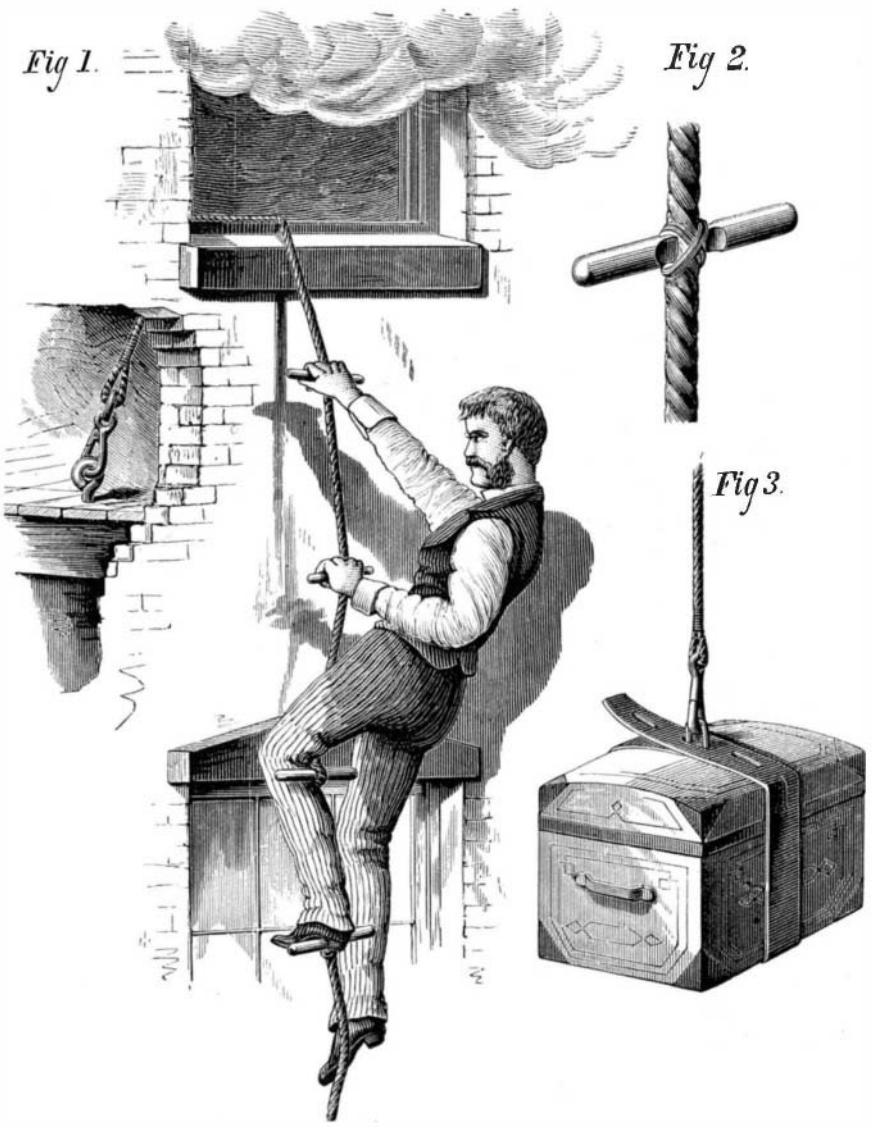
### IMPROVED FIRE ESCAPE.

We noted last week the necessity existing for some simple and efficient fire escape, which could be rolled in small compassso as to be conveniently stowed in the traveler's satchel or trunk. The invention illustrated in the annexed engravings aims to supply this need. It consists of about a hundred feet or less of wire rope, one end of which is turned up to form a loop which is secured by wire seizings. In this loop, which is lined with leather to prevent chafing, a spring hook is secured. Along the rope, crossbars or rests are lashed with wire, at intervals of about 15 inches. These bars are of iron, having a portion of their surface flattened near the centers on one or both sides, and are inserted through the strands of the rope (Fig. 2).

The apparatus can be very quickly got ready for use, as it is only requisite to screw an eye into the woodwork or flooring of the room, attach the snap hook, and lower the escape out of the window, whence it forms a ladder, Fig. 1. The inventor also provides a strap, Fig. 3, which carries a staple to which, after the strap is passed around a trunk, the end of the fire escape rope is attached. The trunk is thus easily lowered; and after reaching the ground, it serves as a means of steadying the ladder. By the same means, women, children, or invalids may be lowered from windows.

Patented through the Scientific American Patent Agency, October 24, 1876. For further particulars, address the inventor, Mr. H. R. Houghton, West 42d street, New York city.




### Age of Labor-Saving Appliances.

The *Manufacturing and Trade Review* thinks that the greatest reason why there is such an over-proportionate abundance of all kinds of products as compared with former times, and comparatively so few workmen are employed, is that these products are the results of mechanical appliances, one of which does the labor of numbers of workmen. Instead of hoes and spades, and sickles, and scythes, and flails, the cultivators, planters, reapers, and mowers, and thrashers are used. So with the production of the nail, horseshoe, cutlery, tools, clothing; in fact, what is not made by machines for the purpose is very far behind the age. The business of the world now is inventing, improving, and running machinery and appliances to make machinery and tools, and in producing the articles they make; and the aim of the present workman must be to thoroughly know the use and care of machinery, the strength and adaptability of materials for the manufacture of appliances. If the world seems to be already supplied with all these, then his business is to possess the machine or appliance and use it in producing the thing which his taste and judgment may suggest. It is useless to resist this march of machinery. Only the man who accepts, adopts, and enters most heartily into its use and product, will keep abreast of the present progress.

### IMPROVED CALCULATING MACHINE.

The drudgery of mental computation, of all labor, is perhaps the most enervating and uninteresting; and an effectual device to remove or even lessen the mental effort will be readily appreciated by mathematicians, engineers, bankers, actuaries, and accountants.

The calculating machine, properly so called, must not be confounded with the simple slide rules, adding machines of various kinds, interest tables, and other devices called by the same name. This instrument is a piece of mechanism that performs its task in a direct and complete manner, taking in a great range of work, and using and giving numbers at full length and in plain figures.

The construction and operation of the apparatus as illustrated herewith are both simple. There is an upper cylinder, which is turned by the crank, and which itself drives a smaller shaft underneath. A slide, that can be set in eight different positions on the cylinder, carries eight figured rings that can be set to represent any number of eight or less decimal places. Each turn of the crank adds the number set up on the rings to the number represented on the ten recording wheels carried by the lower shaft. The multiplication process will best be understood by an example. To multiply 347 by 492, the three upper rings are set at 3, 4, and 7, respectively. The cylinder is then turned twice to multiply by the units figure of the multiplier. If now the slide is carried along one notch, where each ring will act on the next higher recording wheel, and turned 9 times, 347 will be multiplied by 90, and the product at the same time will be added to the product already scored. Another shift of the slide and four turns will complete the operation, and show the result, 170724=(347×2)+(347×90)+(347×400) upon the recording wheels. A half turn of the crank backwards erases this result, bringing all the wheels to 0, ready for the next operation.

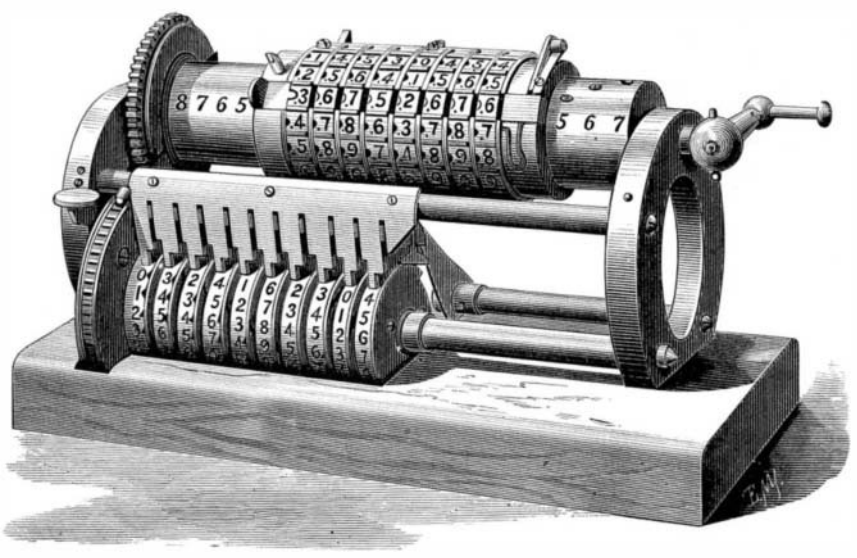
Division is the reverse of multiplication. The dividend is set up on the wheels, the divisor on the rings, and the quotient records itself on the upper recording wheels. The machine of the size illustrated will use numbers of eight or less figures, and show the result in full, if not over ten figures, and its upper figures if more than ten places are necessary.

The dimensions of the instrument are 13×5×7 inches, and

### HOUGHTON'S FIRE ESCAPE.

it contains but eighty working pieces of mechanism, none of them small or delicate. Made mostly of brass and iron, its smaller parts are of steel, portions of which are tempered. Its results are shown in plain figures, stamped on unpolished silver-plated surfaces and filled in black. All prominent parts are nickel-plated and polished.

The machine was invented in 1870, but was not manufactured for general use until this year. It was introduced to the public for the first time at the Centennial Exhibition; and the official report, signed by such well known men as President Barnard, of Columbia College, Professor Hilgard,



### NEW CALCULATING MACHINE.

of the United States Coast Survey, Professor Joseph Henry, Professor J. C. Watson, and Sir William Thomson, says: "It is simple in construction, not liable to get out of order, its use greatly saves the mental labor of computation, and lessens the liability to error. It is deemed superior to all other instruments of its class yet produced." Other well known experts state that a saving in time of more than sixty per cent is effected over ordinary methods.

Upon work of four or five decimal places, the machine is claimed to have an advantage of three to one over common logarithms; and it is quicker and easier to use natural numbers and natural sizes, tangents, etc., on the machine than to use the common logarithmic method.

The patentee and manufacturer is George B. Grant, 94 Beverly street, Boston, Mass. He will supply any further information.

### New Theory of the Origin of Petroleum.

The origin of the immense quantities of hydrocarbon oils which are found saturating strata of sandstones, or pent up in cavities of the older rocks, or escaping to the surface and collecting upon pools of water, has been the subject of frequent discussion. The theory generally accepted, and endorsed by such names as Hunt, Newberry, and Silliman, is that it is of organic origin, either vegetable or mineral. It has even been suggested that the bad smelling petroleum of Canada owes its origin to decayed fish. According to T. Sterry Hunt (*American Journal of Science*, March, 1863), "the pyroschists of Bosanquet belong to the Devonian series, and contain the remains of land plants, so that a partially decayed vegetation may be supposed to have been the source of the organic matter which is intimately mingled with the earthy base of the rocks; * * * but in the pyroschists of the Utica formation, the chief organic remains to be detected are graptolites, with a few brachiopods and crustaceans."

In view of these facts we are not a little surprised at the new and yet plausible theory advanced by the distinguished Russian chemist, Mendelejeff, before a meeting of the Chemical Society of St. Petersburg. The appearance of oil on the surface of the earth proves that it has a tendency to rise through the various strata of the earth, and this is no doubt due to its being lighter than water, which, being everywhere present, forces it upward. For this reason we are compelled to suppose that it was formed lower down in the earth than the places where it is now found. Another reason for this belief is that the sandstones, in which much of this mineral oil is found, contain no charred organized remains, which must be present where the oil was produced, if it be of organic origin. Since petroleum is found in the Caucasus in tertiary, and in Pennsylvania in the Devonian and Silurian, its origin must have been in the older rocks at a still greater depth. But in those ancient periods, like the Silurian, not many organized beings could have existed. Hence Mendelejeff thinks that it is very improbable that petroleum is the product of any decomposed organic matter.

Mendelejeff starts with Laplace's theory of the formation of the earth, applies Dalton's law to the original gaseous condition of the constituents of the earth, and calculates the probable arrangement of the metals in the earth from the density of the globe and the vapor density of the elements. Starting with the assumption, which is not improbable, that iron is the most abundant of metals, since it is present in large quantities in the sun and in meteorites, and admitting the existence of carbon compounds of this metal. not only will it be easy to explain the formation of petroleum, but one can understand all the peculiarities of its occurrence in those places where the earth's strata has been broken by the elevation of mountain chains. Breaks made in this way permitted the water to permeate to the carbonaceous metals; and at the high temperature, and under heavy pressure, it acted upon them, forming oxides of the metals and saturated hydrocarbons. The latter rose as vapors to the higher strata, where they were condensed, saturating the porous sandstones, which are capable of absorbing many oily products.

Many other phenomena of nature are explained by this theory of the formation of petroleum, such as predominance on the earth's surface of elements with small atomic weights, the occurrence of oil in straight lines or arcs of huge circles, its dependence upon volcanic action, which has been noticed by Abich and others, the magnetism of the earth, and many other natural phenomena.

### Salicylic Acid.

M. Blandeau, of Paris, states that, according to dentists, this agent has injurious effects on the teeth. English observers have noticed its effect on the bones, and necrosis of the tibia has been assigned to its use. It evidently possesses considerable affinity for the calcareous salts of bone, and we see the urine loaded with lime salts in an ultra-physiological proportion, from the internal use of the acid. The salicylate of soda presents the same dangers; and too much caution cannot be taken in the use of any salicylic preparation.