PRESSROOM HINTS AND HELPS

TYPOGRAPHIC TECHNICAL SERIES FOR APPRENTICES—PART IV, NO. 28

PRESSROOM HINTS AND HELPS

DESCRIBING SOME PRACTICAL METHODS OF PRESSROOM WORK, WITH DIRECTIONS AND USEFUL INFORMATION RELATING TO A VARIETY OF PRINTING-PRESS PROBLEMS

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PUBLISHED BY THE COMMITTEE ON EDUCATION
UNITED TYPOTHETAE OF AMERICA
1918

Composition and electrotypes contributed by
W. F. Hall Printing Company
Chicago

PREFACE

THE purpose of this volume is to provide the platen and cylinder pressman with suggestions regarding many of the problems that arise daily in the printshop.

The contents of the book are supplementary to volumes numbered 26 and 27 of the series and are to be considered in connection therewith.

No attempt has been made to include all the hints and suggestions which could be given upon the subject—merely a collection of some of the more common ones.

The Committee on Education would be glad to receive brief articles of a similar nature, based on experience, from practical printers, that could be included in future editions.

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PART I—PLATEN PRESS WORK

Oiling

While the press is new every oil hole should be oiled morning and noon for at least two months and every morning after that time. Well oiled bearings will keep the press running smoothly and add to its life. Do not waste oil. Also do not neglect out-of-the-way oil holes. When oiling take a rag in one hand and the oil can in the other and wipe off the top of each hole after oiling. In this way the press will be kept free of surplus oil which always accumulates dirt and dust.

Cleanliness

There is no excuse for a dirty press. If the pressman or feeder will utilize the odd moments when the press is waiting for a form or for a proof to be passed by taking a rag and wiping over the press and the zinc underneath, the press will always be kept clean. A dirty press is evidence of a careless pressman.

Belts

Many presses are now run by motor belted to the pulley, so that only a few feet of belting are used on a machine, which will last for many years with a little care. Whether run by individual motor or from a driving shaft, belts need attention. Well kept belts will prevent much loss of time through unnecessary stoppages. Belts accumulate dust which impair their efficiency. Wipe off this dust with a rag once a week, and put on a little good belt dressing once a month. Do not use castor oil or neatsfoot oil, as they make the belt

spongy. Be sure your belts run at the proper tension; if too tight there is excessive strain on belt and bearings; if too loose the belt will slip and there will be waste of power. Text-book Number 9, "Power Machinery for Printers," contains more extended information on this topic.

Repairs

Any part of a press that is worn or broken should be replaced or repaired at once, as every piece has its work to do and when it is not doing that work properly some other part must take the extra strain, and it in turn is likely to give way and cause a serious break. Watch your press, as soon as any part shows wear, have it attended to. Forehandedness in press repairs will save money in repair expense and prevent loss of production.

A pressman should not detach any of the vital parts of a press. This is frequently the source of great damage, as most pressmen know nothing of the mechanical construction of a press. They should always report existing defects to the foreman, who, upon investigation, should be able to determine whether the press requires the services of a machinist or not.

Adjustment of Platen

Comparatively few pressmen are press machinists, therefore it will be found cheaper in the long run to have an experienced man make the adjustments.

The proper way to set a platen on a job press is to take four blocks of type three inches square and lock them in the four corners of the chase; put a new packing on the press and level up the platen so the four blocks of type will all print with an even impression. Loosen all the check nuts before starting to level and tighten them carefully when through. Be careful not to move the impression bolts when setting up the check nuts.

On the Gordon type of press the bed moves forward to

meet the platen, and the platen remains stationary when taking the impression, while on the Universal type the bed is always stationary and the platen slides in on runways, and locks on the last half inch of the stroke, so the platen cannot rock. This slide or lock is screwed to the casting so that wear can be taken up. If a press shows a slur, close the press to the locking point and take hold of the platen and shake it. If any play is there, take off locks and put a piece of hard paper under them. If this does not remedy the trouble, look at the roller in the cam wheel, and if worn have a new one put in.

Rollers

Do not leave ink that will dry hard on rollers over night. Wash them with kerosene, and they will be in good condition in the morning. Benzine is all right to wash up with in changing from one color to another, where the rollers are to be used immediately, but if left standing any length of time the benzine dries the surface and forms a hard skin. Rollers that are put away for a week or more will keep in better condition if covered with machine oil. For more detailed information regarding rollers and their care see Text-book No. 11, "Printers' Rollers."

Tympan

Use a hard-finished, smooth manilla paper for the top sheet, a leather board, and three or four sheets of book paper under the top sheet. This is a good tympan for the usual run of job work.

Be sure the tympan sheets are drawn uniformly smooth and reasonably tight, and preserve this tension each time the upper clamp is closed during the process of makeready.

If the sheets are drawn too tightly or are too loose when first put on, any subsequent opening and closing of the clamp will cause a shifting of the impression position on the sheets. Be sure the clamps hold the sheets firmly.

The First Impression

Have the tympan under-packed, rather than over-packed, especially if the form contains plates of any kind. Plates often come blocked too high and in this case, a low packing for the first impression often saves injury to both tympan and plates.

It is a good idea to take the first impression of a form on a separate sheet of smooth book paper. This will show whether or not the form has been made up properly and prevent spoiling the tympan sheet. If there is anything wrong with the form, changes can be made and the impression adjusted by adding or taking out tympan sheets, after which an impression can be made on the top sheet for register and make-ready.

Grippers

Be sure the grippers clear the form and the bearers before taking an impression. In moving the grippers, loosen the nuts so the grippers can be moved with the hand. Do not pound them with the wrench, as it batters the edges and very often cracks them. Grippers should lay flat on the tympan when the impression is taken and should be firmly secured. Keep them clean.

Avoid the use of elastic bands on the grippers, as they have a tendency to move the sheet away from the guides, owing to the manner in which the grippers strike the sheet. The grippers are made to fit the sheet perfectly, and by using bands you endanger the likelihood of close register.

Feed Gauges

A 12-point quad put on with glue is the safest gauge, although not so quick to use as some of the patent gauges. After the gauges are in the proper place, paste a strip of card one-half inch wide by one and one-quarter inches long on the tympan alongside of the quad, so that it will project over the edge of the sheet to be printed.

Bend up this projecting lip slightly so the sheets will slide under when feeding. This will prevent the sheets from sliding over the gauge and keep them close to the packing. The length of this lip can be governed by the margin on the stock.

It is often wise to secure a quad gauge to the tympan by pasting over it a narrow strip of gummed paper. This will hold the quad more firmly to the tympan in the case of a long run or feeding heavy stock.

UNDERLAYS

An underlay is used mostly to level up a form, so that all parts will be type high. If a plate is above the right height it may be brought down by sand-papering the back of the block. This can be accomplished by placing the sand paper on a stone and rubbing the bottom of the block over it, being careful to hold the block firm and level. A vignetted cut will print better if an underlay is placed between the plate and the block. To do this, first pull two proofs of plate and then remove the plate from the block. Reduce the height of the block the thickness of two papers. Overlay the solids of one proof by cutting out and pasting on the solids of the other proof. Then skive down the vignetted edges of this underlay, making it slightly smaller all around, and paste this on the back of the plate in exact position, and nail the plate on the block again. This will bring the edges of the vignette two papers below the type, so the rollers will not roll hard on the edges and fill the dots or screen.

OVERLAYS

There is no set rule that can be followed in making overlays; the art in making them is something that must be acquired by experience. To cut a good overlay for a fine halftone is something like painting a picture from a copy. It is necessary for a man to size up the subject, and get in his mind the parts that are to be brought out strong and those

which are to be subdued or put in the background, so that when printed on the paper the photographic value of the picture will be retained and it will blend from the solid to the lighter shades without showing hard or mechanical breaks.

Many shops used etched overlays for halftone work, which produce fine results when properly handled, but as with hand-cut ones, it takes a man of experience to make good etched overlays.

Bearers

The press bearers on each side of the bed serve two purposes. First, they furnish a track over which the inking rollers travel smoothly. Second, they furnish a surface over which the roller collars will roll, thus keeping the inking rollers rotating while they are moving over the face of the form.

Keep the press bearers free from oil so the roller collars will not slide. Most presses are supplied with two sets of roller collars—one set full size, to be used when rollers are new, and the other set a thirty-second of an inch smaller, to be used when rollers shrink. If a plate or electrotype is too high, it will work more satisfactorily to plane the block down to type-high rather than to paste strips on the bearers, as is often done in order to raise the rollers slightly.

A good way to enlarge the roller wheels is to wind two or three thicknesses of insulation tape on them. There is on the market a patented device known as the Morgan expansion truck, which can be adjusted to fit variation in the size of rollers on job presses.

Slurring

There are many things that will cause a job to slur—a springy form, too much packing on the platen, hard rollers, platen out of true, impression-locking device worn, paper not lying flat, too soft an ink, form too heavy for the press, or not locked in the center of chase. In case of slur, first find the cause. Pressmen sometimes put strings across the grippers

and fasten cork stoppers to the strings in such a manner that the pieces of cork will push the sheet down on the platen; or put a frisket on the press and use corks on that.

Very often a slur will appear on the upper side of a form when the page is enclosed in a rule. This is not always the fault of the press; it may be caused by the rollers bearing too hard on the form, causing them to jump on leaving the upper edge of rule; or the sheet may not lie perfectly flat on the platen, allowing the rule to push the sheet down before printing, thus rubbing the ink. Slurring is liable to occur on forms of rule or border panels having large blank spaces inside, such as colored borders around pages, where the rules are fitted close all around and form an air-tight space when the impression is run up. A small opening, like a hole drilled in the side of the top rule, to allow the compressed air to escape as the impression is made will prevent the slight disturbance of the sheet which causes the slur.

Slurring can often be avoided by locking the job cornerways in the chase—that is, having one end about one-half inch nearer the bottom of the chase, thus allowing the rollers to pass over the form diagonally. This lock-up can be made by placing beveled sidesticks inside the chase, on all four sides, next to the chase itself, or by using a special "angle" chase—a method of lock-up which will also be found helpful in running tints or solids with white letters or openings.

The Frisket

A frisket is made by pasting a sheet of tough paper across the grippers, and making an impression on the same paper. Then lay the grippers and sheet down flat on the platen and cut out the printed part, so the form will print through the opening in the frisket.

Perforating

To print and perforate, at one impression receipts or blanks of any kind that have stubs or parts to be torn off,

set up the form and insert the perforating rule, which should be three-point steel, "hyphen" perforating rule, scant type-high (any type foundry will make this rule type-high upon request), allowing a pica or more margin on either side of the rule.

The advantages of scant type-high rule is that it will not easily cut the rollers. To make ready on the press, take an impression on the second tympan sheet, cut a narrow strip of thin pressboard, twelve or sixteen-point, or 120-lb. manila tag board, and paste this over the print of the perforating rule on the tympan; then take an impression on the top sheet and proceed as usual to make the job ready. This will give you a clean perforation, and the stub can be torn off as easily as with a round-hole perforation.

Whenever possible lock the form in the chase so that the perforating rule runs across the tympan, rather than up and down. This arrangement will prevent the rollers being cut by the sharp face of the rule.

When printing a single line on a platen press and difficulty is experienced in getting a sharp impression, take four large letters and lock them in the chase, two on each side of the type line (but outside of the sheet to be printed). These will act as bearers to steady the impression, and will give the required result.

Embossing

Many articles on this subject have been published in the trade journals; also a number of patented compounds, appliances, and attachments to use on job presses for doing this work are on the market, some of them claiming that no more impression is required than to print a form of equal size. Such statements should be taken with reservation. A heated die helps to keep the stock from cracking, but practically the same pressure is required as with a cold die.

Light embossing can be produced on a printing press if carefully made ready without injury to the press, provided the

stock is not too heavy. Card stock, photo mounts, and heavy hard cover stocks require a powerful impression, and a job press used a few times on this work will be found low in the center of the platen, will slur on light forms, and will need much more make-ready in heavy ones. A shop doing much of this work needs a special press fitted with a heating attachment, which can be used for scoring and blanking as well as for embossing.

The dies should be made of brass, one-quarter of an inch thick, mounted on a metal base. A good base to use on job presses can be made by taking a piece of iron 9x12 inches, 668/1000 thick, and have holes 3/16 of an inch in diameter drilled through it all over the block, one-half inch apart, counter sunk for screw head on the bottom of block; get a package of 5/32 screws long enough to push through the block one-eighth of an inch; then get a drill and tap to fit the screws, and a hand drill or bit stock. Place the die face down on the stone, place the iron block over the die in position desired, and drill two holes in the die; remove the base and tap the holes. Two or three threads of the screw will hold the die firm. This base may also be used by gluing the dies on it. Take a piece of rough paper not too thick, and glue to the base, cover the back of die with glue, place on the base in position wanted, and put a weight on it for a short time until the glue dries; then lock in a chase the same as any block.

Remove all packing from the platen, glue a sheet of strawboard over all of the platen, then glue another piece of strawboard about an inch larger than the die on top of the sheet already on the platen, ink the die, take an impression on the board, and with a sharp knife cut away all the parts that are inked on the top strawboard. Let the press run a few times on the impression to smooth this male or counter die. Pull a sheet on plain paper and see if all parts of the die are up strong; if not, a sheet or two of paper may be placed back of the block, and any parts that cut through

the stock can be rubbed down with fine sandpaper, and the weak places patched up with tissue. A counter die made in this manner will wear a long time. A piece of tinfoil over the face of the brass die will brighten the bronze. Zinc dies are sometimes used, but on white or light tinted stock they blacken the edges around the embossing.

Silicate of sodium and whiting made into a putty makes a good embossing compound, which will dry in ten or fifteen minutes. A thin coating of this over the strawboard will help where there are fine lines in the die. Be careful that the press does not stop on the impression when embossing.

Scoring

A four-point rule, made with a quarter round face will produce good results for scoring covers to be used in saddle-wired booklets, as it does not cut the stock. A good method is to take an impression on the platen, and paste a strip of card close to each side of this impression so that the stock will be pushed down between them by the rule, thus forming a raised line and stretching the stock so that it will not crack in folding. For folders and jobs that are to be folded across the grain of the paper, a three-point rule, with a half-point face, makes a good scoring rule by rubbing the sharp edges off the face with emery cloth.

Slipsheeting

Place a rack near the delivery table, and use sheets about 19 x 24 for slipsheets. Put one sheet on the rack, and lay as many of the printed sheets on this as will go without overlapping, place a slipsheet over these, and repeat. This will save time in taking out, as a number can be gathered up almost as quickly as one. Always use slipsheets larger than the sheet being printed.

A strip of cardboard folded to make a bottomless box to fit the job fairly close, to put the sheets in as they come

from the press, thereby forming an air cushion under the printed sheet as it drops into place, will do away with slip-sheeting on many jobs.

Bronzing

This is a part of the pressman's work many try to side-step, even in shops that use bronzing machines. For hand bronzing on job presses have a tin pan about 2x4 feet, two inches deep, place a stand or packing case at the left of the press to put the pan on; put the bronze in the cover of a five-pound ink can, get a wad of cotton batting the size of your fist, dip this in the bronze and rub lightly over the printing. The pressman can pile the sheets in the tray as they come from the press. Run the press slow enough so the bronzer will keep up with the printing. Carry as much size on the form as will work clean, and do not put a sheet on top of one that has not been bronzed. The one doing the bronzing should have a piece of chalk or magnesia to rub on the fingers of the left hand so he will not mark the sheets. Jog the sheets in the pan to shake off as much of the surplus bronze as possible. The bronze left in the pan can be mixed with new and used over again.

When dusting the sheets remove them as far away from the presses and type cases as possible. To dust the sheets use a very fine brush, or a wad of cotton batting. Brush both sides of the sheet with a quick motion, and do not rub hard.

When a bronzing machine is used it should be placed near the press, so the sheets can be bronzed immediately after printing, as the sooner the bronze is put on after the size is printed, the better the results.

Rough cover and antique finish paper usually cannot be bronzed and dusted clean by running once through the machine. They usually require running through the machine a second time. To prepare the machine for the second dusting, first remove the bronzing pads; then brush out the machine

thoroughly, raise the fountain so it will not touch the sheets; throw a handful of powdered French chalk on the dusting rolls, and let the machine run a few minutes to clear them of bronze. Then run the sheets through, feeding the opposite end of the sheet from that used in bronzing. Keep the hands dry by using chalk on them when feeding the machine.

Dieing Out

This class of work can be done on a platen press if the design is simple enough to allow the die to be made from a steel cutting rule, but if the services of a die maker are required to make the die, it will be found cheaper to send the dieing out to some firm making a specialty of this work, as they will do the work for twenty-five or thirty cents a thousand, and the cost of doing the same on a press would be nearly two dollars a thousand.

To do this work on a press, have a rule maker who has bending machines make the die; give him a printed sheet marked where the die is to cut; he will shape the rule to the design, filling the space inside and around the rule by pouring melted lead over the form, so the lead will come within one-eighth of an inch of the top of the rule. This lead brick can then be locked in the chase.

Take a piece of sheet brass, one-sixteenth of an inch thick, about the size of the platen, glue a sheet of machine finish paper to the platen, and then glue the brass to the paper. Put the chase containing the die in the press, having taken off the inking roller; close the press, slowly and carefully turning the wheel by hand to make sure the impression is not too heavy. If the press goes over easy, it is safe to try a sheet on blank paper to see if the die cuts through all parts. Places that do not cut through may be patched up on the bottom of the rule. Pieces of pica reglet about an inch long make good gauges, and will hold better than quads when glued to the brass. Feed the sheets the same as in printing.

Inks for Job Presses

Job presses require an ink of fairly heavy body, as the rollers are small and have no vibrators to keep the ink distributed while passing over the form. For this reason it takes more ink to print a cut on a job press than is required to produce the same results on a cylinder.

All the manufacturers make a halftone black for job presses which is somewhat heavier than the ink made for cylinders; and in buying ink for job presses order job halftone black. This also applies to three-color inks. In fact, you will avoid trouble by ordering all inks for job presses the same way.

A sheet of glass, 12 x 18 inches, with the edges rounded, will be found very useful to mix colors on, and is easily cleaned. In printing a two-color job on coated stock, where a strong color and a tint are used, better results will be obtained by printing the dark color first and using transparent colors for the second printing, as the dark color will lie smoother on the stock than over a tint. Transparent white makes a better working tint than mixing white, and you use much less ink to run the job.

In mixing colors or tints, always clean the ink knife before taking ink from the can. Do not dig down into the middle of the can, but scrape what is needed from the top. If the cover of a can is lost or damaged, fill the can with water, which will keep out the dust and prevent the ink from drying.

Handling Ink Tubes

If you experience difficulty in removing the screw-top from an ink tube, hold it for a moment over a gas jet or lighted match, and the obstinate top may then be readily unscrewed.

In forcing the ink from the tube, always squeeze from the bottom, rolling up the pliable metal as the supply of ink is exhausted. To apply squeeze in the middle almost invariably means a bursted tube, smeary fingers and spoiled stock, besides a large percentage of wasted ink.

Always keep the screw-cap on the tube when not in use.

Washing Up

On presses with disk ink table (Gordon style) wash off the table, and run the rollers up to the high point of the bearers so that they will clear the ink table. They can then be washed without taking from the press.

On presses with cylinder ink distribution (Universal style), run the form roller carriage up to the top, pull out the stop and, with the press running, pour a spoonful of kerosene over all the rollers. Run the carriage part way down the bed, remove the iron vibrator and composition distributor, cleaning them at the same time. Then with a rag, wipe off the fountain, cylinder and rider, and turn the press so the carriage will be at the high point, and wipe off the form rollers.

Feeding Stock

Clean the hands before starting to feed the sheets, place a pile of the stock on the right hand table, and as you reach for the sheet carry the hand over the pile about an inch beyond the edges, and as the sheet is picked up draw the top sheet of the pile toward you. In this way the sheet can be picked up without crushing.

Place a drying rack on the left-hand table, and place the printed sheets on the rack, laying the sheets all headed the same way, so they can be easily jogged together when dry. As the sheets are not handled after printing until they are dry, there is not much danger of smutting the back side.

Printing on Special Material
(Silk, Cloth, or Ribbon)

These materials being of a flimsy nature cannot be handled with one hand, and when a few copies only are to be printed stop the press while placing the sheet to the gauges, take an impression; stop the press again and take out the printed sheet. In other words, stop the press to feed and take out the sheets. This is a slow process, but a sure one.

If more than one color is wanted on the cloth, mount the material on stiff paper by a touch of paste on each corner, cutting the material an inch larger than is required one way, and cutting a half inch off each end after the ink is dry. Cloth or silk mounted in this way can be printed with two or more colors to fairly good register. Any good quality of ink or size will work satisfactorily.

(On Leather)

In printing on leather a stiff ink should be used, so that it will not squeeze out over the edges of the letters, and the impression must be heavy enough to break down the uneven surface of the leather.

(On Celluloid)

Printing on celluloid is not very satisfactory, as the ink will wear off in a short time if handled much. Any ink maker can furnish celluloid ink which is very tacky and stiff. The printing requires a light impression, careful make-ready, with plenty of ink, and the sheets must be placed on racks singly. Do not place one on top of another, for the ink will not dry under twelve hours, and can be rubbed off with a cloth wet with benzine a year after it is printed.

Many calendars and other advertising matter which appear to be printed on celluloid are printed on thin machine-finish paper and coated with celluloid on both sides after printing.

GOLD LEAF PRINTING ON SILK BADGES

A grade of size with lacquer ink—such as used to give the effect of gold in printing on tin—comes in pale and deep gold shades and can be reduced with copal varnish if necessary. Have the press and type clean. The size can be put on by a brayer or roller. Press the gold leaf against the freshly printed impression with a soft cotton pad, laying the badge aside until dry before removing the surplus gold leaf. If the leaf sticks to fabric dust the ribbon with powdered French chalk before printing. Cut the leaf to the size of the print before applying.

Printing with White Ink

The use of white ink on dark colored cover paper is hardly ever a satisfactory job, owing to the impossibility of obtaining a pure white impression. On many jobs the effect of clear white on parts of the design is better obtained by using a white stock and printing over it the darker color by means of a full-surface plate. As there are many times, however, when white ink must be used, the following suggestions may be helpful:

The tympan should be hard and the makeready evened up carefully, and not merely jammed up as is often done with cover forms. There should be a sheet of pressboard under the top tympan sheet. The printing form for a job of this kind should be entirely in strong lines and solid surfaces; light lines or delicate designs are not suitable for printing in white ink.

The disk and rollers should be washed scrupulously clean and the form and other parts likely to come in contact with the ink should be cleaned free from any oil and particles which will affect the purity of the ink. Cover-white ink should be used, not a mixing white or an ink made simply for mixing tints. The ink should be as fresh as possible, as cover inks quickly stiffen up and old ink is difficult to work. The stock should be run through the press twice. The first time the impression should be rather heavy and the amount of ink somewhat limited in quantity. Before the ink is dried hard on the stock the second impression should be made, reducing the strength of the impression a sheet or two and increasing the amount of ink.

An added degree of whiteness may be secured by dusting over this second impression with zinc white powder (sulphate of zinc) and running the sheets through the press a third time without the inking rollers.

Printing Gold Ink

Gold ink for use on a printing press is now furnished in the form of a powder and a varnish, the two ingredients to

be mixed by the pressman as needed. This method has several advantages, among which are economy and control of the consistency of the ink for the job in hand. Directions for mixing the ink are given by the makers, and the pressman, after a little experience, must use his judgment as to the requirements of his work. The ink plate and rollers should be fairly warm. A cool temperature in the pressroom is not suitable. The ink, in comparison with ordinary inks, should be used in generous quantity but not so as to fill up the printing surface.

Bearers an inch wide and full type-high should be placed in each end of the chase, to carry the rollers evenly and lightly over the form. The rollers should be fairly soft and tacky. If the first mixing of ink is too stiff for working wash off the rollers and the form, add a little more varnish and try it again until the right consistency is reached. To get a glistening effect the surface of the stock should have some gloss itself, as gold ink will not shine much on a dull surface, on any material of an absorbent nature.

Printing Copying Ink

Copying ink is not like ordinary printing ink and it must be treated quite different from the usual ink supply. It is a pasty rather than an oily substance, and will revive and leave its more or less indelible color whenever it is pressed by moist fingers or damp paper. The printing form and ink plate must be free from all greasy matter. The inking rollers should be dry and quite hard yet smooth. Old composition rollers that have become too hard for ordinary work are suitable. The ink will spoil fresh rollers in good condition for ordinary printing. Where there is much work with copying ink cloth-covered rollers are used to good advantage, and there is a special cloth cover for the ink disk furnished by dealers.

Before putting copying ink on the press the rollers should be clean and perfectly dry. If the ink is too stiff to work well, it may be reduced with glycerin, or a few drops of water,

worked in while the press is running. Copying ink dries quickly when exposed, so that the press should be kept running as steadily as possible and fresh ink added in small quantities to keep it in working condition. Be careful to avoid putting on too much ink at one time and to prevent it becoming thick and stiff, as the form will fill up and produce a muddy impression when this happens.

The makeready of the form should be the same as for any printing form, except that a soft packing should not be used. Use a sheet of pressboard next to the top sheet of the tympan.

Copying ink is usually washed off with warm water and a rag. Lye, turpentine, benzine, kerosene, or oil are not suitable. To do the job neatly take the rollers to the sink where there is running water and do the washing there rather than on the press. If the ink disk can be taken off the press, do the same with this. Save the hands by using a pair of old cloth gloves while washing up.

The following method of washing up after an occasional job of copying ink has been successful: First wash the disk clean with a wet rag. Then take three or four pieces of smooth (not enamaled) strong paper large enough to cover the disk and the ends of the rollers. Lay one of these sheets on the disk and run up the rollers slowly, to take some ink from the rollers. Repeat this with the other sheets until most of the ink is taken off. Then put on a quantity of good book ink and distribute this over the rollers and plate. The black ink will mix with the remaining copying ink and the rollers and plate can then be washed off as usual with kerosene and a rag.

Double Printing vs. Double Rolling

Sometimes a form comes along which so taxes the inking capacity of the press that double rolling is resorted to with a decided improvement. Sometimes double printing is better than double rolling, and vice versa. Two impressions of an

ink will give a richer, smoother effect than any single impression with multiple rolling.

It often happens, however, that the double printing cannot be given without producing a thickened or blurry impression. This will occur when the paper is hard or rough and a very strong impression is necessary. The hard impression of the first printing is apt to disturb the sheet; if it punches or embosses the back, this crinkling of the sheet makes a little difference in it for the second printing. For cover stock with a form containing no fine lines double printing will usually give better results than an excess of ink with one printing. On the other hand, smooth paper with a form requiring strong color will be printed cleaner by double rolling and one printing.

Three-Color Work on Platen Press

Some of the best specimens of three-color work are executed on a platen press. For this class of work use ink made for the purpose. The yellow plate may be made ready in red ink, and when it is leveled up evenly the rollers may be washed up and the yellow run. It is important that this plate be kept up to proper color or the red and the blue plates which follow will not produce the colors desired by the engraver. The progressive proofs should be kept for inspection and followed closely for color. The red plate will follow the yellow, and the blue plate last. The ink should not be bone-dry before the next color is run, as this condition will give a mottled appearance. The work should be kept covered as much as possible to prevent drying out of the stock, which will cause imperfect register.

Yellow is now often run last, to conform to the color value of the picture. In this case a transparent yellow is used.

To Register Color Plates Two-on

When running process plates two-on on a jobber, more or less annoyance is bound to be experienced in securing regis-

ter, due to the flexibility of the chase. This annoyance can easily be overcome in this manner:

Lock one of the plates and an iron frame (made of adjustable furniture) side by side; placing the iron frame in position to strike where the second plate is desired. After this form is tightened, lock the second plate inside the iron frame, using cards and leads around the block to make shifting easy. By this method the plate locked solid in the chase can be registered by the pressman and the second one inside the iron frame may be shifted without unlocking the first plate.

Save Time and Feed Gauges

When quads are used for gauges they should be soaked in a cup of water, when taken from the old tympan, to remove the old paste and paper. They should not be scraped away to leave uneven surfaces that will not lie flat on the tympan or give a good edge to feed to afterward. A good smooth face to feed to may be given by shaving the quad on the rule-mitering machine, or rubbing the quad on a file.

Testing the Covering Power of Ink

Take samples to be tested of equal weight and to each sample add an equal quantity of cover black or cover white ink, according as the sample is light or dark, and thoroughly mix. Compare results. The ink which changes color least has the greatest covering power or body.

Thin Metal Sheets in the Tympan

Some pressmen on fine grades of work use a sheet or thin brass or zinc instead of the pressboard in the tympan. Properly handled, with careful makeready, this gives fine results and does not wear the printing form as the softer packing does. The object of the metal sheet is to prevent the indentation of the tympan which forms a matrix into which the printing form forces the paper at each impression. The repeated impression of the form into the depressions of a

soft tympan rounds off the sharp edges and fine dots of the printing surface, the degree of wear depending upon the hardness of the stock and the force of the impression.

The metal sheet is first placed under the paper sheets where it remains while making ready, so that the trial impressions may be made on the softer surface until the form is properly planed down and the right impression given to each part. When the makeready is finished the metal sheet is shifted from under the paper and put next to the manilla top-sheet.

This metallic tympan is adapted for new type of uniform height, for halftones and fine line plates, and for work in which an extra hard impression is desired without punching an uneven surface on the back of the sheet. It is not recommended for forms having old type or for old electrotypes or electros of type pages, which require more or less forcing into the tympan in order to give a full impression; nor is it advisable except on a press with a perfectly rigid impression. The makeready and the amount of impression must be carefully regulated to obtain just the right impact of the form on the stock, and when this is done the result is a clean, sharp print with the minimum of wear on the form. Great care must be observed to prevent excessive impression on any part of the form. Even a single impression on this hard tympan, with a particle of hard paste, scrap of paper, or other substance under the sheet in feeding, may mean a smashing down of the form where this excess occurs.

The zinc known as offset zinc, about the thickness of .01 of an inch, used on offset presses, is a good material for tympan purposes.

Locating Overlays Under the Tympan Top Sheet

Many pressmen have difficulty in finding the position for an overlay or for patching up on the under sheet of a tympan. Some pressmen turn down or turn up the top sheet by lifting the clamp and then taking an impression of the

form on the second sheet. This is an awkward method and not accurate, and is liable to crumple up the top sheet.

A better way is to use a sheet of ordinary typewriter carbon paper. Simply lift the top clamp, raise the top sheet, insert the carbon, face down, so that the offset impression may be left on the second sheet, draw the top and second sheet smoothly in place, turn down the clamp, and run up an impression of the form. Upon lifting the clamp again a clear impression will be found in exact position on the under sheet, upon which any necessary overlay or patching may be placed. The carbon sheet should be fresh and the second sheet should be smooth.

This method of locating the position for an underlay may be used on a cylinder press.

Make-ready for Envelope Forms

An even impression is not easily obtained over a large part of a folded envelope, owing to the extra thickness of paper and glue where the edges overlap on the back. To overcome this uneven thickness and present a level surface for the printing form it is necessary to patch up the tympan in exact register with the envelope overlaps. Fairly good results may be obtained for fine lines on machine-made envelopes, but with hand-made envelopes it is often quite impossible to get an impression entirely smooth for any large number of impressions. This is due to the uniformity in the position of the folds in the former, in a given lot of stock, and the almost certain variation in this feature in the latter kind. Good printing on envelopes, especially for fine lines and for two or more colors covering a considerable area of the paper, is better done before the envelope is folded and pasted. For work of this kind envelope makers will furnish the die-cut sheets flat and make them up after printing.

A good method of makeready for the usual run of envelope work is as follows: Have the form locked in the chase so that the envelope will be fed in with the open flap up. Mark

the position on the tympan and set the gauges, using for the purpose several sheets of paper the same size as the envelope, so as to get perfectly smooth impressions for the make-ready. The tympan should have several sheets of book paper under the manilla top sheet. Usually a soft tympan is suitable for work of this kind. Be sure that the gauges are firmly attached to the tympan, and use a solid gauge (not a piece of card) for the side gauge. Place good stiff lips beside the gauges to hold the envelopes in place after feeding (envelopes do not lie flat like cut paper or cards). When this part of the make-ready is complete take an impression on the envelope to be printed, first taking a sheet of paper out of the tympan to allow for the double sheet of the envelope. This impression will show where the overlap comes on the tympan. By cutting the envelope close beside the overlaps an overlay is obtained with this impression of the form. This overlay is then pasted down smoothly on the top of the tympan in exact register with the impression made for setting the gauges. In the case of an address of name, street number, and city and state, in superscription style, there will be an overlay to go in the center of the envelope and perhaps one on each side of the diagonal overlaps. When these overlays are in place take out two sheets from the tympan, put one sheet aside and trim the other so that it will go over the pasted overlays against the gauges. When the make-ready is complete, put a touch of paste under the upper corners of this top sheet to keep it in place during the feeding.

Ordinarily a small corner card printed on what is termed high-cut envelopes requires no extra overlaying, as the printing covers only a smooth part of the double sheet. If, however, the lines are very long and extend over to the cut-out in the center of the back sheet, the same procedure as explained above will be necessary. When an impression is taken on an envelope, lay it on its face and with a knife point cut the front of the envelope around the cut-out of the back sheet. This will give an overlay with an impression for the end of

the lines, to be pasted to register with the tympan impression.

In case of a long run it will be well to provide a top sheet of strong smooth manilla. The extra sheet tipped over the makeready should extend from the gauges to the upper edge of the platen and well to the right side of the tympan sheet.

To Prevent Rules From Cutting Rollers

When a form with light-face rules is to be printed the lock-up of the matter should be positioned, if possible, so that rules with exposed ends will be parallel (and not at right angles) with the inking rollers when the form is on the press. In job work there are many blank forms in which hairline or dotted rules run across the full measure. In the case of upright pages these rules usually furnish an excellent cutting face for spoiling rollers that are in prime condition for type forms and engravings.

It is often impossible, however, to avoid placing rules in the form at right angles with the inking rollers. When this occurs the rollers may be protected to a degree by putting a short piece of brass rule across the exposed rule-ends on the outside of the page. |————————| It is not necessary that these protecting pieces should show in the impression, as they can be made a point or less below type-high and will still serve to protect the rollers.

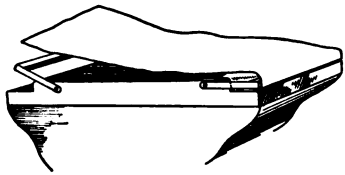
Another good plan for protecting rollers in work of this kind is to tack a piece of beveled wood on the wood furniture close beside the ends of the brass rules. A strip of soft wood, like an 18-point reglet, is planed off at a bevel, having its thickest side to equal type-high when tacked on the regular wood furniture of the form. This may be cut into short pieces and placed in position, leaving blank spaces to allow for the feed gauges on the tympan. They will form a bank at the ends of the rules over which the rollers will run safely.

Jobs of this kind should always be run with firm, well-seasoned rollers, not with new or soft rollers. A piece of bicycle tape around the roller wheels will raise the rollers

lightly off the press bearers and allow them to run lightly over the form.

To Make Tympan Top Sheet Secure

It often happens that the lower clamp on the job platen becomes bent out of true or otherwise defective so that it does not hold the top sheet evenly and securely, especially when the top clamp has to be lifted several times and the top sheet is repeatedly drawn over in the course of making ready. A good way to fasten the top sheet is to turn its lower edge over the top of the clamp and allow the end to



come up under the clamp from below, instead of putting the sheet under the clamp with the end below, as is usually done. Simply lift the clamp up straight, fold about three-quarter inch of the sheet over it, crease the sheet along the under side of the clamp, and push the clamp and sheet down into place together. Rub the fold smooth over the clamp by passing the fingers back and forth two or three times before drawing the sheet under the top clamp.

When the Platen is Low in the Center

A common defect in many platen presses that have been in constant use for a number of years is a weak center in the platen surface. This is usually caused by running a small form like an embossing die or a solid-surface plate in the middle of the chase and printing a heavy impression on hard paper. When the platen is badly hollowed in this manner the press is an expensive one to run, as the time needed to patch up the makeready on every form will quickly run into many

hours of valuable time. The proper way is to have the platen repaired.

If the weakness is only slight, however, the defect may not be serious and it can be easily overcome without loss of time by providing a special built-up sheet to be used on the bottom of the tympan. Get two sheets of very thin manilla large enough to match the tympan surface, and in the center of one of them tip on a small oval patch of tissue about 1¼ x 2 inches. Over this tip on another larger tissue of the same shape, about 3 x 5½ inches. Then put on a third tissue as much larger in proportion as the second is more than the first. Be careful to tip on these tissues with as little paste as will hold them in place and make them smooth. Then cover these patches with the second manilla sheet, attaching the two manilla sheets at the corners where the paste is not likely to cause a lump on the face of the impression. Several of these built-up sheets can be kept on hand, of sizes to fit the different kind of forms to be printed, and they can be used from one form to another. The number of pieces of tissue may be varied according to the depression in the platen as well as to the size and character of the forms to be printed. For a small form a patch of two tissues may be enough, while a large form will need four or five patches of graduated sizes. These sheets can be specially marked to distinguish them from the ordinary tympan sheets and used, under the makeready, from one form to another.

To Print Cross-lined Forms at One Impression

Sometimes a job comes up in which there are several columns divided with brass rules and also with cross rules intersecting the columns. If there are many lines the composition of a job of this kind means considerable time and an extra supply of short rules to justify in the columns. In case there are only a few hundred copies to print the work can be done quicker by making two forms of the table—one containing the type lines and the cross rules in single pieces

and the other containing the vertical rules, or vice versa. A page printed in this manner will give a clean looking set of panels with fewer pieces of rule, with unbroken joints at the intersections, and in perfect alignment across from column to column.

A job of this kind calls for two impressions, of course, which in some cases may increase the time for presswork more than the time saved on the composition. The work may, however, be printed at one impression if the chase is large enough to take the double-size sheet. The two forms are locked side by side so that each is printed in exact position on one half of the sheet. The stock must be trimmed exactly to the correct size to start with, the whole lot being exactly uniform, and the gauges placed so that after the first impression is made the sheet can be turned end for end and another impression made across the first. This involves careful make-up and lock-up of the form and also accurate placing of the gauges on the tympan. There are many kinds of small work in which this plan is better than to print from a single form made up with a large number of short brass rules.

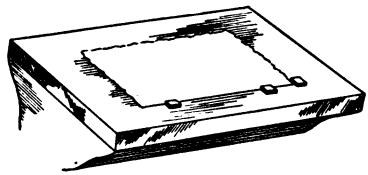
If there is doubt about exact register being secured on account of a variation in the size of the stock, it may be advisable to run the stock through after making ready, then to shift the two parts of the form and run the stock through the second time, feeding the same edges to the gauges, instead of turning to feed the other edges as in the first method.

To Feed Deckle-edges for Close Register

There are several methods of handling work of this kind, the advantage of each depending upon the particular requirements of the job in hand. When the deckle-edge is to be fed to a gauge and only reasonable uniformity in the position of the printing is required, a strip of 18-point reglet nearly as long as the sheet may be used instead of the usual pair of metal gauges. This may be used for both bottom gauge and side gauge. The advantage of the reglet is that the ragged

edge may be supported along the greater part of its length rather than at two small points whose irregularity varies on each sheet. The long strip gauge also gives a better surface on which to move the sheet into position when feeding.

The ordinary job on deckled stock usually has one or more smooth cut edges, where the whole sheet has been cut in halves or quarters. This fact should be taken advantage of when locking the form for the press, the form being arranged if possible to allow the smooth edge of the sheet to feed to the lower gauges. In this case the only difficulty comes with the side gauge. For a printing of one color the strip of reglet will often suffice for a fairly even register. When two colors are to be in close register some pressmen cut a small nip in the lower left side of the sheet, at right angles to the lower edge, and use this smooth cut spot to feed to a quad-gauge placed at this extreme lower left corner. The diagram illustrates the plan. This small nip on the corner of the deckle should be not more than 10 or 12 points long and should take



off just enough of the feathery edge of the paper to leave a firm edge on the sheet to push up against the gauge. It need not be a conspicuous mark on the edge of the sheet when the job is completed. If there are many sheets in the work and a repetition of the mark shows too plainly on the corner of the pamphlet of many pages, the mark can be located at different places on the edges of different sheets.

The older method of registering stock of this kind, and of any kind of irregular sheets, is by means of punctured points. That is, to place in the form at a position where the mark will be obliterated by a fold or be trimmed off, in the subse-

quent binding or trimming, two points which will pierce the sheet when the first impression is printed. When the make-ready for the second impression is made the two points are placed on the tympan in position to match the holes made by the first impression. The feeder must then place each sheet on the tympan so that the punctures fit on the points of the tympan. This plan requires slow feeding, as the sheets cannot be placed as quickly as to an edge gauge. It requires some experience to do the trick successfully.

General Suggestions

Wash the rollers and ink disk before starting each day.

Oil the press once a day, when in use; a few drops only are necessary; don't overflow the oil-holes, and don't fail to wipe the working parts with a rag.

At first distribute only a small quantity of ink on rollers and disk.

Prepare the tympan suited to the form. Two top sheets and one card make a good average tympan for type forms.

Draw the top tympan sheet smooth and tight as possible all over; if it is baggy or wrinkled it will make a slurred impression.

Once a week remove the wheels from the rollers, clean the bearing, and put a drop of oil *in* the wheels.

Try the roller springs occasionally, and see that the tension is enough to hold the rollers firmly to the bearers.

If the machine is run by individual motor, oil the motor once a week, and see that the commutator and brushes are clean, also that the points of contact on the rheostat are clean and bright. Should these points become burned, rub with fine sandpaper.

Pressmen who make their jobs ready with too much impression produce poor looking work, causing the type to be worn down to such an extent that subsequent jobs show a number of battered letters, the changing of which causes delay and expense.

The frequency with which some feeders and pressmen use a throw-off leads to a habit which seriously affects the day's production, decreases the earning power of the press, and results in smutty work.

It is better to govern the speed of any press by its best production. A light-frame Gordon, or a press of similar build can be run at higher speed than a Universal. To speed up the latter to any great extent is likely to cause a strain which soon renders the machine unfit for the fine grade of work for which it was designed; besides, excessive high speed usually causes a greater percentage of stock spoilage than moderate speed.

Rollers, wrenches, ink knives, ink tubes and cans should always be kept free from dirt, and in places where they can be readily found. Covers of ink cans should not be carelessly thrown about.

Make sure that all tympan sheets and the cards under are smooth and free from lumps that will injure the face of the form. Never leave the tympan clamps up out of their places to attend to something else; make the tympan completely at one time, and do not run the press while this is unfinished.

For the first impression the tympan packing should be less than is needed for the final make-ready. Start with a light impression and a small quantity of ink; add as needed.

See that the chase and form are clean and free from pieces of cotton waste, lint, and other dirt that will be taken up by the rollers.

Place the form on the bed, and push it snug against one side of the frame. All chases do not fit the press alike; if the chase is short, the form will be in a slightly different position each time it is put on, unless you push it snug to the same side each time. This is important to get good register.

See that the grippers are free from the form and also from the bearers (if any) in the ends of the chase.

Run up the first impression on a sheet of smooth waste paper. Look on the tympan carefully while making this first

impression, to be sure that the form strikes safely. The appearance of the back of the sheet after this first impression will indicate what will be the next thing to do.

When the form shows reasonably clear, pull an impression on the top of the tympan; then run several impressions on a waste sheet to remove the offset. Set the gauges next, to get the right position on the sheet.

The press should not be started to print the form until the press proof has been examined and the job approved.

Cover the feedboards with sheets of clean paper or card, or wipe them thoroughly before piling the paper on them.

Do not catch the sheets so hard as to leave a crease in them. Do not draw your (possibly dirty) thumb or finger across the pile of sheets so hard as to mark the paper.

Be careful about wetting your finger with your tongue while feeding. A wet spot will mar the sheet. A drop of glycerine well rubbed in your fingers will keep them moist for a long time and will leave no spot on the stock.

Do not feed rough or untrimmed edges of the paper to the gauges; a careful feeder will keep the smooth, clean edges of the stock to the gauge whenever possible.

Wash type with benzine and a clean rag; wash rollers, ink-plate, etc., with kerosene and rags. When washing off stiff ink from new rollers do not rub so hard as to rough-up the surface.

When using ink that will dry hard over night, instead of washing up clean and letting the rollers stand dry, put a small quantity of common machine oil on the ink disk and run the press till the oil has worked into the ink on the rollers, then let them stay till used again. This coating of oily ink helps keep rollers in good condition.

The person who is working at the press last is expected to care for it before leaving for the day, unless otherwise directed. To go off and leave the press uncared for at the end of the day is an act of carelessness.

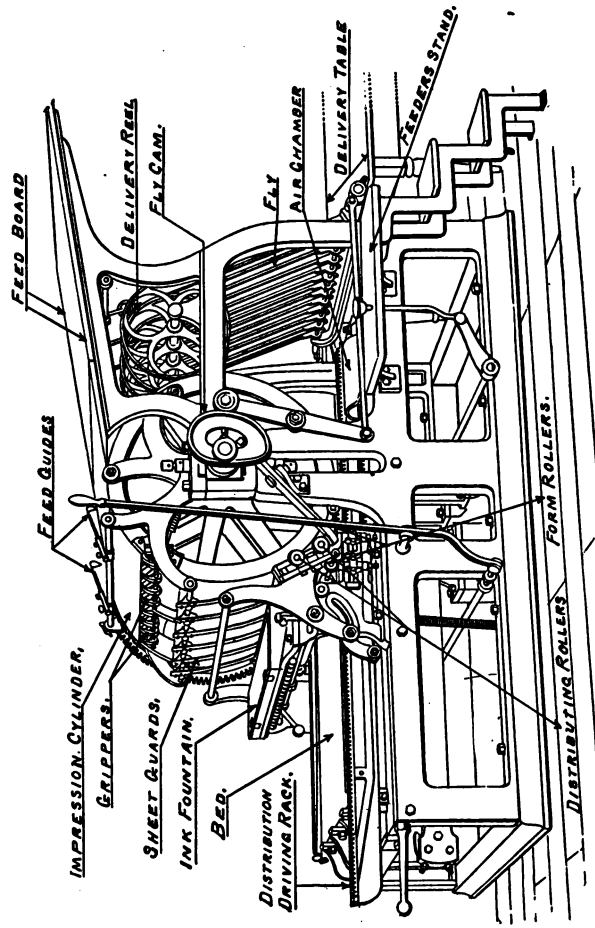


Diagram showing important features of a single revolution press.

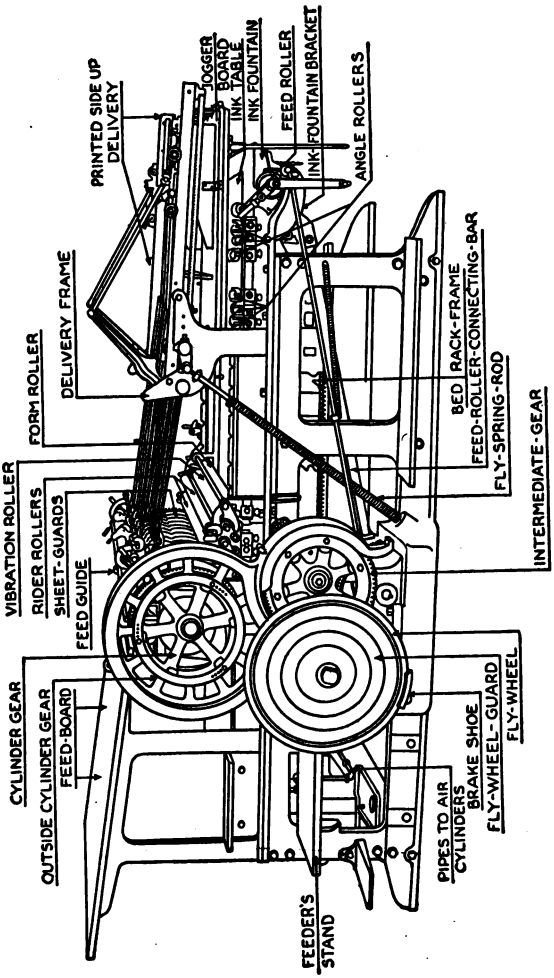


Diagram showing important features of a two revolution press.

PART II—CYLINDER PRESS WORK

Oiling

For the first month or two the main bearings should be oiled two or three times daily, and *all* the moving parts should be carefully oiled before starting the press each morning. Wipe off any surplus oil that runs over the holes. A little Albany grease rubbed in the gears will help to do away with the grinding which is so noticeable in new machines. A heavy machine oil used in the bed tracks will help to keep the press clean, as it will not slop over the sides of the tracks like thin oil will.

Cleanliness

Keep the press clean; do not allow dust and oil to accumulate on the frame. Wipe off the cylinder bearers and bed bearers after every job, as any oil on these parts may cause a slur. Also do not let oil and dust remain on the zinc sheet under the press. A bunch of rags on a mop handle will be handy to reach places not easily reached by the hands. Wipe the zinc a little every day when oiling up, and you will find that a very little work will keep this part of the press clean.

Belts

In most modern press rooms cylinder presses are driven with short belts, connected with a motor, and if the motor belts are made endless the pressman has very little trouble with them. Wipe all belts with a rag once a week, and every month put a small amount of belt dressing on the inside of the belt. Look after the motor once a week; oil and wipe it; examine the brushes and commutator, also the points of

commutator. A motor should be cared for by one who knows contact on the rheostat. If they spark when starting the press, clean the points with fine emery paper. If the motor sparks, take out the brushes and clean them, clean the commutator with fine sandpaper, and wipe with a soft rag; put the brushes back with care, and while the motor is running put a touch of vaseline on your finger and rub it across the what he is doing, and not by an apprentice who can only guess at how a thing should be done. When in doubt, don't guess; ask to be shown.

Repairs

Any part of a press that is broken or worn should be repaired at once; no matter how small the part, it is put on the machine for a purpose, to do a certain part in printing the sheet. Always have repairs of any importance made by a press machinist. While the printing press is a very cumbersome looking machine, it is required to do very accurate work, and it will not stand much abuse or rough handling.

Adjustments

Minor adjustments, such as setting the gripper, stripper fingers, shoo-fly, fly cam, moving the cylinder ahead for extra wide forms, are parts of the pressman's duties; but raising or lowering the cylinder, setting up the impression springs, and packing the bed-reversing parts should be done by a competent press machinist. A pressman who lowers or raises the cylinder of the press to suit the different printing forms will soon have trouble with slurring and wearing the edges of the plates and type pages.

Rollers

This part of the press equipment should be looked after very carefully, because good work cannot be produced with poor rollers, and as they are the most expensive part of the upkeep of the machine they should have constant attention of the pressman.

When putting in a set of new rollers, run the press back so that the ink table will come under the form rollers, place the first roller in the sockets nearest to the cylinder, and adjust it so that the roller will rest on the ink table without flattening the surface. Then set the other form rollers in the same way. Run the press ahead until the ink table is clear of the rollers, and set the rollers sideways, so they will bear lightly on the vibrators. The table rollers should be set in a similar manner.

When washing up the press, pour a little kerosene across the table rollers and the table, and run the press, impression tripped, five or six times. Take out the form rollers and wash them with a rag wet with kerosene, then wipe with a clean rag, being sure to wipe the ends of the rollers as well as the surface. The table rollers may be washed while on the press by turning up the delivery table and taking out the iron vibrators. Wash the edges of the ink table as well as the top.

When washing up for a light color or tint, all rollers should be removed from the press and cleaned thoroughly. When a delicate tint is to be used, put the rollers in the press and ink up with a quantity of cover-white ink, letting the press run a few minutes, and then wash up again. This white ink, being stiff, will pull the black out of the rollers. Also remove the blade from the fountain and clean all parts of the fountain before putting in the tint ink.

New rollers should be allowed to season for a week before using. All rollers not in use on the press should be kept standing on end and covered with machine oil if they are put away for any length of time.

Do not wash rollers with lye, as it eats the glycerine out of them, and rots the composition. Old rollers can be livened up temporarily by sponging them with water, and rolling them on a sheet of paper until dry; then go over them with a rag dampened with glycerine and also rub them with the hand until they are sticky.

If a roller gets bent out of true from being set too hard against the vibrator or by accident, do not try to use it until it is straightened. The roller-maker will have this done if his attention is called to it when the roller is sent to have the composition renewed.

Setting Rollers

The most accurate way to set form rollers is with a roller gauge. This is simply a piece of steel about one point lower than type-high, with a wire handle about six inches long attached to one end. The form rollers should be set before putting a form on the press, because the gauge has to be slipped under each roller while resting on the bed of the press. Drop the end of each roller until it just touches the gauge, then tighten the thumb-screws. The next move is to set the rollers against the vibrators. Run the press to front center so that the form rollers are clear of everything, lock down the steel vibrators, loosen the bolts on each side of the roller socket holders, then set each roller gently and evenly against the vibrator and tighten the bolts. If no roller gauge is at hand, or you should have to set rollers with a form on the press, drop the form rollers until they just touch the table evenly and lightly all the way across, and then set them against the vibrators in the same way as before. To set riders on a vibrator, simply drop them until they rest evenly all the way across.

The angle rollers are set first to rest evenly and lightly on the ink table so that they are not unduly forced on it; then set them against the vibrators in the same way as the form rollers.

The ductor roller is first set lightly on the table, then the press is run to the back center, and the fountain roller set evenly and gently against the ductor roller from end to end.

Setting the Fountain

Tighten up each screw until the blade almost touches the roller and then put in ink. Put in the ductor roller, and run

the press to back center, so that the ductor roller rests on the fountain roller. Have the feeder slowly turn the fountain roller and start adjusting the screws, beginning at the center and working toward each end. If possible, try to make the flow permit you to use five or six teeth of the ratchet. If fewer teeth are used the difference in a tooth will be so great that you cannot add or subtract one to the stroke without making too great a difference in the color. On the other hand, if more than six teeth are used the opposite is true, there not being enough difference between each tooth, and as the ink warms up you would find yourself adding teeth to keep up the color, and in the end you would probably have to open the fountain all the way across.

After the flow is coming evenly, run out the form to the front center where it can be seen, then cut off and add ink according to the printing surface of the form. In cutting off the flow be careful not to screw the blade too hard against the roller, as it is liable to spring it, and once that occurs that part of the blade is useless in the future unless it is re-ground.

The Grippers such as Ford

In order to get good register the grippers must all have the same curve and hit the cylinder at exactly the same distance from edge when they turn over to catch the sheet. If one of them is flattened so that it strikes further in than the others on the cylinder the sheet will probably be knocked back as the grippers take it. This is one of the little things to look for when there is difficulty in getting accurate feeding.

To set the grippers, run the press ahead so that the grippers will be three inches beyond the closing point, lift the grippers by turning the gripper-rod with the hand and place two thicknesses of paper between the button on the rod and the stop; loosen all the grippers on the rod and then, starting with the center gripper, press them one at a time firmly against the cylinder, and tighten the screws. Take the one on the right of the center, then the one on the left, and work from

the center to both ends. Remove the paper between the button and the stop. To make sure they are all set evenly take a strip of paper the length of the cylinder and put this under the grippers, then pull the sheet in front of each gripper to see that each one has the same hold on the sheet.

Feed Guides

Set the tongues under the feed guides so that they will just clear the packing on the cylinder without rubbing. Loosen the guides on the rod and let them rest lightly on the tongues; then tighten the screws that hold them to the rod, back up the press, and feed a sheet to the guides. Turn the press slowly by hand, watching the guides to see that they start to lift just before the grippers touch the sheet. If the guides are out of time with the grippers, adjust the cam on the end of guide rod to time them properly.

Underlays

Practically all the make-ready work on the plates in a form is called underlaying. We of the print-shop usually say "underlay the cuts," when we mean level them up and make them type high. The first thing for a pressman to do after receiving a form made up of type and halftones mounted on wood bases is to make sure that the plates all rest flat and firm on the bed. Unlock the form all around and try the plates one at a time by pressing down on the opposite corners with a finger of each hand, trying to make them rock. Try the plates both ways of the block if only a slight rocking is found, and paste a piece of paper under one corner that does not lay solid on the bed. If two or three papers are required to overcome the rocking, have the plate reblocked and save trouble later.

In leveling up plates always use machine-finish paper, for it will take the paste without puckering, while coated or high-finish papers will wrinkle with the moisture of the paste. When pasting a sheet on the entire bottom of a block take

a little paste on one finger and draw an X on the block from corner to corner, press the block on the paper and cut around the edges. After working thus on the back of a block, try it for rocking before putting it back in the form.

An underlay * is made practically the same as an overlay, and is placed between the plate and the block, never under the block. In making an underlay for a vignetted halftone, take two impressions on 20-lb. folio, cut out the dark spots from one sheet, and paste them on the same spots of the other. After the sheets are pasted, cut away about one quarter of an inch of the vignetted edge and rub the new edges down carefully with fine sandpaper. Plane off the back of the block so that the plate will be two papers below type-high. Then remove the plate from the block and paste the underlay to the back of the plate so that it will register with the face of the plate; and nail firmly on the block again. This will draw the edges of the vignette down close to the wood so they will barely touch the sheet in printing, and the edges of the vignette being slightly below type-high will take very little ink from the rollers.

To Remove a Plate from a Wood Base

To remove a plate from a block for underlaying or repair hold it in the hand with the face up and strike the bottom of the block several times on the bed of the press or other solid surface. Hold the block perfectly level and strike it as flat as possible. This will start the brads. Then insert the blade of an oyster knife carefully under the plate and pry up the plate gently by turning the knife sideways, until the brads have withdrawn about 12-point. Then push the plate back with the fingers, leaving the brads sticking up so that they can be caught by the jaws of a small pliers.

Care should be observed not to bend the plate or mutilate it in any way. If the soft metal backing of an electrotype

* Some pressmen use the word "interlay" to designate any make-ready placed between the plate and the base.

has been deeply scratched or marked by the edge of the oyster knife it is well to smooth off the metal before putting on an underlay or before nailing the plate on again.

Care should be observed, also, in nailing on a plate that has been thus lifted off the block, not to drive the brads in deeper than they were before. An extra hard blow is apt to drive that particular part of the plate down into the wood base and thus make a low place which will be difficult to bring up again. In case of doubt of your ability to lift off a plate and put it back again properly — *don't*. Ask the foreman, so that the job may be done by some one with experience. Meantime, get some old plates and practice doing the trick yourself in your spare time, until you have acquired skill. Don't take chances on a good live plate.

Packing the Cylinder for Book Work

The cylinder of a press should be packed according to the nature of the work to be done. For ordinary bookwork an all-manilla packing is best. The reason is that there is a little give to it, which helps out in making ready quickly, speed being the essential thing, as a rule, in work of this nature. The course to pursue in packing a press with manilla is as follows:

Measure the depth to which the cylinder is cut; that is the difference between the face of the bearers and the surface of the cylinder itself. This is easily done by taking a number of pieces of 90-lb. manilla about two inches square. Place these on the cylinder near the bearers, and keep placing one on top of the other until they are flush with the cylinder bearers. Suppose that it takes nine sheets to pack the press in this manner; cut four manillas, one-quarter inch narrower than the width of cylinder, which, after folding over the front edge, will reach to within one-eighth of an inch of the end of printing surface of cylinder. Take a rag saturated with machine oil, rub all over each sheet individually until the oil

goes through, making the sheet almost transparent; then fold each one over the gripper edge of cylinder, making a fold large enough to hook on to the cylinder hooks, pasting each sheet together at the fold. Be sure to get no paste on the printing surface of the sheet.

Now take a piece of cotton sheeting, at least two inches wider than the cylinder, fold one end over a piece of stiff wire about 3/32 inch in diameter; then glue to the main part of the sheet, leaving the wire inside at the fold. Hook this on to the cylinder with the wire under the cylinder hooks. Close the clamp and drop the shoo-fly; run the press slowly, pulling the sheet evenly around the cylinder until the first reel is reached; wind the cloth on this a couple of times, then tighten in good shape and cut the edges of the sheet that run over on the cylinder bearers. We have now used up five of our original nine sheets, viz., the four oiled ones and the cotton sheeting, which takes the place of another one. So we can carry three more manillas and three sheets of 70-lb. S. & C., which takes the place of one manilla, over the cotton sheeting, and the packing will be the proper height.

Sometimes a manilla is shrunk over the four oiled sheets, instead of using sheeting, and will act just as well, but it will not last as long.

On fine halftone work a harder packing should be used. A sheet of leatherboard should be used in place of the oiled sheets. This should be cut in the same manner as the oiled sheets, except that the fold should not reach down to the cylinder hooks. Score the fold with a knife, not too deeply, but deep enough to make it fold sharply over the edge of the cylinder. Now put on a cotton sheeting in the same manner as on the manilla packing, then carry enough manillas, with three sheets of S. & C. to make it flush with the cylinder bearers. On exceptional work, such as printing engravings on dull-finish stock, a harder packing is sometimes used—a sheet of zinc in place of the leatherboard. One has to use great care in making ready with this kind of packing; the

thinnest patch slightly out of place will show up very plainly. One advantage in a good piece of zinc is that it is of more uniform thickness than any leatherboard.

Makeready for Type Forms

Wipe off the bed of the press with a cloth well saturated with machine oil. Before putting the form on, wipe off the back of it with a coarse brush. Now put the form on the bed, gauge the proper distance from the grippers, and put solid furniture at the back and one side of the chase; on the other side put quoins if the chase does not fill up the entire bed, in which case it will be necessary to plug it against the bearer. On the gripper side of the chase fill in enough furniture so that when the clamps are squeezed tight there will still remain about one pica space between the clamp and the bed of the press.

Next unlock all the quoins in the form and tighten any quoins outside the chase; also tighten the clamps until the chase is held securely but not so that it is warped. If it lies perfectly flat, then gently tighten the quoins evenly all around the form, and after planing down go over all the quoins again. If the form is not springy it is now ready to pull an impression after the cylinder is packed.

The form should be in the middle of the bed sideways unless it is quite small. In that case place it over toward the feeder side of the press. The drop gauge should be the same distance from each end of the sheet and far enough apart so that the sheet is not liable to move away from one or the other when it is moved toward the side gauge. When the grippers close on the sheet it should come just to the edge of the cylinder. If more bite than that is used, the brush is liable to tear the sheet.

To set the grippers, loosen them all, then tighten each one, starting at the center and working toward each end, tapping each one gently with the gripper-wrench before tightening it. To set the drop gauges so that they will rise at the proper

time, have the gripper close at the last possible moment without tearing the sheet and set the cam at the end of the rod that holds the gauges.

When the first sheet is pulled, measure the gripper margin, also the side margin. If O.K., send it to the line-up man. Now print another sheet so that the impression on the back can be plainly seen. It should not be necessary to make many patches on this form. In fact, if your packing contains four or five sheets of news or machine-finish paper it is quite probable you can go ahead without any further patching. If you are very particular, however, you will find that each page is slightly lower in the center than at the end nearest the gripper and the opposite end, and you can build up this with tissue until it is even. By this time your line-up should be O.K., and all corrections made. After setting the color and the sheet delivery you are ready to run.

Makeready for Book Work

Assuming the form is made up on the stone but that the plates are laid by the pressman, first lay out the first form of plates; take one block out of the form and tighten on one plate; measure this with a type-high gauge. You will find it low. If it is necessary to use more than four sheets to make the proper height all over they must be put under the block. If more sheets than that were put under the plate there would be danger of its driving over the catches before running very long. Now put the block back in the form and tighten the form on the press the same as a type form, except that it will be unnecessary to plane it. Lay the same number of sheets on each block and lay the plates and tighten the catches. After gauging the form properly and packing the cylinder pull a sheet, and if the gripper margin is O.K., send the sheet to the line-up man. While he lines up the sheet, pull another, so that the impression can be seen; mark heavy and light impression places, then take out or add papers under the plates to make all uniform in height. This does

not take care of all the high or low spots in the plates, but the general average impression is about the same, and a few minutes spent here saves a great many patches later on. Your lined-up sheets should be back before you take off the plates so that you can save time by registering the plates and leveling them at the same time.

The next operation depends a great deal on the length of the run, the nature of the plates, and the condition of the blocks. If the run is not over 25,000, and the plates are simply type matter and possibly a few line engravings, one overlay (filling up the low spots with heavy tissue, and cutting out the high spots, with the addition of a spot sheet) should put the form in condition to start running after setting color and the delivery, providing the blocks are in good condition. If not, it will be necessary to underlay the plates to make up for any unevenness of the blocks.

If a number of forms are to be printed where the pages are nearly all solid type matter, a little extra work on the first form will be well repaid before they are all printed.

On the first form, if there are any broken plates replace them with solid pages. Mark out a sheet for what is known as a solid overlay. Do not cut anything out of the sheet you mark out, and make only large patches which you are quite sure will fill up holes by unevenness of the blocks or imperfections in the cylinder. After pasting the overlay on the press, shrink a manilla sheet over it and leave it there through the entire run of all the forms. In short runs where the plates are good it is possible to get away with each succeeding form by simply tracing out or putting in a spot here and there under a few plates. If more care is necessary one spot sheet will do the work very well.

Making Ready Illustrated Plate Forms

These are backed up plates mounted on patent ratchet blocks or on a metal base. It is necessary to underlay this form. In an underlay of this nature the object is to make

the printing surface perfectly level. Do not try to bring out different tones of the plates; leave that for the overlay. If there are some solids in the form it is advisable to force them a little more. If there are any vignettes, however, they will have to be worked entirely different. Always keep in mind that the edges of vignetted plates must be kept low, putting more impression inside the edge. If the plates are made carefully the finisher can help out a great deal by cutting away some of the metal under the edge and forcing the edge down so that it is lower than the rest of the plate.

The proper packing to be carried on this form would be as follows: Assuming that four 90-lb. manillas can be carried over the linen, shrink the first one on, then carry one loose manilla, three S. & C. 70-lb. sheets, and the draw-sheet, which is also 90-lb. manilla. The form is underlayed and in register, so that unless something unforeseen happens it will not be unlocked again. Start the press running at a speed which will be used during the printing, then make a run over on the draw sheet, and stop the press. Take a punch, either a hollow circular one, or one made in shape of a right angle, and punch through to the shrunk sheet on each end of each section of the draw sheet. In other words, supposing the form is made up of 32 pages, each section would consist of 8 pages, two deep by four wide. Run through five sheets of S. & C. 70-lb. stock. Now take off the draw sheet, and cut it into sections as before mentioned. Take one sheet of S. & C., cut out all solids from the plates, and paste them on printed pages on the sections where they belong. Take another sheet, leave on the medium tones and the solids, cut away rest, and paste on top of the solids already pasted. Take a third sheet, cut out the high-lights only and paste over the other cut-outs. All this must be done very carefully, as any cut-outs not in exact place will show in the impression.

This is called a three-ply overlay. On an ordinary job a two-ply overlay will suffice. On the other hand, printing on dull finished stocks sometimes requires a four-ply overlay.

When the overlays are completed we have an overlay sheet of the entire form in four sections. The next step is to paste them to the manilla shrunk over the linen, pasting each sheet on the end nearest the gripper. Now take out one manilla, hang in the three S. & C. sheets, and put on a new draw sheet. Pull a sheet on its own stock, also one on S. & C. 70-lb. paper. Mark out a spot sheet on S. & C., using a sheet of its own paper for a guide. Paste this spot sheet over the overlay, and if another is necessary, mark out in the same way. Each time a spot sheet is put on take out one of the S. & C. sheets hanging; if any are left, paste them on, then put on the draw sheet. Set the color and the sheet delivery and the form is ready to run.

Making Ready a Form of Type and Halftones Mounted on Wood

Lock the form on the press the same as a type form, but before tightening the quoins in the form try each mounted plate to see if any do not lie flat. If you try to run a form in which the blocks have a tendency to rock you will get a slur on the plates, and also have trouble with quads and spaces working up. When you find a block that rocks, measure the corners that touch the bed and if they are not higher than type, build up the low corners with patches of paper until the rocking disappears. If the block is very uneven, the safest policy is to have it reblocked. If you have a very large plate, and it is dished, that is, concaved in the center, score the back of the block with a saw about two-thirds of the distance through and when the quoins are tightened it will be fairly flat. Measure each block and plate with a type gauge, and make them all type-high if you do not expect to underlay. If you do expect to underlay, the blocks should measure about the thickness of a 70-lb. S. & C. sheet lower than type-high, so that when the underlay is in place the plate will be the proper height.

A vignette should be at least two sheets lower than type-high. In marking out an underlay for a vignette, run your first mark about one thirty-second of an inch inside the edge of the plate; the next mark should be about the same distance inside the first, and if the center seems quite low another may be marked inside of that. Fill these marks in with French folio, then cut off this underlay just one-sixteenth of an inch inside the edge, and paste it on to the pack of the vignette under the plate, not under the block. Now nail the plate back on the block, and you will have the edges of the plate lower than type-high, with a gradual increase of impression toward the center, giving a soft edge which the rollers touch lightly. To underlay a plate other than a halftone, simply build up the low spots and cut away the high ones, unless the plate has a high-light running to the edge, in which case it sometimes is advisable to cut away the underlay slightly inside the edge. This depends a great deal on the plate. Sometimes the edge does not need cutting away, but if it is at all hard, cut it away. The overlay for this form is made in the same way as the preceding form.

There are times when the rule to run all plates type-high must be broken. Take for instance a solid plate to be printed on dull-finish stock; more impression is needed than if coated stock were used. To get this increase of impression, one cannot add it all on to packing, but should divide it evenly between the packing and under the plate. If it were all added to the packing or all put under the plate, they would not run together, thus causing a slur and soon wearing out the plate.

Bearers

The bed bearers should be 1/1000 of an inch above type-high, and the cylinder should be set so the bearers on the cylinder will be just type-high from the bed. This will keep both bearers pressed together enough so that there will be no chance to slip. Keep the bearers free from oil and do not put any gritty substance on them. If the bed bearers become

worn so that they are low, remove them, and put a sheet of hard paper between the bed and the bearer to bring it to the proper height.

Register Racks

The rack on the cylinder is bolted permanently and there is no chance for adjustment there; the bed rack is bolted to the bed through slotted holes so that it can be moved front or back. If the press thumps at the point where the racks come into mesh, loosen the bolts in the bed rack and turn the press by hand, so that the two racks will be in mesh, and slightly tighten up the bolts. Now speed up the press to the average running speed and run it over several times to let the rack adjust itself; then stop press and tighten the bolts securely. In this way the rack is adjusted to the movement of the mechanism, which is usually slightly different from the adjustment made if the press is turned by hand. The best adjustment is made when the inking rollers are in position and a good size form is on the bed.

To Prevent Slurring

When a press is adjusted properly as to bearers, cylinder bearings, bands, and brush, it will not slur if the form and packing are handled as they should be. Take for illustration a form of sixteen pages containing six full pages of type, five full-page halftones, and five pages made up of type and two or three small halftones on each page; size of type page 6½ x 9½ inches, to print on a sheet 32 x 44 inches. Put this on a press having a 35 x 50-inch bed. After leveling up the plates and putting enough packing on the cylinder to print the type, run a dozen sheets with the press up to speed. Examine the sheets for any slur and you will find the edges all clean, not a sign of slur. All right so far. Now start the overlays, even up the impression of the type and plates on a make-ready sheet and hang it on the cylinder; the overlays, either hand-cut or mechanical, are then put on. Print a sheet and you will find that the halftone overlays have

taken the impression off the type near the plates. Another sheet is patched up and placed on the cylinder, and the press is started on the run. After a few hundred sheets are printed the full-page plates show a slur on the edges away from the grippers, while the other pages appear clean. This is caused by the halftone overlays increasing the size of the cylinder at their respective parts, which makes the print of the plate larger than the plate itself. The difference is so small it cannot be measured except with an instrument fine enough to measure one-thousandth of an inch. Now to overcome the slur, pull two sheets on 50-lb. S. S. & C. paper; cut the solids of the plates out of one sheet and paste on the other; skive down the edges of the print, remove the plates from the blocks, and paste the underlays made from the two sheets on the back of halftones and nail the plates on the blocks again. Remove the equivalent overlays from the cylinder and patch up any places that are weak.

A block that has the least sign of rocking in it will often cause a slur. Sometimes a slur is caused by the brush and bands not holding the sheet snug to the cylinder, thus allowing the sheet to slip ahead a little as the impression lets go at the gutters. This is likely to happen on thin stock. An ink too soft will sometimes be pushed to the edge of the plate by the impression filling the dots of the halftone. A slur is very seldom found on the edge of plates that are toward the grippers except in presses that are loose in the cylinder bearings, causing the cylinder to drop slightly in the gutters.

Two or More Colors at One Impression

Two or more colors can be run on a press at one time provided the form can be made up to allow five inches between the colors. To do this, stop the vibrating of the iron riders on the form rollers. Get a piece of three-quarter-inch brass pipe, and cut four pieces seven-eighths of an inch long, and place them on the ends of each table roller, inside

of the holder posts, or between the posts and the end of the composition, to keep the rollers from making a sideways movement. Divide the fountain in one or more places, according to the number of colors to be run, with fountain dividers (a wad of wet tissue paper will do), to keep the inks separate. Around each roller wind two thicknesses of adhesive tape, same as used by electricians, so it will come in the center of the division of color. This will help to keep the inks from mixing, and will save cutting the rollers.

Ink for Cylinder Presses

In printing on machine-finish paper, such as is used in novels, library books, leaflets, etc., use book ink, costing from 20 to 30 cents a pound. For S. S. & C. paper, when there are engravings in the form, use a better grade of book ink, but do not use ink made for coated stock, as this will offset on hard-sized papers. For coated papers use the best half-tone black to be obtained, not necessarily the highest in price, but an ink that is finely ground and not too tacky, with plenty of color. On some kinds of stock it will be necessary to reduce the ink. For this purpose have a can of soft full-color black made without dryer to use in place of grease reducers; about one pound to five is usually enough, and will not affect the color. It will require three pounds of 50-cent ink to print the same number of sheets that can be printed with two pounds of 80-cent ink, and the results with the 80-cent quality will be much more satisfactory both to the printer and the customer. Also in many cases it will save slipsheeting.

In working colored inks, be sure that the press is thoroughly clean; two or more wash-ups are necessary in going from a dark to a light color.

In working cover white on a cylinder press the ink sometimes does not lie smooth on the sheets. A teaspoon of No. 3 varnish to a pound of ink will smooth it out. Do not use vaseline or other greasy reducers in cover inks.

Despite all the advice that is offered on the subject of doctoring printing ink, it is a pretty good idea to use the ink the way it comes out of the can, and let the ink man know about it if it doesn't work right. Doctoring ink that has been compounded according to a scientific formula is a good deal like mixing the prescriptions of two doctors together in order to get better results.

Keep ink cans covered when not in use. Dust is not a good mixer.

Zinc plates used for solid tints of light color will tend to darken the color on the first few impressions, as the lead in the metal affects the ink. To obtain a true color the plate should be covered with the tint to start with and not washed off unless absolutely necessary.

When printing solid surfaces and the ink looks crawly and speckled, common paste added to the ink will make it lie smooth and dry hard. Throw away any of the ink left after the job is run, as it will not keep with the paste in it.

Every pressroom where color work is done should have a scale that will weigh accurately from one-half ounce to five pounds, and every ingredient used in mixing a color or tint should be weighed, and a memorandum made of the same for future use. For example, we have a job that requires about three pounds of buff tint to print over black:

2 oz. Persian Orange
1 oz. Lemon Yellow
2 lbs. Transparent White
2 oz. Boiled Oil
1 oz. Japan Dryer.

(Tint used on John Wanamaker Suit Folder, July 16, 1917.)

The job is half run off, and we find another pound of tint is needed to finish the work. By taking one-half the quantities and mixing them together, it gives the exact shade of the original lot. The foreman should copy all the formulas in a book, as the same tint may be called for a number of times.

When a quantity of tint ink, 10 pounds or more, is required for a job, it is more economical to have the ink maker do the mixing.

Electricity in Paper

Stock that has been stored in a cold room for some time and taken to the pressroom without being at least twenty-four hours in a warm room before being run through the press will often develop electricity to such an extent that the feeder cannot readily separate the sheets for feeding. This will be found more troublesome in high-finish S. S. & C. and coated papers with a gloss-like finish. It can be overcome by moist heat. Open one or two of the pet-cocks in the steam-pipe or radiator near the press, and let the steam escape until the air in the room is moist, and the sheets will not stick. In damp or rainy days there is not much trouble from electricity if the press-room is warm.

The greatest trouble comes when the sheets develop electricity in running through the press; sometimes the sheets will stick to the delivery or fly to such an extent that it is impossible to deliver the sheets on the table, for they will follow the delivery on the back strokes. At other times the sheet will deliver all right but will stick to the next one on the table. These troubles can be partially overcome by oiling the top sheet, stripper fingers, tapes and fly sticks with three-in-one oil or glycerin; but this lasts only about an hour. The heat from a line of gas jets placed under the sheets as it comes from the delivery is another method frequently used with success.

The Chapman Neutralizer is an appliance that has been generally successful in overcoming static electricity in paper.

Handling Paper

The paper should be delivered to the pressman on platforms or trucks at the back of the press, handy to the feeder if the machine is hand-feed or machine continuous-feed. If

pile feeders are used they should be loaded by the stock men. In putting a lift on the press, roll or fold the long way of the sheet; this saves turning the lift after it is on the feed board, and any bend in the sheets caused by the rolling will be smoothed out by the brush and bands of the press. If rolled the other way the sheets are hard to feed, and are liable to pucker as the grippers take them.

In printing coated paper, do not use the press jogger, but use a rack or tray, and lift the printed sheets and rack off together, being careful to hold the rack level so the sheets will not slide. There are on the market trays made of galvanized iron that are adjustable to any size sheet; these used on top of a drying rack will, on many jobs, do away with slipsheeting.

When slipsheeting, it is better to use the fly delivery, as the slipsheets are then placed over the clean or dry side of the sheet, so that there is no chance to mark the printing by dragging the slipsheet over the freshly inked surface.

When coated stock has been run printed side up, the sheets should be turned over and placed at the back of press, so that the feeder will have them blank side up.

To turn a pile of sheets, have two men do the work, one at each end of the pile; one man with his left hand takes hold of the corner on the right of as many sheets as can be lifted easily, lifting the corner so the man on the other end can slide his hand in the opening and grasp the sheets on his corner; then both men run their right hands to the left corners, which crosses their arms, and turning the sheets brings the arms straight in position to lay the sheets down, with no chance of breaking the edges.

In running close-register work, cover each lift with at least a dozen sheets of slipsheet paper as soon as taken off the press, and cover the edges of the pile at night with wrappers or slipsheets.

In running machine-finish or book paper it is better to use the fly delivery, thus saving the labor of turning the sheets.

Work-and-turn sheets, 28 x 44 and larger, should be split on the press, giving the bindery less trouble in handling the sheets, as well as better results in folding.

Whenever a long run of any job is to be printed with one or more copies on a sheet, have the binder fold a sheet and mark the pages and gauges best suited to the folding machine he will use.

Embossing

This class of work can be executed on a cylinder press when a number of dies of the same subject are used, such as box tops, candy wrappers, or booklet covers, if the dies are not more than three inches wide and not too deep. Have electrotypes made from the original, with extra heavy shell and twelve-points thick, mount them on a metal bed block the same as printing plates. Strip the cylinder down to the iron, wash the surface with benzine to remove all grease, and rub dry with a clean rag; cover the surface of the cylinder with glue, and place a sheet of strawboard on it; put on a top sheet and reel it up tight to hold the board close to the cylinder until the glue dries. Ink up the press with some color that contrasts with the printing, and register the dies to the printed sheets. Remove the top sheet and pull an impression on the strawboard, and run the press over slowly; cut away all the parts of the patches that are inked, wash off the dies, remove the rollers, oil the dies, and let the press run at the printing speed a few minutes to smooth out the male dies. This make-ready will hold up on a long run if good glue is used.

The following is another form of making ready for embossing that looks practical, but the writer not having tried this method cannot guarantee results.

"A form of embossing plates is first made ready with underlays to print even, the dies having been secured to bases of proper height to leave the dies type high.

"A sheet of rubber-offset zinc (.010 to .012 inch thick) is secured under the tympan clamps, having first been creased near the edge so as to fit smoothly over the cylinder at the gripper edge. Over the zinc, which must closely fit the cylinder, a sheet of manilla is drawn, enough make-ready paper or packing having been withdrawn to allow just a clear, light impression. The dies are now registered to the printed sheet to be embossed. After register is obtained the manilla draw sheet is removed from over the zinc.

"The dies are now carefully oiled all over. Then two sheets of French folio are coated on one side with paste. One sheet is laid over the form with paste side up. Over this an embossing compound, made of plaster-of-paris and Sphinx paste of putty-like consistency, is spread, with somewhat more compound near the gripper edge. The other sheet of folio, paste side down, is next laid over the embossing compound. Over the folio place a sheet of thin manilla, and run the press slowly over the impression. After allowing this male or counter die to harden about five minutes, lift it at the gripper edge to ascertain whether it is stiff enough to be transferred from the form to the cylinder. If it lifts readily, the counter die is then coated on the back with thin glue, and transferred to the cylinder by turning the latter slowly over the impression. After the counter die is transferred to the zinc on the cylinder, the compound is cut away on the edges close up to the embossment, which is then allowed to harden until it cannot be indented with finger-nail. Then a manilla draw sheet is put on and the work of embossing started if the embossment is satisfactory. If there are weak spots, these may be reinforced with thin layers of compound, using the same precautions as when making the complete male die."

Do not try to emboss a deep die or one enclosed in a rule on a cylinder press.

There are other methods of embossing, practiced successfully by pressmen who study their particular problems, and use their ingenuity to accomplish results. Embossing com-

pounds of several kinds are sold by dealers in printing and bindery supplies.

Scoring

Always use a round face rule, as a sharp rule will cut the stock, causing it to break when folded. For covers to take in 16 or 24 pages a two-point rule is wide enough; covers for 32 to 48 pages, a four-print rule will make a better score. Ink the rules and fit them to the sheet; use a soft packing on the cylinder. After the rules are in position, pull an impression on the top sheet, and paste a strip of three-ply card on the cylinder on each side of the rule; run the sheets "inside up" so the rounded ridge will come on the outside of the cover. For scoring card folders and circulars a one-point face, with the sharp edges rubbed off, may be used with or without the card strips.

Bronzing

For doing this class of work a bronzing machine is necessary, as hand work is too slow and expensive. The machine should be motor-driven and the motor and bronzing machine should be on a platform fitted with strong casters or truck wheels, so the whole can be moved easily. Have about thirty feet of feed wire attached to the motor and sockets near the presses, where the feed wire can be connected to get power for the motor. For a front-delivery cylinder press, back up the bronzing machine to the press, so the feed-board will come over the delivery table of the press, and, using the sheet delivery, the bronzer feeder will feed sheet as it comes from the press. Run the bronzing machine and the printing press at the same speed, and the work will go through almost as smooth as on one machine.

The dusting rolls and bronzing pads should be set to rub lightly on the cylinder. If set too hard, they rub the bronze into the sheet, and it will come out streaked and dirty. When a sheet has only one or two pages bronzed, remove

all the pads except the one necessary to cover the printed parts, and divide the fountain so the bronze will feed only on the parts to be bronzed. This saves the bronze, and helps to keep the sheets clean. If the sheets do not come out clean after running two or three hours, open up the machine and rub chalk on the dusting rolls to dry up the grease that comes from the bronze. Use size as sticky as the paper will stand without picking. For coated paper use size made for coated stock; do not reduce the heavy size for use on coated paper.

To Test Feed Guides for Register

One frequent cause of loss of register is improperly set guides on a cylinder press. If the guides rise too late the sheet is held back from the grippers and these indent the edge of the sheet against the guides. If the guides rise too soon register is out of the question. Both conditions should be guarded against. A good test for register is to feed a sheet carefully to the gauges and mark the two gauge tongues exactly at the edge of the sheet. Then let the grippers take the sheet forward a few inches from feed-board and then slowly back up until the grippers release the sheet. If the gauges and grippers are properly set the edge of the sheet will be exactly on the test marks. If this is not done, register is impossible until gauges or grippers or both as required are properly set.

General Suggestions

Keep the zinc beneath the press clean, wiping it daily.

Have a place for all tools and accessories, and see that these are always put where they belong when not in use.

Whenever time permits between long runs, have the feeder go all over the press to give it a thorough cleaning, also to try all bolts and nuts for looseness.

Always make sure the ductor roller is secure before starting the press.

Oil the packing frequently in damp weather to keep it from swelling.

Be careful that the form does not fill up. Wash it too often rather than not often enough. Use soft rags free from pins, hooks and eyes, etc., that might damage a plate.

Carry an extra oiled sheet as a tympan on long runs of a work-and-turn job. Do not let ink-offset pile up on this sheet, but replace it as needed. Oil a number of these sheets in advance.

Examine the form frequently. Furniture sometimes shrinks and works loose. Quoins will not stay locked forever, and plates on metal blocks work loose unless the catches are tightened occasionally.

If the paper gives off dust, the rollers and form should be washed up several times daily to retain cleanness in the impression.

Never leave any extra material such as furniture, wrenches, etc., lying on the form or the bed of the press.

Have a marking-up board of ample size set up where the light is good, preferably at a window.

Have a quantity of strips, of thinnest tissue and of French folio about six inches long, cut in various widths from one-eighth inch to an inch. Keep these in a couple of handy boxes. They will be a great help to speedy patching, as they need only be laid over areas previously spotted with paste and torn off, instead of being cut into shape singly with the overlay knife.

Always have at least one good overlay knife. It may be roughly sharpened quickly on sandpaper and the wire edge then taken off on a hard oilstone. Oil the stone with a mixture of equal parts of good machine oil and kerosene.

Keep the fountain well filled with ink during a run. In order to feed out properly on the drop roller the ink must be kept snugly against the fountain's roller. If there is

only a small quantity of ink toward the end of the run this must be constantly worked up to the fountain roller with a knife in the hand.

A good transfer sheet for use in marking on the face of the makeready sheet can be made by taking a piece of 6-ply cardboard of the size desired and covering it with a coating of oil and lamp black. This stiff card will be found handier to use than flimsy carbon paper.

If the tapes become slack and need tightening, which will often happen in dry weather, apply a little glycerin. This will make them draw perfectly tight and remain tight for a long while.

When removing form rollers from the press always run the form under the cylinder before taking out the rollers, and thus avoid any chance of battering the form with the ends of the roller stocks.

In locking a chase on the press, do not have the lock-up come at the cross-bars, as they are liable to spring up if the locking pressure comes on the end of the bars.

Pressman's Handy Kit

A journeyman pressman working on high grade work should have a few special tools to help him with many of the little things necessary in the preparation. Intelligence and skilled fingers are all right but they are not enough to help out in numberless cases. Especially is this true in a place where there are not at hand the facilities needed to do these things to meet the especial case without loss of time. Some tools that will be found necessary are these:

A knife of fine steel to cut overlays.

A machinist's small hammer, and a nail-set.

A small screwdriver, and a file.

An oil stone.

A punch making a hole about ⅛ inch.

A small graver with square end about 6-point or 8-point wide, such as is used by electrotype finishers.

A square-nose pliers for drawing brads.
A small steel square for testing blocks.
A steel straightedge, 18 inches long.
A type-high gauge.
An oyster knife, to insert under wood-mounted plate when necessary to take it from the mount.
A box of flathead brads and some small screws.
Sheets of two or three grades of sandpaper.

If he can afford it another convenient tool is a micrometer for measuring the thickness of paper, etc. This last is often necessary where there is a fine grade of halftone and other illustrated work.

A type-high planer for shaving off the backs of mounted plates is now a quite necessary part of the equipment of a printing plant doing plate work of any kind, as it is almost impossible to expect that all the plates which come into the pressroom from electrotypers and engravers will be true enough in height for the demands of good, quick work.

Printers' Paste

Many printers make their own paste. One common method is to mix flour and water and cook the mixture over a fire while stirring or with a jet of steam until it turns to thick paste. This thick paste is then thinned out with cold water and passed through a very fine sieve by hand to remove lumps. By merely adding cold water a medium thick paste for overlaying or a thin one for use on perfecting presses is obtained.

Probably the best home-made paste is that made by paperhangers. Argo starch is mixed with tepid water and then cooked until clear and free from lumps. Two teaspoonfuls of sugar are added for each quart of paste and the result is a very fine paste at once cheap, easily made, and strongly adhesive. A few drops of phenol prevent souring.

Overlay Papers

There are three thicknesses of overlay paper used in well-equipped pressrooms, although many pressmen get along with but two, and some with only one kind.

For overlaying small type, leveling the impression on plates, both halftones and tint plates and, in fact, wherever a light paper that does not show a broken effect in the impression of the print is needed, the proper paper is thin tissue, one-thousandth of an inch thick. For overlaying larger type, for giving various degrees of impression to the different tones of an engraving and for overlaying on electro forms from small type, linotype, etc., onionskin tissue is better, as less spotting up is required than when using thin tissue. For broad strokes in overlaying and rush work, where a readable impression, regardless of its evenness is wanted, the paper mostly used is French folio. This paper is also very effective in patching up defective letters and is generally used for spotting up underlays and interlays.

Linotype slugs and electros give under impression more than type, which is harder and more nearly level. Linotype slugs are sometimes higher on one end than on the other. In the makeready of linotype forms the overlaying can be reduced by half with a little judicious underlaying, which levels the slugs.

The Use of Oil

To one who is acquainted with its many uses, ordinary lubricating oil is one of the most convenient and also one of the least expensive and valuable aids in many of the operations of the printshop.

1. As a dissipator of electricity, oil mixed in equal parts with alcohol and glycerin and rubbed along the edge of the feed table and on the top sheet on the cylinder will be helpful in overcoming friction which generates electricity.

2. When only a part of the press bed is used, frequent trouble is experienced when the press is speeded up, as the

rollers become heated at the ends and melt or deteriorate upon the surface. A small quantity of oil put upon the extreme sides of the ink table will remove the friction and consequent heating of the rollers, keeping the latter in good condition.

3. There is nothing better to use as a covering for rollers, (when they are to be stored in a cabinet for an indefinite time); when a roller is covered with oil it is not only safe from drying out and losing its suction but will not be destroyed by rats or mice.

4. When rubbed into the tympan sheet of a platen press, oil prevents the sheet from wrinkling or warping when left over night or during long runs. It also makes feeding easier, as it reduces friction in feeding and delivery of stock.

5. A saving of ink in large press-rooms may be secured by soaking a proper sized strip of paper in oil and using this to cover the ink which remains in the fountain of the press at night or when not in use. The oiled paper prevents the ink from "skinning over" and thus effects a saving.

6. At the cutting machine an oiled rag may be rubbed lightly along the edge of the knife before heavy cuts are made and this will make such work easier where power is not in use and also lengthen the life of the machine by reducing the strain upon the working parts.

7. In the composing-room oil has many uses also, among these being the cleaning of composing sticks, rules, etc. These tools may be polished (when rusty) with a paste composed of oil and emery flour without fear of scratching or marring the smooth surface essential to good work.

8. A little oil rubbed over the face of a halftone or other plate to be stored away, will prevent corrosion of the face and keep it in clean condition.

9. Oil which is known to be perfectly free from impurities is also of value as a "first-aid" remedy, as it is very good in relieving burns, either from fire or acid, and also has healing properties when applied direct to fresh wounds, etc.

SUPPLEMENTARY READING

American Manual of Presswork. Published by Oswald Publishing Co., New York. 164 pages, size 8½ x 12½, illustrated.

Modern Presswork. By Fred W. Gage. One of the latest and best books on presswork. Inland Printer Co., Chicago.

Problems of Pressmanship. Published by C. B. Cottrell & Sons Co., New York. This work is out of print, but copies may be found in many libraries. It deals especially with the Cottrell flat-bed cylinder press, but its instructions apply generally to other presses of similar kind.

The Theory of Overlays. By Chas. H. Cochrane. Treating makeready of halftones and other forms for cylinder presses. Inland Printer Co., Chicago.

Concise Manual of Platen Presswork. By F. W. Thomas. Published by Inland Printer Co., Chicago.

Printing for School and Shop. By F. S. Henry. Chapter XIV. Published by John Wiley & Sons, New York.

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.

PLATEN PRESS WORK

1. When and how should a press be oiled?
2. What should be done to keep a press clean?
3. How should belts be cared for?
4. What should a pressman understand and what should he do to keep his press in repair?
5. What is the proper way to set a platen on a job press?
6. What is the difference in mechanism between the Gordon type and the Universal type of press?
7. How should a pressman care for his rollers?
8. How is a tympan prepared?
9. How should you prepare for and take the first impression?
10. How should you make sure that the grippers are properly adjusted?
11. What is a safe feed gauge and how should it be put on and adjusted?
12. What is the use of an underlay, and how is it prepared?
13. What is necessary in order to get a good overlay, and what is the overlay intended to accomplish?
14. What are press bearers for?
15. What may be done to keep the bearers in proper condition?
16. What causes a slur, and what can be done to stop it?

17. What causes a slur to appear on the upper side of a form when the page is enclosed in a rule, and how can it be stopped?
18. How is a frisket made and applied?
19. Describe what must be done to print and perforate with one impression.
20. What can you say about "short-cuts" in embossing?
21. What can you say about the use of ordinary platen presses for embossing?
22. Of what material should the dies be made and how prepared?
23. How is the press prepared for an embossing job?
24. What is a good embossing compound?
25. What care is necessary in embossing?
26. How is scoring done?
27. How is slipsheeting done?
28. How may slipsheeting sometimes be avoided?
29. Describe the process of bronzing.
30. How are the sheets dusted?
31. How should rough cover and antique-finish paper be handled when bronzing is required?
32. When should dieing out be done on a platen press, and when not, and why?
33. Describe the process of dieing out on an ordinary press.
34. Is there any difference between job press and cylinder inks, and why?
35. What is a good surface to mix colors on?
36. What is a good method to use in running a two-color job on coated stock?
37. What precautions should be taken in mixing inks?
38. How should ink tubes be handled?
39. How do you wash up on a Gordon press?
40. How do you wash up on a Universal style press?
41. How should stock be handled in feeding?
42. What is the process of printing on silk, cloth, or ribbon?
43. What is the process of printing on leather?

44. What is the process of printing on celluloid?
45. How is gold leaf printing done on silk badges?
46. What is the use of white inks, and what can you say about them?
47. Describe a process of printing with white ink.
48. Describe a process of printing with gold ink.
49. What are the peculiarities of copying ink?
50. What kind of rollers should be used for this ink?
51. What special points are to be observed in using this ink?
52. How would you wash up a press after a job done with copying ink?
53. When is double rolling desirable to get a good result, and when is double printing better?
54. How is three-color work done on a platen press?
55. How can you secure perfect register when running process plates two-on?
56. How should you care for quads which are used for gauges?
57. How can you test the covering power of ink?
58. Why is a metal sheet sometimes used in the tympan?
59. How is it used?
60. When is it desirable and when not?
61. What care must be taken in using it?
62. What is a good material for this?
63. How are overlays sometimes located under the tympan top sheet and how may this be done?
64. What difficulties occur in printing folded envelopes?
65. How can the best results be obtained in envelope work?
66. Describe a good method of makeready for the usual run of envelope work.
67. What should be done when a small corner card is all that is printed on the envelope?
68. What can sometimes be done in preparing a form to prevent rules from cutting the rollers?
69. When this cannot be done, how may the rollers be protected from sharp rule faces?

70. What kind of rollers should be used on jobs containing hair-line rules?
71. Tell how the tympan sheets can be securely fastened under the lower clamp.
72. What causes the platen to become low in the center, and how may this defect be remedied?
73. What is the usual method of printing cross-lined forms?
74. What other methods may be used?
75. How can deckle-edge stock be handled when fed to a gauge?
76. How can deckle-edge stock on the ordinary job be cut and printed successfully?
77. What device may be used to secure accurate register in two-color work on deckle-edge stock?
78. What is the older method of registering stock when any sort of irregular sheet is used?
79. What should be done every day before starting the press?
80. What rules should be observed in oiling the presses?
81. How should the tympan be prepared?
82. What should be done with roller wheels?
83. What should be the condition of the roller springs?
84. What care should be taken if the press is run by individual motor?
85. What happens if a job is made ready with too much impression?
86. What disadvantage comes from excessive use of the impression throw-off?
87. How should the speed of a press be governed, and why?
88. What care should be taken of tools used in presswork?
89. What care should be taken of tympan sheets?
90. What care should be taken as to chase and form?
91. What care should be taken with the form to get good register?
92. What should you look out for as to the grippers?
93. What precaution should you take before you begin the actual running of a job?

94. What should be done before piling the paper on the feedboard?
95. Give some important "don'ts" about feeding?
96. What points have you learned about washing type, rollers, etc.?
97. What is the advantage of using oil on rollers?
98. Whose business is it to see that the press is in good order when left for the night, and what is meant by good order?

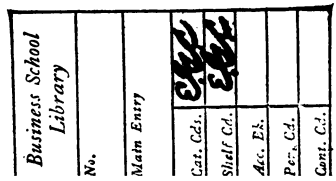
CYLINDER PRESS WORK

99. What does a cylinder press need in the way of oiling?
100. What should be done to a cylinder press in the way of cleanliness?
101. What care should be taken of belts?
102. What care should be taken of the motor?
103. What care should be taken with regard to repairs?
104. What adjustments should the pressman make and what should he not make, and why?
105. Why should rollers receive special care?
106. What should be done in putting on a new set of rollers?
107. When washing up the press, what should you do to the rollers?
108. How do you treat your rollers if you want to run a light tint job immediately after an ordinary black ink job?
109. What should be done with new rollers before putting them on the press?
110. What should be done with rollers not in use?
111. Why is there temptation to wash rollers with lye, and why should it not be done?
112. What may cause a roller to get bent, and what would you do if it does?
113. Describe the process of setting rollers.
114. Describe the process of setting the fountain.
115. What care should be taken with the grippers?

116. Describe the process of setting the grippers.
117. Describe setting the feed guides.
118. What is the first thing a pressman should do when he receives a form made up of type and halftones on wood bases, and how does he do it?
119. What is an underlay?
120. How is an underlay made?
121. Tell in detail how you would take a plate off a block and put it back again.
122. Tell fully how to pack a cylinder for book work.
123. Describe the packing for halftone work.
124. When printing engravings on dull-finish stock, what packing should be used?
125. Describe the process of makeready for a type form.
126. Describe the process of makeready for book work.
127. Describe the process of makeready for illustrated plate forms, specifying (a) underlay, (b) packing, (c) overlay, (d) completion of process after overlay is completed.
128. Describe the process of makeready for a form of type and halftones mounted on wood specifying (a) seeing that the form is perfectly flat, (b) treatment of vignettes, (c) underlay of plates other than halftones, (d) overlays.
129. Should the rule of running all plates type-high be invariable, and why?
130. What points should be observed with regard to bed bearers?
131. What points should be observed with regard to register racks?
132. What are some of the causes of slurring, and how may it be prevented? (It is suggested that the pupil be shown a number of sheets in which slurs appear and ask what is the matter and what would he do about it.)
133. How can you run two or more colors at one impression?

134. What kind of ink should be used (a) on machine-finish paper, (b) on S. S. & C. paper, when there are engravings in the form, (c) on coated paper?
135. What should you do if the nature of the stock makes it necessary to reduce the ink?
136. What is necessary in changing to colored inks?
137. What difficulty is sometimes met in working cover white, and how can it be overcome?
138. What reducers should never be used in cover inks?
139. What is the best thing to do when the ink does not work right, and why?
140. What care should be taken of ink cans, and why?
141. What often appears when zinc plates are used, and how may it be prevented?
142. What is the use of weighing scales in color work?
143. When should the ink be mixed by the pressman, and when by the ink maker?
144. What are some of the troubles caused by electricity in paper, and how may they be overcome?
145. How should paper be delivered to the pressroom and handled in printing?
146. What special methods should be used in handling coated paper?
147. What is the best way to turn a pile of sheets?
148. What precautions should be taken in running close-register work?
149. What can be done in running work-and-turn sheets that will assist the bindery?
150. What precaution should be taken if you have a long run with one or more copies on a sheet?
151. How can you do embossing on a cylinder press? Describe the first process.
152. Describe a second process of doing the same thing.
153. What kinds of embossing should not be attempted on a cylinder press?
154. How is scoring done on a cylinder press?

155. Describe the process of bronzing with a cylinder press and a bronzing machine.
156. How are feed guides tested for register?
157. What care should be taken of the zinc beneath the press?
158. What care should be taken of tools?
159. What should be done to the press, whenever possible, between long runs?
160. What should be observed about the ducter roller before starting the press?
161. How can you keep the packing from swelling in damp weather?
162. What do you need to look after with regard to the form on a long run, and what should be done about it?
163. What should be used as a tympan on long runs of work-and-turn job, and how?
164. What is liable to happen to the form during a run, and how can it be prevented?
165. What should you do if the paper gives off dust?
166. What should you have always at hand for overlay purposes?
167. How can you keep your overlay knife ready for instant use?
168. How should you look out for your fountain during a run?
169. How can you make a good transfer sheet?
170. What can you do if your tapes become slack?
171. What precaution should be observed in removing form rollers, and why?
172. What precaution should be observed in locking the chase on the press, and why?
173. What tools should a pressman have if he is to do good work on high-grade jobs?
174. How are printers' pastes made?
175. How many thicknesses of overlay paper are generally used in press rooms, and what is each used for?
176. Give nine important uses for oil.



TYPOGRAPHIC TECHNICAL SERIES FOR APPRENTICES

THE following list of publications, comprising the TYPOGRAPHIC TECHNICAL SERIES FOR APPRENTICES, has been prepared under the supervision of the Committee on Education of the United Typothetae of America for use in trade classes, in courses of printing instruction, and by individuals.

Each publication has been compiled by a competent author or group of authors, and carefully edited, the purpose being to provide the printers of the United States—employers, journeymen, and apprentices—with a comprehensive series of handy and inexpensive compendiums of reliable, up-to-date information upon the various branches and specialties of the printing craft, all arranged in orderly fashion for progressive study.

The publications of the series are of uniform size, 5 x 8 inches. Their general make-up, in typography, illustrations, etc., has been, as far as practicable, kept in harmony throughout. A brief synopsis of the particular contents and other chief features of each volume will be found under each title in the following list.

Each topic is treated in a concise manner, the aim being to embody in each publication as completely as possible all the rudimentary information and essential facts necessary to an understanding of the subject. Care has been taken to make all statements accurate and clear, with the purpose of bringing essential information within the understanding of beginners in the different fields of study. Wherever practicable, simple and well-defined drawings and illustrations have been used to assist in giving additional clearness to the text.

In order that the pamphlets may be of the greatest possible help for use in trade-school classes and for self-instruction, each title is accompanied by a list of Review Questions covering essential items of the subject matter. A short Glossary of technical terms belonging to the subject or department treated is also added to many of the books.

These are the Official Text-books of the United Typothetae of America.

Address all orders and inquiries to COMMITTEE ON EDUCATION, UNITED TYPOTHETAE OF AMERICA, CHICAGO, ILLINOIS, U. S. A.

PART I—*Types, Tools, Machines, and Materials*

1. **Type: a Primer of Information** . By A. A. Stewart
   Relating to the mechanical features of printing types; their sizes, font schemes, etc., with a brief description of their manufacture. 44 pp.; illustrated; 74 review questions; glossary.

2. **Compositors' Tools and Materials** By A. A. Stewart
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