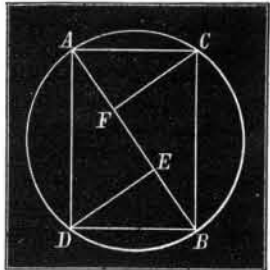


**Facts and Simple Formulæ for Mechanics, Farmers, and Engineers.**

The present is the best time for felling trees. For the purpose of seasoning, timber should be piled under shelter and kept dry: it should have a free circulation of air about it without being exposed to strong currents. The bottom pieces should be placed upon skids, which should be free from decay, and raised not less than two feet from the ground. A space of an inch should intervene between the pieces of the same horizontal layers, and slats or piling strips should be placed between each layer, one near each end of the pile and others at short distances, in order to keep the timber from winding. The strips should be laid one over the other, and in large piles should not be less than 1 inch thick. Each pile should contain but one kind of timber, the heavy sticks being below and the light ones on top: and the piles should be 2½ feet apart.



To cut the best beam from a log, divide the diameter, *ab*, into 3 equal parts, *af*, *fe*, and *eb*; and from *e* and *f*, draw the lines *fe*, *ed*, at right angles to *ab*. Join *ac*, *rd*, *be*, and *bd*; then *abcd* is the cross section of the strongest beam.

To find the weight in pounds of metal objects, measure the number of cubic inches contained in the piece for wrought iron by 0.2816; cast iron 0.2607; copper, 0.32418; lead, 0.41015; brass, 0.3112.

To find the diameter of wrought iron shafting in inches to transmit a given power, multiply the indicated horse power by 65, divide by the number of revolutions per minute, and extract the cube root of the quotient: for crank shafts and prime movers, substitute 83 for 65.

In the drainage of land, the following depths and distances should be observed:

Soil.	Depth of pipes. feet inches	Distance apart. feet.
Stiff clay.....	2 6	15
Friable ".....	2 0	18
Soft ".....	2 9	21
Loam with clay .....	3 2	21
" " gravel.....	3 3	27
Light loam.....	3 6	33
Sandy ".....	3 9	40
Light sand with gravel	4 0	50
Coarse gravelly sand...	3 6	60

In corn mills, for each pair of stones, with all the necessary dressing machinery, etc., about 4 horse power nominal may be allowed. One pair of 4 feet stones will grind about 5 bushels of wheat per hour. Each bushel of wheat so ground per hour requires 1.11 horse power (indicated), exclusive of dressing and other machinery. Speeds in corn mills are as follows: Stones 4 feet diameter, 140 revolutions per minute; dressing machines 21 inches diameter, 450 to 500 revolutions per minute; creepers with 3½ pitch, 75 revolutions per minute. Elevator with 18 inches diameter, 40 revolutions per minute; wheat screen, 18 inches diameter, 300 to 350 revolutions per minute.

An average of 27 kinds of coal has given about 40½ cubic feet per ton.

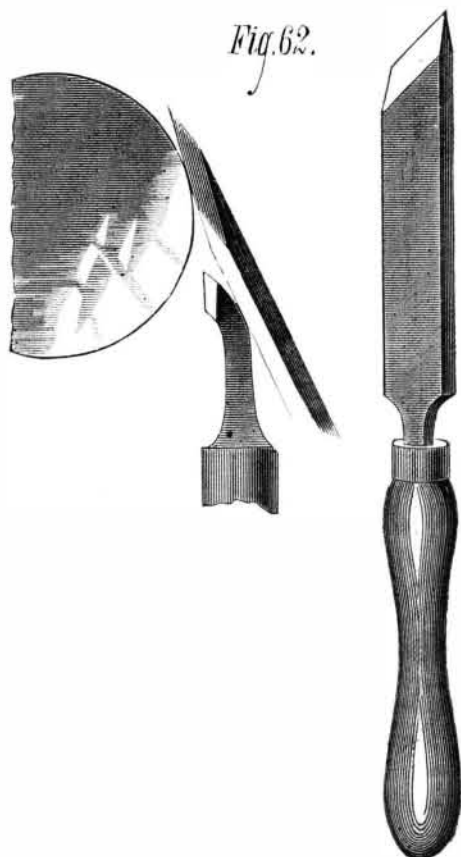
**PRACTICAL MECHANISM.**

BY JOSHUA ROSE.

SECOND SERIES—Number IX.

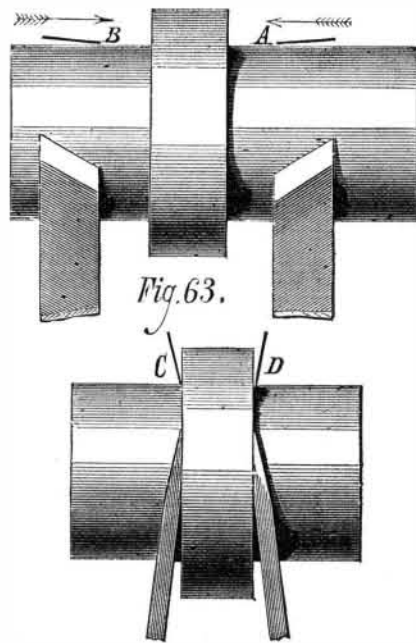
**PATTERN MAKING—TURNING TOOLS.**

For finishing plain work, we have the tool shown in Fig.



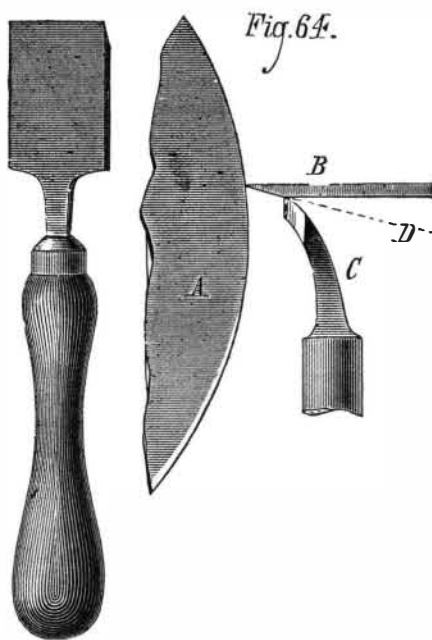
62, which is the exception noted previously as being a finishing and, at the same time, a cutting tool. It is called a skew chisel, because its cutting edge is ground at an angle or

askew to the center line of its length. Furthermore, it is beveled at the cutting end on both sides (as shown in the edge view), being ground very keen. It is employed for fin-



ishing straight or parallel surfaces and for dressing down the ends or down the sides of a collar or shoulder. When used for finishing straight or parallel surfaces, it performs its cutting in the center of the length of its cutting edge only, as shown at A, in Fig. 63, and is held in the position relative to the work shown in Fig. 62. When nicely sharpened it leaves a polish, unlike other finishing tools; but with these advantages, it has a drawback (and a serious one) to learners, as it seems to have a terrible propensity for tearing into the work, whether it is used upon the circumference or facing the shoulders of the work. This difficulty can only be overcome by practice, and the reason lies in the difficulty of learning how to handle the tool with dexterity. It must be held almost flat to the work; and yet, if it should get quite flat against the work, the cutting edge would cut along its whole length, and the pressure of the cut would be sufficient to force the tool edge deeper into the work than is intended, which process would continue, causing the tool to rip in and spoil the work. The face of the chisel nearest to the face of the work being operated upon stands almost parallel, with just sufficient tilt of the tool to let the cutting edge meet the work in advance of the inside face of the tool; or in other words, the amount of the tilt should be about that of the intended depth of the cut; so that, when the cutting edge of the tool has entered the wood to the requisite depth, the flat face will bear against the work and form a guide to the cutting edge. The corner of the chisel which is not cutting must be kept clear of the work. Fig. 63 will convey the idea, the arrows showing the direction in which the chisel is, in each case, supposed to be traveling.

The short lines, A and B, under the arrows, and those touching the collar, at C and D, show the tilt or incline of the chisel to the work. In turning the circumference, the obtuse corner of the chisel is the cutting one; while in turn-



ing down, a side face it is the acute angle. Most pattern makers, however, do not often use the skew chisel for finishing straight cylindrical work, because it is liable to make the surface of the work more or less wavy. It is, however, almost always used for cutting off and for cutting down shoulders, for which purpose it is highly advantageous. For circumferential work on cylindrical surfaces, an ordinary chisel is mostly employed, the position in which it is held to the work causing it to scrape rather than cut. A worn out paring chisel is as good as any, but in any event it should be a short one. Such a chisel is shown in Fig. 64, the position in which it is held being illustrated by A, which represents a section of a piece of cylindrical work, B representing the chisel, and C the hand rest. Some pattern makers prefer to increase the keenness of this tool by holding it so that the plane of its length lies in the direction denoted by the dotted line, D; this, however, renders it more

likely to rip into the work, and the position shown is all that is necessary, providing the cutting edge be kept properly sharpened. This chisel is also used on side faces.

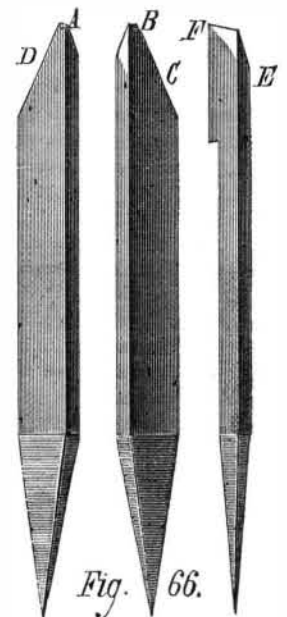
Still another tool, sometimes used for finishing plain cylindrical surfaces and side faces, is that shown in Fig. 65 at A. It is used in the same manner and relative position as the chisel shown above, in Fig. 64.

For finishing hollows, which should first be roughed out with the gouge, the form of tool shown at B, in Fig. 65, should be used. Several of these tools, of various sizes, should be kept; they are used in the same position as the finishing chisel shown in Fig. 64. The tool shown at C, in Fig. 65, is used upon large work, and is advantageous because it presents less surface of cutting edge in proportion to the depth of the cut than does the gouge; and, in conse-



quence, it is less liable to cause the work to jar or tremble. It is usually made about 2 feet long, which enables the operator to hold it very firmly and steadily. It is used with its top face lying horizontally, and should be kept keen. D, in the same figure, represents a similar tool, with a round nose; this latter is not, however, made long, and may be used in a handle.

For boring purposes, the tools shown in Fig. 66 are employed; those shown at A and B, having their cutting edges at C and D, are therefore right and left hand tools. When, however, the hole is too small to admit of those tools being used, that shown at E may be employed, its cutting edge being on its end, at F.



The temper of all these tools should be drawn to a light brown color, and the instruction given for grinding bench tools should be rigidly observed in grinding and oilstoning these turning tools.

**A Remarkable Dwarf.**

Several medical men, including Drs. Alexander Mott, J. L. Little, J. M. Merrill, E. Hudson, and S. Roof, lately visited by invitation the Mexican dwarf, Lucia Zarate, at Tony Pastor's theater in this city. These visitors said she seemed perfect in structure, healthy, and intelligent. She understands and talks Spanish and a few words of English. She is getting her second teeth; and although the doctors could not tell whether or not she was 12 years old, as claimed, they said she had teeth which she could not have under 6 years of age. She ran about, shook hands with, and talked a little to those present. She is now smaller than are many infants at the time of their birth. The following measurements were taken: Height with shoes on, 21½ inches; length of leg from hip, 10¼ inches; around head, 13 inches; circumference of thigh, 4¾ inches; circumference of calf of leg, 4 inches (one inch more than a man's thumb); length of shoe, 3 inches; width of shoe, 1¼ inches. The parents of the child are with her, and are of the usual size; the mother is about the medium height, the father, 5 feet 5 or 6 inches in height, and quite fleshy.

THE latest improvement in mills for grinding wheat, etc., consists in the use of porcelain rollers for crushing the wheat previous to submitting it to the millstones. The result is an improvement in the quality of the flour, and a larger yield in a given time.

DETECTION OF FUCHSIN ADULTERATION IN WINE.—According to M. Jacquemin, natural red wine does not stain wool, the material regaining its white color after washing. If fuchsin be used to color the wine, however, the wool remains tinged with red.