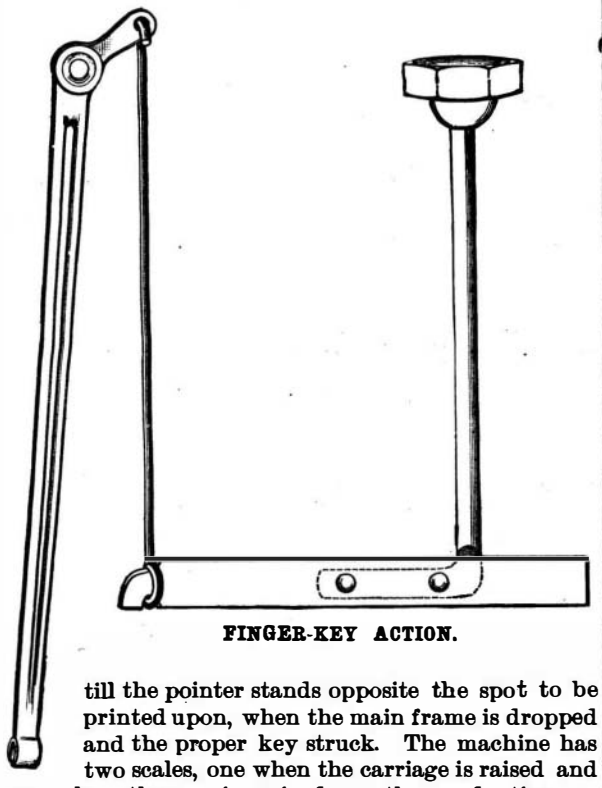
THE "NATIONAL" TYPEWRITER.

A standard, high grade typewriter, designed to embody all the good points of the best instruments, while possessing many special points of superiority all its own, is shown in the accompanying illustrations. It writes 81 characters, including capitals, small letters, figures, punctuation marks, commercial signs, etc., with only 29 keys to learn and manipulate. The machine occupies a space of only 9 by 12 inches, and 7½ inches high, weighing about 13 pounds. It has a comparatively small number of parts and is strongly made, the strong points claimed for it being simplicity, durability, portability, accuracy, speed and wide range of usefulness and utility, while it is almost noiseless.

The keyboard of the instrument is practically the same as that of other standard machines, operators upon which can at once use the "National." The carriage is a fixed portion of the machine, having a longitudinal motion only; it is not hinged, weighs only about 20 ounces, and can be pulled or pushed back toward the beginning of the line at any point without touching a release key. Paper and envelopes can be fed through without raising the carriage. It will run backward and forward while raised as well as when lowered, so that all errors or omissions can be practically corrected in sight. No. 15 indicates the envelope and paper guide; "L. G.," the line gauge; 13, the carriage indicator; 11, the scales; and 37, the automatic pointer or tabulator. The pointer moves to and from the printing point as the main frame upon which the carriage moves is raised and lowered, and for a correction the carriage is moved

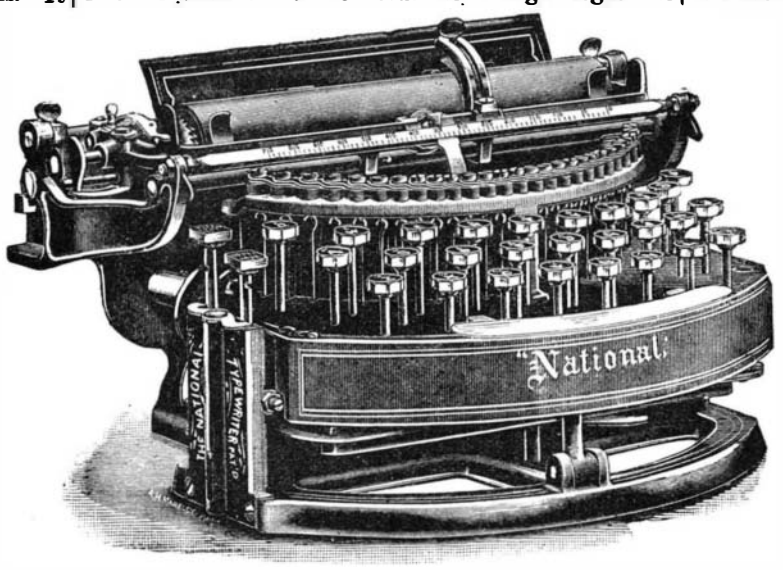


FINGER-KEY ACTION.

till the pointer stands opposite the spot to be printed upon, when the main frame is dropped and the proper key struck. The machine has two scales, one when the carriage is raised and one when the carriage is down, the graduations on both scales running in the same direction.

For manifolding work this machine offers distinct advantages, doing heavy manifolding or single copy work in the same alignment, without change in the machine, the alignment being unaffected by increased number of sheets. This is due to the direct, steady action of the type bars, which are arranged and swing in less than a half circle. The finger key action, shown in one of the views, is very simple, having practically but three simple pieces of strong steel, without any of the delicate and complicated wooden levers, compound levers, toggle joints, etc., and the keys are so supported that they do not wobble or warp out of position.

The ribbon movement is simple and automatic, 44 indicating the ribbon shift handle, and 62, 65 and 17 the ribbon spools and ribbon supports, 31 being the ribbon spools ratchet wheels, 28 an adjustable ribbon stud, and 39 a spring-impelled drum. The ribbons can be changed instantly without soiling the hands, the spools on which the ribbon is furnished being readily removable. It is entirely practicable with the machine to write a document in two or more colors of ink. An adjustable paper shelf assures regularity of margin, marginal stops being instantly adjustable on the carriage way, 51. The lifting main frame is indicated by No. 30, the handles being indicated by No. 35, and No. 22 marking the feed roll. In the back view of the frame is shown the bell-operating mechanism, 26 being the bell ringer, 29 an intermediate bell pawl, 40 the bell ringer wheel, and 67 an intermediate bell pawl stop. The bell can be set to ring at any point from 5 to 70 on the scale. The "National" is the result of a high degree of inventive talent and mechanical skill, as developed by years of practical experience. The "National" is one of the machines employed in the office of the SCIENTIFIC AMERICAN, and its operation gives much satisfaction. It is manufactured by the National Typewriter Co., 715-719 Arch Street, Philadelphia, Pa.



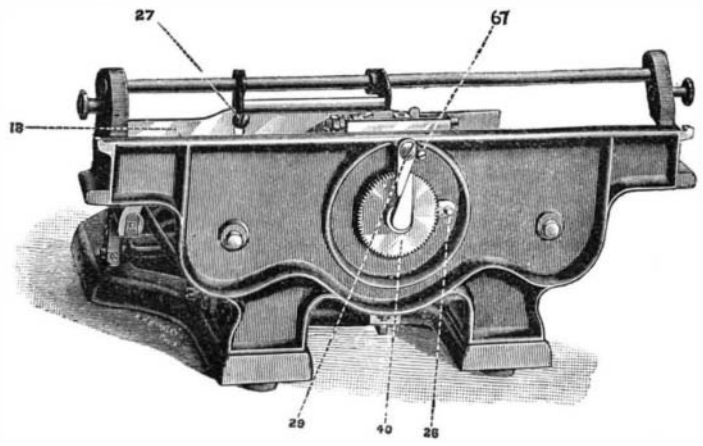
THE NATIONAL" TYPEWRITER.

How Needles Are Made.

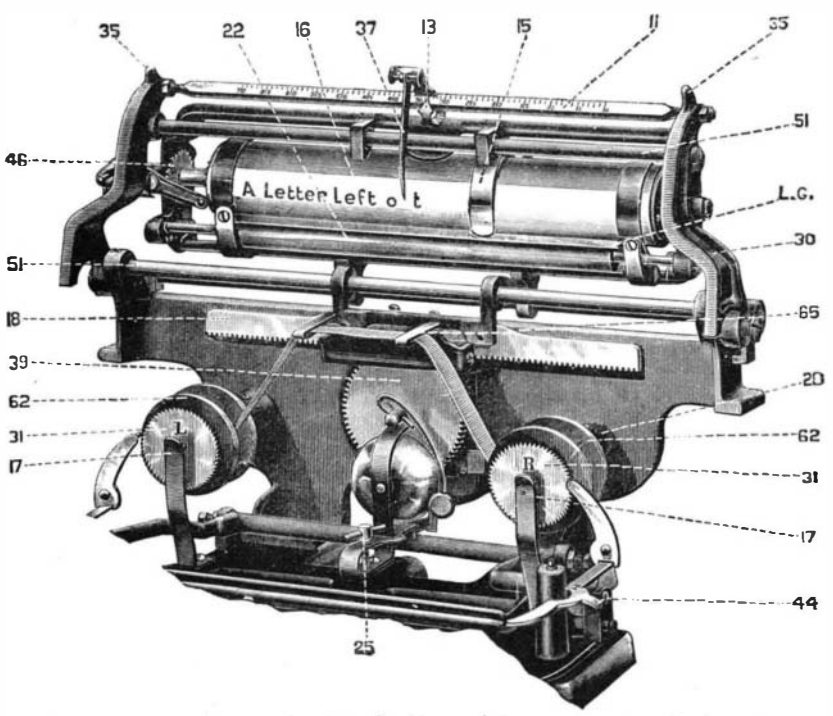
Needles are manufactured out of superior quality of cast steel wire cut into lengths to make two at a time. Pieces are straightened upon an iron table by means of an instrument termed a "rubbing knife." The wire is then pointed by automatic machinery provided with a fan or shaft to carry away the steel and grindstone dust, which is very injurious to inhale. In former days the lives of workmen employed in the needle trade were considerably shortened by breathing air charged with particles. Indeed, the following is a narrative told by a doctor in the district of the industry concerning a patient, a hand needle pointer by trade, who complained that he felt a hard ball of something in his trachea, which rose and fell between his chest and throat. The doctor ridiculed the idea and told him it was nonsense, but the man still persisted it was there, and asked him if he died to examine him. After the poor fellow's death a post mortem examination was made and resulted in a solid mass of steel and stone dust about the size of a bird's egg being found, as he had said, in his throat, and the lungs were so encrusted with steel that a knife would scarcely pierce them. It was therefore truly a blessing to these busy workmen when this deadly process was done away with, and in its stead a healthy one substituted.

After the operation of pointing, the wires are stamped and then pierced to form the eyes. As the diameters of the wires used in this industry are usually very small, *e. g.*, 0·03 of an inch, it will be readily apparent that the above process involves considerable accuracy and skill. The "burrs" produced by stamping are afterward removed by means of flat grindstones called filing machines. A "spit" of these double needles is next placed between a hand vise, termed "clams," and divided into single ones, requiring only to have their heads "rounded" by filing to furnish the complete articles. A finished needle, however, must have a hard and elastic temper, whereas these, in their present state, are softer than the wire out of which they were made. Therefore, after the needles have been burnished in the eyes, they are hardened by heating in an oven, and subsequently cooled by plunging them into oil. This rapid cooling of the steel makes it as brittle as glass. The needles will now almost break upon touching them; indeed, in this condition they would be as useless as in the soft state. To reduce them to a perfect state of elasticity, temperature has to be again raised about 600 degrees, and then by allowing them to cool gradually the required degree of elasticity is obtained. During the process of hardening, the fire makes many of the needles crooked, and these have to be picked out and straightened by a small hammer, one at a time, on an anvil. The heads are afterward softened by the application of heat for facilitating burnishing. The process of scouring the needles bright takes about a week. They are mixed with oil, soft soap and emery powder, wrapped in loose canvas, and placed in a kind of mangle worked by mechanical power. This scouring process done, the needles are washed in hot water and dried in sawdust.

The points, slightly blunted by passing through the various processes described, are now set upon a small revolving grindstone and the eyes reburnished. The next operation is that of polishing the needles, and which is performed by a rapidly rotating wheel covered with prepared leather. The needles are caused to pass many times over the leather in order to thoroughly polish them. Finally they are counted and stuck by women into cloth, wrapped in paper, and labeled for the market.—*Chicago Journal of Commerce.*



"NATIONAL" TYPEWRITER—BACK VIEW OF FRAME.



NATIONAL" TYPEWRITER—NUMBERED PARTS.

Automatic Letter Express Delivery.

The London post office has just placed in front of the Royal Exchange, as an experiment, an automatic boy which is intended to be an adjunct to the express delivery of letters and parcels. By dropping a penny in a slot, the purchaser obtains an outer envelope, inclosing a small white envelope and card, on which the desired communication may be written, resting upon a small desk which falls from the front of the box. At the same time an electric bell calls a messenger from the nearest post office, which is Threadneedle Street. If it be desired to forward a parcel by express delivery, the arrival of the messenger must be awaited, but a letter may be deposited in the message receptacle for immediate dispatch. The necessary fee has in each case to be inclosed in the envelope bearing the name of the addressee, and should the payment be insufficient he will be required to pay simply the difference. For this service ordinary postage is not charged, and the fees specified in the scale, which are at the rate of 3d. per mile, include train and omnibus fares. If the sender requires a cab to be used, the fare must be inclosed in the outer envelope, which has to be marked "By Cab."

THE London *Lancet* thinks it is about time for people "to set about clearing away the miserable sepulchers which abound throughout the country under the name of bath rooms, and to construct rooms for the performance of their daily ablutions in harmony with the importance and necessity of bodily cleanliness."