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**AMERICAN INDUSTRIES.—No. 10.  
SEWING MACHINES.**

In pursuance of our purpose of illustrating and giving some account of important American industries, we have reached a department of the mechanic arts pre-eminently American in its origin and development.

Thirty years ago there was not a thoroughly practical sewing machine in existence; whether such a thing was possible was an unsettled question; how to sew successfully by machinery, if possible, was a problem for the solution of which American genius was projecting and experimenting in various directions. To-day all the markets of the civilized world are supplied, we might say glutted, with an almost endless variety of sewing machines, and almost every conceivable kind of stitching on every species of material that may be sewed is done by machinery. That family is poor indeed that cannot afford one of these most effective of labor-saving machines, and that family must be rich that can afford to do without one.

Let those who ascribe the privations and sufferings of the poor to the baneful effects of labor-saving machinery consider the tens or scores who now earn a comfortable livelihood with this admirable instrument, where formerly one with unremitting toil gained a scanty subsistence by plying the hand needle.

The approved form of machine stitch for general purposes is the so-called lock stitch, formed by the interlocking of two threads, which is accomplished by means either of a shuttle or of a rotary hook. Hence arise the two leading systems of sewing machines.

Happily it does not devolve upon us to decide the question of the relative merits of these systems, or of the particular forms of machines put forth by different manufacturers. We have the highest appre-

ciation of the efforts of all who have effectively worked for the development of this useful art; whether of Elias Howe modifying old devices and applying them to the accomplish-

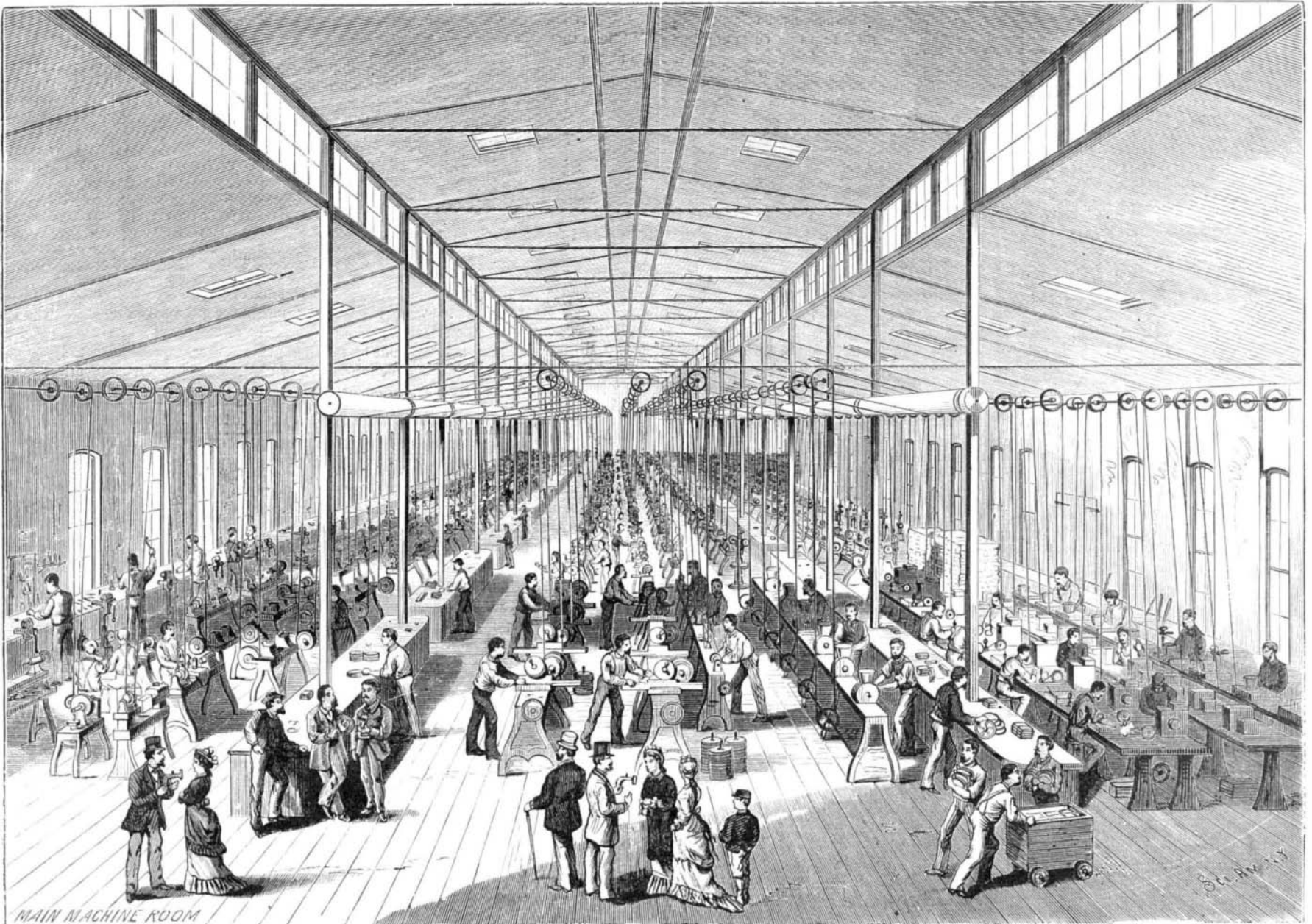
ment of new purposes, or of A. B. Wilson discarding the shuttle and whittling the model of a thoroughly original, ingenious, and effective substitute therefor from the end of a broomstick. We have chosen to present our readers with some illustrations of the works of the Wheeler & Wilson Manufacturing Company.

Without going into the history of this concern, we might say of those from whom it derives its name, that A. B. Wilson, by the original inventions of the rotary hook and four-motion feed (to say nothing of his admirable complete machines), placed himself in the foremost rank of inventors and achieved enduring fame; Nathaniel Wheeler, who for about twenty-five years has been the president of the company, by his sound practical sense and administrative ability, as well as by his knowledge of mechanics and practical skill in mechanical operations, has been the chief developer and organizer of an immense and successful industry.

The works of this company are situated in the thriving city of Bridgeport, in the State of Connecticut. The principal buildings consist of the main factory for metal working, assembling, testing, etc., occupying one complete square, 368x307 feet, under one roof; a woodworking factory, covering a second square, 526x219 feet; a foundry and needle factory upon a third, 368x232 feet; the works altogether covering over seven acres of ground. To illustrate and describe the whole would require a large volume. Our artist has made sketches of a few rooms and interesting operations.

The main machinery room is that in which the principal mechanical operations are performed in the production of the metal parts of the sewing machines. This fireproof room is L-shaped, 300 feet in length, 210 feet in width in one part, and 100 feet in

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**WHEELER & WILSON SEWING MACHINE MANUFACTORY.**

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the other. Power is distributed from four main lines of shafting, which have not perceptibly deviated from correct adjustment since they were first placed in position, thirteen years ago.

In this room there are no less than 1,003 separate machines for special mechanical operations, a large portion of which are automatic—that is to say, practically speaking, possessed of such intelligence and skill as to direct and control their own movements—only needing consciousness to rise to the plane of the skilled mechanic.

The number of driving belts which meet the view in this one room is, by actual count, 1,676, of the total length of 39,510 feet, or but 90 feet less than 7½ miles. This is exclusive of short feed belts, etc., of which there are probably as many more.

Here may be seen good examples of the economical results of the division of labor. Take, for example, the rotary hook. No man makes a book. It is forged here, turned yonder, one machine makes this cut, another that, and so it is passed on from machine to machine, until after 128 distinct operations, that one part is completed, inspected, and ready to take its proper place. So the making of a glass presser involves, we are told, 32 different operations, and a hemmer 70.

In neighboring rooms are the plating, japanning, and ornamenting departments.

We were struck with the apparent excellence of the japanning, its smooth surface and brilliant luster, and were surprised to find, upon inquiry, that by peculiar processes and materials this extraordinary finish was produced more expeditiously, and at less cost, than ordinary and inferior work.

Here we may remark that, being given the liberty of the shop, we improved the opportunity to make inquiries, and in our probings for information one of the mechanics "let out" to us the following: Upon one occasion when Mr. Wheeler (the president) was deeply interested in improving the process of japanning, he stripped off his coat and put his hands to the work to demonstrate how it should be done—not a rare thing for him to do.

A Hibernian employe, happening to see him thus engaged, and not knowing or not recognizing the man, exclaimed to one of the workmen, "Be gorra, but it must be hard times outside!—to see a fine appearin' gintleman like that, rubbin' machines at a dollar and a quarter a day!" If we ought not to have repeated this anecdote, we beg pardon of whoever may be offended.

One of our sketches shows a portion of the assembling room. Here is illustrated the mechanical precision resulting from making all parts of the machines to exact gauge.

In assembling a machine each part is taken from an indefinite number of that kind, yet all come together with the most perfect fit. In other words, all parts of the same kind are perfectly interchangeable. The holes for the shaft bearings in the beds of the machines are reamed out with diamond reamers, producing a perfectly true and polished interior surface, the contact between which and the shaft, though airtight, allows perfect freedom of motion.

For each part of the machine a standard model and a standard gauge are carefully kept, by which the working and inspection gauges are tested from time to time, and kept in the highest degree of exactness.

—cutting, grinding, and tipping the blank, swaging, cutting to length, rough-pointing, tipping, grooving, eye punching, burring, hardening, tempering, polishing, brushing, scouring, buffing, etc., etc.—now number thirty-three, having been recently reduced from fifty-two by improved machinery.

In this department, as may be seen by our illustrations, useful employment is found for the gentler sex.

The buildings of the woodworking factory, or cabinet works, are two in number, each 526 feet in length. Here is made all the furniture for the machines, from a plain table top to the most elaborate and expensive full case or cabinet.

The raw material is cut to dimension at the company's mill in Indianapolis, and transported here to be worked up into the desired forms.

The company's aim is to produce, for general purposes, substantial and well finished rather than simply showy work. In this department, as in all others, every piece of work is subjected to the most rigid inspection, and if any be faulty in any particular it is rejected.

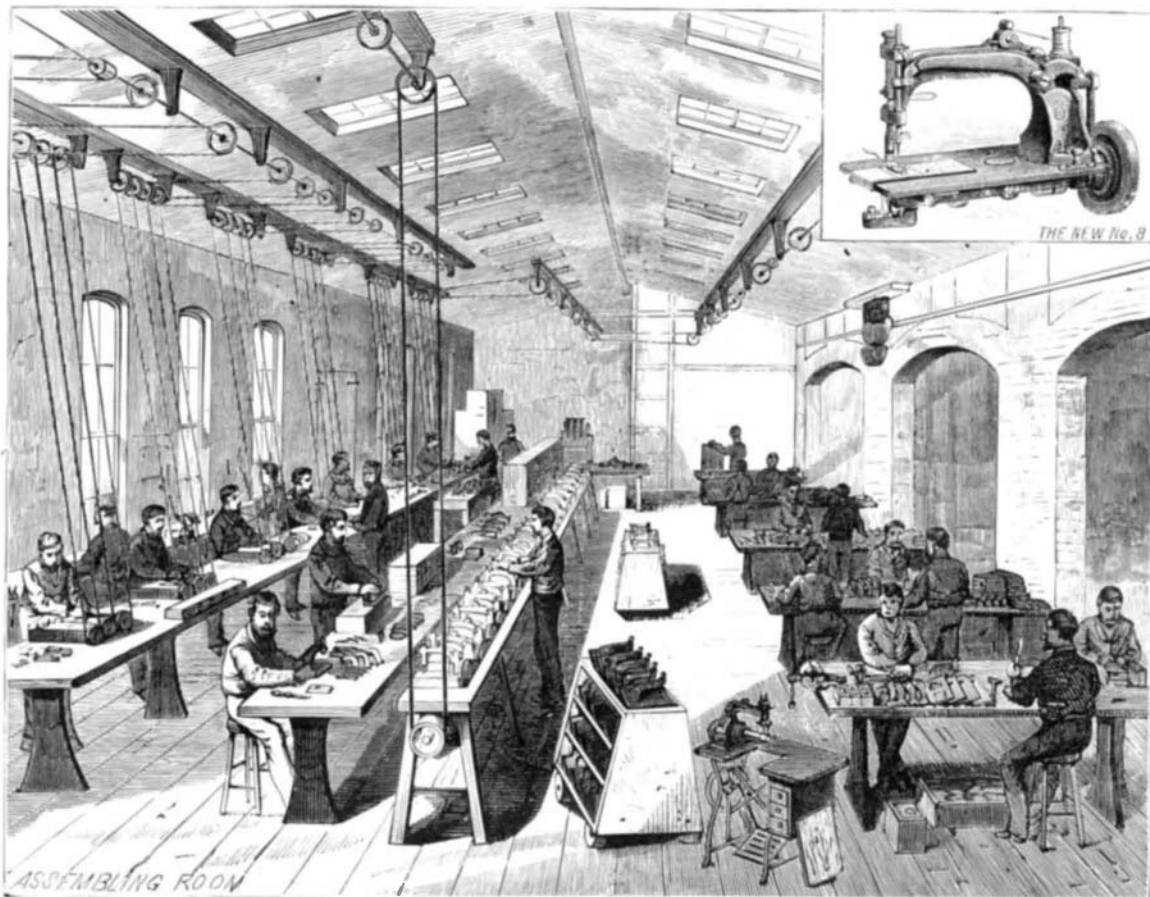
A noticeable feature here is the perfect smoothness and luster produced in finishing the surface of the wood. For this purpose is used a "wood-filler," invented and patented by Mr. Wheeler, by means of which, we are told, the time, labor, and cost of wood finishing are materially reduced, with the production of better results as to the finish itself, the natural beauties of the colors and grain of the wood being fully developed and permanently fixed.

Some of the salient features of the processes of production having been thus briefly touched upon, the conclusion will have been anticipated that the complete products themselves are in all respects thoroughly substantial and as

nearly perfect as can be made from the best materials by the most skilled labor with the most effective appliances. These products consist of sewing machines of various styles, suited as well to the heaviest manufacturing in cloth and leather as to the lightest domestic purposes.

In the heat of the lively competition which has existed for years among the rival manufacturers of sewing machines, it has been the custom for each company to claim that its particular machines were the best in the world.

There are few sewing machines that are not very much better than none. As we said at the outset, it is no part of our purpose to judge of their relative merits; but the fact that at the Paris Exhibition of 1878, the only grand prize for sewing machines from all the world was awarded to the Wheeler & Wilson Company, as is attested by the highest authorities, certainly indicates that the claims of superiority on the part of this company are far removed from idle boasting. At all events, it is gratifying to be able to state the



ASSEMBLING ROOM

The organization and maintenance of the perfect system which prevails throughout these works reflect the highest credit upon the secretary, Mr. Wm. H. Perry, who has been connected with the company almost from the time of its foundation.

Passing through a tunnel under the street we reach the buildings in which are the foundry and the needle factory. Of the former we will only say that for convenience and perfection of all appointments it is not surpassed.

As the sewing machine proper is useless without the needle, the latter is, of course, an article of prime importance. No department of these works is more interesting than the mechanical processes of converting steel wire into perfectly finished needles, and in no department are more wonderful illustrations of the triumphs of inventive genius; but we cannot attempt a detailed description of the machinery and processes, some of which, in fact, we are not at liberty to describe. The distinct operations in the making of each needle



CASE MAKING ROOM

WHEELER & WILSON SEWING MACHINE MANUFACTORY.