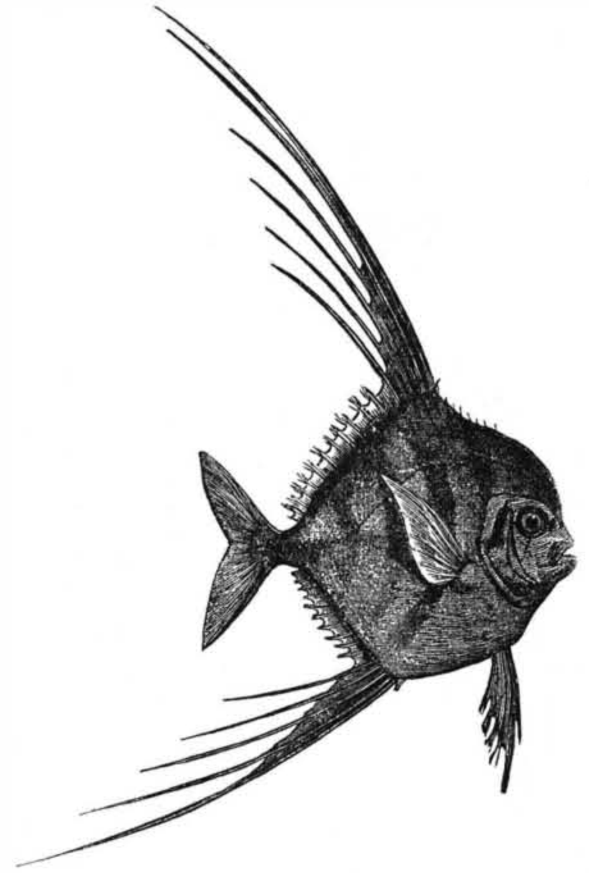
THE CORDONNIER, OR COBBLER FISH.

This fish (*caranx cilianis*) derives its name from the long sharp spines of the dorsal and anal fins, which to many persons have a fancied resemblance to the awl and bristles employed by cobblers in their trade. It is found quite common in various localities, from the Red Sea, throughout all the Indian seas, and is a good example of the genus to which it belongs. No less than seventy species having been classed in this genus.

The form of this fish is sufficiently curious to render it a conspicuous species, and it may be easily distinguished from



its many congeners by an oblong spot on the aperculum and six black bands that are drawn across the body, reaching nearly to the abdomen.

HOW TO CHUCK AND BORE AN ENGINE CROSSHEAD.

A correspondent asks: "How can I chuck a crosshead for a 12 horse engine, and ensure that the holes for the piston rod and the wrist pin shall be true and at right angles with each other?" If the crosshead is a forged one, or if it is of cast iron and the first one cast from the pattern, it will be necessary to line it out with a square, compasses, and scribing block to ensure that there is stock enough to allow it to work clean; if, however, it is known that there is ample material to come off, this may be omitted. The hole for the wrist pin should be bored first, because one hole must be used in connection with a mandril when chucking the crosshead for the second boring. It is easier to turn a mandril for the wrist pin hole than to turn one for the piston rod hole; and furthermore, the wrist pin mandrel can extend through both sides of the crosshead, which would be inconvenient in the case of the piston rod hole on account of the taper.

If the crosshead is lined out, and the lines are carried the full length of the casting or forging, they will still be too short to set the crosshead by, because the thickness of a fine line in the length of the crosshead becomes considerable when multiplied by the length the connecting rod will be; hence, when the crosshead end of that rod is connected, a very minute variation from being square with the wrist pin will cause the connecting rod to require to be sprung to come as it should be with the crank pin journal, unless, indeed, the error be corrected by filing the bore of the connecting rod to suit the want of squareness in the wrist pin. If the latter expedient is resorted to, the brasses at that end will wear unduly on one side face. From these considerations we proceed as follows: We first chuck the crosshead to bore the hole for the wrist pin, clamping it to the face plate of the lathe, and setting it to the scribed lines, if there be any; or we may chuck and hold it by the outside of the metal, trying it with the surface gauge as well as making it run true. By so doing, if there is a want of truth in the casting or forging, between the part parallel with the lathe centers and that parallel with the lathe face plate, we may divide the difference between the two. While setting the crosshead, the holding plates should not be screwed up too tight, so that the work may be moved without giving it heavy blows. When the work is set, the plates must be tightened up gradually, first tightening one a little and then the other, until whole are sufficiently tightened. This is necessary, because completely tightening one bolt first may spring or force the work out of true. After the whole of the bolts are tightened the setting should be tested, to ensure that the work has not moved. The next procedure is to balance the weight of the crosshead upon the lathe face plate by bolting thereon a weight as a counterbalance, testing the balancing by pulling the lathe round by hand and observing if the face plate always stops with one particular part of the work uppermost. If it does, further counterbalancing is necessary. The hole should be bored with a stout tool, held as close in to the tool post as the circumstances will admit. The last boring should be taken at a comparatively fast speed, and with a fine cut.

The next operation is to turn up a mandrel to fit the holes bored as above. The length of this mandrel should be equal to the diameter of the lathe face plate. This mandrel need not be turned from end to end, but only just as far as to let the mandrel stand central with the face plate when the crosshead is chucked the second time. The mandrel should be for an inch at each end parallel and of equal diameter, its middle being a snug fit, so as to drive very lightly into the two wrist pin holes.

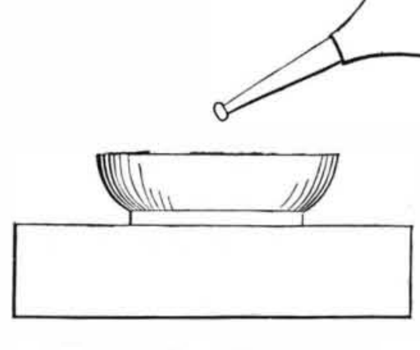
Then chuck the crosshead to bore the piston rod hole, setting it so that the mandrel stands exactly parallel with the face plate of the lathe, and making the outer end run true according to the outside of the metal. To test the setting, the surface gauge is held against the face plate and the hook end of the surface gauge scriber is tried over each end of the mandrel, taking care that the scriber point touches the mandril very lightly, as otherwise it would be apt to spring. After the turning at this end is roughed out, it would be well to test the work again, because sometimes the packing used in setting the work will compress a little, throwing the work out of true. In cases where the rod end is tried into the hole to fit the taper, watchfulness is required to see that trying the rod does not affect the setting of the work. In finishing the work, two or three fine cuts should be taken so as to ensure a clean, true, and smooth taper hole, which will not take much grinding to get a smooth polished bearing. Instead of using a chalk mark upon the rod end in trying it into the crosshead, it is better to use a little Venetian red mixed with lubricating oil, giving the work a very slight coat.

SIMPLE WAY TO MAKE ICE.

Among the different principles on which the production of artificial cold is founded, stands foremost the evaporation of volatile liquids, during which evaporation the heat made latent in the vapor causes its temperature to be far below that of the liquid from which it originates, and so robs the remainder of this liquid and the surrounding bodies from a great deal of their heat, in this way producing a cold of which the intensity is proportional to the rapidity of the evaporation, and therefore depends greatly on the degree of volatility of the liquid used.

It is a common lecture room experiment to freeze a small quantity of water under the bell jar of an air pump, when the vacuum is produced with sufficient rapidity; a tablespoonfull of water placed in a watchglass may be frozen in less than a minute, all what is necessary is that the pump be able to remove the watery vapor formed as fast as it is generated. If the air pump is not in perfect condition, it is necessary to add some auxiliary agent, and this is to place under the bell jar a flat dish filled with sulphuric acid; this, by its great affinity for watery vapor, aids the action of the pump, and makes the experiment successful, even if the pump is in a lesser degree perfect.

This lecture room experiment has been modified into a practical machine by Carré of Paris, and is since some years in operation in many of the Paris restaurants. It consists of a hand air pump, which exhausts the air and watery vapor from a strong glass bottle half filled with water, while this air and vapor before reaching the pump passes through a cylinder with sulphuric acid, which retains most of the watery vapor and makes the evaporation so rapid that a quart of water can be easily frozen in a few minutes, according to condition of machine, of season, and locality.

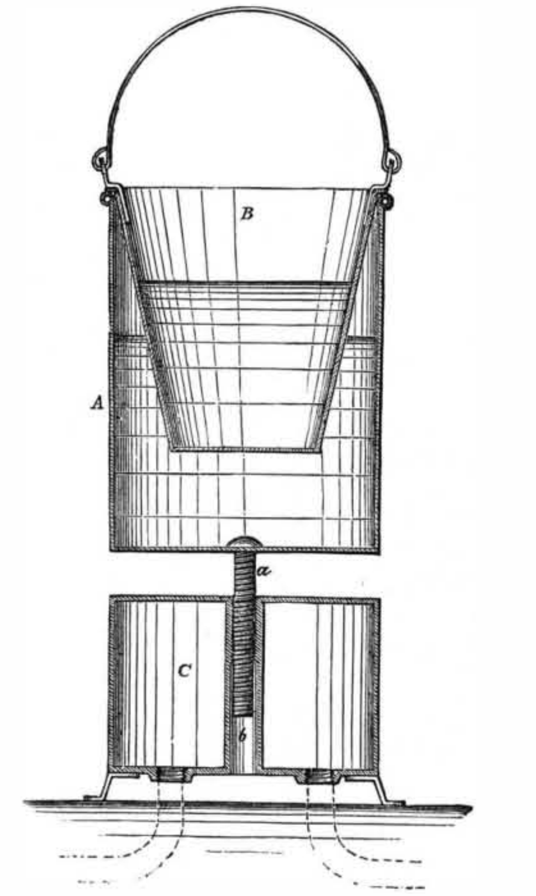


But in place of freezing water by its own evaporation it is more advantageous to use a liquid of greater volatility, such as ether, carbon bisulphide, liquid ammonia, chymogene, or even liquefied carbonic or nitrous oxide. The latter two substances are indeed so volatile that it requires no machinery to freeze water with them; it is sufficient to surround a vessel with either of those substances, when the water in it will be rapidly congealed.

Less volatile substances may also be made to evaporate rapidly enough to freeze water, without the aid of vacuum pumps, by simply aiding their evaporation by means of a blast of air. Böttger has published a simple method of which the whole apparatus required is represented in the engraving. It consists in a flat dish of very thin sheet copper, in which some carbon bisulphide, ether, or chymogene is poured; this dish is placed on a small square board of pine wood, on which some water is placed, so as to be between the board and the bottom of the dish. When in this condition the nozzle of a bellows is kept over it in the position indicated in the figure, and by working the bellows a blast of air is thrown upon the surface of the volatile liquid in the dish, and so its evaporation accelerated. After continuing this for a little while, the water under the dish is found to be frozen.

IMPROVED GLUE POT.

The desirability of keeping glue, while being used, at the right temperature, and avoiding all liability of its boiling



over, on the one hand, or of becoming chilled on the other, is well known to mechanics who have occasion to prepare and use the material. By the invention illustrated herewith this is claimed to be accomplished with certainty and without trouble. To the center of the under side of the bottom of the shell, A, is secured a screw, *a*, which extends downward and at right angles to the bottom. C represents the base, from which emanates the heat designed to dissolve the glue. This base has formed through its center an orifice, *b*, which has within it screw threads corresponding to the threads on the screw, *a*. The upper surface of the base, C, is closed, as well as its under surface. The screw, *a*, after being entered within the orifice, *b*, may be received entirely within said orifice, or but partially so.

Heat being applied into the base, C, by steam, or in any other desirable manner, the shell, A, of the glue pot is turned so as to send the screw, *a*, after being entered within the orifice, *b*, which will bring the under surface of the shell closely in contact with the upper surface of the base. In this position the greatest amount of heat is brought to bear upon the glue pot, and the glue within it very speedily begins to boil. Now, to keep the glue, after being properly prepared, at the requisite temperature, it is only necessary to revolve the shell, A, until its bottom is brought out of contact with the surface of the base. In this position a stratum of air, entering between the base and the bottom of the shell, will modify the temperature to any degree desired; and by simply screwing up or down the cylinder, A, bringing it nearer to or further from the upper surface of the base, the glue may be kept on the boil, or simmer, or otherwise, at pleasure, without danger of boiling or getting too cool to use. This invention was patented January 11, 1876, by Mr. C. S. Comins, of New York city.

Hospitals for those who can Pay.

What is called the Home Hospital Association has been organized in London for the purpose of providing comfortable hospital accommodation, with skilled nurses, in various parts of London, for the benefit of patients who can afford to pay for such advantages. Such hospitals will not only be a great convenience to the public, but will prevent the abuse of charities intended only for the poor.

A scheme is also on foot in London for the establishment of a large hospital composed of separate departments, each devoted to special diseases. It is thought that in this way one general medical staff may be able to superintend the whole institution, and that the material may be rendered more valuable for purposes of clinical instruction.

AN analysis by Charles C. Dreuding shows that the organic constituents of cotton root bark are a red and a yellow resinous coloring matter, fixed oil, gum, sugar, tannin and chlorophyll.

ON August 20th last, Frederick Cavill swam the English channel, twenty miles, from Cape Grisnez, France, to Dover, England. Time, 12 hours.