

EVOLUTION OF A SINGER NEEDLE



Courtesy of April 1930's Sewing Shoppe

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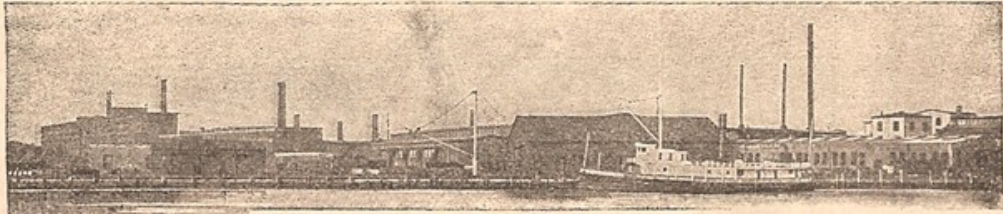


NEEDLES of exactly the proper shape and of the very best quality are absolutely essential to good work with a sewing-machine. Singer cold-swaged needles have achieved a reputation that has made them the subject for numerous spurious imitations that can only be detected by use; therefore, it is only safe to purchase sewing-machine needles at a Singer Agency.

The importance of keeping the quality of its needles up to the highest standard is fully realized by The Singer Manufacturing Company, and the most careful attention is given to every detail in their manufacture.

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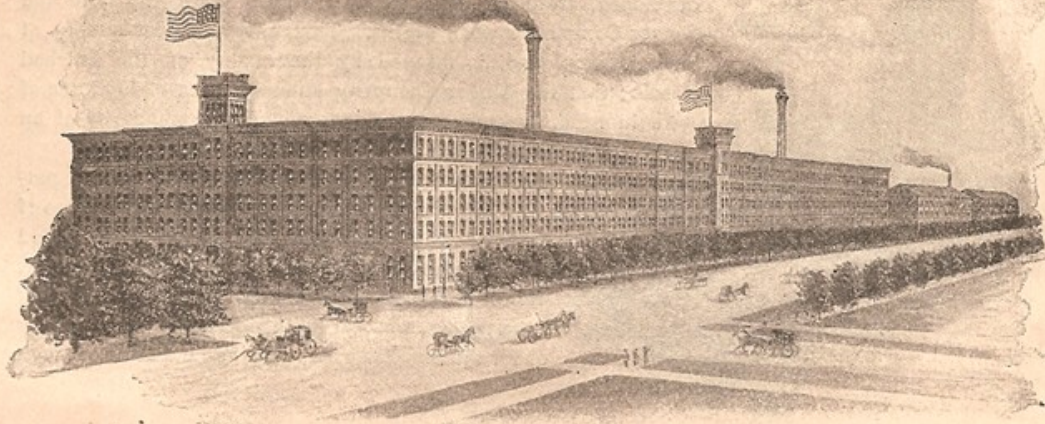
ELIZABETHPORT FACTORY—WATER FRONT



At Elizabethport, New Jersey, in the suburban district of New York City, is situated one of the factories of The Singer Manufacturing Company. An area of 15,000 square feet on the fourth floor of an immense building is given up entirely to needle manufacture. The operations of this department form one of the most interesting features of the entire establishment; and the visitor who sees the intricate machinery and the sequence of processes which are employed to produce each needle, feels anew the magnitude of small things.

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FACTORY AT ELIZABETHPORT—STREET FRONT

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Nature is slow in producing the polished grain of sand from out of rock, and the needle must first pass by a process, now highly developed, from pig-iron to steel wire. With the wire the Singer Company's work begins. That only the best quality of wire is employed, is proved by the quality of the finished needle; that the Singer Company annually uses eighty tons of wire in needle manufacture alone, evinces the popularity of an excellent article.

These needles are of various lengths and patterns, to suit the requirements of different varieties of Singer sewing-machines, but they are all classified in two general divisions, viz., cloth and leather. There are likewise different classes of points; but each needle, whether intended for the manufactory or for the familiar uses of the home, passes through

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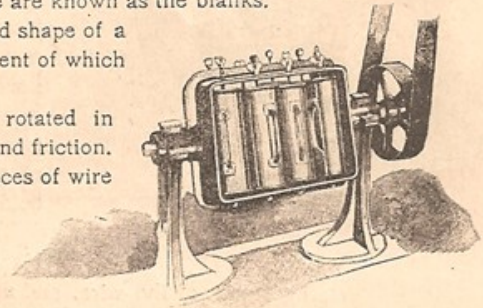
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the same general list of processes. These, as the visitor to the manufactory may view them, are in outline as follows:

The wire is first put through a machine called the straightener and cutter. This removes any bend in the wire, and cuts it into short pieces about one-third the required length of the needle when finished. These pieces of wire are known as the blanks.

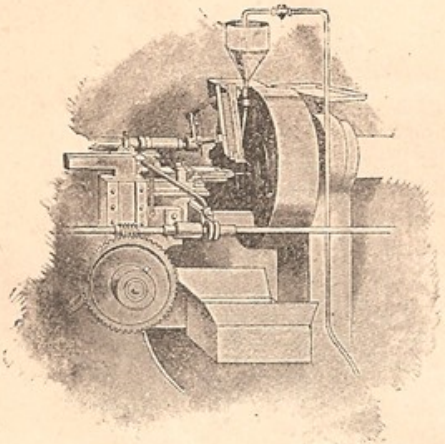
The profile illustration below indicates the size and shape of a "blank" for the particular kind of needles, the development of which we will attempt to follow.

The blanks are placed in small iron cylinders, rotated in such a manner as to keep the wire in constant motion and friction. By this means scale and dirt are removed, and the pieces of wire prepared for the cold-swaging—a process which, as employed by the Singer Company, has been proved the best in the world for the purpose, and greatly increases the strength and elasticity of the needle's blade, which is formed during the operation.



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We begin at this point to realize the fact that the making of a Singer Needle is not as simple an operation as it may be supposed, and to note here how many times in its evolution the needle must be handled as a unit, whether under human or mechanical manipulation. For cold-swaging, the blanks are placed in a hopper, from which they are taken automatically one at a time, and the end presented to the action of a set of revolving sectional steel dies. By the constant opening and shutting of these dies while in rotation, the end of the blank is compressed and drawn out to form the blade, the extent of this manipulation being indicated by the profile shown below.

Some needle-makers form the blade by *cutting* the blank down to the required size, thus removing the strongest part of the wire, and using only its core which is coarser and softer. By the Singer process the original strength of the wire is not only retained but it is vastly

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increased by being forced and welded together, thus making it more compact and tough. Cold-swaged needle-blades are much stiffer and stronger than those formed by the cutting process.

There are many kinds of needles made here, from the tiny ones used for finest stitching of dainty fabrics to some that are five or six inches long, intended for manufacturing purposes. Each kind has its own peculiar number or mark, and this must be stamped on the shank of every needle of that kind. After swaging our bit of wire, it resembles one of these kinds to such an extent that it must next receive its proper stamp so as to be easily identified.

In the drawing out of the blade by the swaging process a slight variation has been produced in the lengths of our needles in embryo, and they must be trimmed to a uniform length.

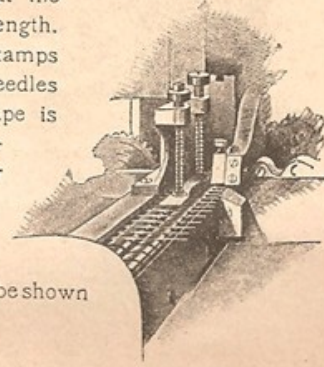
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A young woman attends an ingenious bit of mechanism that not only clips the end but stamps the shank of each needle.

The prominent feature of the machine for clipping and stamping is the ingenious arrangement of the screw-feed for simultaneously carrying the needles across, so that the ends of the shanks are aligned against a fence, and forward so that the points may be presented to a cutter, which trims all to a uniform length. Passing the cutter, each needle receives a blow from a die that stamps upon its shank the descriptive number. Only the round-shanked needles are handled by this machine; flat-shanked needles, whose shape is produced by being ground in a machine fed by a peculiar to-boggan-slide-like arrangement, require also special apparatus for stamping.

The illustration shows the effective way in which one of the oldest principles of mechanics—that of the screw—has been made to serve a purpose in the evolution of our bit of wire. It will be shown again when it is used in the process of forming the point.



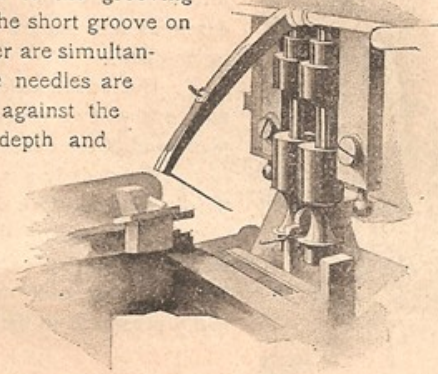
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It is the "flat-shanked" needle that is most familiar to users of Singer sewing-machines. This simple flattening of one side of the shank effectually prevents placing the needle into the needle-bar of your machine in any but the proper position and also better enables its rigid fastening when put into position for sewing.

After the needle is stamped, it is next taken to the grooving machine, by whose wonderful automatic mechanism the short groove on one side of the needle and the long groove on the other are simultaneously made by two circular saws, past which the needles are carried automatically. The saws are pressed in against the blade and withdrawn so as to give the required depth and contour to the groove.

Our illustration shows the long finger that picks up one needle at a time, presents it to the action of the saws and then drops it into a trough. The profile shows the long groove



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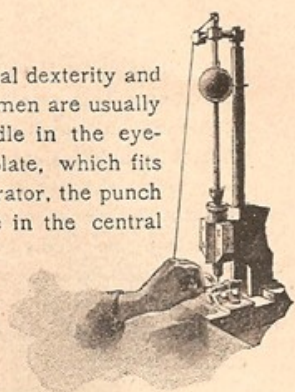
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The needle is now ready for its eye. Manual dexterity and keen sight are necessary for this operation, and women are usually employed on it. The correct position of the needle in the eye-punching machine is insured by a central guide-plate, which fits into the groove on the blade; at the will of the operator, the punch descends and passes through the blade into a hole in the central guide-plate.

But one needle can be punched at a time and every eye must be in precisely the proper place and of the exact size required.

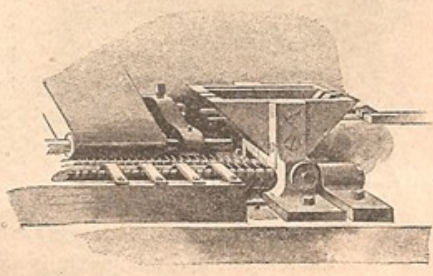
On a daily average a girl will punch 7,000 needle-eyes or more than a dozen a minute. The operators sit facing the windows and in close proximity thereto so as to get good light. Our illustration shows a long row of them carefully intent on the work, the character and effect of which is more graphically presented in the other illustrations.

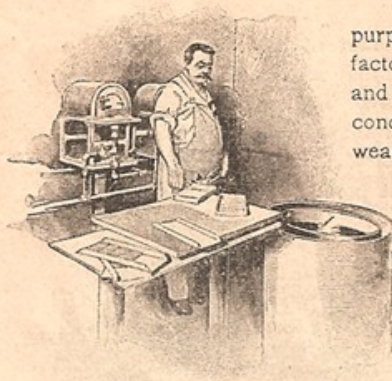


The next essential for the needle is its point. The machine for making the round points on the needles for cloth-sewing has a screw-feed, similar to that used in the clipping and stamping machine, but it is arranged to cause the needles to revolve as they are carried along and first passed under a swiftly-turning emery-wheel that shapes the round point, which passes next under a leather-covered disk that finishes the point.

The designation "Cloth" always means a needle with a round point.

Under the general title of "Leather" the needles have various shapes of points, described as *Twist*, *Reverse Twist*, *Wedge*, *Cross*, *Chisel*, *Reverse Chisel* and *Diamond* points. The different shapes are produced in several different ways, some by automatic mechanism, others by expert manual manipulation. This variety of shapes is necessary for the different uses of needles in leather stitching. It requires the greatest care and accuracy in making these points to satisfy the requirements of the trade, and Singer needles for manufacturing





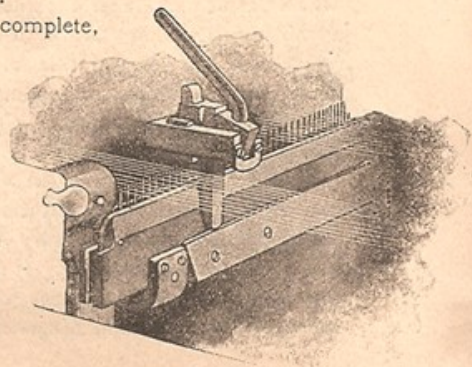
TEMPERING.

through an oil bath, and afterwards tempered in special ovens. Peculiar processes are employed to accurately test the temper, and no needle is passed that falls below the high standard adopted by the Singer Company.

purposes have attained the highest standard of excellence. It is in the factory use of sewing-machine needles that the tests are most severe, and Singer needles lead all others for such use. This fact proves conclusively that they have attained supreme excellence in length of wear and uniformity of manufacture.

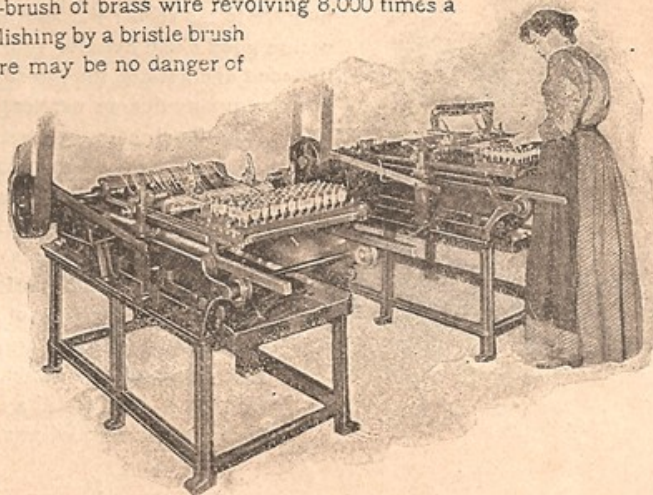
The shape of the needle is now complete,

but the softness of the steel makes it useless as yet for practical purposes. Each needle must be hardened and tempered. It is therefore heated by gas to a cherry red; then passed



Quality has now been added to shape, but the color of the needle and its point is dull. It must be polished. Among sixty to seventy of its fellows, it is arranged in flat-jawed tongs, and held against a scratch-brush of brass wire revolving 8,000 times a minute. This polishes the grooves. Polishing by a bristle brush follows. To polish the eye so that there may be no danger of cutting the thread therein, the needles are strung on cotton threads covered with oil and emery; the thread is drawn back and forth while the needles are in various slanting positions, so that the polishing powder acts on all parts of the aperture.

The illustration on page 12 shows a section of the clamp in which the needles are placed points down; this clamp oscillates or has a rocking





motion thus giving the needles the slanting positions previously referred to. Two machines are shown in operation and all will perhaps indicate to the reader the careful labor and great care expended to secure good clean eyes for your needle in order that it may be easily threaded and not cut the thread as so often happens with needles of inferior quality due to careless manufacture. After being removed from the thread, the needles are cleaned by a revolving brush.

They are then ready for the first inspection, under which the eyes, points and blades are scrutinized with the aid of a glass. For this operation no mechanism has been discovered; feminine delicacy of judgment is employed. Imperfect specimens are thrown aside and the perfect sent to the straightener. Here too, the skill and dexterity of the human hand are necessary. The needles are rolled on an anvil at the level of the eye of an expert operator, who is able to detect the slightest curvature and correct it by a tap of a small hammer. A second inspection for imperfectness follows.

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The needles that have passed through the above operation are now ready for finish-pointing, done on a fine emery, and for finish-polishing by a revolving brush with crocus and alcohol.

Since they now have uniform shapes, sharp points, elastic blades, and smooth eyes, the needles are ready to be packed. This involves the placing of a uniform number, usually one hundred, in the peculiar boxes so familiarly known to the millions of persons using Singer needles. Accurate count is secured by placing the correct number in one side of delicately adjusted scales; a sufficient weight of needles to exactly balance the opposite side turns out a corresponding number.

Having been packed so as to be carefully protected from rust, the processes of manufacture are now complete, and the needles are ready for shipment. Their destinations number every household on the globe, every manufactory in which sewing has any share.

The polished needle, whose development from a coil of rusty wire we have



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watched, may be destined to work a button-hole, embroider a flower, stitch a piece of harness, or sew a long white seam. It has passed through thirty different hands in the course of an evolution which is the result of consummate human ingenuity. A hundred and fifty employees and lavish expenditure are concerned in this evolution, and the essential processes are such that only a fully equipped and well organized plant like that at Elizabethport can possibly produce needles of uniformly good quality. The public is anxious to secure an excellent article, and to satisfy the demand every year the Singer Company turns out twenty-five millions of needles similar to the one in whose manufacture we have been interested.



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OUR OWN PREPARATION. USE NO OTHER.



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FOR SINGER SEWING-MACHINES . . .



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