[For the Scientific American.]

PLATINIZED LOOKING-GLASSES.

BY C. WIDEMANN

NO. III.

It is now unnecessary to use glass free from color or to require parallelisms of the two surfaces. Bubbles of air, stripes, foreign bodies, pieces of the pots, etc., etc., do not interfere with the process. There is then an economy of 50 per cent in the glass.

In order to manufacture a looking-glass of 5 millimeters thickness, they use at the St. Gobain works a plate measuring 10 millimeters thickness. At the Wailly-sur-Aisne works plates are used having but 7·5 millimeters thickness, as it is only necessary to polish the glass on one side. From this a saving is made of 25 per cent on the thickness of the glass.

Very correct calculations show that Mr. Dodé secures an economy of 80 per cent on platinized glasses, as he uses for that purposes only inferior glass, commonly used for flagons; even common brittle glass can be used without the least difficulty. To this saving there is another to be added, which will astonish the reader. A square meter of glass absorbs about 183 grammes of mercury and 550 grammes of tin, representing about a cost of 4 francs, 40 centimes. A square yard of platinized glass costs 1 franc and 20 centimes for platina. It results from this, that at the Wailly-sur-Aisne works, the superficial square yard of platinized glass is sold at an average of 25 francs. This price is doubled in the mercury manufacture.

There is another circumstance for which this new process is recommended to the public. It is with great difficulty that mirrors are obtained with a curved surface. By the platina process this difficulty disappears, and it is as easy to manufacture curved, round, etc., as horizontal mirrors. There is also no inconvenience arising from upsetting the glasses in transportation, or in placing them in the frame.

Already in this country a company has been organized to manufacture reflectors by the means of silver mica leaves on the posterior face, and fastened together so as to obtain a large reflective surface possessing the desired curves. They are cheap, and easily repaired; but they meet with two great difficulties: the quick alteration of the silvery surface caused by the hydrosulphurous gases of coal with which locomotive reflectors are always in contact, and the want of transparency of the mica and its yellow color. I have no doubt that by the adoption of the platina these evils would have found their remedy, for, as it has been seen before, the reflecting surface is on the anterior part of the glass.

A quite peculiar property of the platinized mirrors will no doubt be applied by architects. The platinized glasses forming mirrors are transparent when the light passes through them. A person placed in the rear of an office can see everything going on in the front office without himself being seen. I insist particularly on this property; it appears to me to give to the platinized glass quite a new application which will increase its sales. This transparency is easily explained considering the small quantity of platina deposited on the glass, which quantity is not large enough to give opacity to the glass and prevent the luminous rays from passing through it. This transparency has received a very amusing application quite lately in Paris, mirrors called *mirrors à surprise*, are sold, which, when a black paper at the back of the glass is removed, allows a photograph or any other image to be seen through the metallized surface appearing as a specter; this photograph is simply applied at the posterior side of the reflecting part, and oiled in order to add to its transparency This toy is varied in very different ways, and has just been applied in the new play of "The White Cat" at Paris, and has caused an immense sensation. So I have no doubt that the inventive mind of the Americans will find thousands of applications for this property, either in applying it to the decoration of stores or to external ornamentation. In theaters or concert halls among flowers it produces the most fairy-like effect. The window glasses of a parlor made thus would be transparent in day time, and at night, when the shutters are closed, the whole window would appear as a large looking-glass, and reflect all lights and objects in the apartment.

The manufacture of glasses with amalgam necessitates great labor. In order to obtain 50 meters of looking-glass a large number of hands and a large plot of ground are required. These glasses must remain loaded with weights from 15 to 20 days; then 20 days more are required to eliminate the superabundance of mercury, and three months more are required before they are salable; not to mention all the precautions that have to be taken at every moment in the shipping and setting in frame. Mr. Dodé & Faure are able to platinize a surface of 800 meters a day, with only the aid of a few hands, as one workmen is able to platinize 50 meters of glass in 12 hours' work.

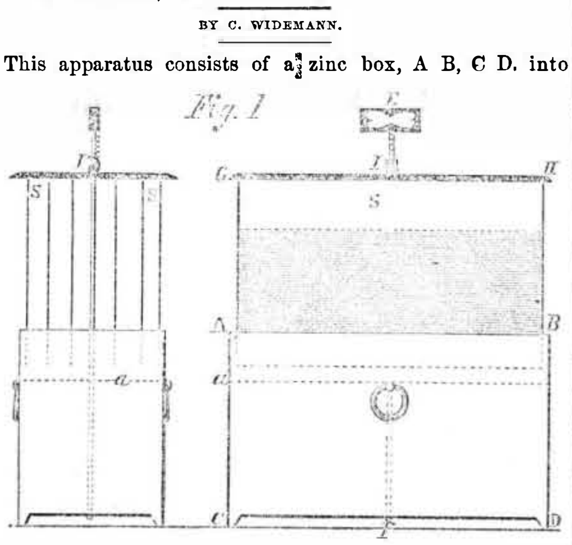
TO SOFTEN PUTTY AND REMOVE PAINT.—To destroy paint on old doors, etc., and to soften putty in window frames, so that the glass may be taken out without breakage or cutting, take 1 lb. of American pearlash, 3 lbs. of quick stone lime, slack the lime in water, then add the pearlash, and make the whole about the consistence of paint. Apply it to both sides of the glass, and let it remain for twelve hours, when the putty will be so softened that the glass may be taken out of the frame without being cut, and with the greatest facility. To destroy paint lay the above over the whole body of the work which is required to be cleaned with an old brush (as it will spoil a new one), let it remain for twelve or fourteen hours, when the paint can be easily scraped off. This recipe has been used by a tradesman. a painter and glazier by trade, for years.

[For the Scientific American.]

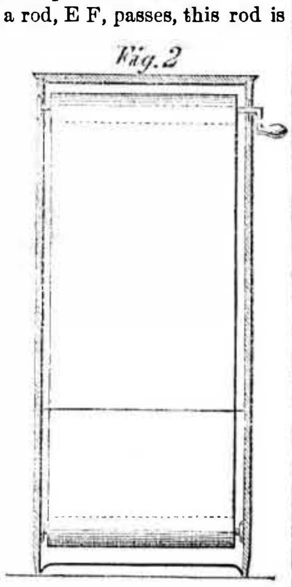
APPARATUS FOR PURIFYING THE AIR BY THE EVAPORATION OF COAL TAR, PITCH, CARBOLIC ACID, PHENIC ACID, OR ANY OTHER DISINFECTANT FOR APARTMENTS, OR HOSPITALS.

BY C. WIDEMANN.

This apparatus consists of a zinc box, A B, C D, into



which the liquid to be evaporated is poured, until it reaches *a*, *a*. In the middle of the box a rod, E F, passes, this rod is provided at its upper end with notches. A cover, G H, provided with blades, S, S, slides down the rod, E F, and can be fixed in any desired position by a hook spring, I, engaging with the notches of said rod.

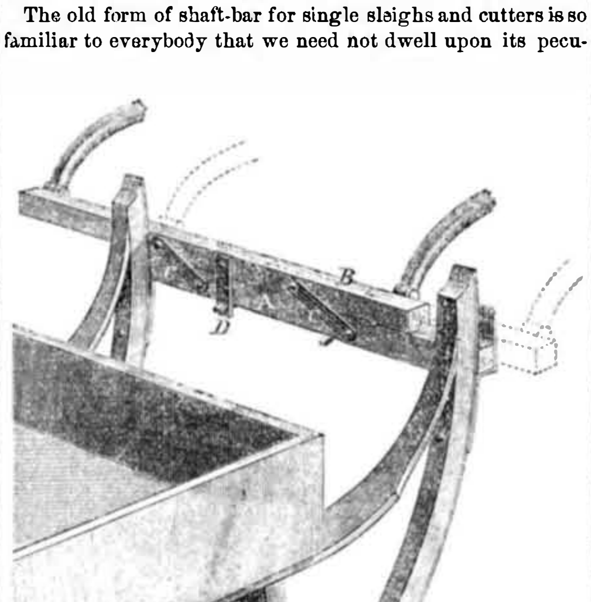


These blades having been dipped in the solution, are raised by sliding them along with the cover, and the air passing through them is saturated with the disinfecting agent. As soon as these blades begin to dry, they are re-dipped in the liquid, and raised as above described—Fig. 1.

This apparatus is very simple, and can be made of wood, tin, or any suitable metal. For hospitals the apparatus is a little modified, as more evaporating surface is required. It consists in an endless cloth passing over two rollers, and dipping in the solution, as shown in Fig. 2.

L. S. CLARK'S IMPROVED SHAFT-BAR FOR SINGLE SLEIGHS.

The old form of shaft-bar for single sleighs and cutters is so familiar to everybody that we need not dwell upon its pecu-



liarities. It provided a means whereby a single horse might travel in the right hand track made by a double team, but whenever it was desired to place the horse directly in front of the sleigh, it was found necessary to have a second pair of attachments. To make the change occupied some time, and required frequently the use of a hammer and wrench to effect it.

The device we herewith illustrate provides a means whereby this change can be effected in an instant of time without tools, and without even taking the horse out of the shafts.

The shaft-bar is double; one portion, A, being permanently fixed to the runners of the sleigh, and the other portion, B, being connected by two bars, C, with A. The bars, C, are pivoted to both A and B. When the horse is desired to travel in the right-hand track, the bar, B, is placed in the position shown, and locked at the fixed bar, A, by the spring latch-bar, D.

When it is desired to have the horse travel directly in front of the middle of the sleigh, all that is necessary is to release D, and throw B over so that it occupies the position shown by the dotted outline, and fasten it there by the latch, D. The change is effected by the hands alone, and scarcely three seconds are necessary to make it.

Patented, through the Scientific American Patent Agency, February 8, 1870, by L. S. Clark, of Bethel, Conn. For town, county, or State rights, address G. M. Lyon & Co., Bethel, Conn.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Inertia---Vis Inertiæ---What are They?

MESSRS. EDITORS:—In a late work, entitled "Force and nature," it is strenuously denied that there is any such thing as inertia in matter. The author bases this denial simply upon the alleged fact, that all matter is in motion; showing that he conceives inertia to be something that pertains only to matter at rest. He is evidently one of those amateur philosophers who enter the temple of science through its third or fourth-story windows, and never take the trouble to descend and examine its foundations, its axioms and definitions; yet he thinks himself competent to demolish the entire fabric and reconstruct it on a new plan, simply because he has traveled much, and seen a great many volcanoes and earthquakes. As the book is destined to early oblivion, it would be unnecessary to notice its error concerning inertia were this error to be found only in its pages; but similar views of inertia have been expressed in the SCIENTIFIC AMERICAN, a publication which is rarely at fault on questions of physical science, and to which thousands look with well-placed confidence for sound advice and instruction on this and other subjects. Errors in such a publication are the more likely to mislead, because they are of rare occurrence.

On pages 217 and 297, Vol. XX., the term inertia is objected to as having received various definitions: as being negative, indefinite, and uncertain in its meaning, and, therefore, liable to mislead; and it is alleged, that there is no occasion for its further use, since it had its origin in "notions of force which are now obsolete."

To the assertion that there is no such thing as inertia in matter, an appropriate reply would be that which the Romans were accustomed to make to absurd propositions: *Nil intra in pruno, nil extra in nuce duri!* "You might as well tell me that prunes have no stones, and nuts have no shells!"

That there is in matter a property which makes it necessary to employ force to impart motion to it, or to increase, diminish, or change the direction of a motion already imparted, is a fact, as well known to us as that prunes have stones, or that nuts have shells; as well known, indeed, as the existence of matter itself; for it is one of the chief characteristics whereby we recognize the existence of matter as a substantive entity. This is the property to which physicists have given the name of inertia. It is not a negative but a positive property, pertaining alike to all matter irrespective of the question whether it be in motion or at rest.

This property of matter was recognized, and received its name, prior to the time of Newton. Newton recognized it and accepted the name, declaring it to be well chosen, as happily indicating the nature of the property; and under this name he made inertia one of the fundamental axioms of his system of physics in the Principia. It is no more possible to construct an inductive system of physics without recognizing this property of matter as a fundamental axiom, than to construct such a system without recognizing the property of gravitation; indeed, to ignore the one, is to ignore the other; for the force of gravitation can have no influence upon matter which offers no resistance. The functions of the two, like action and reaction, are necessary correlatives, inseparable even in thought.

It is true that many definitions have been given of inertia; but this fact does not imply that there is any difference of opinion among physicists as to the nature of the thing defined. A property of matter can only be defined by reference to its modes of manifestation. The property of inertia manifests itself in various ways, thus admitting of as many definitions; but these different modes of manifestation are so correlated that each necessarily implies all the others, so that a definition founded upon any one of these, points us directly to that which is the common cause of all of them, and sufficiently characterizes it for all the purposes of a definition. The following, however, is perhaps a more complete definition of inertia, inasmuch as it is founded upon a feature which is common to all of its modes of manifestation.

INERTIA is that property of matter whereby it offers resistance to the action of any force which imparts motion to it, or which increases, diminishes, or changes the direction of a motion already imparted.

VIS INERTIÆ is the resistance thus offered, viewed with reference to some standard of measurement that comports with its nature as a magnitude.

We see, then, the difference between inertia and vis inertiæ: the first is the property of matter which causes its resistance to changes of motion; the second is the resistance itself considered as a measurable quantity. The "notions of force," entertained by those who recognized inertia as a property of matter and gave it its name, and which are alleged to have become obsolete, were the same as those entertained by Newton, and upon which he constructed his system of physics. He employed the term force to denote a simple quantity, expressible by the single algebraic symbol F, having but one dimension, and referable to simple gravity as its standard of measurement. He did not give that name to the products of F by other quantities, as by time, F t, or by space, F s; nor to what has been called "the force of a moving body," meaning its power to produce effects during the extinction of its motion; a power which is proportional to the product of its mass and velocity, M v, when the effect to be produced is the extinction or production of motion in other matter, and to $M v^2$, when the effect contemplated is such as belongs to the