Machinery and Tools as they are.—Printing Presses.

(Continued from page 123)

POWER PRESS—Perhaps no branch of machinery has made more recent progress in improvement than that which is employed by the printer; the liberal patronage of the newspaper press of our country having greatly contributed to this advancement of the mighty promoter of modern civilization. When the printing press is mentioned, the mind of every American instantly reverts to that kind of press which has created so great a revolution in typographical machinery,—we shall, therefore, first direct attention to what may be called "the model press for rapid printing," viz., Hoe's Power-Press.

In every process which may be adopted for printing, we find that there are several distinct operations to be executed: it is necessary to apply the ink to the faces of the type, which must be done in such a manner that the ink shall be spread uniformly; the sheet of paper must be so placed as to receive the impression of the type, and that, too, with a due regard to the appearance of the margin; the paper must be forced down upon the form of type by a pressure sufficiently powerful to enable it to receive the printed characters, but not enough to cause the type to injure it, in the last place, the paper, when printed, must be withdrawn from the form and laid upon a table. The exigency that requires a machine of such wondrous capability as the modern newspaper press is therefore soon explained. The principal item in the expense of printing is the type-setting or composing, hence it is necessary to print the whole of an impression from one form, and consequently only one machine can be used, to print at least one side of a sheet; perhaps this is no very great defect in book-work, but for newspapers which must, in many cases, be all struck off in the course of two or three hours at the utmost, a rapid printing press is of the utmost importance. There is, however, a certain limit to the capability of printing machines which merely increasing the velocity of the movements would not suffice to overcome. What we allude to is the fact that the sheets of paper must be delivered, one by one, to the machine by an attendant, but this manipulation, for a large newspaper, cannot be well done at a faster rate than twenty-five per minute, or fifteen hundred per hour. This apparently insurmountable obstacle is overcome in Hoe's revolving type cylinder press, by causing the type to have a circular motion instead of the usual horizontal reciprocating motion; the same principle has also been adopted by Applegath, an English manufacturer and patentee, in constructing presses for some London journals, but with this difference, that the latter places the axis of the type cylinder in a vertical position, whereas, in those of Hoe, it is horizontal, which is certainly a preferable construction, as all who have had experience in vertical shafts rotating at a great velocity will allow. Besides, Applegath's arrangement entails other defects, as will hereafter be shown; indeed, if we may judge by a very recent patent of that maker, he is himself of this opinion. It is not, however, our intention to enter minutely into the respective merits of these two machines, in their general principles they are manifestly similar, the main difference being in the already-mentioned arrangement. We shall, therefore, resume our subject with a description of Hoe's printing press, to which the claim of superiority must be awarded by every unprejudiced person, over its English competitor. The following is the manner in which it is arranged:—

The columns of type are firmly secured in position upon strong beds, which are then fastened on the circumference of the type cylinder; around this latter are placed the drums or cylinders intended to carry the sheets of paper, and which, in number, vary from four to eight. All the drums are supported in bearings on a substantial frame, and those for the paper are driven, through the agency of geared wheels, by the type cylinder, so that their surfaces revolve at the same velocity as the periphery of the latter. It will now be easily understood that a sheet of paper, being supplied to one of these drums, the latter will seize it as in the ordinary power-presses, and carrying the paper around, encounter in its course the type-form on the large drum which is likewise revolving, and the two being thus in close contact, the paper is impressed. The sheet is then released from the paper cylinder and carried away by a series of endless tapes, which conduct it to a self-acting flyer, this latter receives the paper, and, at the proper moment, by the impulse of the machinery, folds down and places it on a board, to be removed at the leisure of the attendant. The contrivance of the flyer is another material point in which Hoe's press is superior to that of Applegath, who employs a fly-boy for each paper cylinder, to take charge of the printed sheet and lay it down smoothly with the others—a duty that, as we have just explained, is performed by Hoe's press itself, without any attendant.

We have described the action of one paper cylinder, but, as a matter of course, there are several of these, and it is evident that they all will have a similar action during the revolution of the type drum, so that from 4 to 8 copies, according to the number of cylinders, will be printed on one side during a revolution of the form. Such is a brief description of this part of the machinery, but it is needless to mention that there is also a variety of details which are necessary to insure the correct working of the cylinders. For although the paper drums revolve constantly, and therefore make several revolutions during one revolution of the type, yet they must not be allowed to grasp the paper until the form approaches them, for it must be observed that the beds on which the type are placed occupy only a portion of the cylinder's periphery. Again, in the feeding process, Applegath's press is inferior to Hoe's, the vertical arrangement involving the necessity of expensive feeding machinery for the attendant standing at a sloping desk in the usual manner, pushes forward the paper, sheet by sheet, towards the fingers of the machine, which seize upon the paper; and with horizontal cylinders this is done by delivering the paper to the drums, except when there are eight cylinders in which case the feeding apparatus is rather more complex, in order that the pressmen may not be in each other's way. Contrast this arrangement with the vertical mode of construction, and you find that, in the latter, the paper must be first drawn down in a vertical direction between tapes, until its edges correspond with the position of the form of type on the printing cylinder, when arrived at this position, its vertical motion is stopped by a self-acting feeding apparatus, and it begins to move horizontally, and is thus carried towards the type.

The difficulty of preventing the type from being displaced by the rapidity with which the form is whirled round must occur to every one, this apparent defect is surmounted in Hoe's improved power-press by an ingenious device. The ordinary chase is not at all used, but the type is placed on stout iron beds, which are turned so as to form segments of the type cylinder with broad slots cut in them; in these latter slide pieces of brass, so that when the columns of type are placed on the bed they are firmly held by the column rules, which are of steel and so made as to act like wedges, the lower part also fitting in the slots between the brass pieces, so that when the whole is tightened up by set screws it is impossible for the form to shift. Not the least original part of this machine is the arrangement for inking, the ink fountain, and the usual inking apparatus are fixed at the lower part of the frame, and on that part of the type cylinder which is not occupied by the form are placed inking beds, which make a "distributing table," so that as the cylinder revolves, a roller transfers the ink on to this distributing bed, which, continuing its rotation, imparts the ink to rollers disposed around the framing. The inking rollers are forced against the type when it approaches their locality, so that the form receives a fresh supply of ink, previously to impressing each sheet. It is obvious that the distributing surface must be of less diameter than the type surface, and also that the roller which supplies the former with ink from the fountain, must be depressed when the type is about to pass it, so that they may not come in contact.

(To be Continued.)

Observations Relative to the Electro-Chemical Properties of Hydrogen.

The following paper was lately read before the French Academy of Science:

It is known that when two sheets of platinum have been previously placed in contact, one with hydrogen gas and the other with oxygen, and are immersed in water mixed with sulphuric acid, they constitute, momentarily, a voltaic pair—the sheet covered with hydrogen serving as the zinc side of an ordinary pair. By arranging on the conducting liquid two tubes, half filled, one with hydrogen the other with oxygen, and immersing the sheets of platinum partly in the liquid and partly in one of the gases, the pair gives out electricity until there is no more gas in the tubes. By uniting several pairs, there is formed what has been called a gas battery; it is worthy of notice that in this battery, when the circuit is closed, the gases contained in the tubes of each pair diminish in volume, the hydrogen twice as rapidly as the oxygen, so that the re-composition of water is operated in each element Many eminent philosophers—Faraday among others—have directed their attention to this subject, and their experiments prove that the probable cause of the disengagement of electricity is the combination of the oxygen dissolved in the liquid with the hydrogen adhering to the platinum by the intervention of this metal. The oxygen adhering to the second sheet is therefore only opposed to the polarization that would be produced by carrying over this sheet, the hydrogen that proceeds from the decomposition of the conducting liquid. Therefore the platinum, like other solid bodies employed under some circumstances, instead of this metal, is only the medium that determines the combination of the gases, and permits the circulation of electricity. It appears from this that the nature of the conducting liquids, must have an influence on the development of electricity, and the new results that are found mentioned in that part of the treatise of M. Edmond Becquerel, which speaks of the action of hydrogen on the chloride of gold as well as in that entitled "electric current developed," confirm the truth of this assertion. The following experiment is corroborative of the first:—If a tube of very small diameter, filled with hydrogen gas, be placed in a vessel containing a concentrated solution of chloride of gold, at the end of a few days the temperature not having sensibly varied the level of the chloride of gold, inside, the tube will be very little different from what it was at first. Then introduce a piece of platinum wire, one part in the gas and the other part with its extremity, immersed in the chloride of gold; the gas is seen slowly to diminish in volume, and even at the end of a certain time to disappear completely, when the platinum wire rises to the top, but at the same time as the hydrogen gas disappeared, gold is precipitated in the metallic state on that part of the platinum wire immersed in the chloride. It is to be observed that the liquid does not contain, in solution, any platinum, therefore it is not acted upon by the neutral chloride of gold, at least as far as analysis proves; moreover, the exterior air is not an agent in the manifestation of the phenomenon, since it is produced likewise in close vessels. To be able to judge of the different results obtained. M. Becquerel gives the following conclusions:—

1st. Platinum wire that does not reduce a neutral solution of chloride of gold, may acquire this property when the solution is placed in contact with hydrogen gas, and the wire immersed partly in the gas and partly in the solution; gold is precipitated in the metallic state on that part of the wire immersed in the liquid, and the gas is absorbed while the deposit is going on.

2nd. This action is manifested equally in close vessels not exposed to atmospheric influence. As the liquid, after the re-action, does not contain any platinum in the solution, it results that the metal undergoes no alteration—that it only serves as a conductor, and it acts only by its pressure. These experiments appear to prove that in this circumstance there is produced, between a liquid and a gas (the chloride of gold and hydrogen), when platinum is present, an action of the same kind as between oxygen and hydrogen, under the influence of the same metal.

3rd. A piece of wire, with a sheet of gold under the same conditions, does not furnish any noticeable effect.

4. A voltaic pair may be formed with a single liquid, two sheets of platinum and one gas (hydrogen), but this latter to be in contact with one of the sheets and the liquid; by uniting several pairs there is then a gas battery composed of a single gas, one metal and one liquid. Hitherto it had been laid down as a law, that with the platinum and acid solution, two gases (oxygen and hydrogen) were necessary to obtain this result; only the elements of the battery formed with the chloride of gold, have a feebler intensity of action than the usual gas pairs.

5th. The solution of chloride of gold, chemically pure, may therefore be considered definitively as superseding the acid solution and oxygen in the gas battery. The remarkable effects that are manifested in this circumstance should not be confounded with those that would be produced by certain gaseous solutions or liquids, such as nitric acid absorbing hydrogen at the ordinary temperature, without the appliance of platinum.

For the Scientific American

Heat—Some of its Effects—Aerial and Ocean Currents.

It is a remarkable fact that when a room is well heated, and a door is opened leading into a cold room, that there will be two opposite currents of air produced—the warm will form the upper and the cold the lower one. To this we may have an occular demonstration by holding a lighted candle at the top of the door, upon which we shall discover that the flame is drawn along with the warm current into the cold room; and by holding the candle at the bottom of the door, the flame will be drawn along with the cold current into the warm room.

But what seems to be, indeed, the most remarkable of all, is, that the same cause seems to produce the same effect upon the vast oceans of our globe. Almost every school-boy has heard about that wonderful stream, some distance from our eastern shores, called the Gulf Stream; similar streams are found in nearly all parts of each ocean in the world, being formed at the equator, and flowing north in the northern hemisphere, or south in the southern hemisphere, the water being always the warmest at the surface; some of these streams have been traced as far north as latitude 67°, near Icy Cape. The warm equatorial streams are flowing towards the north and the cold polar streams towards the equator, the cold ones immediately under the warm ones, in an opposite direction; and hence the body of cold water lying at depths, in the regions of the equator, which cannot be accounted for in any other way than by submarine currents from the polar seas. I close by giving the following extract from one of our most celebrated navigators:

"We may see the admirable provisions of nature, by which the Creator has regulated the fluid mass of the ocean, in its endless gyrations, seeking to attain a state of equilibrium, which it never reaches, at the same time and by the same cause distributing the excess of tropical heat throughout the whole surface of the globe, and bringing to the equator the icy masses, which would otherwise accumulate in the frozen zones."

ABRAHAM RUDISILL.

Carlisle, Pa, Dec. 14, 1852.

A Large Mass of Iron.

It is said that the largest mass of wrought iron ever manufactured in Great Britain is a hammered shaft lately completed at the extensive engine factory of Mr. Nevil, at Llannelly, in Wales. This piece of iron is sixteen inches in diameter, more than twelve feet in length, and weighs four tons. It is intended for a steam engine of two hundred horse-power.

Stealing Calico Patterns.

In a case of theft which came before the court at New Bedford recently, it appeared that Miller, the defendant, charged with stealing a new pattern of calico, was employed to steal by a calico manufacturer in Haverstraw, and witnesses testified that it was a common thing for workmen to steal new patterns, and sell them to rival establishments. One witness said that he had received $100 per year