THE NEW TERMINALS OF THE BROOKLYN BRIDGE.

Nothing shows more impressively the rapid growth of the metropolis than the continual and imperative demands for means of transportation for the hundreds of thousands of people whose business is located in New York and whose homes are in the adjacent towns. Brooklyn is the greatest of these cities of residence, and, although means have been multiplied for transporting the people, still the demand for greater facilities increases.

Since the opening of the Bridge Railway on September 24, 1883, the railway has had a carrying capacity of over 200,000 passengers per day, the largest number for one day being 223,625, which was October 12, 1892. Since the opening of the railway there have been numerous alterations and improvements to facilitate the handling of passengers to the fullest extent under the existing system. In ten years the facilities proved totally inadequate, and greater capacity being imperatively demanded, the present new system of operation was devised and the construction of the terminal stations, which are now partly finished, was begun.

The Brooklyn station, although still incomplete, is farther advanced than that at the New York end.

We give an engraving of the interior of the New York terminal station as it will be when finished, the view being taken from the City Hall or western end of the building. The structures at the opposite ends of the bridge are practically alike, except that the Brooklyn station is constructed to accommodate elevated railroads at either end and at the side and is provided with galleries to permit of passing over the cars and tracks, giving access to the passages which lead to the elevated railroad platforms. The bridge station of the Brooklyn Elevated Railroad is integral with the bridge station, and is built by the bridge and leased by the elevated railroad. The Kings County Elevated Railroad is provided with structures of its own outside of the bridge station.

The system of tracks, by means of which the capacity of the bridge railway is to be practically doubled, is illustrated in the view of the New York station. The tracks on opposite sides of the bridge are double, each being composed of two pairs of rails, one pair of rails on one side of the bridge leading to the right of one platform, the other pair of rails leading to the right of the other platform. The rails of the track on the other side of the bridge are arranged in a similar way, one pair leading to the left of one platform, the other leading to the left of the other platform. Arranged in this way, each train comes in on a track which is contiguous to the platform, there being no switching.

It will thus be seen that the movements of the train are positive and that there can be no mishap due to misplaced switches. The only switches used are those employed for shifting the empty trains from the incoming tracks to the outgoing tracks. These switches are to be operated by a man in the elevated gallery shown in the left of the illustration. At present steam locomotives are employed in the switching, but an experiment looking to the application of electric locomotives for this purpose is soon to be tried, it being desirous to abolish the smoke and noise of the steam. At present the trains are operated under a headway of one and a half minutes; under the new system the headway is to be cut down to forty-five seconds. It has been observed that the platform is cleared of passengers in thirty seconds on an average, and it is believed that when the new system is in complete working order, with the number of trains doubled, the congestion at the stations will be completely obviated and the capacity of the stations will be ample for many years to come.

The City Hall station at the New York end will cover the site of the old station and extend beyond it, the railway having been changed already so far as possible, to adapt it to the new system. This station is rectangular, 521 feet long and 87 feet 6 inches wide. There will be two floors. On the upper floor will be the tracks and two elevated platforms, as shown in the illustration, and there will be an intermediate floor on which will be located the toilet rooms and the ticket sellers' boxes. There will be six stairways from the first floor to the platforms, and communication with Rose and William Streets by means of stairways and elevators.

The Brooklyn terminal station, which is already well along toward completion, is 357 feet in length and 90 feet wide. The arrangement of platforms and stairways is substantially the same as that of the New York station.

In the construction of the Brooklyn station 420,000 pounds of cast iron have been used and 3,400,000 pounds of steel. The work of erecting these structures at the ends of the bridge has been carried on without serious interruption of traffic, the old buildings having been torn down and the new ones built up while the thousands of passengers have surged back and forth as usual.

THE highest chimney in the world is at Glasgow. Height, 474 feet.

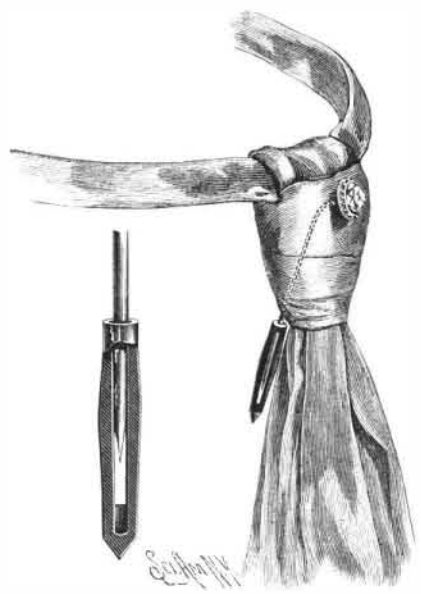
His Dream Was Worth Millions.

Elias Howe almost beggared himself before he discovered where the eye of the needle of a sewing machine should be located. His original idea was to follow the model of the eye at the heel. It never occurred to him that it should be placed near the point, and he might have failed altogether if he had not dreamed he was building a sewing machine for a savage king in a strange country. Just as in his actual working experience, he was rather perplexed about the needle's eye. He thought the king gave him twenty-four hours to complete a machine and make it sew. If not finished in that time, death was to be the punishment. Howe worked and worked and puzzled and puzzled, and finally gave it up. Then he thought he was taken out to be executed. He noticed that the warriors carried spears that were pierced near the head. Instantly came a solution of the difficulty, and while the inventor was begging for time he awoke. It was four o'clock in the morning. He jumped out of bed, ran to his workshop, and by nine o'clock a needle with an eye at the point had been rudely modeled.

[The Philadelphia Times, we believe, is responsible for the above story. It is so well told we give it place, but we have doubts about the eye-pointed needle being invented in just the way the article states it to have been.—ED.]

A SCARF PIN LOCKING DEVICE.

To securely lock a scarf pin in place, preventing its being lost or stolen, the device shown in the accompanying illustration has been devised and patented by Robert E. Lutters, Tenth Street, between Fourth and Fifth Avenues, College Point, L. I., N. Y. It consists of a sleeve adapted to engage and form a spring clamp upon the shank of the pin near its point, after the pin has been inserted in the scarf, as shown in the larger view. The sleeve, as better shown in the small view, is longitudinally slotted, and the insertion therein of



LUTTERS' SCARF PIN LOCKING DEVICE.

the shank of the pin spreads the body of the sleeve, and causes it to take a sufficiently firm frictional hold upon the pin to secure the latter from removal or displacement. The safety locking device is preferably made of hard rubber.

Three Good Business Hints.

Lloyds Commercial Guide gives the following advice to its readers. Never sign a paper without reading it; and if, after reading, you do not understand it, have it thoroughly explained before you put a signature to it. It is best to get some third person, who is not interested in the matter at all, to explain the meaning of what is not clear, or to point out words that may have two meanings in the document.

Always make a memorandum in your little book of any contract you undertake for money or any agreement to work. It saves much trouble to keep a memorandum book and put down the dates when you either pay or receive money. Whenever money passes on account, set it down. If any money or thing of value goes through your hands, give a receipt for it and make a memorandum. Your receipt settles the amount that passes, and that cannot be disputed. When you pass it to a third party, get a receipt and keep it. This form is as important in the transfer of income, trust money, or valuables among your own family as with other persons.

Never allow a person to do any service for you without first agreeing upon the cost to you. This rule, strictly adhered to, will save you many annoyances.

That Mammoth Potato.

The photo. picture of the mammoth potato we published on page 199 proves to be a gross fraud, being a contrivance of the photographer who imposed upon us as well as others. An artist who lends himself to such methods of deception may be ranked as a thoroughbred knave, to be shunned by everybody.

Average Wages of British Workmen.

There has been issued from the Board of Trade an elaborate report dealing with the average wages paid in several trades throughout the United Kingdom. The report has been prepared by Sir Richard Giffen, and accuracy is thus abundantly established. It is, says Engineering, a monument of great labor, for there are 500 closely printed pages of figures.

The average wage, according to the returns made, is 24s. 7d. per week, equal to £64 (or $320) per annum, quite a satisfactory figure, especially when it is remembered that the summation includes several industries which are not highly skilled, and includes also in all trades the helpers and laborers engaged in each. The average wage for women is 12s. 8d., which again is satisfactory, for many dressmakers, milliners, etc., are included, who only receive a nominal wage while learning their art. Lads and boys get 9s. 2d., and girls, where also the "improver" tends to reduce the average result, 6s. 5d. These average results are arrived at by an analysis of returns of wages actually paid for 1885, and of the wage paid for a stipulated day or week in 1886, with the maxima and minima paid in one week. Nearly a million workers were brought under this census, after all doubtful cases had been eliminated. As the trades were representative of all classes and districts, the return may not err on the side of the maximum. As reflecting on the minimum wage question again, the fact that only 2·5 per cent of men are paid less than 15s. is significant, while only one-fourth of all men workers have less than £1 a week. One-third of the men engaged have 20s. to 25s.; and 24·2 per cent between 25s. and 30s. This is what one would expect—that 58 per cent of workmen come within the class of 20s. to 30s. a week—limits which certainly afford a fair competency. Between 30s. and 35s. there are 11·6 per cent, and only 4·2 per cent between the latter figure and 40s., while this rate is exceeded by 2·4 per cent. Only one in a thousand gets less than 10s., and be it remembered the classification includes helpers in all the trades. As to women, 26 per cent have less than 10s., 50 per cent between 10s. and 15s., and 18·5 per cent between 15s. and 20s., while 5·5 per cent have more.

Another interesting point is the relation of the average wages in England, Scotland, and Ireland. It is not altogether surprising to learn that wages are lower in Scotland than in England by about 10 per cent, and that in Ireland they are still lower, the difference, as compared with England, being from 16 to 20 per cent, and more in those trades where the proportion of unskilled to skilled workers is greatest, for the report shows that skilled labor is paid about the same as in England, while mere muscular labor is very cheap. That is a condition which is easily understood. Some of the figures from the report may be quoted:

AVERAGE ANNUAL WAGE.

Trades.	England.	Scotland.	Ireland.	United Kingdom.
	£ s.	£ s.	£ s.	£ s.
Engineering	58 14	54 9	45 18	56 19
Metal work	59 12	54 15	51 2	57 19
Sawmills	57 15	52 9	49 13	55 14
Coachbuilding	57 8	53 4	52 18	56 6
Breweries	61 17	54 17	50 13	60 15
Distilleries	64 9	52 5	47 4	52 12
Chemical works	58 12	50 0	47 0	55 18
Printing—large works	55 9	47 0	44 3	52 11
" —small "	44 1	41 19	36 17	43 8
Building trades	72 0	63 0	61 0	—

These figures are based on the assumption that the men work full time.

Moving a Large Factory.

In the work of track elevation on the Providence division of the New York, New Haven and Hartford, it became necessary to move one of the largest factory buildings of the Sturtevant Blower Works at Jamaica Plain. This building is 50 × 350 feet, about half the length of which has three and the other half two stories. The three-story portion was moved about 50 feet east and 300 feet south, and the other portion was moved 50 feet east from its former location. The work in the three-story section, except upon the lower floor, was carried on all of the time during the removal, power being supplied by a 20 horse power electric motor belted from the second floor of the building to the main line of shafting. Provision was made for moving the motor away from the generator, which was situated in the engine room, by placing a reel containing the conducting wire upon the floor of the moving building, which allowed the wire to unwind and made it possible to keep the motor running while the building was upon the rollers. The moving was carried out in the usual way by means of capstans worked by horse power, which were connected to the building by ropes and blocks. The building was thoroughly tied in both directions by heavy iron rods before the moving was commenced, and though the walls of the first story are 20 inches thick, and of the second story 16 inches thick, the work was done without injury to the structure, in spite of the fact that the latter part of the journey was over filled ground.—The Boston Herald.

The Cotton States Exposition.

The Cotton States Exposition has now been open to the public 15 days and yet the visitor finds much still to be done to make a tour of the grounds with comfort. The roads and walks are very far from the condition of roadway "that leads down to destruction," spoken of in Scripture. The poor sinner who foots his way from the entrance to the exit takes on a goodly load of dust, besides going over acres of corn-racking broken stone. The management cannot be wholly blamed for this, as labor in this section is not only less abundant, but also less to be depended upon than in northern localities.

The exhibits in the various buildings are assuming shape, and are certainly very creditable, though much is still to be done in this respect. The most complete of all is the United States exhibit, including the Fisheries Commission, in the same building.

The display of varieties of living fish in glass tanks is tasteful in arrangement, and very instructive in conception. The building set apart for and filled with the efforts of Negro genius and skill is also very near completion and worthily attracts much attention; not necessarily for its great perfection in finish of exhibits, or new fields of progress, but that the emancipated race has been able to "climb up the stair" of ability in so short a period of freedom.

The observer sees, necessarily, plagiarism in all their works of art and mechanics, while yet feeling a hearty sympathy in their laborious education.

That the "expert" will never fear the efforts of the novice is so plainly written in this and—I dread to say it—the woman's building, he who runs may read. As the plot of the exposition develops itself, I will write, be it tragedy or comedy. Whether the experiment of a successful exhibition, with ear muffs and chilblains as companions, will be possible, remains as the deciding side of the result.

October 9 was a "banner day" at the fair; the attendance was very great: cause—arrival of the old "Independence Bell" from Philadelphia.

I was much pleased with the exhibit of acetylene gas (made from the union of lime and coal by heat). It is compressed into liquid form in steel cylinders about 4 inches in diameter by 4 feet long. Each cylinder, which can be taken to any household and attached to the pipes, it is claimed, contains enough liquid gas to run six burners three hours in the evening for a month. In this form there is, of course, no residue.

They attract much attention, as the white flames they burn constantly show the beauty of the light and the absolute simplicity of operation. The exhibitors say that experiments in manufacture so far justify the statement that $10 per ton will be a maximum cost of the compound, but others say the cost is far greater.

MEAD.

The Rubber Stamp Industry.

BY GUSTAV HEINSOHN.

While a single rubber stamp may appear insignificant, and it costs a trifle, the trade in goods of this class has reached a very large aggregate and become a source of profit to a great number of persons. It is the most widely distributed of all the branches of rubber manufacture, geographically speaking. One must consider that when the business man of Nagpur or Melbourne or Rio de Janeiro or Bankipore uses a rubber stamp it is not due to that article having reached him by accident from a distant country; the letters have been moulded and the stamp vulcanized in a shop in his own city. The United States is the home of the rubber stamp, and the largest production of such goods is still to be found here, but there is no export business to speak of. The most that can be done in the direction of foreign trade is to operate through foreign branches, or to arrange for the collection of royalties from manufacturers abroad under American patents. But rubber stamps are made and used already far beyond the limits of patent protection—that is, in countries without patent laws.

How many rubber stamps are made or used is past finding out. It is safe to say that few up-to-date business men have not sometimes a use for a rubber stamp, while in a single office hundreds of different stamps may be used. One needs only to look at the bank checks which pass through any large business house every day, with their stamped indorsements, and often with stamped signatures, to gain an idea that an enormous number of stamps must be in use. By the way, the banks are among the most valuable customers of the rubber stamp manufacturer. Two years ago the Chemical National Bank of New York, it is said, gave one order for 7,000 rubber stamps, though of course this was exceptional, the occasion being a monetary panic when clearing house certificates were issued and very much unusual work was necessary in conducting the banking business. Insurance and other companies having a great number of agents, patent medicine manufacturers whose compounds are sold through thousands of dealers, and many other concerns have rubber stamps made for their agents, whose names are stamped on the advertising matter which is pouring ceaselessly through the presses. Printing the names of agents on circulars, cards, etc., with type, which would have to be changed for every name, would be much more expensive.

Like most things which have any value at all, the rubber stamp has been improved from time to time until it is now capable of many more uses than at the beginning. On account of a new feature which will be described further on, the rubber stamp is coming into use for lettering boxes and packages, instead of the old-fashioned stencil plate, with the result of saving a great deal of time, besides securing a better label in many cases. Where a merchant ships goods frequently to the same customer, a rubber stamp can be obtained for marking packages with the customer's name and address, with far greater satisfaction than from the use of marking pot and brush. As rubber stamps are now manufactured, there is a steady increase in practicable sizes. "Hand stamps" 10 × 14 inches are now advertised, and they have proved as satisfactory in use as the one-line stamp with which the name of a corporation is affixed to a bank check over the treasurer's signature. Nor are these stamps confined to the printing of letters or figures. One of the big typewriter companies recently had a 10 × 12 inch rubber stamp made, embracing a good representation of their machine, made from a photograph, and this is stamped on the boxes in which the machines are sent out to the trade.

The trade in rubber stamps has been not a little stimulated by the invention of the pneumatic feature, by which the stamp is rendered flexible. The advantage of the improved stamp is that it will print on any surface, whether flat, uneven, concave, convex, or yielding, such as pasteboard boxes, packages prepared for the mails, etc. It is due to the flexible feature, indeed, that the large sized rubber stamps above referred to have come into existence, since the stamps formerly made could be satisfactorily used only on surfaces that were exactly level and uniformly smooth.

In the manufacture of rubber stamps a form of printing type is set up, styles of letter being selected such as it is desired to reproduce in the rubber, and a cast of the type faces taken to serve as a matrix or model for the rubber. When the mould has hardened sufficiently, a sheet of unvulcanized rubber is forced into it by hydraulic or other pressure, with the result that, when the rubber is removed, it presents a facsimile of the type metal letters. By vulcanizing the rubber its quality becomes fixed, and the letters retain their form permanently. The cementing of the rubber letters to the handle or "mount" is done with some preparation the nature of which is usually guarded as a secret. The manufacture of the air cushion mount involves an interesting feature. There is first secured a rubber sheet or cushion, on one side of which is a series of cells, similar in appearance to a piece of honeycomb, except that the cells are square or oblong instead of hexagonal. These are the air cells, and they will be probably one-fourth inch deep and as large square, though various sizes are used for different kinds of work. The printing surface, or rubber die, is first securely cemented upon the back or closed side of a sheet of the cells. The opposite or open side is then hermetically sealed by cementing it to another flat piece of rubber, or direct upon the stamp handle base, thus forming airtight compartments, which, under pressure, give flexibility to the printing surface and allow it to conform to any surface on which it is desired to print. The advantage of having a number of small cells is that the delicate separating walls all assist in supporting the rubber printing surface and giving it the necessary firmness. Besides, if a few cells should in time become broken, the stamp will not thereby lose its form. Unlike the pneumatic bicycle tire, the pneumatic rubber stamp is not rendered useless by a puncture, since the inflation or distension of the cells is not necessary to render the stamp effective.

Closely related to the rubber stamp trade is the manufacture of solid rubber type. There are many cases where it is desirable to change frequently the matter to be printed, or stamped, and for this reason a demand has grown up for rubber letters which can be rearranged as often as desired. Formerly the frames or mounts into which were inserted the feet of the rubber type—so to speak—were provided with thumbscrews for holding them in place. Too frequently, however, such screws were apt to be tightened so far as to compress the types, resulting in bad work in printing. An improvement was devised to overcome this, by means of which each letter, as it is put in place, is compressed with a pair of pincers, the base of the letter expanding and filling the socket completely as the pressure of the tool is removed. Thus the letters are prevented from falling out of the handle. But the chief improvement in connection with rubber type work has been in the adaptation to it of the pneumatic mount, so that a form of rubber type is now used precisely as a flexible hand stamp would be.—India Rubber World.

THE largest library is in Paris, the National, containing 2,200,000 volumes.

Science Notes.

Gilded Fabrics.—For some time past gilded or silvered tulles have been in the market. According to Mr. Villon, the following is the process of preparing these fabrics: The tulle is immersed in a one per cent solution of nitrate of silver. After a quarter of an hour it is dried and then plunged into a solution of Raschig salt. This latter is a salt of potassium of sulphonated hydroxylamine. The nitrate is immediately reduced, and the silver deposits upon the fibers in impermeabilizing them. It then only remains to dry the tulle, wash it, and dry it anew. This done, it is covered with gold or silver in a galvanic bath formed of double cyanide of potassium and gold or silver. The same process may be used for silvering or gilding other fabrics.

A New Tannin Plant.—Mr. H. Trimble calls attention in Garden and Forest to a tree that is yet little known, but which seems capable of rendering great services as a source of tannin. This is the Castanopsis, a tree intermediate between the oak and the chestnut. A species of this tree, C. chrysophylla, is found in California and Oregon. Its bark is very rich in tannin, as may be seen from a comparison of the following analyses:

	Water, per cent.	Dry tannin.	Ashes.
Castanopsis (bark)	42·72	18·92	3·70
" (wood)	9·75	3·67	0·72
Quercus densiflora (bark)	10·31	16·12	2·46
Ostrya virginiana (bark)	20·41	6·49	8·47

Although this tree does not form forests in California, it is nevertheless of comparative frequency and grows to a great height. It would seem advantageous to develop the culture of it for the industrial preparation of tannin.

Lighting by Luminescence.—In a paper read by Mr. A. Witz, before the Academy of Sciences, the author gives the results of his attempts to measure the quantity of energy necessary to illuminate Geissler tubes. The figures that he has obtained show that, in lighting by luminescence, the proportion of calorific energy as compared with the total energy is more feeble than in any other luminous source.

The author thinks that by reducing the losses of electricity to a minimum, by concentrating the light in a confined space, by utilizing the fluorescence of certain substances, and, finally, by devising certain special arrangements, one may hope to obtain luminous sources whose photogenic rendering will be superior to the best now known.

Cycle Notes.

In the smaller towns in France, when a fire breaks out, a messenger has to make the rounds of the town summoning the firemen from their work. These messengers are now mounted on bicycles, and are able to summon the firemen in a much shorter time than formerly.

A New York magistrate has decided that the repairing of a punctured tire is a necessity. Wheelmen have long held this idea, but it was not until a man was arrested for violating the Sunday law by repairing a puncture that the court finally rendered judgment on this important question.

An English cycle insurance company has a reference department, which should be of great value to the intending purchaser of a second-hand wheel. If the machine has been insured in the company, the would-be buyer, upon the payment of a fee of twenty-five cents, will be given all particulars of the age, make, and original price of the machine, and whether any or what accidents the company has been called upon to pay upon it while it was insured with them. By this means the purchaser is in a large measure protected against buying a stolen or misrepresented wheel.

Responses from the leading manufacturers of the country place the output of wheels for 1895 anywhere from 400,000 to 750,000, and that of 1896 from 600,000 to 1,000,000. A fair average of those opinions would bring the prophecy for 1896 to near 750,000 wheels. The general opinion is that prices will remain about the same as 1895.

The Board of Education of Montclair, N. J., has taken formal recognition of bicycles as a means of going to and from school. At a recent meeting the fact that between seventy five and one hundred children rode to school every morning on bicycles and that some accommodation should be provided for the wheels was considered. The board then ordered that racks for the wheels be put in the different schools.

Complaint has been made that cycling is keeping the young and old away from church. In the suburbs of London a minister of the Gospel preaches a special sermon in his church for the benefit of cyclists. Every Sunday the wheelmen ride out to the church from the city, and the minister is said to have close and attentive audiences. The same plan has also been tried in this country with success.

The Jersey City Board of Aldermen, on October 8, passed Alderman McCarthy's ordinance, which provides for the imposition of a $25 fine on any person who throws tacks, pieces of glass or other like material in the public highways. The object of the ordinance is to prevent the puncturing of bicycle tires.

Eleusian Remains.

The Standard states that the excavations that are being carried out by the Greek Archæological Society on the site of ancient Eleusis, a few miles from Athens, have just yielded some results of exceptional importance. In a very ancient and well preserved tomb there have been found, in addition to the skeleton of a woman, a number of articles, including ear-rings of fine gold, silver and bronze, several finger rings, sixty-eight small vases of various shapes in terra cotta, two tripods, three Egyptian scarabæi and a small statuette of the goddess Isis in porcelain. These discoveries leave no doubt of the fact that the celebrated mysteries of Eleusis were of Egyptian origin, and were borrowed from the religious rites of the ancient Egyptians. These important relics have been deposited in the National Museum.

IMPROVED "LONG RUN" PERFECTING PRINTING PRESS.

For some time past there has been quietly running in the city of Boston a press which printers who have seen it say is destined to revolutionize the printing of such jobs as are known generically in the trade as "long runs" of book and cut work.

To describe the machine in the fewest words, it is a web perfecting press with patent offset mechanism. It is manufactured by C. B. Cottrell & Sons Company and is the invention of the former senior member of that house, now deceased.

As shown in our engraving, the new machine in appearance is strong, symmetrical, evenly proportioned, ideal in shape and design. There is no important part of the press which is not easily accessible, the location of parts being well-nigh perfect in arrangement.

It is a press for printing fine work by automatic feeding from a continuous roll of paper; prints both sides of the sheet at one operation; and is so constructed that there is no offset in the printing of the second side.

This last consideration is one of the most important features of the new press, for it adds the virtue of quality to that of speed.

The surface of the second impression cylinder is in four sections and is covered by four tympans supplied from rolls of paper within the cylinder. These tympans are set to shift automatically at stated intervals. The movement is not slow, partial and continuous, but quick, complete and instantaneous. The entire tympan covering of the cylinder shifts in one revolution, moving the full length of the printed surface. This is done with no diminution in the speed of the press and no cessation of its printing.

Furthermore, this shifting of the tympan can be adjusted to suit the special needs of each job. Thus, the surface may be changed automatically after every eighty impressions, if heavy cuts are in the form, or it may be set to wind off on 160 impressions or on 240 if the work is ordinary book or pamphlet printing.

The paper, after printing, is cut into sheets and delivered (accurately jogged both ways) on the table. There are no tapes and no fly. The delivery is positive and in its operation the sheet has no printed surface contact.

The cutter is rotary, makes a sheer cut and leaves the edges perfectly square and smooth.

The press prints a 33 × 46 sheet, running at a conservative speed of 3,500 completed sheets per hour—equal to 7,000 impressions on one side.

Altogether, the Cottrell web perfecting press, with offset mechanism, may fairly be ranked among the great achievements in printing machinery of the present day.

GYROGRAPH OR ARTISTIC TOP.

Our engraving shows a novelty in tops recently added to the long list of interesting modifications of this old-time toy.

The novelty in the present case consists in making the point upon which the top spins produce a record of its movements.

The top consists of a heavy disk of iron secured to a spool on which to wind the string. The spool is bored axially to receive a pencil which forms the point on

THE GYROGRAPH.

which the top spins. The handle is swiveled so that the top may be spun while the handle is held in the hand. After the top is set in motion, it is placed on a paper in the position shown in the engraving. The pencil point then traces the intricate curves as shown.

If desired, a slate pencil can be substituted for the lead pencil. The manufacturers state that a well centered hard pencil with the lead cut square across gives the most accurate curves, though not necessarily the most beautiful.

Breeding Habits of Toads.

It was stated that a correspondent of Meehan's Monthly inquired how it was possible to find toads no larger than peas if the tadpole is the first stage of toad life. The reply of the Monthly was to the effect that toads are oviparous or viviparous, according as water is or is not accessible. This is not quite true.

Every toad passes through the tadpole stage, however far he may be from the water, and no case is known of a toad bearing young alive, but all toads and frogs lay eggs. It is true that some forms pass through the tadpole stage while still in the egg, and others carry their young in various ways, until the tadpole period is passed, but none of them ever bear young alive, as viviparous in its true sense would imply.

It may be interesting to note some of the curious breeding habits of toads. The remarkable toad of South America, Pipa americana, is the most extraordinary. The eggs are laid by the female, and are immediately transferred by the male to the back of the female, to which they adhere and where they are impregnated. The skin of the back is excited into increased activity by the presence of the eggs, and gradually grows up around each egg, until it is inclosed in a pouch.

Here the eggs develop, passing through the tadpole stage, and when the form of the adult is reached the little fellows emerge and take up an independent existence. Pouches filled with eggs, to the number of one hundred and fourteen, have been observed on the back of a single female. This is the only case among the Batrachia in which the young are nourished at the expense of the parent, but even this toad could not be called viviparous.

Another interesting form is the obstetrical toad of middle Europe. The eggs are laid by the female in a long albuminous string which is taken by the male and wound about his body and thighs. The albumen dries and the eggs become fastened to his body and there remain until hatched.

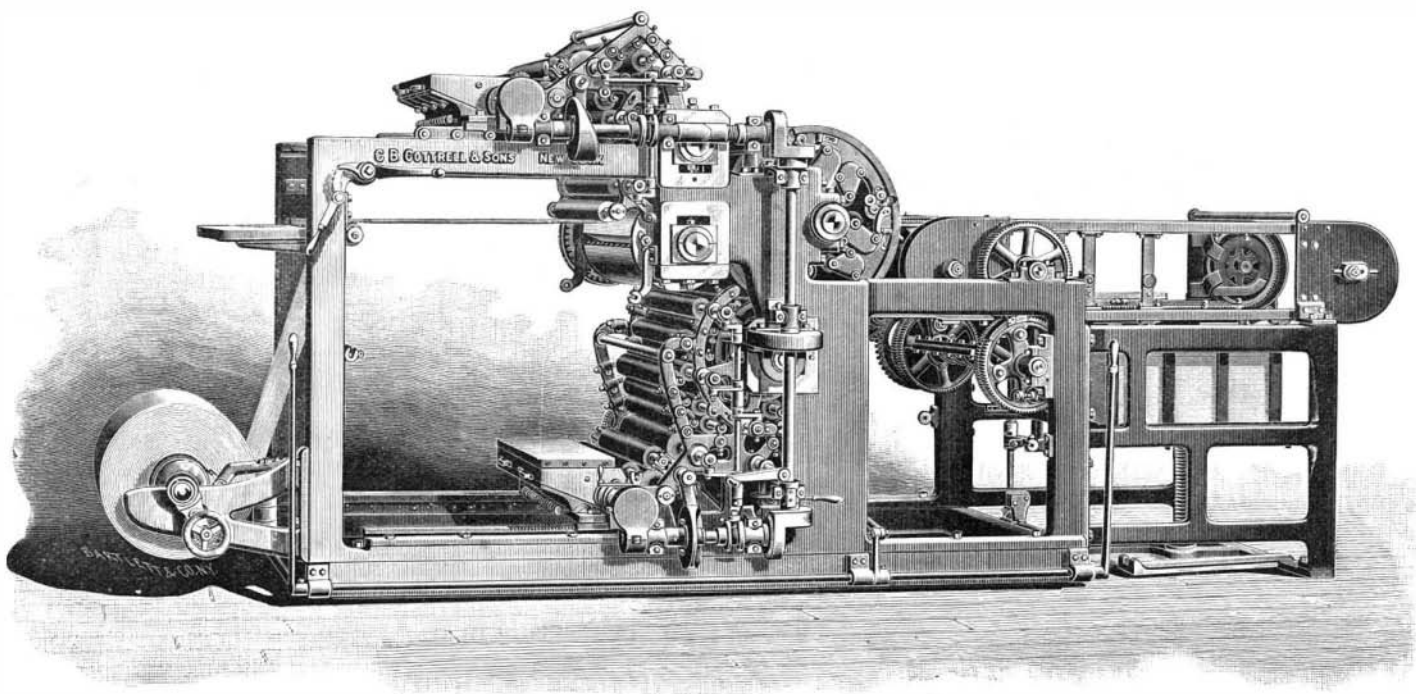
The species Nototrema and Opisthodelphys, of Peru, carry their eggs in a pocket formed by the unfolding of the skin of the back; the young of the former leave the egg while tadpoles, those of the latter pass through their entire metamorphoses while in the pouch.

Our own toads deposit their eggs in long albuminous strings having the appearance of a necklace of black beads. The eggs of the frogs and salamanders are deposited in more or less globular masses of the albuminous substance. We may distinguish the eggs of the salamanders from those of the frogs, for the former have a circular outer envelope which surrounds each egg.

The tadpoles of the toad, unlike those of the frog and salamander, retain their early black color throughout their larval state. They also undergo their metamorphoses while much smaller than the frog. The toad tadpoles take on the adult form when they are literally not larger than peas. At this stage they leave the water in great numbers and make long journeys in every direction, traveling mostly at night, but often emerging from their hiding places after a rain, thus giving rise to the suspicion that they have fallen with the rain.

The hylidæ or tree toads lay their eggs in the water, in small pockets, and not in strings as do the other toads. They also undergo their metamorphoses while small. One of the Mexican tree toads is said to deposit its eggs in the water which accumulates in the axils of leaves and to undergo its changes high above the ground.

In the spring of the year nearly every pond and pool will be found on careful search to contain numerous masses of albuminous jelly filled with eggs in various stages of development. Nothing is more interesting than to bring home these eggs and watch them develop from day to day. Whether they be the eggs of frogs or salamanders, or the strings of toads' eggs, we shall see them all hatch into lively little tadpoles. We can scarcely hope to keep the frog or salamander tadpoles until their legs bud forth and they become ready to live on land, for it requires too long a time, but we may keep the toad tadpoles and watch the limbs gradually appear and the tail disappear until the adult form is reached. The little tadpoles will devour the slime which gathers on the sides of the aquarium, and they will also suck the juices of raw meat. They grow rapidly and in a short time acquire legs and lose their tails, and though still no larger than peas, they are perfectly formed toads ready to take up a terrestrial life.—F. P. G., in Outdoor World.



IMPROVED "LONG RUN" PERFECTING PRINTING PRESS.

A REUTER's telegram of September 11, from Berne, reported the fall of a huge mass of ice from the Altels Glacier upon the hamlet of Spitalmatte, in the Upper Gemmi Pass, causing the death of at least ten persons and the loss of, it is estimated, two hundred head of cattle. A stretch of land nearly two miles in length has been overwhelmed and the pass has been partially blocked.