MACHINES FOR MAKING PACKING BOXES.

The new and curious machines that we are about to describe are of American origin, and are designed for the manufacture of packing boxes.

The wood, in the form of boards, after being sawed into pieces of the proper dimensions to form the sides of the box, is planed by powerful machine tools, which, while making it even and smooth, regulate its thickness. The pieces are next printed with characters in black in a rotary machine analogous to a newspaper press. This operation is performed very quickly. In

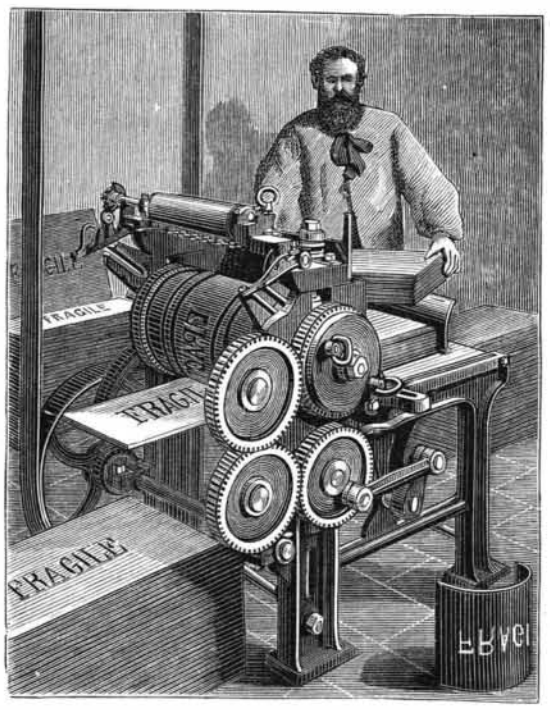

Fig. 1.—MACHINE FOR PRINTING ON WOOD.

addition to its being printed with an indelible ink, the inscription is stamped in the wood, thus making it ineffaceable.

The machine that does this (Fig. 1) consists of a table, an ink block with its inking rollers, and two cylinders, the whole actuated by gearings and pulleys.

The workman places a pile of the prepared wood on the table, and a tappet actuated by a rod beneath the table shoves out the bottom piece from the pile, and this is caught between the cylinders, which carry it along and print an inscription on its upper surface, as shown in the engraving. Immediately, and at every revolution, one of the pieces is printed and put upon the pile in front of the machine. Above the upper cylinder is placed an ink block, which, through an arrangement that is as simple as ingenious, deposits the necessary quantity of ink on the type.

The printed wood is next passed to the nailing machine (Figs. 2 and 3), which is actuated by a belt running over a pulley driven by a line of shafting. The workman, standing in front of the machine, places his foot upon a pedal which acts upon a coupling box that throws the machine into gear. In a single revolution, the pieces to be united are assembled and fastened to each other by a series of nails, varying in size according to circumstances, and brought under the hammers by vertical tubes.

A boy, standing upon a platform, places the nails in buckets attached to the links of a chain belonging to the machine. The nail is put head downward into each bucket, then every revolution of the machine moves the chain forward by one line of links and empties the nails, point downward, into the tubes, A (Fig. 3). In order to facilitate the entrance of the nails, the tubes are provided with a hopper at the top. Beneath, the nails enter the hammer boxes obliquely. When the machine moves, the hammer rods rise, the nail slides into the lower part of the box, which presses against the wood to be nailed. The hammer at once falls and drives the nail into the wood by pressure, and without a blow. The motion of the machine is at once arrested, and the wood being set free, the workman reverses it or replaces it, and then, pressing the pedal again, drives in another series of nails at the place presented. The nails are driven very regularly, and are very firmly embedded in the wood. Each machine daily drives, on an average, more than 24,000 nails, weighing altogether about 285 lb. Each box consists of from 18 to 20 pieces of wood, all sawed out mechanically to fixed dimensions, and which pass successively through twenty or twenty-five hands.—*La Nature.*

Fig. 2.—NAILING MACHINES IN OPERATION.

Action of Magnets on Liquids.

Some weeks ago, one of my students, Mr. J. C. Child, and myself were working with a diamagnetic instrument, simply repeating well-known experiments. Plucker's method of observing the diamagnetism of liquids having failed in our hands to give satisfactory results, we hit upon a method which was new to us, and which was very satisfactory. Into a glass tube of about four or five millimeters internal diameter a small quantity of liquid was introduced, forming a short cylinder. This tube was placed horizontally at right angles to the line joining the poles of the magnet, with the liquid nearly between the poles. When the current was turned on, the liquid was very evidently repelled. Water was repelled through a distance of about half a centimeter; wood spirit through a greater distance. By moving the tube in the direction of its length, the wood spirit could be pushed any distance through the tube. The amount of motion is of course a function of the resistances due to adhesion and friction as well as of the repulsive force. The attraction of liquids is easily shown by the same method.

A single modification of the above plan of proceeding is to incline the tube slightly, so as to make the liquid flow toward the poles. If the required velocity be not too great, the magnet acts as a break to stop the motion. It is well to bend the tube up a little at each end to prevent the liquids from flowing out. This method is well adapted for projection so as to be seen by large audiences. S. T. MOREHEAD.

Washington and Lee University,
Lexington, Va., May 9, 1887.

—*American Journal of Science.*

Subsidence of the Earth over Salt Mines.

Mr. Thomas Ward read a paper before the British Association entitled "The History and Cause of the Subsidences at Northwich and its Neighborhood in the Salt Districts of Cheshire." He said:

Northwich overlies extensive beds of salt, occupying about three square miles. The first or "top" rock salt lies at a depth of about 50 yards from the surface, and is covered by Keuper marls, and these by the drift sands and marls. Between the two beds of salt there are 30 feet of indurated Keuper marl. The second or "bottom" rock salt is over 80 yards in thickness. These beds of salt occupy the lowest portion of an old triassic salt lake. The first bed of rock salt was discovered in 1670, the second in 1781. The falling in of a rock salt mine is a very rare occurrence, and subsidences of this kind do not give rise to the reports which are met with in the newspapers.

The first reported destruction of a mine was in 1750, and from that date to the end of the 18th century every two or three years a mine collapsed. In the present century, at considerable intervals of time, collapses of mines have occurred; but these, with scarcely an exception, were old, abandoned "top" mines. The subsidences which are so destructive in the town of Northwich and the neighborhood are entirely caused by the pumping of brine for the manufacture of white salt. It was only about 1770, or shortly afterward, that the first sinking was noticed. Since that date subsidence has gone on very rapidly, and much destruction of property has resulted. Large lakes, or "flashes," one of more than 100 acres in area, and of all depths up to 45 feet, have been and are being formed. The brine pumps set up a circulation of the salt water, or brine, lying on the rock salt, which flows to the pumping center. The brine thus removed is replaced by fresh water, which on its passage to the pump saturates itself, taking up sufficient salt to make a solution containing about 26 per cent of salt. This continual removal of salt from the surface of the rock salt lowers it, and the overlying earths either follow the diminishing surface continuously or else, after remaining suspended for a time, suddenly fall into the cavity from which the water has extracted the salt. The brine currents, on their way to the pumping centers, form deep valleys or troughs, and the surface of the ground overlying forms a fac-

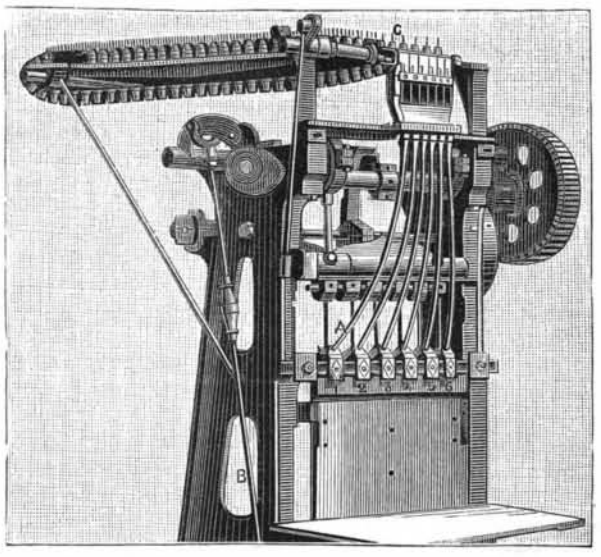

Fig. 3.—DETAILS OF A NAILING MACHINE.

simile of these hollows. The property on the sloping sides of the valley is pulled to pieces and destroyed; the windows and doors all get out of form, owing to the unequal sinking of the various portions of the house. When, owing to the different nature of the marls and the abundance of sand overlying them, a sudden sinking takes place, the hole extends to the surface and swallows up anything upon the surface—as a horse in a stable, barrels of beer in a cellar, or water butts and other utensils in a yard. The damage done to property is enormous, but thus far no human life has been los .

Treatment of Sciatica by Refrigeration of the Sound Limb.

Some time ago, M. Debove announced that he had been able to afford marked relief in a case of obstinate sciatica by means of a spray of chloride of methyl applied along the course of the sciatic nerve in the unaffected member. At a recent meeting of the Societe de Biologie (*Le Concours Medical*, August 6, 1887), M. Raymond reported that he had obtained favorable results by a similar method in three cases. He found, however, that the effect was the same even when the spray was directed to any part of the limb, and not necessarily along the course of the sciatic nerve. This would seem to prove that the relief of the pain was due to an impression made upon the spinal centers by refrigeration of the peripheral nerve terminations, rather than to a direct influence exerted upon the trunk of the affected nerve itself, or of its fellow in the opposite limb.

ON the occasion of the new issue of coins in England in the Queen's jubilee year, the iron dies from which the coins were struck were made by electrolysis. The plaster moulds of the originals first received a coating of copper, and on the template thus formed the iron was deposited. According to Prof. C. Roberts-Austen, Chemist of the Royal Mint, London, the iron was of excellent quality. A current of 0·089 ampere from two Smee elements was used. The solution consisted of sulphate of iron and sulphate of magnesia of specific gravity 1,153, in equivalent proportions. This solution was almost neutralized with carbonate of magnesia until it gave a very feeble acid reaction with litmus. In Russia, plates of iron thus obtained are used for printing bank bills.—*Ann. Industrielles.*