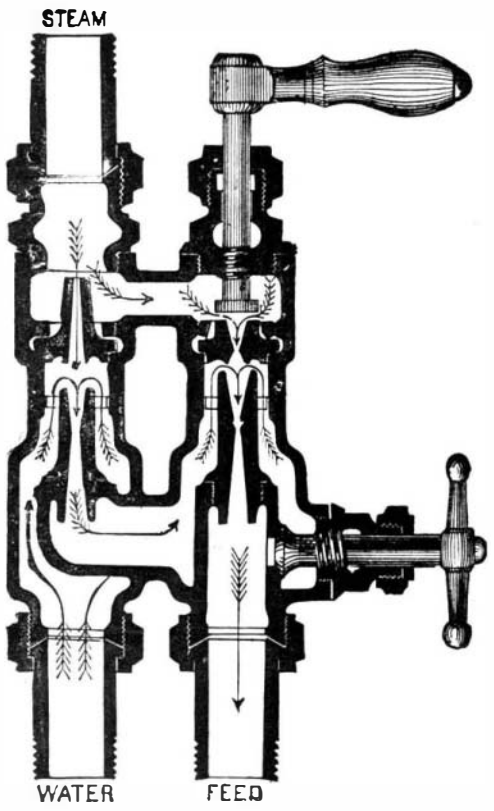
THE HANCOCK INSPIRATOR

One of the recent contributions to hydraulic engineering —and one which promises to be of great value to all users of steam—is the "inspirator," so called, an invention patented by John T Hancock, of Boston.

The inspirator is a compound steam jet apparatus, for raising and forcing water, designed to do the work ordinarily accomplished by pumps and injectors, with greater economy and regularity than has yet been possible with these machines.

The Hancock inspirator consists of a combination of two sets of apparatus, contained each in a separate chamber, one being employed for lifting water from a well or other



LONGITUDINAL SECTION OF HANCOCK INSPIRATOR.

source of supply, and conveying the same to the second apparatus, which transmits it to the boiler, or forces it against a greater pressure than that of the impelling steam. The lifting apparatus raises water more than 25 feet, and can be used independently of the forcing apparatus, for raising water to a moderate height, thus supplying the place of a suction pump or a steam jet pump.

The sectional view shows the simplicity of construction which characterizes the inspirator. The illustration represents the form used on stationary boilers. Steam enters through the pipe marked STEAM, the water from the well is drawn through the pipe marked WATER, and the condensed steam and water issue through the pipe marked FEED.

The apparatus on the left in the engraving is for lifting, that on the right for forcing. No adjustment is necessary for varying steam pressures, but the quantity and temperature of the water can be varied by increasing or reducing the quantity of steam or water supply.

For locomotives the form of the inspirator is somewhat modified, but the principle is the same.

The continuity of the jet of steam and water never being broken by the jar of a locomotive passing over switches and frogs, the inspirator is a more reliable feeder than a pump. Is not appreciably affected by wear, nor is its action liable to be stopped by sediment in the water.

On locomotives the lifting apparatus serves an important purpose as a regulating device, making this instrument more sure and positive in its action.

We are informed that although the inspirator has been but a comparatively short time before the public, a large number of them (over 4,000) are now use, and that they have thus far given general satisfaction.

Many advantages over a pump are claimed for it as it needs no packing, it is not noisy, and it can be adjusted to feed the boiler continuously, which is acknowledged by all engineers to be the best and most economical method of feeding.

The inspirator is manufactured by the Hancock Inspirator Company, office 52 Central Wharf, Boston, Mass.

Houses for Workingmen.

The Chicago *Tribune* mentions a building scheme which the Union Mutual Life Insurance Company propose to carry out upon some of their vacant property in the southern part of Chicago. The plans are the work of Messrs. Wheelock & Clay. The problem of building houses in a continuous block, and yet having, to a great degree, the appearance of isolation, is accomplished by a double court in front between each pair of houses; this feature, besides giving ample light and ventilation to all inner rooms, affords the architects an opportunity of displaying considerable variety in the treatment of their designs, not only of the exterior, but of the interior. The courts in the rear are quite similar to those in front, leaving only a short line of party wall between the two houses. As the courts are thus in pairs, they give double the amount of light, and yet the windows are so arranged that it is impossible to see from one into any other. Also, by an ingenious arrangement of the staircase in each alternate house, the front entrances are entirely separate and come in regular succession.

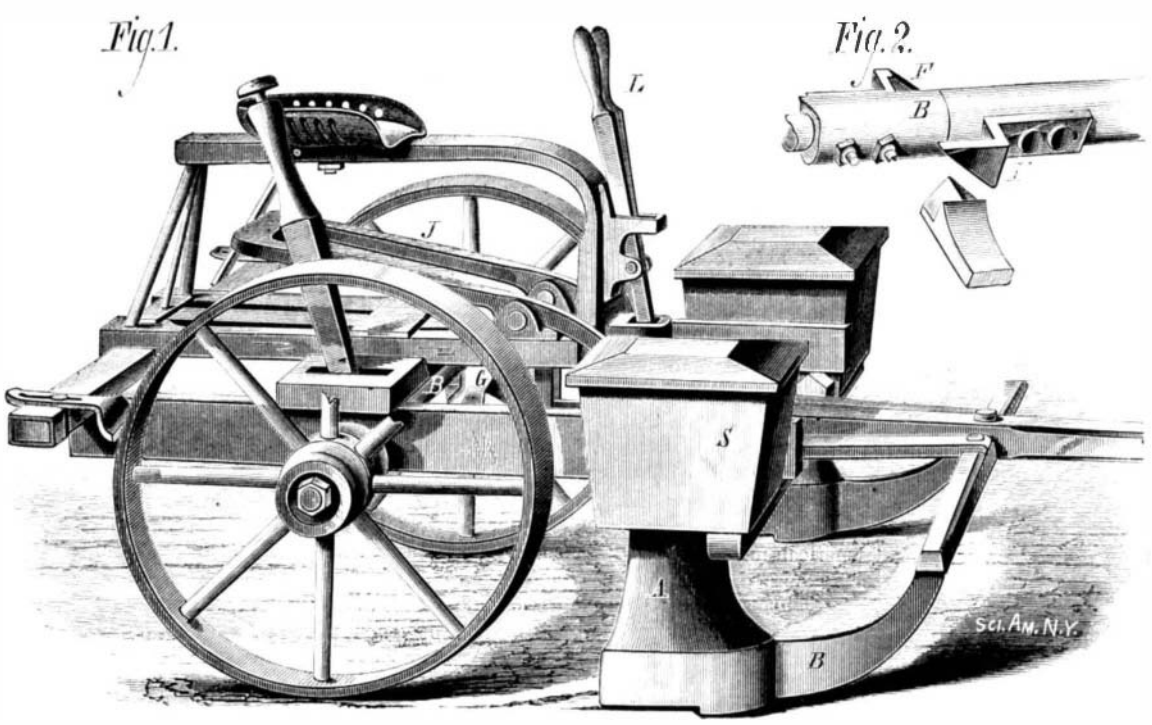
These houses are to be of two stories, with cellar and attic; in the cellar are the laundry, furnace room, storerooms, etc. Each house has a parlor, hall, and staircase hall, dining room, kitchen, etc., upon the first floor; part of them have a library in addition, all well lighted and ventilated. The main stairs are at the rear of the parlor, and not exposed to view upon entering or leaving the entrance halls, which are to have tile floors, open and unobstructed.

A NEW CHECK ROW CORN PLANTER AND DRILL.

The accompanying engraving shows a new agricultural implement recently patented by Mr. Osman C. Du Souchet, of Alexandria, Mo. It is designed for planting corn in accurate check rows, and it is constructed so that all parts of its mechanism are under the control of the driver. The working parts of the machine are supported by wheels having a very broad tread, and by hollow standards, A, connected with the runners or plows, B. Seed boxes, S, are mounted on a frame that is jointed to another frame connected directly with the axle, and the seed valves are operated by a common bar that is connected with a lever, G, which is actuated by two cam lugs, F, placed on opposite sides of the axle. These lugs strike opposite sides of the beveled end of the lever, G, in alternation, and thus impart to the lever and to the seed valves a reciprocating motion. A section of the axle bearing the cam lugs is shown in Fig. 2.

The frame that carries the runners and seed boxes may be raised or lowered by moving the lever, J, and it may be maintained in a raised position by means of a latch, shown at the rear of the seat. The lever, C, is supported by a slide, which is moved by the lever, L, so as to throw the lever into and out of engagement with the cam lugs on the axle.

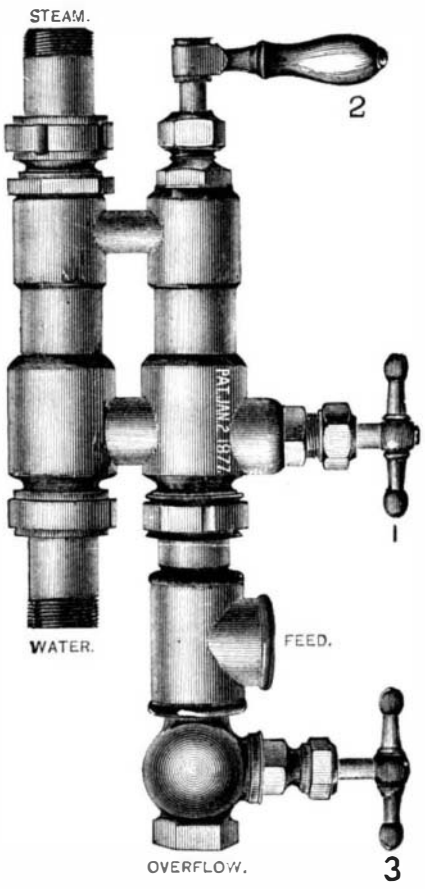
At one side of the machine there is upon the axle a spur wheel, which may be turned by the lever at the left of the seat whenever it is desired to change the relative position of the cam lugs on the axle. To admit of this adjustment the drive wheels are connected with the axle by pawls and ratchets. As the machine moves forward the runner, B, makes a furrow, into which the seed is dropped through the hollow standards, A. The wheels, having a wide tread, follow the runners and cover the seed.



DU SOUCHET'S CHECK ROW CORN PLANTER AND DRILL.

California Raisins.

About four years ago Mr. J. P. Whitney, a gentleman widely known in California in connection with wool growing and grain raising on a large scale, began planting vines of the "Muscat of Alexandria" variety of white grapes, with a view to demonstrating that raisins can be made in America of as good a quality as those from abroad. Since that time about 200,000 vines have been planted. As the first result of Mr. Whitney's experiment two car loads of 20,000 lbs. each of California-made raisins were recently sent East, one car load coming to New York city, and the other going to Boston. The New York *Times* reports that in both cities they have been received with favor, selling equally well with the best imported Malaga raisins, with which they compare favorably as to size, color, skin, stones, and flavor—the latter being the most essential quality. The United States is the greatest raisin-consuming country in the world, and uses annually more raisins than the whole of Europe. The market is mainly supplied from Spain, the raisins known as "Malagas" being considered the best. They come from a comparatively narrow strip of country in the south of Spain, which has hitherto been regarded as surpassing all other regions for raisins of that character. The annual yield of Malaga grapes averages 2,250,000 boxes of 20 lbs. each. It sometimes reaches 2,500,000 boxes, and last season about 2,000,000 boxes were marketed. Of this enormous yield the United States takes fully one half, on which it pays a duty —as on all other raisins—of 2½ cents per lb.



HANCOCK INSPIRATOR.

The American raisins are made from a white grape, the "Muscat of Alexandria," to the raising of which the soil and climate of a large portion of California are well adapted. The vine begins to bear somewhat in the second year, although the full bearing capacity is not developed until it is five years old, and continues to bear for about half a century, and sometimes for 75 years. In the cultivation of raisin grapes American grape growers have little to learn from Spain, but in the curing and packing of the raisins a lack of experience is still felt.

The raisins are not cured by any artificial process, however, but in a comparatively simple manner. The grapes are laid on gravel beds, and are exposed to the sun for ten or twelve days in August or September, when they are ready for packing, having turned from white to brown, and gradually changed to the familiar dark color of the raisins of commerce. The white sugar which is generally found attached to the raisins sold in the market is entirely a natural product of the grape, and comes on with age, first appearing, as a rule, when the raisins are about two years old. The packing, however, is an operation which requires great care. To properly pack a single 20 lb. box the entire time of one man is needed for a day and a half, so careful is the manipulation of the raisin bunches, while at least as much time is required to select and pick over the bunches before packing. Mr. Whitney believes, however, that raisins can be cured in California fully equal to the Malaga or any other raisin.

The chief difficulty with which the California raisin raiser will have to contend

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, 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 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.

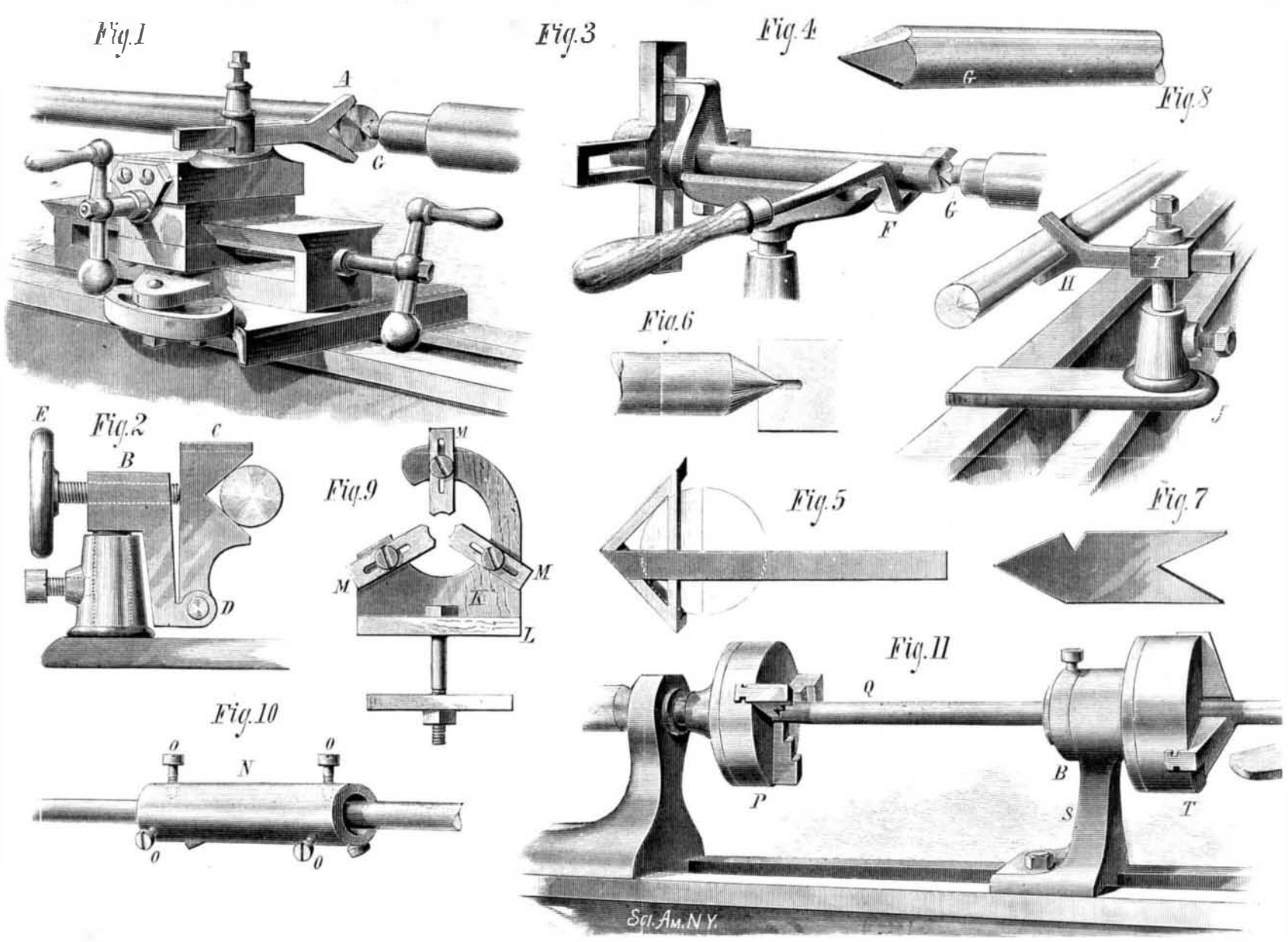
The matter of steadying long, slender rods while being turned in the lathe is often perplexing.

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 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.



CENTERING AND STEADYING TOOLS.

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