PRACTICAL MECHANISM.

BY JOSHUA ROSE.

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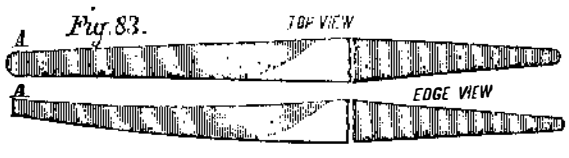
HAND TURNING—BRASS WORK.

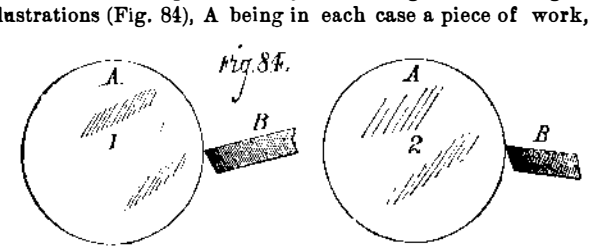
For roughing out brass work, the best and most universally applicable tool is that shown in Fig. 83, which is to



brass work what the graver is to wrought iron or steel. The cutting point, A, is round-nosed. The hand rest should be set a little above the horizontal center of the work, and need not be close up to the work, because comparatively little power is required to cut brass and other soft metals, and therefore complete control can be had over the tool, even though its point of contact with the rest be some little distance from its cutting point. The best method of holding and guiding is to place the forefinger of the left hand under the jaw of the hand rest, and to press the tool firmly to the face of the rest by the thumb, regulating the hight so that the cutting is performed at or a little below the horizontal center of the work. The tool point may thus be guided with comparative ease to turn parallel, taper, or round or hollow curves, or any other desirable shape, except it be a square corner. Nor will it require much moving upon the face of the lathe rest, because its point of contact, being somewhat removed from the rest, gives to the tool point a comparatively wide range of movement. The exact requisite distance for the rest to be from the work must, in each case, be determined by the depth of the cut and the degree of hardness of the metal; but as a general rule, it should be as distant as is compatible with a thorough control of the tool. The cutting end of this tool should be tempered to a light straw color.

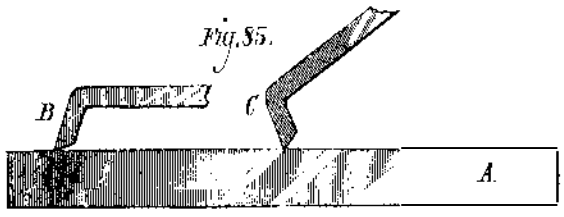
SCRAPERS

To finish brass work, various shaped tools termed scrapers are employed. The term scraper, however, applies as much to the manner in which the tool is applied to the work as to its shape, since the same tool may, without alteration, be employed either as a scraping or a cutting tool, according to the angle of the top face (that is, the face which meets the shavings or cuttings) to a line drawn from the point of contact of the tool with the work to the center line of the work, and altogether irrespective of the angles of the two faces of the tool whose junction forms the cutting edge. To give, then, the degree of angle necessary to a cutting tool, irrespective of the position in which it is held, is altogether valueless, as will be perceived by considering the following illustrations (Fig. 84), A being in each case a piece of work,



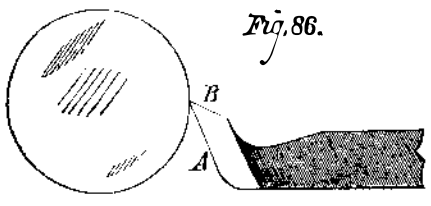
and B, a tool. The tool edge, as applied in No. 1, will act as a scraper; whereas in No. 2 it will act as a cutting tool.

Now let us take a tool applied to flat surfaces, as in Fig. 85, A representing a piece of flat metal. The tool, if applied

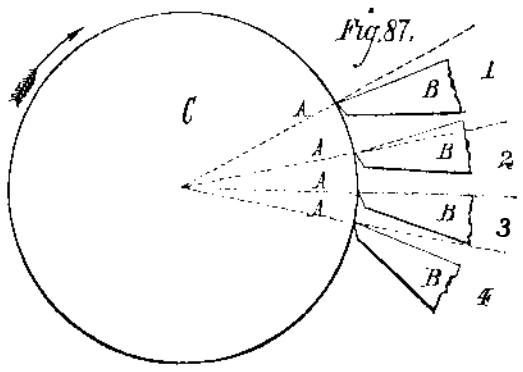


as shown at B, would present a cutting edge, and as shown at C, a scraping edge, to the work, the tool being the same in both cases. The result of attempting to present the cutting edge, as at B, is that it would jar in consequence of the springing of the tool.

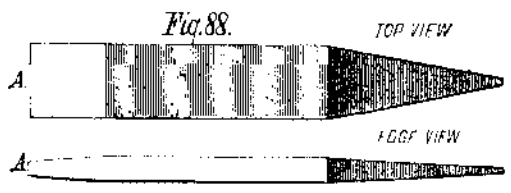
The angle of the back or side face of any tool (that is, the face, A, in Fig. 86), either to the top face, B, or to the work,



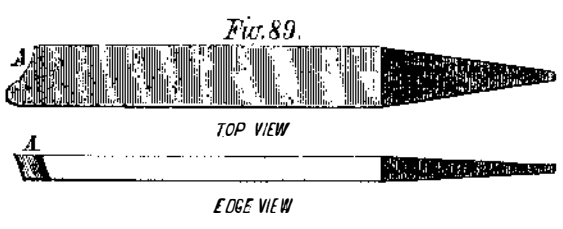
does not in any case determine its tendency to cut or scrape, but merely affects its capability of withstanding the strain and wear due to severing the metal which it cuts. Nor is there any definite angle at which the top face, B, to the work converts the edge from a cutting to a scraping one. A general idea may, however, be obtained by reference to Fig. 87, the line, A, being in each case one drawn from the center of the work to the point of contact between the tool edge and the work, C being the work, and B, the tool. It will be observed that the angle of the top face of the tool varies in each case with the line, A. In position 1, the tool is a cutting one; in 2, it is a scraper; in 3, it is a tool which is a cutter and scraper combined, since it will actually perform both functions at one and the same time; and in 4, it is a good cutting tool, the shapes and angles of the tools being the same



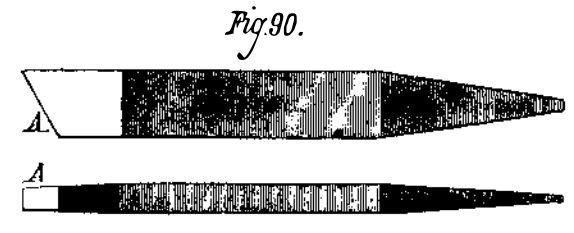
in each case. Fig. 88 represents a flat scraper for finishing brass, A being in each case the cutting edge. Since the tool may be turned upside down, the end of this tool may be and



frequently is ground at an angle, especially in those cases where, for some required purpose, the tool is made of a particular shape, such, for instance, as in the case of the tool shown in Fig. 89, the angle being shown at A. On all brass



work, it is, however, better to dispense with any angle. Fig. 90 represents a scraper (A being the cutting edge) designed



for operating close down to the lathe center or in a square corner such as is formed at the junction of a head or collar upon a shaft or bolt. This tool may also be turned upside down, so as to form a right or left hand tool.

Scrapers will cut more freely if applied to the work with the edges as left by the grindstone; but if they are smoothed, after grinding, by the application of an oilstone, they will give to the work a much smoother and higher degree of finish. They should be hardened right out for use on cast iron, and tempered to a straw color for brass work. If the scraper jars or chatters, as it will sometimes, by reason of its having an excess of angle, as shown in Fig. 8 9, or from the cutting end being ground too thin, a piece of leather, placed between the tool and the face of the rest, will obviate the difficulty.

Round or hollow curves may be finished truly and smoothly by simply scraping; but parts that are parallel or straight upon their outer surfaces should, subsequent to the scraping, be lightly filed with a smooth file, the lathe running at a very high speed to prevent the file from cutting the work out of true. The file should, however, be kept clean of the cuttings by either using a file card or cleaner, or by brushing the hand back and forth on the file, and then striking the latter lightly upon a block of wood or a piece of lead, the latter operation being much the more rapid, and sufficiently effective for all save the very finest of work. If the filings are not cleaned from the file, they are apt to get locked in the file teeth and to cut scratches in the work. To prevent this, the file may be rubbed with chalk after every eight or ten strokes, and then cleaned as described. After filing the work, it may be polished with emery paper or emery cloth. The finer the paper and the more worn it is, the better and finer will be the finish it will give to the work; for all metals polish best by being rubbed at a high speed with a thin film composed of fine particles of their own nature, as ivory is best polished by ivory powder, and wood by shavings cut from itself. To facilitate the obtaining the film of metal upon the emery paper, the latter may be oiled, to a very slight extent, by rubbing a greasy rag over it, which will cause the particles it at first cuts to adhere to its surface. Emery cloth is the best for highly finishing purposes, because it will wear longer without becoming torn. It should be pressed hard against the work, and reversed in all directions upon it, so as to wear all parts of its surface equally, and to distribute the metal film all over; and the work should be revolved at as high a speed as possible, while the emery cloth is, during the first part of the polishing, kept in rapid motion upon the work backward and forward, so that the marks made upon the work by the emery cloth will cross and recross each other. When fine finishing is to be performed, the emery cloth (or what is better, crocus cloth) should be pressed very lightly against the work and moved laterally very slowly.

Round or hollow corners, or side faces of flanges, of either wrought or cast iron or brass, may be polished with grain emery and oil, applied to the work on the end of a piece of soft wood, the operation being as follows: The end of the wood to which the oil and emery is to be applied should be slightly disintegrated by being bruised with a hammer; this will permit the oil and emery to enter into and be detained in the wood instead of passing away at the sides, as it otherwise would do, thus saving a large proportionate amount of material. The wood, being bruised, will also conform itself much more readily to the shape of curves, grooves, or corners. The hand rest is then placed a short distance from the work, and the piece of wood rests upon it, using it as a fulcrum. The end of the wood should bear upon the work below the horizontal level of the center of the latter, so that depressing the end of the wood held in the hand employs it as a lever, placing considerable pressure against the work; and the distance of the rest from the work allows the end of the piece of wood to have a reasonable range of lateral movement, without being moved upon the face of the lathe rest. The method of using the wood is the same as that employed in using emery cloth, except that it must, during the earlier stage of its application, be kept in very continuous lateral movement, or the grain emery will lodge in any small hollow specks which may exist in the metal, and hence cut small grooves in the work. Another exception is that the finishing must be performed with only such emery as may be embedded in the wood, and without the application of any oil; especially are these directions necessary for cast iron or brass work. The work may then be wiped dry, and an extra polish imparted to it by the application of fine or worn and glazed emery cloth, moved slowly over its surfaces.

Genius vs. Capital.

The great misfortune which causes the failure of many industrious, hard-working, correct people, in their efforts to benefit themselves and the world, is not so much their poverty, as many would have us believe, as their inability to interest others in their plans of business and progress. They frequently present schemes for the advancement of the arts and sciences, for the perfection of mechanical appliances, which have merit of an extraordinary commendable character, but which they are not able to bring into practical use because they do not find patrons to recognize the value of their ingenuity. So, frequently, it occurs that much is lost because it is not made available at the time of its inception. It is simply a miscarriage, in a physical sense. It is not owing to the poverty of the inventor. It may be owing to the lack of means; but we hold that a man is not poor when he has a sufficient supply of energy and brains to illustrate fairly any new principle in the mechanic arts. Brains are two-fold more valuable than money. But the poverty exists on the part of those who are not able to see and apply the devices for progress which come up under this head. We do not censure a man for not entering enthusiastically into a scheme which he does not understand, but we do censure men who, being favorably situated, cannot understand and assist a scheme which has merit and brains in its conception and application.

Thus one man may be rich in devices, and another in material wealth; but they do not come together because the man of wealth, not having the brains of the inventor or projector of a scheme for progress, and not willing to inform himself, stands aloof and says to the inventor: "You are a poor fool—why should you bother me?—I've no time to spend with you. If you have something so good as you represent it, why don't you prove it practically before the world, and not trouble us capitalists for means to assist you?"

Here is where the most wealthy man—the one who furnishes means for capital to double itself—becomes poor, and where he is humiliated, and depressed and discouraged, may be to the extent of distress, simply because he has not the "almighty dollar" to aid him.

There is too much of this subject to be preached in one sermon, says the *Trade Review*, which we quote.

A New Method of Preparing Plaster of Paris for Casts

Not a very long time since, some lucky individual struck upon the happy thought that plaster of Paris would be improved by mixing it with a solution of alum, and such in reality proved to be the case. This induced a Frenchman named Landrin to study the action of the alum in this case, and he arrived at the conclusion that its principal *rôle* was to convert any caustic lime, of which there is always more or less present, into a sulphate. Starting with this idea, he attempted to accomplish the same result by the use of other sulphates, and in this he succeeded. Next he tried the effect of using just enough dilute sulphuric acid to effect this conversion into sulphate, and afterwards calcining it. Finally, he ascertained that the quickest and simplest way was to immerse the unburnt gypsum for 15 minutes in water containing 8 or 10 per cent of sulphuric acid, and then calcine it. Prepared in this way, it set slowly, but made excellent casts, which were perfectly white, instead of the usual grayish tint. The latter effect is due to the destruction of a small amount of organic matter by the slight excess of sulphuric acid

J. A. D. says: "A clerical error occurs in your report of Mr. Wells' address on the distribution of wealth, in stating the average amount of property for each inhabitant in this country to be $6,000, based upon a grand total of $25,000,000,000. A glance shows an error of one cipher, and the $6,000 should be $600."