Hard Rubber Casting Patterns.

BY JOHN T. USHER.

India rubber has been employed by the writer with very satisfactory results for making small patterns. Such patterns can be made and finished more cheaply than those made of metal and in many cases more cheaply than those made of wood. Patterns made of rubber are especially adapted to card pattern work, which consists of a number of patterns grouped together and attached to a metal plate, or upon a wooden board, together with the gate and spun channel pattern, the iron moulder being enabled thereby to produce at one operation a mould complete, ready for pouring in the metal. The rubber patterns are also eminently adapted for use in connection with a follower board, for grouping generally or to be used singly. The advantages claimed for rubber patterns are: 1. Their extreme lightness; (2) durability; (3) strength; (4) freedom from shrinkage and warpage; (5) freedom from the attacks of water or acids, heat or cold under ordinary conditions.

It is presumed that all the readers of the India Rubber World are acquainted with the manipulation of rubber in a general way. Therefore only a summary of the methods employed in making the preliminary patterns and moulds from and in which the subsequent patterns are produced will be given.

The preliminary patterns can be made of wood, beeswax, modeling clay, or modeling composition; in fact, of any substance which can be shaped to the desired form and which will retain this form long enough to allow an impression to be taken in plaster of Paris. In many cases the preliminary pattern can be formed all the more easily by making a face pattern of either of its sides. Then pour an impression of the face pattern and form the preliminary pattern therein or thereon with beeswax, and then pouring or making a plaster mould on or of that as the case may be, the face pattern or mould upon or in which the preliminary pattern is formed serving as one-half of the mould. The other half mould being made by pouring or making a counter-impression directly on or in the first impression of half mould, cutting rings, grooves, or depressions some distances from the mould surfaces proper to locate the two halves of the mould in their respective positions.

The moulds can also be made in plates or metal without any preliminary pattern in the usual manner, if preferred. When the plaster moulds are to be used to make patterns in, they must, after being made, be invested in a metal flask. After the first pattern has been made, it may be used as a pattern for making all the subsequent plaster moulds needed. When a preliminary pattern has been made or is available, the plaster moulds should always be made directly in the flasks, thereby avoiding the necessity of inverting the moulds after they have been made.

To pour an impression, and in making moulds of plaster in order to get the best results, the article to be poured should be first shellacked and allowed to dry, and then soaked in water for ten minutes or more, and then poured while it is still wet. If the article to be poured is made of some other material than plaster, it may be dipped in water and then poured while still wet, but on no account must oil or any greasy substance be used to insure an easy separation if the latter are to be used for making the patterns in.

In pouring an impression, the amount of water necessary to saturate the plaster is first poured into a soft rubber bowl, a pinch of common table salt is then added and stirred in, the plaster is then added by shaking it out of a scoop in order to loosen it as much as possible, then let it stand a few seconds until thoroughly saturated; the surplus water can then be poured off, and the plaster stirred or mixed. If this has been done properly, the mixture will then be of the consistency of thick cream. When salt has been added the plaster must be used immediately, as it commences to set very quickly. In no case must the plaster be put into the bowl before the water, as it will nearly always come out lumpy after being mixed, and it is also liable to crumble away during the process of vulcanizing. In pouring an impression, a little of the plaster is first poured on the highest part and is then made to flow to and around the lower parts as quickly as possible by taking the article in the hand or hands and jarring it sharply; a little more plaster is then added again on the highest part and the jarring repeated, and so on until enough has been added. Should the jarring be omitted when pouring, or too much plaster be added at one time, the chances are that the work will be imperfect.

Should the shape of the moulded article be such that the parts cannot be separated by inserting the point of a knife blade between them, without the risk of breaking, then the part that has been poured must be carefully cut away until the shell and surface can be seen through the plaster. This cutting can in most cases be done in such manner that the parts can be lifted away in large pieces, leaving the part it is desired to save intact.

In making hard rubber patterns, where the body of the pattern or any part of it would be more than ¼ inch in thickness, it will be necessary to so arrange the moulds as to produce a shell pattern.

When cores are used, the plaster of which they are made must be mixed with carbonate of lime, as whiting, chalk, or marble dust, in such proportions as to allow of its being readily dissolved in acid after the patterns have been vulcanized. This removes the cores, the plaster of Paris being in itself insoluble. A mixture of half plaster and half whiting will be found to be very satisfactory for making the cores.

If the patterns are immersed in muriatic or sulphuric acid, the whiting will dissolve very quickly, leaving the plaster as a precipitate, which can be easily washed out with water, without in any way injuring the pattern. Paper also makes an excellent core for this purpose; in fact, better than plaster. When metal moulds are desired in preference to those of plaster, it will be found easier and better to first make the plaster moulds, and then, after carefully shellacking them, to use them as patterns from which to cast the metal moulds.

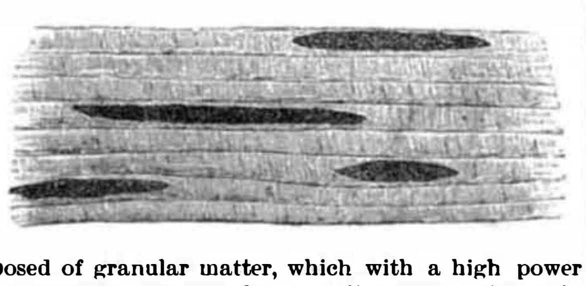
Before packing the plaster moulds, the surfaces proper should be coated with collodion. After being packed, they should be put into boiling water for a few minutes to soften the rubber prior to closing the moulds. The pattern may then be vulcanized. After vulcanization they must not be taken out of the moulds until thoroughly cold, otherwise they are liable to warp.—India Rubber World.

A PARASITE VERY NUMEROUS IN HOGS.

BY PROF. JOHN MICHELS, LATE U. S. DEPARTMENT OF AGRICULTURE.

During the four years in which I had charge of the inspection of hogs for the United States government, my attention was drawn to a parasite which was so numerous that it was found almost daily during the search for Trichina spiralis under the microscope.

This parasite, shown in the cut which accompanies this article, has the appearance of an elongated worm with a blunt point at each end. It assumes many forms, sometimes being narrower and longer than shown in the drawing and at other times broader and shorter, and even almost round. The interior is composed of granular matter, which with a high power proves to be embyros, the worm-like body being only a sac.



These sacs are sometimes very numerous in the muscle, while each sac contains many hundreds of the embyros; taken together the number existing in some hogs must be counted by the million.

This parasite, which is considered to be harmless, is called by the United States Department of Agriculture "Tarcosperidium," and by the Germans "Psorospermien," and it is remarkable, considering their great number in a food product, that little appears to be known of their life history.

I have made preparations of the sac for microscopical examination, and expelled the embryos from the sac, which prove to be the shape of half moons.

Rapid Fire Guns.

One of the most important lessons of the naval battle of the Yalu River was the demonstration of the great importance of the rapid firing guns, especially when the ships to which they are opposed are not protected. The recent trials at Indian Head will probably lead to the adoption of rapid fire mechanism hereafter for our 6 inch guns. Two 6 inch breech-loading rifles fitted as rapid fire guns have been tried. One was fitted with a Dashiell breech mechanism, and the other with Lieut. F. F. Fletcher's new breech mechanism. The record claimed for the Fletcher gun is said to be five rounds in 54 seconds. This invention is a close competitor of the Armstrong gun of the same caliber, six rounds in one minute being fired from a gun of that make a short time ago. The Krupp gun of 15 centimeters, which is equivalent to 5·87 inches caliber, was fired at the Meppen ground at the rate of eight aimed shots per minute, and eight shots were fired at a target 3,000 meters away in 40 seconds. On the British Royal Sovereign a series of ten aimed rounds were fired from an Elswick gun in 1 minute 57·8 seconds. The French rapid fire Canet guns 5·91 inches caliber have been equally successful. In England an 8 inch Armstrong gun has been tested which gave very remarkable results. The interval between the shots for an ordinary 8 inch piece is about 1 minute 15 seconds; the new Armstrong gun fired shots at an interval 15 seconds with a crew of only five men.

The mount for a rapid fire gun is hardly second in importance to the gun itself, as quick loading and firing would be of very little value without special facilities for training, elevating and sighting; mounts are now receiving great attention both at home and abroad.

Water.

Pure water consists of 2 parts hydrogen and 1 part oxygen. Chemical name hydrogen oxide, chemical symbol H_2O. Pure water is a colorless, odorless, tasteless, transparent liquid, and is practically incompressible. Water freezes at 32° F. and boils at 212° F. At its maximum density—39·1° F.—it is the standard for specific gravities, and 1 cubic centimeter weighs 1 gramme.

1 United States gallon	=	231 cubic inches.
		0·13369 cubic foot.
		8·3311 pounds—distilled water.
		8·34 pounds—in ordinary practice.
1 cubic foot	=	62·425 pounds at 39·1° F., maximum density.
		62·418 pounds at 32° F., freezing point.
		62·355 pounds at 62° F., standard temperature.
		59·64 pounds at 212° F., boiling point.
		57·5 pounds at ice.
1 cubic foot	=	7·485 U. S. gallons.
1 pound	=	27·7 cubic inches.
1 cubic inch	=	0·03612 pound.

A column of water 1 inch square and 2·31 feet high weighs 1 pound.

A column of water 1 inch square and 1 foot high weighs 0·433 pound.

A column of water 33·947 feet high equals the pressure of the atmosphere at the sea level.

One pound per square inch equals a column of water 2·31 feet in height.

0·433 pound per square inch equals a column of water 1 foot in height.

Water is an almost universal solvent; consequently pure water does not occur in nature. Sea water contains nearly every known substance in solution.

The latent heat of water is 79 thermal units. When water freezes, it gives off its latent heat. The latent heat of steam is 536 thermal units. When steam condenses into water, it gives off its latent heat.—Catalogue of Holly Manufacturing Company.

The Iowa Meteorite.

The Boston Commonwealth says: A close examination of the fragments of the Winnebago County (Iowa) meteorite has been made by Prof. H. A. Newton, of Yale College. More than a thousand pieces of the meteor are in the museum at Yale, and the examination of them results in some interesting deductions. The meteor was a very noticeable one and attracted the attention of very many persons over a large extent of country, from the comparison of whose stories the details of the meteor's approach have been determined. One man, a surveyor, had the presence of mind to direct his theodolite to the cloud left after the explosion, and an accurate reading of his circles gave most reliable data. The fragments were scattered over several square miles, and vary in size from a grain of dust, almost, to some eighty pounds. It is estimated that the meteor must have been at least five hundred pounds in weight and was perhaps as large as a small flour barrel; and that it approached the earth with planetary velocity, or about ten miles per second, in an orbit not unlike that of the earth itself until within about five miles, when it burst. After the explosion, the velocity of the pieces could not have been greater than that of sound, or about a quarter of a mile per second. After the primary explosion, there must have been numerous minor ones, evidence of which is to be seen in the fragments themselves. Their velocity was so great that the friction of the surfaces against the air caused the material to fuse and to flow backward over the edges. Different stages of fusion are clearly noticeable, and in addition many cases of fresh fracture, which must have taken place when the fragment was quite close to the earth.

How to Arrest a Boil, Carbuncle, or Malignant Pustule.

Dr. Barker writes to the Medical Summary that he has used the following procedure for several years with unvarying success: Take a large hypodermic syringe, holding say half an ounce, fitted with a small needle. Fill it with a 1 to 500 solution of mercuric chloride, insert the needle into one of the peripheral openings, in case it is a carbuncle, and wash out the little cavity. Then direct the needle toward and into the surrounding induration and force a little of the solution into it. Treat each opening and its corresponding peripheral circumference in the same manner, carefully washing out the necrosed connective and other tissues that have become separated. Repeat this daily with the solution, gradually reduced to one-half the original strength, until all induration has disappeared and granulations have begun to appear. If the first injection be thoroughly performed, the spread of the carbuncle will be arrested at once and there will be no more pain. Washing out the little cavities is painless, but the injection into the indurated tissues is not free from pain. The same treatment is applicable to the little feruncles that invade the meatus auditorius externus and the inner surface of the alæ nasi.—Medical and Surgical Reporter.