In this case paralysis preceded death."

In answer to the question touching the amount of lead necessary to be absorbed to produce symptoms of poisoning, Dr. Hammond said:

In some cases the quantity is infinitesimal, but it varies. The most common kind of poisoning is occasioned by the use of water conveyed in lead pipes. The family of Louis Philippe suffered from lead poisoning while living at Claremont. The water upon examination was found to contain but one grain of lead to the gallon. A lead colic was almost unknown in Amsterdam till the inhabitants began to substitute lead roofs for tiles, when a violent epidemic of the disease occurred and caused great ravages. In experiments which I instituted with reference to the action of water upon lead I found that one pint of water remaining in a bright leaden jar for six consecutive hours contained, upon being tested by passing a current of sulphureted hydrogen through it, one-seventh of a grain of lead—a proportion amply sufficient to have produced the most serious results if the water in which it was found had been used as a drink for a few weeks."

Winter Cholera in Chicago.

During the first three months of the present year a remarkable outbreak of what is called "winter cholera" occurred in Chicago and many parts of the Northwest. Fortunately the disease was not fatal, though it no doubt increased indirectly the fatality of other diseases. The characteristics of the outbreak were described as follows in a report to the National Board of Health, by Dr. H. A. Johnson:

"The epidemic of so-called winter cholera the present winter in Chicago is noteworthy as decidedly modifying the usual health condition of the city, and also for its own peculiarities. From all that can be learned from conversation with physicians it appears that it became suddenly prevalent about the holidays, though there are records of a rather unusual amount of diarrheal trouble earlier in December. From that time to the present the epidemic has continued with more or less violence, but now seems to be somewhat abating. It is not possible to even approximately estimate the degree of its prevalence with any certainty. The disorder has made no marked figure in the mortality reports, and there are no returns of non-fatal diseases. Judging from the number of cases mentioned to me by physicians as having come under their own observation and treatment, and allowing for the whole number in the city, as well as the very large probable number of cases where no physician was consulted, I should say that at least 15,000 or 20,000 cases have occurred; and perhaps 30,000 or 40,000, of all degrees of mildness or severity, would be more nearly correct. In one of the principal suburbs, where it was easier to make an estimate, and where it was to all appearances much less prevalent than in the city, nearly 2 per cent of the population were more or less affected. Here, too, according to the experience of some physicians, a majority of the cases were adult males, whose business carried them to the city every day. Popular opinion was at first inclined to attribute it to the excessive cold of the winter, and many physicians were inclined to share the opinion. Bad sewerage and ventilation could not be generally credited with its production, as it occurred equally where nothing was wrong in these respects. It is probable, however, that it was aggravated in some instances by bad sanitary conditions. The fact that the disorder occurred simultaneously in many widely separated localities over the country is against the idea of any local conditions producing it—such as the drinking water, which was constantly and carefully watched by Dr. DeWolf and the health officers without finding any marked impurities, notwithstanding that the Fullerton avenue conduit was discharging from the North branch into the lake all winter. A number of physicians of extensive observation strongly suspected a malarial element in the disorder. In this connection I may state that a well known physician from the interior of the State, Dr. Howard, of Champaign, has said that in his town he had seen a large number of cases of severe bowel complaint this winter in children, and very few in adults. In all, or nearly all, cases he found that the sufferers had been eating snow, and that the disease was apparently directly traceable to that. He also favored the idea of its malarial character, at least in part. The facts known are very suggestive, but it will require much more extensive inquiry at a later period to justify any positive deductions."

The prevalence of diarrheal complaints in Chicago has continued into May, and the general sanitary condition is described as extremely bad. The death rate was higher than it has been before in many years, particularly among children.

Distemper.

Ceilings and walls are often finished in distemper, but very often turn out unsatisfactory from the want of knowledge in the mixing and laying on. Absorption in the wall should be checked or stopped, or one part will absorb more color than another, and an uneven or spotty appearance results. Various preparations are used for preparing walls and to stop absorption. One of these is to mix about a dozen pounds of the best whiting with water, adding thereto enough parchment or other size to bind the color, about two ounces of alum, and the same weight of soft-soap dissolved in water; mix well and strain through a screen or coarse cloth. In mixing the distemper, one writer says, "two things are essentially necessary, clean and well washed whiting and pure jellied size." The whiting should be put to soak with sufficient soft water to cover it well and penetrate its bulk. When soaked sufficiently the water should be poured off, which will remove dust from the whiting. It may then be beaten up to a stiff paste by the hand or spatula. Size is next added and mixed together. Care should be taken not to break the jelly of the size any more than can be avoided. Another caution is that distemper should be mixed with jellied size to lay on well; the color then works cool and floats nicely, but when the size is used hot it drags and gathers and works dry, producing a rough wall. A little alum added to the distemper hardens it and helps to dry out solid and even. The best size is made from parchment clippings, which are put into an iron kettle filled with water and allowed to stand twenty-four hours till the pieces are thoroughly soaked, then they are boiled for five hours, and the scum removed. The liquid is then strained through a cloth.

For mixing colors the whiting and the color required, finely ground, are dissolved separately and then mixed to the required tint. For example, lampblack mixed with whiting makes gray, and the most delicate to the darkest shades may be obtained. For French gray the whiting required is taken and soaked in water, and Prussian blue and lake finely ground in water are added to produce the necessary shade or tint. Buff may be made by dissolving in like manner, separately, whiting and yellow ocher. A little Venetian red gives a warm tone. A good salmon tint is produced by adding to the dissolved whiting a little of the same red, just sufficient to tinge. Drabs of various tints can be easily made by grinding up finely a little burnt umber and mixing it with the dissolved whiting. The sooner the distemper color dries after being laid on the better, and the best plan is to close windows and doors during laying and throw them open afterward.—*Building News, London.*

Qualitative Analysis of Alkaloids.

As well known, reagents for certain alkaloids and their salts have hitherto been wanting. Mr. Maurice Robin proposes, in a new French scientific journal, *Revue Scientifique*, a new method of qualitative analysis of these substances based on the use of sulphuric acid and cane sugar.

A small portion of the alkaloid to be examined is mixed with double its weight of common powdered sugar in a small porcelain capsule, one or two drops of sulphuric acid are added, and the mixture is stirred with a glass rod.

Hydrochlorate of morphine treated in this manner give a very beautiful *rose* color, which passes very rapidly to *violet.*

The latter color is persistent, and resembles that which is obtained on dissolving permanganate of potash. Sulphate of quinine gives a color which is at first *greenish*, then *bright yellow*, and finally *coffee brown*, surrounded by a yellow circle.

Sulphate of atropine gives a *violet* color, which increases in depth till it becomes at length *brown.* With narcotine there is developed a persistent and very characteristic *mahogany* color which cannot be mistaken. With salicine, a *bright red;* with veratrine, a *dark green.* With codeine the reaction is especially manifest, and this is the more interesting from the fact that up to the present time we have had no precise reagent for this alkaloid. The color obtained is a magnificent and very intense *cherry red*, which soon changes and becomes *violet.* This violet tint, which is very beautiful, differs somewhat from that which morphine assumes; and, moreover, these two alkaloids are distinguished very readily by the first reaction, which, in the case of morphine, is accompanied by a *rose* color. This reaction may also serve to show whether, as sometimes happens, codeine has been adulterated with sugar. If adulteration *is* present the *cherry red* and *violet* will make their appearance, while pure codeine acted upon by sulphuric acid shows no change of color whatever.

Suspension by Subdivision.

To the Editor of the Scientific American:

The fact that substances which are quick to obey the universal law of gravitation when in a mass are apparently lighter when in a state of fine division, will doubtless strike most persons as singular when they consider that the relative amount of air displaced by each part of a substance must be the same whether the part be large or small; while to make a body really alter its weight compared to air, it is necessary that the relation between its weight and bulk should be changed. Its specific weight has clearly not altered. How then is the suspension of finely divided substances to be accounted for when, if the same subdivisions be collected into a mass, they will rapidly fall; and also in view of the fact that the force of gravitation acts upon each particle without regard to its neighbors, and will exert its powers whether the particles are separate or aggregate?

It is easy to understand, for example, why a sphere of wood will fall more slowly than a sphere of lead of the same size, the wooden one presenting such a relatively greater resisting surface to the air compared with its weight than the one of lead.

Let us see, therefore, whether the mere act of dividing a substance can alter the relations of weight and resisting surface so as to permit an explanation of this phenomenon.

If two spheres of lead or other homogeneous substance, having the respective diameters of one and ten, be weighed, it will be found that their weights are related to each other as the *cubes* of their diameters, or as one to one thousand, while the relation between the areas of their great circles or surfaces of resistance are as one to one hundred, or as the *squares* of their diameters, thus making the resistance of the air relatively greater in the case of the smaller body.

Now, although only liquids resolve themselves into spheres when divided, yet this reasoning may be regarded as approximately true of the irregular subdivisions of solid bodies, while the levity of fog and clouds will be made more comprehensible. This principle is, of course, applicable to solids immersed in liquids, and also to the ascension of bodies of less specific weight than the fluids in which they are immersed. As the text books do not explain this common phenomenon, I thought that the above might prove interesting.

WM. B. COOPER.

Philadelphia, May, 1881.