handle; the other end is shaped like a grocer's scoop. At the extremity of the cylinder, where the bevel of the scoop commences, is a sliding door of tin, which, when shut, closes the cylinder entirely. Across the base of the scoop and immediately in front of the door is a groove; into it is fastened a piece of lamp wick saturated with alcohol. The cylinder is filled, through the sliding door, about one third with powered rosin; the door is then pushed down until only a small space or slit is left, about ⅛ inch or sufficiently to allow the powdered rosin to trickle in a shallow stream over the ignited alcohol, whenever the instrument is held at an angle downwards. The whole thing should cost about $1. When the instrument is held by the handle in a nearly upright position, the rosin will not burn; but directly it is lowered, as in the act of striking, a flame will issue of the width of the cylinder and three or four feet long; and this flashing can be repeated in quick succession as often as the instrument is raised and lowered. Three or four men thus armed could in an hour traverse a large lot of planted corn. The sudden flash, directed to the corn, would be too brief to wither the plant; but it would spoil the appetites, legs, and wings of a mass of grasshoppers. It may be found necessary to mix the rosin with a small quantity of fine gravel or sawdust.

Omaha, Neb. CHARLES PONTEZ.

PRACTICAL MECHANISM.

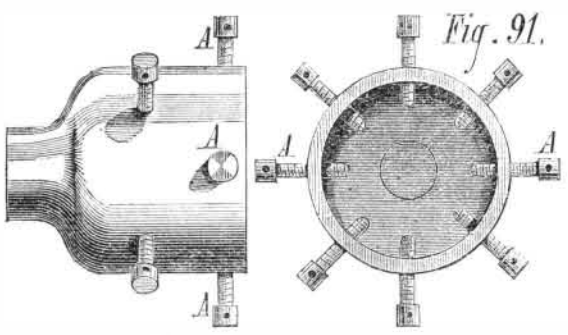
BY JOSHUA ROSE.

NUMBER XXVI.

LATHE CHUCKS.

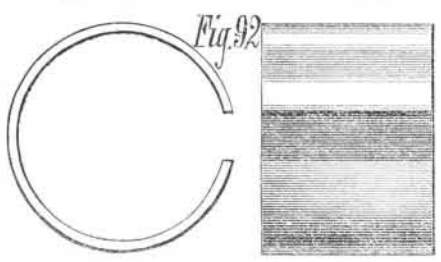
That class of lathe work which, by reason of its shape, cannot be held and driven between the lathe centers, is what is termed chucked, that is to say, it is fastened to the face plate of the lathe by suitable plates and bolts, or held in special chucks. Of special chucks, the universal chuck is the the most useful, and is so common that a description of it is unnecessary. When the running center of the lathe is removed in order to put a chuck on the spindle, the hole into which the center fits should be carefully plugged with either rag, cotton waste, or paper, to prevent the metal turnings or dirt from getting into it; and the screw on the lathe spindle and the face of the collar at the end of the screw should all be carefully wiped, as should the face of the hub or boss of the chuck, since the presence of any dirt there will cause the chuck to run out of true. When the chuck is removed from the lathe, it should be put away standing upright and not laid flat upon its face, in which position dust would accumulate in the thread.

If a piece of work requires to be operated upon at a distance from the face of the chuck, a universal chuck will not hold it sufficiently firmly; and the bell chuck, shown in Fig. 91, should be brought into requisition. In using this



chuck, is best to set it the work as nearly true as possible, using the front screws, A A, before attempting to adjust the four back screws, and to set the work true near the front face of the chuck, striking the work with a mallet (on the end standing out farthest from the chuck) to true it; and then, when the work is adjusted as nearly true as possible, to set up the four back screws, until they each bear lightly upon the work, and then tighten them gradually and successively, giving them not more than a quarter turn each at a time, and continuing from one to the other until they are finally screwed sufficiently tight, which proceeding will prevent the springing of the work by the screws. The bell chuck will hold work very firmly, and obviate the necessity (in most cases) of a guide or cone chuck being placed upon the outer end of the work to steady it.

The screws should be made of steel, the ends being turned down below the depth of the threads, so that, if in the course of time the ends should bulge from the pressure of the screws, it will nevertheless be an easy matter to remove

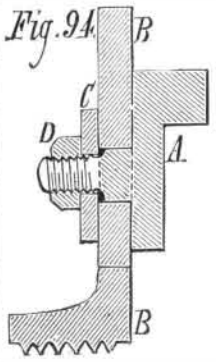


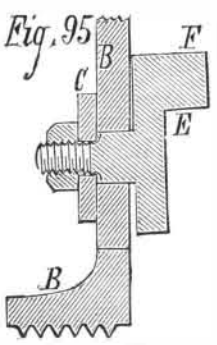
them from the chuck, to replace them when necessary, or to straighten them if they become bent, as is sometimes the case. To prevent bulging, the ends should be tempered to a straw color. When tubes, brass work, or finished work, which is liable to be damaged by the pressure of the screws, is held in a bell chuck, a piece of soft metal, as copper or brass, should be interposed between the screws and the work; and here it is as well to remark that the same precautions should be taken in fastening a carrier, driver, or dog to work driven thereby. Pieces of copper, both flat and of circular form, such as shown in Fig. 92, should be kept for this especial purpose. The object of leaving a space between the two ends is to allow them to close, when required for work of a smaller diameter than the ring of copper, it being obvious that the same piece can be opened or sprung outwards to accommodate work of a larger diameter. To hold rings or hollow work larger in diameter than the bell chuck, the screws may be inverted, that is, put into the chuck with the heads inside and the ends protruding outside the chuck; it is, however, at times difficult in such cases to obtain access to the heads of the screws, but whenever this can be done, the bell chuck will be found a most effective and serviceable tool. A special implement should be kept for inserting into the holes of the heads; for if promiscuous pieces of steel are used, they will destroy the screws by bulging outwards the edges of the holes, making them taper and causing the lever to slip outwards and away from the screw head. Such an implement is called a "Tommy," and is shown in Fig. 93;

it is made of round cast steel and left soft, the sizes of the ends, A and B, being made to fit the holes in the screw heads. The object of curving the end, A, at C, is to enable the end, A, to be used in instances when the end, B, could not be employed, by reason of some obstruction or interposing projection upon the work.

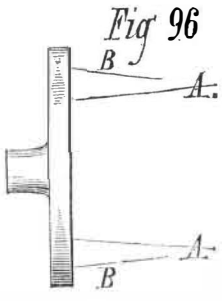
The next form of chuck to be considered is the dog chuck; and of this there are two kinds, the first being one in which the screwing inwards or outwards of one dog operates one or more of the others, by means of gearing or other suitable devices, and the second being those in which the dogs slide in grooves or slots in the chuck plate, and are adjusted to accommodate the work and then bolted firmly to the chuck plate, the work being held by screws passing through the jaws of the chuck.

The first kind of chuck is a very useful tool for ordinary work, and is a necessity to every lathe; but however well it may be made, and no matter how carefully it is used, it will become in time out of true and unfit for work requiring great nicety. For work which does not require reversing in the chuck, it is of course at all times good; but if the work does require reversing, the jaws of the chuck will require adjustment to keep them true; and since such jaws are hardened they cannot be turned up in their places unless they are first removed from the chuck and softened. There can be no doubt that, in a majority of causes, ill usage causes these chucks to get out of true rapidly; and a common reason for their depreciation arises from the following causes: The jaws are, of necessity, adjusted to fit the slots or grooves in the chuck plate with great exactitude, after the manner shown in Fig. 94, A being a jaw to which is secured a sliding fit in the slot of the plate by means of the plate and nut, C and D; from which it will readily be observed that the presence of any dirt upon the face plate will make it very difficult to move the jaw either towards or away from the center of the chuck, and that even the absence of sufficiently frequent lubrication will produce the same effect, because the dust and fine particles of metal collect upon and in the grooves of the chuck, and form a species of gum coating not unlike india rubber, forming a serious obstacle to the movement of the jaw. Instead of properly cleaning the chuck, to obviate the difficulty, the artisan, especially if his job is in a hurry, is apt to slack back the nut, D, thus causing the jaw to fit loosely to the thickness of the chuck plate, so that, when the jaw is forced against the work, it springs away from the face of the plate in the direction shown in Fig. 95, the amount to which the nut is loosened determining the degree to which the lower end of the jaw will spring away from the chuck plate in cases where the work is being held by the inside face, E, of the chuck. If, however, the outside face, F, of the jaw is gripping the work, the jaw will spring in the opposite direction, so that the lower end of the jaw (shown above to be away from the chuck) will be close to it, and the outer end will spring off, the conditions of pressure being exactly reversed. It will be at once perceived that the wear of the face of the jaw and of the face of the plate, C, which fits against the face plate, B, will, if not taken up by the nut, produce in time the same defect; and it is this wear, together with that of the screws, nuts, and gearing, if there be any, to operate the screws, which causes this class of chuck to get out of true, even if carefully used.



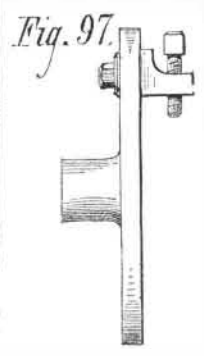


Many cases arise in which it is necessary that the inside face of a piece of work requires when chucked to bear against the face plate if the jaws grip at F, and against the face of the jaw if the jaws grip the work at E, so as to ensure the work being set true with that face. When, however, the jaws of the chuck are loose in the slots or slides, as shown in figure, tightening the jaws upon the work will force the latter away from the face plate to an amount proportionate to a degree of looseness of the jaw, as is shown in Fig. 96, in



which the lines, A A, represent the direction in which the inside face, E, of the jaws would stand to the chuck when gripping the work, and B B the direction of the same when the outside face, F, is gripping the work, the effect being, in both cases, to spring or force the work away from the face of the chuck jaws as the case may be, rendering it very troublesome to set the work true, and entailing a great loss of time; for a very slight defect in a chuck is, by reason of reversing the work in the lathe, multiplied upon the work; and when it is considered how many times in a year that defect is encountered, how many times it has performed its duties imperfectly, and how much extra labor in fitting and adjusting has become necessary, it will be readily perceived that it is better to throw away a dozen imperfect chucks, if needful, to obtain a good one.

Chuck dogs are detached dogs which fit into the square holes of the chuck plate or face plate, as shown in Fig. 97,



being held to the plate by the nut and washer. These dogs are movable to any part of the plate, their position being regulated to conform to the shape of the work, which renders possible their employment in cases where a dog chuck would be of no service, such, for instance, as holding a triangular piece of work. The center line of the screw should stand exactly parallel to the face of the face plate, or tightening the screws, which in this case grip the work, will force the latter towards or away from the face of the plate, according to the direction in which the screws are out of true. The screws should have their ends turned down below the thread, and should be hardened as directed for bell chuck screws, since these screws may be also reversed in the dog for some kinds of work. The dog should be screwed very firmly against the face plate, so as to avoid their springing.

Universal or scroll chucks, containing screws or gear wheels which are enclosed, should be occasionally very freely supplied with oil, and the chuck worked so as to move the jaws back and forth to the extreme end of their movement, so as to wash out any particles of metal or dust which may have lodged or collected in them; for proper cleaning will reduce the natural wear to a minimum, and prevent the internal parts from cutting, as they are otherwise apt to do.

SCIENTIFIC AND PRACTICAL INFORMATION.

A NEW USE FOR MAY BUGS.

Dr. Chevreuse, of Switzerland, announces a new and curious utilization of the may bug or cockchafer. It consists in decapitating the living insect one hour after it has fed, when, on opening the stomach, several drops of a colored liquid are obtained, which varies with the nature of the plant fed upon. This substance has been used as a water color for painting with considerable success, Dr. Chevreuse having formed a scale of fourteen different tones or shades. It is a permanent pigment, unalterable by air or light, and imparts this quality, it is stated, to other paints with which it may be mixed.

A CURE FOR SOOTY CHIMNEYS.

F. C. R. says: About fifteen years ago, a dwelling was raised one story higher, and a chimney had also to be raised some feet higher; and as the chimney was built up, it was plastered on the inside with salt mortar, to prevent the adhesion of the soot. The result is that the part plastered with salt mortar is white and clean to this day, while the other part gets filled with soot up to the very line where the salted part begins, and has to be cleaned each year, the chimney being in almost constant use. The proportions used were 1 peck of salt, added while tempering, to 3 pecks of mortar.

A NEW GENERAL ANTIDOTE FOR POISONS.

M. Jeannel gives the following formula for an antidote for a number of deadly poisons: Solution of sulphate of iron (D. 145) 100, water 800, calcined magnesia 80, washed animal charcoal 40. These ingredients are kept separate, the solution of sulphate of iron in one vessel, the magnesia and charcoal in another, with some water. When needed, the sulphate solution is poured into the last mentioned receptacle and violently agitated. The mixture should be administered promptly in doses of from 1·6 to 3·3 ounces. From experiments M. Jeannel finds that this antidote, employed in proper proportions, renders preparations of arsenic, zinc, and digitaline completely insoluble. It does not render oxide of copper absolutely insoluble, however, and leaves in solution notable quantities of morphine and strychnin. It neither decomposes nor precipitates cyanide of mercury nor tartar emetic. It saturates free iodine entirely, and acts but partially upon solutions of alkaline hypochlorites. Four ounces of the antidote are found to neutralize the poisonous effect of 1·6 ounces of arsenite of soda. It retards the toxic action of sulphate of strychnin, affording sufficient delay to administer evacuants. One third of an ounce is efficacious against digitaline injected into the intestines. The formula, says M. Jeannel, is certainly preferable to the officinal hydrated peroxide of iron, which, in course of time and at a temperature of 59° Fah., undergoes molecular modifications which render it unreliable as an antidote for arsenical preparations.