

## THE WATERBURY BRASS MILLS.

The Waterbury Clock Company—The American Cap and Flask Company.

There is hardly a household in the land that has not upon its mantel a little monitor, with wheels of brass, that reminds the inmates how swiftly time is passing away. One has only to imagine all the clocks and watches of the world suddenly stopped or out of order, to see what an utter derangement would take place. The confusion of tongues at the Tower of Babel would be hardly greater than the distress and dismay of mankind without their time-pieces, and since all the important events of life are generally appointed for certain hours of the day or night, we can see at once that the machines which measure those hours must be well made and wholly reliable. That the Yankee clocks comprise all these requisites is a well-known fact, and we shall dilate a little upon the method by which they are made.

It is not difficult to produce a combination of machinery that approximates to correctness and will run if well overlooked and sent to a clockmaker once a month in order to be regulated; or, if we spend a great deal of time in elaborating costly and delicate parts we shall also produce a good clock, but not at a price within the reach of all. For a complete and harmonious system of making time-pieces (more particularly watches) commend us to the American Watch Company at Waltham, Mass., and the Clock Company at Waterbury, Conn. Anything like the precision and accuracy attained by the diminutive tools used at the watch factory has never fallen under our notice before, and the popularity of the watches therein made is—to the good sense of our countrymen be it said—increasing daily; commend us to the Watch Company for a beautiful and an accurate time-keeper for the pocket, and to the Clock Company for one of larger dimensions.

In one of the large rooms in Benedict and Burnham's factory we found the Waterbury Clock Company in full operation, turning out clocks for the world. If the reader has one upon his shelf, as doubtless he has, he will see that the works or train are contained between two brass plates or a frame. This frame is stamped or cut out of a sheet of brass of the proper thickness, and is then drilled for the reception of the shafts or pivots of the wheels which work between it. The shafts—such they are in reality—are cut from wire specially prepared for the purpose; they are then placed in a lathe and the bearings turned up. The turner has a stock in which two tools are made fast, and this stock is further fitted with two stops that come in contact with the rest on which the tool rides. This stock and the tools are brought up to the shaft running in the lathe and moved along until the stop strikes the rest. When this occurs the tool can go no further, and by performing a similar operation on the other end of the shaft, the length between the two shoulders is secured. The diameter of the bearing is also attained at the same time and the surface of it rendered smooth by burnishing. These processes are done very quickly. The wheels of the clock are stamped out of a brass sheet. The blank is first cut out round, and the spaces between the arms of the wheel are punched subsequently. The wheels are then put on to a mandrel and turned up in an engine lathe to an exact size; they are then ready to be transferred to the cutting engine which makes the teeth. These machines are so familiar to all our mechanical readers that we shall not advert to them here; and when we say that nearly all parts of the clock are stamped out of sheet brass and afterwards made true by skillful workmen at various tools, we give a fair idea of the way in which brass clocks are made. The shafts, pinions, &c., are all nicely adjusted in their places and the clocks when finished do not fail to keep excellent time.

In another building, belonging to the Clock Company, we saw the operation of making the dial plates and of transferring engravings or prints to the ornamented glasses in front of the clocks. This latter process is well known to most persons. The dials are made of sheet zinc and are painted with white zinc paint; after the primary coat has dried the dials are placed on a revolving plate and ground perfectly smooth, and are also highly polished by the application of pumice-stone and water. The fine surface

thus produced is to be printed with the hours and minutes of the day, and for this purpose it is put into a press and impressed with all the figures at one operation. This task was formerly done by hand and was a tedious process. When the clock movements are ready and the dials finished, it only remains to furnish the cases which protect them from injury. The cases are made in all styles and of all varieties of wood. The outside is veneered in a tasteful manner, and the eight-day clock is at once a beautiful and a useful article. A large amount of lumber is used in this branch of the business, and we were shown lofts where all the hours of all the days of people in every part of the globe were lying in readiness to be recorded, so that they might make the register of human life complete.

It was indeed a sight that one could scarcely look upon without being impressed by its solemnity. Here in this inanimate case lay, in one sense, the springs of human action. For man has his engagements—his hours of business, mischief, duty or what not, and each of these would, at some future time, be checked off by the machinery now dumb and inert before us. The Turk might learn the value of time and lounge less upon his couch. The volatile Frenchman might spare a portion of his leisure for more important duties than those of pleasure-seeking; and wide over the fertile or sterile earth, on plains beautiful with verdure, or in some rocky fastnesses grim with cold and dark with decay and neglect, even in some "donjon keep," or in the palace of royalty, these little monitors might tick—tick—tick—"the day is passing away!" We saw the child of tender years, and senile old age, glance with its flushed and eager face or with a saddened and weakened vision at the white-faced clock that ticked remorselessly upon the mantel. We saw the young and old—a long stream winding up to the church, the bride with her groom, and the dead burying the dead. We saw the whole round of business routine in one unending throng run over the dial plate; them that do traffic and trade, and the money changers in the temple; and those also who rob that they may live, and steal while honest men sleep. Even the burglar, startled from his nefarious work by the shrill alarm of the clock, paused in his midnight raid and sneaked away. Nor were the processes of nature absent from the imagination; for time governs all things, even the growing of trees, the grass sprouting green in the sunshine and the flowers tinted by the pencil of the sun. The periods of all these things are recorded by some of the clocks made here; the minute, the hour, the day of the week, of the month, the month of the year and the year of our Lord. What more could any one ask?—and what fuller or more complete reminder of life and its manifold duties could we have than that afforded by the Yankee clock, ticking so surely and certainly upon the mantel, the whole year round?

"THE BRAZEN YOUNG LADY."

We should not omit, however, to notice another item of manufacture in the Waterbury Clock Company's room, namely, the "brazen young lady." Most of our readers in large cities must have seen the *autoperipatetikos* (we should like to know how much the proprietors of the patent paid for that name) or walking doll, who owes her (or its) existence, first, to the ingenuity of the inventor, and secondly to the SCIENTIFIC AMERICAN, who stood godfather to the doll and sent it forth upon its travels stamped and guaranteed from infringement or loss of dignity by trespass on her rights, and last but by no means least, to the Waterbury Clock Company. This young lady—clad in the full glory of shining raiment, and endowed with mysterious wheels, springs and shafts, instead of vitality—laid, at the time of our visit, about the workshop in various stages of construction. The huge boots she (or it) wears were made at one blow by a drop-press and afterwards fastened together; the wheels were cut out, and the whole mystery and miracle of her mechanical interior was exposed to view. A fearful buzzing and whizzing was heard as the works ran down or were wound up, and when, at the turning of the key the wheels were put in motion, the young lady tottled off upon the table in the full possession of all her powers.

Let us leave the factory and turn to another spectacle—to another branch of trade, some of whose

wares aim not to preserve life but to destroy it. We will go over some of the rooms in the large factory occupied by the—

AMERICAN CAP AND FLASK COMPANY.

While the clock hints to mankind that time flies, the percussion cap performs a similar office in a different way. It does not hint alone, it asserts that not only time is fleeting, but that life itself is in danger; but the warning of the percussion cap is never heard until it is swallowed up in the fiercer explosion that insures certain death to those in the path of the missile projected through its instrumentality. The process of manufacturing percussion caps is very much more interesting and far more profitable than that of exploding them. And it may not be out of place to state that over 100 tons of copper are annually made up here into this article alone; the Cap and Flask Company being the largest manufacturers in the country. They are also made out of the strip of copper that seems ubiquitous in Waterbury. In after ages, should that thriving place ever fall into ruin, we predict that strips of brass and copper will be seen sticking out in all directions. After the metallic tape has been rolled to the requisite thinness it is submitted to the action of a rapidly-working process, which cuts out star-shaped blanks in great numbers; these fall into a receptacle below, and are carefully collected and carried away to be formed up into the conventional cap shape. The cap is drawn up in the same general way that we have seen the kerosene-lamp tubes, &c., produced. The caps have now to be filled with a fulminating powder, counted and packed. The fulminating powder is prepared in an out-house, and is reduced from mercury in glass retorts and much care is necessary in its preparation. The caps are filled with this percussion powder by small plungers working in a machine devoted to the purpose. It seems like a very delicate operation to perform by machinery, but we were assured by the agent that no accident had occurred. The arrangement for counting the caps is very peculiar. A little girl holds a perforated tin plate in her hand which she thrusts into the heap of caps before her. The holes in the plate are just large enough to admit a single cap, and a slight sifting motion causes the apertures to be filled. There are one hundred holes in a plate, consequently when the plate is full the exact number is known; there is also a false bottom to the counter, which, on being pulled out, allows the caps to fall into a long trough, from which they are easily slid into the paper boxes. These boxes are all made on the premises, and employ quite an army of young women in their production. The labels are also printed on the premises. In this connection the story of the rebel soldier on the Rappahannock is not out of place. At one time our men were so near a certain rifle pit that they heard a rebel soldier snap his musket ineffectually several times; one of our men called out to him—"I say, Reb! where did you get your caps?" "They're Northern copperheads" was the quick-witted response. This anecdote has no significance, literal or political, but serves to show that in the art of making percussion caps the rebels have something to learn yet.

In another department belonging to this company we witnessed the operation of making powder flasks and shot pouches. The flasks are made out of tin, copper and zinc; three different kinds. The copper ones being of course the most costly. The designs on the side are struck by dies, and the halves—the flask is made in two pieces—are afterwards soldered inside by means of a tool peculiarly bent for the purpose. Shot pouches are made of embossed leather, and are sewed together on the outside in a handsome manner; yet another very effectual weapon was shown us in the shape of a pocket pistol. The pistol is a very harmless-looking concern and holds from a half of a pint to a quart of ammunition at one charge. It is carried in the inside pocket and is altogether a very handsome and convenient tool. Some medicinal virtues are also ascribed to it, as well as diplomatic ones, as it is asserted that in case of cholera or sudden and alarming cold in the head or violent pain in the epigastrium, the ammunition contained in the pocket pistol will effect a speedy cure. It is equally efficacious as a flag of truce, and has been known to heal differences of opinion very quickly, and dissipates any hostile intention entertained by an adversary.