### BRASS FINISHING BY ACIDS.

Many articles of brass cannot readily be finished by the file or by abrading substances, owing to the intricacies of their surfaces. Especially is this true of brass castings of an ornamental character. But a most elegant finish can be obtained by means of acids, which may be protected, if desired, by means of a lacquer or varnish; the acid finish, however, is generally preferred without the addition of a varnish.

If the work to be finished is greasy, it should be cleaned by heating and dipping in acidulated water—vinegar and water, or washing soda in water—and then in clear water. The finishing bath may be either nitric acid two parts, water one part; or one part sal ammoniac, one part sulphuric acid, one part nitric acid, one part water; all by measure, and the sal-ammoniac to be dissolved in water until a saturated solution is obtained. The articles should not be allowed to remain in the acid more than ten seconds, then taken out, plunged into clear, cold water, thence into hot soapy water, and dried in hot sawdust.

### Hooks and Eyes.

For more than a dozen years the manufacture of hooks and eyes for women's and children's dresses may be said to have been dead, buttons having superseded them. But there are indications that hooks and eyes are again to come into use, at least to a considerable extent. If this should prove to be the case, it will gladden the hearts of some who have preserved their machinery from the scrap heap. Thirty years ago the State of Connecticut had manufactories within her territory that produced these little articles to the value of $112,000 annually at fifteen cents a gross. Previous to 1830, or thereabout, hooks and eyes were made by hand and sold at $1.50 per gross.

The machines for making hooks and eyes are quite ingenious, those for the hooks being capable of making ninety per minute and those for the eyes one hundred and twenty per minute. That for making the hooks takes the wire from a reel through a straightener, cuts off the wire to the exact length, when a blade strikes the piece in the middle of its length, and two side blades moving simultaneously bend the wire double, laying the two halves of its length close together and parallel. Then two pins rise, one on each side of the ends of the wire, to form the eyes of the hook, and two semi-rotating pushers bend the ends round the pins, making the eyelets for sewing the hook on to the fabric. The unfinished hook is still perfectly flat, when a horizontal pin, and a vertical bender working upward, curve the double end of the hook, and a presser flattens the end to a "swan bill." The eye is formed in another machine, but by means of similar appliances. Brass wire is used for silvered hooks and eyes and iron wire for the black or japanned goods. The silver coating is made by mixing an acid precipitate of silver with common salt and the cream of tartar of commerce to produce a paste. Certain proportions of this paste and of the brass hooks and eyes are placed in a tumbling barrel, and by attrition and affinity the brass and silver unite. The articles, as they come from the tumbling barrel, are of a lusterless white, but are polished by being placed in cotton cloth bags with bar soap and rubbed with hot water under the vibrating arm of a washing machine.

### A New Torpedo and Shrapnell Shell.

Under date of Constantinople, January 9, the New York *Herald* prints a dispatch which states that at the trial of torpedoes recently on the Bosphorus, Daoud Bey, a Turk, produced a torpedo, invented by himself, the motive power of which is obtained by means of rocket tubes. Daoud's weapon attains a speed of 200 yards in 20 seconds, and is declared by experts to eclipse any torpedo yet invented.

It adds to this an account of Gen. Berdan's invention, viz.: a fuse for shell projectiles that cannot possibly fail to effect explosion at the right moment. Briefly stated, the principle involved consists in utilizing the rotary motion of the projectile to ignite a fuse after the former has made a certain number of revolutions. The rifling of the gun determines the space passed over in each revolution, thus permitting the adjustment.

THE habit which the editors of some so-called practical journals have of sneering at and deprecating the use of symbols for indicating mathematical operations is a very pernicious one, and is an insult to their intelligent readers. It is almost superfluous to say that any man who does not know that + means *plus*, and — means *minus*, and that $\sqrt[3]{}$ denotes that the cube root is to be extracted, does not know enough to perform the operations indicated, even though they be expressed in the plainest English possible. Those who do know enough to add, or subtract, and extract the cube root, know the value and convenience of the symbols denoting those operations, and the only effect any attempt to decry their use can possibly have upon their minds is to create a feeling of contempt for those who ridicule their use.—*The Locomotive.*

PETROLEUM wells to the number of 2,890 were put down in 1883, against 3,260 in 1882, and 3,852 in 1881. In 1883, 245 dry holes were found, against 180 in 1882, showing that the limits of the different oil fields are now pretty well defined, and the prospector who goes outside of them has a pretty good chance to fail in "striking oil."

### Tanning by Electricity.

Making leather is now essentially the same in principle as it was in the days of the Pharaohs. Improvements have been made in the methods of depilating, or removing the hair, from hides and skins, and machinery helps to forward the work in both tanning and finishing, but the aid of a vegetable astringent—tannic acid—is necessary in combination with the gelatine of the hide to make true leather. And this is a long operation, requiring, for sole leather, from four to eight months, and the lighter harness and upper leathers less in proportion. It is now claimed that this long tanning process can be shortened by electricity, and an English patent has been issued with this object. It is well known that hides being "sweated" for unhairing give off a great deal of ammonia, from the combination of the nitrogen of the gelatinous tissue with hydrogen. This process of decomposition is immediately checked when the hides go into the tan liquors, but the precise chemical reactions which take place in the vats have never been clearly understood. In heavy sole leather it is claimed that, in many cases, tannin is deposited by precipitation in the hide cells, besides that which is directly taken up by combination with the gelatine.

The new process proposes to hasten the tanning by enhancing chemical affinity by means of electrical currents, and thus making these reactions more active. The method is to pass a current of electricity through the vats containing the tannin infusion and the hides. The vat becomes simply a large voltameter, in which gases are evolved by the decomposition of water—hydrogen at the cathode and oxygen at the anode. The arrangements are such that the hydrogen alone acts upon the hides, where it rapidly combines with the nitrogen of the tissues and produces decomposition of the gelatinous matters. After a short period, according to the usual manner of changing tan liquors, the solution of tannin is replaced by a more concentrated one, and the current is reversed in direction, so that oxygen is evolved among the hides, where it oxidizes the tannin and precipitates it in the pores and intercellular spaces in the tissues.

### The First Steam Fire Engine.

Along in 1864, an errand led the writer into Greenwood's foundry, at Cincinnati, and having to wait a while to see Mr. Greenwood, I was allowed the privilege, then seldom granted, to go into the work room where the inventor of the steam fire engine was at work. It was a long, high room, the walls on the east side being hung with drawings of the engine. Beneath the drawing ran a long work bench, and at this stood a very diminutive specimen of a man, short and spare, stoop-shouldered even to deformity. He had a square white paper cap on his head, and was busy measuring something while I looked at him. I saw that his head redeemed his poor body, for it was massive, and the eyes had in them the light of genius. In a moment he turned to me and asked: "Did Mr. Greenwood give you permission to come in here?"

"He did, sir; he told me to come and see how the steam fire engine was getting on, so I could report its progress to Mr. Probasco" (of the great hardware house of Tyler Davidson & Co.).

"Ah, very well," said the inventor, "very well. My name is Latta, Moses Latta, and Mr. Probasco knows me well, and, as you come from him, you shall see what few see. Can you in any way or to any extent understand drawing on the wall?" I confessed that I could not. "Well, it is very simple. Let me explain. The engine is intended to throw at any time eight streams of water—four from each side—and whenever the water can be obtained in sufficient quantity for the eight streams, there will be no trouble in supplying them to the eight lines of hose. It is intended, of course, to take the engine to the scene of the fire with horses—four horses. As the engine starts out the furnace is fired up, and ordinarily, by the time we shall arrive at the fire, steam will be up and the engine ready for service. Eight of these large streams forced out on to a fire with the pressure we shall be able to command will drown any fire; even four of them, well directed, will be of wonderful value. But," added Mr. Latta, "the trouble is that there is no certainty that this or any other steam fire engine will ever run to a fire. You are not aware, probably, how bitter the feeling of the volunteer firemen is against this engine. They say it shall never throw a stream on a fire in this city. The recent riots here show what a mob can do in our city, and I fear sometimes that I shall never live to see this grand idea brought into the service of the world. My steps are dogged; spies are continually on my track; I am worried with all sorts of anonymous communications, threatening me with all sorts of ills and evils unless I drop work on this engine and pronounce myself a failure."

The old man's eyes flashed as he said: "I'll never give it up! I'll build it, and there are men enough in this city to see that it has a fair trial, and it shall have it. When it is finished, it will be heard from at the first fire, and woe to those who stand in its way!"

With that we separated. As the time approached for the public trial of the engine, the volunteer firemen were in a ferment. It would never do to destroy the engine before it had a trial, and to destroy it after a successful exhibit of its powers was made equally useless, so it was understood that no demonstration, *pro* or *con*, would be made on it until it should come to a fire; then it was to be rendered useless, and all who had a hand in its working were to be rendered useless, too.

The public trial came off. The engine far exceeded in efficiency anything that had been claimed for it by its inventor or by his backers, and a feeling of satisfaction swept over the city at the knowledge that such a great auxiliary power was with them to fight fire. Still it was known, or believed generally, that its first appearance at a fire would be the signal for as bloody a riot as had ever disgraced the city. The volunteer fire department was there, as everywhere else, a political ring, far more efficient, under ordinary circumstances, at the polls than at a fire, and its members were to a man selected for their "influence" at the voting precincts and for their ability to make the contents of the ballot box, when it was emptied, show "by a large majority" their man ahead, no matter what kind of ballots had gone into it. Then, if this "steamer" was of any account, it would ruin and break up not only the companies, but their friends and backers, and the manufacturers who built hand engines.

One night an alarm rang out from some great warehouse on Third Street, near Main. A minute or two elapsed to the listeners on Main Street, above Fourth, and then down came the great steam fire engine, four mammoth gray horses in front of it at a gallop, the smoke streaming from its stack, the fire flashing from its grates, its ponderous wheels grinding the cobble stones into powder as they struck them, and, as the great monster went down the hill, people woke as out of a trance, and started after it.

The engine was brought in front of the block, and soon stream after stream shot from it. The warehouses were among the most valuable in the city, and were stored with costly goods. The time had come, the engine was there, four streams had been gotten on, when the cry, "The hose is cut!" rang out. Then the melee began, but the citizens were stronger than the volunteer firemen, and after a struggle the "steamer" drowned the fire and was taken home.

The next morning Moses Latta awoke to find himself famous, and the action of the appreciative citizens of Cincinnati soon put him in a position where his genius was made more available to the world. The "steamer" of today has little in it outside of the fact that it is built to effect the same purpose as was Latta's engine, but that was the germ of all those which now at the tap of the electric bell seem to hitch themselves to the horses and tear down our streets when an alarm is struck.—*Chicago Herald.*

### Oiling the Waves.

Wm. J. Card, captain of the coasting schooner Turban, reports some interesting particulars of his use of oil to break the force of waves, on a voyage from North Carolina to Nova Scotia, in September last. The schooner was of 163 tons registered, with a cargo of 300 tons railroad iron, which loaded her down until her gunwales were not more than two feet above water. On the third day out the weather became boisterous, and on the following morning, soon after daybreak, the vessel ran into a gale. The wind was varying about from southeast to northeast, and blew up a heavy sea, the fury of which was increased by a cross sea, caused by the hurricane that had prevailed for some days to the southward of the vessel's position. The schooner, by reason of her deep loading, was completely at the mercy of the seas, which broke over her with terrific force.

Soon after noon Capt. Card stationed a man in the bow of the schooner—it being unsafe to venture on the jib-boom, which was in danger of being carried away by the seas—and directed him to throw over from a small oil can a little oil at the approach of every "comber." The oil was poured out through the spout of the can, and the Captain estimates the quantity thrown over each time at rather less than an ordinary tumblerful. As the supply on board was limited, it was thrown out only at the approach of very heavy seas.

At first petroleum burning oil was used, and while this had some effect, it was not heavy enough to thoroughly break the wave, and linseed oil—some ten gallons of which had been laid in for painting purposes—was then employed. The result was in every way satisfactory, and the use of the oil was continued for about fifteen hours, by which time the supply was exhausted. The fury of the gale had, however, subsided, and the schooner reached port in safety. Capt. Card says that without the use of the oil the vessel could not have lived out the gale—the effect of the oil having been to level the comb of the wave and prevent its breaking over the vessel.

SOMETHING new in a conductor's outfit has recently been introduced on one of the Brooklyn horse car lines. In the fare-recording apparatus swung from their necks, so the passenger can see his fare noted, is fixed a watch, so the passenger can also see the time. Of this innovation a conductor lugubriously said to a reporter of one of our contemporaries: "I come pretty near getting mad sometimes, when a passenger catches hold of me and turns me around like a wooden man, to see what time it is, but as that is what the watches are for I don't know as I ought to object. I suppose at this rate they'll keep on fitting us out with things for the accommodation of the public until a man won't be considered fit for a car unless he has got a calendar stitched on to the back of his coat, a thermometer hanging from one buttonhole, and a city directory hooked to a strap around his waist."

CURE FOR CRAMP.—The simplest and best method, says the editor of the *Pacific Medical and Surgical Journal*, is a bandage applied above or below the knee, preferably the former.