tire and hub were shown, the exhibit would be complete. The wheels are painted brilliantly red, which might be described as mono-chrome-engineering.

Guanine.

The perfectly white solution of the scales of the bleak (*leuciscus alburnus*), a fish indigenous to the rivers of France, is now used largely for the manufacture of artificial pearls. The solution or guanine is a mucus which lubricates the scales of the fish. It coagulates by heat to a thick, white deposit, and is obtained by carefully scraping the fish over a shallow tub containing fresh water. Care is taken not to scale the back or dorsal part, as these scales are yellow, while the white scales possess the value. The material is received on a horsehair sieve. The first water, mixed with a little blood, is thrown away. The scales are then washed and pressed, when the mucus or essence (guanine) sinks to the bottom of the tub and appears as a very brilliant blue-white oily mass. It takes 40,000 fish to furnish two pounds of the material. The fishermen seal it in tin boxes with ammonia, and in this condition send it to Paris. If a drop of the essence be taken up by a straw and let fall upon water, it floats, giving forth the most brilliant colors. Mere glass bulbs, in shape of pearls, lined with this substance, imitate the real gems with remarkable closeness.

PRACTICAL MECHANISM.

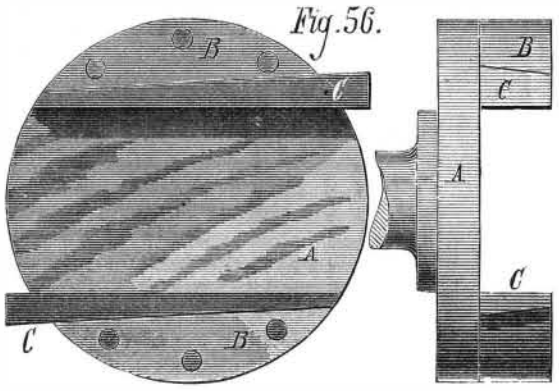
BY JOSHUA ROSE.

SECOND SERIES—Number VIII.

PATTERN MAKING.

Fig. 56 represents a side and face view of a very useful chuck, suitable for holding core boxes while boring them. It is shown attached to one of the metal plates that fit the mandrel of the lathe, and is usually made of hard wood; but for a large sized one, say 15 or more inches in diameter,

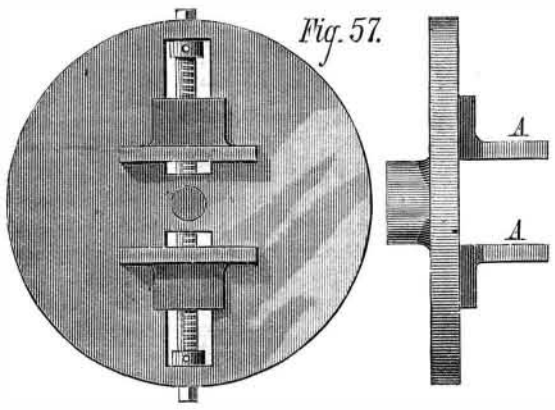
Fig. 56.



the disk portion, A, may be made of pine wood. The two sides, B B, are firmly fixed to the disk, their inner edges being planed at an acute angle to it. The work is held by driving the wedges, C C, and may be truly chucked by them in a comparatively short space of time.

Another very useful chuck is shown in Fig. 57, and it will

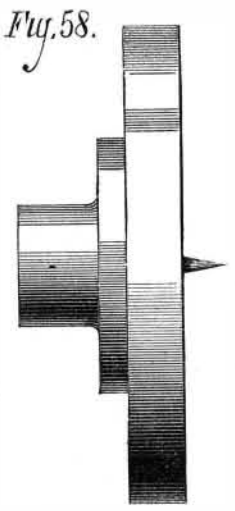
Fig. 57.



answer the same purposes as that shown in Fig. 56. It is, however, made entirely of metal somewhat similar to a machinist's dog chuck, but much lighter. Pieces of wood may be screwed on the jaws at A A, and bored to the curvature of any round piece of wood, an advantage which the chuck shown in Fig. 56 does not possess. Or the jaws may be turned round in their places, so that the faces, A A, will stand outwards, and the wooden pieces screwed thereon may be made to fit a hole. This chuck will be found to save much time over the plan of screwing work to the common face plate. V pieces of wood may be fixed to the jaws, and a piece of work in the rough held by them during the process of facing, boring, and turning the projecting part. The work can then be reversed in the chuck, and similar operations performed on the opposite end; and the work can be taken from the lathe and tried as to either fit or conformation, and, if necessary, restored in a moment to its original position in the chuck, so as to run quite true; but at the same time, for first class work, it is better not to use the Vs on finished surfaces. For holding bits and small work, neat little chucks may be purchased at the hardware stores, and they act similarly to the nipping arrangements applied to boring braces. These chucks can be supplied to either screw on the lathe mandrel; and they will, with a taper shank, fit into the taper hole provided to fit the holes which receive the lathe centers. It is well to have one of each, so as to be able to use one of them in place of the still lathe center, to operate upon work already chucked on the face plate of the lathe.

A simple and very useful chuck still remains to be described, being what is known as the cement chuck, which is made as follows: A disk of hard wood is screwed to a metal plate, where it should remain permanently; but if the face plate cannot be spared, bore a slightly taper hole through the disk, a little smaller than the diameter of the screw of the lathe mandrel, and partly through the disk. Then screw the disk on the mandrel, working the disk backwards and forwards to form a thread in the bore of the disk, and then turn and face it perfectly true. Then bore a small hole in its center, and drive in a piece of soft steel wire, leaving a short length projecting from the face and turn it to a point, as shown in Fig. 58.

Fig. 58.

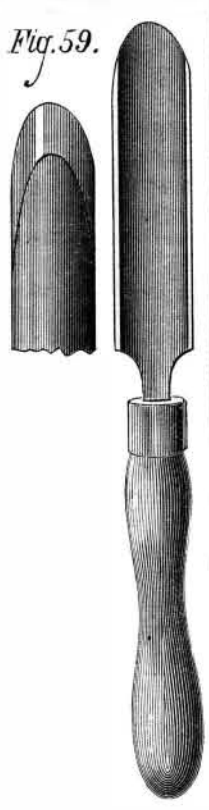


The object of this chuck is to drive thin delicate work, which it would be difficult to screw or clamp by adhesion, and this is accomplished as follows: We first prepare a wax composed of 8 parts of resin to 1 of the best beeswax, melted together, and we stir them well together, and run the mixture into tubes of paper or other suitable molds. To chuck the work, we take a stick of the wax, and press its end against the face of the chuck while the lathe is running, and then place the center of the piece of work on the steel point, applying sufficient pressure to cause the steel point to force its way into the work. Just before the work touches the waxed surface, we throw the lathe belt on to the loose pulley; and the momentum of the lathe, combined with a moderately heavy pressure, will generate, by friction, sufficient heat to melt the wax and cause the work to adhere to the chuck. The work may be detached, when necessary, by inserting behind it a thin wedge or blade.

TURNING TOOLS.

The turning work necessary in making patterns is usually done by hand; although on small and plain work, such as simple boring and facing, slide rest tools may be used to advantage, inasmuch as they will operate quicker than hand tools. Since, however, pattern lathes are not usually provided with slide rests, we shall confine our remarks to hand tools. For roughing out, the turning gouge, shown in Fig. 59, is used. In grinding this gouge, it is necessary to lower the back hand when grinding at and towards the outside corners, so that the cutting edges may be formed, by the junction of two faces, at as acute an angle as those forming the cutting edge in the center of the width of the tool.

Fig. 59.

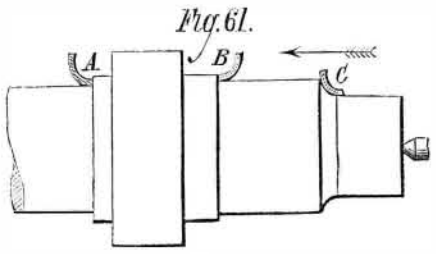


It is always the custom to reduce the work in the lathe to nearly the required form by this tool, the finishing tools being (with one exception) simply scraping tools, and not, properly speaking, cutting tools; hence it is evidently inadvisable to leave much for them to take off. The manner of holding the gouge is shown in Fig. 60. One hand grasps the handle near the end, while the other grasps the gouge near the cutting point, that is to say, as near as the hand rest will permit. It is sometimes, however, necessary to slightly vary the manner of holding by passing the forefinger of one hand around the hand rest while the gouge is confined between the thumb and forefinger, thus gripping the gouge end to the rest. This is advisable when turning a piece of work that is not completely round, as, for instance, tipping off the teeth of a gear wheel, in which case gripping the gouge to the hand rest will steady it and prevent it from digging into the work. The gouge is shown, in Fig. 60, to be cutting from left to right; it will, however, cut equally well if used from right to left, in which case the position of the hands must be reversed, the left hand gripping the gouge near the cutting edge. In either case, however, the gouge is not held horizontally level, but is tilted to one side, the lower side being the cutting one, otherwise the tool would rip into the work.

Fig. 60.

Fig. 61 shows the section of the tool and the tilt of the tool when cutting from right to left; while that of the tool, A, shows tilt when cutting from left to right. The reasons for this are as follows: The face of the gouge, on its hollow side and near the cutting edge, receives the strain which is necessary to curl the shaving, that is to say, which is necessary to force it out of the straight line. But if we were to place the gouge in the position shown in Fig. 61, at C, the whole of this strain would be placed upon the gouge, tending to force it forward and into the cut, as denoted by the direction of the arrow; and as a consequence, the gouge would run forward and dig into the work, in spite of all endeavors to prevent it. When, however, the gouge is held in the positions relative to its line of travel to its cut, shown in Fig. 61, at A and B, there is but little tendency for it to run forward, and it can be fed easily to its cut. In addition to its use as a roughing tool, the gouge makes a very efficient finishing tool for hollows, though it is not often employed as such by patternmakers. In this case, however, great care must be taken in controlling its position to the work, as shown in Fig. 61.

Fig. 61.



Trial of a Weeding Machine.

A trial of a weed eradicator, manufactured by Messrs. Ord and Madison, Darlington, Eng., lately took place under the auspices of the Highland Agricultural Society. The object of the machine is to remove the weeds which grow among corn crops. A drum, about 24 inches in diameter, is placed between two carrying wheels. Three sets of projecting teeth or iron combs run horizontally along the drum. This, when the machine is in operation, revolves by the action of the gearing, the combs at the same time working in and out of the slits, and over and along the top of the crop. Supposing the ground to be soft, the teeth catch the weeds and pull them fairly out of the soil; but should the soil be hard, as was the case at the trial, and thus have a firm grip of the roots of the weeds, the combs tear off the heads, so that they are prevented from seeding, leaving the stem in the soil. As the drum revolves and the teeth are drawn in towards the center, the weeds or their heads come in contact with the circumference of the drum, and, not being pulled in at the slits, are allowed to drop to the ground. The teeth exert little or no action upon the crops, passing between the teeth.

Remedy for Obesity.

According to Dr. Philbert, the waters of Brides in Savoy, which are very similar to those of Carlsbad, are very useful in the treatment of obesity. The purgative salts contained in these waters are sulphate of soda, chloride of sodium, chloride of magnesium, sulphate of magnesia, and sulphate of lime. To increase the effect, from 15 to 80 grains of sulphate of soda are added to each glass of mineral water. The quantity taken daily is $\frac{4}{5}$ quart, divided into three doses, and the purgative effect is produced in two or three days. The course may last from four to six weeks. As an adjuvant to the waters, a vapor bath may be taken every day or every second day. Farinaceous and saccharine articles of food are not allowed, and brandy, liqueurs, and coffee are interdicted; but the quantity of food is not limited, and a moderate amount of wine may be taken without harm. Muscular exercise is considered indispensable, and the mountains in the vicinity of Brides afford every facility for walking, where, in addition, this treatment may be followed by the grape cure.

A College of Cookery.

At last a practical step has been taken towards emancipating the people from the evils of bad cookery. We know of no department in domestic economy which is so sadly in need of reform, especially in the United States. Mr. William Emerson Baker, of the sewing machine firm of Grover & Baker, has given to the Governor of Massachusetts and to four other trustees a farm of 50 acres and $50,000, to form a college of cookery. Cookery is to be taught as an art—which it certainly is—and the pupils are to be instructed in the scientific principles which underlie wholesome cookery. The horrible pies, fried meats, hot bread, and other dyspepsia-generating compounds, together with the inexplicable concoctions produced by the verdant Milesian handmaid, let us hope, are doomed to disappear; and instead, our kitchens are to be tenanted in future by culinary artists able to prepare, palatably and healthfully, the vast variety of food this country affords.

Farming in California.

Some idea to what vast extent farming is carried on in California, and some other Western States, may be formed from the following item in one of our exchanges: "Plowing in unbroken furrows six miles long can be seen in Fargo, California. The teams start in the morning and make one trip across an entire township and back before dinner, and the same in the afternoon, making 24 miles' travel every day." It would seem that the steam plow ought to find a place in such a region.