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Vol. VII

JULY 1960

No. 12

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BRITAIN'S CONTRIBUTION TO THE ART OF PRINTING

By

R. S. HUTCHINGS

Editor of "The British Printer"

Precision of detail and simplicity of design are foremost among the traditional virtues which printing in Britain at its best shares with many other British industrial products. These basic characteristics are the natural reflection of a habitual preoccupation with the appropriate choice of raw materials and an instinctive avoidance of ostentation. They also happen to be characteristics which are particularly relevant to the problems of printing's transition from a mediaeval craft to a highly-mechanised industry.

The nature of printing is essentially multiplication. There can be no intrinsic advantage in hand methods or in any arbitrary limitation of the number of impressions when every copy must be an exact facsimile of the press proof. The printer's end product is the complete run—no one single copy can crystallise his achievement and any aesthetic merit is shared by whatever number of copies are required by his patron or customer.

They Showed The Way

This realisation—whether consciously appreciated or not—lies at the heart of Britain's contribution to graphic arts standards in the

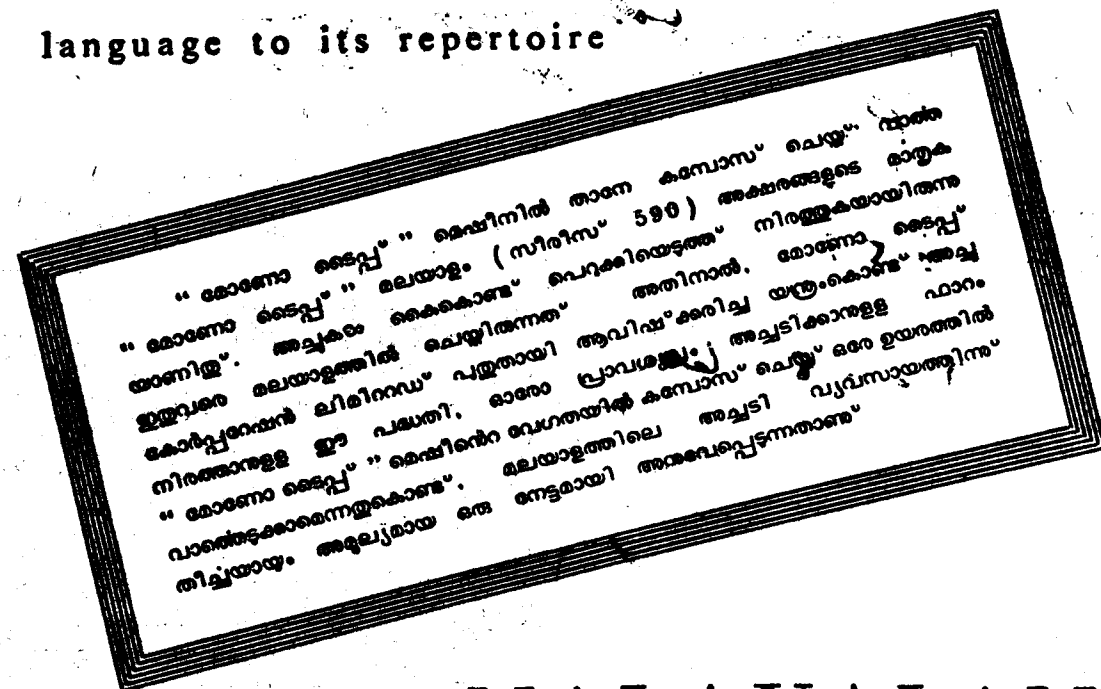
modern world. Since the early years of the present century, a succession of British printers and typographic designers have demonstrated that machine methods and machine-made materials could be controlled to provide results in no way inferior to those of earlier epochs.

Such men as Stanley Morison, Sir Francis Meynell, Walter Lewis and Oliver Simon applied scholarly understanding and skilled judgment to the exploitation of mechanical composition, and high-speed machining and all the new photo-mechanical developments of the 20th century. Their work proved to an international audience that whole-hearted acceptance of techniques implicit in modern economic conditions and social requirements need not be detrimental to the historical aesthetic role of printing.

Work of British Pioneers

The influence of their work has been predominant in shaping the characteristic idiom of contemporary graphic design in Britain and also in setting standards of performance in the international sphere. Each highly-developed national printing industry naturally—and very properly—cultivates its own graphic traditions,

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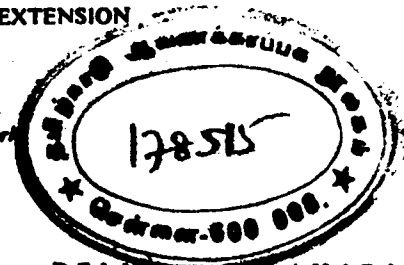


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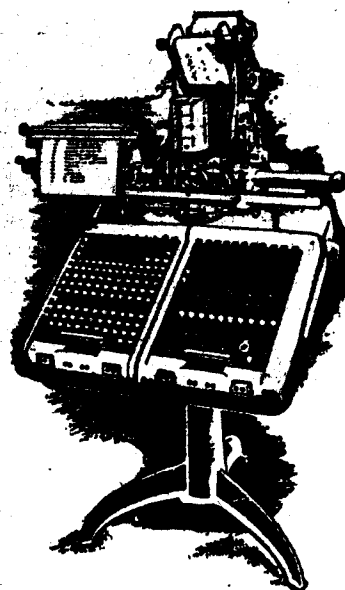
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but the world-wide circulation of British books and periodicals and commercial literature has tended in recent decades to provide recognised yardsticks of practice even in countries which have in the past been most insulated against foreign printing influences.

Prior to the end of the 17th century, the progress of printing in the United Kingdom was overshadowed—as in so many other countries—by political restrictions which hampered the emergence of a national style and opportunities for the international interchange of ideas. The subsequent world-wide growth of Britain's trade and oversea activities nevertheless dispersed both the materials and the techniques of the British printer throughout the world at a time when the European mainland was largely preoccupied with its own problems. Pioneers from England, Scotland, Ireland and Wales established the earliest presses in underdeveloped countries of every continent. The American Declaration of Independence was set in the types of William Caslon, and a host of non Latin alphabets were first transposed into the printed word by 18th and 19th century typesetters in London, Bristol, Sheffield, Glasgow and Edinburgh.

Display Types

The types of John Baskerville of Birmingham—who also originated wove paper—were the first typographical materials from Britain to achieve widespread recognition in France, Italy and Germany. His books were greatly admired for their clarity of type and precision of presswork by Bodoni and other distinguished European printers of his time—although, oddly enough, his work exercised little immediate influence in his own land. During the early years of the 19th century the "fatface" novelties of Robert Thorne and other British typefounders initiated a world trend in typographic design and provided the basic models of the display letters which became the representative currency of the industrial revolution.

At the present time—a century and a half later—the display types of Thorne and his

successors are still in daily use throughout the English-speaking world, and the text types originated in Britain by The Monotype Corporation Ltd., and Linotype and Machinery Ltd., provide virtually universal media of communication in almost every language of humanity. The type specimens of these companies also contribute towards the world-wide distribution of British standards of composition and presswork, and support the ever-expanding circulation of books, periodicals and trade catalogues printed in Britain.

Meanwhile, printers in Britain are themselves becoming more export-minded and are today catering for the expanding needs of international trade in a multitude of languages for both home and oversea customers. Multilingual printing is produced, not only in London, but also in such provincial centres as Bradford, Birmingham, Hertford and Salisbury. Several printing houses in Britain, and at least one process engraving house, now maintain permanent sales representatives in the United States of America, and orders from continental Europe are increasing in number and importance year by year.

Many Inventions

But if Britain's international status in the graphic industries has received its most emphatic recognition in terms of design, her contributions in the technical field have been no less sustained.

From Earl Stanhope's iron press of 1800—one of the earliest improvements on the mediaeval heritage of Gutenberg—Britain's inventors and engineers have provided the world with a constant succession of significant innovations in printing technology. Stereotyping, roller composition, and (in our own times) printed circuitry and electronic register controls all originated in Britain. The earliest cylinder press and the first commercially practicable offset-litho machines were British patents. The foundations of modern photo-mechanical practice were laid by William Fox Talbot, and the first patent relating to photographic type competition was filed in 1898 by

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PRINTING

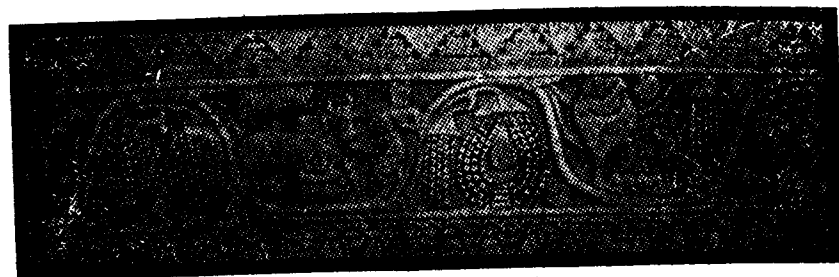


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and electronic register control. Their exhibits at successive international exhibitions effectively link Britain's technical progress with the traditional determination of the country's printing industry to exploit machine-age methods of aesthetic as well as commercial advantage.

Courtesy—British Information Services

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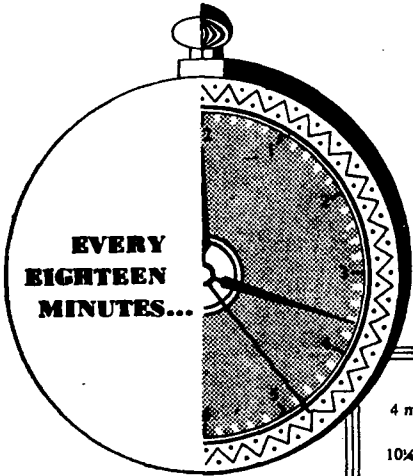
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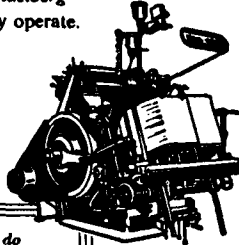
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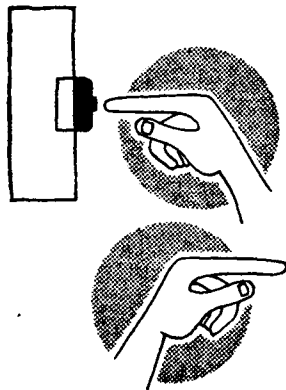
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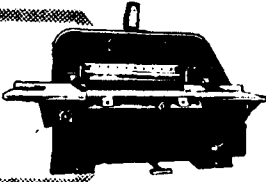
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Paperback Books are a Century Old

Last year 300 million paperback books were sold in the United States. This mass offering of information and culture to Americans in the form of inexpensive books has been heralded as a recent development of great significance.

It is certainly significant. However, it is not exactly a development.

A century ago—in the summer of 1860—a man named Erastus Beadle in New York began publishing "Dime Novels", small booklets in

from hand to hand, read to tatters, and then thrown away."

This situation is remarkably similar to that which existed during World War II when the contemporary Pocket Books line was put on sale in 1939. G. I.'s read millions of books like their Civil War predecessors.

Mr. Beadle published nearly 2,000 books during the more than 30 years in which his line was supreme. And, like the books of



Contemporary paper books produced in Britain maintains high standards of design and production which are admired and emulated throughout the world. Their annual total now exceeds 60,000,000 copies and may this year achieve a record approaching 80,000,000. This photograph was taken in a London bookshop which specialises solely in the sale of paper-back editions.

bright orange covers. Their success was instant and widespread. In the course of the next five years, during the Civil War, they sold more than 4,000,000 copies. His best-seller was called "Seth Jones", a story of the New York wilderness in 1785. It sold nearly half a million copies by 1865.

During the Civil War soldiers "literally absorbed the convenient little books by the million. The volumes were exchanged, passed

today, they came out in all colours: Orange, brown, blue, tan, green, yellow, red and buff.

Generally, the books represented the pioneer spirit of America. They "portrayed the struggles, exploits, trials, dangers, feats, hardships, and daily lives of the American pioneers from the days of the Puritans."

As the years went by, variety became the keynote of Beadle and Company. After the Dime Novels came Pocket Novels. Then

there was the Boy's Library of Sport, Story and Adventure and the New Dime Novels.

"American Tales" were next on the list, soon followed by Beadle's "Half-Dime Library", which, rightly enough, sold for a nickel.

The titles of the books were as varied as the series in which they appeared.

Here are some: "Sam Sheridan, the Secret Service Special, or, The Jamboree at Early Bird Bar"; "The Rough Riders, or Sharp Eye, the Seminole Scourge"; "Sky-Rocket Rob, the Life-Saver"; "Spitfire Saul, King of the Rustlers"; "The Down-East Detective in Nevada"; "Garry Kean, the Man with Backbone"; and the "Buffalo Bill" and "Deadwood Dick" series. Even "Deadwood Dick, Jr.", showed up a couple of years later.

Not all of the books were pure adventure, however. A significant series was published around 1870 called "Lives of Great Americans".

It contained biographies of George Washing-

ton, John Paul Jones, Anthony Wayne La ette, Davy Crockett, Lincoln, Pontiac, Gr... Daniel Boone and Kit Carson.

Mr. Beadle also published song books, joke books on sports and several specialized items such as the "Ladies Letter Writer", "Housewife", "The Debater", "The Elocutionist" and three "Books of Fun."

The "Wild West" was not the only region to provide subject matter for Mr. Beadle's books, which were written by scores of authors. New York City was the scene of several of his novels, including "The Wolves of New York", "The Phantom Hand, or the Heiress of Fifth Avenue", and "The Wall Street Blood, Tick, Tick, the Telegraph Girl".

Despite the titles of Mr. Beadle's books, and the sometimes fierce-looking cover illustrations, they were generally high in tone. One review said: "Ethically they were uplifting". Mr. Beadle was proud that persons of all ages read the books, including Abraham Lincoln.

RUSSIAN FILMSETTER FOR NEWSPAPERS

A Russian-built composing machine, designed especially for small and medium sized works, but stable enough to be used for setting newspapers and for high speed production, is one of the interesting printing trade developments reported in a recent issue of *Printing Abstracts* (Vol. 15, No. 3) published by the Printing, Packaging and Allied Trades Research Association. The machine is available in several models, providing a range of type sizes (Abstract 727).

Further Russian progress in photocomposing is reported in the German magazine *Papier und Druck*. An article in the magazine notes that the first filmsetter made in the country works on a punched tape principle and has a speed of 25,000 characters per hour. It is claimed that one compositor can attend up to three machines (Abstract 721). Another German magazine, *Polygraph*, gives information about a prototype filmsetter under development in the Soviet Union which is designed to set 30,000 symbols per hour. It works on the following principle: letters, numbers or symbols are placed on a rapidly rotating disc which passes the lens of the machine. Setting is carried out by means of a perforated programming tape producing a film which, after development, can be printed down on to a zinc offset plate (Abstract 738).

Protection of Documents

In regard to paper, one of the most interesting items deals with the restoration and protection of documents. Summarising an article about the methods used at the Bibliotheque Nationale and the Archives Nationales at Paris, *Printing Abstracts* notes that the preliminary step usually consists of degreasing by solvents, washing in pure water or dilute

alkali, soap or alcoholic solutions, bleaching followed by a second washing and drying at low temperature. Torn areas in valuable documents are repaired by patching with pieces of paper as similar to the original as possible, and cut to fit the edges of the holes exactly. An interesting lamination procedure is used; this consists of placing the document between two thin cellulosic films and then covering both sides with thin rag paper and melting the cellulose film layers which impregnate the document and the protective sheets, rendering them transparent (Abstract 705). Other items of interest in this section include details about a new penetration and sizing tester for paper (Abstract 693), a micro-profile test for evaluating the smoothness of paper (Abstract 709) and notes on an investigation on a printability tester developed by FOGRA, the German counterpart of PATRA (Abstract 723).

Swiss Sheet Fed Rotary

Regarding machinery, information is given about a new Swiss-made sheetfed rotary, which has a speed of 3,600 i. p. h. (Abstract 754); a four-colour sheet-fed gravure machine equipped with a suction pile stream feeder and combination gripper and chain delivery, and which has a maximum speed of 4,000 sheets per hour (Abstract 776), and a web-fed letterpress rotary which can accommodate either rubber or plastic plates and has a speed of 7,000 revs/hr. with zig-zag folding (Abstract 755).

Miscellaneous equipment described includes a mechanical device for cleaning damping rollers which, it is claimed, will wash a roller in little more than a minute (Abstract 847); a fully automatic Soviet book stitching machine

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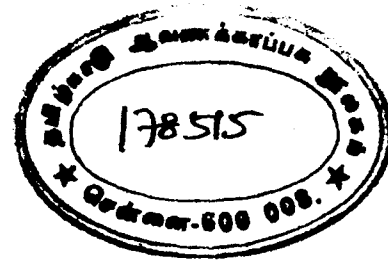
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which has five heads and an output of 105 sheets a minute (Abstract 859), and a step and repeat contact printer designed for the speedy production of multiple positives or negatives by contact on film up to and including 16 x 24 in. (Abstract 871).

Printing Abstracts also gives information about a three-colour process developed by Kodak Ltd. which has been designed to run at minimum cost 1,000 or so reproductions,

although being capable of larger runs (Abstract 954); a one-piece postal tube for publicity leaflets maps and calendars which need no paper wrap or end closure to keep the contents in place (Abstract 644), and a system of measuring printing pressure by a piezoelectric pressure-sensitive element built into a printing plate (Abstract 902).

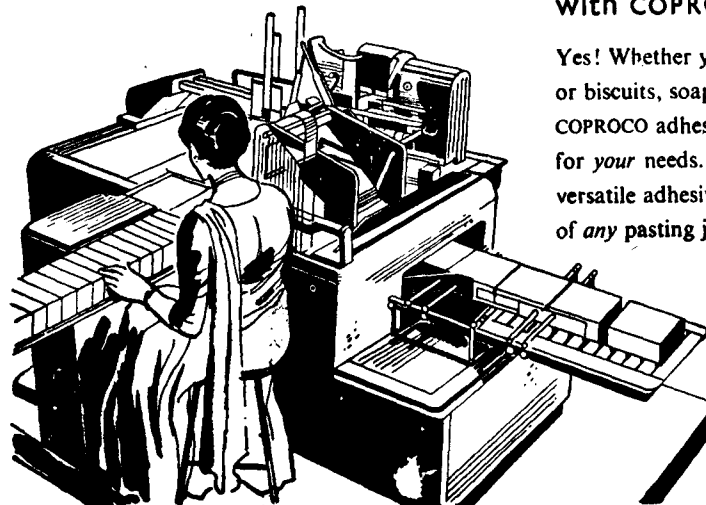
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Uses and Limitations of Type-High and Rotary Numbering Machines

By

SHRI R. RAMASWAMY,

(General Manager, Government of India Press, New Delhi)

NUMBERING boxes, both type-high and rotary, are made to suit various purposes. They are generally classified as backward numbering or forward numbering. In the backward numbering machines, the numbering will start from a higher figure and end up at the lowest figure desired. For instance, if we start off a job with the number 10,000, the next number to be printed will be 09,999, in the forward numbering machines, it starts from No. 1 and goes on to the limit of the capacity of the machine. Backward numbering machines are most useful when the delivery is printed-side-up. In the printing machine with printed-side-up delivery, the use of a forward numbering machine will necessitate rearrangement of the sheets. The majority of printers nowadays prefer backward printing machines as most printing machines are now made to deliver sheets printed-side-up. Forward numbering machines are useful only when the sheets are delivered printed-side-down.

Numbering machines are either made to suit particular jobs or in a universal manner so that they can be used on the ordinary run of jobs handled by printers. The ordinary numbering boxes have usually six wheels, which give six digit numbers. They can be provided with removable letter slides or number slides. The removable letters can be fixed in place of the word 'No'. If we are to deal with a very big order, the total of which runs to more than a six digit number, we can print the first portion of the job up to the capacity of the machine with a prefix letter 'A'. The next batch of numbers can be numbered with the same numbering machines with

different prefix letters. In doing so, we need alter only the letter slides on each of the numbering boxes.

Special numberings machine are made for cash receipt numbering and other multi-foil work where large orders may justify their use. For instance, we may have to deal with a large order for receipt books where foils are numbered 0001 to 1000 or 001 to 100. In these cases, we can order backward numbering machines which start numbering the foils from 1000 or 100 and come down to 0001 or 001. Thereafter the machine will go back to number 1000 or 100 as the case may be. In other words, numbering boxes will go on repeating the numbers 1000 to 0001 or 100 to 001. These boxes can also be supplied with removable letter slides.

The type-high numbering machines are used alone or with type when printing on a cylinder or platen type of letterpress machine. They are usually plunger-operated. There are also special types of type-high numbering machines which are chase-operated and the use of these machines is generally confined to such jobs as ticket printing (like tram tickets, bus tickets, currency note numbering, etc.) Such numbering machines are worked in conjunction with special chases and sometimes as many as 100 numbering machines can be made to operate on a sheet. These machines are used for numbering tickets or notes already printed; and come in most handy when the space for insertion of numbering machines in a forme is very limited. They ensure great production economy since a large number of boxes can be used at a time. For instance, let us

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assume we are to number tram or rail tickets which have been printed 48 up or 96 up. The subsequent operation of numbering will be done on chase-operated numbering boxes with either 48 boxes or 96 boxes. The economy of the use of these machines can be calculated thus: when the press is running even at a nominal speed of a 1,000 copies per hour, it will be yielding an output equal to 48×1000 or 96×1000 numbers per hour. To number these in the bindery would alone require the utilisation of 24 numberers or 48 numberers, assuming that a hand numberer does about 2,000 impressions per hour.

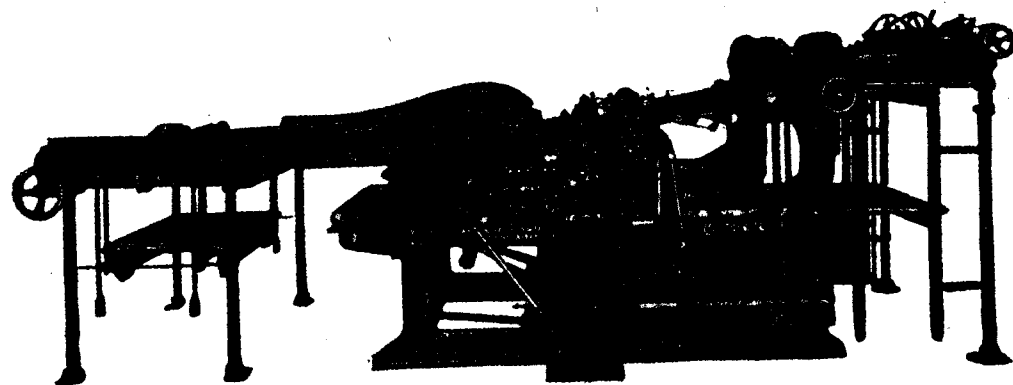
Further modifications in type-high numbering machines are generally those which enable one to repeat the numbers by the insertion of discs or skip wheels. The discs enable us to make the machines repeat the numbers twice, thrice, 4 times or as many times as may be required, and they are most useful when we are producing duplicate or multi-foil forms. The skipping wheels have altogether a different purpose. If, for instances we are printing receipts five-to-view on a sheet, the numbers on the first sheet will read 1,2,3,4, and 5. The next sheet will, therefore, bear numbers, 6, 7, 8, 9 and 10. The third sheet will be numbered 11, 12, 13, 14 and 15. It will be seen that unless we have some device which makes the machine skip 5 times, it is not possible to use the ordinary numbering boxes for such work. Hence what we call skip wheels are used. These skip wheels enable the skipping to be done up to 3, 4 or up to 9 numbers as we may desire. But it must be appreciated that when we do skip numbering work, the numbering boxes should be arranged in sets. If four-to-view receipts are printed, 4 skip wheels will have to be utilised, which means that we must have a set of four boxes. If we are doing 5 receipts on a page, we will have to utilise 5-skip, which means that we require a set of 5 boxes.

A critical examination of the unit wheel of a skip numbering box will reveal certain interesting features. When we are doing 4-skip work, the unit wheel of the first box will

print 1, 5, 9, 3, 7, 1, 5, 9, 3, 7, etc. In other words the unit wheel will be engraved with figures 1, 5, 9, 3, 7, in a cyclic order. By means of notches within the skip wheel, the unit wheel will automatically bring into position the tens wheels in correct order. The second box will have the numbers, 2, 6, 0, 4, 8, 2, 6, 0, 4, 8. The third box will have 3, 7, 1, 5, 9, 3, 7, 1, 5, 9. The fourth box will have 4, 8, 2, 6, 0, 4, 8, 2, 6, 0. If a 5-skip is adopted the unit wheel will have the figures 1, 6, 1, 6, 1, 6 and so on. The second box will be 2, 7, 2, 7, 2, 7. The third box will have the figures 3, 8, 3, 8, 3, 8, repeat and the 4th will have 4, 9, 4, 9 and the 5th will have 5, 0, 5, 0, 5, 0. It will be possible to visualise the figures on the unit wheels progressively for each of the different skips desired. These skip wheels will enable one to alter the same numbering box for different kinds of work, the only alteration in the box being the insertion of the unit wheels, with skips arranged thereon. These unit wheels are also termed skip wheels. If we have 10 numbering boxes and we want three skips, we can have three sets of boxes, three boxes in each set. The proper skip wheels should, however, be inserted in the boxes. The 10th box will not be in use. When using the boxes for 4-skip work, only 8 boxes will come into play for two sets, thus rendering two boxes useless for the work. If we have 5-skip work, we can operate 2 full sets and no box will be rendered surplus but anything in excess of 5 skip will render 4, 3, 2, 1 boxes, as the case may be, surplus.

We have examined in the previous paragraphs how type-high numbering machines can be used to great advantage with discs and skip wheels. We have explained that the type-high numbering machines are either plunger-operated or chase-operated. The rotary numbering machines, however, work differently. They are cam-operated. In other words, the numbering machines have a runner bowl which works in the cam track of the numbering filament. As they work into the cam, the cam is so cut that the desired change in num-

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bering is automatically brought about, after printing each cycle.

In the same manner skip wheels are used for printing several receipts to view at a time. The numbering boxes of rotary machines can also be ordered with the requisite number of skip wheels. For the purpose of security printing and triplicate foil work or multiple foil work, we manipulate jobs on rotaries in a different way. One way is to have modifications in the boxes themselves with delicate springs. Another is to have a cam track suitably designed so that the necessary changes can be brought out on one revolution. The third method, which is the simplest, is to have several sets of boxes and arrange them for printing on different foils and then slit the web for collation at the delivery end, registering the foils one over the other with the help of divert bars.

The advantages of having rotary numbering machines designed to suit particular needs will be realised when we reckon the total output of numbers as being equivalent to the total speed of the machine multiplied by the number of boxes utilised. If a rotary machine is running at a speed of 4,000 impressions an hour and we have 30 boxes, we can get the colossal output of 1.2 lakhs of numbers in an hour. If we cast this out for hand numbering it may be found that the entire cost of numbering boxes may be realised over a few jobs.

The material used for making rotary numbering boxes is generally of superior quality, the reason being that these machines have to work at very high speeds without fouling.

Rotary numbering boxes can be made to print with the travel of the web or down the travel of the web. The former are known as upright boxes and cost less. The other boxes are those which run down a web and cost more because of designing and cutting difficulties. It has to be appreciated that while numbering on the flat bed machine the same numbering box can be used whether the numbers lie on a sheet horizontally or vertically, it is not so with rotary numbering boxes. While numbering across the web on the rotary, an

upright box is used, when the web runs down the web a sideways box must be used. The definition of upright or sideways box depends upon the position of the numbers on the web and not on how they appear on the finished printed article. Another basic difference is that in an ordinary upright box for numbering across the web, all the figures will print simultaneously. On the other hand when sideways numbering machines are used for numbering down the web, the unit wheel will print first before the tens, and tens before the hundreds, and so on. The sideways numbering machines are, therefore, made in such a manner that the figure wheels are of different sizes in order to give a correctly curved printing surface. It is for this reason that when ordering sideways numbering machines, we should state very clearly what the circumference of the cylinder is on which the numbering work is being done. For instance, a sideways numbering machine manufactured to work in conjunction with say 25" cylinder circumference cannot and must not be used with a cylinder of any other circumference. Numbering box carriers and cams must also be changed to agree with the cylinder changes in size.

Rotary numbering boxes are used not only for rapid execution of work but also for economising expenditure on numbering. They are, therefore, ordered to suit needs. If we are asked to print some receipt books of 100 foils of receipts on each book, say about 10,000 copies in all, it would be advantageous to use 3 figure numbering boxes which would number from 100 to 001 and repeat. Such boxes will start numbering from 100, then 099, and so on to 001, and thereafter go back to 100 again, and so there will be no necessity for any operator to change the figures. The production rate with these machines will be very much more than with hand numbering machines, as in the latter case it would be necessary for the operators to change the numbers every time from 100 to 001.

Backward numbering machines have only one difficulty: it is that of sinking the zeros. It

is customary in the forward numbering boxes, both rotary and type-high, to have sinkable zeros, with the result that when we want to number 1 it will appear as 1 and not as 000001. In these boxes after the unit 9 has been printed off, the tens wheel will come into position and automatically the zero also comes up. In other words, zero remains sinkable only until its proper printing position is reached. After all digits have been printed, i.e., 999999, the machine is stopped and the number is altered by hand to come back to 1. On the other hand, in backward numbering boxes it is customary to have the zeros in position. If, however, a sinkable zero is required, it is necessary at every stage to stop the machine and push in the zero to the sinkable position. Therefore a certain loss of machine time occurs. When we order rotary numbering boxes, it is imperative that we mention to the manufacturer that we desire a sinkable 0. But it is customary when printing security numbering work to allow the zeros to appear. Therefore, when printing on such boxes the number 400 will appear as 000400, the number four as 000004, and five will appear as 000005, and so on. These are the numbering sequences when we use a six-wheel box.

In both rotary and type-high numbering boxes we have another classification of boxes, which are called combination numbering boxes in one. They are used for certain specific types of work, such as receipt books, which will have both foil numbering and book numbering. In this case the book numbers can be made to alter every 100 or every 50 leaves as may be

required. The foil numbers will change with each foil. In view of the fact that they are meant for specific types of work, it is most important to make an advance job analysis to ensure that there is sufficient demand to justify the purchase of requisite numbers of boxes for the specific purposes.

Both type-high and rotary numbering boxes can be had with figures and letters engraved to suit any pattern. It is, however, normal for the firms manufacturing these numbering boxes to have in stock specific types of lettering.

The subject of the arrangement and handling of numbering boxes is quite complex and can by itself form a specific matter of study. It is for this reason that in many large firms abroad engaged in numbering cash memos, tickets, etc., a team of specialists is engaged not only for the purpose of looking after the machines but also for the express purpose of selecting the numbering arrangements for jobs and for insertion of necessary skip wheels, etc., in the machines available in the factory.

Rotary numbering boxes can also be used with such machines as the Halley numbering frames, which in fact are contraptions for numbering sheets with the help of boxes positioned along the periphery of the numbering cams. These machines are made to number of flat sheets and are found in many modern binderies specialising in the production of multiple foil numbering work from flat sheets. The data that are given for rotary numbering boxes are also to be given for procuring the numbering boxes for use with these machines.

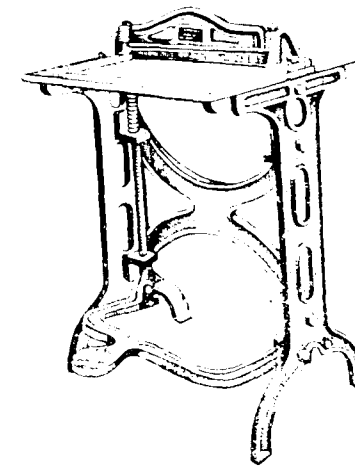


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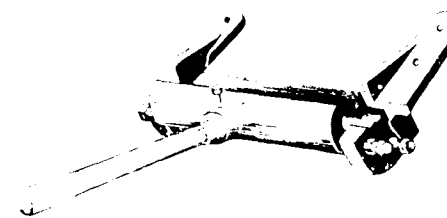


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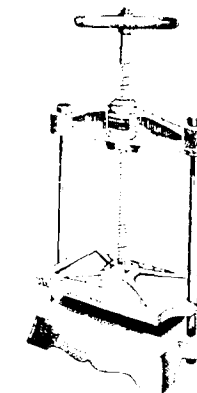
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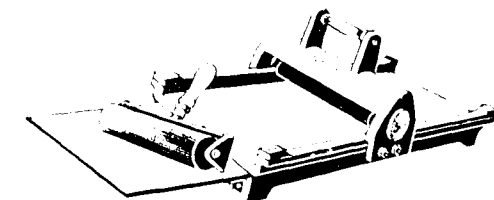
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