PLATEN PRINTING PRESSES

TYPOGRAPHIC TECHNICAL SERIES FOR APPRENTICES—PART I, NO. 6

PLATEN PRINTING PRESSES

A PRIMER OF INFORMATION REGARDING THE HISTORY & MECHANICAL CONSTRUCTION OF PLATEN PRINTING PRESSES, FROM THE ORIGINAL HAND PRESS TO THE MODERN JOB PRESS

TO WHICH IS ADDED A CHAPTER ON AUTOMATIC PRESSES OF SMALL SIZE

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Introductory

CENTURIES before the invention of movable type and the beginning of modern printing the Chinese obtained impressions from engraved blocks by inking their surface and laying upon the inked surface a sheet of paper which was forced into contact with the ink by means of brushes which were manipulated with considerable skill. This original printing was a slow process, suited only to the use of a soft ink and a highly absorbent paper, and could only be used in such a country as China where labor was exceedingly cheap and but few copies were needed. Some of the better grades of this work were excellently done and the process is still in use in that country. Even before the invention which was the birth of printing as we know it, the need was felt for some better means of producing impressions from engraved blocks, and a crude sort of press was designed of which but little is known. The first historic mention of a printing press is in the agreement made between Gutenberg and Fust, in which it is included as part of the equipment pledged by Gutenberg to secure a loan of money. (See text-book No. 50, "The Invention of Typography.")

The first press was evidently the outgrowth of an idea suggested by the cheese- and wine-presses of that time, and the source of power was at first a lever, which was soon replaced by a screw movement to gain a greater amount of result for the same human effort expended. In this press the impression was made by the approach of two flat surfaces, on one of which the form was laid. When the

sheet had been placed upon its inked face the whole was slid under the other surface, or platen, and the two brought together by means of a lever in the hands of the workman. Hence they were, later on, designated hand presses, although they were most probably only known as presses at that time.

The Hand Press

A hand press is primarily any press run by manual power. This designation might be applied to a number of small machines in present use, but it has, by trade usage, been reserved to that style of bed-and-platen machine which has descended to us by evolution from the simple press of the fifteenth century. The first hand presses were constructed of wood and, owing to the character of the material and their crude mechanical design, were small in size. In most of them the bed was made twice the size of the platen and the impression was made by two pulls between which the bed was moved a distance equal to half the sheet being printed. The necessity for having a perfectly flat surface for the bed soon led to the use of a slab of marble for that part of the press.

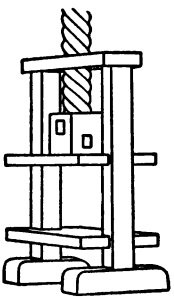

FIG. 1. Old Wooden Screw Press

The first real improvement of which we have any record was made about the middle of the sixteenth century, and this was but a slight modification of the existing machines. This machine consisted of the frame or uprights supporting the platen, the platen of wood, the marble bed, and a sort of slide on which it was run under the platen to get the impression. But crude as it may seem, it was seventy years before there was any further improvement in its construction.

Naturally with such tools there could be but little attempt to make-ready and one of the first additions was the tympan frame and drawer and the frisket.

In 1620 William Jansen Blaeu, a joiner, who became enamored of the art, took up printing, constructed for himself a press of greatly improved design, and added the strap and rounce for running the bed in and out. He was unable, however, to build a machine strong enough for a single pull on a large form and retained the two pulls. Blaeu's press was evidently much in advance of the craft at that time and remained the standard for more than a century, and in 1770 an English writer on printing by the name of Luckombe wrote: "There are two sorts of presses in use; the old and the new-fashioned press; the old sort till a few years ago were the only ones used in England." The new-fashioned presses to which he referred were the ones built by Blaeu. Another important innovation that Blaeu incorporated in this press was a spring to raise the platen after the impression, thereby lessening the labor of the pressman.

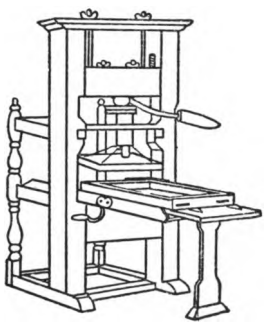

FIG. 2. Blaeu Hand Press

The next great improvement was made by Adam Ramage, who, in 1790, began to build presses in Philadelphia. He substituted an iron bed and platen for the wood and the stone that had been in use so long and built a much better machine, though still small in size. He used a triple-thread, rapid-motion screw that greatly shortened the pull, and his press was much admired in its day. Even as late as 1885 a number of them were in use as proof presses. They were usually about cap size (13 × 16).

In 1797 George Clymer, of Philadelphia, produced the

first all-iron press, but it did not come into general use until 1805. This press was an entirely new departure from the old ideas, and the impression was given by means of a series of compound levers which greatly magnified the power of the pressman as exerted on the handle-bar and did away with much of the friction of the old screw press, which ate up a large percentage of the power. This press he christened the "Columbian" in honor of his country, and it was for a long time unsurpassed for ease of working. It was peculiar in appearance from the fact that the weight of the platen was counterbalanced by a series of levers terminating in a counterweight in the shape of an eagle. This was the first press to be built in large sizes and to give a full-sheet impression at a single pull. Heretofore the maximum platen had been about 12 × 18 inches, but the Columbian was built as large as 23 × 32 inches.

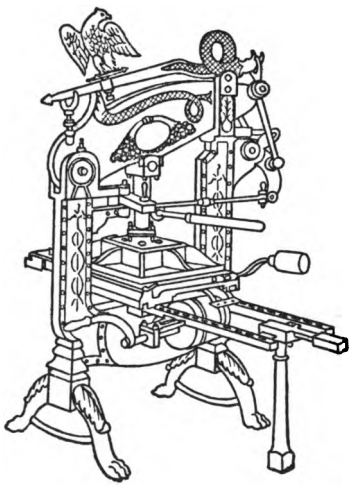

FIG. 3. Columbian Press

About the same time that Clymer was working out his new press, Earl Stanhope, of London, England, invented an all-iron press of a different pattern and not nearly as strong or easy to work as the Columbian. The Stanhope press also printed a full sheet and was a good machine. It was completed in 1800. It never became very popular, and when, in 1807, the Columbian press was introduced into England it gradually crowded the Stanhope out because of its greater ease of working. Stanhope combined

the lever motion with the old screw motion. His presses had a heavy cast-iron frame.

The rapid growth of the printing business in the beginning of the nineteenth century and the desire for heavier presses that would give harder pressure over large forms led Peter Smith, of New York, to invent a style of hand press combining the solid cast-iron frame similar to the Stanhope press but much heavier, with a shorter system

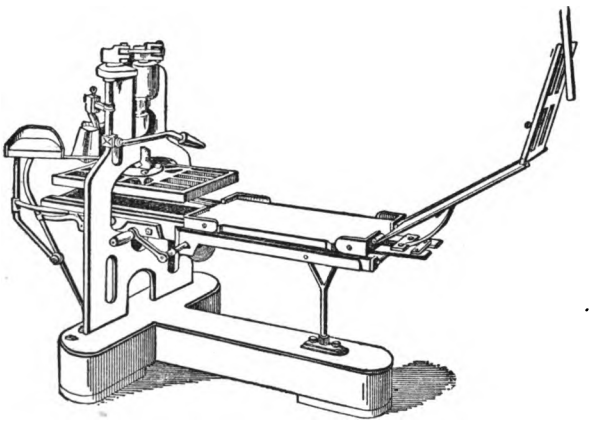

FIG. 4. Stanhope Press, 1800
Built of iron, but impression screw and some other parts were of wood

of levers which were similar to those used by Tuft, of Boston, in 1813. The Smith press became popularly known as the Acorn press and was the favorite for a few years.

In 1829 Samuel Rust perfected the design of the style of hand press known as the Washington press, which was so far superior to any of its predecessors that it soon drove them out of the market. This is the model of the present-day hand presses used for proving by engravers and others. In it the simplification of the lever motion is so complete that there are only two members, with a friction roll or pin between them, and the power is so magnified that very

large sizes have been built and successfully worked. Several firms still build hand presses of extra heavy construction in the style of the Washington press for use by photo-engravers in proving their plates. Owing to the fact that the hand press admits of an unlimited dwell on the impression, thus allowing the ink to incorporate itself with the surface of the paper, it has held its place as the ideal proof-press where extra fine impressions are desired.

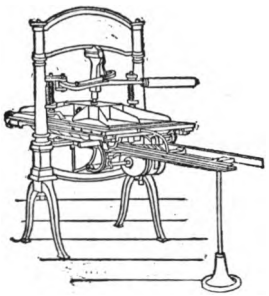

FIG. 5. Washington Hand Press

The original principles of the hand press remain in the latest model, the only difference being in the method of gaining the force necessary to give the desired impression. These original principles are that of a flat bed and flat platen approaching each other with parallel motion, and the sliding movement of the bed by which it is placed under the platen to receive the impression.

The two great drawbacks to the hand press, from the viewpoint of the modern printer, are its lack of speed and the fact that until near the end of its reign it required the form to be inked by hand.

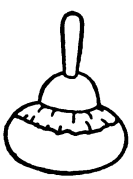

FIG. 6. Inking Ball

At first the inking was done by means of leather-faced balls made by securing the especially prepared sheepskin to the handle in such a way that the flesh side was out and the wool made the padding of the ball. These balls were used by placing a small portion of ink on the slab and beating or braying it out with one of the balls and then beating the balls together with a rolling motion so that the ink was evenly distributed over their surfaces, and then beating the ink onto the face of the type. To one who has never

seen their use the rapidity and evenness with which the form is inked is rather surprising. The next attempt to simplify the inking was by means of a leather roller such as is now used by the lithographer, but it was only partially successful and was used only for cheap work.

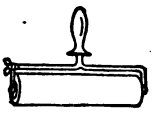

FIG. 7. Hand Roller

In 1813 the composition roller was invented, and from that time dates the new era in printing. (See text-book No. 11, Printer's Rollers.) The first rollers were used singly in a hand-frame with two handles, but it was not long before two rollers were used together in the same frame to get better inking and distribution. Then followed a mechanical arrangement of a vibrating cylinder upon which the rollers were distributed and they were made the full length of the bed so as to ink the form with one passage across back and forth. Later this apparatus was remodelled so as to be run by power and become automatic, the rollers being in constant rotation and the mechanism for pushing them across the form being tripped into action by a lug on the tympan as it was raised from the form. This greatly increased the output of the hand press and did away with the roller boy, or rather the assistant pressman, and substituted the boy without experience to replenish the ink at the direction of the pressman.

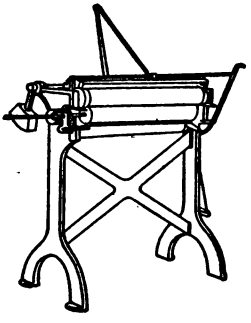

FIG. 8. Early Automatic Inking Apparatus for Hand Press

The Power Platen Press

As the printing and publishing business grew in importance the number of presses required to meet its demands grew in proportion, likewise the skill and

speed of the pressmen; but as the maximum on good work was about a "token" of 250 sheets per hour the demand for something that would print a larger sheet or give a more rapid production became imperative.

Isaac Adams, of Boston, in 1830, invented a power press which combined the advantages of the hand press for fine book work with the ability to print a large form by power. These presses were afterwards improved by himself and his brother Seth Adams. In this press the platen was made stationary and the bed rose to meet it for the

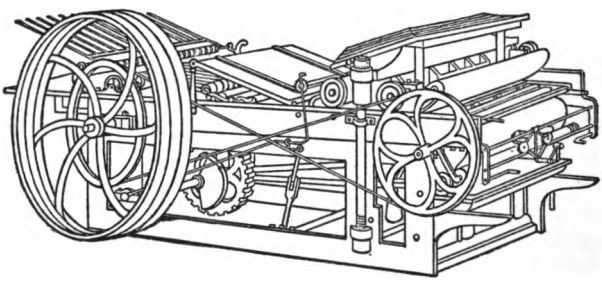

FIG. 9. Adams Book Press

impression and dropped back again to its lower position while the inking rollers passed over the form, they being drawn in and out by the frame or carriage of the frisket which carried the sheet into printing position. As soon as its advantages were seen, the Adams press was constructed with additional rollers up to the number of six, and this press enabled Messrs. Harper Brothers, of New York, to revolutionize the printing of illustrated books in America. This was about 1845. While hardly to be classed as a job press, the Adams press was the legitimate successor of the hand press, and for a number of years smaller sizes were used for some classes of job work on account of their speed as compared with the hand press. The smaller sizes were run at a speed of about 800 an

hour and the larger sizes about 750 impressions an hour, while some were built to carry a sheet as large as 32 × 44 inches and run at a speed of 600 impressions an hour, giving an output of about 15 per cent less. As late as 1872 Mr. William B. MacKellar said, in his "American Printer," "The Adams is the only machine press giving perfect register." Later on, the Adams was succeeded by the cylinder press, but that is beyond our subject of the Platen Press, and we shall leave it for another volume. (See "Cylinder Printing Machines," text-book No. 7.)

Advent of the Job Press

The growth of printing was not confined to books, but included much that we call job work, i.e., small circulars, cards, bills, blanks, etc., many of which were troublesome to print on the hand press and costly because of the trouble and slowness. There arose a demand for small and more rapid machines to take care of this work. The first reply was the small Adams press, but this was neither convenient nor speedy enough to fill the demand, and not as satisfactory as its big brother in its field.

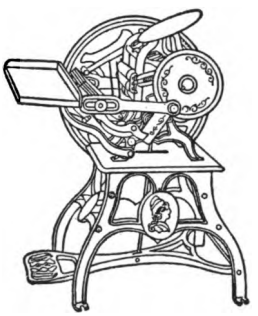

FIG. 10. Columbian Card Press

The pioneer in the job press field was S. P. Ruggles, of Boston, who brought out his first series of presses in 1830. His press was known as the Ruggles card press, and a number of them were quickly sold. In this press the bed was a flat portion on one side of a cylinder supported between side frames and the platen was hinged to the lower part of the frame so as to be driven up against the form with a clam-shell

motion. The inking was accomplished by rollers which travelled entirely around the cylinder, all that portion not forming the bed being used as a distributing surface. Only small sizes of this press were built; about 6 × 9 inches was the largest and there was a smaller size. In 1840 Ruggles took out patents for another job press in which the position of the bed and platen were reversed and the form hung from the bed face down. This machine had a moving tympan and a roller frame which slid between the bed and platen, very much as the frisket and roller frame on the large Adams presses. This was known among the workmen as the "Up-side-down Ruggles." It was a strong press and capable of doing good work and it is only a few years ago that the writer saw several in use printing cloth covers in a bindery. For this work it was particularly well adapted. Ruggles himself named this the "Engine press."

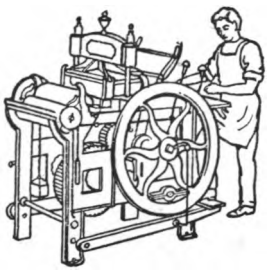

FIG. 11. Ruggles Engine Press

In 1832 Seth Adams, of Boston, produced two styles of platen presses which were a distinct departure from the then existing practice, but both of them are now obsolete and few printers of today have seen either. During the next twenty-five years a number of improvements were made in the job press, none of which were of sufficient value to endure to the present time.

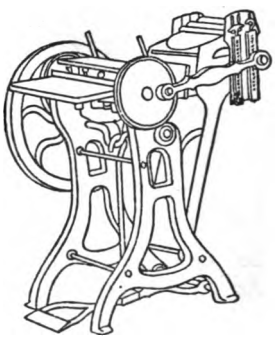

FIG. 12. Original Gordon Press

The first really notable advance was made in 1856 by George P. Gordon, who built a press which was the prototype of the well-known machine which bears his name today, though, of course, much cruder in general construction. In 1860 Gordon brought out an improvement on his machine which he called the Franklin press and which immediately became popular and crowded out most of the other presses in use for job work. This press is practically the one that is in general use today with minor improvements.

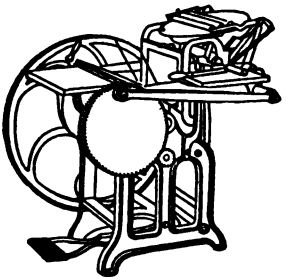

FIG. 13. Gordon's Franklin Press

The principle of construction invented by Gordon has not been changed, but simply refined, and the machine built upon more substantial lines to meet the present demand for heavier impression and higher speed. The Chandler & Price Gordon is the typical press of this class, and the latest pattern is much heavier in proportion than Gordon ever dreamed would be necessary. In this press Gordon endeavored to attain nearly parallel impression and to do away with the clam-shell movement that had characterized most of the early presses by mounting the bed upon long legs with a swinging motion and rocking the platen into position for feeding by means of a crank driven by a cam in a gear wheel. This wheel also drew the bed into position for making the impression by means of another crank, or rather two of them, and a pair of strong steel arms. This press was easy to feed and ran

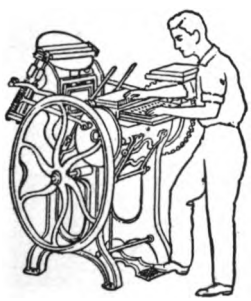

FIG. 14. An Early Gordon Press

much lighter than any of its predecessors. It was at first worked by foot-power by means of a treadle so arranged that the feeder could operate it and throw his weight on the treadle when running a heavy form.

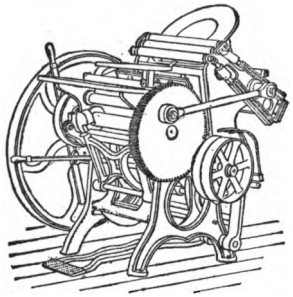

FIG. 15. Chandler & Price Gordon Press

Another press which was very popular for quite a time was the invention of F. O. Degener, of New York, in 1860. This press had a bed and platen hinged together and driven by an eccentric in such a way that they both rose together and opened out to a practically horizontal position for feeding the sheet and inking the form (the rollers being so placed that they passed over the form as it rose and fell) and then dropped into the middle of the frame of the press for the impression, where they were held in the parallelogram formed of the side arms and the back and front shafts, making a very strong, quick-acting press. Its fault of the short hinged clam-shell impression kept it from surviving.

One platen press that deserves study is the Globe press, which was the first attempt of modern builders to produce a machine giving a parallel motion to the impression. This appeared about 1868 and had a perpendicular bed and cylinder ink distribution. It made the impression (after the platen had rocked up from the horizontal feeding position to a perpendicular about half an inch from the form) by the dropping of two arrow-headed draw-bars into sockets in

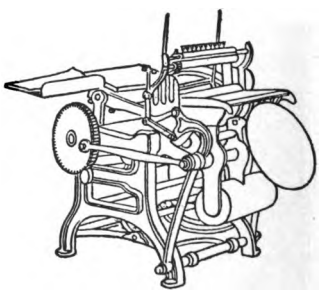

FIG. 16. Liberty Press

the platen beam and so pulling it up to the impression by a motion entirely independent of that which moved the platen to and from the feeding position.

About 1877 George P. Gordon brought out a machine which he christened the Improved Gordon, and which greatly resembled his Franklin press except in the movement of the platen. The rocking motion was done away with and the platen hinged to the frame by its lower corners and raised into printing position by a series of levers sliding at its back, these being actuated by the familiar cam. The long legs to the bed were retained to give as near as possible a parallel impression. This press was never as popular as his Franklin press and has practically dropped out of the market.

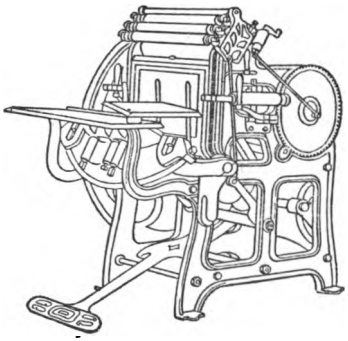

FIG. 17. Globe Press

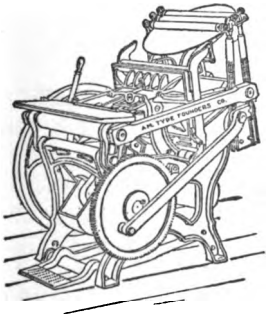

FIG. 18. Peerless Gordon Press

Another platen press by the same inventor as the Globe was marketed under the name of the Peerless. This machine also had a bed fixed in perpendicular position, but the platen was hinged just below the bed, which gave the objectionable clam-shell effect. The platen was raised into position and the pinch given by a toggle-joint motion which gave enormous power and strength. This press was in the zenith of its popularity about the time of the great

American Centennial Exhibition in 1876, though put on the market about six years previously.

In 1869 Merritt Gally, of Rochester, N. Y., made the greatest step forward in platen printing presses that has ever been made, when he invented the machine that was called the Universal press. This machine was in a class by itself and the name Universal has therefore come to be used to designate any press giving the perfectly parallel impression in a similar manner. In Gally's machine the platen is a rocker that rolls up into feeding position upon flat ways and then rolls back to a perpendicular plane and is pulled up directly parallel to the form with a sliding motion. This press had excellent cylindrical ink distribution and was equal to a big cylinder in this respect. The frame was cast in one solid casting and the whole machine was built stronger than any machine which had preceded it.

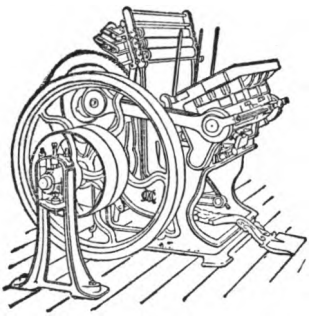

FIG. 19. Gally Universal Press

There was one weak point in the original Gally press, and that was that the rolling motion of the platen and the pause for feeding were controlled by two small rollers working in a cam in the end of the draw-bar or arm where they fitted on the crank in the main drive wheel. These rollers were not easy of access for oiling and gave continual trouble by cutting. The platen was also partially controlled by a spring attached to its lower edge and to the front of the frame. This being a compression spring was originally made of rubber and gave trouble by getting soft from the oil used in lubricating the press. In a later pattern these faults were

both corrected by an invention of John Thomson, his assistant.

In 1885 Mr. Thomson redesigned the whole machine, added a number of improvements while retaining its prime features, and brought out the Colt's Armory press;

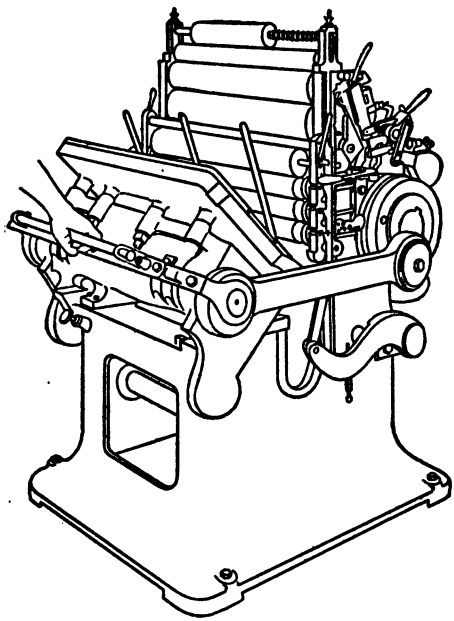

FIG. 20. Colt's Armory Press

so called because it was first built in the celebrated machine shops of that great gun factory, famous for the accuracy of its products. Thomson also invented a variation of this press with an eccentric motion for giving the impression intended especially for embossing. This latter machine had no rollers or inking apparatus. Both Gally and Thomson built extra varieties of their presses

for inking and embossing at the same time, and for heavy duty in "cut" and color printing.

The most recent of platen presses is the Golding, which first appeared about 1885 and became quite popular in the early 90's. It is quite different from the other machines, giving the impression by means of a lever motion the fulcrum of which is just below the platen and between it and the source of power. Another feature of this press was the attempt to gain speed by reducing as much as possible the weight of the moving parts such as roller carriers, etc., and balancing the weight of the platen by the method of hanging it. This press has the clam-shell movement, with special means of adjusting the impression. It is built with a frame made in one solid casting.

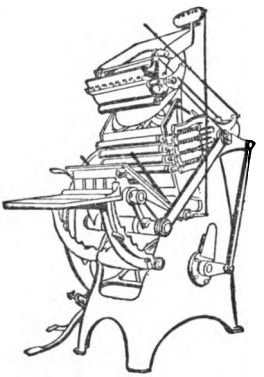

FIG. 21. Golding Art Jobber

The principle of the Gordon press has been utilized in varying forms for a number of machines, but most of them have succumbed because of poor material and inefficient construction. There are now only two makers in the United States offering the distinctive Gordon type of machines — the Chandler & Price Company, of Cleveland, and the Peerless Press Company, of Palmyra, New York. English makers have made machines of this general type under the name of Cropper, Minerva, Arab, Jardine, etc.

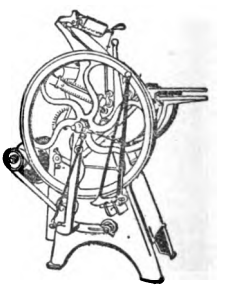

FIG. 22. Pearl Press

From the Gally Universal there have developed several machines which are well known. The Colt's Armory,

of Hartford, Connecticut, which had been building the press under contract with Gally, engaged John Thomson as its selling agent for the press and it became known as the John Thomson Press. Thomson, in 1902, purchased the plant, patents, and trademark from the Colt Company and a corporation, the John Thomson Press Company, now makes the press at Long Island City. Several models of the machine are made, the latest improved patterns being known as the Laureate. The National Machine Company, of Hartford, Connecticut, is also making machines of similar type under the names of National and Hartford printing machines. In Great Britain machines of the Universal type are known under the names Caxton, Britannia, Rex, Victoria, etc., while German makers have copied the principle in machines of some excellence under the title of Victoria, Regina, etc.

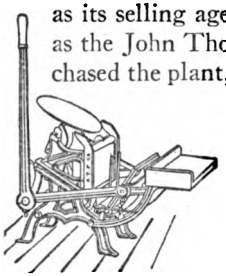

FIG. 23. "Pilot" Hand Lever (Amateur)

In addition to commercial presses there were various small "amateur" presses put on the market, of which the "Pilot" and "Official" are examples. These were used by boys and persons who practiced printing as amateurs.

FIG. 24. "Official" Hand Lever (Amateur)

Platen Press Sizes

At first the platen presses for handling job work were made quite small in size. The original Ruggles press was able to print cards and circulars up to about 5 × 7 inches. The early Gordons were about 7 × 10 inches inside the chase. The Up-side-down Ruggles was 10 × 14 inches inside chase. As soon as the job printing press became an established fact there was a demand

for a variety of sizes. These were quickly supplied, and the builders have ever since been trying to turn out larger platen presses. They are, however, handicapped by the inability of the feeder to handle a large sheet rapidly enough to be economical.

In the beginning the hand presses were made to print the size and shape of sheet best known, which was somewhere near our present "cap" size or 13 × 16 inches, but when the craft advanced and book printing became the principal part of the business the medium size (18 × 23 inches) was selected as the standard and we find presses classed as medium (18 × 23), medium and a half (28 × 27), and double medium (23 × 36). Job presses were soon standardized to fractions of the medium and we find the half-medium (11½ × 18), the quarter-medium (9 × 11½), and the eighth-medium (6 × 9). In order to enable the printer to handle a full sheet of the size for which the press was called the actual sizes of the chases were made a little larger to allow for lock-up. Thus the eighth-medium became 7 × 11, and later 8 × 12, to allow for handling the popular quarter-post or folio letter sheets. The quarter-medium was enlarged to 10 × 15 inches. The half-medium expanded to 13 × 19 inches. To meet the demand for economical and rapid production of various classes and sizes of work the press builders made the sizes to correspond approximately with the sheets. Other sizes have been made from time to time, but these remain as standard to the present, while most of the odd sizes have disappeared. The first to exceed the 13 × 19 inches was Gally, who built his Universal press 14 × 22 inches inside chase, and that size became known as half-superroyal, which has also become standard and is made by several other manufacturers, notably the Colt's Armory and the Victoria. Later the Chandler & Price Gordons were put out in 14½ × 22 inches size, and the Golding was built 15 × 21.

Table of Press Sizes

The following table gives the regular sizes of each of the principal makes of platen presses now on the market for job printing.

Name of Press	*Sizes Offered*				
Chandler & Price Gordon . .	8 × 12	10 × 15	12 × 18	14½ × 22	....
Peerless	8 × 12	10 × 15	12 × 18	14½ × 22	....
National	...	10 × 15	13 × 19	14½ × 22	....
Hartford	...	....	....	14 × 22	....
Colt's Armory	...	10 × 15	13 × 19	14 × 22	....
Golding	8 × 12	10 × 15	12 × 18	15 × 21	....
Pearl	5 × 8	7 × 11	9 × 14	....	....
Perfected Prouty	7 × 11	9 × 13	10 × 15	12 × 18	....
Victoria (German)	...	10 × 15	13 × 19	14 × 22	16 × 21
Caxton (English)	7 × 11	10 × 15	13 × 19	....	....
Falcon (English)	...	10 × 15	13 × 19	....	....

The above table gives the names of the presses most generally sold at the present time, and also shows that the sizes have been pretty well standardized, especially the quarter-medium, half-medium, and half-superroyal. Originally the Gally Universal was built in the 7 × 11 inch size, but proved too complicated in the ink distributing apparatus for so small a press and was abandoned.

The last ten years have not produced any new style of press or any very distinct advance in the character of those on the market, though all of them have been improved in manufacturing detail and small conveniences added. The Chandler & Price Gordon has been built heavier. The Universal has been improved and the Colt's Armory or Thomson press has been made with four rollers and some other improvements and styled the Laureate Series. But they are all sticking to the original idea of their class.

The Class of Impression

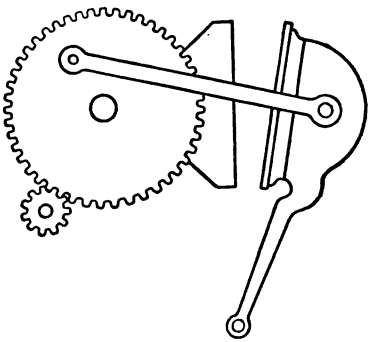

FIG. 25. Impressional Principle of Gordon Press — Open

The first job presses built were designed to give a quick motion and most of them were made with the bed hinged to the platen just below the lower edge, producing what is known as the clam-shell impression. This has to be readjusted each time a heavier form is placed on the machine, because of its wedge shape. That is, when the press is adjusted so that the bed and platen meet in the same plane on a light form and a heavier one is placed on it the impression meets at the lower edge of the sheet, or rather form, before the full impression is made. Thus the lower part of the print has a much heavier impression than the upper, and in forcing the full impression the press is strained unless the upper impression screws are advanced to take up the lacking impression. This was a very decided disadvantage.

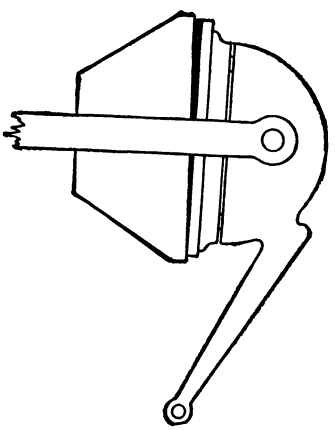

FIG. 26. Impressional Principle of Gordon Press — Closed up

Mr. George P. Gordon endeavored to overcome this by dropping the hinge as low as possible, thus lengthen-

ing the hinge and reducing the wedge to the narrowest possible limits. This did not entirely eliminate the trouble, but reduced the imperfection so greatly that his press is still considered one of the best for light and medium weight forms. This motion or impression was called the long-hinge impression.

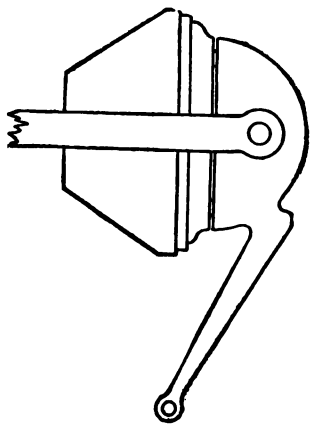

FIG. 27. Impression leveled up by tipping top of Platen forward

From the very first it was recognized that the ideal impression was the kind given by two flat surfaces approaching each other with a parallel movement, as in the hand press.

The Adams power press retained this parallel impression and that was one of the reasons for its immediate success. The drawback was the immense power required to make the impression. This power Adams provided by replacing the levers of the hand press by what is known as the toggle-joint motion for raising the bed and giving the impression.

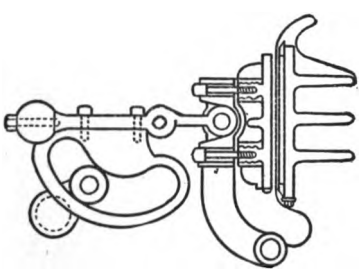

FIG. 28. Diagram of Impressional Principle of Peerless Press

This method of producing the impression was also used in the Peerless press in connection with the short joint of the clam-shell impression. The first Ruggles had a clam-shell impression, but in his second machine (the Engine press) he used the parallel impres-

sion. Most of the job presses for a number of years were built on the clam-shell plan, until the Globe made the attempt to combine the clam-shell approach with a short final parallel pull-up on the impression.

To Merritt Gally belongs the honor of producing the first job press with an absolutely parallel impression. In this machine he provided for the feeding position of the platen by a rolling motion to and from the point of position for impression, while the last half inch of advance to the form was in an absolutely parallel position, or exactly perpendicular to the plane of impression. This allowed for the easy adjustment of impression for any weight of form, so that a large amount of make-ready was done away with and the press made easier for the pressman. In this machine the impression is regulated by an eccentric and the equalizing screws are only needed to make the original adjustment and to take up wear. The Universal style of machine as improved by John Thomson is the one used for all heavy job work today. It is built by two concerns under different names and with slight variations of detail, but substantially the same.

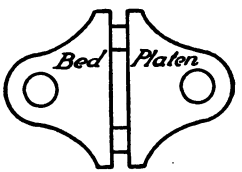

FIG. 29. Parallel Impression, Universal Press

The list on page 23 will show the character of impression of each of the presses still to be found in the shops of printers all over the country and with which the apprentice may be brought into contact.

The essential parts of a platen job press of any kind are: The frame which carries the mechanism and which supports the bed in those with a fixed bed; the bed which carries the form or printing surface; the platen which carries the tympan, receives the sheet, takes it up to the face of the form, and makes the impression; the side arms which in combination with the back and front

shaft form the strong parallelogram which holds together the parts giving the impression; the driving gear and cranks which furnish the motion and power for the impression; the roller carriage; the rollers; the distribut-

Name	*Platen Motion*	*Bed Motion*	*Impression*
Franklin Gordon	Rocking by Cam	Swinging	Long Hinge
Improved Gordon	Short Hinged	Swinging	Long Hinge
Peerless	Short Hinged	Fixed	Clam Shell
Golding	Short Hinged	Fixed	Clam Shell
Caxton (English)	Rocking	Swinging	Long Hinge
Universal	Rolling	Fixed	Parallel
Colt's Armory	Rolling	Fixed	Parallel
Globe	Short Hinged	Fixed	Clam Shell
Liberty	Short Hinged	Swinging	Clam Shell
Victoria (German)	Rolling	Fixed	Parallel
Pearl (Golding)	Short Hinged	Fixed	Clam Shell
Falcon (English)	Rocking	Swinging	Long Hinge

ing surface for the ink, which is either a disc with a rotating motion or a cylinder, in which latter case there are additional rollers for breaking up the ink, called distributors; the fountain for containing and supplying the ink as needed. Formerly the treadle for operating the press was a very important part, but of recent years power has been so generally applied even to the smallest sizes that the treadle is only supplied on request or where the dealer knows it will be needed.

Automatic Delivery

From an early time attempts were made to increase the speed of the platen press and also the ability of the operator to feed it by some contrivance for automatic delivery of the printed sheet. Ruggles contrived a card drop in the shape of a metal guide for the bottom of the sheet, which was raised after the card had left the form and allowed it to drop into a drawer beneath. The same idea

was more elaborately worked out by George P. Gordon on his early presses. A number of such contrivances were built, and we remember having seen one in which the sheet was taken from the feed board by one of two sets of grippers set at the ends of a revolving frame which carried them to the impression and then delivered them on a tray above the ink disc. The English Falcons have a frame which acts somewhat similarly and delivers the sheet at the bottom of the press. This press is also built with an automatic feeder. The Standard press has a similar delivery, as well as an automatic feeder. (See page 31.)

Special Platen Presses

From time to time platen presses have been designated for special purposes, such as embossing, hat-tip printing, dieing out of paper boxes and advertising novelties, inking-in book covers, gold stamping on book covers. This latter, however, while a bed-and-platen machine, is hardly within the scope of our subject. The most important of these machines is the heavy type of printing press designed for printing and embossing at one operation. Presses of this class were designed by Gally and by Thomson and designated by a series number attached to the title of the press, as Universal No. 4, Colt's Armory No. 5. The Goldings also construct an Art Series Golding which they recommend for embossing. The hat-tip press was a small platen hand

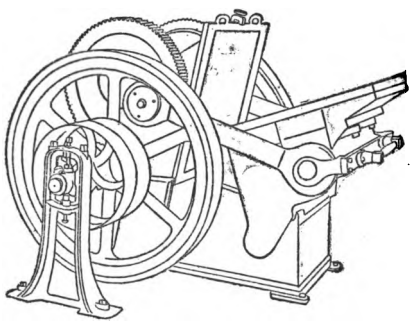

FIG. 30. Gally Embosser

press with a bed heated by gas, used for gold stamping on leather and fabrics. It is used today only by badge makers and is known as the Taylor press. The power is derived from a lever and cam at the top of the frame. In this press the bed is the upper member and moves down toward the platen in making the impression.

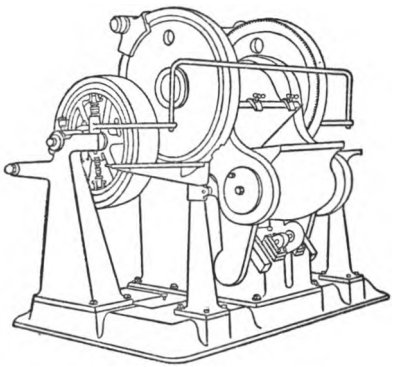

FIG. 31. John Thomson Embosser

Embossing Presses

About 1875 Gally placed on the market a special press of the Universal type without any inking apparatus, intended for use in embossing printed matter and cutting and creasing paper boxes. It was built very much heavier than any printing machine had ever been up to that time and in sizes from 14 × 22 inch to 20 × 30 inch; of recent years a press as large as 32 × 44 has been built for cutting and creasing. When a few years later the Colt's Armory press was designed, a cutter and creaser was also made of even heavier construction and a size as large as 28 × 41 inches was built. The Globe, Liberty, and Peerless were also used for light embossing

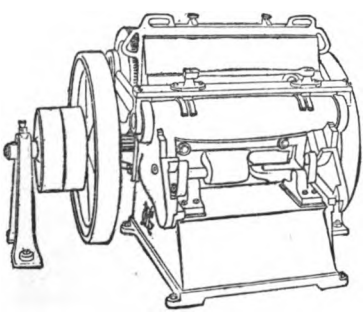

FIG. 32. Gally Paper Box Creasing and Cutting Press

and in 1876 the Peerless received an award at the Centennial Exhibition in Philadelphia largely because of a job of embossing done on it at that time. But none of them were built for the purpose and they did not give results warranting their regular use, as embossing requires a parallel approach of the male and female dies to secure the best work, as well as great strength and solidity of impression.

A few years later John Thomson designed a Special Colt's Armory Embossing Press with an eccentric movement for giving the impression, which was of extreme strength and power. This press is made in two sizes, 12 × 18 and 18 × 24 inches. The Victoria Press is also made in a heavier series, intended for embossing in the 14 × 22 size. The Caxton is another press that is specially built in an extra heavy embossing series, known as the Art Caxton. It is but little known in the United States.

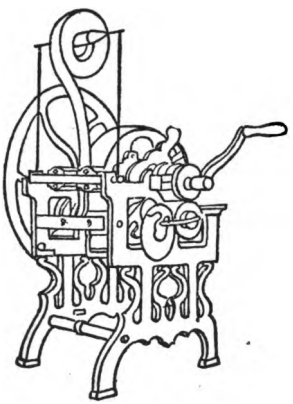

FIG. 33. Gordon Ticket Press with roll feed

High Speed Platens

Of late years there has sprung up a demand for jobbing presses of higher speed, and many attempts have been made to construct the regular platens so as to permit of their being run faster, until they are now capable of greater speed than the human feeder's ability to supply sheets. But it was soon found that a point was reached where a mechanical or automatic feeder must be made a part of the press, and this led to an entirely new series of machines. As early as 1870 George P. Gordon devised a high speed platen press for small cards, especially railroad tickets, which was capable of an output of ten

thousand per hour and which he named the "Firefly." This press was fed with strips of card of a size for ten tickets. It remained in use about ten years, but is now obsolete. Several were also built to feed the cardboard from a roll.

Automatic Feed Job Presses

One of the earliest attempts to gain speed by automatic feeding and delivery was that of Wellington P. Kidder, who in 1885 designed a press along the lines suggested by the Gordon, but with a fixed platen and swinging bed on long legs. This press fed from a roll

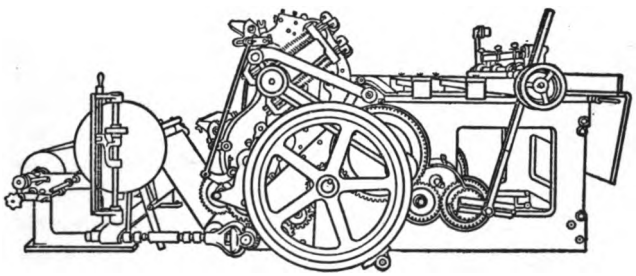

FIG. 34. Kidder Self-Feeding Platen Press with Automatic Cutters

or web and had a quite efficient cut-off which enabled a 10 × 15 inch press to print a form in the centre of a 20 × 30 inch sheet and cut it off at about 2500 per hour. On smaller sheets a higher speed was obtainable. There was nothing peculiarly different about the press itself, but the combination of press and feeder with cut-off was a novelty at that time. The feeding was, of course, intermittent, and the cut-off had a shear motion and made the cut while the web was stopped for the impression.

The Kidder was largely used for printing wrapping paper. But few are now in use, though the larger

machines built by the same company are quite popular. They belong in the cylinder class.

One style of the platen Kidder was built with two sets of rollers, one inking from above and the other below, with two discs separated slightly more than the diameter of the rollers. In this kind of work the web shifted only half the width of the chase and the roller bearers were so arranged that one set was raised off the upper half of the form and the other off the lower half. Like many other attempts at two color platens, this had a very short life in the printing office.

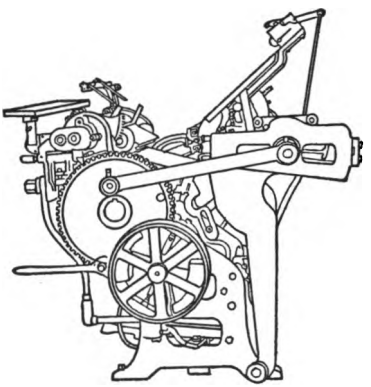

FIG. 35. Platen Press with Miller Automatic Feeder

The last fifteen years have been prolific of special automatic-feed job presses of various designs, though few of them have been platen presses, and most have been designed for special work and not placed on the market for the use of the printer.

Among the most successful is the New Era press. This is a bed-and-platen machine. It was perhaps not first in chronological order, though that is a debatable question, as the principle upon which it is based was worked out by a pressman by the name of Charles Toy, in Philadelphia, who was first financed by Robert S. Menanin. Toy afterwards sold his patents to a company who never fully developed them. In this machine the unit system is used, and it practically consists of a number of small platen presses, very much along the idea of the old Up-side-down Ruggles, joined up in series

to print in two or more colors, perforate, punch, number, etc., on one or both sides in one passage through the machine, the stock being fed from a roll and cut off to size after printing. The intermittent feed is an important feature of this machine, and has been so accurately worked out that register work in four colors has been done with some success. Its capacity is about 5 × 7 inches or less, several sizes being made.

The first really successful automatic press for general

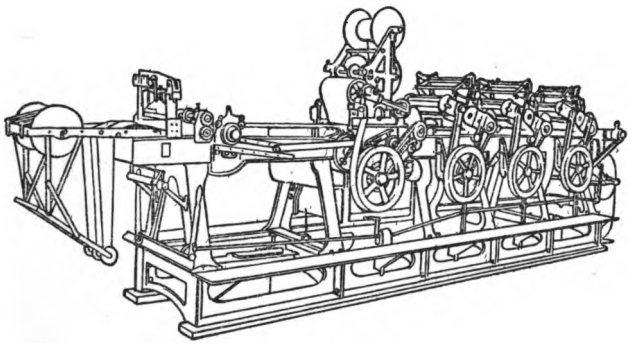

FIG. 36. New Era Press

job work (that is, the first high-speed one, for several attempts had been made in slower moving machines) was the Harris Rotary press, which was produced by Albert Harris about 1890 and first publicly shown at the American Institute Fair in New York. At first the automatic feeder on this machine was crude and would handle only cards and envelopes in one color where no register was required, but the later patterns have been greatly improved and have been used on four- and six-color work, while a very excellent sheet feed has been added. Being a rotary machine, it required special means for handling type forms and was provided with boxes or turtles for this purpose, in which the type was securely locked and

arranged to suit the curve of the cylinder by means of radially beveled reglets and furniture. The early machine was made to handle a card up to 9 × 12 and later to 12 × 12 inches, and as small as 2¼ × 3 inches. Next a 12 × 18 inch size was added, and later sizes as large as 28 × 44 inches, but these really belong in the class of cylinder presses.

One of the strong features of the Harris press from

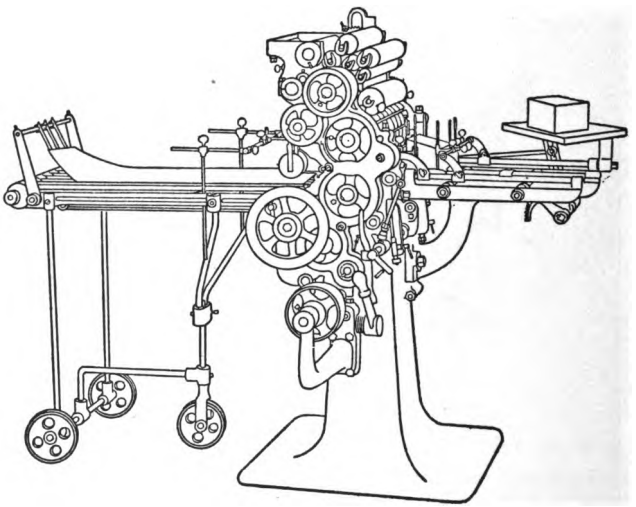

FIG. 37. Harris Rotary Press

the very first was the splendid ink distribution, which was cylindrical and equal to the best flat-bed cylinder on the market. This made for economy of ink. Another point of excellence was its speed, which was due to its continuous rotary movement and reached 12,000 per hour on the 12-inch press and 8,000 on the 18-inch machine, though the average running speeds were about 10,000 and 6,000 respectively. The Harris Rotary was also built in the 12 × 18 inch size to print two colors

at one time. As the two colors were printed before the grippers released their first hold on the sheet, the register was exact. The two form cylinders ran in contact with one impression cylinder and one make-ready had to do for the two colors. This, however, did not prove any serious drawback in actual practice and many of these presses are in use.

Other inventors also attacked the special problem from various points and there are a number of self-feeding

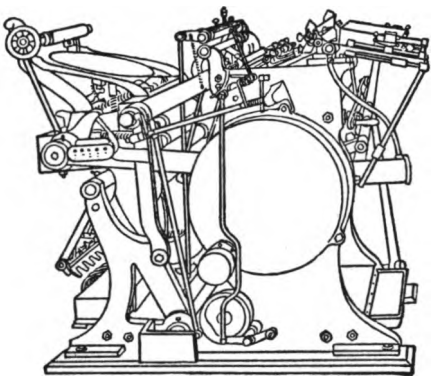

FIG. 38. Standard Self-Feeding Press

rapid jobbers on the market. Of these, the Standard and National are platen machines, as is also the Auto-feed Falcon. The Standard is a self-feeder built around the original Gordon idea of long legs to do away with the clam-shell motion. It is built heavy and substantial and has a good feeder. It uses ordinary flat forms and electrotypes and has an easy make-ready. The National is a specially designed machine with a sliding platen motion and a feeder for which good claims are made.

Small Cylinder Job Presses

The idea of getting more speed from a cylindrical platen or bed early possessed the inventors who specialized in printing machines, and quite early in his career George P. Gordon devised what was known as the Quadrant Gordon. This machine has entirely disappeared from the market.

More recently the Auto press has been a candidate for the favor of the printer looking for a big output from a

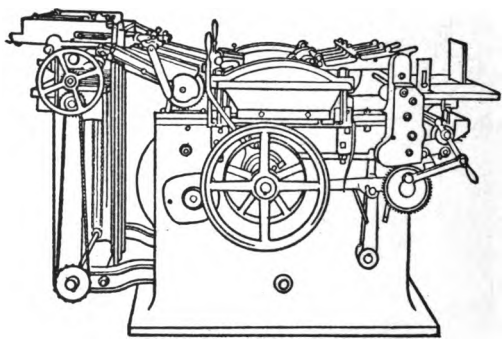

FIG. 39. The Auto Press

flat form. This machine is virtually a cylinder press with a very small cylinder, the journals of which are carried in sliding boxes. This cylinder is geared to the bed and driven by it, and the sliding boxes and moving cylinders reduce the travel of the bed one-half, while the gearing full length of the bed ensures register. The bed drops on the return motion. The whole machine is very compact and may be run out at a speed of 4000 per hour. It is built in two sizes, one 11 × 14 inches, the other 14 × 16 inches, and with automatic or with hand feed.

The latest jobber is the Kelly press. This is a miniature cylinder press designed upon the most compact lines

and capable of quite a high speed — 2500 or more per hour. The size of printing form is 15 × 20 inches. The press is furnished with a special automatic feeder or fitted for hand feeding. The method of handling is similar to a regular cylinder and the parts are the same except the driving gear for the bed, which is contained in the standard of

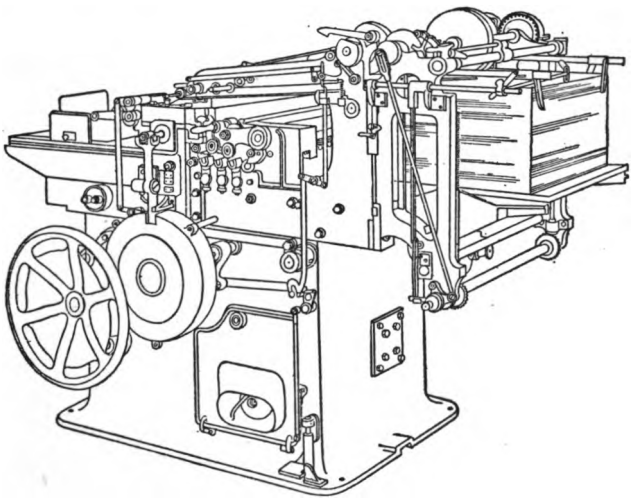

FIG. 40. The Kelly Press

the machine. This is built up to ordinary feeding height for a standing feeder.

A number of other small cylinder presses are now being offered to printers for use in their platen press departments, of which the Kelly press is a leading example. These presses are designed for high speed, with or without automatic feed, for producing large quantities of the classes of printing ordinarily done on platen presses.

SUPPLEMENTARY READING

A Short History of the Printing Press. By Robert Hoe. Published by R. Hoe & Co., New York. 1902. Privately printed.

American Manual of Presswork. Oswald Publishing Company, New York. Second edition, 1916.

American Dictionary of Printing and Bookmaking. This work was published by Howard Lockwood & Co., New York, in 1894 and is now out of print. Copies may be consulted in many libraries. It contains many historical references to printing presses.

SUGGESTIONS TO STUDENTS AND INSTRUCTORS

THE following questions, based on the contents of this pamphlet, are intended to serve (1) as a guide to the study of the text, (2) as an aid to the student in putting the information contained into definite statements without actually memorizing the text, (3) as a means of securing from the student a reproduction of the information in his own words.

A careful following of the questions by the reader will insure full acquaintance with every part of the text, avoiding the accidental omission of what might be of value. These primers are so condensed that nothing should be omitted.

In teaching from these books it is very important that these questions and such others as may occur to the teacher should be made the basis of frequent written work and of final examinations.

The importance of written work cannot be overstated. It not only assures knowledge of material but the power to express that knowledge correctly and in good form.

If this written work can be submitted to the teacher in printed form it will be doubly useful.

QUESTIONS

1. What suggested the idea of the first press?
2. How was the impression produced?
3. Why were the first presses made with a platen smaller than the bed?
4. Give the date of the first real improvement in the hand press.
5. Name the first press builder of whom we have any record.
6. In what important particular did Blaeu improve the hand press?
7. Who produced the first all-iron hand press?
8. Name a peculiarity of the Columbian hand press.
9. Who perfected the Washington press?
10. Why has it remained popular as a proof press for so long?
11. What peculiarity attaches to a hand press impression?
12. Name the essential parts of the hand press.
13. How is the make-ready kept in position on a hand press?
14. Explain the need of the frisket.

15. At what date were composition rollers invented?
16. How were the forms inked by the first printers?
17. How were the ink balls used?
18. What was the effect of the composition roller upon hand presswork?
19. Give the name of the first power press.
20. What was the date of its introduction?
21. How did it differ from the hand press as to impression?
22. How did it compare with the hand press in speed?
23. Name the first practical job press.
24. Who was the inventor of the first really successful job press?
25. What relation does it bear to the present styles of presses?
26. In what year was the Gordon press invented?
27. Which was the principal competitor of the Gordon in the early days of its history?
28. Give the reason for its failure to survive.
29. Describe the peculiarities of the Globe press.
30. Who invented the Universal press?
31. What were the peculiarities that placed it in a class by itself?
32. Name the distinctive types of platen presses now in use.
33. Give the reason for having a number of sizes of presses for job work.
34. How were the sizes of presses named?
35. Give the standard sizes now in general use.
36. Name the three peculiarities of impression which serve to classify the job presses.
37. What presses give the perfect or parallel impression?
38. How is the long-hinged bed motion obtained?
39. Name the essential parts of a job press.
40. Describe two methods of ink distribution used on job presses.

41. Why is automatic delivery considered desirable on a job press?
42. Name the purposes for which special platen presses are made.
43. Who invented the first high-speed platen press?
44. What is the principle upon which the New Era press is constructed?
45. How does the Harris press differ from other job presses?
46. Why does the rotary movement give high speed?
47. Of what type is the Standard press?
48. What is the principal peculiarity of the Auto press?
49. What is the type of the Kelly press?

ADAMS, ISAAC — Inventor of the first power press.

ADAMS, SETH — Brother of Isaac and inventor of a card and job press and co-laborer with his brother in perfecting the Adams press.

ADAMS PRESS — A bed-and-platen power press invented by Isaac Adams, in 1830, and for fifty years the favorite machine for book and "cut" printing.

BANK — A wooden table placed beside the hand press to hold the sheets being printed.

BEARERS — Wood or metal strips exactly type high used to bear off the impression in press work. Also the metal strips to sustain the pressure of the rollers in job presses.

BED — The flat, smooth surface upon which the form rests in a hand press, also the surface against which the form is supported in the job press.

BED-AND-PLATEN PRESS — A general name given to all machine presses having a flat bed and platen which give the impression necessary for printing by approaching each other. A hand press is a bed-and-platen press though not generally so called.

BLANKET — The compressible substance interposed between the face of the form and the platen to ease the impression and soften it. In the hand press the blanket is enclosed in the tympan.

BRAYER — A small roller used to bray out or distribute the ink on the stone for the roller in hand press work. The brayer is also used to supply ink to the ink plate of job presses where there are no fountains.

CARD PRESS — A small press especially designed for running cards and very small jobs. The Ruggles was the first card press and was so named.

CARRIAGE — That part of the press upon which the form is run in and out for taking the impression. (See also Coffin.) That part of an Adams press which carries the frisket and sheet to be printed in and out between the bed and platen.

CHASE — An iron or steel frame used to secure the type or pages to be printed firmly in the proper place on the press. In most job presses the chase is specially made to fit and is a feature of the press.

COFFIN — In the early hand presses the bed was a slab of marble and was held in proper position and moved in and out under the platen in a wooden box which was called the coffin.

COLT'S ARMORY PRESS — An improved style of Universal by John Thomson, named for the factory in which it was first built.

COMPOSITION ROLLER — A roller made of glue and molasses, or other elastic composition, used in all printing presses for inking the form.

CORNER IRONS — Four angle irons placed at each corner of the bed of a hand press to assist in locking the form securely to the bed.

DEGENER PRESS — A press invented by F. O. Degener. See also Liberty Press.

DISTRIBUTE INK — To bray or roll it out so as to get an even film on the roller.

DOCTOR — A knife or long blade scraping across the face of a roller or cylinder, to spread or to remove color, ink, dirt, etc.

ENGINE PRESS — A style of platen press invented by Ruggles in which the bed was above the platen and the form was suspended face down from the bed.

FALCON PRESS — A style of job press which is very popular in England, designed somewhat along the lines of our Gordon.

FEEDER — A person or apparatus which supplies sheets to a press as they are printed.

FRAME OF THE PRESS — In a hand press, the upright frame in which were swung the platen and the levers for giving the impression. In a job press, the frame supporting the mechanism, except where the bed is fixed, when it is the frame supporting the bed.

FOUNTAIN — A mechanism attached to or part of modern presses for supplying ink in regular quantities as used, composed of a receptacle for ink, a roller for feeding it out as required, and a knife or doctor for regulating the supply.

FOUNTAIN SCREWS — Screws for adjusting the flow of ink from the fountain; they impinge upon the blade or doctor and press it against the roller to regulate the feeding of the ink.

FRANKLIN PRESS — A style of press invented by George P. Gordon. See Gordon.

FRISKET — An iron frame covered with paper with openings cut through where the printing occurs, hinged to the upper part of the tympan and used to prevent smut on the sheets and to raise or lift the sheets from the form.

GALLY, MERRITT — Inventor of the Universal press.

GLOBE PRESS — A press of considerable merit which had cylindrical distribution and a special means of securing a long dwell on the impression. Now obsolete.

GOLDING PRESS — A press built by Golding of Boston (now at Franklin, Mass.), one of the latest of successful machines.

GORDON, GEORGE P. — The inventor of the first really successful job press, and of the type of press which still bears his name.

GRIPPERS — See Nippers.

HAND INKER — A machine designed to reduce the labor of inking the form on the old-time hand press.

HANDLE BAR — The bar or lever ending in the handle in a hand press.

HAND PRESS — The original style of bed-and-platen press which was worked by hand; any press worked by hand, in distinction from a power or machine press.

HAND ROLLER — A roller held in a frame with one or two handles so as to be used by hand.

HAT-TIP PRESS — A small hand press with facilities for heating the bed and form, which in this case are above the platen, for gold leaf work on leather and fabrics.

IMPRESSION — The force with which the inked form meets the paper; all the presses of today have means of altering the amount of impression.

IMPRESSIONS — The product of the press.

INK BLOCK — A block or stand upon which the ink was mixed or ground with a muller and brayed out before applying to the balls or the rollers.

INK FOUNTAIN — See Fountain.

INK SLAB OR INK STONES — Slabs of marble or slate used to distribute the ink upon and thus get an even film upon the roller prior to applying it to the form.

INK SLICE — A specially shaped scraper or knife to handle ink.

INK TABLE — Table for supporting the slab or surface upon which ink is distributed.

JOB PRESS — Generic name of all machines specially intended for running small jobs, such as cards and commercial work.

LEVER PRESS — Any press in which the impression is given by the moving of a lever, but mostly used for a type of presses used for proving and hat-tip printing in which the lever was pulled down.

LIBERTY PRESS — A particularly strong press invented by F. O. Degener, which enjoyed considerable popularity from 1860 to 1880.

MACKLE — A double impression caused by some part of the sheet reaching the type before the whole.

MAKE-READY — The preparation or evening up of the form and press so as to give a perfect impression.

MAKING REGISTER — The operation of adjusting the guides on the press so that the pages will back each other perfectly, or so that the various parts of a color job will fall in their proper places.

MONK — An old hand pressman's term for a blotch caused by an undistributed particle of ink getting on the form.

MULLER — A piece of stone with a flat bottom used to rub and grind the pigment into the varnish in mixing printing ink.

NIPPERS — In a job press, the pieces of metal that catch the edges of the sheet and strip it from the form. In the Harris and other cylinder presses, the curved pieces of metal that grasp the edge of the sheet and hold it against the cylinder while printing.

OUT OF REGISTER — A sheet or job is out of register when the pages or colors are not in exact position.

OVERLAY — A special make-ready for use with engravings. Sometimes applied to the ordinary make-ready as applied to the tympan of the press, in contradistinction to underlays placed under the form.

PEERLESS PRESS — A style of platen jobber using a toggle motion to give impression.

PICK — A small particle of dirt or foreign substance which causes a defect in a cut or letter in a printed sheet. Also, said of the ink when it is stiff and pulls off small particles from the surface of the paper.

PLATEN — That part of a hand press which gives the impression. In a job press, that part which carries the tympan and make-ready and upon which the sheets are fed, and which gives the impression.

PLATEN PRESS — Any press that gives an impression by the bringing together of two flat surfaces, one of which is called the bed and the other the platen.

POINT — A sharp point or spur of steel, which is so placed as to perforate the sheet in printing the first side or first color and provide a means of registering the other side or colors.

POINT-FEED — Feeding sheets to be printed the second time onto points for exact register.

POINT HOLES — The holes made by points. Point holes were used as the means of register on the early machine presses such as the Adams and also on the early cylinders.

POWER PRESS — Any press driven by mechanical power.

PRESSMAN — The individual who operates a press; in olden times the man who made the form ready, placed the sheet, and made the pull, while the assistant inked the form.

PULL, PULLING — The operation of making the impression. An expression still used, as when we speak of pulling a proof, even though a machine press is used.

PROOF — A first or trial sheet used to detect errors and see that corrections are made.

PROOF PRESS — A press especially built for making proofs. There are a number in the market.

RAMAGE PRESS — The invention of Adam Ramage, the first with an iron bed and platen.

RAILROAD TICKET PRESS — A special card press for printing railroad tickets and numbering them at one operation.

REGISTER — The adjusting of guides or points so as to secure accuracy of position in printed sheets. In book work the pages must back so that one page falls directly back of the other, and in very fine work it is proper that each line on one page should register exactly on the corresponding line on the other side of the sheet. Also the condition of being in correct register. A sheet is said to register or to be in register when perfect in this respect.

ROLLER BEARERS — See Bearers.

ROLLER CARRIAGE — That part of the press which carries the rollers across the form to ink it.

ROLLER FRAME — A light iron frame for holding a hand roller while in use.

ROLLERS — Journals or shafts of metal upon which are carried cylindrical masses of flexible composition used to distribute the ink and apply it to the form; each press has its own peculiar size of roller.

ROLLER STOCK — The journal or stock upon which the roller is cast, usually of metal, though sometimes of metal with a wooden cylinder to secure a large roller without using too much composition.

ROTARY PRESS — A machine in which the impression is given between two cylindrical surfaces one carrying the form and the other the sheet. Among job presses the Harris is the typical rotary.

ROUNCE — A small cylinder of wood on an iron journal with a handle placed beneath the ribs of a hand press and connected with the

ends of the carriage or bed with straps by which it is wound in or out.

RUGGLES PRESS — The first successful job press. Now obsolete.

SET-OFF, OFFSET — A smut or smudge caused by freshly printed sheets coming into contact before they are sufficiently dry.

SLUR — A draggy looking impression, as though the sheet had been slightly drawn while the impression was on. One of the defects caused by a loose tympan or badly adjusted hinges. On job presses it is caused by wear in the joints of the platen or bed, or by wear in the journals of the side arms.

STANHOPE PRESS — A hand press invented by Earl Stanhope, of London.

THOMSON PRESS — See Colt's Armory.

TURTLE — A metal box for holding type in position on the printing cylinder of a rotary press.

TYPE BOX — See Turtle.

UNDERLAYS — Make-ready placed beneath the form to correct the inequalities in height of the form.

UNIVERSAL PRESS — A type of press invented by Merritt Gally and improved by John Thomson.

VICTORIA PRESS — German adaptation of the Universal idea.

WASHINGTON PRESS — The surviving pattern of the hand press now used for proving in printing offices and engraving establishments.

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The Committee also desires to acknowledge its indebtedness to the many subscribers to this Series who have patiently awaited its publication.

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