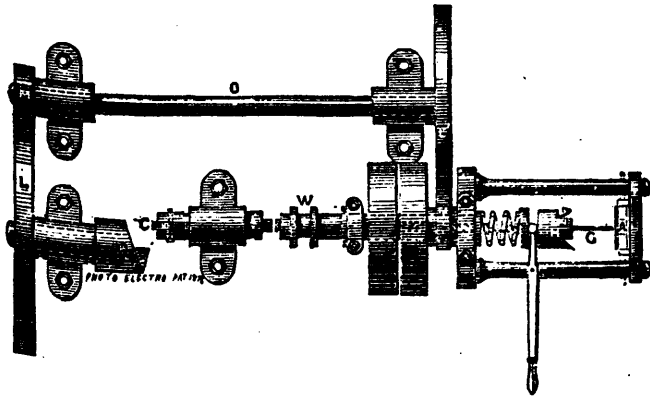


NUT-TAPPING MACHINE.

An improved nut-tapping machine has been patented by Mr. T. Mason, of Birmingham, which is said to be capable of turning out a much larger amount of work with reduced labour, owing to the application of the self-acting principle.

The machine consists of the usual framework, with driving shaft and gear. It is fitted with a long box chuck or hopper, in which the blanks are placed; the tapping tool is fixed at the lower end of this chuck, and is started by means of a cam. As each nut is tapped, the tool is withdrawn by means of a balance weight, freeing the nut from the chuck, when another blank falls into position for tapping, and so on until the chuck or hopper is empty. In front of the chuck there is a slide guide, worked by a lever from the balanced weight, which is to prevent the twisting or dropping of the nut from the chuck until the tapping tool is re-started.



In the engraving, which represents a plan of the machine, seen from above, A is the box chuck into which the blanks are fed, G is the tapping tool held in a spring chuck, H, carried on a shaft driven in the usual manner by a pulley and belt. L and M represent toothed wheels and pinions, by which motion is imparted to a screw cam, B. This cam rubs against a friction roller, C, the impact starting the tapping tool into the blank. When the nut has been tapped, the tool is withdrawn by the action of a balance weight connected by means of a lever to the collar, W; the same lever serves also to work a slide guide placed in front of the chuck to prevent the nut under operation from twisting or dropping until the tap is re-started. The tool, G, is held in the chuck, H, until its shank is covered by the tapped nuts, when by actuating the lever, the tap springs out, and the operations are repeated.

PROTECTING IRON.—A new method of protecting iron has recently been introduced, which is described as follows, by *Iron*: The method is to coat the surface to be protected with a thin film of borate of lead having a little oxide of copper dissolved in it, and having also suspended in it bright scales of precipitated platinum. A red heat is employed to fuse the composition, which is either applied with a brush or employed as a bath, in which small articles may be dipped. Its effect is, to cover the iron with a thin glassy coating of a bright grey tint, not far removed from that of polished iron itself, and unaffected by sewer gases, dilute acids and alkalis, and the heat of a kitchen fire. Modifications of the compositions give the means of imparting different colors to the coating, and these are as easy of application as the platinum grey just mentioned. The effects are really very good, and show how ornamental an iron grating of neat pattern, or an iron frieze might be in front of a gallery in a large building, or in any equally elevated position. Cost is in all cases a most important feature of preservative operations. We are told that the cost of platinum is about equal to that of applying three coats of paint, and about one-tenth of that of electro-plating with nickel.

MEAN DISTANCE OF WATER MOLECULES.—Hermann Herwig concludes that no two molecular layers in water can be more than 1.86 of a millionth of a millimeter apart, and that the same is true with regard to the mean distances of adjacent molecular centers. Sir William Thomson had previously estimated the least value of the same distances at 0.05 millionths of a millimeter. These two estimates, one being less than four-fold the other, furnish satisfactory approximations to the true value.

Educational.

MECHANICAL EDUCATION.—Mechanical education in Russia has been carried to a point of success not yet reached in this country. Col. Forney, of the *Philadelphia Press*, writing from the Paris Exhibition, remarks that American progress has astonished Europe, yet "Germany, Switzerland and France have methods and systems that deserve to be studied. Even Russia may be a model for all of us. Yesterday I saw some machinery at the Exhibition, and my admiration increased as I was told that much of this exquisite work was made by the youth, many of them sons of the best families, sent into the machine shops to learn trades as a part of their education. There was no alternative; they were compelled to pass this ordeal. The Government is the master, and young Russia must obey; and now obedience becomes a delight; and it is as much the fashion to finish a practical education in this way, as formerly it was the fashion to pass through a school or an academy, or college, for the easy acquisition of superficial accomplishments."

MATHEMATICAL DRAWING INSTRUMENTS, by W. F. Stanley (E. and F. N. Spon), is the fifth edition of a very useful book, which has been much improved by the addition of fresh matter. Several new instruments are described, and the book having been selected as a "science and art" prize, mainly because of the hints it gives on drawing and colouring, Mr. Stanley has extended that part, and those interested will find in his remarks on perspective much food for thought. — "London Science Class-books," edited by G. C. Foster, F.R.S., and P. Magnus B.Sc., B.A. (Longmans). — "Hydrostatics and Pneumatics," by P. Magnus; "Botany," by W. R. McNab, M.D., (two divisions); "Zoology," by A. Macalister, M.D., (two divisions), are well adapted for their purpose—viz., use in schools, and as stepping-stones to more advanced works. They are neatly printed and well illustrated.

WHY ARE WE RIGHT-HANDED?—Investigations which were very recently carried through by a French physician, Dr. Fleury, of Bordeaux, have adduced facts showing that our natural impulse to use the members on the right side is clearly traceable to physiological causes. Dr. Fleury after examining an immense number of human brains, asserts that the left anterior lobe is a little larger than the right one. Again, he shows that, by examining a large number of people there is an unequal supply of blood to the two sides of the body. The brachiocephalic trunk which only exists on the right of the arch of the aorta, produces, by a difference in termination, an inequality in the waves of red blood which travel from right to left. Moreover, the diameters of the subclavian arteries on each side are different, that on the right being noticeably larger. The left lobe of the brain, more richly hemotised than the right, becomes stronger; and as, by the intersection of the nervous fiber, it commands the right side of the body, it is obvious that that side will be more readily controlled. This furnishes one reason for the natural preference for the right hand, and another is found in the increased supply of blood from the subclavian artery. The augmentation of blood we have already seen suggested; but the reason for it is here ascribed to the relative size of the artery, and not to any directness of path from the heart. Dr. Fleury has carried his investigations through the whole series of mamalia; and he finds that the right-handed peculiarities exist in all that have arteries arranged similar to those of man. At the same time such animals, notably the chimpanzee, the seal, and the beavers, are the most adroit and intelligent. — *The Eclectic*.

INDIARUBBER FOR BOOK-BINDING.—The leaves must be made single, and squared true in the press. The back edge is then rounded by allowing the sheets to form themselves in a grooved recess or mould: when true the book must be held tightly in the press between boards, exposing the rounded back: the back has then the indiarubber solution applied to it; when dry another coat is put on, and on this a piece of calico, by which the book is held in its case. The indiarubber can be bought already in solution, or may be made by dissolving in naphtha.

INDESTRUCTIBLE WRITING INK.—According to the *Pharmacist*, an ink that cannot be erased even with acids is obtained by the following receipt:—To good gall ink add a strong solution of fine soluble Prussian blue in distilled water. This addition makes the ink, which was previously proof against alkalis, equally proof against acids, and forms a writing fluid which cannot be erased without destruction of the paper. The ink writes greenish blue, and afterward turns black.