in the effort to compete with foreign raisins is the cost of labor. The Spanish vineyardists can get all the laborers they need for from 15 to 25 cents per day, while the California producers must pay at least $1 per day. The very much greater productiveness of the soil, however, will do much to offset this disadvantage.

AMATEUR MECHANICS.

CENTERING AND STEADYING.

To center a cylindrical piece of metal readily and accurately is a very simple matter when the workman is provided with tools especially designed for the purpose, and it is not difficult when an engine lathe or even an engine rest is available; but to do it easily and properly in an ordinary plain foot lathe may puzzle some of the amateur mechanicians.

Although some of these methods are well known they will nevertheless be described for the benefit of some who may require the information.

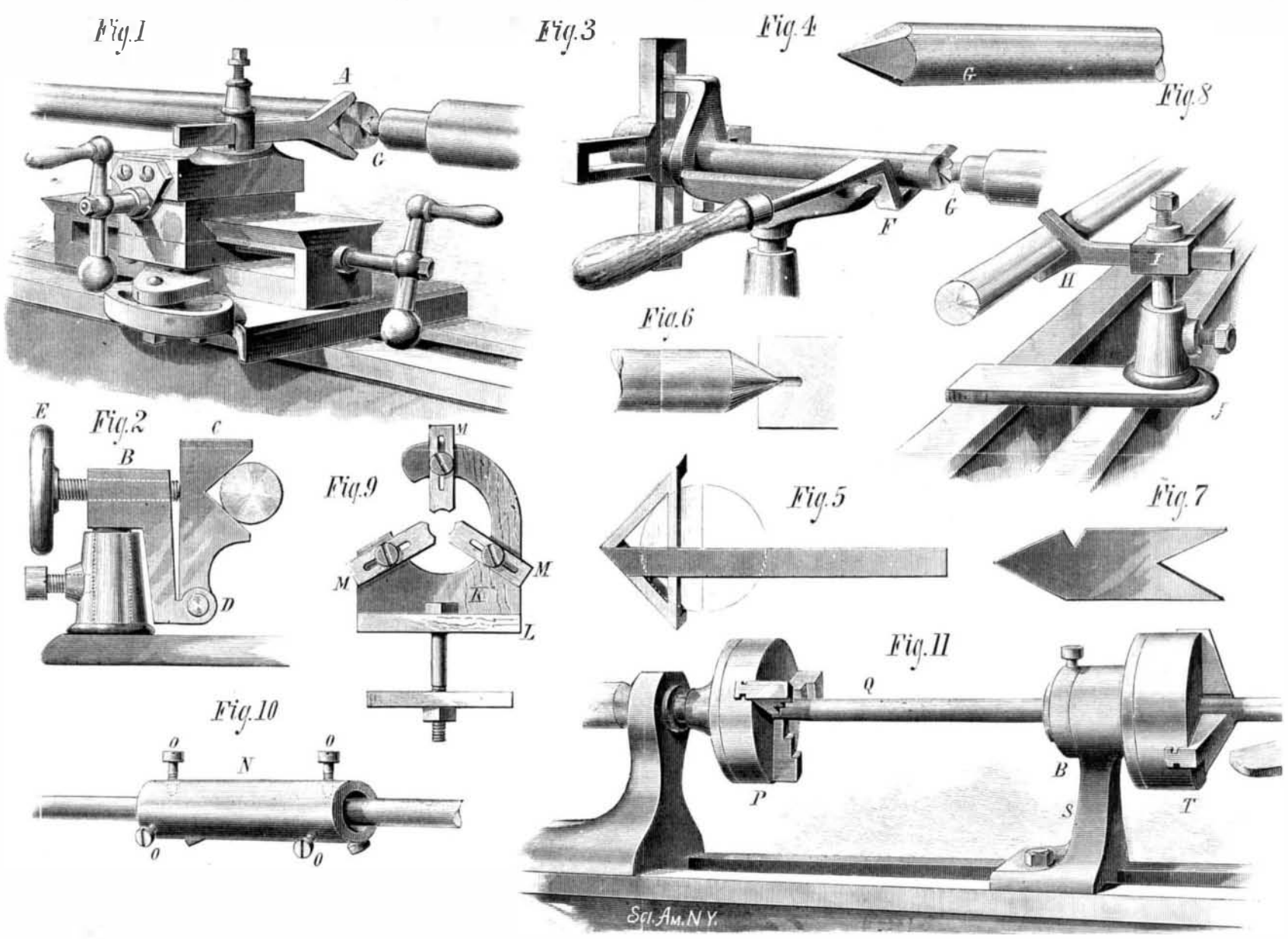
The method of centering shown in Fig. 1 is one of the most common where the lathe is provided with an engine rest. A forked tool, A, is clamped in the tool post in such a position that a line drawn from the point of the tail center will bisect the angle of the fork. A square pointed center, G, is inserted in the tail spindle and moved against the end of the rod being centered with a slight pressure, the tool, A, the work may be tested in a lathe. If it is found to revolve truly on the centers it may be drilled, otherwise the center must be corrected with the center punch, and the work again tested in the lathe.

After centering by any of these methods, the center must be drilled and countersunk with a suitable tool, so that it will fit the lathe center, as shown in Fig. 6. The angle of the lathe centers should be sixty degrees. To insure uniformity in everything pertaining to the centers, the center gauge, shown in Fig. 7, should be used for getting the required angle on the lathe centers and on the drills used in centering.

The matter of steadying long, slender rods while being turned in the lathe is often perplexing.

In some cases it may be done tolerably well in the manner illustrated in Fig. 8. The fork, H, is supported by the standard, I, which is inserted in the socket of the rest support, J. The device shown in Fig. 2, may be used in a similar way.

Fig. 9, represents a steady rest, the construction of which will hardly need explanation. For light work it may be made of wood; the upright being secured to the cross piece, L, which rests upon the lathe bed. The slotted pieces, M, are adjustable lengthwise to accommodate the size and position of the shaft. When it is required to support a bar



CENTERING AND STEADYING TOOLS.

being at the same time moved forward by the screw of the engine rest until the rod turns smoothly in the fork and the square pointed center has found the center of the rod; the tail spindle is then moved forward until the cavity is sufficiently deep to permit of starting the center drill. The angle of square center, G, for very hard material, should be a little more obtuse than that shown in Fig. 4. In any case, it should be of good material and well tempered.

In Fig 2 is shown a centering tool which is designed to take the place of the engine rest and fork in Fig. 1. The part B is fitted in place of the ordinary tool rest, and the jaw, C, which has in it a V-shaped notch, is hinged to the part B at D. A screw, E, passes through the upper end of the part B, and bears against the jaw, C. After what has already been said in connection with the engine rest, the manner of using this contrivance will be readily understood.

In Fig. 3 the hand tool, F, is employed for steadying the shaft and bringing it to a center. This tool is bent to form a right-angled notch for receiving the shaft, and when in use it is supported by the tool rest after the manner of an ordinary hand turning tool.

Work that is too large to be readily centered in this manner is often centered approximately by means of the universal square, as shown in Fig. 5. A diametrical line is drawn along the tongue of the square, the work is then turned through a quarter of a revolution, and another line is drawn. The intersection of these lines will be the center, at least approximately.

This point may now be marked with a center punch, and which is not round, the sleeve, N, shown in Fig. 10, is employed. It slips over the shaft and revolves in the steady rest. The bar is centered by the screws, O.

The device shown in Fig. 11, is used where a hollow mandrel lathe is not at hand. A piece of gas pipe, Q, is held by the chuck, P, and is secured by a set screw in the sleeve, B, which is journaled in the standard, S, and carries the chuck, T.

This arrangement may also be employed for turning the ends of long rods where it is not desirable to put them regularly on the centers of the lathe. M.

THE MANUFACTURE OF SEWING AND FLOSS SILK.

Twenty years ago the manufacture of silk goods in the United States was confined to so few firms and limited to such small amounts, that it was hardly to be classed among the industries of the country. Since about 1860 we have been brought into closer commercial relations with China and Japan, and other silk producing countries of the world, which has given silk manufacture a powerful impetus. American manufacturers discovered that their goods could rival those of European production in quality as well as price, and consumers found it to their advantage to patronize the home industry. Statistics could be given which would show the immense increase of American silk stuffs and the corresponding decrease of imported silks, but as the purpose of this article is to describe the process of manufacturing, they must be omitted.

The raw silk is imported in bales, each containing twenty bundles or "books." These weigh from five to eight pounds each, and are made up of a number of skeins. They are broken open and the skeins assorted according to the fineness of fiber; this is done entirely by touch and very rapidly. Ordinary grades of silk contain three sizes; the finer qualities only two. The fiber is exceedingly fine, translucent, of a white or yellow color, and very tough.

After the skeins are sorted they are soaked for three hours in a tank of soap and hot water, to remove the natural gum and the adulterating substances which are added to increase the weight. This adulteration is sometimes equal to one fourth of the entire weight. The silk is dried in a centrifugal drier without rinsing, as it is found that the presence of a small quantity of soap facilitates the handling of the material. It now goes to the reeling machine. Each of these contains thirty spools and reels. The skeins are placed upon the latter and rapidly spooled. Each machine has a single attendant who, after long practice, shows wonderful dexterity in untangling and tying the delicate fiber.

To a casual observer, raw silk appears to be regular and to possess a perfectly smooth surface; this is, however, not the case; it is uneven and contains many scales and projecting lumps, which must be removed before the silk can be twisted. This important process of cleaning consists simply in running the fiber through a pair of sharp and nicely adjusted semicircular knives. It is now ready to be combined to form the thread. Three or more fibers, the number varying with the size of thread desired, are reeled together on a spool, which, in another machine, is rapidly revolved as the silk is wound off; this process twists it loosely together. The operation of combining and twisting is repeated, and the thread is now made, though several processes are still necessary to finish it. The first of these is stretching, an operation which elongates and tightens the twist, at the same time squeezing out the soap, which had been left till this stage. The stretching machine consists of a pair of large wooden rolls placed over a tank of pure water. The silk is wet and reeled from one to the other.

It now undergoes the most delicate operation in the entire process of manufacture—that of dyeing. Those who delight in artistically combining the soft tints of floss silk into beautiful embroideries, little think of the wonderful skill and care which is necessary to produce those tints. Primary colors must be combined, the most delicate shades must be perfectly matched, and the faultless gradations of color, which blend so harmoniously in the same skein, must be most carefully chosen with reference to the general effect. The beautiful anilines are largely used, and the skeins of silk, hung upon long wooden rods, are suspended in the hot dye. A large amount of the liquid is next extracted in the centrifugal drier, and the remainder in the drying room. The dye contained in the thread makes it stiff and harsh, and to restore its natural softness and pliability it must be "wrung." A sturdy operative hangs the skein upon a