AN IMPROVED CALCULATING MACHINE.

There has lately been invented by Mr. Dorr E. Felt, of Chicago, a calculating machine which he has named the comptometer. It is a practical machine operated by keys for the computation of numbers and the solution of mathematical problems. The rapidity and accuracy with which computations are made on the comptometer when in the hands of a skillful operator are calculated to meet the approval and win the admiration of all.

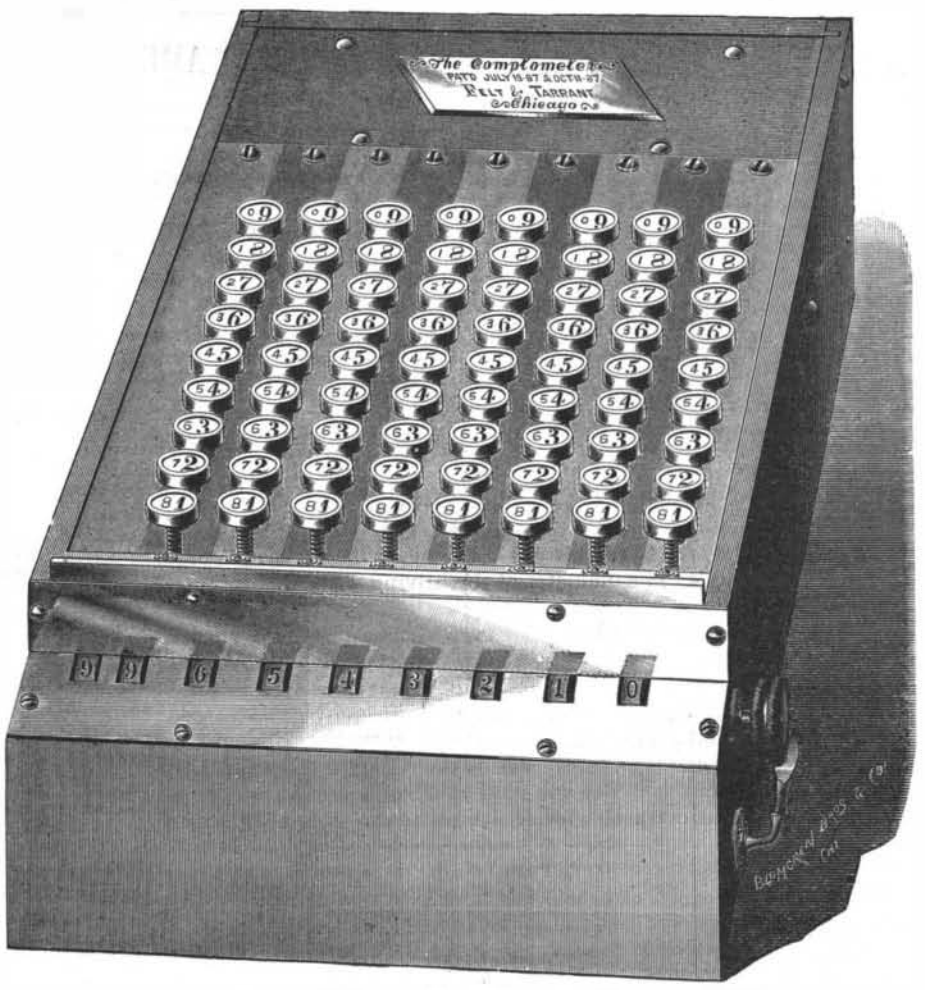
In the construction of the comptometer all the operating parts are made of the finest hardened steel, thus insuring the greatest degree of durability. The accuracy and durability of the machine have been thoroughly tested in the actuary's department of the United States Treasury at Washington, where one is in constant use. It will add, subtract, multiply, and divide, from which it is evident that all arithmetical problems can be solved on it. Particular attention is called to its availability in computing interest, discount, percentage, and exchange. It is a neat, compact machine, fourteen and one-quarter inches long, seven and one-quarter inches wide, and five inches high, weighing eight and a half pounds.

By referring to the cut, it will be seen that each key has two numbers on its top, one large and the other small, but for the present leave the small one out of consideration, and understand every reference to be to the large one only. It will be seen that the keys resolve themselves into rows running from right to left and rows running from the operator. For convenience in explaining, the rows running from right to left will be called rows, and those running from the operator will be called series. It will be further noticed that every key in the first row has the figure 1 on its top, those in the second the figure 2, those in the third the figure 3, etc. The figures on the tops of the keys in the series run from one to nine inclusive. The first series represents units, the second tens, and the third hundreds, etc. To add, it is merely necessary to touch on the machine the numbers to be added; thus, if we have 5,673 plus 932, we touch the figure 5 in the fourth series, 6 in the third, 7 in the second, and 3 in the first, when 5,673 will be shown on the register; we next touch 9 in the third series, 3 in the second, and 2 in the first, when the sum of the two numbers, 6,605, will be shown by the register. This operation can be continued until the limit of the machine is reached, which in the standard size is 999,999,999.

Subtraction, multiplication, and division can each be as rapidly and as easily performed.

By again referring to the cut, it will be seen that at the front of the machine is a plate in which are a number of square openings, which is called the register plate. At these openings are shown all results by numeral wheels, which are below the plate and which stand side by side on the same shaft, and each of these numeral wheels is acted upon by its keys direct and also by the carrying part of the numeral wheel next lower in order, something that has never been practically accomplished before in any mathematical calculator operated by keys. The carrying mechanism in this machine is entirely independent of the keys struck, and the power required for carrying is gradually accumulated and automatically released at the proper moment, therefore requiring no additional effort to depress the key when, through the operation of the carrying device, the next numeral wheel in order above has to be moved, than when such is not the case; therefore, when a succession of nines occur on the register, and a key is struck in one of the lower orders, it is impossible to discover that any more power is required than when one nine only appears on the register. In this machine two positive stops are employed for each numeral wheel, one to prevent over-rotation of the numeral wheel under the impulse of the key stroke, and the other to prevent over-rotation of the numeral wheel when actuated by the carrying mechanism. As there is no frictional device employed to prevent over-rotation, the machine always responds to a light touch on the keys; and as each numeral wheel is always in positive engagement with its controlling devices, absolute accuracy is insured at all times. It having been stated that the carrying device is independent, it will be at once seen that when a key of one of the higher orders is struck, the carrying device of the next lower order is at once released, allowing the numeral wheel on which the key struck acts to move independently of all numeral wheels lower in order. The result of any operation being obtained, the machine is returned to naught by depressing the lever which appears on the right and turning the knob above it until the figures seven appear on the register, when release the lever and continue turning the knob, and the machine will stop at the ciphers.

The comptometer is being manufactured by Messrs. Felt & Tarrant, 52, 54, and 56 Illinois Street, Chicago.



FELT'S IMPROVED CALCULATING MACHINE.

The Buried Forests of New Jersey.

An industry the like of which does not exist anywhere else in the world furnishes scores of people in Cape May County, New Jersey, with remunerative employment, and has made comfortable fortunes for many citizens. It is the novel business of mining cedar trees—digging from far beneath the surface immense logs of sound and aromatic cedar. The fallen and submerged cedar forests of Southern New Jersey were discovered first beneath the Dennisville swamps 75 years ago, and have been a source of constant interest to geologists and scientists generally ever since. There are standing at the present day no such enormous specimens of the cedar anywhere on the face of the globe as are found embedded in the deep muck of the Dennisville swamps. Some of the trees have been uncovered measuring six feet in diameter, and trees four feet through are common.

Although ages must have passed since these great forests fell and became covered many feet beneath the surface, such trees as fell, according to the scientific theory, while they were yet living trees are as sound to-day as they were the day of their uprooting. Such trees are called "windfalls" in the nomenclature of the cedar mines, as it is thought they were torn up by the roots during some terrible gale of an unknown past. Others are found in the wreck that were evidently dead trees when they fell, and to these the miners have given the name of "breakdowns." The peculiar action of the wind and water in the swamp has kept these breakdowns in the same stage of decay they were in when they fell, as the same agency has preserved intact the soundness of the living trees.

The theory of those who have made this mysterious collection of buried cedar trees a study is that they in some unknown age formed a vast forest that grew in a fresh water lake or swamp that covered this portion of New Jersey, the properties of the soil of which were necessary to the forest's existence. According to Clarence Deming and Dr. Maurice Beasely, eminent geological authorities in Southern New Jersey, the sea either broke in upon the swamps or the land subsided and the salt water reached the trees. This destroyed the life of many of them, and subsequently some prehistoric cyclone swept over the forest and leveled it to the earth. The heavy trees gradually sank into the soft soil of the swamps until they reached the substantial earth or rock beneath it, where they reposed, unknown and undisturbed, until their presence was accidentally discovered in 1812. Ever since then the logs have been mined, and have been an important factor in the commercial and business prosperity of South Jersey.

The buried forest lies at various depths in the swamp, and the uncovering of the trees or working the "cedar mine" is done in a very simple and easy manner. The log miner enters the swamp and prods in the soft soil with a long, sharp iron rod. The trees lie so thickly beneath the surface that the rod cannot be pushed down amiss on its testing errand, for the prodding is not so much in search of a tree as it is to test whether the tree is a "windfall" or a "breakdown." When the prod strikes the log, the miner chips off a piece with the sharp point of the tool, which brings the chip or splinter to the surface when drawn out of the muck. By the appearance and order of this chip the miner can tell at once whether the tree he has tested is a sound or a dead one. If the former, he quickly ascertains the length of the trunk by prodding along from one end of it to the other.

That ascertained, he proceeds at once to raise the log from its hidden bed. He works down through the mud a saw similar to those used in sawing out ice in filling an ice house. With this he saws the log in two as near the roots as he cares to. The top of the tree is next sawed off in the same way, and then the big cedar stick is ready to be released from its resting place. A ditch is dug down to the log, the trunk is loosened by cant hooks, and it rises with the water to the surface of the ditch. A curious thing is noticed about these logs when they come to the surface, and that is that they invariably turn over, with their bottom sides up. After mining, the log is easily "snaked out" of the swamp and is ready for the mill or factory.

These ancient trees are of a white variety of cedar, and when cut have the same aromatic flavor intensified many degrees that the common red cedar of the present day has. The wood is of a delicate flesh color. One of the mysterious characteristics of these long-sunken trees is that not one has ever been found to be waterlogged in the slightest. It is impossible to tell how many layers deep these cedars lie in the swamps, but it is certain that there are several layers, and that with all the work that has been done in constantly mining them during three-quarters of a century, the first layer has not yet been removed from the depths. At some places in the Dennisville swamp the soil has sunk in for several feet and become dry, and there the fallen cedars may be seen lying in great heaps, one upon the other. No tree has ever been removed from the Dennisville swamp from a greater depth than five feet, but outside the limits of the swamp they have been found at a great depth, which shows the correctness of the deep-layer theory. Near the shore of the Delaware, eight miles from Dennisville, white cedar logs have been exhumed from a depth of 12 feet. At Cape May, 20 miles distant, drillers of an artesian well struck one of the trees 90 feet below the surface. It was lying in an alluvial deposit similar to the Dennisville swamp. Another log was found at Cape May 20 feet below the surface, and a third at a depth of 70 feet. These deeply buried logs were among the largest ever brought to light, and their location so far away from the Dennisville marsh indicates the great extent of that ancient forest area.

The uses to which the cedar logs are put are many. The principal use is the making of shingles and staves. The longevity of articles made from the wood is shown in shingles, tubs, pails, and casks made from it over 70 years ago, and which have yet to show the slightest indication of decay. The shingles and staves are worked into shape entirely by hand, the only machine work that is permitted in manipulating the cedar logs being the sawing of them into proper lengths for the uses to which the lumber is to be put. The Dennisville cedar shingles command a price much higher than the best pine or chestnut shingles.

What it is in the amber colored swamp water and red muck at Dennisville that preserves these trees so that, after the lapse of centuries, their fiber is as clean and smooth and strong as it was when the green branches of the cedar were waving over the swamp is a mystery that scientific men have as yet been unable to solve. —*N. Y. Sun.*

The New British Rifle.

Experimental firing with the new British military rifle at ranges beyond 2,000 yards has given the following results. The targets were small field fortifications ten yards long. The firing, volleys by about thirty men, was almost wholly from direction, sighting being impossible, owing to the hazy weather; yet at 2,000 yards out of 370 shots there were 159 hits; from 367 shots at 2,400 yards there were 96 hits; and from 629 shots at 2,800 yards there were 104 hits. Penetration at the extreme ranges had been thought doubtful, but some bullets at 2,800 yards struck an iron target and were broken to pieces.