Machine Construction & Drawing.

(From *Collin's Elementary Science Series.*)

(*Continued from page 92.*)

Figs. 75, 76, 77, represent the coupling adapted for a 3″ shaft, drawn to a scale of $\frac{1}{8}$.

34. One form of the *clutch* or *claw* coupling is shown in figs. 75*a*, 76*a*, 77*a*. This is a convenient form of coupling to use for shafting which is to be connected and disconnected at either long or short intervals, that is to say, it may be used as a permanent coupling or otherwise. If it is used as a permanent coupling there are two equal halves similar to B, one on each of the shafts *c* and *d*, each half being fixed to its shaft by a key. But if the coupling is to be connected and disconnected frequently, one half will be fixed, as B, to the shaft *d*, and the other half A will slide upon the shaft *c*, to which it is connected by the key *e*; this key is *sunk* or *let into* the shaft, and its projecting portion fits the key-way in the coupling. Fig. 76*a* is a sectional elevation, made by the plane S P, fig. 77*a*. The figures show the coupling for a $2\frac{1}{2}$″ shaft, drawn to a scale of $\frac{1}{8}$.

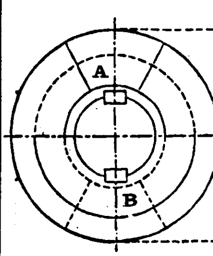


Fig. 75*a*.

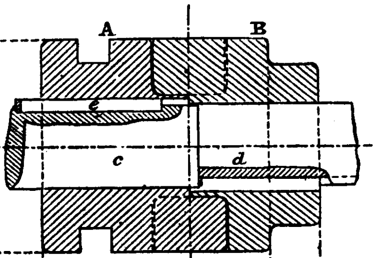
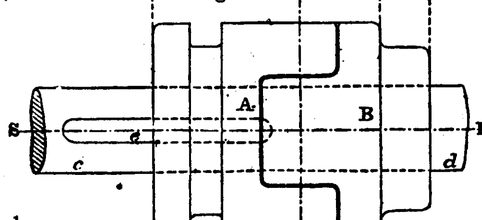


Fig. 76*a*.



Scale $\frac{1}{8}$.

Fig. 77*a*.

35. Helical or Screw Curve.—Figs. 78, 79, Plate VI., represent in front and end-elevation the helical curve, which is traced as follows:—If during the revolution of a cylinder a marker, which moves parallel to the axis of the cylinder and at a uniform rate, traces upon its surface a curve, the curve so traced is called the *helical or screw curve*. The distance moved through by the marker during one revolution of the cylinder is termed the *pitch*, and the direction in which it moves determines whether the curve is *right* or *left-hand*. Assuming the cylinder to be turning in the direction of the hands of a watch, as indicated in fig. 78, and the marker to move from right to left (0—16, 0—8 in fig. 79), the curve is *right-handed*, and *left-handed* if *vice versâ*. The curves shown in figs. 78, 79, are right-handed and of the same pitch, but differing in diameter; the pitch is the distance *ab* (0—16). In the example illustrated, the curves are supposed to be fine wires bent to the required form, or the cylinders upon which they are traced are supposed to be transparent, so that the back half of the curve may be seen; the front half of the curve is marked 0—8, the back half 8—16. If the curve were a left-handed one, the portion marked 8—16 would be the front, and that marked 0—8 the back half.

The length of the curve is equal to the hypothenuse of a right-angled triangle *abc*, fig. 81, having for its base the circumference of the cylinder, fig. 80, and for its height the pitch *ab*, fig. 82. And if the triangle be

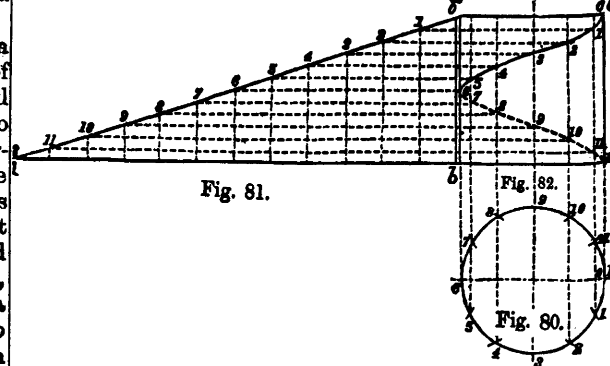


Fig. 81. Fig. 82. Fig. 80.

wound round the cylinder, keeping the base at right angles to the axis, the hypothenuse will assume the curved form shown in figs. 82 and 79, where ab = the pitch, bc = the circumference of the cylinder, and ac = the length of the curve. *ac*, fig. 81, is a *development* of the curve.

36. The drawing of the curve is as follows:—Having the diameter of the cylinder and the pitch of the curve given; for the larger curve, divide the circumference of the circle, fig. 78, into any convenient number of equal parts, divisible by 4, as 12 or 16; and the pitch *ab*, in fig. 79, into the same number of equal parts; in the example we use 16, numbering the points 1, 2, &c., to 16, respectively in both figures. From 16, 1, 2, &c., to 8 (9 to 15 being in the same lines as the former), in fig. 78, draw lines parallel to the axis of the cylinder *cc*, and from 1, 2, &c., to 16, in fig. 79, lines perpendicular to the axis; the intersections of the lines 1—1, 2—2, 3—3, &c., are points in the curve; join these points and the curve is complete. In the top half of fig. 79, between *b*, *d*, is shown a quarter of this larger curve, numbered 4 to 8. In the lower half, between *b*, *d*, is shown a quarter of the smaller curve, numbered 0 to 4, which can be obtained similarly, the construction lines indicating clearly how to project it. In the examples, figs. 78 to 82, we have taken a sufficient number of points to determine the curve with a sufficient degree of accuracy for ordinary purposes; if greater accuracy is required it can be obtained by taking a larger number of points on the circumference of the circle, and the same number between *a* and *b*. It will be noticed the curve is *quickest* between 0—2 and 6—8, figs. 78, 79; intermediate points may be taken between these to determine the curve more accurately.

37. Screws.—Screws are made by cutting helical grooves, of a triangular, square, or other cross-section,* in cylindrical pieces of metal or wood; the ridge or projecting part is termed the *thread*; the *pitch* is the distance between two consecutive threads, measured as described for the helix, Art. 35, page 33. The two common kinds of screws in use, excepting those for wood, are the V or triangular and the square-threaded; the former is chiefly used for *bolts*, *studs*, and *set-screws*; the latter to transmit motion by means of slides, as in the slides of lathes, planing machines, and other engineering tools, &c.

* A section made by a plane perpendicular to the direction of the length of the groove.