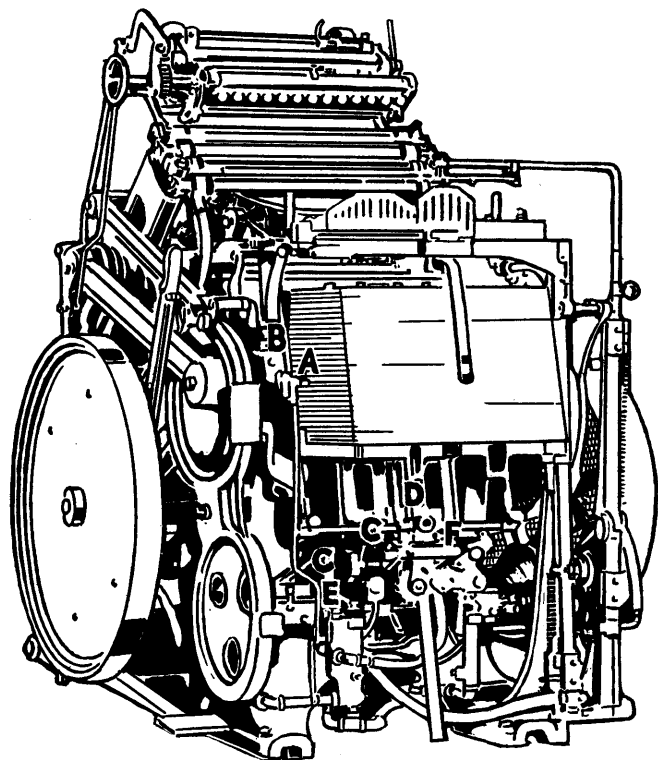

HANDBOOK
OF
**AUTOMATIC
PLATEN
PRESSWORK**

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OF
AUTOMATIC PLATEN
PRESSWORK

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Control A starts and stops feeding of stock. Control B regulates the air blast for different weights of stock.

Controls C are for raising and lowering the feed table. Control D is the regulating screw for adjusting the height of the stock pile. Control E provides intermittent or continuous air blast. Control F regulates position of sheet on platen.

THE CHANDLER & PRICE
CRAFTSMAN AUTOMATIC UNIT

10 x 15 and 12 x 18

P R E F A C E

IT is recorded that George P. Gordon saw what became the most popular printing press in a dream. His press, patented in 1851, met the demand which precedes and stimulates every invention.

In order to meet the increasing demand for an improved press Chandler & Price in 1885 built the C & P Gordon with more weight and strength for heavier impressions and better distribution of the ink. Patented depressible grippers and an impression throw-off were added for convenience and economy.

Continuous improvement kept these hand-fed (open) presses in the lead.

Just prior to the beginning of the present century it became apparent that hand feeding was not equal to the increasing demand for speedier printing machines. Automatic feeders for cylinder machines were invented and were further developed as they became quite generally adopted.

As early as 1903 a lad of nineteen years had invented an automatic sheet feed for the C & P Gordon press. It was patented, successfully demonstrated and offered to the Chandler & Price Co. in 1905.

At that time the low cost of hand

feeding and the high cost of a mechanical feeder made it inadvisable to build a self-feed C & P Gordon press at once, especially since there were several types of platen press feeders on or being prepared for the market and the acid test of time was required to prove which type is best.

Then came the World War with the consequent scarcity of skilled workers and rapidly advancing wage scales to create the demand for a better press and a better feeder than had been developed. The Chandler & Price Co. engineers again examined the Rice feeder and found that the nineteen-year-old inventor had designed in 1903 a feeder simpler than any since developed. It was only necessary to refine the movements, strengthen the parts and fit them to the C & P Gordon press redesigned for high speed and heavy impressions.

These refinements and improvements are now complete and The Chandler & Price Co., who have built more than one hundred thousand printing presses, are offering the printer the new C & P Craftsman Automatic Units, as distinguished in the job printing field as were their hand-fed C & P forerunners of yesterday.

I N T R O D U C T I O N

The various superior features inherent in the design and construction of the C & P Craftsman Automatic Units are discussed in this handbook of automatic platen presswork.

Outstanding are the methods of sheet separation, sheet control and positive delivery, which make these features of the Units the simplest and most effective ever developed.

As the vacuum and blast lines are fully protected against clogging and leaks and the sucker tips are the most effective device for separating and picking up sheets, the sheet separation is the best known. Air trouble is never encountered at this vital step of operation on the C & P Units.

As the platen is in a fixed position for feeding and as the stock pile is always the same distance from the bottom gauges on the platen, the travel of the feed bar is predetermined

so that the sheet is under perfect control without time-consuming adjustment of the feed bar. Equally trouble-free is the register fork, operated by a positive cam, which pulls the sheet to three stationary gauges in a down and over movement effective with all stock from onion skin tissue to twelve-ply cardboard, both inclusive.

The positive delivery is protected by the same trouble-free air line and sucker tips as the feed bar and by freedom of interference with the sheet by any fixed or moving part or of another sheet so that it is easy to feed up to twelve-ply cardboard.

A comparison of the sheet separation and control and positive delivery of the C & P Units with others is sure to convince one that this is the simplest, most efficient and versatile feeder on the market.

THE hand-fed (open) platen press becomes rarer with the increasing demand for speed. The need for a handbook of platen presswork, prepared not for the beginner but covering the operation of the automatic (self-feed) platen press of today, emphasized by requests for such a handbook, led to the preparation of this booklet.

When a platen pressman without experience on an automatic platen press is confronted with the operation of one, his first thoughts are about the order of sequence of the steps of the operation.

The order of sequence of the steps of the operation of the C & P Units is given in the first chapter and should

be memorized by the beginner and checked and double checked as the Unit is demonstrated the first time for his instruction. Other beginners in the past have found this foundation a distinct help in quickly mastering the operation of an automatic press.

A few operating aids are given in chapter two; not many are needed because the Units are so simple and efficient.

Chapter three contains an outline of the inherent superior features of the Units and in the final chapter are some hints designed to be helpful to the pressman by way of suggestion to the younger and perhaps refreshing the memory of the more experienced.

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I N S T A L L A T I O N

Unpacking — The unit was shipped from the factory with a minimum number of parts removed. While unpacking, each individual part should be examined in order to become familiar with its particular use on the unit, as at some time or other a job will come along for which this or that part was included in the equipment.

After the parts have been examined thoroughly, clean the grease from each item with kerosene or gasoline and finally wipe dry with a clean cloth.

Foundation — It is essential that the unit be placed on as solid a foundation as possible. The press must be level and each foot must rest solidly on the foundation, using shims

where necessary and then lagged to the floor.

Wiring — When motor equipment is furnished, a wiring diagram is included to assist the electrician. Particular attention must be given to the direction of the rotation of the motor pulley. This should be such that when facing the pulley of the motor the direction of rotation is clockwise.

The general practice is, if floor space permits, to place the control on the left side of the press so as to have easy access to the push button fastened to the side of the press and the fly-wheel foot brake. Enough room should be allowed between the controller and the unit for convenience of the operator.

C A R E A N D O I L I N G

Lubrication — Before the press is turned over either by power or by hand it should be thoroughly lubricated with a good grade of machine oil. A successful method to follow in oiling is to commence at the same place each time and continue around the machine until the starting point is reached.

Oil holes should be used where provided, but it is highly essential that every moving part be lubricated at a point of contact or bearing.

Particular attention must be given to the main and back shaft bearings, the bed shaft, the pump and the crankshaft bearings, and to the feed bar and delivery arm slides, both on the slides proper and on their bearings at the bottom. Do not forget that all the bearings of this machine are good, tight fits and in order for the press to function properly and without injury frequent and thorough lubrication at all points is an absolute necessity.

In addition to the regular machine oil, an occasional supply of No. 20 motor oil should be used on the feed bar and delivery arm slides and a good grade of ball-bearing grease should be used in the cam rollers and the saddle roller bearings.

Starting and Preliminary Running

— The press should be turned over several times by hand to make sure that all connections have been properly made and that there are no interferences. It can be operated under

power at slow speed and continually watched for bearings or moving parts getting warm.

The 10 x 15 press should not be run over 2500 and the 12 x 18 not more than 2000 impressions per hour for the first few days. The maximum speed can be used after the press has had a fairly good run-in.

During the preliminary running and before the feeding operations start, the feed bar and delivery arm should not be on the unit.

CHAPTER ONE

Operation of the C & P Craftsman Automatic Units

Order of Sequence

1. Place packing and tympan on platen; lock up form, place chase in press.
2. Ink up press and pull impression on tympan.
3. Set the gauges and get position O. K.
4. Make ready, fasten stripping devices in position and get O. K. to run.
5. Position stock pile; set side and back stock pile stops.
6. Set feed bar.
7. Adjust separator wires.
8. Set register fork.
9. Set delivery arm.
10. Raise feed table to feeding height.
11. Lock delivery table in position.
12. Start press under power.
13. Start feeding by dropping lever which closes vacuum line and opens blast. Set impression counter.
14. Adjust blast.
15. Set jogger arms.
16. Insert wedges in pile of stock if it is not level on top.
17. Adjust fountain and disc rotation.
18. Turn on electric heater or spray.
19. Start jogger (when it may be used without causing offset).
20. If close register, run 10 sheets through twice; if the register is O. K. run 100 sheets to be used for fall-ins to check register every so often throughout the run. This point cannot be stressed too strongly as it will more than pay for the time spent in knowing your register is correct throughout a long run.

Packing — The packing may include a sheet of flat, smooth, hard cardboard of about same thickness as post card and four or five sheets of 50-lb. s. and s. c. The sheets of paper used for packing should be clipped on all four corners and clamped like the tympan under the bails. Oiled manila tympan paper is the preferred draw-sheet.

Locking Up the Form — Instructions for positioning the sheet and the form are molded in, and guide lines for sheet and form scribed in the shorter ends of the chase. Generally the form is locked so the sheet comes

at the center of the platen or somewhat below the center.

Positioning the Gauges — After the packing and tympan are smooth and tight under the bails the press is inked up with a moderate supply of ink and the chase is placed in the press. Roller bearers never have to be used on Craftsman Units but the press grippers, generally carried close to the ends of the gripper bar, must clear the form as the first impression is pulled on the tympan.

The regular procedure used on hand-fed presses is followed to get the gauge margins of the sheet but the left lower gauge is set about one inch and the right lower gauge about one and one-half inches from the ends of an 8½ x 11 sheet when feeding the shorter end of the sheet to the end gauge at the left. The end gauge is placed one inch from the lower edge of the sheet when it is against the lower gauges. When feeding to the end gauge at the right the lower gauges would be in transposed positions. A third brass-tongue gauge pin may be used about one point below the lower gauge line, generally about one inch closer than the register fork to the middle of the sheet, when the sheets tend to buckle. On smaller and larger sheets the gauges are positioned in the same way, which is the best on the C & P Units.

The gauges on hand-fed presses have generally been set one-sixth of the length of the sheet from the ends

of the sheet. This method must be discarded on the C & P Automatic Units.

After position O. K. is obtained the next operation is make-ready.

Make-ready — A trial impression on a sheet of s. and s. c. on top of a sheet of the stock to be used on the job will show where extra squeeze is needed; if all over the form, the hand wheel at the rear of the press is used to increase impression. The hand wheel at the side of the press is used to equalize the impression on the top and bottom of the form. On some jobs no further regulation of impression is required. If necessary to use spot overlay, cut overlay and a cut-out (either one or more of these may be used), they are registered in the packing and when the final O. K. to run is obtained the necessary preferred stripping devices are placed in position.

Positioning the Stock Pile — The gauge bar is placed against one of the lower gauge pins when platen is open and the feed table is moved forward or backward by turning the hand wheel until the face of the feed table front stop touches the curved end of the bar. The stock pile is placed on the feed table and lined up approximately one-fourth to three-eighths inch inside of the gauge bar when it is in line with the end gauge.

Side and Back Pile Stops — The side and back pile stops are positioned to contact the stock pile.

Setting the Feed Bar — The feed bar is generally set so that the sucker tips are about one-half inch back from front edge of the sheet on top of the stock pile.

Setting the Delivery Arm — The delivery arm is set so that the sucker tips come down on the rear (top) edge of the sheet.

Setting the Register Fork — The register bracket is positioned so that the register fork is about one-third the length of the lower gauge edge of the sheet from the end-gauge end of the sheet and the fork should extend about one-half inch under the lower edge of the sheet. A finger clip is attached to the register fork and a blank sheet of stock placed from one-fourth to three-eighths inch inside of the end gauge and in contact with the lower gauges. The action of the register fork in moving the blank sheet when the operating arm at the left side of the platen is moved by hand shows how the fork will work when the Unit is operated under power. Generally when the spring clip is adjusted to give the proper tension to move a sheet of onion skin tissue to the end gauge without buckling no further adjustment is needed for thicker paper and cardboard as the clip adjusts itself to the various thicknesses of stock.

Feed Table — The top sheet on the pile of stock should be one-fourth inch or less below the lowest position of the feed arm suckers when over the feed

table so that when the blast is on, the sheets will be raised to the sucker tips.

The feeler or pile height regulator is adjusted by its regulating screw to raise the pile to proper level. The pile should not be too high lest the feed bar pick up more than one sheet nor too low lest it miss an occasional sheet. Heavy stock may be carried a trifle higher than light stock. For cardboard and paper more than one thirty-second inch thick the outer latch should be thrown out from the ratchet wheel, causing the table to lift faster, but thrown in for thinner stock.

Delivery Table — The delivery table can be locked in position when the feeder is operating. At any time it may be moved in or out of position when the press is running. No timing is necessary.

Starting the Run — When the stock pile is up high enough for feeding, the press can be operated. Feeding can be started by dropping the lever which closes the feeder vacuum line and opens the blast.

Blast — The adjusting screw is turned down to decrease and up to increase the blast.

On the heavier cardboard stocks a continuous and on lighter stocks an intermittent blast is used. Continuous blast is obtained by turning screw out of contact with valve lever.

If necessary to use the blast in spots, one or more of the slots in front of the top of the table may be

closed by turning the blast collar which surrounds the blast tube.

Jogger — The jogger is so simple that its adjustment to the sheet may be made without instructions. As the jogger is not used if offset is likely to occur if the printed sheets are moved horizontally on the pile immediately after delivery, the jogger arms are kept stationary by moving the operating lever on its pivot while the delivery table is not in the receiving position.

Stock may be moved from the delivery table while the press is running by swinging the back jogger arm out of the way.

Pile Wedges — The top of the pile of stock on the feed table should be

reasonably level in order that the feeder arm may function without interruption. Paper is affected by atmospheric conditions, more rapidly near the edges than in the center of the sheet, and the result is a sheet that is not flat but wavy. When a number of such sheets are stacked in a pile supported by a level base the top of the pile is not level. This condition may be controlled by inserting wedges of cardboard or wood in the pile to bring low spots in the top of the pile up to level.

If the stock is very wavy it is easier to keep the top of the pile level if a low instead of the possible 15-inch pile is placed on the feed table.

C H A P T E R T W O

Operating Aids — The feeder of the C & P Automatic Unit is simple and trouble-proof.

As there is no rubber hose in connection with the feed and delivery bars to develop mysterious leaks often hard to locate, and as the feed and delivery main air line tubes are equipped with filters, which may be removed, cleaned and replaced in a minute, no trouble due to insufficient suction (vacuum) is encountered.

If Feed Bar Sucker Tips Fail To Pick Up Sheets — This may be due to incomplete separation caused by —

1. Incorrect adjustment of air blast and separator wires.
2. Sheets welded together on the edges by dull knife of cutter.
3. Sheets in pile not cut to same size.
4. Sheets sticking together because of ink used on previous run.
5. Stock with porous or highly finished surface.
6. Static electricity in the pile on the feed table.
7. Top sheet of pile too far below sucker tips.
8. Top of pile not level.

The operator soon learns to regulate the air blast and set the separator

wires for successful separation of the various stocks.

Thorough rolling, winding and jogging of the lift before placing it on the feed table is the corrective when sheets are welded or stuck together and to some extent diminishes static.

Stock hard to separate because of its surface requires strong blast and concentrated suction which is discussed on another page under the head of "Feed Bar."

The elimination of static is a problem for the individual shop. The correctives are seasoning of the stock and atmospheric control.

The top of the pile must be high enough to allow the blast to raise the top sheet to the sucker tips.

The top of the pile should be level. Sucker tips above low spots do not seal as easily as those above the high spots so the feed bar can not properly function and either fails to pick up the sheet, or the tips above the high spots pick up the sheet and take it off the top of the pile at an angle instead of straight forward as when all tips are functioning.

If Feed Bar Picks Up Two or More Sheets — This is another result of faulty separation and the correctives

given for missing sheets are effective in stopping pickup of more than one sheet.

If Sheet Cuts Under Register Fork — If sheet cuts under the register fork a V should be cut in the tympan in front of the fork and the tip of the V slightly raised above tympan.

If Delivery Arm Fails To Pick Up

Sheet — The delivery arm is discussed on another page.

A rod is provided under the top edge of the platen to which hold-down wires may be attached to hold the sheet down on the platen until the sucker tips of the delivery arm take the sheet.

CHAPTER THREE

Noteworthy Features of the C & P Automatic Units

Helpful Aids for Economical Production — The C & P Automatic Units have unexcelled inking systems. The vibrating brayer fountain is used on the 12 x 18 and Craftsman fountain on the 10 x 15. The bib holding the blade drops away from the fountain roller allowing quicker wash-up. The fountain roller need not be removed.

An adjustment near hand wheel at the left end controls the movement of the fountain roller and may be quickly changed to give a throw of from one to four teeth on the ratchet.

When the fountain vibrator roller on the 12 x 18 is not needed it may be locked in a position up out of the way or may be locked out of contact position to run off a surplus of ink, for fifty or sixty impressions. The numerous screws on the fountain are in front so that the pressman can adjust them with a printed sheet on the platen and another on the delivery table and the form rollers and ink plate, all right under his eye. (Exceptional visibility and accessibility with outstanding ease of adjustment and control, saving time and trouble,

are features of the inking system and other parts of the Units.)

The ink disc is unique in that it is reversible to revolve either to left or right. The change is made in a few seconds by means of a knurled collar lock on a shaft beneath the disc which allows the driving gear to be thrown into either left or right disc gear.

The control of the ink supply by the fountain and the unique disc permits a selective supply of ink to the dimension of the form parallel to the fountain, heavy or light in the center or at either end.

While the Units are equipped with four form rollers, with a vibrator on both the upper and lower pairs to ink heavy forms, it is necessary to use only one pair, with or without vibrator, on lighter forms. Not to be overlooked is the fact that less ink is required when the vibrator is used.

An exclusive feature of the Craftsman press is the form roller pressure control by means of screw bolts which raise or lower the roller tracks. This must be used to be appreciated at its full value on vignette plates,

rule forms, machine cast forms and zinc line cuts with large open blank spaces and when using metallic inks. The roller tracks alongside the disc are also adjustable for height.

The lower pair of form rollers may be fitted with tripping trucks which hold these rollers off of the form on the descent but release them for form inking on the ascent.

A roller-saddle lifter is provided for use when removing form rollers from or replacing them on the press.

Impression Adjustment — The platen and rocker are a solid one-piece casting affording maximum impression strength and rigidity and there are no impression screws. Thus the platen can not be thrown out of parallelism to the form and is in a permanently adjusted position for feeding.

The impression is adjusted by hand wheels which control the position of the eccentric bushings in which the back shaft and the bed shaft are mounted. The impression load is not taken by the screws operated by the hand wheels.

By turning the hand wheel on the back shaft the bed is moved toward or away from the platen.

Turning the hand wheel at the left side of the press maintains accurate alignment between form and platen (keeps them parallel) while impression is increased or decreased. Indicators and scales are provided close to both hand wheels.

When both indicators are pointing

to zero on the scales, impression is set for printing an average form of about five square inches on 100-lb. coated paper with about .035-inch packing (equivalent to manila post card, five sheets of 50-lb. s. and s. c. book and a drawsheet of oiled manila).

When forms requiring more squeeze or thinner papers are being printed, or when less packing is used, the hand wheels are turned so the indicators turn toward the "In" marks on scales to increase the impression.

For thicker paper and cardboard, lighter forms or when using more packing, hand wheels are turned so that indicators move toward the "Out" marks on scales. After adjustment the locking screws should be tightened.

Feed Bar — The feed bar assembly is telescoped on the end of the curved feeding tube when the platen is open and the tube is in the forward position and securely clamped. A stop screw at the end of the feeding tube prevents a possible forward movement of the feed bar when running. The feed bar may be fitted with from two to six sucker tips. As many of these tips as are not needed may be shut off from the air line by plugs furnished for this purpose. It is necessary to have one sucker tip in line with the register fork. The choice of the number and location of the other tips depends on the size and shape of the sheet to be fed.

On light paper the suckers should be placed closer to the lower gauge

edge of the sheet on top of pile on feed table than on heavy stock. For heavy paper and cardboard the suckers are set back slightly and the separator wires adjusted accordingly.

Metal sucker tips are used on stock up to 24-lb. bond in thickness and on heavier paper, envelopes, etc., the rubber tips are used.

It may be necessary when feeding thin papers to cover the face of the metal tip with gummed paper and punch a hole one-eighth inch in diameter in the gummed paper.

The wires used to assist separation should be kept close to the sucker tips to avoid buckling of the sheet.

Brass fingers, extending in front of the feed bar assembly and used to hold down the curly front end of a sheet and also used as guide to register when using only two sucker tips, may be secured to the feed bar.

A rod to which hold-down wires may be secured is under the back edge of the platen.

Delivery Arm — The delivery arm is telescoped on the delivery tube. Both feeding and delivery tubes are fitted with filters which prevent clogging of the air lines. There are no rubber hose to develop mysterious leaks hard to find.

The rubber sucker tips may be used on delivery arm for most jobs; the exception is stock so light that it is drawn up in the tip, when the metal tip and gummed paper may be used.

When the sucker tips must come

down on wet ink to pick up the sheet triple naught (000) emery cloth with proper size hole is placed over the tip. The emery cloth may be glued on metal tips. A rubber cement, applied after it has started to dry, holds the emery cloth on rubber tips.

Feed Table — The feed table may be quickly lifted by grasping its back edge with the hand and lifting it part way, taking care it is not lifted too high and out of the bearing. The final raising is done with the handle.

The table is quickly lowered by grasping the handle with one hand, moving the ratchet out of mesh with the lever and controlling the descent of the table with the handle.

Automatic Throw-off — The press is equipped with an automatic throw-off which functions when the feed bar misses a sheet on the feed table.

There is no delivery throw-off but a delivery cut-out is provided. It is a small horizontal plunger valve near the bottom of the right side of the feeder near the delivery release valve. Its function is to break the vacuum so that when there is no sheet on the platen the suckers will not pull the tympan sheet.

Hand Feeding — The automatic feed table may be stopped from raising with the adjusting screw and used as the delivery table for hand feeding. The feed and delivery bar assemblies are removed. The delivery connecting link is disconnected. The delivery table is unlocked and removed with

the pivoting pin. A wooden table is provided for hand feeding, done as easily on a Unit as on an open press.

It will be noted that all settings and adjustments are positive. Nothing is left to chance or poor judgment.

The sheet is in full view from all angles at all times except when the platen is closed.

The air lines, equipped with filters, are trouble-proof to the highest degree.

Every part of the press and feeder is built to the same high standard that made the C & P Gordon the most popular and economical hand-fed press.

Both the feed and delivery tables are placed so that the sheet is in full view and the sheet, delivered printed side up, is where the operator can easily watch it. The delivery table is favorably located for the use of a sheet heater and a spray.

The register fork is a trouble-proof feeding device which may be adjusted when the operator is standing at either side of the press. The fork may be moved to any position as its bracket is adjustably mounted along the lower edge of platen under the gripper bar.

For right register the driving link is disconnected from the bottom of

the operating arm at the left of platen and connected to the top of the arm on the pin provided. The coiled spring is changed likewise. With the small bristol wrench loosen the hollow head set screw in the top of the register and twist the register to the right to a position of about fifteen degrees. The above instructions are of course reversed to change back to left hand register.

The register fork is a pull, not a push, register device and pulls the sheet to three stationary gauges in a down and over movement.

Any preferred device may be used to strip the sheet from the form as the press grippers and any accessory stripping device attached to them will not interfere with the feeding arm or delivery bar.

By comparison it will be found that the feeder is the simplest, most reliable and versatile and most completely trouble-proof and that it will function at the highest possible speed.

Make-ready is reduced to the minimum because of the exclusive impression regulation, the strength and rigidity of the impression and the superior inking system.

There are no timing arrows or other timing marks to watch as all movements are automatically synchronized.

CHAPTER FOUR

Lockup For the Platen Press — The stone should be clean before the form to be locked is placed on it. A wire brush is useful for removing bits of metal and other foreign matter from the bottom of the form after it has been locked up. The form should be locked in the center or two picas below center of the chase when possible. In order to prevent the form from rising from the stone, metal furniture is preferred and the straight-thrust quoin is better than the older sliding quoins which lock with a twist. If the latter must be used all available space for quoins should be utilized. Example: three pairs should be used on the side of an 8½ x 11 page form and two pairs on the foot of the page. Reglet is used on both sides of the quoins. The quoins near the top of the chase should lock toward the left and those at the bottom of the form toward the lower long side of the chase.

Wood furniture is not stable in dimensions. If it must be used in open or border rule forms, each rule should be flanked with high slugs and strips of solid metal furniture placed next to the four sides of the form.

The "L" arrangement of furniture is good when space permits. Otherwise the furniture at the foot of the page should be slightly shorter than its width and the furniture on the side a trifle longer than its length in order to get a secure lockup without binding. Pages of leaded lines yield more to the quoins at the foot than to those on the side of the page, the leads giving more than the ends of the lines. It should be kept in mind that wood units yield more to the quoin squeeze than leads and type and brass and steel rules yield less than type. Example: in locking up two columns of type or slugs separated by a brass rule, the columns must be longer than the rule else the quoin pressure will be on the end of the rule and thus be removed from the foot of the columns. This sort of a bind results in a bent rule which punches or even cuts through the sheet. This difference in yield must be kept in mind to obtain secure lockup without loss of time. It must be evident that secure lockup is not possible if bind is caused by a lead, line, reglet, rule, slug or piece of furniture which is too long, if wood bases are irregular in dimensions, if

furniture or chase are not true or borders do not fit.

If the units of the form are not rectangular it can not be locked up to lift without excessive squeeze, which causes the form to rise and springs the chase out of true. Machine cast matter is encountered which is wider at the top than the bottom, longer on the top than the bottom and higher on one end than the other. Halftones and electrotypes come mounted on wood bases irregular in length, breadth and height. A glance at the bottom of the form will note a bow which if not corrected will cause slur and possibly work-ups and pull-outs.

When locking up, the quoins at first should not be tight but have just enough contact to hold the form in position while it is planed down. Then the quoins are tightened to hold the form for lift and, with quoin key under a corner of the chase, the units of the form are carefully sounded. Any loose units are marked with bits of card for better justification.

The quoins bearing against the dimension of the form which yields more should be locked first and the quoins against the other dimension last. A page of leaded lines gives more to the quoins at the foot which should be locked first. If the quoins at the ends of the lines, where give is less, are locked first the quoins at the bottom are not fully effective. Failure to note the direction in which there is more yield and to lock the

quoins accordingly is the cause of some mysterious slurs, work-ups and pull-outs.

If the form contains plates or type not in condition to print because of very hard dried ink, it should be thoroughly cleaned before sending it to press. If lye is used all wood must be removed from the form. Some powerful detergents which may be used without removing the wood are benzol, carbon tetrachloride and acetone. The first two are frequently used to remove dried ink from composition rollers as well as plates and type. Crude carbolic acid (dead oil) is a very powerful detergent used to remove hard dried ink from ink plates, fountains, metal rollers, type and plates, but should not be used on composition rollers as it tans and rots them.

Make-ready Hints — After the gauges are set position O. K. should be obtained. Then the first trial impression may be pulled on a sheet of s. and s. c. and the next on a sheet of the same placed over a sheet of stock to be used on the job. Just the corners need print clear. The sheet is turned over and held at an angle to the light so that the impression on the reverse of the sheet may be studied before marking out for overlay. It is well to glance across the back of the sheet in both directions to note the peculiarities of the impression. For type, rules, zinc line cuts (everything except half-tones and

rubber plates), the impression is marked out on the back of the sheet. Even the edges of half-tones show on the back of the sheet and may be studied as an impression guide.

Marking Out — All corners printing clear are missed by the first mark, which takes in the space inside the corners. Succeeding smaller marks take in the spots further toward the center of the form. These concentric marks indicate the size and shape of the tissue overlay patches, which are carefully attached, smooth and flat, to the marked out sheet with Sphinx paste free from lumps. The marked out sheet, fed to gauges again, is stabbed with blade on three edges, the stabs penetrating the packing. The upper bail is raised, the tympan rolled back and the overlay sheet is pasted in register on the sheet of paper in the packing preferred. A blank sheet is removed from packing for each overlay sheet inserted. Another trial impression is pulled on stock to be used. Perhaps no further patching is needed or at most a few patches in spots will complete the needed impression. If not, another overlay is made and registered over the first.

Overlays for halftones and rubber plates are marked out on the face of the sheet with carbon paper beneath it. This marked out overlay should be registered on the bottom sheet of packing and cut overlays should be registered on it.

Mechanical cut overlays are economical because they can be prepared in less time than a hand cut overlay. Directions come from the manufacturers. Point to remember about chalk overlay: heat the overlay board to drive out moisture before pulling the impression to be etched. The card will swell in the etching solution, but after it is removed it will shrink as it dries but no smaller than when heated. Because all of the form is printed at once, heavy cut overlays are not suitable for the platen press as excess pressure in one spot results in bear-off in another.

The cut-out is a time-saver in making ready large solids; it improves the print and yields with the overlay a thorough make-ready that makes possible good coverage without excess ink, thus avoiding offset. Also the edges of the plate are not punching on the reverse of the sheet to scratch ink from the face of the next sheet. The cut-out is used to advantage on large letters, heavy rules, etc., as well as solid plates, to remove squeeze from the edges and place it in the center. An impression is pulled on paper or thin card and is then cut out of the sheet, cutting a point inside of the edges with a bevel outward. The cut-out is pasted in register on the sheet next below the tympan.

Platen Press Inks — For high-grade work special platen press inks must be used.

Because all of the form is printed

at once the ink should be as stiff as the paper allows and as short as can be properly distributed. All possible pigment should be used to obtain the heavy body needed instead of getting it with gums and heavy varnish. Inks with maximum pigment go further and yield a better print without mottle and offset.

Of course for cheap work the cheaper inks may be used, as news ink on news print, book ink on uncoated book, poster ink on poster paper, etc. For nice work either a good grade of platen press job or half-tone ink or a mixture of the two may be used on antique book, index bristol, railroad board, etc. For enameled coated paper platen press half-tone ink and for dull and semi-dull coated, dull platen press half-tone inks are used. Should picking occur, soft reducing half-tone ink softens the half-tone ink without greatly weakening the color. Japan driers should not be used as they tend to make the ink tacky. A paste drier for light colored and cobalt drier for dark colored inks and black are better. As platen press inks generally dry promptly, drier should not be added unless necessary and then a half ounce to the pound gives all the help a drier can; an ounce to the pound is the limit. Very often slow drying is due to low temperature or excessive humidity and when this is corrected the ink dries promptly. Rag bond and ledger papers require a heavy bond

ink. Job or half-tone ink works well on sulphite bonds.

Tints — There are three sorts of tints: opaque, to hide the color of the paper; translucent, for use where the color of the paper need not be hidden, and transparent. The opaque tint is mixed with titanium cover white as base. This is the best cover white, but two or three impressions without moving the gauges may be needed to get a good white on black or dark colors. Aluminum cover ink has the best hiding power among printing inks. The first impression should be well set but not bone dry before the second "bump." Many colored cover inks are merely tinted cover white since there are few opaque colors; there is no opaque blue and English vermilion, the only opaque red, is costly.

Mixing white, mixing magnesia, gloss white or a combination of two or all of these may be used as base for tints not required to be opaque and not to be used on coated paper.

For transparent tints on coated paper, alumina hydrate ground in linseed oil varnish is the best and safe tint base. When mixing tints caution is in order at the start lest too much colored ink be added to a large batch of tint base. A small trial mix is safer.

The simple tints made by adding a color to white are easy and a great variety is made possible by adding blue, red, yellow or green to the original simple tint. Good tints for

use on coated paper are made by adding process red, process blue and transparent process yellow to alumina tint base. This tint base with process or half-tone black yields gray, which may be altered with the colored process inks to afford a number of gray tints.

In mixing and matching tints, shades and colors the task will be easier if the effect produced by the principal colors is realized and always kept in mind. Black can not deepen a color; it tends to make it muddy or dirty looking. White can not add light or brightness to a color; it can only make it paler. Yellow adds brightness and red adds warmth to a color. Blue makes a color cold. In green, a mixture of blue and yellow, are seen the coldness of blue and the brightness of yellow. A purple mixed from red and blue will be warm or cold according with a preponderance of red or blue. When a mixed color of unknown origin is viewed for the first time, careful scrutiny may note whether there is white, which would produce a pale cast, yellow, which would make a bright mixture, red, making it warm, or blue with its coldness, in the unknown mixture. In order to study the effect of added colors in a mixture, make a simple brown by adding black to deep orange chrome yellow, which should then be altered by adding to different portions, yellow, red, blue and green.

Yellow is deepened by adding purple, red by adding green and blue by adding the burnt sienna shade of brown instead of using black to deepen them.

Care of Printing Ink — Inks generally reach the printer with a strip of gummed tape around the bottom of the lid of the can to keep the air out. After the tape is removed, if the lid can not be easily raised, insert a thin blade between can and lid and, holding the blade against the can, work it around until the lid can be removed without breaking it or spoiling its fit over the can. Rub vaseline on the inside of that part of lid that surrounds the can so that it may be removed easily in the future. After a withdrawal of ink from the can, the remaining ink should be leveled and covered with a piece of paper smeared with vaseline. The lid is replaced and gummed paper should be stripped around the can where the bottom edge of the lid surrounds it, just as when received from the ink maker. You will be pleased to find this keeps the ink from going to waste in the can a long while.

Ink that has picked up a lot of lint and dirt from the paper and the air during a long run should not be put in a can with clean ink but kept in a separate can for use on a cheap job. Dirt in ink may be kept at the minimum if the entire circumference of the steel fountain roller is carefully washed to remove all dry and gummy

ink and any skin on top of the ink in the fountain removed each morning before starting the run and the fountain kept covered night and day. Dirt gets on paper in transit from the mill and by watching for it when opening the case or other container, the dirt may be removed with the wraps and kept out of the stock. A dull knife makes more dirt and dust on the cutting machine than a sharp one. By careful jogging and keeping the table of the cutting machine clean, much dirt may be kept from getting into the stock. The pressroom floor should not be swept while presses are running.

Multicolor Printing — In two-color printing on coated paper it is better to print the black or dark key plate first and overprint it with a transparent colored ink. The black is run full strength and thus it is easy to get the proper effect with the colored ink. If the color is run first and varies toward light or dark, this can not be corrected with the black. By adding paste drier to the overprinted color prompt drying is obtained but if the color is run first with a retarder in it so that the black will take well, drying will be delayed. If we run the color first with drier in it, drying may crystallize it so that we may have to add wax to the black to make it take. One will have little trouble with overprinted ink on black half-tone ink if the colored ink is mixed from process colored inks and alumina hydrate tint

base. Register trouble also is minimized by running the key form first.

Whenever possible it is easier to run the black or key form first in four color process work. After position O. K. on this form one need have little register worry. The black will not crystallize and with paste drier in the last color all the colors will set well.

Some ink makers state they now make process inks practically trouble-proof, i. e., they need no conditioning by the pressman against crystallization, slow drying, poor trapping, etc. If such inks are not available it is well to add a half ounce of lanolin to the pound of ink. No lanolin is added to the last color but instead a half ounce of paste drier to the pound of ink unless it is black when the same quantity of cobalt drier is added. If a high gloss is wanted, a half ounce of gloss drying varnish is added to the last color.

It is necessary to keep close watch on the ink that it leaves the form clean after each impression and neither piles on nor fills the plate. This must be watched when overprint varnish is to be printed over an ink. The ink must have a homogeneous surface if the overprint varnish is to be smooth. The ink should be quite dry before overprinting the varnish. The sheet heater and spray are great helps.

Scoring, Perforating, Embossing and Die Cutting — Scoring is better done with the grain when possible and almost any rule or combination

of rules can be used to score a strong, long-fibered stock. It is the weak, short-fibered papers and boards that are hard to score without cracking at the score. For such stock proceed as follows: tack a piece of nonpareil reglet on the edge of a five-pica piece of wood furniture slightly longer than the scoring. Lock up in chase with reglet down. Ink the edge of the furniture and pull a good impression on the tympan. Place a piece of soft copper wire slightly longer than the score in the center of the print on tympan endwise. Get it straight and in the center with a piece of rule and then secure it with gummed kraft tape. Pull an impression or two by hand to make sure the wire indents the wood without slipping. The stock is fed with its reverse side on the tympan so that the scoring is outward. This has solved many scoring problems.

In order to use perforating rule in a form without cutting the rollers, the perforating rules should be less than type high. If there is no way to shave or grind it off on the bottom, the rest of the form may be underlaid to make it higher than the rule. A sharp, clean perforation is obtained by overlaying perforation print on sheet next below tympan with a strip of shimming brass. The sheet will strip from the form if the rule is parallel to the platen and just the right squeeze used. Extra brass-tongue gauge pins close to rules below lower gauge

line help to strip the sheet from the form. Dealers can supply perforating rule .916 inch high.

Cold embossing is often necessary. After a type form or other form with movable units has received an O. K. it should be electrotyped and the embossing die made from the electro. For a cheap job a deeply etched reverse zinc plate will serve as a female die but a brass die is used for a good job. Perhaps the quickest and easiest method of cold embossing is to glue or shellac a piece of automatic repressed felt blanket on the platen, black side up. An impression is pulled on the blanket and the parts not needed chamfered away.

An electric heater which wires to regular light socket is available for hot embossing. A die may be made on a piece of cardboard glued on platen over which is spread compound carried by dealers or barytes and silicate of soda may be mixed to form a putty-like compound. The die is chamfered and allowed to harden. Silicate of soda over any die (hot or cold embossing) will make it stand up longer. It is hardly necessary to state that all the care spent on an embossing job ends in disappointment if register is lost, so it should be checked at intervals when printing the form which is afterwards to be embossed. A tack may be stuck in the furniture so that part of its head prints on the edge of the sheet as a check on the register.

Die cutting and creasing is done by using a sheet of saw steel on the platen. The design is drawn or traced on wood and jig-sawed out for the rules, which can be had in standard heights. Strips of rubber or cork are glued on the wood on both sides of the rule to make stripping of the sheet from the form easy; the longer dimension of these strips parallels the rule. By another method a piece of rubber with cement on its face is fed to gauges and an impression pulled of the rule form. The rubber sticks to the wood and air holes are punched in it. This saves time on a large form which otherwise would require the cutting and gluing of many small bits of rubber on the wood.

Make-ready is with overlay under the sheet of saw steel, which is fastened to platen with countersunk screws.

Printing From Rubber Plates — The wide use of rubber plates has made many printing problems easier. All hard, rough uneven papers are better printed from rubber and the appearance of the surface of the paper remains unaltered, which is impossible when it is crushed by a metal form. Surfaces other than paper, hard or impossible to print from metal form, are easily printed from rubber, such as celluloid, cellulose tissues, wood, metal sheets, fiber and glass. Make-ready is easier and ink consumption 25 per cent less with rubber forms. Coverage is better and

as no embossment shows on the reverse of the sheet there is less offset. Rubber casts of the smallest type and half-tones as fine as 110 line screen are practicable. A very light impression is used. An overlay has a spreading effect on a rubber plate absent on a metal one. Gasoline and kerosene are not used but a mixture of alcohol and benzol is a good wash for rubber. Overlays are marked out on the face of the sheet with a carbon sheet beneath it, same as for half-tones.

Imitation Typewriter — This is often done by printing through China silk of same mesh as typewriter ribbon stretched between grippers. Another method is to place the silk over the form, running the ends down under the furniture. Silk should not be too tight over form to avoid premature wear. Some wet the silk with Sphinx paste and when it is about dry pull an impression to set the silk in the form. A third and the best method is to cover the bottom form roller with silk, not using the vibrator. The silk is not lapped over but sewed with the edges meeting. This gives a good imitation and is the quickest method if silk is kept on the roller and uses less ink.

Preventives of Slur — A blur or slur is a common trouble and much time is lost in preventing this blemish. Some causes of slur are (1) platen not parallel to form, which might be caused by printing a form with light units at the bottom of the chase and

heavy ones at the top without advancing the upper part of the bed with the hand wheels; (2) lumps or wavy sheets of cardboard or other material in the packing, or tympan and packing paper not drum-head tight under the bails. Pressboard often becomes wavy and a flat sheet of aluminum is preferred; (3) lack of thorough make-ready, especially on rule forms. Light rules in a type form will print when less than type high, a two-point face rule prints type high and heavy rules require more squeeze and if an assortment of these and type are all given the same squeeze, slur is likely to show on some unit. It is well to study the impression of a rule on the reverse of the sheet from its side in order to overlay it so that it will print uniformly throughout its length. (4) Perhaps the most common cause of slur is a springy form and chase which give under impression. To check on this one should glance down between the bed and form when placing the chase in the press, also noticing later whether the form or chase move under impression. All slurs look worse if an ink too soft for the stock is used and on hard papers a very soft ink gives the appearance of a slur. (5) Ineffective stripping of the sheet from the form may cause slur. As the sheet should start to leave the top of the form (next to ink disc) first, the stripping devices should be arranged accordingly.

Sometimes a stubborn slur is caused

by a rule border, flanked by a wide open space inside, at a right angle to the grippers. If the sheet has some margin, stripping fingers or brass rule secured to the grippers or bits of rubber or cork on a cross stripping device like the above or a string are effective. In the case of all forms surrounded completely by borders the first and by far the most important step is to make the border level and type high.

Wavy paper in itself will cause slur if the sheet is not properly stripped from the form.

At times the pressman may be puzzled as to the cause of the slur.

If a flat sheet of stock other than that used on the job shows no slur, it indicates better stripping is needed; but if the test sheet shows the slur, it indicates the cause lies elsewhere. Sometimes the platen is out of parallel with the form but oftener the cause is found to be a springy form or chase or incomplete make-ready.

Mottle In Ink — A frequent cause of trouble is a mottle in the ink. In some shops the attempt is made to use cylinder machine inks on the platen press and this is a common cause of mottle; the platen press requires a stiffer, heavier and shorter ink.

Some printers use inks of extra good quality made especially for platen presses and find it is economical because there is less trouble from offset and sticking as less ink is re-

quired to cover and for the same reason the consumption of ink is less.

Too much reducer is often used because of insufficient make-ready and ineffective stripping. Mottle is most common on forms with solid plates and very often the attempt is made to print the solids with surplus ink and scant make-ready. Too much ink of itself will cause mottle. After a solid plate is made level and type high and thoroughly made ready with overlays, the impression should be strengthened in the center and removed from the edges with a cut-out. It is then possible to print with less ink and the better the ink, the thinner the film that can be carried and get coverage. This also makes stripping less difficult. As the sheet leaves the upper edge of the form first, the stripping should start near the top. If the stripping devices start to peel the sheet from the bottom of the form first, the result is slur, sticking and sheets on the rollers and it is folly to try to change this by reducing the ink.

Caking Of Ink On Plates — When ink cakes on plates it forms a surface when printed on paper unfavorable to the reception thereon of other inks or overprint varnish. This fault is common with inks containing pigments of high specific gravity and low oil absorption. The form must be watched in plate printing as carefully as the print and if the ink starts to cake and pile on the plate a little

alumina hydrate tint base or mixing magnesia should be mixed with the ink and some No. 3 varnish if there is a tendency to mottle.

Printing With Metallic Inks — Aluminum ink has been improved so that it may be bought mixed in the can ready to use. It may be bought with body suited to paper on which it is to be used, as aluminum cover ink, or softer for use on coated paper. Gold ink is best mixed just before it is to be used. On cover and other absorbent papers it is necessary to make two impressions, the first in a base size. When it is well set, but not bone dry, the metallic ink is over-printed. Sometimes one impression will pass on coated paper but generally it is necessary to make two impressions in metallic ink, allowing the first to become well set before superposing the second. The first impression is moderately inked.

It is well to make ready with a light ink like orange as the metallic ink may dry on the press. Excessive squeeze should be avoided and the make-ready should be thorough and complete. The rollers should be firm and resilient and neither hard nor soft. Set them with the orange ink on them and the vibrators off so that the outlines of the form may clearly be seen in the film of ink on the rollers as they pass up on to the ink plate after having inked the form. If the outlines can not be seen or are very faint, the roller contact is too light

and the rollers can not function. The outlines will be squashed if the roller pressure is excessive and the rollers should be raised. This is the guide to form roller setting for all ink. For metallic inks the vibrators should be in firm contact with the form rollers. If a metallic ink lacks luster there is too much varnish for the powder and if it piles on the edges of the form very much, the powder is in excess.

Kerosene As Reducer — Besides being the best wash for use on composition rollers kerosene is an excellent reducer when it is necessary to decrease the tack of an ink that is picking and no soft reducing ink is on hand. It has no superior at any price for this purpose. The best grade of kerosene is used. Petrolatum is useful for the same purpose when the body of the ink must be retained. Of course these reducers, like all others, should be used sparingly because any such addition to the ink tends to weaken the color.

Numbering Machines — Some numbering machines do not work freely if locked up very tight. On a long run the packing where the plunger strikes should not be soft and spongy else it may be hammered down by the plunger until it finally meets with insufficient pressure to operate it. If numerals are not well inked use a soft bottom roller.

The ordinary numbering machines answer very well if used on jobs that include a gathering operation when

the high numbers are on top of the piles. Otherwise the machines that number backward are preferable. There are many time-saving machines for specialty printing not in general use and when confronted with jobs apparently difficult to number economically the printer should consult the machine manufacturer. Among special machines are the plungerless model, the skip machines and those with plunger striking in the margin or off the sheet.

Proper care of the machines will save spoilage and lost time on the press. When a run is finished the machine should be washed with gasoline and a wire brush by turning the numerals until all are washed and the machine should be placed in kerosene (best grade) until needed again. Before sending the machine to press the kerosene should be washed out with gasoline or benzol and oiled sparingly in holes when all wheels have the 4 up.

Ink Trouble — Probably more work is spoiled due to ink trouble than any other cause. Because of the demand for high speed, inks are expected to set and dry rapidly and many printers imagine this can be accelerated by adding a generous quantity of drier. This is an error which results in making the ink sticky so that it piles on and fills the form and causes picking and offset. The ink maker so treats and compounds pigments, varnishes, driers, wax, etc., that the ink will

work well and dry in from three to twelve hours. The printer can not hasten drying except with heat, which assists absorption by the paper and penetration of the ink. Moisture is driven out of the paper, which absorbs the ink instead, and the ink is made thinner and more fluid so that it gets into the paper faster. Heat is more effective with absorbent papers. If ink can penetrate and set well no drier need be added if the room is warm and superposed inks will set and take well.

If the ink does not penetrate and is not absorbed but remains on the surface, trouble may be looked for, either chalking, sticking, offset, or failure to take on preceding color. Proper setting leaves the ink open as well as the paper with a soft, velvety finish on which following colors take and lay well.

Quick setting is best obtained by using an ink strong in pigment and running the thinnest film that will cover. A compound that helps an ink to set quickly and minimizes offset is composed of paraffin wax and lanolin, equal parts, melted together. A half ounce of this mixture and a half ounce of corn starch in a pound of ink helps it to set and keeps down offset — but the best safeguards are ample heat, absorptive paper, ink strong in color, thorough makeready and a very thin film of ink.

Sheets likely to offset should not be jogged and should be moved care-

fully. Solids should be made ready with a cut-out in addition to the overlay to avoid embossment of the edges of the plate on the reverse of the sheet which causes offset by scratching the wet ink on the face of the next sheet.

The spray is invaluable in superposing one ink on another where the sheet heater is not so effective.

The printer should not consider drier an offset preventive and a quick setting and drying compound for it is neither. It is a safeguard against too long delayed drying, insurance that the ink will dry in a reasonable time.

Offset and sticking are often caused by ink too heavy for the paper, too much ink and static electricity. The static holds the sheets together so that the air cushion is absent.

Too much squeeze can cause picking on coated paper by breaking the coating.

When running color work on unknown paper the ink maker should be given a sample so that the inks may be suited to its surface to avoid picking, filling, offset, poor trapping, excessive gloss and too hard drying, commonly called crystallization.

If colors are superposed on others not well set the print will be dead and flat without snap.

Sometimes an ink is encountered that dries too fast on the press and causes filling and caking. It may even be necessary to wash up because the ink has dried on plate and rollers.

A half ounce of lanolin to the pound of ink checks too rapid drying.

Registering Print On Card Quickly

— When a sheet of paper printed in one color is used to set the gauges for the second color, slits may be cut in the print or it may be made transparent with gasoline before placing it over the print of the second color on the tympan to determine the position of the gauges; however, this is not practicable with very thick cards, in which case a sheet of tissue may be pasted near its upper edge to the tympan close to the upper bail. The tissue is then smoothed out downward on the tympan and a print of the form made on it. The card is then placed under the tissue to set the gauges.

Registering Underlay or Interlay On Back of Plate

— Sometimes an underlay between a plate and patent base or an interlay between plate and wood base is hard to register because of the shape of the printing surface of the plate. Slits in the underlay permit matching with points in the face of the plate. The underlay is then creased on its edges over the four corners of the plate. With these four angles as guides the underlay may be squared and pasted in the center of the back of the plate and the close approach to register needed is obtained.

Driers — If driers were not added to inks drying would be too slow for further operations after the first color is printed and in the case of single

color prints delivery to the customer would be too long delayed without prompt drying in a few hours or over night. (Special inks are made to dry with heat almost as soon as they hit the paper. A number of such inks are on the market and further research is expected to yield a complete line of these especially quick drying inks, which are made from different vehicles than regular inks.)

Most ink is still made to dry in a few hours, as most jobs do not require quicker drying. The ink and drier are made for use at an average temperature and average relative humidity and drying is retarded in a damp or cold room. The drying is a chemical reaction and theoretically the speed of the reaction is about double for every twenty degrees rise in temperature. The printer knows that a temperature of from seventy-five to eighty degrees favors drying.

Japan driers tend to make ink sticky so are not used in platen press inks. Cobalt driers are used in black, dark colors and white, and the lead-manganese driers are favored for the light colors. Some pigments as chrome yellows, chrome green, bronze and Milori blue and umber are natural driers and need little added siccativ.

Tints Under Half-Tone Prints

— The rubber plate prints solids so well that the custom of putting a tint on paper and then overprinting a half-tone is being revived. Such tints add life and beauty to the half-tone print.

With rubber plates uncoated paper may be used. The plates are not costly and may be made in standard sizes, stored after the first job and used later. Tints of cream and buff are pleasing under black and other tints may be used to advantage. Brown and violet half-tone prints are improved by a tint ground.

Duotypes and Duographs — A duotype is a print from two half-tone plates made from the same negative and etched differently. One half-tone, etched flat, is used as a tint block and the other re-etched half-tone is printed in a full-strength ink. The harmony may be that of analogy when the tint is made with the full color as base or it may be that obtained by contrast of color between the two prints.

A duograph is a print from two half-tone plates made from the same copy but with the screen at different angles. Either a full color ink and a tint of it may be used or inks with contrast of color. The great possibilities of these two-color prints may frequently be noted on magazine covers. Persian orange and green-black is a favorite combination.

Grippers and Other Stripping Devices

— Sometimes the press grippers are bent to strip a sheet from the form but this is a mistake. At all times the grippers should be flat at impression. If stripping is ineffective, sandpaper may be glued on grippers or cross stripping devices may be used.

When a printed sheet is to be em-

bossed it is easier to get register if, after the male die is made, cardboard is placed on the unused part of the platen of about the same thickness as the die. When the tympan is secured under the bails it is smoother and there is less tendency to draw when the force and the sheet meet the female die. The press grippers should be left off of the sheet but a cross stripping device may be used.

Sometimes an all around border is embossed on a letterhead sheet, 8½ x 11 inches, with paper margin of a nonpareil or less outside the embossed border and stripping is difficult because of the edge of the die. Little pieces of rubber or cork in the unused portion of the female die will push the sheet off and make stripping easy.

On the common run of commercial work in a single color it matters little what stripping devices are used, but when a register job comes along it is well to check on the stripping device in use by printing a sheet twice occasionally. Some pressmen keep the press grippers off of the sheet and use cross strings or a web of strings when possible and when strings can not be used auxiliary grippers are fastened on the press grippers. Whatever device is used should be checked at intervals on a register job.

Overprint Varnishing — Overprint varnishing has come into general use. Surface coated stocks are suitable. Either metal or rubber plates may be

used. The choice of ink is important. It must cover and leave the plate smoothly without caking or piling and the ink must transfer cleanly to the paper, leaving the plate clean after each impression and lying in a homogeneous film on the paper; otherwise the varnish film can not be satisfactory. Enough ink must be carried to cover and two impressions of some inks may be necessary on some papers. The ink must not be just well set as when overprinting ink, it must be dry before overprinting varnish.

The makeready should be thorough and complete, after inking up in a light ink. An excess of varnish should not be carried to avoid sticking. After makeready the fountain should be set until the varnish almost but does not quite cover, then opened up until it covers without excess varnish. By holding the sheet to get suitable light, the coverage of the varnish may be seen. Perhaps just a patch of tissue in spots will correct the coverage without using more varnish.

The best overprint varnish gives less trouble but all must be watched very carefully. The sheets should be delivered into shallow racks and "woke up" every few hours. In two or three hours the lifts first varnished should be examined and if the sheets make a swishing noise when separated, the varnish is sufficiently set to require winding and in another two or three hours they should be

winded again. If the right quantity of varnish is used the sheets should be left to dry about twelve hours or over night after winding shows no danger from sticking.

If the sheets in the first lifts show no tendency to stick, the varnish may be going into the paper because the ink is not dry or does not completely cover the surface under it. The varnish appears spotty instead of uniform when this is the trouble.

If the spotty appearance is not due to poor coverage but to the varnish sticking to the next sheet so that it is pulled off, too much varnish is being fed. The feed should be decreased and the proper coverage obtained by more thorough makeready.

Varnish is affected by changes in temperature and relative humidity. Dampness and cold delay setting and drying; excess heat thins the varnish and the anti-sticking wax in it and may cause the varnish to dry on the press. At the first sign the press should be washed up as strong detergents like benzol or carbon tetrachloride will be needed if the varnish dries hard.

It is not practicable to say how many sheets should go in a rack or how often and at what intervals winding is necessary because of varying conditions with which the pressman becomes familiar as he proceeds. At the start he must be very careful until he knows his varnish as he does his ink.

Inexpensive Paneling — The panel of size wanted is cut out of a hard card like pressboard. A sharp knife and a rule are used to get straight, smooth edges which must not be torn. The frame of the cut-out is glued on a wood base which is underlaid to make the frame about type high when it is locked up and put in the press. The cut-out is put in the frame or panel and coated on the face with glue, run on the impression and allowed to remain until the glue has secured it to the tympan. After a few

trial impressions to make sure everything is alright, another thin, tough tympan is put on over the panel die and clamped under the bails.

Paneling on short runs is sometimes done with a frisket of heavy ledger as when a portrait, part of a square half-tone, larger than an oval, must be printed in the oval. After makeready the frisket is secured to the grippers and cut so that just enough of the half-tone to fit the oval is printed through the frisket. This print will have an oval panel effect around it.